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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
12/413,722 03/30/2009 Yong-jin KANG 2456.1058 9676

21171 7590 10/19/2016
STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

STEINBERG, JEFFREY S

ART UNIT PAPER NUMBER

2622

NOTIFICATION DATE DELIVERY MODE

10/19/2016

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail@s-n-h.com

Notice of Abandonment	Application No.	Applicant(s)
	12/413,722	KANG ET AL.
	Examiner	Art Unit
	Jeffrey S. Steinberg	2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. Applicant's failure to timely file a proper reply to the Office letter mailed on 15 March 2016.
 - (a) A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
 - (c) A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
 - (d) No reply has been received.

2. Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) The submitted fee of \$_____ is insufficient. A balance of \$_____ is due.
The issue fee required by 37 CFR 1.18 is \$_____. The publication fee, if required by 37 CFR 1.18(d), is \$_____.
 - (c) The issue fee and publication fee, if applicable, has not been received.

3. Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) No corrected drawings have been received.

4. The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33(b). See 37 CFR 1.138(b).

5. The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.

6. The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. The reason(s) below:

 A message inquiring about Abandonment was left in the General Mailbox of STAAS & HALSEY LLP at 12:45 ET on 10/8/2016. At the time of this posting no reply has been received

/ILANA SPAR/ Supervisory Patent Examiner, Art Unit 2622	/Jeffrey S Steinberg/ Examiner, Art Unit 2622
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Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.



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Office Action Summary

Application No. 12/413,722	Applicant(s) KANG ET AL.	
Examiner Jeffrey S. Steinberg	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 01 December 2015.
- 2a) This action is **FINAL**.
- 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-5, 8-18, 21-26, 28-30, 32, 34-36, 38 and 42 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-5, 8-18, 21-26, 28-30, 32, 34-36, 38 and 42 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 8-18, 21-26, 28-30, 32, 34, 36 and 38 have been considered but are moot because the arguments do not apply to all of the references or citations used in this rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

- i. Determining the scope and contents of the prior art.
- ii. Ascertaining the differences between the prior art and the claims at issue.
- iii. Resolving the level of ordinary skill in the pertinent art.
- iv. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

2. Claims 1, 14, 28-29 and 34 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent to Liberty (7,158,118) (hereinafter "Liberty I") in view of a US Patent Application by FUJIOKA et al. (2007/0197284), and further in view of a US Patent to Liberty II (2005/0253806).

Regarding Claims 1, 14, 28-29 and 34 (All Currently Amended), Liberty I discloses an input apparatus (Title), comprising:
a motion detector (Abstract) which detects a movement of the electronic input apparatus (Col. 4, ll. 28-31); an which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected movement (Col. 13, ll. 10-21, respectively, where the scroll wheel is an optional input component that is rotated by a user), such that the received user input corresponds to a function and is not based on the movement detected by the motion detector (Fig. 2: 230 {Cable Broadcast Input}, 232

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{Satellite Input} or 234 {VHF/UHF Input}, all three inputs not based on the motion detector); and a controller which selects the function among a plurality of functions based on the received user input, and controls the generated command to be transmitted to an external device. (Col. 6, ll. 31-38) but fails to disclose any action in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received.

FUJIOKA et al. teaches action in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received.(Pg. 3, ¶[0031]).

Liberty II teaches generation a command associated with the selected function by combining the detected movement and the received user input (Pg. 15, ¶[0125]),

Liberty I, FUJIOKA et al. and Liberty II et al. are analogous because they are both concerned with the same endeavor, Touch Screen Technology. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of FUJIOKA et al. and Liberty II et al., since such a modification would have provided for action to be taken upon satisfaction of a condition precedent within a predetermined time and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 28 (Currently Amended), Liberty I discloses an electronic apparatus (Abstract) comprising:

a motion detector (Col. 16, ll. 38-46) to detect a movement of the electric apparatus for performing a function of an external device (Col. 6, ll. 31-38) and to generate first signals corresponding to the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector (Col. 13, ll. 15-17, where a button press is not considered a motion detector), for selecting the function among a plurality of functions based on the received user input and to generate second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function (Col. 13, ll. 18-29 but fails to disclose any action in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received or generation of signals reflective of a combined input.

FUJIOKA et al. teaches action in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received.(Pg. 3, ¶[0031]).

Liberty II teaches generation of second signals corresponding to a combined function (Pg. 15, ¶[0125]).

Liberty I, FUJIOKA et al. and Liberty II et al. are analogous because they are both concerned with the same endeavor, Touch Screen Technology. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of FUJIOKA et al. and Liberty II et al., since such a modification would have provided for action to be taken upon satisfaction of a condition precedent within a predetermined time and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675

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(1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 29 (Currently Amended), Liberty I discloses an electronic apparatus, comprising: a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor (Col. 4, ll. 56-67) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device, and to transmit the generated command to the external device. (Cols. 16-17, ll. 65-23, respectively, where the user frame of reference is not assumed to be stationary); an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected motion (Col. 13, ll. 10-21, respectively, where the scroll wheel is an optional input component that is rotated by a user) but fails to disclose in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received or a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input .

FUJIOKA et al. teaches action in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received. (Pg. 3, ¶[0031]).

Liberty II teaches a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input. (Pg. 15, ¶[0125]).

Liberty I, FUJIOKA et al. and Liberty II et al. are analogous because they are both concerned with the same endeavor, Touch Screen Technology. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of FUJIOKA et al. and Liberty II et al., since such a modification would have provided for action to be taken upon satisfaction of a condition precedent within a predetermined time and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Liberty I and FUJIOKA et al. are analogous because they are both concerned with the same endeavor, Touch Screen Technology. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of FUJIOKA et al., since such a modification would have provided for action to be taken upon satisfaction of a condition precedent within a predetermined time and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 30 (Previously Presented), the Liberty I-FUJIOKA et al. Combination discloses the electronic apparatus of Claim 29, and discloses it further comprising: a converter to receive a translation data signal and a rotation data signal. (Fig. 7: 812).

Regarding Claim 42 (New), the Liberty I-Fujioka Combination discloses the input apparatus as claimed in Claim 1, and further discloses wherein the selected function is a volume adjustment function, wherein the

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command associated with the selected function is a volume up or a volume down command. (Col. 6, ll. 41-45)

3. Claims 2-5, 8-13, 15-18, 21-26, 32 and 38 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent to Liberty (7,158,118) (hereinafter "Liberty I") in view of a US Patent Application by FUJIOKA et al. (2007/0197284), and further in view of a US Patent Application Publication by Liberty et al. (2005/0253806) (hereinafter "Liberty II").

Regarding Claims 2 and 15 (Both Original), the Liberty I-FUJIOKA et al. Combination discloses the input apparatus as claimed in Claim 1, and is capable of performing the method as claimed in Claim 14, respectively, but fails to disclose wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.).

Liberty II discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector (Pg. 2, ¶[0011] and a user manipulation input to the input unit. (Pg. 7, ¶[0060], where a scroll wheel is manipulated by a user).

The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 9 (Previously Presented) the Liberty I-FUJIOKA et al. Combination discloses the input apparatus as claimed in claim 1, but fails to disclose wherein the input unit includes a button unit having a plurality of buttons and further discloses wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

Liberty II discloses wherein the input unit includes a button unit having a plurality of buttons (Pg. 7, ¶[0060]) where visual feedback occurs when a button is pressed and a different button on the 3D pointing device can be pressed) and further discloses wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pg. 8, ¶[0066], where a button is depressed enabling visual feedback and the optional IR photo-detector detects rotational motion).

The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396

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U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 11, 21 and 24 (All Previously Presented) the Liberty I-FUJIOKA et al. Combination discloses the input apparatus claimed in claim 1 and but fails to disclose that it is capable of methods as disclosed in Claim 14 and further wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an user touch signal.

Liberty II discloses wherein it is capable of methods as disclosed in Claim 14 and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an user touch signal. (Pg. 157, ¶[0124], where a scroll wheel is manipulated by a user).

The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 12, 22 and 25 (All Previously Presented) the Liberty I-FUJIOKA et al. Combination is capable of performing the method as claimed in claims 1, 14, and 14, respectively, but fails to disclose wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

Liberty II discloses wherein the input unit comprises a button unit having a plurality of buttons (Pg. 7, ¶[0060]), wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Pg. 15, ¶[0124]).

The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

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Regarding Claims 3 and 16 (Both Original), the Liberty I-FUJIOKA et al. Combination discloses an input apparatus and is capable of the method disclosed as claimed in claims 2 and 15, respectively, but fails to disclose wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

Liberty II teaches wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 15, ¶[0124]).

The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 4 and 17 (Both Original), the Liberty I-FUJIOKA et al.-Liberty II Combination discloses the input apparatus and is capable of the method disclosed as claimed in claims 3 and 16, respectively, and Liberty et al. II further discloses wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction (Id.), wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 17, Claim 21, where the determination of whether a device is being held by a user necessarily involves analysis of the direction of movement).

Regarding Claims 5 and 18 (Original), the Liberty I-FUJIOKA et al.-Liberty II Combination discloses the input apparatus and is capable of the method as claimed in claims 4 and 17, respectively, and Liberty et al. II further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 1 ¶[0005], where a remote control is designed with buttons having up and down arrows).

Regarding Claims 6 and 7 (Canceled).

Regarding Claim 8 (Previously Presented) the Liberty I-FUJIOKA et al. Combination discloses the input apparatus as claimed in claim 1, but fails to disclose wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

Liberty et al. II teaches wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

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The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II because a predetermined time delay was added and all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 10 and 23 (Both Previously Presented) the Liberty I-FUJIOKA et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, but fails to disclose wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Liberty et al. II teaches wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Pg. 15, ¶[0124]).

The Liberty I-FUJIOKA et al. Combination and Liberty et al. II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty et al. II, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 13 and 26 (Both Original), the Liberty I-FUJIOKA et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, but fails to disclose wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

Liberty et al. II teaches wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Pgs. 15-16, ¶¶[0130-0131]).

The Liberty I-FUJIOKA et al. Combination and Liberty et al. II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty et al. II, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

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Regarding Claims 19-20, 27 and 31 (All Cancelled).

Regarding Claim 32 (Previously Presented), the Liberty I-FUJIOKA et al. Combination discloses the electronic apparatus of Claim 1, but fails to disclose wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

Liberty II teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

The Liberty I-FUJIOKA et al. Combination and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Liberty I-FUJIOKA et al. Combination with the teachings of Liberty II, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 33 (Cancelled).

Regarding Claim 38 (Previously Presented), the Liberty I Combination discloses an apparatus capable of performing the method of claim 14, but fails to disclose wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

Liberty II. teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Liberty II and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

4 Claims 35-36 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over a US Patent to Liberty II (2005/0253806) in view of a US Patent Application by FUJIOKA et al. (2007/0197284), and further in view of a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claim 35 (Currently Amended), Liberty II discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising: detecting a translation of the electronic apparatus using an acceleration sensor (Pg. 5, ¶[0047]) and detecting a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device (Fig. 7: 812); and transmitting the generated command to the external device. (Pg. 9, ¶[0076]); but fails to disclose generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received; and receiving a user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate

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from the detected translation and rotation, and such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector.

FUJIOKA et al. teaches generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received (Pg. 3, ¶[0031]).

Ohta teaches receiving a user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, and such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector. (Abstract).

Liberty II, FUJIOKA et al. and Ohta are analogous because they are all concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. and FUJIOKA et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. KSR, 550 U.S. at 416, 82 USPQ2d at 1395; Sakraida v. AG Pro, Inc., 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); Great Atl. & P. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 36 (Original) the Liberty II-FUJIOKA et al.-Ohta Combination discloses an apparatus capable of performing the method of claim 35, and Liberty II further discloses it comprising: receiving a translation data signal and a rotation data signal into a converter. (Pg. 5, ¶[0041]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on 8am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Spar Ilana can be reached on 571 270 7537. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey S. Steinberg/
Examiner, Art Unit 2622

/ILANA SPAR/
Supervisory Patent Examiner, Art Unit 2622

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-7,158,118 B2	01-2007	Liberty; Matthew G.	G06F3/017	345/156
*	B	US-2007/0197284 A1	08-2007	FUJIOKA; Kenji	A63F13/10	463/30
*	C	US-2008/0125223 A1	05-2008	Ohta; Keizo	A63F13/04	463/36
*	D	US-2005/0253806 A1	11-2005	Liberty, Matthew G.	G06F1/3215	345/156
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	78455	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/01/21 16:50
L2	6505	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/01/21 16:50
L3	4138	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/01/21 16:50
L4	7604	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/01/21 16:50
L5	94293	L1 L2 L3 L4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2016/01/21 16:50
L6	1	L5 (acceleration or accelerometer or motion or movement) with ((button or touch\$3) near2 input\$4) same (generat\$3 near5 command) and @ay<="2008" (predetermin\$3 adj1 time)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2016/01/21 16:50
S2	30558	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:50
S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO;	OR	OFF	2012/02/14 11:52

			DERWENT			
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipul\$5) contoller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
S15	1	"20080042986".pn.	US-PGPUB; USPAT	OR	OFF	2012/02/15 09:07
S16	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S17	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S18	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S19	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S20	41974	S16 S17 S18 S19	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S21	1	S20 (input adj2 apparatus) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO;	AND	ON	2012/09/17 16:29

			DERWENT			
S22	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S23	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S24	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S25	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S26	41974	S22 S23 S24 S25	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S27	1	S26 (accelerometer OR gesture OR cursor OR pointer OR arrow) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:03
S28	2	S26 ((INPUT with device) or (accelerometer OR gesture OR cursor OR pointer OR arrow)) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:06
S30	12	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 08:28
S31	4	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	USPAT	OR	OFF	2012/09/18 08:29
S32	37	348/734.ccls. and accelerometer	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 20:08
S33	0	"10799918"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/18 20:17
S34	1	("20060044282".PN.) (MOTION same input)	US-PGPUB	AND	ON	2012/09/20 14:31
S35	37728	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO;	OR	OFF	2013/05/08 17:28

			DERWENT			
S36	3537	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S37	2433	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S38	4132	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S39	46596	S35 S36 S37 S38	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S42	1	S39 (motion adj1 detect\$3) contoller (functions)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:28
S43	1	S39 (motion adj1 detect\$3) contol\$3 functions	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:33
S44	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S45	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S46	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S47	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S48	46673	S44 S45 S46 S47	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S49	161	S48 (control with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO;	AND	ON	2013/05/09 10:20

			DERWENT			
S50	1	S48 ((combine control) with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:38
S53	4	KANG-YONG-JIN.IN.	USPAT	OR	OFF	2013/05/09 15:19
S54	6	LEE-SUNG-HAN.IN.	USPAT	OR	OFF	2013/05/09 15:20
S55	0	SHIN-Hyun-coog.IN.	USPAT	OR	OFF	2013/05/09 15:25
S56	57	kim-dae-hyun.IN.	USPAT	OR	OFF	2013/05/09 15:25
S57	1	YOON-Eung-sik.IN.	USPAT	OR	OFF	2013/05/09 15:26
S58	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S59	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S60	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S61	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S62	46673	S58 S59 S60 S61	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S63	1	S62 ((combine control) with (motion adj1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 15:29
S64	1	WO-0126090-\$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 08:45
S65	1	"20040090423".pn.	US-PGPUB	OR	OFF	2013/05/15 15:16
S66	1	"20080042986".pn.	US-PGPUB	OR	OFF	2013/05/15 18:50
S67	37847	345/156-178.ccls.	US-PGPUB; USPAT; USOCR;	OR	OFF	2013/05/15 18:55

			EPO; JPO; DERWENT			
S68	3551	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S69	2437	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S70	4139	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S71	46734	S67 S68 S69 S70	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S72	150	S71 "288" threshold	US-PGPUB	AND	OFF	2013/05/15 18:55
S73	61	S71 "288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 18:57
S74	4197	"288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 19:07
S75	6	KANG-Yong-jin.in.	USPAT	OR	OFF	2013/09/15 10:17
S76	6	LEE-sUNG-HAN.in.	USPAT	OR	OFF	2013/09/15 10:17
S77	0	SHIN-Hyun-ooog.in.	USPAT	OR	OFF	2013/09/15 10:19
S78	62	KIM-Dae-hyun.in.	USPAT	OR	OFF	2013/09/15 10:20
S79	3	YOON-Eung-sik.in.	USPAT	OR	OFF	2013/09/15 10:21
S80	2	"20050253806".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:23
S81	2	"20090027335".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:28
S82	54627	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S83	4933	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11

S84	3211	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S85	5753	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S86	66725	S82 S83 S84 S85	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S87	988	S86 ((motion with detect\$3) same (input adj1 (apparatus or device)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2014/03/28 15:12
S88	1	"20080125223".pn.	US-PGPUB	OR	OFF	2014/03/30 12:48
S89	75084	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S90	6338	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S91	4061	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S92	7478	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S93	90596	S89 S90 S91 S92	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S95	4061	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/08/03 14:59
S96	1	((combine control) with (motion adj1 detect\$2)) function S93 (touch with time)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2015/08/03 15:02
S100	1	"7158118".pn.	USPAT	OR	OFF	2015/08/17 14:14

S101	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S102	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S103	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S104	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S105	92888	S101 S102 S103 S104	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S106	7	S105 ((movement or move) with ((pre adj1 determin\$3) adj1 time))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 10:38
S107	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S108	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S109	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S110	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S111	92888	S107 S108 S109 S110	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S112	4358	S111 (signal with combin\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2015/11/09 13:00

S113	19	S111 ((movement or move) with ((pre adj1 determin\$3) adj3 time))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 13:45
S114	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S115	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S116	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S117	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S118	92888	S114 S115 S116 S117	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S119	17386	S118 ((movement or move) with (input or button))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 16:10
S120	5082	S118 ((movement or move) with (input or button)) same (command or signal)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 16:11
S121	3467	S118 ((movement or move) with (input or button)) with (command or signal)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 16:12
S122	12	(acceleration or accelerometer or motion or movement) with ((button or touch\$3) near2 input\$4) same (generat\$3 near5 command) and @ay<="2008"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:07
S123	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
S124	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16


S125	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
S126	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
S127	92888	S123 S124 S125 S126	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
S128	9	S127 (acceleration or accelerometer or motion or movement) with ((button or touch\$3) near2 input\$4) same (generat\$3 near5 command) and @ay<="2008"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/10 11:16

EAST Search History (I nterference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S52	0	"L5" ((combine control) with (motion adj1 detect\$2))	USPAT	AND	ON	2013/05/09 10:47
S97	0	("15" ((combine control) with (motion adj1 detect\$2)) function (touch with time)).clm.	US-PGPUB; USPAT	AND	ON	2015/08/03 15:03
S98	0	("15" ((combine control) with (motion adj1 detect\$2)) function (DETECT with predetermin\$2)).clm.	US-PGPUB; USPAT	AND	ON	2015/08/11 09:31

1/ 21/ 2016 5:12:20 PM

C:\ Users\ jsteinberg\ Documents\ EAST\ Workspaces\ 12413722.wsp

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE									
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014	02/26/2015	08/20/2015	
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	6	✓	✓	✓	✓	-	-	-	-	-	
	7	✓	✓	✓	✓	-	-	-	-	-	
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	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	11	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	12	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	13	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	14	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	15	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	17	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	18	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	19	✓	✓	✓	✓	-	-	-	-	-	
	20	✓	✓	✓	✓	-	-	-	-	-	
	21	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	22	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	27	✓	✓	✓	✓	-	-	-	-	-	
	28	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	29	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	32	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	34	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	35	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	36	✓	✓	✓	✓	✓	✓	✓	✓	✓	

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected


Claims renumbered in the same order as presented by applicant

 CPA

 T.D.

 R.1.47

CLAIM		DATE								
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014	02/26/2015	08/20/2015
	37	✓	✓	✓	-	-	-	-	-	-
	38	✓	✓	✓	✓	✓	✓	✓	✓	✓
	39	✓	✓	✓	✓	-	✓	✓	-	-
	40	✓	✓	✓	✓	-	✓	✓	✓	-
	41				✓	-	✓	✓	✓	-
	42							✓	✓	✓

Search Notes 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
345	156-178	2/14/2012	JSS
463	36-39	2/14/2012	JSS
348	14.05, 114, 734	2/14/2012	JSS
715	810 ,831 ,856	2/14/2012	JSS

SEARCH NOTES		
Search Notes	Date	Examiner
Consulted Steve Sherman, AU 2629	12/13/2012	jss
Consulted Kirk Hermann	5/12, 9/1&14/2013	jss
Consulted Srilakshmi Kumar	8/19/2015	JSS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
345	156-178	5/9/2013	JSS
463	36-39	5/8/2013	JSS
348	14.05, 114, 734	5/8/2013	JSS
715	810 ,831 ,856	5/8/2013	JSS

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BIB DATA SHEET
CONFIRMATION NO. 9676

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.	
12/413,722	03/30/2009	345	2622	2456.1058	
APPLICANTS INVENTORS Yong-jin KANG, Suwon-si, KOREA, REPUBLIC OF; Sung-han LEE, Hwaseong-si, KOREA, REPUBLIC OF; Hyun-coog SHIN, Suwon-si, KOREA, REPUBLIC OF; Dae-hyun KIM, Suwon-si, KOREA, REPUBLIC OF; Eung-sik YOON, Suwon-si, KOREA, REPUBLIC OF;					
** CONTINUING DATA *****					
** FOREIGN APPLICATIONS ***** REPUBLIC OF KOREA 2008-66996 07/10/2008					
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **					
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Verified and /JEFFREY S STEINBERG/ Acknowledged Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY KOREA, REPUBLIC OF	SHEETS DRAWINGS 16	TOTAL CLAIMS 40	INDEPENDENT CLAIMS 14
ADDRESS STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005 UNITED STATES					
TITLE INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS					
FILING FEE RECEIVED 4550	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

SECOND OR SUBSEQUENT REQUEST FOR CONTINUED EXAMINATION (RCE)


TRANSMITTAL

(INCLUDING FILING FEE AND/OR PETITION FOR
EXTENSION OF TIME FEE)

*Subsection (b) of 35 U.S.C. §132, effective May 29, 2000
provides for continued examination of a utility or plant application
filed on or after June 8, 1995.*

See The American Inventors Protection Act of 1999 (AIPA)

To: Commissioner for Patents Box RCE PO Box 1450 Alexandria, VA 22313-1450	Attorney Docket No.:2456.1058		
First Named Inventor	Yong-jin KANG et al.		
Application No.	12/413,722	Group Art Unit	2622
Filing Date	March 30, 2009	Examiner	Steinberg, Jeffrey s
CPA Filing Date		Confirmation No	9676
Title of Invention	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS		
This is a Request for Continued Examination (RCE) under 37 C.F.R. §1.114 of the above-identified application.			
1.			
Submission required under 37 C.F.R. §1.114 (Box a or b must be completed)			
a. <input type="checkbox"/> Previously submitted			
i. <input type="checkbox"/> Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on ____ (Any unentered amendment(s) referred to above will be entered).			
ii. <input type="checkbox"/> Consider the arguments in the Appeal Brief or Reply Brief previously filed on __			
iii. <input type="checkbox"/> Other			
b. <input checked="" type="checkbox"/> Enclosed			
i. <input checked="" type="checkbox"/> Amendment/Reply			
ii. <input type="checkbox"/> Affidavit(s)/Declaration(s)			
iii. <input type="checkbox"/> Information Disclosure Statement (IDS)			
iv. <input type="checkbox"/> Other			
2.			
Miscellaneous			
a. <input type="checkbox"/> Suspension of action on the above-identified application is requested under 37 C.F.R. §103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. §1.17(i) required).			
b. <input type="checkbox"/> Other			

				BASIC FEE		\$	1,700.00
Since an Official Action set an <u>original</u> due date of <u>December 1, 2015</u> , petition is hereby made for an extension of time to cover the date this RCE is filed, for which the requisite fee is enclosed (1 month (\$200)); (2 months (\$600)); (3 months (\$1,400)); (4 months (\$2,200)); (5 months (\$3,000)):							
Claims As Amended	Claims Remaining After Amendment	Highest Number Previously Paid For	Number Extra	Rate			
Total Claims	31	- 41 =	0	X \$80.00 =		\$ 0.00	
Independent Claims	6	- 6 =	0	X \$420.00 =		\$ 0.00	
Suspension Fee (\$140.00)							
Total of above Calculations =						\$	1,700.00
Reduction by 50% for filing by small entity (Note 37 C.F.R. 1.27)							
TOTAL FEES DUE =						\$	1,700.00
4. <input type="checkbox"/> Small entity status: a. <input type="checkbox"/> Verified Statement Claiming Small Entity Status. b. <input type="checkbox"/> A Verified Statement Claiming Small Entity Status was previously filed and such status is still proper and desired. c. <input type="checkbox"/> is no longer claimed. 5. <input type="checkbox"/> Other:							
6. METHOD OF PAYMENT							
<input type="checkbox"/> A check in the amount of \$ <u>\$1,700.00</u> is enclosed. <input checked="" type="checkbox"/> EFS-Web Authorization for "TOTAL FEES DUE" to Credit Card. <input type="checkbox"/> Charge "TOTAL FEES DUE" to Deposit Account No. 19-3935.							
7. GENERAL AUTHORIZATION							
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to credit any overpayment or charge any additional fees under 37 C.F.R. 1.16 (filing fees) or 37 C.F.R. 1.17 (processing fees) during the prosecution of this application and of any related application(s) claiming benefit hereof pursuant to 35 U.S.C. §120 to maintain pendency hereof and of any such related application to: Deposit Account No. 19-3935.							
8. CORRESPONDENCE ADDRESS							
STAAS & HALSEY LLP 21171 <small>PATENT TRADEMARK OFFICE</small>							
9. SIGNATURE OF ATTORNEY OR AGENT REQUIRED							
NAME	David J. Cutitta			REGISTRATION NO.	52,790		
SIGNATURE				DATE	December 1, 2015		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yong-jin KANG et al.

Serial No. 12/413,722

Group Art Unit: 2622

Confirmation No. 9676

Filed: March 30, 2009

Examiner: Jeffrey S. STEINBERG

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT
METHOD APPLIED TO SUCH INPUT APPARATUS

AMENDMENT WITH RCE

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450
Mail Stop : RCE

Sir:

This is in response to the Final Office Action mailed September 1, 2015 and having a period for response set to expire on December 1, 2015.

This Amendment is submitted concurrently with a Request for Continued Examination and the requisite fee for the same.

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND the claims in accordance with the following:

1. (Currently Amended) An input apparatus, comprising:
a motion detector which detects a movement of the input apparatus;
an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate ~~[[e]]~~ from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;
and

a controller which selects the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch,

wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons,

wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electronic apparatus;

receiving a user input by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received; and

generating a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input,

the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:
a motion detector to detect a movement of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected movement;
an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, for selecting the function among a plurality of functions based on the received user input, in response to the

movement of the input apparatus being detected within a predetermined amount of time after the user input is received and to generate second signals corresponding to the selected function;

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function.

29. (Currently Amended) An electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:

a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The input apparatus of claim 1, wherein

the predetermined command is for raising or lowering a volume of the external device by moving up or down the input apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected movement;

receiving a user input including user manipulations for selecting the function among a plurality of functions ~~based on the received user input~~ on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among the plurality of functions based on the user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received;

generating second signals corresponding to the selected ~~functions~~function; and

combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function; ~~and~~

35. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and ~~detect~~detecting a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving a user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, and such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received; and

transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:

receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

42. (Previously Presented) The input apparatus as claimed in claim 1, wherein the selected function is a volume adjustment function,
wherein the command associated with the selected function is a volume up or a volume down command.

REMARKS

INTRODUCTION:

As set forth in the preceding section, claims 1, 14, 28, 29, 34, and 35 have been amended, while no claims have been added or cancelled.

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36, and 38 are pending and under consideration. Claims 1, 14, 28, 29, 34, and 35 are independent claims. Reconsideration of the claims in view of the following remarks is respectfully requested.

REJECTIONS UNDER 35 USC § 102 & § 103:

Claims 1-2, 14-15, 28-29, 34-35, and 42 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by a US 7,158,118 ("Liberty 1").

Claims 9, 11-12, 21-22 and 24-25 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Liberty 1 in view of a US 2008/0125223 ("Ohta").

Claims 3-5, 8, 10, 13, 16-18, 23, 26, 28-30, 32 and 38 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Liberty 1 in view of US 2005/0253806 ("Liberty 2").

Claims 35-36 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Liberty 2 in view of Ohta.

Among other features, independent claim 1 has been amended to recite:

An input apparatus, comprising:

a motion detector which detects a movement of the input apparatus;

an input unit which is disposed on the input apparatus to receive user input by a user manipulation **separate from the detected movement**, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller which selects the function among a plurality of functions based on the received user input, **in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received**, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

(Emphasis Added)

The Office Action relies upon Liberty 1, col. 16, line 65 thru col. 17, line 23 for the above emphasized feature of independent claim 1. However, the relied upon portion is still part of the movement of the Liberty 1 apparatus. In particular, the relied upon portion shows how to compute a change of coordinates for movements between what Liberty 1 terms “user frame” and “body frame”. Nonetheless, this portion of Liberty 1 describes sensor movement.

Further analysis of Liberty 1 fails to yield any feature of Liberty 1 (i.e. not relied upon by the Office Action) which can reasonably be equated with the claimed “user input by a user manipulation” because there is no such feature in Liberty 1 which is both “separate from the detected movement” and used to generate “...a command associated with the selected function by combining the detected movement **and the received user input**” as recited in independent claim 1.

Furthermore, Liberty 1 fails to discuss or suggest “in response to the movement of the input apparatus being detected within a **predetermined amount of time after the user input** is received” as recited in independent claim 1.

The Office Action indicates at page 3 that this previously proposed feature is discussed by Liberty 1 at col. 14, lines 39-49:

The various state transitions illustrated in FIG. 8 can be triggered by any of a number of different criteria including, but not limited to, data output from one or both of the rotational sensors 502 and 504, data output from the accelerometer 506, time domain data, frequency domain data or any combination thereof. State transition conditions will be generically referred to herein using the convention “Condition_{stateA_stateB}”. For example, the 3D pointing device 400 will transition from the ACTIVE state to the INACTIVE state when condition_{active_inactive} occurs.

Notwithstanding that Liberty 1 does not discuss or suggest any feature which can reasonably be equated with the claimed “user input” as explained above, the relied upon portion of Liberty 1 does not discuss any “predetermined amount of time” after anything. Moreover, the Examiner had previously indicated that amending the independent claims to recite, “user input being received within a predetermined amount of time” should place the Application into condition for allowance. The foregoing amendment further clarifies the Examiner’s proposed amendment.

For at least these reasons, independent claim 1 patentably distinguishes over Liberty 1. Although the above remarks are specifically directed to independent claim 1, at least some of the same or similar remarks can be helpful to understand that independent claims 14, 28-29, and 34 also patentably distinguish over Liberty 1.

Regarding the rejection of independent claim 35, the June 18, 2015 Amendment explained why independent claim 35 patentably distinguishes over the Liberty 2/Ohta combination. The Office Action is silent on these arguments. Applicants respectfully submit that independent claim 35 patentably distinguishes over the cited references for at least the reasons set forth in the June 18, 2015 Amendment which is incorporated herein.

Furthermore, Liberty 2 and Ohta, taken alone or in combination, fail to discuss or suggest "generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, **in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received**" as recited in independent claim 35.

Accordingly, all of the independent claims patentably distinguish over the cited references. The remaining rejected claims patentably distinguish over the cited references for at least their respective dependencies.

Regarding claim 11, the respective features of claim 11 additionally patentably distinguish over the Liberty 1/Ohta combination for the reasons set forth in the June 18, 2015 Amendment which is incorporated herein.

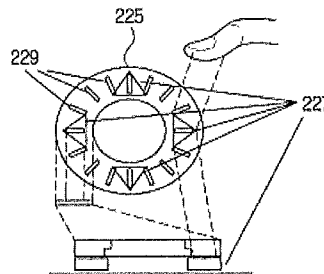
Accordingly, withdrawal of these rejections is respectfully requested.

In addition, in a **telephone interview conducted on November 10, 2015**, the Examiner indicated that his Supervisor found additional references which the Examiner and Supervisor believe can be used to reject the amended claims. In the interview, the Examiner provided the following references (enclosed) and cited paragraphs:

- U.S. 2007/0152981 ("Im – a Samsung Application) – paragraph [0056]
- U.S. 2007/0132729 ("Son et al.") – paragraph [0010]
- U.S. 2005/0225539 ("Prados") – paragraph [0092]

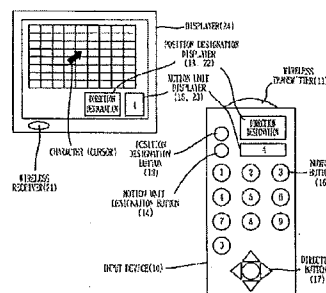
Applicant asserts that the claim 1 as amended distinguishes the references above, taken alone or in combination, for at least the following reasons.

Im discusses a navigation key which includes a mechanical button 227 and a plurality of electrical sensors that are arranged in a circular form. A control part determines whether a sensed touch is a continuous movement, by sensing an electrical sensor, or a pressing, by sensing a mechanical button, and performs the corresponding operation, as illustrated below at FIG. 4B of Im:



That is, Im merely describes performing an operation corresponding to the type of input, but unlike claim 1 in the present invention, does not suggest or disclose “generating a command by combining a user’s manipulation and a movement of an input apparatus.”

Referring to the second reference provided in the interview, Son describes a method of moving a cursor more easily. Specifically, a function of direction designation or a function of regional designation toggled by using a direction designation button, and a motion unit by a direction key is determined by a motion unit designation button, as illustrated below at FIG. 1 of Son.



That is, Son merely describes determining whether the above-mentioned special button or normal button is manipulated, and therefore cannot be reasonably interpreted as suggesting a new command that is generated by two types of buttons.

In addition, **Son is different from the invention of claim 1 in the present application in that, in Son, a specific function may be set up by a special button, but a normal button is not necessary to be manipulated within a predetermined time after a manipulation of a special button.**

Prados pertains to an apparatus which moves a touch screen according to a user touch, but also fails to disclose generating one command by combining a plurality of manipulations.

In view of all of the above, it appears that the newly cited references, taken alone or in combination, also fail to suggest or disclose receiving “a user input by a user manipulation separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and a controller which *selects the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received,*” as recited in amended independent claim 1 (emphasis added).

Accordingly, independent claim 1 patentably distinguishes over the cited references, and should be allowable for at least the above-mentioned reasons. Since similar features recited by each of the independent claims 14, 28, 29, 34, and 35, with potentially differing scope and breadth, are not suggested or disclosed by the cited references, the rejection should be withdrawn and claims 14, 28, 29, 34, and 35 also allowed.

The remaining rejected claims patentably distinguish over the cited references for at least their respective dependencies.

CONCLUSION:

There being no further outstanding rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this Amendment, the Examiner is requested to telephone the undersigned to attend to these matters.

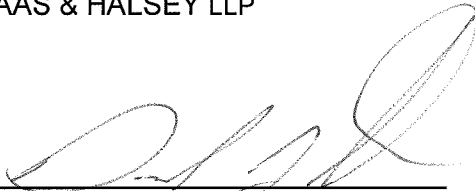
Serial No. 12/413,722

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: December 1, 2015

By: 
David J. Cutitta
Registration No. 52,790

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

Electronic Patent Application Fee Transmittal

Application Number:	12413722
Filing Date:	30-Mar-2009
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Filer:	David John Cutitta/Mikel Severson
Attorney Docket Number:	2456.1058

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
RCE- 2nd and Subsequent Request	1820	1	1700	1700
Total in USD (\$)				1700

Electronic Acknowledgement Receipt

EFS ID:	24227110
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	21171
Filer:	David John Cutitta/Mikel Severson
Filer Authorized By:	David John Cutitta
Attorney Docket Number:	2456.1058
Receipt Date:	01-DEC-2015
Filing Date:	30-MAR-2009
Time Stamp:	14:12:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1700
RAM confirmation Number	1597
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RCEandAMENDMENT.pdf	1543556 <small>e22246fce61ca2faaf34a5d759a7252708af2890</small>	yes	17

Multipart Description/PDF files in .zip description				
Document Description		Start	End	
Request for Continued Examination (RCE)		1	2	
Response After Final Action		3	3	
Claims		4	11	
Applicant Arguments/Remarks Made in an Amendment		12	17	

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30640 <small>fec79fc57ff84811dd4c5785e20d01a580e7bc5</small>	no	2
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Warnings:

Information:

Total Files Size (in bytes):	1574196
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	12/01/2015	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	* 31	Minus	** 40	= 0	X \$80 = 0
	Independent <small>(37 CFR 1.16(h))</small>	* 6	Minus	*** 14	= 0	X \$420 = 0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
 /KIMBERLY PANNELL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND the claims in accordance with the following:

1. (Currently Amended) An input apparatus, comprising:
a motion detector which detects a movement of the input apparatus;
an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate ~~[[e]]~~ from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and
a controller which selects the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.
2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electronic apparatus;

receiving a user input by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received; and

generating a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the

command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,

wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,

wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:

a motion detector to detect a movement of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected movement;

an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, for selecting the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus

being detected within a predetermined amount of time after the user input is received and to generate second signals corresponding to the selected function;

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function.

29. (Currently Amended) An electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:

a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The input apparatus of claim 1, wherein

the predetermined command is for raising or lowering a volume of the external device by moving up or down the input apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected movement;

receiving a user input including user manipulations for selecting the function among a plurality of functions ~~based on the received user input~~ on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among the plurality of functions based on the user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received;

generating second signals corresponding to the selected ~~functions~~function; and

combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function; ~~and~~

35. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and ~~detect~~ detecting a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving a user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, and such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received; and

transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:

receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

42. (Previously Presented) The input apparatus as claimed in claim 1, wherein the selected function is a volume adjustment function,
wherein the command associated with the selected function is a volume up or a volume down command.

AFCP 2.0 Decision

Application No.

12/413,722

Applicant(s)

KANG ET AL.

Examiner

Jeffrey S. Steinberg

Art Unit

2622

This is in response to the After Final Consideration Pilot request filed 11/2/2015.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

- An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.
- A non-broadening amendment to at least one independent claim was not submitted.
- A proper AFCP 2.0 request was submitted in response to the most recent final rejection.
- Other:

2. **Proper Request**

A. After final amendment submitted with the request will not be treated under AFCP 2.0.

The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

- The after final amendment will be treated under pre-pilot procedure.

B. Updated search and/or completed additional consideration.

The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

- 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.
- 2. The after final amendment would not overcome all of the rejections in the most recent final Office action. See attached interview summary for further details.
- 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.
- 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.
- 5. Other: Practitioner Koren was contacted 11/10/2015. He agreed that the Art of Record, namely Ohta, disclosed simultaneous button press and movement inputs and further stated that an RCE is forthcoming and was already speaking with his Client today.

Examiner Note: Please attach an interview summary when necessary as described above.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	12	(acceleration or accelerometer or motion or movement) with ((button or touch\$3) near2 input\$4) same (generat\$3 near5 command) and @ay<="2008"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:07
L2	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
L3	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
L4	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
L5	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
L6	92888	L2 L3 L4 L5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/10 11:16
L7	9	L6 (acceleration or accelerometer or motion or movement) with ((button or touch\$3) near2 input\$4) same (generat\$3 near5 command) and @ay<="2008"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/10 11:16
S2	30558	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:50
S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51

S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:52
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipul\$5) contoller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
S15	1	"20080042986".pn.	US-PGPUB; USPAT	OR	OFF	2012/02/15 09:07
S16	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S17	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S18	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S19	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S20	41974	S16 S17 S18 S19	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29

S21	1	S20 (input adj2 apparatus) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 16:29
S22	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S23	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S24	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S25	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S26	41974	S22 S23 S24 S25	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S27	1	S26 (accelerometer OR gesture OR cursor OR pointer OR arrow) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:03
S28	2	S26 ((INPUT with device) or (accelerometer OR gesture OR cursor OR pointer OR arrow)) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:06
S30	12	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 08:28
S31	4	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	USPAT	OR	OFF	2012/09/18 08:29
S32	37	348/734.ccls. and accelerometer	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 20:08
S33	0	"10799918"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/18 20:17
S34	1	("20060044282".PN.) (MOTION same input)	US-PGPUB	AND	ON	2012/09/20 14:31

S35	37728	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S36	3537	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S37	2433	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S38	4132	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S39	46596	S35 S36 S37 S38	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S42	1	S39 (motion adj1 detect\$3) contoller (functions)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:28
S43	1	S39 (motion adj1 detect\$3) contol\$3 functions	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:33
S44	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S45	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S46	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S47	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S48	46673	S44 S45 S46 S47	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20

S49	161	S48 (control with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:20
S50	1	S48 ((combine control) with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:38
S53	4	KANG-YONG-JIN.IN.	USPAT	OR	OFF	2013/05/09 15:19
S54	6	LEE-SUNG-HAN.IN.	USPAT	OR	OFF	2013/05/09 15:20
S55	0	SHIN-Hyun-coog.IN.	USPAT	OR	OFF	2013/05/09 15:25
S56	57	kim-dae-hyun.IN.	USPAT	OR	OFF	2013/05/09 15:25
S57	1	YOON-Eung-sik.IN.	USPAT	OR	OFF	2013/05/09 15:26
S58	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S59	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S60	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S61	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S62	46673	S58 S59 S60 S61	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S63	1	S62 ((combine control) with (motion adj1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 15:29
S64	1	WO-0126090-\$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 08:45
S65	1	"20040090423".pn.	US-PGPUB	OR	OFF	2013/05/15 15:16
S66	1	"20080042986".pn.	US-PGPUB	OR	OFF	2013/05/15

						18:50
S67	37847	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S68	3551	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S69	2437	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S70	4139	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S71	46734	S67 S68 S69 S70	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S72	150	S71 "288" threshold	US-PGPUB	AND	OFF	2013/05/15 18:55
S73	61	S71 "288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 18:57
S74	4197	"288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 19:07
S75	6	KANG-Yong-jin.in.	USPAT	OR	OFF	2013/09/15 10:17
S76	6	LEE-sUNG-HAN.in.	USPAT	OR	OFF	2013/09/15 10:17
S77	0	SHIN-Hyun-ooog.in.	USPAT	OR	OFF	2013/09/15 10:19
S78	62	KIM-Dae-hyun.in.	USPAT	OR	OFF	2013/09/15 10:20
S79	3	YOON-Eung-sik.in.	USPAT	OR	OFF	2013/09/15 10:21
S80	2	"20050253806".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:23
S81	2	"20090027335".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:28
S82	54627	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S83	4933	463/36-39.ccls.	US-PGPUB;	OR	OFF	2014/03/28

			USPAT; USOCR; EPO; JPO; DERWENT			15:11
S84	3211	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S85	5753	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S86	66725	S82 S83 S84 S85	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S87	988	S86 ((motion with detect\$3) same (input adj1 (apparatus or device)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2014/03/28 15:12
S88	1	"20080125223".pn.	US-PGPUB	OR	OFF	2014/03/30 12:48
S89	75084	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S90	6338	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S91	4061	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S92	7478	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S93	90596	S89 S90 S91 S92	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S95	4061	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/08/03 14:59
S96	1	((combine control) with (motion adj1 detect\$2)) function S93 (touch with time)	US-PGPUB; USPAT; USOCR; EPO; JPO;	AND	ON	2015/08/03 15:02

			DERWENT			
S100	1	"7158118".pn.	USPAT	OR	OFF	2015/08/17 14:14
S101	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S102	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S103	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S104	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S105	92888	S101 S102 S103 S104	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 10:38
S106	7	S105 ((movement or move) with ((pre adj1 determin\$3) adj1 time))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 10:38
S107	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S108	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S109	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S110	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S111	92888	S107 S108 S109 S110	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 13:00
S112	4358	S111 (signal with combin\$3)	US-PGPUB;	AND	ON	2015/11/09

			USPAT; USOCR; EPO; JPO; DERWENT			13:00
S113	19	S111 ((movement or move) with ((pre adj1 determin\$3) adj3 time))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 13:45
S114	77162	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S115	6455	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S116	4113	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S117	7560	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S118	92888	S114 S115 S116 S117	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/11/09 16:10
S119	17386	S118 ((movement or move) with (input or button))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 16:10
S120	5082	S118 ((movement or move) with (input or button)) same (command or signal)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 16:11
S121	3467	S118 ((movement or move) with (input or button)) with (command or signal)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/11/09 16:12

11/10/2015 11:48:54 AM

C:\Users\jsteinberg\Documents\EAST\Workspaces\12413722.wsp

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12413722
	Filing Date	2009-03-30
	First Named Inventor	Yong-jin KANG et al.
	Art Unit	2622
	Examiner Name	Jeffrey S. Steinberg
	Attorney Docket Number	102-1567

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5335557		1994-08-09	Yasutake	
	2	5729249		1998-03-17	Yasutake	
	3	5805137		1998-09-08	Yasutake	

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FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² j	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	10-260776	JP		1998-09-29	Itu Res Inc	abstract	<input checked="" type="checkbox"/>

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12413722
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	Attorney Docket Number	102-1567

If you wish to add additional Foreign Patent Document citation information please click the Add button **Add**

NON-PATENT LITERATURE DOCUMENTS **Remove**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Korean Office Action dated July 31, 2014 issued in KR Application No. 10-2008-0066996	<input checked="" type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

EXAMINER SIGNATURE

Examiner Signature	/Jeffrey Steinberg/	Date Considered	11/05/2015
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.S./

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	12413722
Filing Date	2009-03-30
First Named Inventor	Yong-jin KANG et al.
Art Unit	2622
Examiner Name	Jeffrey S. Steinberg
Attorney Docket Number	102-1567

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Patrick J. Stanzione/	Date (YYYY-MM-DD)	2014-09-03
Name/Print	Patrick J. Stanzione	Registration Number	40434

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
12/413,722 03/30/2009 Yong-jin KANG 2456.1058 9676

21171 7590 11/18/2015
STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

STEINBERG, JEFFREY S

ART UNIT PAPER NUMBER

2622

NOTIFICATION DATE DELIVERY MODE

11/18/2015

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail@s-n-h.com

Applicant-Initiated Interview Summary	Application No. 12/413,722	Applicant(s) KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	

All participants (applicant, applicant's representative, PTO personnel):

- (1) Jeffrey S. Steinberg. (3)_____.
- (2) Patrick R. Koren, Reg. No. 63,633. (4)_____.

Date of Interview: 10 November 2015.

Type: Telephonic Video Conference
 Personal [copy given to: applicant applicant's representative]

Exhibit shown or demonstration conducted: Yes No.
If Yes, brief description: _____.

Issues Discussed 101 112 102 103 Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1, 14, 28, 29 and 34.

Identification of prior art discussed: Ohta.

Substance of Interview

(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Practitioner Koren was contacted 11/10/2015. He agreed that the Art of Record, namely Ohta, disclosed simultaneous button press and movement inputs and further stated that an RCE is forthcoming and was already speaking with his Client today.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Attachment

/Jeffrey S Steinberg/
Examiner, Art Unit 2622

/ILANA SPAR/
Supervisory Patent Examiner, Art Unit 2622

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Advisory Action Before the Filing of an Appeal Brief	Application No. 12/413,722	Applicant(s) KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	AIA (First Inventor to File) Status No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 02 November 2015 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:

- a) The period for reply expires _____ months from the mailing date of the final rejection.
- b) The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
- c) A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires _____ months from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
- a) They raise new issues that would require further consideration and/or search (see NOTE below);
 - b) They raise the issue of new matter (see NOTE below);
 - c) They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
 - d) They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).

- 4. The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
- 5. Applicant's reply has overcome the following rejection(s): _____.
- 6. Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
- 7. For purposes of appeal, the proposed amendment(s): (a) will not be entered, or (b) will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

- 8. A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 9. The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
- 10. The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
- 11. The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

- 12. The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
The Combination of.....
- 13. Note the attached Information *Disclosure Statement(s)*. (PTO/SB/08) Paper No(s). 9/3/2014
- 14. Other: PTO 2323 is attached as well as an Interview Summary.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
- Claim(s) allowed: .
 - Claim(s) objected to: .
 - Claim(s) rejected: 1-5,8-18,21-26,28-30,32,34-36,38 and 42.
 - Claim(s) withdrawn from consideration: .

/ILANA SPAR/ Supervisory Patent Examiner, Art Unit 2622	/Jeffrey S Steinberg/ Examiner, Art Unit 2622
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The Combination of detected movement and the received user input is solely within the Ohta Reference, (Pg. 4, Para. [0078]). Further the Ohta Reference also discloses that this Combination is only effective when it occurs when it is done simultaneously (predetermined time equals zero).(Pg. 4, Para. [0078], where the button is pressed and the controller is moved simultaneously).

Applicant-Initiated Interview Summary	Application No. 12/413,722	Applicant(s) KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	

All participants (applicant, applicant's representative, PTO personnel):

- (1) Jeffrey S. Steinberg. (3)_____.
- (2) Patrick R. Koren, Reg. No. 63,633. (4)_____.

Date of Interview: 10 November 2015.

Type: Telephonic Video Conference
 Personal [copy given to: applicant applicant's representative]

Exhibit shown or demonstration conducted: Yes No.
If Yes, brief description: _____.

Issues Discussed 101 112 102 103 Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1, 14, 28, 29 and 34.

Identification of prior art discussed: Ohta.

Substance of Interview

(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

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Attachment

/Jeffrey S Steinberg/
Examiner, Art Unit 2622

/ILANA SPAR/
Supervisory Patent Examiner, Art Unit 2622

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Paragraph (b)

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The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.


A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0		
Practitioner Docket No.: 2456.1058	Application No.: 12/413,722	Filing Date: 03/30/2009
First Named Inventor: Yong-jin KANG	Title: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS	
<p>APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.</p> <ol style="list-style-type: none"> The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (e.g., a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c). The above-identified application contains an outstanding final rejection. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web). Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, e.g., extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.] By filing this certification and request, applicant acknowledges the following: <ul style="list-style-type: none"> Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0. The examiner will verify that the AFCP 2.0 submission is compliant, i.e., that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions: <ul style="list-style-type: none"> The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, e.g., by mailing an advisory action. If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview. <ul style="list-style-type: none"> The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate. If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116. 		
Signature 	Date 11/2/15	
Name (Print/Typed) Patrick R. Koren	Practitioner Registration No. 63,633	
<p>Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.</p>		
<input checked="" type="checkbox"/> * Total of <u>1</u> forms are submitted.		

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yong-jin KANG et al.

Serial No. 12/413,722

Group Art Unit: 2622

Confirmation No. 9676

Filed: March 30, 2009

Examiner: Jeffrey S. STEINBERG

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT
METHOD APPLIED TO SUCH INPUT APPARATUS

AMENDMENT UNDER 37 CFR 1.116 UNDER AFCP 2.0

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450
Mail Stop : After Final

Sir:

This is in response to the Final Office Action mailed September 1, 2015 and having a period for response set to expire on December 1, 2015.

This Amendment is filed under the After Final Consideration Pilot Program 2.0 (AFCP 2.0), and an AFCP 2.0 Certification and request is filed herewith.

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND the claims in accordance with the following:

1. (Currently Amended) An input apparatus, comprising:
a motion detector which detects a movement of the input apparatus;
an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate ~~[[e]]~~ from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and
a controller which selects the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.
2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:
detecting a movement of the electronic apparatus-;
receiving a user input by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;
selecting the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received; and
generating a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the

command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:
a motion detector to detect a movement of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected movement;
an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, for selecting the function among a plurality of functions based on the received user input, in response to the movement of the input apparatus

being detected within a predetermined amount of time after the user input is received and to generate second signals corresponding to the selected function;

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function.

29. (Currently Amended) An electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:

a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The input apparatus of claim 1, wherein

the predetermined command is for raising or lowering a volume of the external device by moving up or down the input apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected movement;

receiving a user input including user manipulations for selecting the function among a plurality of functions ~~based on the received user input~~ on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected movement, and such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among the plurality of functions based on the user input, in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received;

generating second signals corresponding to the selected ~~functions~~function; and

combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function; ~~and~~

35. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and ~~detect~~ detecting a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving a user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, and such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received; and

transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:

receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

42. (Previously Presented) The input apparatus as claimed in claim 1, wherein the selected function is a volume adjustment function,
wherein the command associated with the selected function is a volume up or a volume down command.

REMARKS

INTRODUCTION:

As set forth in the preceding section, claims 1 and 35 have been amended to correct an error and not for reasons related to patentability. No claims have been added or cancelled here.

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36, and 38 are pending and under consideration. Claims 1, 14, 28, 29, 34, and 35 are independent claims. Reconsideration of the claims in view of the following remarks is respectfully requested.

AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

This Amendment is filed under the After Final Consideration Pilot Program 2.0 (AFCP 2.0), and an AFCP 2.0 Certification and Request is filed herewith.

REQUEST FOR EXAMINER INITIATED INTERVIEW

In the interest of advancing prosecution, the Examiner is respectfully requested to contact the undersigned to schedule an Examiner initiated interview under AFCP 2.0 before taking further action on the Application. Applicants believe that from the previous discussions regarding an Examiner's Proposed Amendment that the Application may be close to allowance, and that the Examiner may believe that currently pending claims may need only minor amendments to allow the Application.

REQUEST FOR WITHDRAWAL OF FINALITY

The Office Action maintains the grounds for rejection of independent claim 35 without explanation, merely indicating that the arguments are moot in light of new grounds for rejection. However, claim 35 stands rejected on the same grounds as in the non-Final Office Action.

The Office Action is also silent on the traversal of the rejection of dependent claim 11, while maintaining the same grounds for rejecting the respective features of claim 11, i.e. that that the respective features of claim 11 are allegedly taught by Ohta. However, in the Amendment filed on June 18, 2015, detailed arguments were presented showing that Ohta does not teach the respective features of dependent claim 11, which the Office Action summarily dismisses as moot in light of new grounds for rejection while continuing to rely upon Ohta for these features.

Accordingly, the Office Action is improper for failing to address each of the traversals of the June 18, 2105 Amendment. Because the Office Action is improper, the Finality is also improper.

Accordingly, withdrawal of the Finality of the Office Action is respectfully requested.

REQUEST FOR ENTRY OF AMENDMENTS AFTER FINAL

In the event that the request for withdrawal of finality is not approved, Applicants respectfully submit that the foregoing claim amendments should be entered for at least the reasons that (1) the amendments are clerical in nature and place the Application into better condition for Appeal and (2) the Finality of the Office Action should be withdrawn for at least the above reasons.

Accordingly, entry of the foregoing claim amendments after Final rejection is respectfully requested.

REJECTIONS UNDER 35 USC § 102 & § 103:

Claims 1-2, 14-15, 28-29, 34-35, and 42 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by a US 7,158,118 ("Liberty 1").

Claims 9, 11-12, 21-22 and 24-25 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Liberty 1 in view of a US 2008/0125223 ("Ohta").

Claims 3-5, 8, 10, 13, 16-18, 23, 26, 28-30, 32 and 38 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Liberty 1 in view of a US 2005/0253806 ("Liberty 2").

Claims 35-36 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Liberty 2 in view of Ohta.

Independent claim 1 recites:

An input apparatus, comprising:
a motion detector which detects a movement of the input apparatus;
an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller which selects the function among a plurality of functions based on the received user input, **in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received**, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

(Emphasis Added)

The Office Action relies upon Liberty 1, col. 16, line 65 thru col. 17, line 23 for the above emphasized feature of independent claim 1. However, the relied upon portion is still part of the movement of the Liberty 1 apparatus. In particular, the relied upon portion shows how to compute a change of coordinates for movements between what Liberty 1 terms "user frame" and "body frame". Nonetheless, this portion of Liberty 1 describes sensor movement.

Further analysis of Liberty 1 fails to yield any feature of Liberty 1 (i.e. not relied upon by the Office Action) which can reasonably be equated with the claimed "user input by a user manipulation" because there is no such feature in Liberty 1 which is both "separate from the detected movement" and used to generate "...a command associated with the selected function by combining the detected movement **and the received user input**" as recited in independent claim 1.

Furthermore, Liberty 1 fails to discuss or suggest "in response to the movement of the input apparatus being detected within a **predetermined amount of time after the user input** is received" as recited in independent claim 1.

The Office Action indicates at page 3 that this previously proposed feature is discussed by Liberty 1 at col. 14, lines 39-49:

The various state transitions illustrated in FIG. 8 can be triggered by any of a number of different criteria including, but not limited to, data output from one or both of the rotational sensors 502 and 504, data output from the accelerometer 506, time domain data, frequency domain data or any combination thereof. State transition conditions will be generically referred to herein using the convention "Condition_{stateA_stateB}". For example, the 3D pointing device 400 will transition from the ACTIVE state to the INACTIVE state when condition_{active_inactive} occurs.

Notwithstanding that Liberty 1 does not discuss or suggest any feature which can reasonably be equated with the claimed "user input" as explained above, the relied upon portion of Liberty 1 does not discuss any "predetermined amount of time" after anything. Moreover, the

Examiner had previously indicated that amending the independent claims to recite, "user input being received within a predetermined amount of time" should place the Application into condition for allowance. The foregoing amendment further clarifies the Examiner's proposed amendment.

For at least these reasons, independent claim 1 patentably distinguishes over Liberty 1. Although the above remarks are specifically directed to independent claim 1, at least some of the same or similar remarks can be helpful to understand that independent claims 14, 28-29, and 34 also patentably distinguish over Liberty 1.

Regarding the rejection of independent claim 35, the June 18, 2015 Amendment explained why independent claim 35 patentably distinguishes over the Liberty 2/Ohta combination. The Office Action is silent on these arguments. Applicants respectfully submit that independent claim 35 patentably distinguishes over the cited references for at least the reasons set forth in the June 18, 2015 Amendment which is incorporated herein.

Furthermore, Liberty 2 and Ohta, taken alone or in combination, fail to discuss or suggest "generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, **in response to the translation and rotation of the input apparatus being detected within a predetermined amount of time after the user selection input is received**" as recited in independent claim 35.

Accordingly, all of the independent claims patentably distinguish over the cited references. The remaining rejected claims patentably distinguish over the cited references for at least their respective dependencies.

Regarding claim 11, the respective features of claim 11 additionally patentably distinguish over the Liberty 1/Ohta combination for the reasons set forth in the June 18, 2015 Amendment which is incorporated herein.

Accordingly, withdrawal of these rejections is respectfully requested.

CONCLUSION:

There being no further outstanding rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this Amendment, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.


Respectfully submitted,

STAAS & HALSEY LLP

November 2, 2015
Date: _____

By:  _____
Patrick R. Koren
Registration No. 63,633

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

REPLY/AMENDMENT FEE TRANSMITTAL		Attorney Docket No.	2456.1058		
		Application Number	12/413,722		
		Filing Date	March 30, 2009		
		First Named Inventor	Yong-jin KANG et al.		
		Group Art Unit	2622		
AMOUNT ENCLOSED	0.00	Examiner Name	Jeffrey S. STEINBERG		
FEE CALCULATION (fees effective 03/19/2013)					
CLAIMS AS AMENDED	Claims Remaining After Amendment	Highest Number Previously Paid For	Number Extra	Rate	Calculations
TOTAL CLAIMS	31	- 41 =	0	X \$ 80.00 =	\$ 0.00
INDEPENDENT CLAIMS	6	- 6 =	0	X \$ 420.00 =	0.00
Since an Official Action set an <u>original</u> due date of <u>December 1, 2015</u> no petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month (\$200)); (2 months (\$600)); (3 months (\$1,400)); (4 months (\$2,200)); (5 months (\$3,000)):					
If Notice of Appeal is enclosed, add (\$800.00)					
If Statutory Disclaimer under Rule 20(d) is enclosed, add fee (\$160.00)					
Information Disclosure Statement (Rule 1.17(p)) (\$180.00)					
Total of above Calculations =					\$ 0.00
Reduction by 50% for filing by small entity (37 CFR 1.27)					
TOTAL FEES DUE =					\$ 0.00
(1) If entry (1) is less than entry (2), entry (3) is "0".					
(2) If entry (2) is less than 20, change entry (2) to "20".					
(4) If entry (4) is less than entry (5), entry (6) is "0".					
(5) If entry (5) is less than 3, change entry (5) to "3".					
METHOD OF PAYMENT					
<input type="checkbox"/> Check enclosed as payment.					
<input type="checkbox"/> Charge "TOTAL FEES DUE" to the Deposit Account No. below.					
<input type="checkbox"/> EFS-Web Authorization for "TOTAL FEES DUE" to Credit Card.					
<input checked="" type="checkbox"/> No payment is enclosed.					
GENERAL AUTHORIZATION					
<input checked="" type="checkbox"/> If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:					
Deposit Account No.		19-3935			
Deposit Account Name		STAAS & HALSEY LLP			
<input checked="" type="checkbox"/> The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.					
SUBMITTED BY: STAAS & HALSEY LLP					
Typed Name	Patrick R. Koren		Reg. No.	63,633	
Signature			Date	November 2, 2015	

Electronic Acknowledgement Receipt

EFS ID:	23964581
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	21171
Filer:	Patrick Robert Koren/Renee Adams
Filer Authorized By:	Patrick Robert Koren
Attorney Docket Number:	2456.1058
Receipt Date:	02-NOV-2015
Filing Date:	30-MAR-2009
Time Stamp:	17:44:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	After Final Consideration Program Request	AFCP20_24561058.pdf	281350 <small>30cc583b19d2199bc26bec04079e9b49d21d7e74</small>	no	2

Warnings:

Information:

2		AMDAF_24561058.pdf	1349377 0b2c0650e4a39204ab971cbb2b34f02186172fed	yes	15
Multipart Description/PDF files in .zip description					
Document Description		Start	End		
Response After Final Action		1	1		
Claims		2	9		
Applicant Arguments/Remarks Made in an Amendment		10	14		
Fee Worksheet (SB06)		15	15		
Warnings:					
Information:					
Total Files Size (in bytes):				1630727	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	11/02/2015	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total (37 CFR 1.16(i))	* 31	Minus	** 40	= 0	X \$80 = 0
	Independent (37 CFR 1.16(h))	* 6	Minus	*** 14	= 0	X \$420 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/Davina Butler/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
12/413,722 03/30/2009 Yong-jin KANG 2456.1058 9676

21171 7590 09/01/2015
STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

STEINBERG, JEFFREY S

ART UNIT PAPER NUMBER

2622

NOTIFICATION DATE DELIVERY MODE

09/01/2015

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail@s-n-h.com

Office Action Summary

Application No. 12/413,722	Applicant(s) KANG ET AL.	
Examiner Jeffrey S. Steinberg	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 6/18/2015.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-5, 8-18, 21-26, 28-30, 32, 34-36, 38 and 42 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-5, 8-18, 21-26, 28-30, 32, 34-36, 38 and 42 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 8-18, 21-26, 28-30, 32, 34, 36 and 38 have been considered but are moot because the arguments do not apply to the references used in this rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 14-15, 28-29, 34-35 and 42 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by a US Patent to Liberty (7,158,118) (hereinafter "Liberty I").

Regarding Claims 1, 14, 28-29 and 34 (All Currently Amended), Liberty I discloses an input apparatus (Title), comprising:

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a motion detector(Abtract) which detects a movement of the ~~electronic~~ input apparatus (Col. 4, ll. 28-31); an Input unit which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected movement (Cols. 16-17, ll. 65-23, respectively, where the user frame of reference is not assumed to be stationary), such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and a controller which selects the function among a plurality of functions based on the received user input, {in response to the movement of the input apparatus being detected within a predetermined amount of time after the user input is received} (Col. 14, ll. 39-49, proposed by the Applicant in response to the Examiner's suggestion and therefore not an entered Amendment)}, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device. (Col. 6, ll. 31-38).

Regarding Claims 2 and 15 (Both Original), Liberty I discloses the input apparatus as claimed in Claim 1, and is capable of performing the method as claimed in Claim 14, respectively, and further discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector (Col. 16, ll. 38-46) and a user manipulation input to the input unit. (Col. 16, ll. 5-6).

Regarding Claim 35 (Previously Presented), Liberty I discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus (Col. 4, ll.

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28-31), the method comprising:

detecting a movement of the electric apparatus for performing a function of an external device (Abstract); generating first signals corresponding to the detected movement (Cols. 16-17, ll. 65-23, respectively, where the user frame of reference is not assumed to be stationary); receiving user manipulations for selecting the function among a plurality of functions (Fig. 1: Function) based on the received user input; generating second signals corresponding to the selected functions (Cols. 16-17, ll. 65-23); combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected functioning and generating a command by combining the first and second signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated (Cols. 16-17, ll. 65-23, where any electronic device takes action, typically nanoseconds after the instruction) and further discloses that the reception of the aforesaid user manipulations were on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected movement. (Col. 16, ll. 5-6).

Regarding Claim 42 (New), Liberty I discloses the input apparatus as claimed in Claim 1, and further discloses wherein the selected function is a volume adjustment function, wherein the command associated with the selected function is a volume up or a volume down command. (Col. 6, ll. 41-45)

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Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

- i. Determining the scope and contents of the prior art.
- ii. Ascertaining the differences between the prior art and the claims at issue.
- iii. Resolving the level of ordinary skill in the pertinent art.
- iv. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

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3. Claims 9, 11-12, 21-22 and 24-25 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over a US Patent to Liberty (7,158,118) (hereinafter "Liberty I") in view of a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claim 9 (Previously Presented) Liberty I discloses the input apparatus as claimed in claim 1, and further discloses wherein the input unit includes a button unit having a plurality of buttons (Col. 15, ll. 46-50) but fails to disclose wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

Ohta teaches wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pg. 4, ¶[0078], discloses combining pressing a button and moving a controller).

Liberty I and Ohta are analogous because they are both concerned with the same endeavor, Control Devices. It would have been obvious to one having ordinary skill in

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the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of Ohta, since such a modification would have combined motion detectors with manual input and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 11, 21 and 24 (All Previously Presented) Liberty I discloses the input apparatus claimed in claim 1 and is capable of a methods as disclosed in Claim 14 but fails to disclose wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an user touch signal.

Ohta teaches wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected

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motion signal and an input touch signal. (Pg. 4, ¶[0078], discloses combining pressing a button and moving a controller).

Liberty I and Ohta are analogous because they are both concerned with the same endeavor, Control Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of Ohta, since such a modification would have combined motion detectors with manual input and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 12, 22 and 25 (All Previously Presented) Liberty I discloses the input apparatus and is capable of the method as claimed in claims 1, 14, and 14, respectively, but fails to disclose wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined

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time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

Ohta teaches wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Pg. 4, ¶[0078], discloses combining pressing a button and moving a controller).

Liberty I and Ohta are analogous because they are both concerned with the same endeavor, Control Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of Ohta, since such a modification would have combined motion detectors with manual input and have been obvious as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

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4. Claims 3-5, 8, 10, 13, 16-18, 23, 26, 28-30, 32 and 38 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent to Liberty (7,158,118) (hereinafter "Liberty I") in view of a US Patent Application Publication by Liberty et al. (2005/0253806) (hereinafter "Liberty II") .

Regarding Claims 3 and 16 (Both Original), Liberty I discloses the input apparatus and is capable of the method disclosed as claimed in claims 2 and 15, respectively, but fails to disclose wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

Liberty II teaches wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 5, ¶[0041]).

Liberty I and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by

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Liberty I with the teachings of Liberty II as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 4 and 17 (Both Original), Liberty I-Liberty II Combination discloses the input apparatus and is capable of the method disclosed as claimed in claims 3 and 16, respectively, and Liberty et al. II. further discloses wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction (Id.), wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 17, Claim 21).

Regarding Claims 5 and 18 (Original), the Liberty I-Liberty et al. II Combination discloses the input apparatus and is capable of the method as claimed in claims 4 and 17, respectively, and Liberty et al. II further discloses wherein the direction manipulation

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input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 1, ¶[0006]).

Regarding Claims 6 and 7 (Canceled).

Regarding Claim 8 (Previously Presented) Liberty I discloses the input apparatus as claimed in claim 1, but fails to disclose wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Liberty et al. II teaches wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Liberty I and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of Liberty II because a predetermined time delay was added and all the claimed elements were known in the prior art and one skilled in the art could

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have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 10 and 23 (Both Previously Presented) Liberty I discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and but fails to disclose wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Liberty et al. II teaches wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Pg. 15, ¶[0124]).

Liberty I and Liberty et al. II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary

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skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Liberty et al. II, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 13 and 26 (Both Original), Liberty I discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, but fails to disclose wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

Liberty et al. II teaches wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Pgs. 15-16, ¶¶[0130-0131]).

Liberty I and Liberty et al. II are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Liberty et al. II, as all the claimed elements were

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known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 19 and 20 (Both Canceled)

Regarding Claim 27 (Canceled).

Regarding Claim 28 (Previously Presented), Liberty I discloses an electronic apparatus (Abstract) comprising:

a motion detector (Col. 16, ll. 38-46) to detect a movement of the electric apparatus for performing a function of an external device (Col. 6, ll. 31-38) and to generate first signals corresponding to the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector (Col. 16, ll. 38-46), for selecting the function among a plurality of functions based on the received user input and to generate second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device

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in order to perform the selected function (Col. 6, ll. 31-38), and further discloses generation of second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function. (Cols. 16-17, ll. 65-23, respectively, where the user frame of reference is not assumed to be stationary).

Regarding Claim 29 (Previously Presented), Liberty I discloses an electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor (Col. 4, ll. 56-67) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; but fails to disclose an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected motion; and a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device. (Cols. 16-17, ll. 65-23, respectively, where the user frame of reference is not assumed to be stationary).

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Regarding Claim 30 (Previously Presented), the Liberty I-Liberty II Combination discloses the electronic apparatus of Claim 29, and discloses it further comprising: a converter to receive a translation data signal and a rotation data signal. (Fig. 7: 812).

Regarding Claim 31 (Cancelled).

Regarding Claim 32 (Previously Presented), Liberty I discloses the electronic apparatus of Claim 1, but fails to disclose wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

Liberty II teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Liberty I and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty I with the teachings of Liberty II, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550

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U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 33 (Cancelled).

Regarding Claim 38 (Previously Presented), Liberty I discloses an apparatus capable of performing the method of claim 14, but fails to disclose wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

Liberty II. teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Liberty II and Liberty II are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination

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yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

5. Claims 35-36 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over a US Patent to Liberty II (2005/0253806) in view of a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claim 35 (Currently Amended), Liberty II discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor (Pg. 5, ¶[0047]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; and transmitting the generated command to the external device. (Pg. 9, ¶[0096]); generating a command to perform the selected function by combining the detected translation (Id.), the detected rotation and the user selection input but fails to disclose receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation.

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such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector.

Ohta teaches receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation. (Abstract).

Liberty II and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

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Regarding Claim 36 (Original) the Liberty II-Ohta Combination discloses an apparatus capable of performing the method of claim 35, and Liberty II further discloses it comprising:

receiving a translation data signal and a rotation data signal into a converter. (Pg. 5, ¶[0041]).

/JEFFREY S STEINBERG/

Examiner, Art Unit 2622

/CHARLES V HICKS/

Primary Examiner, Art Unit 2622

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	Page 1 of 1

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*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A US-7,158,118 B2	01-2007	Liberty; Matthew G.	G06F3/017	345/156
*	B US-2008/0125223 A1	05-2008	Ohta; Keizo	A63F13/04	463/36
*	C US-2005/0253806 A1	11-2005	Liberty, Matthew G.	G06F1/3215	345/156
	D US-				
	E US-				
	F US-				
	G US-				
	H US-				
	I US-				
	J US-				
	K US-				
	L US-				
	M US-				

FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	30558	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:50
S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:52
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipul\$5) contoller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
S15	1	"20080042986".pn.	US-PGPUB; USPAT	OR	OFF	2012/02/15 09:07

S16	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S17	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S18	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S19	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S20	41974	S16 S17 S18 S19	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S21	1	S20 (input adj2 apparatus) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 16:29
S22	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S23	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S24	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S25	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S26	41974	S22 S23 S24 S25	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S27	1	S26 (accelerometer OR gesture OR cursor OR pointer OR arrow) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:03

S28	2	S26 ((INPUT with device) or (accelerometer OR gesture OR cursor OR pointer OR arrow)) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:06
S30	12	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 08:28
S31	4	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	USPAT	OR	OFF	2012/09/18 08:29
S32	37	348/734.ccls. and accelerometer	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 20:08
S33	0	"10799918"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/18 20:17
S34	1	("20060044282".PN.) (MOTION same input)	US-PGPUB	AND	ON	2012/09/20 14:31
S35	37728	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S36	3537	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S37	2433	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S38	4132	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S39	46596	S35 S36 S37 S38	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S42	1	S39 (motion adj1 detect\$3) contoller (functions)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:28
S43	1	S39 (motion adj1 detect\$3) contol\$3 functions	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:33

S44	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S45	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S46	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S47	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S48	46673	S44 S45 S46 S47	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S49	161	S48 (control with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:20
S50	1	S48 ((combine control) with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:38
S53	4	KANG-YONG-JIN.IN.	USPAT	OR	OFF	2013/05/09 15:19
S54	6	LEE-SUNG-HAN.IN.	USPAT	OR	OFF	2013/05/09 15:20
S55	0	SHIN-Hyun-coog.IN.	USPAT	OR	OFF	2013/05/09 15:25
S56	57	kim-dae-hyun.IN.	USPAT	OR	OFF	2013/05/09 15:25
S57	1	YOON-Eung-sik.IN.	USPAT	OR	OFF	2013/05/09 15:26
S58	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S59	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S60	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO;	OR	OFF	2013/05/09 15:29

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S62	46673	S58 S59 S60 S61	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S63	1	S62 ((combine control) with (motion adj1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 15:29
S64	1	WO-0126090-\$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 08:45
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S67	37847	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S68	3551	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S69	2437	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S70	4139	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S71	46734	S67 S68 S69 S70	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S72	150	S71 "288" threshold	US-PGPUB	AND	OFF	2013/05/15 18:55
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S74	4197	"288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 19:07
S75	6	KANG-Yong-jin.in.	USPAT	OR	OFF	2013/09/15 10:17

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S77	0	SHIN-Hyun-ooog.in.	USPAT	OR	OFF	2013/09/15 10:19
S78	62	KIM-Dae-hyun.in.	USPAT	OR	OFF	2013/09/15 10:20
S79	3	YOON-Eung-sik.in.	USPAT	OR	OFF	2013/09/15 10:21
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S81	2	"20090027335".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:28
S82	54627	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S83	4933	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S84	3211	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S85	5753	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S86	66725	S82 S83 S84 S85	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S87	988	S86 ((motion with detect\$3) same (input adj1 (apparatus or device)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2014/03/28 15:12
S88	1	"20080125223".pn.	US-PGPUB	OR	OFF	2014/03/30 12:48
S89	75084	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S90	6338	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO;	OR	OFF	2015/08/03 14:59


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S91	4061	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S92	7478	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S93	90596	S89 S90 S91 S92	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2015/08/03 14:59
S95	4061	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2015/08/03 14:59
S96	1	((combine control) with (motion adj1 detect\$2)) function S93 (touch with time)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2015/08/03 15:02

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	("15" ((combine control) with (motion adj1 detect\$2)) function (DETECT with predetermin\$2)).clm.	US-PGPUB; USPAT	AND	ON	2015/08/11 09:31
S52	0	"L5" ((combine control) with (motion adj1 detect\$2))	USPAT	AND	ON	2013/05/09 10:47
S97	0	("15" ((combine control) with (motion adj1 detect\$2)) function (touch with time)).clm.	US-PGPUB; USPAT	AND	ON	2015/08/03 15:03

8/ 11/ 2015 10:00:51 AM

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Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE								
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014	02/26/2015	08/20/2015
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓
	6	✓	✓	✓	✓	-	-	-	-	-
	7	✓	✓	✓	✓	-	-	-	-	-
	8	✓	✓	✓	✓	✓	✓	✓	✓	✓
	9	✓	✓	✓	✓	✓	✓	✓	✓	✓
	10	✓	✓	✓	✓	✓	✓	✓	✓	✓
	11	✓	✓	✓	✓	✓	✓	✓	✓	✓
	12	✓	✓	✓	✓	✓	✓	✓	✓	✓
	13	✓	✓	✓	✓	✓	✓	✓	✓	✓
	14	✓	✓	✓	✓	✓	✓	✓	✓	✓
	15	✓	✓	✓	✓	✓	✓	✓	✓	✓
	16	✓	✓	✓	✓	✓	✓	✓	✓	✓
	17	✓	✓	✓	✓	✓	✓	✓	✓	✓
	18	✓	✓	✓	✓	✓	✓	✓	✓	✓
	19	✓	✓	✓	✓	-	-	-	-	-
	20	✓	✓	✓	✓	-	-	-	-	-
	21	✓	✓	✓	✓	✓	✓	✓	✓	✓
	22	✓	✓	✓	✓	✓	✓	✓	✓	✓
	23	✓	✓	✓	✓	✓	✓	✓	✓	✓
	24	✓	✓	✓	✓	✓	✓	✓	✓	✓
	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
	26	✓	✓	✓	✓	✓	✓	✓	✓	✓
	27	✓	✓	✓	✓	-	-	-	-	-
	28	✓	✓	✓	✓	✓	✓	✓	✓	✓
	29	✓	✓	✓	✓	✓	✓	✓	✓	✓
	30	✓	✓	✓	✓	✓	✓	✓	✓	✓
	31	✓	✓	✓	-	-	-	-	-	-
	32	✓	✓	✓	✓	✓	✓	✓	✓	✓
	33	✓	✓	✓	✓	-	-	-	-	-
	34	✓	✓	✓	✓	✓	✓	✓	✓	✓
	35	✓	✓	✓	✓	✓	✓	✓	✓	✓
	36	✓	✓	✓	✓	✓	✓	✓	✓	✓

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE								
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014	02/26/2015	08/20/2015
	37	✓	✓	✓	-	-	-	-	-	-
	38	✓	✓	✓	✓	✓	✓	✓	✓	✓
	39	✓	✓	✓	✓	-	✓	✓	-	-
	40	✓	✓	✓	✓	-	✓	✓	✓	-
	41				✓	-	✓	✓	✓	-
	42							✓	✓	✓

Search Notes 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
345	156-178	2/14/2012	JSS
463	36-39	2/14/2012	JSS
348	14.05, 114, 734	2/14/2012	JSS
715	810 ,831 ,856	2/14/2012	JSS

SEARCH NOTES		
Search Notes	Date	Examiner
Consulted Steve Sherman, AU 2629	12/13/2012	jss
Consulted Kirk Hermann	5/12, 9/1&14/2013	jss
Consulted Srilakshmi Kumar	8/19/2015	JSS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
345	156-178	5/9/2013	JSS
463	36-39	5/8/2013	JSS
348	14.05, 114, 734	5/8/2013	JSS
715	810 ,831 ,856	5/8/2013	JSS

/J.S./ Examiner.Art Unit 2629	
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yong-jin KANG et al.

Serial No. 12/413,722

Group Art Unit: 2622

Confirmation No. 9676

Filed: March 30, 2009

Examiner: Jeffrey S. STEINBERG

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT
METHOD APPLIED TO SUCH INPUT APPARATUS

REQUEST FOR RECONSIDERATION

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

This is in response to the Office Action mailed March 19, 2015, and having a period for response set to expire on June 19, 2015

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 1 and 32 in accordance with the following:

1. (Currently Amended) An input apparatus, comprising:
a motion detector which detects a movement of the ~~electronic input~~ apparatus;
an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate
e from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and
a controller which selects the function among a plurality of functions based on the received user input, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.
2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:
detecting a movement of the electronic apparatus ;
receiving a user input by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;
selecting the function among a plurality of functions based on the received user input; and
generating a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Previously Presented) An electronic apparatus comprising:
a motion detector to detect a movement of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected movement;
an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, for selecting the function among a plurality of functions based on the received user input and to generate second signals corresponding to the selected function;
a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function.

29. (Previously Presented) An electronic apparatus, comprising:
a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;
an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and
a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Currently Amended) The ~~electronic~~input apparatus of claim 1, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the ~~electronic~~input apparatus.

33. (Cancelled)

34. (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:
detecting a movement of the electric apparatus for performing a function of an external device;
generating first signals corresponding to the detected movement;
receiving user manipulations for selecting the function among a plurality of functions based on the received user input on an input unit disposed on the electronic apparatus such that the user

manipulations are separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

generating second signals corresponding to the selected functions;

combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function; and

35. (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input; and

transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

42. (Previously Presented) The input apparatus as claimed in claim 1, wherein the selected function is a volume adjustment function,

wherein the command associated with the selected function is a volume up or a volume down command.

REMARKS

INTRODUCTION:

As set forth in the preceding section, claims 1 and 32 have been amended to correct an error and not for reasons related to patentability. No claims have been added or cancelled here.

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36, and 38 are pending and under consideration. Claims 1, 14, 28, 29, 34, and 35 are independent claims. Reconsideration of the claims in view of the following remarks is respectfully requested.

REJECTIONS UNDER 35 USC § 102 & § 103:

Claims 1-2, 9, 11-12, 14-15, 21-22, 24-25 and 42 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by US Patent Publication 2008/0125223 by Ohta (Ohta). Claims 3-5, 8, 10, 13, 16-18, 23, 26, 28-30, 32, 34-36 and 38 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent Application Publication 2005/0253806 by Liberty et al. (Liberty) in view of Ohta. All rejections are respectfully traversed.

Independent claim 1 was previously amended to recite at least the following:

a controller which selects the function among a plurality of functions based on the received user input, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

Applicants assert that the Office Action fails to establish that Ohta and Liberty, alone or in combination, suggest or disclose all of the above-recited features of claim 1.

The Request for Reconsideration After Final filed January 16, 2015 explained why Ohta and Liberty do not disclose or suggest the above-recited features of independent claim 1. Applicants further explained the difference between the above-claimed controller and Ohta in the telephone interview conducted on January 27, 2015 (see the interview summary at the bottom of this section).

The current Action, however, ***has not answered these assertions on the merits***. Applicants respectfully submit that the January 16, 2015 assertions are still applicable despite the Office changing the rejection from relying upon only Ohta to relying upon Ohta and Liberty for some of the dependent claims such as claims 2, 11 and 12.

The same arguments are therefore presented again here, but in a different manner and with additional detail added to help clarify the differences between Ohta and the claimed controller.

In the controller recited in claim 1, a **command associated with the function (that is selected based on the received user input) is generated by combining the detected movement and the received user input.** This is not disclosed in Ohta.

Ohta relates to a remote control for a Nintendo video game device such as a Nintendo Wii. The Action appears to rely on Ohta's motion detecting means, which may be an acceleration sensor (37) to disclose the motion detector detecting a movement of claim 1. In Ohta however, the motion detecting means is merely used to calculate a tilt value of the controller and is not combined with a received user input to generate a command associated with the function (paragraph [0093], [0125]).

For example, Ohta clearly describes that the tilt detected by the motion detecting means is used to notify the player of a direction in which the player should turn the controller 5 rather than being "combined with a received user input to generate a command associated with the function," as in claim 1 (see, e.g., paragraph [0106]). As another example, Ohta describes how the game apparatus 3 compares the reference value c with the current tilt value t of the controller 5 to determine whether the controller 5 is oriented excessively upward or downward (paragraph [0119]). Ohta further describes using the comparison of the reference value c with the current tilt value t of the controller 5 to provide a warning to the user in the form of an image which indicates the current tilt of the controller 5 is oriented excessively downward (paragraph [0147]).

Consequently, Ohta's motion detecting means is merely used to obtain a tilt value used to notify the player of a direction in which the player should turn the controller 5 and to provide a warning to the user of excessive tilt of the controller 5 and thus the Action fails to establish that Ohta's motion detecting means is combined with a received user input to generate a command associated with a user-selected function as in claim 1.

In the interview conducted on January 27, 2015, Examiner Steinberg indicated that he is specifically relying on the following portion of paragraph [0148] of Ohta:

In step S11, the CPU 10 executes a game process depending on a game operation performed by the player. Specifically, a game process is executed based on a pointing position indicated by the pointing position data 70 stored in the main memory 13.

The rejection relies upon the interpretation that the preceding sentences describe **two distinct operations**, the first being “a game operation performed by the player” and the second being “a game process executed based on a pointing position” and the separate assertion that these separate functions are inherently combined by Ohta's controller 5.

We asserted during the interview that this interpretation is incorrect because each of the two sentences from Ohta's paragraph [0148] describe the **same** game process of step 11. The current Office Action is completely unresponsive to this assertion, and therefore we expand on this assertion here.

In fact, the first sentence cited from paragraph [0148] is merely a general description of the game process S11 of FIG. 13, while the second sentence provides a more specific example of the game process. Therefore the cited paragraph merely describes a command based on a detected movement but not combining the detected movement and the received user input as claimed.

For example, Ohta separately describes independent game operations that may be performed by controller 5 including a game “operation of pointing [to] any position on the screen using the controller 5” (see e.g. FIG. 7 and paragraph [0100]) and “a game operation of pressing down each operation button such as buttons 32a to 32i of the operation section 32 (see e.g. paragraphs [0100] and [0113]).

Referring again to FIG. 7 and corresponding text, Ohta again clarifies that a pointing operation is an independent game operation (i.e. a game operation independent from an operation of pressing an operation button). For example, in describing FIG. 7, Ohta states in part:

An exemplary game operation will be described with reference to FIG. 7. FIG. 7 is a diagram illustrating a situation where the controller 5 is used to perform a game operation. In this embodiment, as illustrated in FIG. 7, the player performs a game operation of pointing at a position P on the screen of the television 2 using the controller 5 (paragraphs [0102]).

As apparent from the text above, a game operation of Ohta is a pointing operation as also described at FIG. 7 and paragraph [0102]. The two sentences of paragraph [0148] relied upon for the rejection, however, merely describe such a pointing operation in the context of FIG. 13 and the marker detection and pointer position calculation process. Taken in that context, the two sentences fail to describe generating a command by combining two different types of inputs (i.e. a pointing operation and selecting of an operation button).

For example, paragraph [0148] of Ohta states in part:

In step S11, the CPU 10 executes a game process depending on a game operation performed by the player. Specifically, a game process is executed based on a pointing position indicated by the pointing position data 70 stored in the main memory 13. Note that, when the process of step S11 is executed following step S9 or S10, the pointing position indicated by the pointing position data 70 is not a position which is currently pointed by the controller 5, and is a pointing position which is calculated when the markers 6R and 6L have been detected most recently. Such a pointing position may not be a correct game input which is intended by the player. Therefore, the process of step S11 is executed following step S9 or S10, the CPU 10 may execute a process of temporarily suspending the game.

Thus, the two sentences relied upon in the rejection (the first two sentences in the cited paragraph above) both describe the same game process S11, which is described as depending on a "game operation" such as the pointing operation of FIG. 7. That is, the first two sentences describe the same pointing operation both generally and then more specifically. In the context of the complete paragraph the first two sentences can be interpreted as stating that in step S11, the CPU 10 executes a game process depending on a pointing operation performed by the player **and** that the pointing position of the **same** pointing operation is indicated by the pointing position data 70 stored in the main memory 13. In the context of the complete paragraph, this pointing operation is described principally to clarify that the pointing position may not be the actual position of the controller 5 when the controller is out of measurable marker range (i.e. is oriented excessively upwards or downwards) but may **instead** be the last measured position of the controller.

Consequently, in view of all of the above assertions, Applicants request that if the rejection of the above-claimed controller is to be maintained in view of paragraph [0148] of Ohta, the Action **must** provide an informative rejection by specifically responding to each of the assertions set forth above.

As noted in at least MPEP 707.07(f), the Examiner is required to answer and address all traversals. Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it (emphasis added). This requirement is in addition to any repetition of a previously held position and is required to allow the applicant a chance to review the Examiner's position as to these arguments and to clarify the record for appeal.

Absent such a response, it should be noted that Ohta fails to disclose a controller as claimed.

In addition, the Office Action fails to demonstrate that Liberty compensates for the noted deficiencies of Ohta.

Thus, independent claim 1 patentably distinguishes over the cited references and should be allowable for at least the above-mentioned reasons. Since similar features recited by independent claim 14, with potentially differing scope and breadth, are not suggested or disclosed by the references, the rejections should be withdrawn and claim 14 also allowed.

Further, the dependent claims, which variously depend from independent claims 1 and 14, should be allowable for at least the same reasons as claims 1 and 14, as well as for the additional features recited therein.

Amended independent claim 28 recites at least the following:

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function.

Applicants assert that the Office Action fails to establish that Ohta and Liberty, alone or in combination, suggest or disclose all of the above-recited features of claim 28.

The Office Action at page 11, again relies on Ohta's paragraph [0148] to describe all of the above-recited features. Applicants disagree for the same reasons provided above for independent claim 1.

Applicants further assert that Liberty fails to describe the claimed controller.

Liberty relates to a remote controller having a motion detecting sensor (abstract). Specifically, the remote controller in Liberty is embodied as a free space pointing device 400. However, in contrast with the controller of claim 28, motion of Liberty's free space pointing device 400 is used to implement a single command. For example, Liberty states in part:

According to exemplary embodiments of the present invention, it is anticipated that free space pointing devices 400 will be held by a user in front of a display 408 and that motion of the free space pointing device 400 will be translated by the free space pointing device into output which is usable to interact With the information displayed on display 408, e.g., to move the cursor 410 on the display 408. For example, rotation of the free space pointing device 400 about the y-axis can be sensed by the free space pointing device 400 and translated into an output usable by the system to move cursor 410 along the y2 axis of the display 408. Likewise, rotation of the free space pointing device 408 about the

Z-axis can be sensed by the free space pointing device 400 and translated into an output usable by the system to move cursor 410 along the x2 axis of the display 408 (paragraph [0038]).

Thus, as apparent from the preceding text, Liberty's free space pointing device 400 is used to implement a single command such as moving a cursor along a particular axis of a display. Although Liberty does discuss moving a cursor to implement other commands such as cursor fading, volume or media transport, or zooming in or out, in each case movement of Liberty's free space pointing device 400 is used to implement only a single command and is not described as being combined with user manipulations separate from the detected movement, and corresponding to a function as recited in claim 28.

In other embodiments, Liberty describes post-processing readings of a free space pointing device 400. More specifically, in Liberty, once calibrated sensor readings have been compensated for linear acceleration, processed into readings indicative of angular rotation of the free-space pointing device 400, and compensated for tilt, then post processing can be performed to compensate for various factors such as human tremor. In other words, Liberty allows human tremor to be removed from a motion of the free space pointing device 400 for more accurate readings of the free space pointing device 400.

However, Liberty does not address two separate inputs within the free space pointing device 400, such that a first input is a detected movement, and the second input is user manipulation such that the received user input is separate from the detected motion and not based on the motion detected by free space pointing device 400. In other words, Liberty merely analyzes a motion of the free space pointing device 400, performs various types of calibrations and compensations on the motion, and then performs a final compensation for other factors experienced during the motion, such as human tremor and used the compensated signal to generate a single command. In other words, all the factors compensated for and calibrated in Liberty are directed only to a single input of the motion of the free space pointing device 400, and there is no separate input received by an input unit disposed on the free space pointing device 400 in Liberty and then combined with the motion detection. Accordingly, in Liberty there is no command to perform a single function that is generated by combining a motion detected input and a non-motion-detected input.

Therefore, for at least the above reasons, Liberty does not teach or suggest, among other things, "a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function," as recited in independent claim 28.

Accordingly, independent claim 28 patentably distinguishes over the cited references and should be allowable for at least the above-mentioned reasons. Since similar features recited by each of the independent claims 29, 34, and 35, with potentially differing scope and breadth, are not suggested or disclosed by the cited references, the rejections should be withdrawn and claims 29, 34, and 35 also allowed.

Further, claims 30 and 36, which variously depend from independent claims 29 and 35, should be allowable for at least the same reasons as claims 29 and 35, as well as for the additional features recited therein.

Dependent claim 11 recites at least:

wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

The Action at page 4 relies on Ohta's paragraph [0078] to describe all of the above-recited features. Applicants traverse.

The portion of Ohta cited in the Action states in full:

In FIGS. 3 and 4, the controller 5 has a housing 31 which is formed by, for example, plastic molding. The housing 31 is in the shape of substantially a rectangular parallelepiped where a front-to-rear direction (the Z-axis direction in FIG. 3) is a longitudinal direction. The whole housing 31 has a size which enables an adult and a child to hold the controller 5 with one hand. A player performs a game operation by using the controller 5, i.e., specifically, pressing down a button provided on the controller 5, and moving the controller 5 itself to change a position or an attitude of the controller 5 (paragraph [0078]).

As is apparent from the preceding text, the cited portion of Ohta describes pressing down a button provided on the controller 5 and moving the controller 5 but fails to describe generating a command by combining a signal associated with the pressing of the button and the moving of the controller. Furthermore, the cited paragraph is silent with respect to the timing of the independent operations.

The cited portion of Ohta consequently fails to describe all of the above-recited features of dependent claim 11. In addition, the Office Action fails to demonstrate that Liberty compensates for the noted deficiencies of Ohta and so claim 11 should be allowed.

INTERVIEW SUMMARY:

A telephone interview was conducted with Examiner Jeffrey Steinberg on January 27, 2015. In the interview, Applicant's representative presented arguments with respect to independent claim 1. The current Office Action is unresponsive to these arguments and therefore they are included here for further consideration by the Examiner. More specifically, the Examiner clarified that the rejection relies on paragraph [0148] of Ohta, which allegedly describes two distinct operations, the first being "a game operation performed by the player" and the second being "a game process executed based on a pointing position" and that these separate functions are inherently combined by Ohta's controller 5. Applicants pointed out to the Examiner that his interpretation is incorrect because each of the two sentences from Ohta describes the same game process of step 11 as described above in more detail.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: June 18, 2015

By: 

David J. Cutitta
Registration No. 52,790

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

REPLY/AMENDMENT FEE TRANSMITTAL	Attorney Docket No.	2456.1058
	Application Number	12/413,722
	Filing Date	March 30, 2009
	First Named Inventor	Yong-jin KANG et al.
	Group Art Unit	2622
AMOUNT ENCLOSED	0.00	Examiner Name Jeffrey S. STEINBERG

FEE CALCULATION (fees effective 03/19/2013)

CLAIMS AS AMENDED	Claims Remaining After Amendment	Highest Number Previously Paid For	Number Extra	Rate	Calculations
TOTAL CLAIMS	31	- 41 =	0	X \$ 80.00 =	\$ 0.00
INDEPENDENT CLAIMS	6	- 6 =	0	X \$ 420.00 =	0.00

Since an Official Action set an original due date of June 19, 2015, petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month (\$200)); (2 months (\$600)); (3 months (\$1,400)); (4 months (\$2,200)); (5 months (\$3,000)):

If Notice of Appeal is enclosed, add (\$800.00)

If Statutory Disclaimer under Rule 20(d) is enclosed, add fee (\$160.00)

Information Disclosure Statement (Rule 1.17(p)) (\$180.00)

Total of above Calculations =

\$ 0.00

Reduction by 50% for filing by small entity (37 CFR 1.27)

TOTAL FEES DUE =

\$ 0.00

(1) If entry (1) is less than entry (2), entry (3) is "0".

(2) If entry (2) is less than 20, change entry (2) to "20".

(4) If entry (4) is less than entry (5), entry (6) is "0".

(5) If entry (5) is less than 3, change entry (5) to "3".

METHOD OF PAYMENT

- Check enclosed as payment.
- Charge "TOTAL FEES DUE" to the Deposit Account No. below.
- EFS-Web Authorization for "TOTAL FEES DUE" to Credit Card.
- No payment is enclosed.

GENERAL AUTHORIZATION

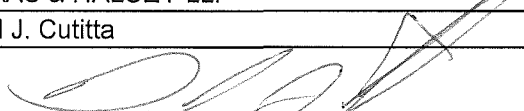
- If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:

Deposit Account No. 19-3935

Deposit Account Name STAAS & HALSEY LLP

- The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STAAS & HALSEY LLP

Typed Name	David J. Cutitta	Reg. No.	52,790
Signature		Date	June 18, 2015

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Electronic Acknowledgement Receipt

EFS ID:	22667028
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	21171
Filer:	David John Cutitta/Mikel Severson
Filer Authorized By:	David John Cutitta
Attorney Docket Number:	2456.1058
Receipt Date:	18-JUN-2015
Filing Date:	30-MAR-2009
Time Stamp:	10:14:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amendment.pdf	1739591 <small>377ff7ab03e5ecc2dd23e9d891cb1a10a3d00a41</small>	yes	17

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Amendment/Req. Reconsideration-After Non-Final Reject		1	1
Claims		2	8
Applicant Arguments/Remarks Made in an Amendment		9	16
Fee Worksheet (SB06)		17	17

Warnings:

Information:

Total Files Size (in bytes):	1739591
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
<small>* If the difference in column 1 is less than zero, enter "0" in column 2.</small>			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	06/18/2015	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	* 31	Minus	** 40	= 0	X \$80 = 0
	Independent <small>(37 CFR 1.16(h))</small>	* 6	Minus	*** 14	= 0	X \$420 = 0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
 /Tina J. Barden/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
12/413,722 03/30/2009 Yong-jin KANG 102-1567 9676

21171 7590 03/19/2015
STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

STEINBERG, JEFFREY S

ART UNIT PAPER NUMBER

2622

NOTIFICATION DATE DELIVERY MODE

03/19/2015

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail@s-n-h.com

Office Action Summary

Application No. 12/413,722	Applicant(s) KANG ET AL.	
Examiner Jeffrey S. Steinberg	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 16 January 2015.
- 2a) This action is **FINAL**.
- 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-42 is/are pending in the application.
5a) Of the above claim(s) 6,7,19,20,27,31,33,37 and 39-41 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-5,8-18,21-26,28-30,32,34-36,38 and 42 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 8-18, 21-26, 28-30, 32, 34-35 and 38 have been considered but are moot because the arguments do not apply to the citations or the entirely different rejections being advanced currently.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 9, 11-12, 14-15, 21-22, 24-25 and 42 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claims 1 and 14 (Both Currently Amended), Ohta discloses an input apparatus (Abstrac]) capable of performing a method, comprising:
a motion detector (ld.) which detects a ~~motion~~movement of the electronic apparatus;

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an input unit ~~which is more sensitive than the motion detector and~~ which is disposed on the input apparatus (Fig. 3:5) to receive user input by a user manipulation separate from the detected ~~motion~~movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector (Pg. 5, ¶[0090]); and a controller (Pg. 5, ¶[0081]) which selects the function among a plurality of functions based on the received user input, generates a ~~predetermined~~ command associated with the selected function by combining the detected ~~motion~~ movement and the received user manipulation input to the input unit, and controls the generated ~~predetermined~~ command to be transmitted to an external device (Pg. 11, ¶[0148], where the pointing position input can disable the game regardless of the function chosen), ~~wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.~~

Regarding Claims 2 and 15 (Both Original), Ohta discloses the input apparatus and is capable of performing the method as claimed in claims 1 and 14, respectively, and further discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Pg. 4, ¶[0078], discloses combining pressing a button and moving a controller).

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Regarding Claim 9 (Previously Presented) Ohta discloses the input apparatus as claimed in claim 1, and further discloses wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pg. 4, ¶[0078], discloses combining pressing a button and moving a controller).

Regarding Claims 11, 21 and 24 (All Previously Presented) Ohta discloses the input apparatus claimed in claim 1 and is capable of a methods as disclosed in Claim 14 and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal. (Pg. 4, ¶[0078], discloses combining pressing a button and moving a controller).

Regarding Claims 12, 22 and 25 (All Previously Presented) Ohta discloses the input apparatus and is capable of the method as claimed in claims 1, 14, and 14, respectively, and further discloses wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined

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time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

Regarding Claim 42 (New), Ohta discloses the input apparatus as claimed in Claim 1, wherein the selected function is a volume adjustment function, wherein the command associated with the selected function is a volume up or a volume down command. (Fig. 3: 32b, 32c).

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

- i. Determining the scope and contents of the prior art.
- ii. Ascertaining the differences between the prior art and the claims at issue.
- iii. Resolving the level of ordinary skill in the pertinent art.
- iv. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

3. Claims 3-5, 8, 10, 13, 16-18, 23, 26, 28-30, 32, 34-36 and 38 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent Application Publication by Liberty et al. (2005/0253806) in view of a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claims 3 and 16 (Both Original), Ohta Combination discloses the input apparatus and is capable of the method disclosed as claimed in claims 2 and 15, respectively, but fails to disclose wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 5, ¶[0041]).

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Liberty teaches wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

(Pg. 5, ¶[0041]).

Ohta and Liberty et al. are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 4 and 17 (Both Original), the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method disclosed as claimed in

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claims 3 and 16, respectively, and Liberty et al. further discloses wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction (Id.), wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 17, Claim 21).

Regarding Claims 5 and 18 (Original), the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 4 and 17, respectively, and Liberty et al. further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 1, ¶[0006]).

Regarding Claims 6 and 7 (Canceled).

Regarding Claim 8 (Previously Presented) Ohta discloses the input apparatus as claimed in claim 1, but fails to disclose wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

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Liberty teaches wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Regarding Claims 10 and 23 (Both Previously Presented) Ohta discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and but fails to disclose wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Liberty teaches wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Ohta and Liberty et al. are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the

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prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 13 and 26 (Both Original), Ohta discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, but fails to disclose wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

Liberty et al. teaches wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Pgs. 15-16, ¶¶[0130-0131]).

Ohta and Liberty et al. are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination

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yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claims 19 and 20 (Both Canceled)

Regarding Claim 27 (Canceled).

Regarding Claim 28 (Currently Amended), Ohta discloses an electronic apparatus (Abstract) comprising:

a motion detector (Id.) to detect a ~~motion~~movement of the electric apparatus for performing a function of an external device (Fig. 3:5) and to generate first signals corresponding to the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector (Pg. 5, ¶[0090]), for selecting the function ~~of~~among a plurality of functions based on the received user input and to generate second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function,[sic] (Pg. 11, ¶[0148], where the pointing position input can disable the game regardless of the function chosen) ~~wherein, if the~~

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~~second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals.~~ but fails to disclose generation of second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function,[sic].

Liberty et al. teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

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Regarding Claim 29 (Previously Presented), Liberty et al. discloses an electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor (Pgs. 15-16, ¶¶[0130-0131]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; but fails to disclose an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected motion; and a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

Ohta teaches wherein the motion detector is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550

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U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 30 (Previously Presented), the Liberty et al.-Ohta Combination discloses the electronic apparatus of claim 29, and discloses it further comprising: a converter to receive a translation data signal and a rotation data signal. (Id.).

Regarding Claim 31 (Cancelled).

Regarding Claim 32 (Previously Presented), Ohta discloses the electronic apparatus of claim 1, but fails to disclose wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

Liberty teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by

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Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 33 (Cancelled).

Regarding Claim 34 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a ~~motion~~movement of the electric apparatus for performing a function of an external device (Abstract); generating first signals corresponding to the detected ~~motion~~movement (Pg. 2, ¶[0012]); receiving user manipulations for selecting the function ~~of~~among a plurality of functions (Pg. 2, ¶[0009]) based on the received user input; generating second signals corresponding to the selected functions; ~~and~~ combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected functioning and generating a command by combining the first and second

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signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated. (Pgs. 15-16, ¶¶[0130-0131]) but fails to disclose that the reception of the aforesaid user manipulations were on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected motion/movement.

Ohta teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

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Regarding Claim 35 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor (Pg. 5, ¶[0047]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;; and transmitting the generated command to the external device. (Pg. 9, ¶[0096]); generating a command to perform the selected function by combining the detected translation (Id.), the detected rotation and the user selection input but fails to disclose receiving user selection input ~~to~~ to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector.

Ohta teaches receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, as all the claimed elements were known in the

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prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at 416, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atl. & P. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

Regarding Claim 36 (Original) the Liberty et al.-Ohta Combination discloses an apparatus capable of performing the method of claim 35, and Liberty et al. further discloses it comprising:

receiving a translation data signal and a rotation data signal into a converter. (Pg. 5, ¶[0041]).

Regarding Claim 37 (Cancelled).

Regarding Claim 38 (Previously Presented), Ohta discloses an apparatus capable of performing the method of claim 14, but fails to disclose wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

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Liberty et al. teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038])

Regarding Claim 39-41 (Cancelled).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Application Publications by SMITH (2004/0218104) and BISSET (2004/0090423).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey Steinberg/
Examiner, Art Unit 2622

/CHARLES V HICKS/
Primary Examiner, Art Unit 2622

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-2005/0253806	11-2005	Liberty et al.	345/156
*	B US-2008/0042986	02-2008	Westerman et al.	345/173
*	C US-2006/0044282	03-2006	Pinhanez et al.	345/173
*	D US-2008/0125223	05-2008	Ohta, Keizo	463/36
*	E US-2004/0218104	11-2004	Smith et al.	348/734
*	F US-2004/0090423	05-2004	Bisset, Stephen J.	345/169
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			


FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE									
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014	02/26/2015		
	1	✓	✓	✓	✓	✓	✓	✓	✓		
	2	✓	✓	✓	✓	✓	✓	✓	✓		
	3	✓	✓	✓	✓	✓	✓	✓	✓		
	4	✓	✓	✓	✓	✓	✓	✓	✓		
	5	✓	✓	✓	✓	✓	✓	✓	✓		
	6	✓	✓	✓	✓	-	-	-	-		
	7	✓	✓	✓	✓	-	-	-	-		
	8	✓	✓	✓	✓	✓	✓	✓	✓		
	9	✓	✓	✓	✓	✓	✓	✓	✓		
	10	✓	✓	✓	✓	✓	✓	✓	✓		
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	23	✓	✓	✓	✓	✓	✓	✓	✓		
	24	✓	✓	✓	✓	✓	✓	✓	✓		
	25	✓	✓	✓	✓	✓	✓	✓	✓		
	26	✓	✓	✓	✓	✓	✓	✓	✓		
	27	✓	✓	✓	✓	-	-	-	-		
	28	✓	✓	✓	✓	✓	✓	✓	✓		
	29	✓	✓	✓	✓	✓	✓	✓	✓		
	30	✓	✓	✓	✓	✓	✓	✓	✓		
	31	✓	✓	✓	-	-	-	-	-		
	32	✓	✓	✓	✓	✓	✓	✓	✓		
	33	✓	✓	✓	✓	-	-	-	-		
	34	✓	✓	✓	✓	✓	✓	✓	✓		
	35	✓	✓	✓	✓	✓	✓	✓	✓		
	36	✓	✓	✓	✓	✓	✓	✓	✓		

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE								
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014	02/26/2015	
	37	✓	✓	✓	-	-	-	-	-	
	38	✓	✓	✓	✓	✓	✓	✓	✓	
	39	✓	✓	✓	✓	-	✓	✓	-	
	40	✓	✓	✓	✓	-	✓	✓	✓	
	41				✓	-	✓	✓	✓	
	42							✓	✓	



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
12/413,722 03/30/2009 Yong-jin KANG 102-1567 9676

21171 7590 02/10/2015
STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

STEINBERG, JEFFREY S

ART UNIT PAPER NUMBER

2622

NOTIFICATION DATE DELIVERY MODE

02/10/2015

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail@s-n-h.com

Applicant-Initiated Interview Summary	Application No. 12/413,722	Applicant(s) KANG ET AL.	
	Examiner Jeffrey S. Steinberg	Art Unit 2622	

All participants (applicant, applicant's representative, PTO personnel):

(1) Jeffrey S. Steinberg. (3) _____.

(2) David J. Cutitta, Reg. No. 52,790. (4) _____.

Date of Interview: 1/27/2015.

Type: Telephonic Video Conference
 Personal [copy given to: applicant applicant's representative]

Exhibit shown or demonstration conducted: Yes No.
If Yes, brief description: _____.

Issues Discussed 101 112 102 103 Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1,9 and 14.

Identification of prior art discussed: Ohta, Liberty.

Substance of Interview

(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

1] Practitioner does not think the Paragraph cited, [0148] of Ohta (2008/0125223), Specifically: "... the CPU 10 executes a game process depending on a game operation performed by the player. Specifically, a game process is executed base on a pointing position . . .", reads on his amendment to Claim 1 (ie, user input by manipulation {which I think is the 'operation' in the preceding quotation} AND the input through the motion detector.

2] In the last OA Examiner rejected Claim 28 using Ohta in view of "Ohta" which was a typo that should have been in view of Liberty The Abstract of Liberty was cited for the proposition that the handheld device that uses at least one sensor to detect motion and can perform other functions.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Attachment

/Jeffrey S. Steinberg/
Examiner, Art Unit 2622

/Alexander S. Beck/
Supervisory Patent Examiner, Art Unit 2622

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 2622
Docket No.: 2456.1058

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yong-jin KANG et al.

Serial No. 12/413,722

Group Art Unit: 2622

Confirmation No. 9676

Filed: March 30, 2009

Examiner: Jeffrey S. STEINBERG

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT
METHOD APPLIED TO SUCH INPUT APPARATUS

REQUEST FOR RECONSIDERATION AFTER FINAL

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

This is in response to the Office Action mailed October 16, 2014, and having a period for response set to expire on January 16, 2015.

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claim 28 in accordance with the following:

1. (Previously Presented) An input apparatus, comprising:
a motion detector which detects a movement of the electronic apparatus;
an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and
a controller which selects the function among a plurality of functions based on the received user input, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.
2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.
4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction,

wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch,

wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons,

wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch,

wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the

controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons,

wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electronic apparatus ;

receiving a user input by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among a plurality of functions based on the received user input; and
generating a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,

wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation,

wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:

a motion detector to detect a movement of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected movement;

an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, for selecting the function among a plurality of functions based on the received user input and to generate second signals corresponding to the selected function;

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected ~~function,~~function.

29. (Previously Presented) An electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The electronic apparatus of claim 1, wherein
the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

33. (Cancelled)

34. (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a movement of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected movement;

receiving user manipulations for selecting the function among a plurality of functions based on the received user input on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

generating second signals corresponding to the selected functions;

combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function; and

35. (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input; and
transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

42. (Previously Presented) The input apparatus as claimed in claim 1, wherein the selected function is a volume adjustment function,

wherein the command associated with the selected function is a volume up or a volume down command.

REMARKS

INTRODUCTION:

As set forth in the preceding section, claim 28 has been amended to correct an error and not for reasons related to patentability. No claims have been added or cancelled herein.

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36, and 38 are pending and under consideration. Claims 1, 14, 28, 29, 34, and 35 are independent claims. Reconsideration of the claims in view of the current amendments and the following remarks is respectfully requested.

REJECTIONS UNDER 35 USC § 103:

Claims 1, 9, 14 are rejected under pre-AIA 35 U.S.C. 1 02(b) as being anticipated by US Patent Publication 2008/0125223 by Ohta (Ohta). Claims 2-5, 8, 10-13, 15-18, 21-26, 28-30, 32, 34-36, 38 and 42 are rejected under pre-AIA 35 U.S.C. 1 03(a) as being unpatentable over US Patent Application Publication 2005/0253806 by Liberty et al. (Liberty) in view of Ohta. All rejections are respectfully traversed.

Previously amended independent claim 1 recites at least the following:

a controller which selects the function among a plurality of functions based on the received user input, *generates a command associated with the selected function by combining the detected movement and the received user input*, and controls the generated command to be transmitted to an external device.

Applicants assert that the Final Office Action fails to establish that Ohta and Liberty, alone or in combination, suggest or disclose all of the above-recited features of claim 1.

In the controller recited in claim 1, a ***command associated with the function (that is selected based on the received user input) is generated by combining the detected movement and the received user input.***

Ohta relates to a remote control for a Nintendo video game device such as a Nintendo Wii. The Action appears to rely on Ohta's motion detecting means, which may be an acceleration sensor (37) to disclose the motion detector detecting a movement of claim 1. In Ohta however, the motion detecting means is merely used to calculate a tilt value of the controller and is not combined with a received user input to generate a command associated with the function (paragraph [0093], [0125]).

For example, Ohta clearly describes that the tilt detected by the motion detecting means is used to notify the player of a direction in which the player should turn the controller 5 rather than being “combined with a received user input to generate a command associated with the function,” as in claim 1 (see, e.g., paragraph [0106]). As another example, Ohta describes how the game apparatus 3 compares the reference value c with the current tilt value t of the controller 5 to determine whether the controller 5 is oriented excessively upward or downward (paragraph [0119]). Ohta further describes using the comparison of the reference value c with the current tilt value t of the controller 5 to provide a warning to the user in the form of an image which indicates the current tilt of the controller 5 is oriented excessively downward (paragraph [0147]).

Consequently, Ohta's motion detecting means is merely used to obtain a tilt value used to notify the player of a direction in which the player should turn the controller 5 and to provide a warning to the user of excessive tilt of the controller 5 and thus the Action fails to establish that Ohta's motion detecting means is combined with a received user input to generate a command associated with a user-selected function as in claim 1.

In addition, the Office Action fails to demonstrate that Liberty compensates for the noted deficiencies of Ohta.

Thus, independent claim 1 patentably distinguishes over the cited references and should be allowable for at least the above-mentioned reasons. Since similar features recited by independent claim 14, with potentially differing scope and breadth, are not suggested or disclosed by the references, the rejections should be withdrawn and claim 14 also allowed.

Further, the dependent claims, which variously depend from independent claims 1 and 14, should be allowable for at least the same reasons as claims 1 and 14, as well as for the additional features recited therein.

Amended independent claim 28 recites at least the following:

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function.

Applicants assert that the Final Office Action fails to establish that Ohta and Liberty, alone or in combination, suggest or disclose all of the above-recited features of claim 28.

The Office Action notes at page 3, item b, that Ohta fails to describe all of the above-recited features. However, the Office Action proposes to modify Ohta with Liberty, and appears to assert that Liberty discusses a controller as claimed.

Applicants disagree, noting that the Action fails to provide any rationale or cite any portion of Liberty that describes a controller as claimed. For example, in the rejection of claim 28 at page 11 of the Action the only discussion of Liberty is as follows:

Ohta ... fails to disclose generation of second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function,[sic].

Ohta teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Thus, as apparent from the text above, there is no specific rationale provided in the Action describing how and where Liberty describes all of the features of the controller in claim 28.

To the contrary, Applicants assert that Liberty fails to describe the claimed controller.

Liberty relates to a remote controller having a motion detecting sensor (abstract).

Specifically, the remote controller in Liberty is embodied as a free space pointing device 400.

However, in contrast with the controller of claim 28, motion of Liberty's free space pointing device 400 is used to implement a single command. For example, Liberty states in part:

According to exemplary embodiments of the present invention, it is anticipated that free space pointing devices 400 will be held by a user in front of a display 408 and that motion of the free space pointing device 400 will be translated by the free space pointing device into output which is usable to interact With the information displayed on display 408, e.g., to move the cursor 410 on the display 408. For example, rotation of the free space pointing device 400 about the y-axis can be sensed by the free space pointing device 400 and translated into an output usable by the system to move cursor 410 along the y2 axis of the display 408. Likewise, rotation of the free space pointing device 408 about the Z-axis can be sensed by the free space pointing device 400 and translated into an output usable by the system to move cursor 410 along the x2 axis of the display 408 (paragraph [0038]).

Thus, as apparent from the preceding text, Liberty's free space pointing device 400 is used to implement a single command such as moving a cursor along a particular axis of a

display. Although Liberty does discuss moving a cursor to implement other commands such as cursor fading, volume or media transport, or zooming in or out, in each case movement of Liberty's free space pointing device 400 is used to implement only a single command and is not described as being combined with user manipulations separate from the detected movement, and corresponding to a function as recited in claim 28.

In other embodiments, Liberty describes post-processing readings of a free space pointing device 400. More specifically, in Liberty, once calibrated sensor readings have been compensated for linear acceleration, processed into readings indicative of angular rotation of the free-space pointing device 400, and compensated for tilt, then post processing can be performed to compensate for various factors such as human tremor. In other words, Liberty allows human tremor to be removed from a motion of the free space pointing device 400 for more accurate readings of the free space pointing device 400.

However, Liberty does not address two separate inputs within the free space pointing device 400, such that a first input is a detected movement, and the second input is user manipulation such that the received user input is separate from the detected motion and not based on the motion detected by free space pointing device 400. In other words, Liberty merely analyzes a motion of the free space pointing device 400, performs various types of calibrations and compensations on the motion, and then performs a final compensation for other factors experienced during the motion, such as human tremor and used the compensated signal to generate a single command. In other words, all the factors compensated for and calibrated in Liberty are directed only to a single input of the motion of the free space pointing device 400, and there is no separate input received by an input unit disposed on the free space pointing device 400 in Liberty and then combined with the motion detection. Accordingly, in Liberty there is no command to perform a single function that is generated by combining a motion detected input and a non-motion-detected input.

Therefore, for at least the above reasons, Liberty does not teach or suggest, among other things, "a a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function," as recited in independent claim 28.

Accordingly, independent claim 28 patentably distinguishes over the cited references and should be allowable for at least the above-mentioned reasons. Since similar features recited by each of the independent claims 29, 34, and 35, with potentially differing scope and breadth, are not suggested or disclosed by the cited references, the rejections should be withdrawn and claims 29, 34, and 35 also allowed.

Serial No. 12/413,722

Further, claims 30 and 36, which variously depend from independent claims 29 and 35, should be allowable for at least the same reasons as claims 29 and 35, as well as for the additional features recited therein.

REQUEST FOR ENTRY IN ACCORDANCE WITH 37 CFR §1.116:

Entry of this Amendment in accordance with 37 CFR §1.116 is respectfully requested. Applicants submit that this Amendment places the subject application in condition for allowance. This Amendment was not presented earlier because Applicant believed that the prior Amendment placed the subject application in condition for allowance. Thus, entry of this Amendment as an earnest attempt to advance prosecution is requested.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: Jan. 16, 2015

By: 

David J. Cutitta
Registration No. 52,790

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

REPLY/AMENDMENT FEE TRANSMITTAL	Attorney Docket No.	2456.1058
	Application Number	12/413,722
	Filing Date	March 30, 2009
	First Named Inventor	Yong-jin KANG et al.
	Group Art Unit	2622
AMOUNT ENCLOSED	0.00	Examiner Name Jeffrey S. STEINBERG

FEE CALCULATION (fees effective 03/19/2013)

CLAIMS AS AMENDED	Claims Remaining After Amendment	Highest Number Previously Paid For	Number Extra	Rate	Calculations
TOTAL CLAIMS	31	- 41 =	0	X \$ 80.00 =	\$ 0.00
INDEPENDENT CLAIMS	6	- 6 =	0	X \$ 420.00 =	0.00

Since an Official Action set an original due date of January 16, 2015, petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month (\$200)); (2 months (\$600)); (3 months (\$1,400)); (4 months (\$2,200)); (5 months (\$3,000)):

If Notice of Appeal is enclosed, add (\$800.00)

If Statutory Disclaimer under Rule 20(d) is enclosed, add fee (\$160.00)

Information Disclosure Statement (Rule 1.17(p)) (\$180.00)

Total of above Calculations = \$ 0.00

Reduction by 50% for filing by small entity (37 CFR 1.27)

TOTAL FEES DUE = \$ 0.00

(1) If entry (1) is less than entry (2), entry (3) is "0".

(2) If entry (2) is less than 20, change entry (2) to "20".

(4) If entry (4) is less than entry (5), entry (6) is "0".

(5) If entry (5) is less than 3, change entry (5) to "3".

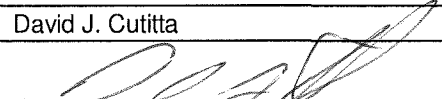
METHOD OF PAYMENT

- Check enclosed as payment.
- Charge "TOTAL FEES DUE" to the Deposit Account No. below.
- EFS-Web Authorization for "TOTAL FEES DUE" to Credit Card.
- No payment is enclosed.

GENERAL AUTHORIZATION

- If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:
- Deposit Account No.
- Deposit Account Name
- The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STAAS & HALSEY LLP

Typed Name	David J. Cutitta	Reg. No.	52,790
Signature		Date	Jan. 16, 2015

Electronic Acknowledgement Receipt

EFS ID:	21227348
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	21171
Filer:	David John Cutitta/Mikel Severson
Filer Authorized By:	David John Cutitta
Attorney Docket Number:	102-1567
Receipt Date:	16-JAN-2015
Filing Date:	30-MAR-2009
Time Stamp:	10:06:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amendment.pdf	1350474 <small>b5b3036ee3b15c9f78a7ae2854f30392446e1213</small>	yes	14

Multipart Description/PDF files in .zip description			
	Document Description	Start	End
	Response After Final Action	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	13
	Fee Worksheet (SB06)	14	14

Warnings:

Information:

Total Files Size (in bytes):	1350474
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		(Column 2)
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)		(Column 3)	
AMENDMENT	01/16/2015	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 31	Minus ** 40	= 0	X \$80 =	0
	Independent <small>(37 CFR 1.16(h))</small>	* 6	Minus *** 14	= 0	X \$420 =	0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)		(Column 3)	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/KAREN VESTAL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/413,722	03/30/2009	Yong-jin KANG	102-1567	9676
21171	7590	10/16/2014	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			STEINBERG, JEFFREY S	
			ART UNIT	PAPER NUMBER
			2622	
			NOTIFICATION DATE	DELIVERY MODE
			10/16/2014	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail@s-n-h.com

Office Action Summary

Application No. 12/413,722	Applicant(s) KANG ET AL.	
Examiner Jeffrey Steinberg	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 18 June 2014.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-40 is/are pending in the application.
5a) Of the above claim(s) 6,7,19,20,27,31,33,37 and 39-41 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-5,8-18,21-26,28-30,32,34-36 and 38 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9/3/2014.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 8-18, 21-26, 28-30, 32, 34, 35, and 38 have been considered but are moot because the arguments do not apply to the citations or the entirely different rejections being advanced currently.

All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 9, 14 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claims 1 and 14 (Currently Amended), Ohta discloses an input apparatus (Abstract) capable of performing a method, comprising:

a motion detector (Id.) which detects a ~~motion~~movement of the electronic apparatus;

an input unit ~~which is more sensitive than the motion detector~~ and which is disposed on the input apparatus (Fig. 3:5) to receive user input by a user manipulation separate from the detected ~~motion~~movement, such that the received user input corresponds to a

function and is not based on the movement detected by the motion detector (Pg. 5,

¶[0090]); and a controller (Pg. 5, ¶[0081]) which selects the function among a plurality of

functions based on the received user input, generates a predetermined command

associated with the selected function by combining the detected ~~motion~~movement and

the received user manipulation input to the input unit, and controls the generated

~~predetermined~~ command to be transmitted to an external device. (Pg. 11, ¶[0148],

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where the pointing position input can disable the game regardless of the function chosen);

~~wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.~~

Regarding Claim 9 (Previously Presented) Ohta discloses the input apparatus as claimed in claim 1, and further discloses wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pgs. 14-15, ¶¶[0124-0125]).

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

- i. Determining the scope and contents of the prior art.
- ii. Ascertaining the differences between the prior art and the claims at issue.
- iii. Resolving the level of ordinary skill in the pertinent art.
- iv. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

3. Claims 2-5, 8, 10-13, 15-18, 21-26, 28-30, 32, 34-36, 38 and 42 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent Application Publication by Liberty et al. (2005/0253806) in view of a US Patent Application Publication by Ohta (2008/0125223).

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Regarding Claims 2 and 15 (Both Original), Ohta discloses the input apparatus and is capable of performing the method as claimed in claims 1 and 14, respectively, but fails to disclose wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

Liberty et al. teaches wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Id.).

Ohta and Liberty et al. are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claims 3 and 16 (Both Original), the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method disclosed as claimed in claims 2 and 15, respectively, and Liberty et al. further discloses wherein the input unit

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comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 5, ¶[0041]).

Regarding Claims 4 and 17 (Both Original), the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method disclosed as claimed in claims 3 and 16, respectively, and Liberty et al. further discloses wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction (Id.), wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 17, Claim 21).

Regarding Claims 5 and 18 (Original), the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 4 and 17, respectively, and Liberty et al. further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 1, ¶[0006]).

Regarding Claims 6 and 7 (Canceled).

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Regarding Claim 8 (Previously Presented) Ohta discloses the input apparatus as claimed in claim 1, but fails to disclose wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Liberty teaches wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Regarding Claims 10 and 23 (Both Previously Presented) the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and Liberty et al. further discloses wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

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Regarding Claims 11, 21 and 24 (All Previously Presented) the Ohta-Liberty et al. Combination discloses the input apparatus claimed in claim 1 and is capable of a methods as disclosed in Claim 14 and Liberty et al. further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claims 12, 22 and 25 (All Previously Presented) the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 1, 14, and 14, respectively, and Liberty et al. further discloses wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Pgs. 14-15, ¶¶[0124-0125]).

Regarding Claims 13 and 26 (Both Original), the Ohta-Liberty et al. Combination discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and Liberty et al. further discloses wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Pgs. 15-16, ¶¶[0130-

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0131])).

Regarding Claims 19 and 20 (Both Canceled)

Regarding Claim 27 (Canceled).

Regarding Claim 28 (Currently Amended), Ohta discloses an electronic apparatus (Abstract]) comprising:

a motion detector (Id.) to detect a ~~motion~~ movement of the electric apparatus for performing a function of an external device (Fig. 3:5) and to generate first signals corresponding to the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector (Pg. 5, ¶[0090]), for selecting the function ~~of~~ among a plurality of functions based on the received user input and to generate second signals corresponding to the selected function; a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function,[sic] (Pg. 11, ¶[0148], where the pointing position input can disable the game regardless of the function chosen) ~~wherein, if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals.~~ but fails to disclose generation of second signals corresponding to the selected function; a controller to

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combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function,[sic].

Ohta teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 29 (Previously Presented), Liberty et al. discloses an electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor (Pgs. 15-16, ¶¶[0130-0131]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; but fails to disclose an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate

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from the detected motion; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

Ohta teaches wherein the motion detector is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 30 (Previously Presented), the Liberty et al.-Ohta Combination discloses the electronic apparatus of claim 29, and discloses it further comprising: a converter to receive a translation data signal and a rotation data signal. (Id.).

Regarding Claim 31 (Cancelled).

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Regarding Claim 32 (Previously Presented), the Liberty et al.-Ohta Combination discloses the electronic apparatus of claim 1, and Liberty et al. further discloses wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Regarding Claim 33 (Cancelled).

Regarding Claim 34 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a ~~motion~~movement of the electric apparatus for performing a function of an external device (Abstract); generating first signals corresponding to the detected ~~motion~~movement (Pg. 2, ¶[0012]); receiving user manipulations for selecting the function ~~of~~among a plurality of functions (Pg. 2, ¶[0009]) based on the received user input; generating second signals corresponding to the selected functions; ~~and~~ combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected functioning and generating a command by combining the first and second signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated. (Pgs. 15-16, ¶¶[0130-0131]) but fails to disclose that the reception of the aforesaid user

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manipulations were on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected ~~motion~~ movement.

Ohta teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 35 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor (Pg. 5, ¶[0047]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;; and transmitting the generated command to the external device. (Pg. 9, ¶[0096]); generating a command to perform the selected function by combining the detected translation (Id.), the detected rotation and

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the user selection input but fails to disclose receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation, such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector.

Ohta teaches receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 36 (Original) the Liberty et al.-Ohta Combination discloses an apparatus capable of performing the method of claim 35, and Liberty et al. further discloses it comprising:

receiving a translation data signal and a rotation data signal into a converter. (Pg. 5,

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¶[0041]).

Regarding Claim 37 (Cancelled).

Regarding Claim 38 (Previously Presented), the Liberty et al.-Ohta Combination discloses an apparatus capable of performing the method of claim 14, and Liberty et al. further discloses wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038])

Regarding Claim 39-41 (Cancelled).

Regarding Claim 42 (New), Ohta discloses the input apparatus as claimed in Claim 1, wherein the selected function is a volume adjustment function, wherein the command associated with the selected function is a volume up or a volume down command. (Fig. 3: 32b, 32c).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey Steinberg/
Examiner, Art Unit 2622

/CHARLES V HICKS/
Primary Examiner, Art Unit 2622

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey Steinberg	Art Unit 2622	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-2005/0253806	11-2005	Liberty et al.	345/156
*	B US-2008/0042986	02-2008	Westerman et al.	345/173
*	C US-2006/0044282	03-2006	Pinhanez et al.	345/173
*	D US-2008/0125223	05-2008	Ohta, Keizo	463/36
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12413722
	Filing Date	2009-03-30
	First Named Inventor	Yong-jin KANG et al.
	Art Unit	2622
	Examiner Name	Jeffrey S. Steinberg
	Attorney Docket Number	102-1567

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12413722
	Filing Date		2009-03-30
	First Named Inventor	Yong-jin KANG et al.	
	Art Unit		2622
	Examiner Name	Jeffrey S. Steinberg	
	Attorney Docket Number		102-1567

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EXAMINER SIGNATURE

Examiner Signature	/Jeffrey Steinberg/	Date Considered	10/09/2014
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	12413722
Filing Date	2009-03-30
First Named Inventor	Yong-jin KANG et al.
Art Unit	2622
Examiner Name	Jeffrey S. Steinberg
Attorney Docket Number	102-1567

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Patrick J. Stanzione/	Date (YYYY-MM-DD)	2014-09-03
Name/Print	Patrick J. Stanzione	Registration Number	40434

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**


Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE REVISED THROUGH. /J.S./

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE								
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014		
1	1	✓	✓	✓	✓	✓	✓	✓		
2	2	✓	✓	✓	✓	✓	✓	✓		
3	3	✓	✓	✓	✓	✓	✓	✓		
4	4	✓	✓	✓	✓	✓	✓	✓		
5	5	✓	✓	✓	✓	✓	✓	✓		
	6	✓	✓	✓	✓	-	-	-		
	7	✓	✓	✓	✓	-	-	-		
6	8	✓	✓	✓	✓	✓	✓	✓		
7	9	✓	✓	✓	✓	✓	✓	✓		
8	10	✓	✓	✓	✓	✓	✓	✓		
9	11	✓	✓	✓	✓	✓	✓	✓		
10	12	✓	✓	✓	✓	✓	✓	✓		
11	13	✓	✓	✓	✓	✓	✓	✓		
12	14	✓	✓	✓	✓	✓	✓	✓		
13	15	✓	✓	✓	✓	✓	✓	✓		
14	16	✓	✓	✓	✓	✓	✓	✓		
15	17	✓	✓	✓	✓	✓	✓	✓		
16	18	✓	✓	✓	✓	✓	✓	✓		
	19	✓	✓	✓	✓	-	-	-		
	20	✓	✓	✓	✓	-	-	-		
17	21	✓	✓	✓	✓	✓	✓	✓		
18	22	✓	✓	✓	✓	✓	✓	✓		
19	23	✓	✓	✓	✓	✓	✓	✓		
20	24	✓	✓	✓	✓	✓	✓	✓		
21	25	✓	✓	✓	✓	✓	✓	✓		
22	26	✓	✓	✓	✓	✓	✓	✓		
	27	✓	✓	✓	✓	-	-	-		
23	28	✓	✓	✓	✓	✓	✓	✓		
24	29	✓	✓	✓	✓	✓	✓	✓		
25	30	✓	✓	✓	✓	✓	✓	✓		
	31	✓	✓	✓	-	-	-	-		
26	32	✓	✓	✓	✓	✓	✓	✓		
	33	✓	✓	✓	✓	-	-	-		
27	34	✓	✓	✓	✓	✓	✓	✓		
28	35	✓	✓	✓	✓	✓	✓	✓		
29	36	✓	✓	✓	✓	✓	✓	✓		

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE								
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014	10/09/2014		
	37	✓	✓	✓	-	-	-	-		
30	38	✓	✓	✓	✓	✓	✓	✓		
31	39	✓	✓	✓	✓	-	✓	✓		
32	40	✓	✓	✓	✓	-	✓	✓		
33	41				✓	-	✓	✓		
34	42							✓		

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	30558	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:50
S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:52
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipu\$5) contoller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
S15	1	"20080042986".pn.	US-PGPUB; USPAT	OR	OFF	2012/02/15 09:07

S16	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S17	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S18	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S19	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S20	41974	S16 S17 S18 S19	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S21	1	S20 (input adj2 apparatus) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 16:29
S22	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S23	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S24	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S25	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S26	41974	S22 S23 S24 S25	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S27	1	S26 (accelerometer OR gesture OR cursor OR pointer OR arrow) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:03

S28	2	S26 ((INPUT with device) or (accelerometer OR gesture OR cursor OR pointer OR arrow)) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:06
S30	12	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 08:28
S31	4	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	USPAT	OR	OFF	2012/09/18 08:29
S32	37	348/734.ccls. and accelerometer	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 20:08
S33	0	"10799918"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/18 20:17
S34	1	("20060044282".PN.) (MOTION same input)	US-PGPUB	AND	ON	2012/09/20 14:31
S35	37728	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S36	3537	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S37	2433	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S38	4132	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S39	46596	S35 S36 S37 S38	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S42	1	S39 (motion adj1 detect\$3) contoller (functions)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:28
S43	1	S39 (motion adj1 detect\$3) contol\$3 functions	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:33

S44	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S45	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S46	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S47	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S48	46673	S44 S45 S46 S47	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
S49	161	S48 (control with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:20
S50	1	S48 ((combine control) with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:38
S53	4	KANG-YONG-JIN.IN.	USPAT	OR	OFF	2013/05/09 15:19
S54	6	LEE-SUNG-HAN.IN.	USPAT	OR	OFF	2013/05/09 15:20
S55	0	SHIN-Hyun-coog.IN.	USPAT	OR	OFF	2013/05/09 15:25
S56	57	kim-dae-hyun.IN.	USPAT	OR	OFF	2013/05/09 15:25
S57	1	YOON-Eung-sik.IN.	USPAT	OR	OFF	2013/05/09 15:26
S58	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S59	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S60	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO;	OR	OFF	2013/05/09 15:29

			DERWENT			
S61	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S62	46673	S58 S59 S60 S61	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:29
S63	1	S62 ((combine control) with (motion adj1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 15:29
S64	1	WO-0126090-\$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 08:45
S65	1	"20040090423".pn.	US-PGPUB	OR	OFF	2013/05/15 15:16
S66	1	"20080042986".pn.	US-PGPUB	OR	OFF	2013/05/15 18:50
S67	37847	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S68	3551	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S69	2437	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S70	4139	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S71	46734	S67 S68 S69 S70	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/15 18:55
S72	150	S71 "288" threshold	US-PGPUB	AND	OFF	2013/05/15 18:55
S73	61	S71 "288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 18:57
S74	4197	"288" (threshold with tim\$3)	US-PGPUB	AND	OFF	2013/05/15 19:07
S75	6	KANG-Yong-jin.in.	USPAT	OR	OFF	2013/09/15 10:17

S76	6	LEE-sUNG-HAN.in.	USPAT	OR	OFF	2013/09/15 10:17
S77	0	SHIN-Hyun-ooog.in.	USPAT	OR	OFF	2013/09/15 10:19
S78	62	KIM-Dae-hyun.in.	USPAT	OR	OFF	2013/09/15 10:20
S79	3	YOON-Eung-sik.in.	USPAT	OR	OFF	2013/09/15 10:21
S80	2	"20050253806".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:23
S81	2	"20090027335".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/09/15 10:28
S82	54627	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S83	4933	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S84	3211	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S85	5753	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S86	66725	S82 S83 S84 S85	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2014/03/28 15:11
S87	988	S86 ((motion with detect\$3) same (input adj1 (apparatus or device)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	OFF	2014/03/28 15:12
S88	1	"20080125223".pn.	US-PGPUB	OR	OFF	2014/03/30 12:48

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S52	0	"L5" ((combine control) with (motion adj1 detect\$2))	USPAT	AND	ON	2013/05/09 10:47

10/4/2014 12:08:07 PM

CYWEE EX 2009 - 228


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BIB DATA SHEET
CONFIRMATION NO. 9676

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/413,722	03/30/2009	345	2622	102-1567		
APPLICANTS						
INVENTORS						
Yong-jin KANG, Suwon-si, KOREA, REPUBLIC OF; Sung-han LEE, Hwaseong-si, KOREA, REPUBLIC OF; Hyun-coog SHIN, Suwon-si, KOREA, REPUBLIC OF; Dae-hyun KIM, Suwon-si, KOREA, REPUBLIC OF; Eung-sik YOON, Suwon-si, KOREA, REPUBLIC OF;						
** CONTINUING DATA *****						
** FOREIGN APPLICATIONS *****						
REPUBLIC OF KOREA 2008-66996 07/10/2008						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
Verified and /JEFFREY S STEINBERG/ Acknowledged Examiner's Signature		Initials	KOREA, REPUBLIC OF	16	40	14
ADDRESS						
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005 UNITED STATES						
TITLE						
INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS						
FILING FEE RECEIVED 4550	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/413,722	03/30/2009	Yong-jin KANG	102-1567

CONFIRMATION NO. 9676

POA ACCEPTANCE LETTER



21171
STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

Date Mailed: 09/29/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/15/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/413,722	03/30/2009	Yong-jin KANG	102-1567

CONFIRMATION NO. 9676

POWER OF ATTORNEY NOTICE



38209
Stanzione & Kim, LLP
919 18th Street, NW
Suite 440
Washington, DC 20006

Date Mailed: 09/29/2014

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/15/2014.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

U.S. Serial No.: 12/413,722
Filing Date: March 30, 2009

Submission of
Power of Attorney to Prosecute Applications Before the USPTO
And
Statement under 37 C.F.R. 3.73(b)

Honorable Commissioner of
Patent and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached are:

- (1) a Power of Attorney to Prosecute Applications Before the USPTO which revokes all previous powers of attorney given in the application identified in the attached statement under 37 C.F.R. 3.73(b), appoints the practitioners associated with Customer Number 21171 as attorney(s) or agent(s), and changes the correspondence address for the application identified in the attached statement under 37 C.F.R. 3.73(b) to the address associated with Customer Number 21171; and
- (2) a Statement under 37 C.F.R. 3.73(b) which identifies the application in which the attached Power of Attorney is to be filed.

In accordance with the attached, please enter the Power of Attorney and direct all correspondence and telephone communication in the identified application to:

STAAS & HALSEY LLP
1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

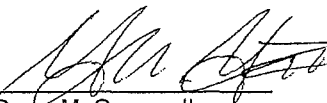
USPTO Customer No. **21171**

If there are any additional fees associated with filing of this paper, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: Sept 15, 2014

By: 
Gene M. Garner, II
Registration No. 34,172

1201 New York Avenue, N.W., 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

 Practitioners associated with the Customer Number:

21171

OR

 Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

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21171

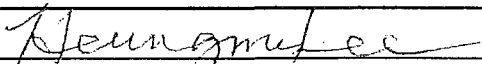
OR

<input type="checkbox"/> Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address:

SAMSUNG ELECTRONICS CO., LTD.
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do 443-742**A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.****SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	Sep. 11, 2014
Name	Heungmo Lee	Telephone	
Title	Vice President, Samsung Electronics Co., Ltd.		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Yong-jin KANG

Application No./Patent No.: 12/413,722 Filed/Issue Date: March 30, 2009

Titled: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

SAMSUNG ELECTRONICS CO., LTD., a CORPORATION

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

- 1. the assignee of the entire right, title, and interest in;
- 2. an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or
- 3. the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 022467, Frame 0222, or for which a copy therefore is attached.

OR

B. A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

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Additional documents in the chain of title are listed on a supplemental sheet(s).

As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature

Gene M. Garner, II
Printed or Typed Name

September 15, 2014

Date

Attorney
Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Electronic Acknowledgement Receipt

EFS ID:	20137187
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Gene M. Garner/Elizabeth McGrane
Filer Authorized By:	Gene M. Garner
Attorney Docket Number:	102-1567
Receipt Date:	15-SEP-2014
Filing Date:	30-MAR-2009
Time Stamp:	14:03:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA.PDF	327794 <small>2901cc84dab64748cfb80c42a7a51fa2179d ae43</small>	no	3

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Information:

CYWEE EX 2009 - 236

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12413722
	Filing Date	2009-03-30
	First Named Inventor	Yong-jin KANG et al.
	Art Unit	2622
	Examiner Name	Jeffrey S. Steinberg
	Attorney Docket Number	102-1567

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	3	5805137		1998-09-08	Yasutake	

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	1	10-260776	JP		1998-09-29	Itu Res Inc	abstract	<input checked="" type="checkbox"/>

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12413722
	Filing Date		2009-03-30
	First Named Inventor	Yong-jin KANG et al.	
	Art Unit		2622
	Examiner Name	Jeffrey S. Steinberg	
	Attorney Docket Number		102-1567

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EXAMINER SIGNATURE

Examiner Signature	Date Considered
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	12413722
Filing Date	2009-03-30
First Named Inventor	Yong-jin KANG et al.
Art Unit	2622
Examiner Name	Jeffrey S. Steinberg
Attorney Docket Number	102-1567

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Patrick J. Stanzione/	Date (YYYY-MM-DD)	2014-09-03
Name/Print	Patrick J. Stanzione	Registration Number	40434

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-260776

(43)Date of publication of application : 29.09.1998

(51)Int.Cl. G06F 3/033
G05G 9/00

(21)Application number : 09-343347 (71)Applicant : ITU RES INC
(22)Date of filing : 12.12.1997 (72)Inventor : YASUTAKE TAIZO

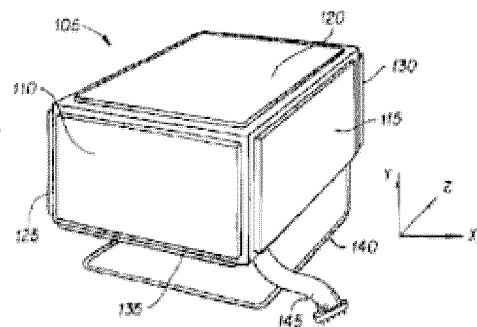
(30)Priority
Priority number : 91 798572 Priority date : 26.11.1991 Priority country : US

(54) CONTACT TYPE INPUT EQUIPMENT AND POSITION CONTROL METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an equipment capable of not only inputting a position but also inputting the other information by using a sensor for detecting contact by providing first and second force detectors for generating signals in response to the position of applied force and making the second force detector perform the contact different from that of the first force detector.

SOLUTION: The first force detector generates the two signals for stipulating the position of the force applied to it in response to the position of the force applied to the first force detector. The second force detector is mounted to the four end parts of the first force detector, performs the contact different from that of the first force detector and generates the signals in response to the force applied to it. For instance, relating to a control input equipment 105, a connection part 145 for control connects six force detectors 110, 115, 120, 125, 130 and 135 and outputs the response signals of the force detectors. The connection input equipment 105 generates control input by pressing one of the six force detectors.



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平10-260776

(43) 公開日 平成10年(1998) 9月29日

(51) Int.Cl. ⁸	識別記号	F I	
G 0 6 F 3/033	3 1 0	G 0 6 F 3/033	3 1 0 Y
G 0 5 G 9/00		G 0 5 G 9/00	Z

審査請求 有 請求項の数39 O L (全 17 頁)

(21) 出願番号 特願平9-343347
(62) 分割の表示 特願平4-317133の分割
(22) 出願日 平成4年(1992)11月26日

(31) 優先権主張番号 7 9 8 5 7 2
(32) 優先日 1991年11月26日
(33) 優先権主張国 米国 (U S)

(71) 出願人 592244697
アイティユー リサーチ インコーポレイ
テッド
アメリカ合衆国 95014 カリフォルニア
州 クパチーノ デンプスター アヴェニ
ュー 10455

(72) 発明者 タイゾー ヤスタケ
アメリカ合衆国 95014 カリフォルニア
州 クパチーノ デンプスター アヴェニ
ュー 10455

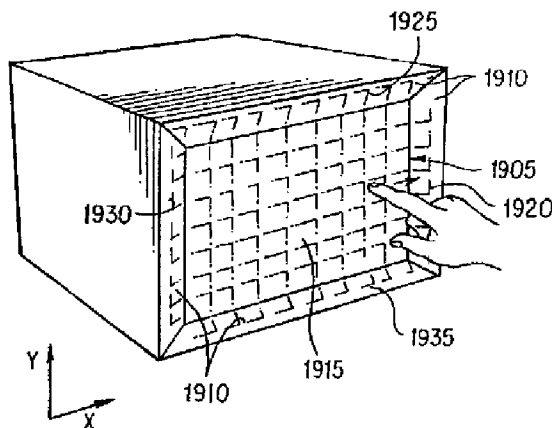
(74) 代理人 弁理士 谷 義一 (外1名)

(54) 【発明の名称】 接触式入力機器および位置制御方法

(57) 【要約】

【目的】 入力機器を提供する。

【構成】 ユーザは指で平坦部分1915のいずれかの位置を押すと、その押下位置が入力され、押下したまま指を動かすとコンピュータ上の画面のカーソルが移動する。移動速度は押下圧力により決定され、指が端部1900で停止するとカーソルの移動が継続される。



【特許請求の範囲】

【請求項1】 2次元における制御信号を出力する接触式入力機器であって、第1および第2の力検出器を具え、その第1の力検出器はそれに加えられる力の位置を規定する2つの信号を前記第1の力検出器に加えられる力の位置にตอบสนองして発生し、前記第2の力検出器は第1の力検出器の四つの端部に装着され、第1の力検出器とは異なる接触をなすようにされ、それに加えられる力にตอบสนองして信号を発生するようにしたことを特徴とする接触式入力機器。

【請求項2】 請求項1に記載の接触式入力機器において、前記第2の力検出器は、第1の力検出器における異なる位置に加えられる力を区別することを特徴とする接触式入力機器。

【請求項3】 コンピュータシステムのスクリーンに表示されている物体を2次元において移動制御する接触式入力機器であって、平坦な形状を有するセンサーであって、該センサーの中央部表面はユーザーによる接触時にその接触位置に対応する信号を発生し、該信号を用いて前記コンピュータシステムのスクリーンに表示されている物体のための位置制御信号を発生し、該センサーの中央部周囲を取り囲むセンサーの端部は前記ユーザーのセンサー端部表面への接触にตอบสนองして制御持続信号を発生するセンサーを有し、前記制御持続信号は前記ユーザーが前記センサー端部に接触した際、該センサー端部への接触直前に、前記センサーの中央部において接触していた位置にตอบสนองして発生していた移動制御指令であって、前記コンピュータシステムのスクリーン上に表示されている物体のための移動制御指令の継続を可能とさせる信号であることを特徴とする接触式入力機器。

【請求項4】 請求項3に記載の接触式入力機器において、前記センサーの中央部の形状が四角形であり、前記センサーの端部が該センサーの中央部の一端に装着されることを特徴とする接触式入力機器。

【請求項5】 請求項3に記載の接触式入力機器において、前記センサーの端部上において、前記ユーザーによる接触位置が変わらず、かつその接触が継続している場合にのみ、前記スクリーン上に表示されている物体の移動継続指令が発生されることを特徴とする接触式入力機器。

【請求項6】 請求項3に記載の接触式入力機器において、前記センサーの中央部の周辺に複数のセンサーの端部を装着し、当該複数のセンサーの端部の各々が前記ユーザーの接触により前記制御持続信号を発生することを特徴とする接触式入力機器。

【請求項7】 請求項3に記載の接触式入力機器において、前記センサーの中央部の周囲に4つのセンサーが前記センサーの端部として分離して装着されることを特徴とする接触式入力機器。

【請求項8】 請求項3に記載の接触式入力機器において、前記センサーの端部の手触りが前記センサーの端部と異なることを特徴とする接触式入力機器。

【請求項9】 請求項8に記載の接触式入力機器において、前記センサーの端部の表面が前記センサーの中央部よりそりあがった形状を有することを特徴とする接触式入力機器。

【請求項10】 請求項3に記載の接触式入力機器において、該接触式入力機器の本体の形状が立方体の形状を有し、該立方体の一面に前記センサーの中央部と前記センサーの端部とが装着されることを特徴とする接触式入力機器。

【請求項11】 請求項10に記載の接触式入力機器において、前記立方体の各面に前記センサーの中央部および前記センサーの端部が装着されたことを特徴とする接触式入力機器。

【請求項12】 請求項3に記載の接触式入力機器において、前記スクリーンに表示されている物体を、前記ユーザーによるセンサー中央部の表面での接触にตอบสนองし、相対モードで前記物体を移動させる制御信号を発生させ、前記相対モードは前記センサー中央部における接触位置の変化率に対応して移動制御指令を発生させるモードであることを特徴とする接触式入力機器。

【請求項13】 請求項3に記載の接触式入力機器において、前記スクリーンに表示されている物体を、前記ユーザーによるセンサーの中央部の表面での接触にตอบสนองし、絶対モードで前記物体を移動させる制御信号を発生させ、前記絶対モードは前記センサー中央部における接触位置座標そのものに対応した前記スクリーン上の位置座標に前記物体を移動させる制御指令モードであることを特徴とする接触式入力機器。

【請求項14】 請求項3に記載の接触式入力機器において、前記ユーザーによる表面接触位置を検出する単体センサーの一部として、前記センサーの中央部および前記センサーの端部が構成されることを特徴とする接触式入力機器。

【請求項15】 請求項14に記載の接触式入力機器において、前記単体センサーは前記ユーザーの接触による力を検出し、接触時に加えられる力の量により前記コンピュータシステムのスクリーン上に表示される物体の位置制御および前記移動継続指令を発生することを特徴とする接触式入力機器。

【請求項16】 請求項15に記載の記載の接触式入力機器において、前記センサーの端部に加えられる力の量に比例して前記物体の移動速度を制御する指令が発生されることを特徴とする接触式入力機器。

【請求項17】 請求項3に記載の接触式入力機器において、前記スクリーンに表示される物体がカーソルであることを特徴とする接触式入力機器。

【請求項18】 請求項3に記載の接触式入力機器にお

いて、前記センサーの中央部および前記センサーの端部への接触が前記ユーザの指であることを特徴とする接触式入力機器。

【請求項19】 コンピュータと入力機器を用いた、コンピュータシステム上の表示物体の位置を制御する位置制御方法であって、

前記入力機器は中央部とその周囲に配置されている端部とから構成され、

ユーザーによる前記入力機器の中央部の平坦な表面への接触を検出することによりこれに対応した信号を発生させ、

該信号を用いて位置制御指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上の対応する位置に表示し、

前記ユーザーによる前記入力機器の端部への接触を検出することにより制御継続信号を発生させ、

該端部への接触を検出する直前に前記入力機器の中央部における接触より生成された移動制御指令と前記制御継続信号を用いて移動制御継続指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする位置制御方法。

【請求項20】 請求項19に記載の位置制御方法において、前記入力機器は単体のセンサーであり、該単体のセンサーは表面への接触時の位置を検出することを特徴とする位置制御方法。

【請求項21】 請求項19に記載の位置制御方法において、前記スクリーン上の表示物体を前記ユーザーによる前記中央部の表面への接触に対応し、相対モードで前記表示物体を移動させ、前記相対モードは前記中央部における接触位置の変化率に対応して移動制御指令を発生させるモードであることを特徴とする位置制御方法。

【請求項22】 請求項19に記載の位置制御方法において、前記スクリーン上の表示物体を、前記ユーザーによる前記入力機器の中央部の表面の接触に対応して、絶対モードで移動させる制御信号を発生させ、前記絶対モードは前記中央部の接触位置座標そのものに対応した前記スクリーン上の位置座標に前記表示物体を移動させる制御指令モードであることを特徴とする位置制御方法。

【請求項23】 請求項19に記載の位置制御方法において、前記入力機器の端部への接触を検出する直前に、前記入力機器の中央部における接触により得られた移動速度に対応する移動制御継続指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする位置制御方法。

【請求項24】 請求項19に記載の位置制御方法において、前記入力機器の端部への接触を検出することにより事前に設定された移動速度に対応する移動制御継続指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする位置制御方法。

【請求項25】 請求項19に記載の位置制御方法において、前記入力機器の端部への接触を検出し、前記ユーザーが端部における接触点を変えず、かつ継続して接触している場合のみ移動制御継続指令を発生させ、前記表示物体をコンピュータのスクリーン上で継続移動させることを特徴とする位置制御方法。

【請求項26】 請求項19に記載の位置制御方法において、前記表示物体はカーソルであることを特徴とする位置制御方法。

【請求項27】 請求項19に記載の位置制御方法において、前記入力機器の端部への接触において加えられる力をも検出することを特徴とする位置制御方法。

【請求項28】 請求項27に記載の位置制御方法において、前記入力機器の端部に加えられる力の量に比例して前記表示物体の移動継続速度を制御する指令を発生することを特徴とする位置制御方法。

【請求項29】 コンピュータのスクリーン上に表示される物体を入力機器の操作により該物体の位置を制御するための位置制御方法であって、

該入力機器は平坦な形状のセンサーを有し、該センサーの中央部の表面上の接触点の移動軌跡を検出し、

当該異動軌跡の検出に応じて前記物体を移動させるための移動制御信号を発生させ、

前記センサーの端部への接触を検出し、

前記センサーの端部の接触が検出された場合には前記センサーの中央部の移動軌跡の検出に反応して、前記物体の移動を継続させるための継続信号を発生させること特徴とする位置制御方法。

【請求項30】 請求項29に記載の位置制御方法において、前記端部への接触を検出する直前に、前記センサーの中央部の接触により得られた移動速度に対応する移動制御指令を発生させることにより前記物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする位置制御方法。

【請求項31】 請求項29に記載の位置制御方法において、前記センサーの端部への接触を検出することにより事前に設定された移動速度に対応する移動制御継続指令を発生させ、これにより前記物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする位置制御方法。

【請求項32】 請求項29に記載の位置制御方法において、接触により前記センサーの端部に加わる力の量に比例して前記物体の移動継続速度を制御する指令を発生することを特徴とする位置制御方法。

【請求項33】 請求項29に記載の位置制御方法において、前記コンピュータのスクリーン上に表示されている物体を相対モードで移動させ、該相対モードは前記センサーの中央部における接触位置の変化率に対応して移動制御指令を発生させるモードであることを特徴とする

位置制御方法。

【請求項34】 請求項29に記載の位置制御方法において、前記コンピュータのスクリーン上に表示されている物体を前記センサーの中央部の複数の異なる位置での連続的な接触に対応して絶対モードで前記物体を移動させる制御信号を発生させ、前記絶対モードは前記センサーの中央部における接触位置座標に対応した前記スクリーン上の位置座標に前記物体を移動させる制御指令モードであることを特徴とする位置制御方法。

【請求項35】 コンピュータシステムのスクリーンに表示されている物体を多次元において操作するため制御信号を出力する接触式入力機器であって、平坦な形状のセンサー有し、該センサーの中央部の表面に対してユーザーによりした接触した時に接触位置に対応する信号を前記センサーの中央部が発生し、該信号を用いて前記コンピュータシステムのスクリーンに表示されている物体の位置制御のための位置制御信号を発生し、前記センサーの端部は、該端部への接触に応じて制御継続信号を発生し、該制御継続信号は前記コンピュータシステムのスクリーンに表示されている物体のための移動制御指令の継続を可能にする信号であることを特徴とする接触式入力機器。

【請求項36】 請求項35に記載の接触式入力機器において、前記センサーの端部表面の手触りが前記センサーの中央部とは異なることを特徴とする接触式入力機器。

【請求項37】 請求項35に記載の接触式入力機器において、前記センサーの端部は、接触点の位置を検出可能であることを特徴とする接触式入力機器。

【請求項38】 請求項35に記載の接触式入力機器において、前記センサーの端部は背所向点に加わる力の量を検出可能であることを特徴とする接触式入力機器。

【請求項39】 請求項35に記載の接触式入力機器において、前記センサーの中央部および前記センサーの端部が立方体の形状の入力機器本体の一面に装着されたことを特徴とする接触式入力機器。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、接触式入力機器の分野に関するものである。本発明による入力機器は、ユーザーが接触により与える力を検出する複数の表面センサーより構成されており、6つの自由度を持つ制御入力を生み出すことが可能な装置である。この自由度6の制御入力信号は入力機器を物理的に移動させることなく発生させることができるため、対話型のコンピュータグラフィックス上におけるカーソルや表示物体の操作に適した入力機器である。さらにこの入力機器は音響や電磁場の外乱に対して影響を受けないため、クレーン、フォークリフト等の産業機械の制御用入力機器としても適している。

【0002】

【従来の技術】

(a) 自由度3および自由度6の接触式入力機器に関する過去の技術

2次元入力機器として発明されたマウス、ジョイスティック、トラックボール、ライトペン、タブレット等は対話型のコンピュータグラフィックス用入力機器として広く用いられている。そしてこれらの機器はユーザーが使用しやすいように改良されている。3次元/自由度3

(“3D”)入力機器は、コンピュータグラフィックス環境のカーソル、あるいは表示物体のX、YZ座標の位置を操作するための装置であり、6次元/自由度6

(“6D”)入力機器は、3次元座標の位置操作のみならず、その姿勢(X、Y、Z軸まわりの回転)も操作できる装置である。しかし現在使用されている6D入力機器は2D入力機器と比較してその位置操作の容易性、正確度等に関して多くの改良すべき問題点を含んでいる。すなわち現在までに発明されている3D/6D入力機器は、ユーザーがその対象となる物体の制御をする上での使用の容易さや精度面で難点があり、さらに入力操作が“直感的”に理解できるものではなく、また長時間の使用によるユーザーの疲労度の問題点が指摘されている。

【0003】3次元入力機器として良く知られているものとしては、“コンピュータグローブ”があり、具体例としてMattel社のPower Gloveがある。また同様のものとしてEXOS社のEXOS Dextrous Hand Master、VPL Research社のData Gloveがある。これらのグローブにはセンサが装着されており、ユーザーはこのグローブを手に着けて位置と姿勢の入力を発生させるものである。位置と姿勢の入力情報は独立した電磁場源あるいは音響源とその信号を検出するためにグローブに装着されたセンサからのデータが利用される。しかしこの入力機器の使用に際してはユーザーが常にグローブを手につける必要がある上、装置が簡素ではないため、使いにくさ等の不快感を有無問題あるいは空間に手を揚げる操作によって6つの自由度を決定する必要があるため長時間の使用により疲労感を生むという問題がある。さらにこの入力機器はその設計原理が音響あるいは電磁波を利用しているため、他のシステムから発生する同種類の信号が外乱として入力機器に混入するという技術上の難点も持っている。

【0004】3D/6D入力機器として、第2番目の部類として考えられる機器は“フライングマウス”と呼ばれるものである。Ascension Technology社のBirdコントローラはパルス状電磁場を用いて制御入力機器自体の位置と姿勢を検出し、制御入力信号を発生するものである。しかしこの入力機器はユーザーが入力機器を掴み、空間に手を揚げて使用する必要がある。また金属物体が存在する場合、その入力性能に影響を受けるといった問題がある。Logitech社

の2D/6Dマウスは、Mattel社の入力機器と同様に音響センサを利用したものである。Polhemus社の3SPACEセンサ(U. S. Patent 4, 017, 858: Jack Kuiper氏に1977年4月12日認可)は電磁的カップリングを利用した3つの送信アンテナと3つの受信アンテナより構成されている。これらの3つの送信アンテナコイルと3つの受信アンテナコイルは、それぞれが直交しており、これら9つの送信/受信の組み合わせによる情報を利用して入力機器自体の3次元の位置と姿勢を同定するものである。しかしいずれの“フライングマウス”入力機器もユーザーが手を空間に掲げて使用する必要があるため長期間の使用による疲労感、またコードと結合しているという不便さ、さらに他の電磁波、音響外乱に敏感であるといった難点がある。

【0005】“フライングマウス”に似た他の入力機器としては、U. S. Patent 4, 839, 838がある。この入力機器は6つの独立した加速度測定センサを利用した6D制御入力機器で“慣性マウス”と呼ばれるものである。しかし、この入力機器もユーザーが空間にその機器を掲げて使用するタイプのものであり、入力信号の精度の向上に限界がある。他の慣性マウスに関連した発明としてはLynn T. Olson氏が発明したU. S. Patent 4, 787, 051がある。

【0006】第3番目の部類として考えられる3D/6D入力機器としては3D/6Dジョイスティックとトラックボールがある。Spacial Systems社のSpaceballは球状の剛体にひずみゲージあるいは光センサを装着し、この球体を動かすことなく入力信号を発生させるものである。ユーザーはこの球体を押し、ねじったりして3次元の位置と姿勢の入力信号を制御する。このSpaceballはU. S. Patent 4, 811, 608(1989年3月14日John A. Hiton氏に認可)に示されている。さらに同様の機器としてCis Graphics社より販売されているDIMENSION6/Geoballコントローラは、6つの軸を持ち光センサが装着された球体状機器となっている。この入力機器も直線移動の力と回転のトルクをユーザーからの入力として検出できるものである。しかしこれらの入力機器はいくつかの技術的欠点を持っている。一例としては、これらの入力機器は制御入力ペン(Stylus)が持っている精度の高い入力操作ができない点である。さらにこれらの入力機器は指を用いて制御するものではなく手首の筋肉を使って入力機器を動かすために細かな操作に不適合であり、また発生する制御入力信号は相対的なものであるため絶対座標の入力には適していない。したがってこれらの入力機器は3次元入力用デジタイザーとしては利用できない。また他の問題点としては、これらの入力機器は制御対象の位置の決定が直交座標系に従っていない場

合、ユーザーに直感的で入力しやすい環境を提供できない点である。具体例として制御対象が円筒座標系あるいは極座標系によってその位置が決定される場合、これらの入力機器は直感的な入力を発生させる適応性に欠けていると言える。

【0007】(b)接触による力に敏感な検出器に関する過去の技術

接触による力に敏感な検出器を用いた入力機器は大きな機械的動作を機器に与えることなく制御入力信号を発生できるという特長を持っている。これらの機器は様々な形態があるが、単にユーザーの指やペンの接触圧力の有無のみならず力の定量的な状態量を認識できる機器も開発されている。このような機器の一例としてTekscan社(マサチューセッツ州ボストン市)の検出器がある。この検出器は力に敏感な格子状の複数の検出器パッドが使用され、複数の指を検出器の表面に接触させた時、それぞれの指の位置と圧力の定量値を検出するものである。他の検出器としてはIntelligent Computer Music Systems社(New York州Albany市)のTouch Surface(登録商標)がある。Touch Surfaceは連続的に1本の指またはペンのXY座標の位置と力(Z軸方向)の定量値を検出できる。さらにユーザーの接触点が複数点の場合はその位置平均のX、Y座標が得られる。しかしこれらの検出器は、2.5次元(すなわちX、Y座標とZ軸の正方向)の入力操作能力しか持っておらず3次元以上の制御入力機器としては直接的に使用できない。力に敏感な検出器はバネ式の2次元入力用ジョイスティックに使用されている。一例としてU. S. Patent 4, 719, 538(John D. Cox氏に認可)があり力センサ(force responsive capacitive transducer)を利用したジョイスティック型の入力機器が発明されているがこれは3D/6D入力能力を持っていない。2D入力機器の多機能化を図った2D入力機器としては、U. S. Patent 4, 896, 543(Larry S. Gullnan氏に認可)がある。この入力機器は3軸の力を検出できるコンピュータ入力用ペンとして設計されており、コンピュータグラフィックスの線の幅や、濃度、色の選定等が制御できるようになっている。しかしこれらの入力機器は3次元物体の姿勢を制御する機能を持っていない。またZ軸の負の方向の位置も操作できない。すなわち一旦入力ペンを入力機器表面から離すと、もはや入力信号を発生できない。したがってこれらの入力機器は3次元入力機器としては技術的限界があると言える。

【0008】(c)作業現場で使用される3D/6D入力機器に関する過去の技術

作業現場においては様々な3D/6D制御入力機器が使用されている。これら現場で用いられる入力機器は頑

丈、正確かつ外乱に対して影響を受けない機器である必要がある。コンピュータグラフィックス等に利用されている入力機器は鉋工業の作業現場における要求を満たしていないと考えられる。したがって現在使用されている典型的な作業現場入力機器としては、複数のレバーを同時に使用する方法が多く採用されている。しかしこの方法はユーザーにとって直感的で理解しやすい入力方法ではない。具体例として、土木作業用クレーンはそのクレーン棒の回転、伸縮、昇降操作のための入力として複数のレバーを使用する。このような非直感的で理解しにくいユーザーインターフェイスにおいてオペレーターはクレーン棒の位置と姿勢の決定に複数レバーの複雑な操作を要求されるため、クレーン操作は高度なトレーニングを必要とし、また操作ミスによる事故の誘因ともなるものである。

【0009】すなわち3D/6Dの制御入力機器はユーザーにとってその使用が簡単で、その製造コストが低く、正確かつ直感的な入力を可能とし、電磁場、音響等の外乱に影響を受けずさらに制御対象の操作に対して柔軟性を持った機器が望ましいと言える。特にコンピュータグラフィックス用入力機器に強く求められている性能としては、コンピュータグラフィックスの物体の位置と姿勢を正確に操作でき、かつコンピュータ入力ペンでも同様の操作が簡単にできることである。この性能要求に対してユーザーの指等を用いて簡単な操作で正確かつ直感的で理解しやすい方法で入力することが望ましい。またユーザーが空間に機器を揚げることなく入力できるという点も望ましい項目である。さらに3D/6D機器は絶対座標と相対座標の両方の入力モードを可能にすることが望ましい。すなわちデータタブレットやタッチスクリーンのように指定された絶対座標系における位置制御入力を可能にするといった利点とマウス、トラックボールのように前時点と次の操作時における位置の変化分を制御入力信号として発生させる利点と両方の機能を持つということである。またユーザーが複数の指を用いて、位置と姿勢を正確に入力することが可能である点も望ましい項目である。また中立点(制御対象物の定位置)維持に関する制御入力においてはユーザーの継続的な接触による制御信号の維持を必要としないという点も望ましい項目である。

【0010】

【発明が解決しようとする課題】本発明の目的は、接触を検知するセンサ(圧力センサ等)を使用して位置の入力だけでなく、他の情報をも入力できる接触式入力機器および位置制御方法を提供することにある。

【0011】

【課題を解決するための手段】このような目的を達成するために、請求項1記載の発明は、2次元における制御信号を出力する接触式入力機器であって、第1および第2の力検出器を具え、その第1の力検出器はそれに加え

られる力の位置を規定する2つの信号を前記第1の力検出器に加えられる力の位置にตอบสนองして発生し、前記第2の力検出器は第1の力検出器の四つの端部に装着され、第1の力検出器とは異なる接触をなすようにされ、それに加えられる力にตอบสนองして信号を発生するようにしたことを特徴とする。

【0012】請求項2記載の発明は、請求項1に記載の接触式入力機器において、前記第2の力検出器は、第1の力検出器における異なる位置に加えられる力を区別することを特徴とする。

【0013】請求項3の発明は、コンピュータシステムのスクリーンに表示されている物体を2次元において移動制御する接触式入力機器であって、平坦な形状を有するセンサーであって、該センサーの中央部表面はユーザーによる接触時にその接触位置に対応する信号を発生し、該信号を用いて前記コンピュータシステムのスクリーンに表示されている物体のための位置制御信号を発生し、該センサーの中央部周囲を取り囲むセンサーの端部は前記ユーザーのセンサー端部表面への接触にตอบสนองして制御持続信号を発生するセンサーを有し、前記制御持続信号は前記ユーザーが前記センサー端部に接触した際、該センサー端部への接触直前に、前記センサーの中央部において接触していた位置にตอบสนองして発生していた移動制御指令であって、前記コンピュータシステムのスクリーン上に表示されている物体のための移動制御指令の継続を可能とさせる信号であることを特徴とする。

【0014】請求項4の発明は、請求項3に記載の接触式入力機器において、前記センサーの中央部の形状が四角形であり、前記センサーの端部が該センサーの中央部の一端に装着されることを特徴とする。

【0015】請求項5の発明は、請求項3に記載の接触式入力機器において、前記センサーの端部上において、前記ユーザーによる接触位置が変わらず、かつその接触が継続している場合にのみ、前記スクリーン上に表示されている物体の移動継続指令が発生されることを特徴とする。

【0016】請求項6の発明は、請求項3に記載の接触式入力機器において、前記センサーの中央部の周辺に複数のセンサーの端部を装着し、当該複数のセンサーの端部の各々が前記ユーザーの接触により前記制御継続信号を発生することを特徴とする。

【0017】請求項7の発明は、請求項3に記載の接触式入力機器において、前記センサーの中央部の周辺に4つのセンサーが前記センサーの端部として分離して装着されることを特徴とする。

【0018】請求項8の発明は、請求項3に記載の接触式入力機器において、前記センサーの端部の手触りが前記センサーの端部と異なることを特徴とする。

【0019】請求項9の発明は、請求項8に記載の接触式入力機器において、前記センサーの端部の表面が前記

センサーの中央部よりそりあがった形状を有することを特徴とする。

【0020】請求項10の発明の発明は、請求項3に記載の接触式入力機器において、該接触式入力機器の本体の形状が立方体の形状を有し、該立方体の一面に前記センサーの中央部と前記センサーの端部とが装着されることを特徴とする。

【0021】請求項11の発明は、請求項10に記載の接触式入力機器において、前記立方体の各面に前記センサーの中央部および前記センサーの端部が装着されたことを特徴とする。

【0022】請求項12の発明は、請求項3に記載の接触式入力機器において、前記スクリーンに表示されている物体を、前記ユーザーによるセンサー中央部の表面での接触にตอบสนองし、相対モードで前記物体を移動させる制御信号を発生させ、前記相対モードは前記センサー中央部における接触位置の変化率に対応して移動制御指令を発生させるモードであることを特徴とする。

【0023】請求項13の発明は、請求項3に記載の接触式入力機器において、前記スクリーンに表示されている物体を、前記ユーザーによるセンサーの中央部の表面での接触にตอบสนองし、絶対モードで前記物体を移動させる制御信号を発生させ、前記絶対モードは前記センサー中央部における接触位置座標そのものに対応した前記スクリーン上の位置座標に前記物体を移動させる制御指令モードであることを特徴とする。

【0024】請求項14の発明は、請求項3に記載の接触式入力機器において、前記ユーザーによる表面接触位置を検出する単体センサーの一部ととして、前記センサーの中央部および前記センサーの端部が構成されることを特徴とする。

【0025】請求項15の発明は、請求項14に記載の接触式入力機器において、前記単体センサーは前記ユーザーの接触による力を検出し、接触時に加えられる力の量により前記コンピュータシステムのスクリーン上に表示される物体の位置制御および前記移動継続指令を発生することを特徴とする。

【0026】請求項16の発明は、請求項15に記載の記載の接触式入力機器において、前記センサーの端部に加えられる力の量に比例して前記物体の移動速度を制御する指令が発生されることを特徴とする。請求項17の発明は、請求項3に記載の接触式入力機器において、前記スクリーンに表示される物体がカーソルであることを特徴とする。

【0027】請求項18の発明は、請求項3に記載の接触式入力機器において、前記センサーの中央部および前記センサーの端部への接触が前記ユーザーの指であることを特徴とする。

【0028】請求項19の発明は、コンピュータと入力機器を用いた、コンピュータシステム上の表示物体の位

置を制御する位置制御方法であって、前記入力機器は中央部とその周囲に配置されている端部とから構成され、ユーザーによる前記入力機器の中央部の平坦な表面への接触を検出することによりこれに対応した信号を発生させ、該信号を用いて位置制御指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上の対応する位置に表示し、前記ユーザーによる前記入力機器の端部への接触を検出することにより制御継続信号を発生させ、該端部への接触を検出する直前に前記入力機器の中央部における接触より生成された移動制御指令と前記制御継続信号を用いて移動制御継続指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする。

【0029】請求項20請求項19に記載の位置制御方法において、前記入力機器は単体のセンサーであり、該単体のセンサーは表面への接触時の位置を検出することを特徴とする。

【0030】請求項21の発明は、請求項19に記載の位置制御方法において、前記スクリーン上の表示物体を前記ユーザーによる前記中央部の表面への接触に対応し、相対モードで前記表示物体を移動させ、前記相対モードは前記中央部における接触位置の変化率に対応して移動制御指令を発生させるモードであることを特徴とする。

【0031】請求項22の発明は、請求項19に記載の位置制御方法において、前記スクリーン上の表示物体を、前記ユーザーによる前記入力機器の中央部の表面の接触に対応して、絶対モードで移動させる制御信号を発生させ、前記絶対モードは前記中央部の接触位置座標そのものに対応した前記スクリーン上の位置座標に前記表示物体を移動させる制御指令モードであることを特徴とする。

【0032】請求項23の発明は、請求項19に記載の位置制御方法において、前記入力機器の端部への接触を検出する直前に、前記入力機器の中央部における接触により得られた移動速度に対応する移動制御継続指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする。

【0033】請求項24の発明は、請求項19に記載の位置制御方法において、前記入力機器の端部への接触を検出することにより事前に設定された移動速度に対応する移動制御継続指令を発生させることにより前記表示物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする。

【0034】請求項25の発明は、請求項19に記載の位置制御方法において、前記入力機器の端部への接触を検出し、前記ユーザーが端部における接触点を変えず、かつ継続して接触している場合のみ移動制御継続指令を発生させ、前記表示物体をコンピュータのスクリーン上で継続移動させることを特徴とする。

【0035】請求項26の発明は、請求項19に記載の位置制御方法において、前記表示物体はカーソルであることを特徴とする。

【0036】請求項27の発明は、請求項19に記載の位置制御方法において、前記入力機器の端部への接触において加えられる力をも検出することを特徴とする。

【0037】請求項28の発明は、請求項27に記載の位置制御方法において、前記入力機器の端部に加えられる力の量に比例して前記表示物体の移動継続速度を制御する指令を発生することを特徴とする。

【0038】請求項29の発明は、コンピュータのスクリーン上に表示される物体を入力機器の操作により該物体の位置を制御するための位置制御方法であって、該入力機器は平坦な形状のセンサーを有し、該センサーの中央部の表面上の接触点の移動軌跡を検出し、当該異動軌跡の検出に応じて前記物体を移動させるための移動制御信号を発生させ、前記センサーの端部への接触を検出し、前記センサーの端部の接触が検出された場合には前記センサーの中央部の移動軌跡の検出にตอบสนองして、前記物体の移動を継続させるための継続信号を発生させること特徴とする。

【0039】請求項30の発明は、請求項29に記載の位置制御方法において、前記端部への接触を検出する直前に、前記センサーの中央部の接触により得られた移動速度に対応する移動制御指令を発生させることにより前記物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする。

【0040】請求項31の発明は、請求項29に記載の位置制御方法において、前記センサーの端部への接触を検出することにより事前に設定された移動速度に対応する移動制御継続指令を発生させ、これにより前記物体を前記コンピュータのスクリーン上で継続移動させることを特徴とする。

【0041】請求項32の発明は、請求項29に記載の位置制御方法において、接触により前記センサーの端部に加わる力の量に比例して前記物体の移動継続速度を制御する指令を発生することを特徴とする。

【0042】請求項33の発明は、請求項29に記載の位置制御方法において、前記コンピュータのスクリーン上に表示されている物体を相対モードで移動させ、該相対モードは前記センサーの中央部における接触位置の変化率に対応して移動制御指令を発生させるモードであることを特徴とする。

【0043】請求項34の発明は、請求項29に記載の位置制御方法において、前記コンピュータのスクリーン上に表示されている物体を前記センサーの中央部の複数の異なる位置での連続的な接触に対応して絶対モードで前記物体を移動させる制御信号を発生させ、前記絶対モードは前記センサーの中央部における接触位置座標に対応した前記スクリーン上の位置座標に前記物体を移動さ

せる制御指令モードであることを特徴とする。

【0044】請求項35の発明は、コンピュータシステムのスクリーンに表示されている物体を多次元において操作するため制御信号を出力する平坦な形状のセンサーを有し、該センサーの中央部の表面に対してユーザーによりした接触した時に接触位置に対応する信号を前記センサーの中央部が発生し、該信号を用いて前記コンピュータシステムのスクリーンに表示されている物体の位置制御のための位置制御信号を発生し、前記センサーの端部は、該端部への接触に応じて制御継続信号を発生し、該制御継続信号は前記コンピュータシステムのスクリーンに表示されている物体のための移動制御指令の継続を可能にする信号であることを特徴とする。請求項36の発明は、請求項35に記載接触し入力機器において、前記センサーの端部表面の手触りが前記センサーの中央部とは異なることを特徴とする。

【0045】請求項37の発明は、請求項35に記載の接触式入力機器において、前記センサーの端部は、接触点の位置を検出可能であることを特徴とする。

【0046】請求項38の発明は、請求項35に記載の接触式入力機器において、前記センサーの端部は背所句点に加わる力の量を検出可能であることを特徴とする。

【0047】請求項39の発明は、請求項35に記載の接触式入力機器において、前記センサーの中央部および前記センサーの端部が立方体の形状の入力機器本体の一面に装着されたことを特徴とする。

【0048】

【実施例】以下、図面を参照して本発明の実施例を詳細に説明する。

【0049】図1は、本発明に関する第1の好適実施例である、接触による力に敏感な検出器を持つ3D制御入力機器を示している。

【0050】制御入力機器105は立方体の形状をしている。第1番目の入力検出器110は入力機器105の前面に装着されている。第2番目の力検出器115は入力機器105の右側に付いている。第5番目の力検出器130は入力機器の裏側に付いている。第6番目の力検出器135は入力機器105の底部に付いている。フレーム140は入力機器105の端に取り付けられており、入力機器105の6面すべてにユーザーが接触できるように設計されている。制御用接続部145は6つの力検出器110、115、120、125、130および135を結合し、これら力検出器の応答信号を出力する。

【0051】制御入力機器105は6つの検出器のいずれかを押すことにより制御入力が発生する。この立方体表面に沿ってユーザーが力を与えると、その与えられた力の方向に制御対象物体が移動するため、ユーザーインターフェイスとしては極めて直感的で理解しやすいものとなる。一例としては、ユーザーが入力機器105の上

部に付いている力検出器120を下に向けて押すと制御対象物体は下(-Y方向)へ移動する。同様に入力機器105の底部に付いている力検出器135を上に向けて押すと制御対象物体は上(+Y方向)に移動する。入力機器105の裏側に付いている力検出器130を押せば制御対象物体はユーザーに向けて(-Z方向)接近してくる。入力機器105の前面に付いている力検出器110を押すと制御対象物体は、ユーザーから遠ざかっていく(+Z方向)。入力機器105の右側に付いている力検出器115を左側方向に押すと制御対象物体は左の方向(-X方向)へ移動する。同様に入力機器105の左側に付いている力検出器125を右側方向に押すと制御対象物体は右方向(+X方向)へ移動する。

【0052】図1の制御入力機器における3次元座標の制御入力信号処理に関する電子回路のブロックダイアグラムを図2に示してある。力検出器110, 115, 120, 125, 130および135は制御接続部145によって統合されたアナログ-デジタル(A/D)変換器205に接続される。A/D変換器205はそれぞれ力検出器が独立して発生するアナログ信号をデジタル信号に変換する。6つの独立したデジタル信号は積分器210に入力される。積分器210は入力機器の左右に付いている力検出器125と115のデジタル信号の差を積分し、X軸方向の位置制御信号($X = \int (X_{125} - X_{115}) dt$)を出力する。同様にして入力機器の上部、底部に付いている力検出器120, 135からのデジタル信号の差を積分して、Y軸方向の位置制御信号($Y = \int (Y_{135} - Y_{120}) dt$)を出力し、さらに入力機器の前面と裏面に付いている力検出器110, 130からのデジタル信号の差を積分してZ軸方向の位置制御信号($Z = \int (Z_{110} - Z_{130}) dt$)を出力する。このようにして処理された位置制御指令信号X, Y, Zはコンピュータ220に接続され、コンピュータ画面上のカーソルやコンピュータグラフィックス上の表示物体の操作信号として使用される。またクレーン用サーボモータ230等に接続して、重機械の制御信号としても利用できる。

【0053】第1番目の制御入力機器の設計概念105は接触圧力の有無に敏感であり、A/D変換器は力検出器から送られてくる信号を変換後バイナリー出力信号として積分器210へ転送する。この方式は単一速度を持った制御入力信号を発生させるためにコンピュータ上のカーソルやグラフィックス上の表示物体はあらかじめ決められた速度で望ましい方向へ移動する。しかし力検出器110, 115, 120, 125, 130および135に接触圧力の定量値を測定できる機能を付加すればA/D変換器205はマルチビットのデジタル信号を出力することが可能であり、その結果積分器210の最終出力もマルチビットの値となる。このマルチビットの値を制御指令信号として利用すると制御速度を変化させる

ことが可能となりユーザーの与える接触圧力の増減に対して制御対象の移動速度の増減を操作できることになる。

【0054】図3は、本発明の第2の好適実施例である、接触式の6D制御入力機器を示している。制御入力機器305は、立方体の形状をしているが、この入力機器には合計3つの力検出器が装着されている。第1番目の力検出器310は入力機器305の前面に付いており、図4(a)の示す如く、この検出器はユーザーの接触点の位置(X, Y)を検出し、2つのアナログ信号を出力する。さらにこの力検出器310はユーザーの接触圧力の定量値を3番目の信号として出力する。第2番目の力検出器315は入力機器の右側に付いており、図4(a)に示す如く、この検出器に触れるユーザーの接触点の位置を検出し、Y, Z座標として認識する。さらにこの力検出器315は接触圧力の定量値を出力する。第3番目の力検出器320は、入力機器305の上部に付いており、この検出器320は図4(a)に示す如く接触点の位置をZおよびX座標として認識し、接触圧力の定量値を出力する。

【0055】この制御入力操作において検出器310, 315および320は、コンピュータのカーソル、コンピュータグラフィックス上の表示物体あるいはその他の制御対象物体の位置制御信号を発生するが、これらの信号は冗長系となっている。すなわちY座標の位置制御信号は力検出器310または315より入力することが可能である。同様にしてX座標の位置制御信号は力検出器310または320より入力可能であり、Z座標の位置制御信号は力検出器315または320より入力可能である。これらの2つのX座標入力はその和を計算して最終的なX座標用信号として出力される。Y, Z座標入力をX座標入力処理と同様にして処理される。このようにして検出器上におけるユーザーの接触点の座標の変化は制御対象物の位置変化の指令信号として解釈され、その制御指令信号の大きさは一定値かあるいはユーザーが調節できる可変ゲイン用いられる。

【0056】6つの自由度を必要とする応用制御において、力検出器310, 315および320は回転制御入力を生じさせることができる。これらの力検出器はユーザーの接触圧力の大きさを検出できるため、その圧力値の大小によりモード切り換えが可能となる。図5に示す閾値検出器535は各検出器から第3番目の信号である接触圧力値を入力として取り込み、その値の大小により検出器群の第1, 第2番目の信号である接触点の位置信号を位置制御指令処理部540へ転送するかあるいは回転制御指令処理部545へ転送するかを決定する。すなわちもしユーザーが入力機器上の検出器表面に与える力があらかじめ指定された値を超えたならば、この検出器が出力する2つのアナログ信号は回転制御のための指令信号として認識される。図4(b)に示す如く検出器3

10において強い接触圧力が検出されたならば検出器310より出力される2つのアナログ信号はZ軸まわりの回転制御のための信号として使用される。同様に検出器315において強い接触圧力が検出されたならば検出器315より出力される2つのアナログ信号はX軸まわりの回転制御用信号として使用され、検出器320において強い接触圧力が検出されたならば検出器320より出力される2つのアナログ信号はY軸まわりの回転制御用信号として使用される。

【0057】図5は図3に示した6D制御入力機器の電子回路に関するブロックダイアグラムを示している。接触圧力に敏感な検出器310、315および320は接続部510で結合されて閾値検出器535へ接続される。閾値検出器535は力検出器の信号を位置制御部540あるいは回転制御部545へ転送する。位置制御部540は2つのモード（絶対/相対座標）を持っている。絶対座標モードにおいては力検出器におけるX座標は直接的にコンピュータ上のカーソルあるいは制御対象物体の座標系におけるX座標として処理される。もし同時に2つの入力信号が入ってきた時は、その平均を取るかあるいは一方を排除する。相対座標モードにおいては位置制御部540はX値の変化分のみを出力する。もし2つの入力信号が同時に入ってきた時はその平均を取るかあるいは一方を排除する。この機能はYおよびZに関する情報処理においても同様に適用される。

【0058】回転制御部545はユーザーの力検出器表面における回転のジェスチャーを回転指令信号として認識する。すなわちユーザーが閾値検出器で判定で指定された圧力値以上の強い接触圧力を力検出器に与えた場合、この力検出器のアナログ信号は回転制御部545へ転送され、この力検出器表面に垂直な軸まわりの回転指令信号として処理される。この時接触圧力点の角度は検出器表面の中心点を原点として計算される。相対モードでは角度変化のみが回転制御信号として使用される。回転制御信号はユーザーの指定するゲイン調整によりその信号強度の度合を変化させることができる。また絶対モードによる入力も可能でありこの入力モードでは力検出器表面における接触圧力点の絶対角度が回転指令信号となる。

【0059】図6は本発明の第3の好適実施例である6D制御入力機器605を示している。この入力機器605は立方体の形状をしている。第1番目の力検出器610は入力機器605の前面に付いている。第2番目の力検出器615は入力機器605の右側に付いている。第3番目の力検出器620は入力機器605の上部に付いている。第4番目の力検出器625は入力機器605の左側に付いている。第5番目の力検出器630は入力機器605の裏側に付いている。第6番目635は入力機器605の底部に付いている。フレーム640は入力機器605の端に取り付けられており、入力機器605の

6つの表面がユーザーによって接触できるように配慮されている。接続部645は力検出器610、615、620、625、630および635を結合し各検出器におけるユーザーの接触点位置信号および接触圧力信号を供給する。

【0060】X、Y、Z座標の位置データおよび姿勢データは図3および図4に示されている制御入力機器305と同様の方法によって算出される。力検出器の数を増加させることにより入力機器の入力の冗長性の能力を強化している。すなわちZ軸まわりの回転入力検出器610または630から入力可能となる。またX軸まわりの回転入力検出器615または625から入力可能となりさらにY軸まわりの回転入力検出器620または635から入力可能となる。同様にしてX座標の位置入力は検出器610、615、630および625から入力可能となる。またY座標の位置入力は検出器610、615、630および625から入力可能となり、さらにZ座標の位置入力は検出器620、615、635および625より入力可能となる。前に記述したように同時に複数の制御入力信号が発生した場合はその平均をとるかあるいは第2番目以降の入力信号を排除する。この性質は設計において検出器信号に優先度を割り当てて処理するかあるいは入力信号の相対的時間によって優先度を決定することによって処理することも可能である。さらに入力信号は絶対座標/相対座標モードのいずれの方法でも利用できる。

【0061】本発明の第4の好適実施例である6D制御入力機器は図7に示されている。制御入力機器705は立方体の形状をしており、3つのつまみを持っている。6つの力検出器710、715、720、725、730および735は入力機器705の表面に付いており、その機能は図6に示した制御入力機器605で記述した内容と同様のものである。しかしこれら力検出器はX、Y、Zの座標に関する位置入力信号の発生にのみ使用される。

【0062】つまみ740、750および760はX、Y、Z軸まわりの回転入力信号を発生させる。すなわちつまみ740はY軸まわりの回転、つまみ750はX軸まわりの回転、さらにつまみ760はZ軸まわりの回転入力を発生する。

【0063】つまみ740に示されているように各つまみは少なくともひとつの力検出器パッドが装着されており、このつまみの外表面周囲(Circumference)に関する一次元の接触圧力情報を検出できるようになっている。このつまみに付いている検出器は2つの接触入力に対してはその平均値を出力できる。この検出器が付いたつまみ表面に1点あるいは2点の接触圧力が与えられ、さらにこの接触点が移動する時、つまみに付いている力検出器はつまみの軸まわりの回転入力として認識する。各つまみを2本の指でひねるようにすべらせ

るとその動作速度に応じて各つまみの力検出器は各軸まわりの回転入力に対応する信号を出力する。すなわちつまみ740に装着されている力検出器745はつまみ740の外周まわりの一次元位置情報を検出する。この検出器に2点の接触圧力が与えられた場合、この2つの接触点の平均となる位置の移動が相対座標モードで検出され、さらに信号の大きさは可変式ゲインで指定された値を提供する。この処理において回転指令信号(角度変化)は以下の方程式を用いて算出する。

【0064】

【数1】角度(θ) = $G * 360^\circ * d1 / L$

ここにおいて θ = 回転指令信号

G = 可変(プログラマブル)ゲイン

d1 = 2本の指位置の平均値の変化分

L = つまみの外周距離

具体的算出例としてはつまみ740を2つの指でまわす動作を行いながら指をすべらせる。その結果2本の指の位置の平均値が1センチメートル移動したとするならばY軸に対して90度の回転指令信号というように計算する。この時ゲイン調整により指令角度の量を望ましい値に増減できる。

【0065】図8は接触式円筒型の制御入力機器800を分解して示したものであり、この入力機器も本発明で生み出された設計概念である。この円筒型入力機器800は6つの円筒が互いに直交して結合しており、この円筒表面に装着している力検出器801, 802, 803, 804, 805, 806に接触圧力を加えることによりX, Y, Zの位置制御入力を発生させるものである。6つの力検出器は図1に示された制御入力機器105において使用されている検出器と同様のものでありその機能や信号処理も同様である。円筒型入力機器800は、力検出器810, 811, 812, 813, 814, 815を用いて回転制御信号を発生させることが可能である。この回転に関する入力は図7に示されている制御入力機器705に装着されているつまみ740, 750および760の持つ機能と同等のものであり、各軸まわりの回転指令入力はその和を算出して最終的回転入力とする。

【0066】他の種類の円筒型制御入力機器900は図9に示されている。円筒型入力機器900は6つの円筒が互いに直交しており直交座標系の原点で結合している。そして6つの円筒には円筒型入力機器800と同じように力検出器がそれぞれ装着されており位置制御入力を発生できるようになっている。しかし円筒型入力機器900は入力機器800とは異なる方法で回転制御入力を発生させる機能を持っている。すなわち各円筒部分に装着されている力検出器はその検出信号の利用の観点から少なくとも4つの区域に機能的に分けて信号処理を行う。そして区分された力検出器の各区域は円筒表面を90度おおうものである。他の5つの円筒も同様にして機

能面より4つの区域に分けて信号処理を行う。図に示すように各区分された区域の中心は6つの円筒で定義される直交座標系の軸平面上に位置している。

【0067】円筒型入力機器900の操作は“押し”モードとして記述される。回転入力は機能的に4分割された円筒の一区域を押すことによりこの区域を含む平面に対して垂直な軸まわりの回転制御入力が発生し、この入力は制御対象物と同じ回転方向に押す動作と同等の制御入力として使用される。この操作は図9(b)に示されており、Z軸まわりの回転入力は力検出器の分割区域902, 904, 905, 907, 908, 909あるいは910を押すことにより入力が発生する。力検出器分割区域904, 906, 908および910は正方向のZ軸まわりの回転入力(時計回り)を発生し、力検出器分割区域902, 905, 907および909は負方向(反時計回り)の回転入力を発生する。これらの信号は和を取って処理することができ、信号の大きさも“ON/OFF”のバイナリーレベルかあるいは複数レベルの処理が可能である。X軸およびY軸まわりの回転入力発生操作もZ軸の場合と基本的に同じものである。

【0068】第3番目の円筒型制御入力機器1000は図10に示されている。円筒型入力機器800および900と異なり円筒型入力機器1000は6つの円筒の端に力検出器が装着されていない。円筒に装着されている力検出器の回転入力に関する機能は円筒型入力機器800における力検出器810~815と同じものである。しかし円筒型入力機器1000の力検出器はユーザーの接触に関する2次元情報を検出する能力を持っており、円筒表面におけるユーザーの接触点における軸方向と円周方向の座標信号を発生する。図10(a)に示すように親指と人指し指でX軸円筒表面をX軸方向に滑らせた場合、この接触点は力検出器1010によって検出される。2本の指で触れた場合はその接触点の位置平均値が位置入力信号として処理され、この信号はコンピュータのカーソルあるいは制御対象物の相対位置制御入力信号として利用される。Y軸およびZ軸に関する位置制御入力に関してもX軸における入力信号発生機能と同様であり図10(b), 図10(c)にそれぞれ示されている。

【0069】図11は配管移動ロボットの制御入力機器1100であり円筒座標系で位置が決定される制御対象物への本発明の適用として示されている。この例は工業プラントの配管内を移動するロボットの制御に本発明の制御入力機器が有効に利用されることを示すものであり、配管移動ロボットは図12に描かれている。この図においてロボット1205は3本の足1210, 1215および1220を持っておりカメラあるいは超音波検出器1225を搭載して配管1230の内壁を検査するために移動する。

【0070】この配管移動ロボット用の制御入力機器1

100は3つの力検出器1105, 1110および1115が装着されており、この力検出器はユーザーの接触点位置と接触圧力の値を検出できる。配管にそったZ軸の位置データは検出器1110における接触点のZ軸方向の座標をもとに出力される。また角度データは検出器1110における接触点の角度の値をもとに出力される。

【0071】半径に関する位置データは検出器1105および1115における接触点の半径の長さがその座標成分として使用される。

【0072】また別の入力方法としては制御入力機器105と同様の機能を応用して検出器1105および1115に加える接触圧力を用いてZ軸上の位置制御を実行することも可能である。また角度情報は制御入力機器305と同様の機能を用いて発生することが可能である。半径方向の情報は検出器1110に加える接触圧力値を検出して、制御入力が発生させることが可能である。

【0073】図13に示す制御入力機器1305はコンピュータ入力ペンが容易に使用できるように入力機器の前面を修正したものである。すなわち前面に装着してある力検出器1310が傾いている。位置制御の機能は入力機器305と同様である。傾いた力検出器はその傾きによって入力信号を修正することなく検出器1310で検出するユーザーの接触点の移動の同定は入力機器305に装置されている検出器310の機能と同様のものである。また、回転制御に関するつまみ1315, 1320および1325の機能も制御入力機器705におけるつまみと機能と同様のものである。

【0074】図14は制御入力機器705の形状修正をしたもので大型検出器1410が採用されている。この変形はCAD/CAMにおけるデジタイザ用として適している。

【0075】図15はマウス150に力検出器を2つ装着したシステムを示している。マウス1505は通常のマウス操作によりXY位置制御入力が発生する。力検出器1510はZ軸の負の方向(-Z)、また力検出器1515は正の方向(+Z)に関する位置制御入力が発生する。

【0076】図16に示されているくさび形状の制御入力機器1605は図17に示しているクレーン車1705のような重機械のクレーン棒制御に適用できる。力検出器1610はX, Y軸方向の位置制御入力が発生し、ユーザーの接触圧力値に対応する第3番目の出力信号はクレーン棒1705を反時計回りに回転させる角度制御入力として使用される。この時ユーザーが入力機器を右側から押すことにより発生する回転制御入力に対応してクレーン棒はあたかも右側から力が加わったごとく反時計回りに動くことになる。力検出器1610より発生するX軸方向の位置制御信号はクレーン棒端1710の伸縮制御に使用され、Y軸方向の位置制御信号はクレーン

棒端1710の高さの制御に使用される。力検出器1615はX, Y軸方向の位置制御入力が発生し、ユーザーの接触圧力値に対応する第3番目の出力信号はクレーン棒1705を時計回りに回転させる角度制御入力として使用される。この時ユーザーが入力機器を左側から押すことにより発生する回転制御入力に対応してクレーン棒はあたかも左側から力が加わったごとく時計回りに動くことになる。力検出器1615のX軸方向の位置制御入力はクレーン車の安定用支持棒(outrigger)の移動に使用され、Y軸方向の位置制御入力はクレーンかぎ(hook)の昇降制御に使用される。この制御入力機器表面におけるユーザーの接触点の移動とこの入力に対応して動くクレーン車1705の動作の関係をより理解しやすく示すために参照番号が図16および図17に1から5まで記述してある。制御入力機器上の参照番号で示してある接触点のXY座標と圧力に関する入力動作がユーザーによって加えられるとクレーン車1705はその入力機器の参照番号と同じ参照番号に対応するクレーンの動作を実行する。

【0077】図18は極座標系(球面極座標系)で定義される制御対象物に適用する制御入力機器1805を示したものである。入力機器1805は半球形状をしており、半球表面1810と底面1815よりなっている。半径方位の位置入力は半球の底面1815に付けられている力検出器への接触圧力によって検出し、2つの角度座標(θ :シータ, ϕ :ファイ)の入力は半球表面に付けられている力検出器によって検出する。

【0078】図19は2次元レベルでコンピュータ上のカーソルやグラフィックス表示物体の制御を可能にする制御入力機器である。ユーザーの接触による力に敏感な力検出器1905はその接触点におけるX, Y座標と圧力の値を検出する。力検出器1905は平坦な部分1915と突き出した四辺の部分1910よりなっている。この設計概念では検出器の平坦な部1915の四辺の端が隆起した部分1910となっており、この四辺の棒は平坦な部分に対して傾きを持っている。この形状は力検出器の平坦な部分と隆起した部分に異なる制御機器を持たせるために利用される。一例として相対座標モードにおいて力検出器1915におけるユーザーの接触点の位置の変化はコンピュータ上のカーソルの位置変化に比例する制御入力が発生する。もしユーザーの指が力検出器の平坦部分の端である隆起部分1910に達したならばユーザーの指の動きは止まり隆起部分1910に定常の接触圧力を加えることになるが、この時検出される圧力信号はカーソルの移動を継続する制御信号として処理される。カーソル移動の継続を実行する制御入力はユーザーの接触点が隆起部分に達する直前の速度と移動の方向に関する制御情報を利用するか、あるいは事前に指定された速度が用いられる。この継続動作の制御信号は隆起部分1910に接触圧力が検出される時に限り発生し、

隆起部分1920の場合であればX軸の正の方向へ向かってカーソルは継続的に移動する。あるいは継続動作の速度は接触圧力の大きさに比例するものであっても良い。このような機能を用いて隆起部分1920は+Xの方向のカーソルの制御、隆起部分1925は+Y方向のカーソルの制御、隆起部分1930は-X方向のカーソルの制御、隆起部分1935は-Y方向のカーソルの制御を可能にする。

【0079】このようにユーザーは2つの選択的モードを用いてユーザーの指が検出器の平坦な部分1915の端に達しても、そのままの状態でもカーソルを望みの方向に制御することができる。

【0080】図1から図10までのものおよび図13、図14に示した制御入力機器は直交座標系に適したものである。一般的にこれらの機器の制御入力には位置制御と回転制御に分類される。さらに位置制御における“押しモード”は図1、図8および図9(a)に示す設計概念に採用されている。“引きずり”モードを用いる位置制御は図3、図6、図7および図10(a)、図10(b)、図10(c)に示す設計概念に示してある。回転制御入力に関しては3つのモードが使用される。“回転のジェスチャー”モードは図3と図6に示す設計概念に用いられ、回転の“押し”モードあるいは“トルク”モードは図9(a)、図9(b)、図9(c)、図9(d)に示す設計概念に用いられている。最後に回転の“ねじり”モードは図7と図8に示す設計概念に示されている。これらの制御モードは様々な設計概念の応用に対応して自由に組み合わせることができる。さらに図11、図12、図16、図17に示した円筒座標系や極座標系用の制御入力機器においても同様に様々な制御モードの組み合わせが可能である。

【0081】以上、本発明を種々の好適実施例について説明してきたが、当業者は、本発明の精神および範囲を逸脱することなく種々の変形、変更を加えることができるものである。例えば、本発明の実施例はシングルまたはマルチビットの検出器およびA/D変換器の組み合わせからの情報の取り出し方について種々記述しているが、これらの内容は応用事例に応じて最前の適応となるように互いに取り換えて実施できるということはよく知られていることである。さらに直交座標系に適用する制御入力機器は、図1、図3に示すとおりその検出器が互いに直交しているが、検出器は図13のように傾きを与えることもできる。しかしこの変更も基本的に直交座標系に帰属すると考えられる。すなわちこのような変形、変更は本発明の技術的範囲に属すると考えられる。

【0082】

【発明の効果】以上、説明したように請求項1～39の発明によれば、センサーの中央部および端部により異なる信号を発生させることによりセンサーの中央部のユーザーの指の接触によりスクリーン上のカーソルなどの物

体の移動のための位置を指示することができ、また、ユーザーの指の接触点がセンサーの端部に到達して、その位置以上の指の移動ができなくても、センサーの端部での接触によりカーソルの移動の継続を指示することができる。さらにはセンサーの中央部は、接触位置だけではなく接触により加わる力の量をも情報として受け付けるので、たとえば、カーソルの移動を指示しながら、上記力の量によりカーソルの移動速度をも指示することができる。

【図面の簡単な説明】

【図1】接触による力に敏感な検出器を6個持つ3D制御入力機器を示す斜視図である。

【図2】図1に示した3D制御入力機器の電子回路処理のブロックダイアグラムである。

【図3】X-Y軸の位置および接触による力に敏感な検出器を3個持つ6D制御入力機器を示す斜視図である。

【図4】(a)は図3における位置制御に関するユーザーインターフェイスを示す斜視図であり、(b)は図3における回転制御に関するユーザーインターフェイスを示す斜視図である。

【図5】図3の6D制御入力機器の電子回路のブロックダイアグラムである。

【図6】X-Y軸の位置および接触による力に敏感な検出器を6個持つ6D制御入力機器を示す斜視図である。

【図7】X-Y軸の位置および接触による力に敏感な検出器を6個持ち、さらに3つの制御用つまみを持つ6D制御入力機器を示す斜視図である。

【図8】接触式円筒型制御入力機器の“ねじりモード”の操作の説明図である。

【図9】(a)は接触式円筒型制御入力機器の“押しモード”を示す斜視図であり、(b)、(c)および(d)は、それぞれ、(a)におけるZ、XおよびY軸まわりの回転制御入力の検出を示す斜視図である。

【図10】(a)、(b)および(c)は、それぞれ、“引きずりモード”におけるX、YおよびZ座標の検出を示す斜視図である。

【図11】配管内移動ロボットの制御入力機器を示す斜視図である。

【図12】配管内移動ロボットを示す斜視図である。

【図13】コンピュータ用入力ペンの使用を容易にするため制御入力機器705の形状修正を示す斜視図である。

【図14】制御入力機器705をCAD/CAMデザイナー用に修正した形を示す斜視図である。

【図15】マウスに対して接触力検出器を2個装置した制御入力機器を示す斜視図である。

【図16】クレーン車において制御入力機器として使用されるくさび形状の入力機器を示す斜視図である。

【図17】クレーン車の説明図である。

【図18】極座標系で位置が決定される制御対象に使用

する制御入力機器を示す斜視図である。

【図19】2次元におけるカーソルあるいは物体の制御における2つの異なるモードを持つ制御入力機器を示す斜視図である。

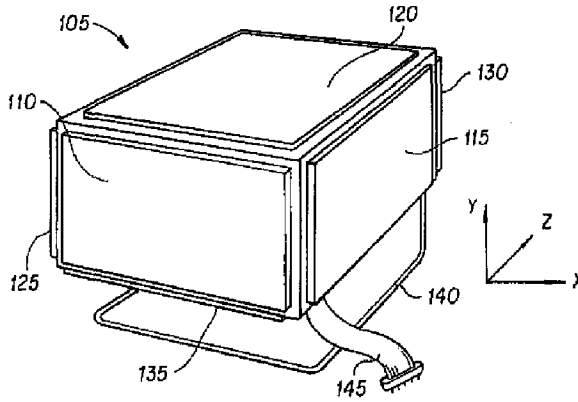
【符号の説明】

- 105 入力機器
- 110, 115, 120, 125, 130, 135 カ

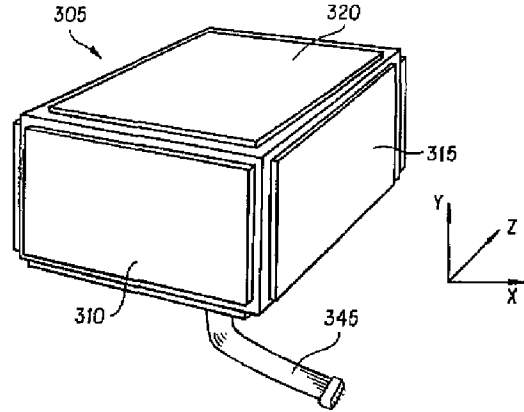
検出器

- 140 フレーム
- 145 制御接続部
- 205 A/D変換器
- 210 積分器
- 220 コンピュータ
- 230 クレーン用サーボモータ

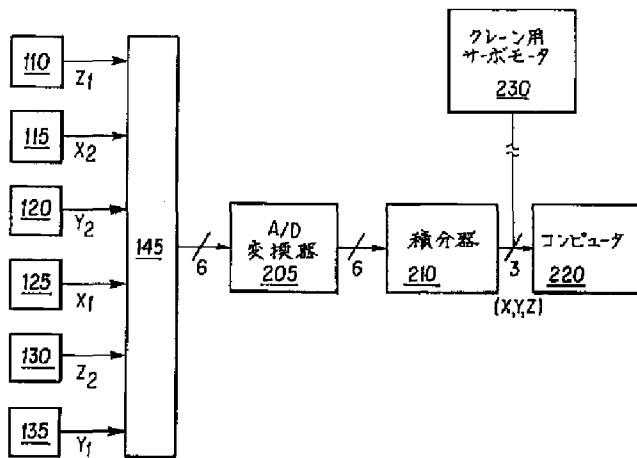
【図1】



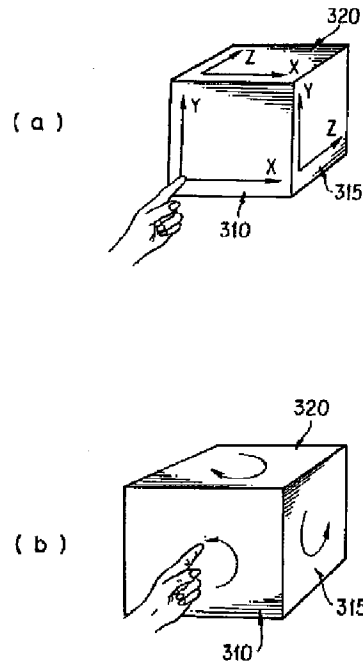
【図3】



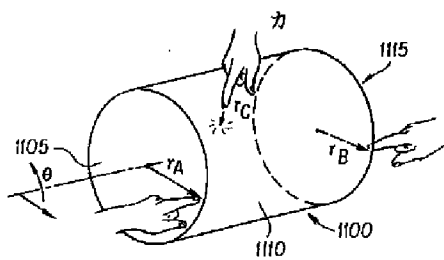
【図2】



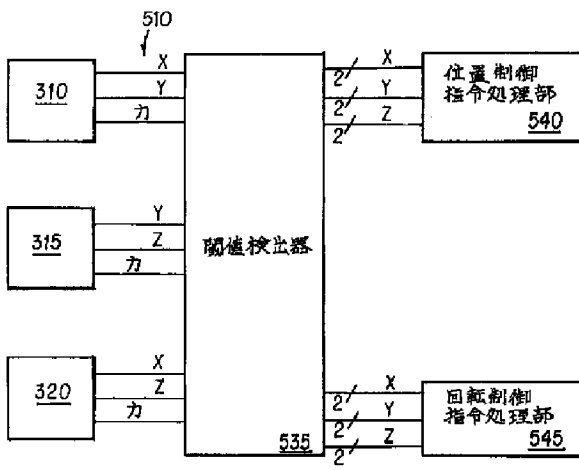
【図4】



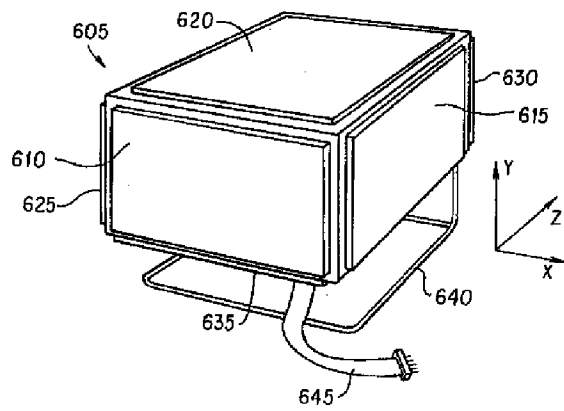
【図11】



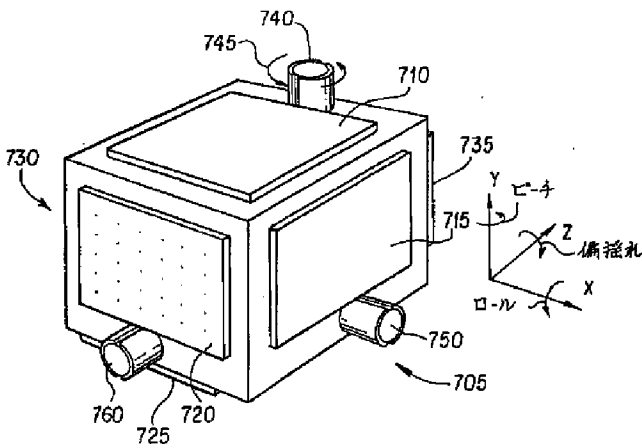
【図5】



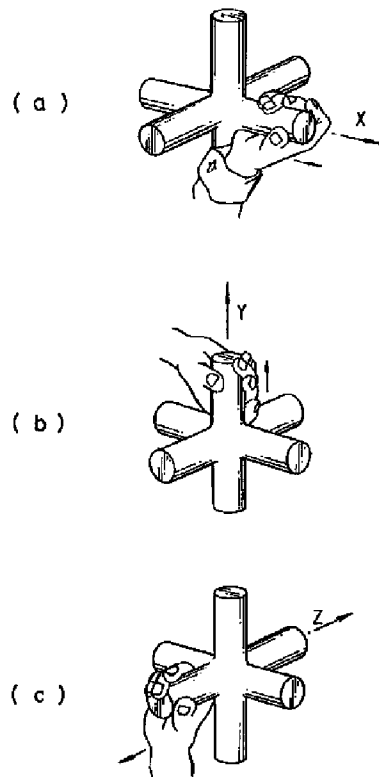
【図6】



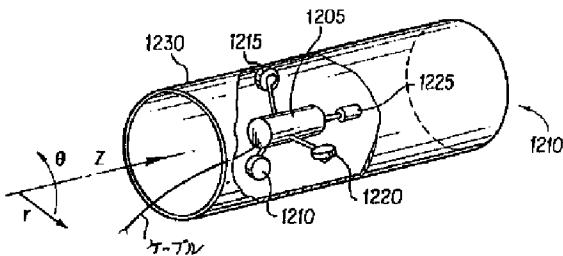
【図7】



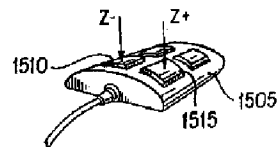
【図10】



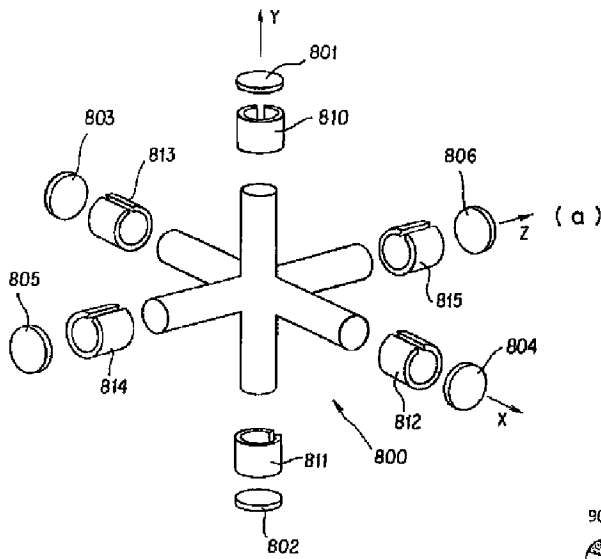
【図12】



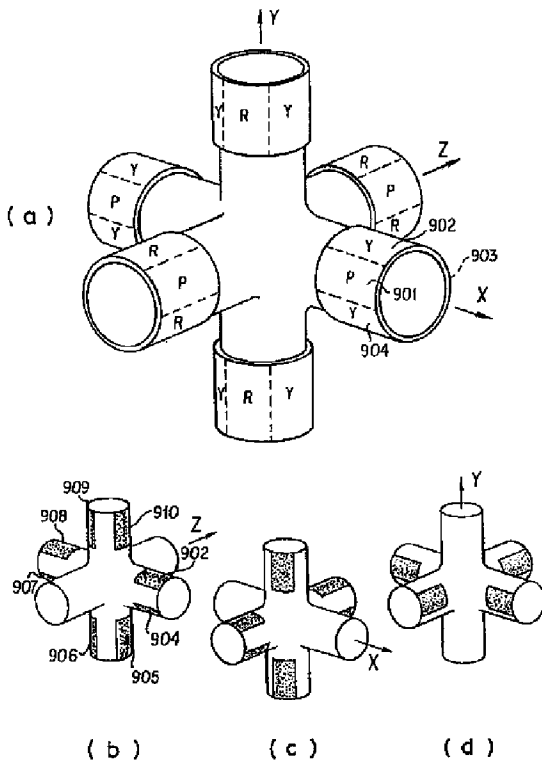
【図15】



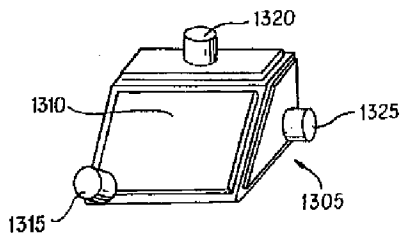
【図8】



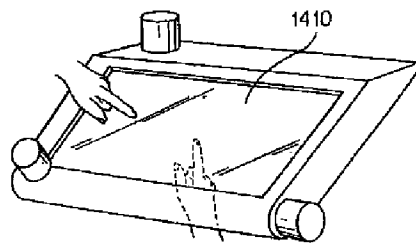
【図9】



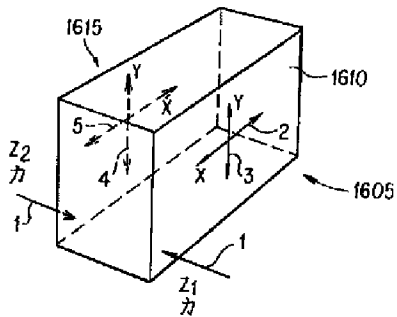
【図13】



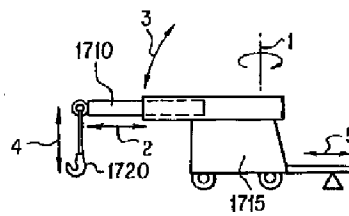
【図14】



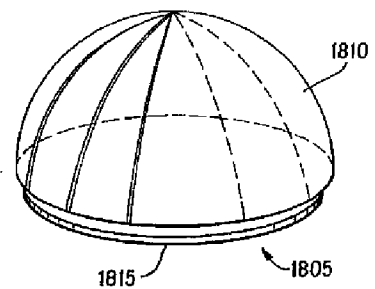
【図16】



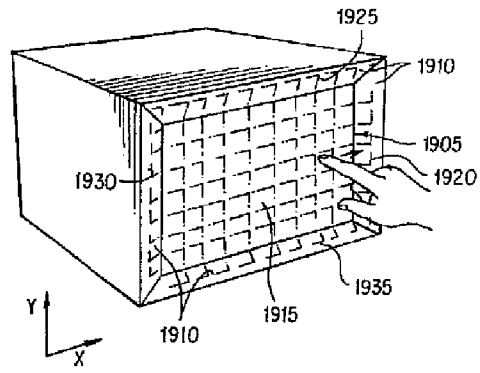
【図17】



【図18】



【図19】



Electronic Acknowledgement Receipt

EFS ID:	20032675
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/Amelia Khalaf
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	03-SEP-2014
Filing Date:	30-MAR-2009
Time Stamp:	14:45:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	US_IDS_Form_SB_08a1.pdf	612230 <small>34da5c571b0cf7e9672d24a0cd4385968ac296e</small>	no	4

Warnings:

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2	Non Patent Literature	Korean_Office_Action.pdf	274500	no	7
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3	Foreign Reference	JP10-260776.pdf	1395559	no	18
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Warnings:

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Total Files Size (in bytes):			2282289		
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)**

Application Number	12413722	Filing Date	2009-03-30	Docket Number (if applicable)	102-1567	Art Unit	2622
First Named Inventor	Yong-jin KANG et al.			Examiner Name	Jeffrey S. Steinberg		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

Other _____

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other _____

MISCELLANEOUS

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502827

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Lev I. Iwashko/	Date (YYYY-MM-DD)	2014-06-18
Name	Lev I. Iwashko	Registration Number	70168

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yong-jin KANG et al.

Application No.: 12/413,722

Group Art Unit: 2622

Filed: March 30, 2009

Examiner Jeffrey S. Steinberg

Customer No.: 38209

Confirmation No. 9676

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

BOX RCE

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT WITH REQUEST FOR CONTINUED EXAMINATION (RCE)

Sir:

In response to the Final Office Action mailed April 18, 2014, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 10 of this paper.

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An input apparatus, comprising:
a motion detector which detects a ~~motion~~ movement of the electronic apparatus;
an input unit ~~which is more sensitive than the motion detector and~~ which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and
a controller which selects the function among a plurality of functions based on the received user input, generates a predetermined command associated with the selected function by combining the detected ~~motion~~ movement and the received user manipulation ~~input to the input unit~~, and controls the generated ~~predetermined~~ command to be transmitted to an external device;
wherein, ~~if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.~~

2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller

generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a ~~motion~~ movement of the electronic apparatus ;
receiving a user input ~~more sensitively than the motion~~ by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

selecting the function among a plurality of functions based on the received user input;
and

generating a ~~predetermined~~ command associated with the selected function by combining the detected ~~motion~~ movement and the received user manipulation ~~input~~, and controls the generated ~~predetermined~~ command to be transmitted to an external device₂,

~~wherein, if the user manipulation is input and if the motion is detected simultaneously or~~

~~within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.~~

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates

a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation, wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch, wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation, wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:

a motion detector to detect a ~~motion~~ movement of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected ~~motion~~ movement;

an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, for selecting the function ~~of among~~ a plurality of functions based on the received user input and to generate second signals corresponding to the selected function;

a controller to combine the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function,

~~wherein, if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals.~~

29. (Currently Amended) An electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:

a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The electronic apparatus of claim 1, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a ~~motion~~ movement of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected ~~motion~~ movement;

receiving user manipulations for selecting the function of ~~among~~ a plurality of functions based on the received user input on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected ~~motion~~ movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector;

generating second signals corresponding to the selected functions;

combining the first and second signals into a single command associated with the selected function to be transmitted to the external device in order to perform the selected function; and

~~generating a command by combining the first and second signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated.~~

35. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the

detected translation and rotation, such that the received user input corresponds to a function and is not based on the translation and rotation detected by the motion detector;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input; and
transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

42. (New) The input apparatus as claimed in claim 1, wherein the selected function is a volume adjustment function,
wherein the command associated with the selected function is a volume up or a volume down command.

REMARKS

Introduction

Applicants note with appreciation the Examiner's indication that each of the references cited in the Information Disclosure Statement of March 4, 2014 have been considered.

Upon entry of the foregoing amendment, claims 1-5, 8-18, 21-26, 28-30, 32, 34-35, 38, and 42 are pending in the application. Claims 1, 14, 28, 29, 34, and 35 have been amended. Support for these claim amendments can be found at least in paragraph [00154] of Applicants' originally-filed Specification. Claims 6, 7, 19, 20, 27, 31, 33, 37 and 39-41 have been previously cancelled without prejudice or disclaimer. New claim 42 has been added. Support for this new claim can be found at least in paragraph [00152] of Applicants' originally-filed Specification. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC §103 to Liberty and Ohta

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36 and 38 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2005/0253806 to Liberty et al. (hereinafter Liberty) in view of U.S. Publication No. 2008/0125223 to Ohta. Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Independent Claims 1, 14, 27, 28, 29, 34, and 35

Referring to independent claims 1, 14, 28, 29, 34, and 35, in the Final Office Action dated April 18, 2014, the Examiner alleges that Liberty and Ohta teach all of the limitations as previously presented in independent claims 1, 14, 28, 29, 34, and 35. However, it is respectfully submitted that Liberty and Ohta do not teach or suggest all of the features as presently recited in independent claims 1, 14, 28, 29, 34, and 35, for at least the following reasons.

On pages 3-4 of the Final Office Action dated April 18, 2014, the Examiner relies on paragraphs [0059] and [0117] of Liberty as allegedly teaching the limitations as previously presented in independent claim 1, namely "an input unit which is more sensitive than the motion detector..., and a controller which generates a predetermined command by combining the detected motion and the user manipulation input to the input unit, and controls the generated

predetermined command to be transmitted to an external device, wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.”

Applicants submit that the above-cited portions of Liberty are directed to post-processing readings of a free space pointing device 400. More specifically, in Liberty, once calibrated sensor readings have been compensated for linear acceleration, processed into readings indicative of angular rotation of the free-space pointing device 400, and compensated for tilt, then post processing can be performed to compensate for various factors such as human tremor. In other words, Liberty allows human tremor to be removed from a motion of the free space pointing device 400 for more accurate readings of the free space pointing device 400.

However, Liberty does not address two separate inputs within the free space pointing device 400, such that a first input is a detected motion, and the second received user input is a user manipulation such that the received user input is separate from the detected motion and not based on the motion detected by a motion detector. In other words, Liberty merely analyzes a motion of the free space pointing device 400, performs various types of calibrations and compensations therefor, and then performs a final compensation for other factors experienced during the motion, such as human tremor. In other words, all the factors compensated for and calibrated in Liberty are directed only to a **single input of the motion** of the free space pointing device 400, and there is no separate input received by an input unit disposed on the free space pointing device 400 in Liberty. Accordingly, there is no command in Liberty that is generated to combine a motion detected input and a non-motion-detected input to perform a single function.

Therefore, for at least the above reasons, Liberty does not teach or suggest, among other things, “a motion detector which detects a movement of the electronic apparatus, an input unit which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected movement, such that the received user input corresponds to a function and is not based on the movement detected by the motion detector, and a controller which selects the function among a plurality of functions based on the received user input, generates a command associated with the selected function by combining the detected movement and the received user input, and controls the generated command to be transmitted to an external device,” as presently recited in independent claim 1.

On page 4 of the Final Office Action dated April 18, 2014, the Examiner admits, and Applicants agree, that Liberty does not teach or suggest all of the limitations of Applicants' independent claim 1, specifically "an input unit...which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion." The Examiner relies on the Abstract of Ohta as allegedly teaching the limitations lacking in Liberty. However, Applicants respectfully submit that Liberty and Ohta, alone or in combination, do not recite the limitations of independent claim 1 as presently recited for at least the following reasons.

Applicants respectfully submit that Ohta is directed to an input device that includes an image capturing means for capturing an image of a target object, and calculates a pointing position of a screen of a display device based on then image captured by the image capturing means. More specifically, the input device of Ohta includes a motion detecting means, and a processor to calculate a tilt value of the input device.

However, Ohta does not address two separate types of user manipulations, such that one is motion detection based and the other is non-motion-detection based. As such, there is no command in Ohta that is generated to combine a motion detected input and a non-motion-detected input to perform a single function.

Accordingly, Ohta does not teach or suggest, among other things, "a motion detector which detects a motion of the electronic apparatus that corresponds to a function, an input unit which is more sensitive than the motion detector and which is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion, such that the received user input corresponds to the function and is not based on the motion detected by the motion detector, and a controller which generates a predetermined command to perform the function by combining the detected motion and the received user input , and controls the generated predetermined command to be transmitted to an external device, wherein, if the user manipulation is input to the input unit and if the motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal," as presently recited in independent claim 1, and therefore, Ohta does not remedy the deficiencies of Liberty.

Hence, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify or combine Liberty and Ohta to provide every limitation of Applicants' claim.

Thus, Liberty and Ohta, separately or in combination, fail to teach or suggest every limitation of Applicants' claim 1, as presently recited.

Also in the Final Office Action dated April 18, 2014, the Examiner provides substantially similar portions of Liberty and Ohta to attempt to reject independent claims 14, 28, 29, 34, and 35, and therefore, Applicants respectfully submit that similar arguments above regarding claim 1 are also applied to independent claims 14, 28, 29, 34, and 35. Furthermore, independent claims 14, 28, 29, 34, and 35 have been amended in a manner similar to independent claim 1. Accordingly, Liberty and Ohta also fail to teach or suggest every limitation of Applicants' claims 14, 28, 29, 34, and 35.

For the foregoing reasons, Liberty and Ohta are inadequate grounds for rejecting Applicants' claims 1, 14, 28, 29, 34, and 35 under 35 U.S.C. § 103(a), and Applicants respectfully request reconsideration and withdrawal of this rejection and allowance of these claims.

Dependent Claims 2-5, 8-13, 15-18, 21-26, 30, 32, and 38

Dependent claims 2-5, 8-13, 15-18, 21-26, 30, 32, and 38 each depend from independent claims 1, 14, 29, and 35, respectively, and therefore contain each of the features recited in independent claims 1, 14, 29, and 35. Accordingly, since Liberty and Ohta fail to teach or suggest independent claims 1, 14, 29, and 35, for the reasons discussed above, Applicants submit that Liberty and Ohta also fail to teach or suggest dependent claims 2-5, 8-13, 15-18, 21-26, 30, 32, and 38. Applicants respectfully request withdrawal of this rejection and allowance of these claims.

New Claim 42

New dependent claim 42 recites "wherein the selected function is a volume adjustment function, wherein the command associated with the selected function is a volume up or a volume down command."

Support for this new claim can be found at least in paragraph [0152] of Applicants' specification.

Applicants affirm that none of the above-cited references teach, disclose, or suggest the

Serial No.: 12/413,722
Amendment With RCE dated June 18, 2014
Reply to the Final Office Action of April 18, 2014

limitations as recited in new claim, and Applicants respectfully request allowance of this new claim.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,
STANZIONE & KIM, LLP

Dated: June 18, 2014
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: /Lev I. Iwashko/
Lev I. Iwashko
Registration No. 70,168

Electronic Patent Application Fee Transmittal

Application Number:	12413722
Filing Date:	30-Mar-2009
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Filer:	Patrick J. Stanzione/Amelia Khalaf
Attorney Docket Number:	102-1567

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
RCE - 2nd and Subsequent Request	1820	1	1700	1700
Total in USD (\$)				1700

Electronic Acknowledgement Receipt

EFS ID:	19337503
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/Amelia Khalaf
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	18-JUN-2014
Filing Date:	30-MAR-2009
Time Stamp:	12:41:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

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Payment Type	Credit Card
Payment was successfully received in RAM	\$1700
RAM confirmation Number	9382
Deposit Account	502827
Authorized User	STANZIONE, PATRICK

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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CYWEE EX 2009-281

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCE_Transmittal_Updated_Electronic.pdf	697788 cb7d9a38c79566d6d8eb62c4d37407b61e6ad7b7	no	3

Warnings:

Information:

2		Amendment_RCE.pdf	573773 b8237d53557192681640e30386b488c5adb82	yes	14
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Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	9
Applicant Arguments/Remarks Made in an Amendment	10	14

Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	30624 aa48b1b6233cb037c24f084d730971bdef0888cf	no	2
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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New International Application Filed with the USPTO as a Receiving Office

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/413,722	03/30/2009	Yong-jin KANG	102-1567	9676
38209	7590	04/18/2014	EXAMINER	
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006			STEINBERG, JEFFREY S	
			ART UNIT	PAPER NUMBER
			2622	
			NOTIFICATION DATE	DELIVERY MODE
			04/18/2014	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptomail@snkiplaw.com
patent@snkiplaw.com

Office Action Summary

Application No. 12/413,722	Applicant(s) KANG ET AL.	
Examiner Jeffrey Steinberg	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 12/26/2013.
- 2a) This action is **FINAL**.
- 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-40 is/are pending in the application.
5a) Of the above claim(s) 6,7,19,20,27,31,33,37 and 39-41 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-5,8-18,21-26,28-30,32,34-36 and 38 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/4/2014.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

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The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 8-18, 21-26, 28-30, 32, 34, 35, and 38 have been considered but are moot because the arguments do not apply to the references being used in the current rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

- i. Determining the scope and contents of the prior art.
- ii. Ascertaining the differences between the prior art and the claims at issue.
- iii. Resolving the level of ordinary skill in the pertinent art.
- iv. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

2. Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36 and 38 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over by a US Patent Application Publication by Liberty et al. (2005/0253806) in view of a US Patent Application Publication by Ohta (2008/0125223).

Regarding Claims 1 and 14 (Currently Amended), Liberty et al. discloses an input apparatus (Pg. 2, ¶[0008]) capable of performing a method, comprising:
a motion detector (Id.) which detects a motion of the electronic apparatus;
an input unit which is more sensitive than the motion detector (Pg. 7, ¶[0059], where detection of a hand tremor pattern is taught and used to limit an input based upon the identity of the user, which is determined by the individuality of the tremor) ~~and receives~~
and a controller which generates a predetermined command by combining the detected motion and the user manipulation input to the input unit, the selected function and controls the generated predetermined command to be transmitted to an external device,

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wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal. (Pg. 13, ¶[0117], where the pressing of a button may not be allowed if a particular user is not operating the input device) but fails to disclose wherein the motion detector is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion.

Ohta teaches wherein the motion detector is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claims 2 and 15 (Both Original), the Liberty et al.-Ohta Combination discloses the input apparatus and a method as claimed in claims 1 and 14, respectively, and Liberty et al. further discloses wherein the controller generates a move command to

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move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Id.).

Regarding Claims 3 and 16 (Both Original), Liberty et al. discloses the input apparatus and is capable of the method disclosed as claimed in claims 2 and 15, respectively, and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 5, ¶[0041]).

Regarding Claims 4 and 17 (Both Original), the Liberty et al.-Ohta Combination discloses the input apparatus and is capable of the method disclosed as claimed in claims 3 and 16, respectively, and Liberty et al. further discloses wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction (Id.), wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 17, Claim 21).

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Regarding Claims 5 and 18 (Original), the Liberty et al.-Ohta Combination discloses the input apparatus and is capable of the method as claimed in claims 4 and 17, respectively, and Liberty et al. further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 1, ¶[0006]).

Regarding Claims 6 and 7 (Canceled).

Regarding Claim 8 (Previously Presented) the Liberty et al.-Ohta Combination discloses the input apparatus as claimed in claim 1, and Liberty et al. further discloses wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Regarding Claim 9 (Previously Presented) the Liberty et al.-Ohta Combination discloses the input apparatus as claimed in claim 1, and further discloses wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pgs. 14-15, ¶¶[0124-0125]).

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Regarding Claims 10 and 23 (Both Previously Presented) the Liberty et al.-Ohta Combination discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and Liberty et al. further discloses wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Regarding Claims 11, 21 and 24 (All Previously Presented) the Liberty et al.-Ohta Combination discloses the input apparatus claimed in claim 1 and is capable of a methods as disclosed in Claim 14 and Liberty et al. further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claims 12, 22 and 25 (All Previously Presented) he Liberty et al.-Ohta Combination discloses the input apparatus and is capable of the method as claimed in claims 1, 14, and 14, respectively, and Liberty et al. further discloses wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is

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detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Pgs. 14-15, ¶¶[0124-0125]).

Regarding Claims 13 and 26 (Both Original), the Liberty et al.-Ohta Combination discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and Liberty et al. further discloses wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Pgs. 15-16, ¶¶[0130-0131]).

Regarding Claims 19 and 20 (Both Canceled)

Regarding Claim 27 (Canceled).

Regarding Claim 28 (Currently Amended), Liberty et al. discloses an electronic apparatus comprising:

a motion detector (Pg. 8, ¶[0066]) to detect a motion of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected motion; an input unit to receive user manipulations for selecting the function of a plurality of functions (Id.) and to generate second signals corresponding to the selected function; a controller to combine the first and second signals into a single

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command to be transmitted to the external device in order to perform the selected function wherein, if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals. (Id.) but fails to disclose where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion.

Ohta teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 29 (Previously Presented), Liberty et al. discloses an electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor (Pgs. 15-16, ¶¶[0130-0131]) and detect a rotation of the electronic apparatus

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using an angular velocity sensor for performing a function of an external device; but fails to disclose an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected motion; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

Ohta teaches wherein the motion detector is disposed on the input apparatus to receive user input by a user manipulation separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 30 (Previously Presented), the Liberty et al.-Ohta Combination discloses the electronic apparatus of claim 29, and discloses it further comprising: a converter to receive a translation data signal and a rotation data signal. (Id.).

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Regarding Claim 31 (Cancelled).

Regarding Claim 32 (Previously Presented), the Liberty et al.-Ohta Combination discloses the electronic apparatus of claim 1, and Liberty et al. further discloses wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Regarding Claim 33 (Cancelled).

Regarding Claim 34 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the electric apparatus for performing a function of an external device (Abstract); generating first signals corresponding to the detected motion (Pg. 2, ¶[0012]); receiving user manipulations for selecting the function of a plurality of functions (Pg. 2, ¶[0009]); generating second signals corresponding to the selected functions; ~~and~~ combining the first and second signals into a single command to be transmitted to the external device in order to perform the selected functioning and generating a command by combining the first and second signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated. (Pgs. 15-16, ¶¶[0130-0131]) but fails to disclose that the reception of the aforesaid user manipulations were on an

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input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected motion.

Ohta teaches where said input unit is disposed on the electronic apparatus to receive user manipulations separate from the detected motion. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 35 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor (Pg. 5, ¶[0047]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;; and transmitting the generated command to the external device. (Pg. 9, ¶[0096]); generating a command to perform the selected function by combining the detected translation (Id.), the detected rotation and

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the user selection input but fails to disclose receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation.

Ohta teaches receiving user selection input to select the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation. (Abstract).

Liberty et al. and Ohta are analogous because they are both concerned with the same endeavor, Handheld Devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Liberty et al. with the teachings of Ohta, since such a modification would have taken into account inputs in addition to the detected motion of the device, thereby making the device more valuable to the user to the ultimate benefit of the manufacturer in the form of profit.

Regarding Claim 36 (Original) the Liberty et al.-Ohta Combination discloses an apparatus capable of performing the method of claim 35, and Liberty et al. further discloses it comprising:

receiving a translation data signal and a rotation data signal into a converter. (Pg. 5, ¶[0041]).

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Regarding Claim 37 (Cancelled).

Regarding Claim 38 (Previously Presented), the Liberty et al.-Ohta Combination discloses an apparatus capable of performing the method of claim 14, and Liberty et al. further discloses wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038])

Regarding Claim 39-41 (Cancelled).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey Steinberg/
Examiner, Art Unit 2622

/Alexander S. Beck/
Supervisory Patent Examiner, Art Unit 2622

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey Steinberg	Art Unit 2622	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-7,233,316	06-2007	Smith et al.	345/157
*	B US-2008/0042986	02-2008	Westerman et al.	345/173
*	C US-2006/0044282	03-2006	Pinhanez et al.	345/173
*	D US-2008/0125223	05-2008	Ohta, Keizo	463/36
	E US-			
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12413722
	Filing Date	2009-03-30
	First Named Inventor	Yong-jin KANG et al.
	Art Unit	2694
	Examiner Name	Jeffrey S. Steinberg
	Attorney Docket Number	102-1567

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	1	0178054	WO		2001-10-18	Inter-Link Electronics, Inc.	abstract	<input checked="" type="checkbox"/>
	2	1569082	EP		2005-08-31	Microsoft Corporation	abstract	<input checked="" type="checkbox"/>
	3	1852163	EP		2007-11-07	Nintendo Co, Ltd	abstract	<input checked="" type="checkbox"/>

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12413722
	Filing Date		2009-03-30
	First Named Inventor	Yong-jin KANG et al.	
	Art Unit		2694
	Examiner Name	Jeffrey S. Steinberg	
	Attorney Docket Number		102-1567

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	1	European Search Report dated December 16, 2013 issued in EP Application No. 09156677.8	<input checked="" type="checkbox"/>

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EXAMINER SIGNATURE

Examiner Signature	/Jeffrey Steinberg/	Date Considered	03/28/2014
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	12413722
Filing Date	2009-03-30
First Named Inventor	Yong-jin KANG et al.
Art Unit	2694
Examiner Name	Jeffrey S. Steinberg
Attorney Docket Number	102-1567

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Patrick J. Stanzione/	Date (YYYY-MM-DD)	2014-03-04
Name/Print	Patrick J. Stanzione	Registration Number	40434

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**


Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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ALL REFERENCES CONSIDERED EXCEPT WHERE REVISED THROUGH. //J.S./

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2622

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
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 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014		
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29	36	✓	✓	✓	✓	✓	✓		

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
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Claims renumbered in the same order as presented by applicant

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 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013	03/30/2014		
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30	38	✓	✓	✓	✓	✓	✓		
31	39	✓	✓	✓	✓	-	✓		
32	40	✓	✓	✓	✓	-	✓		
33	41				✓	-	✓		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12413722	
	Filing Date		2009-03-30	
	First Named Inventor	Yong-jin KANG et al.		
	Art Unit		2694	
	Examiner Name	Jeffrey S. Steinberg		
	Attorney Docket Number		102-1567	

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	1	0178054	WO		2001-10-18	Inter-Link Electronics, Inc.	abstract	<input checked="" type="checkbox"/>
	2	1569082	EP		2005-08-31	Microsoft Corporation	abstract	<input checked="" type="checkbox"/>
	3	1852163	EP		2007-11-07	Nintendo Co, Ltd	abstract	<input checked="" type="checkbox"/>

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	Attorney Docket Number		102-1567

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	1	European Search Report dated December 16, 2013 issued in EP Application No. 09156677.8	<input checked="" type="checkbox"/>

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	12413722
Filing Date	2009-03-30
First Named Inventor	Yong-jin KANG et al.
Art Unit	2694
Examiner Name	Jeffrey S. Steinberg
Attorney Docket Number	102-1567

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Patrick J. Stanzione/	Date (YYYY-MM-DD)	2014-03-04
Name/Print	Patrick J. Stanzione	Registration Number	40434

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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(72) Inventor: **Kong, Yuan**
Redmond, WA 98052 (US)

(74) Representative: **Grünecker, Kinkeldey,**
Stockmair & Schwanhäusser Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

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(71) Applicant: **MICROSOFT CORPORATION**
Redmond, WA 98052 (US)

(54) **Multi-modal navigation in a graphical user interface computing system**

(57) A pointing device, and the use thereof, is described that allows a displayed cursor or other navigation control to be controlled in different modes, such as at different resolutions. The pointing device may include a first pointing element and a second pointing element. The first and second pointing elements may independ-

ently control the same navigation control using their own respective navigation modes. The pointing device may additionally or alternatively have switching capability to switch between navigation modes. In this way, a single pointing element may be used to control the navigation control in accordance with various navigation modes.

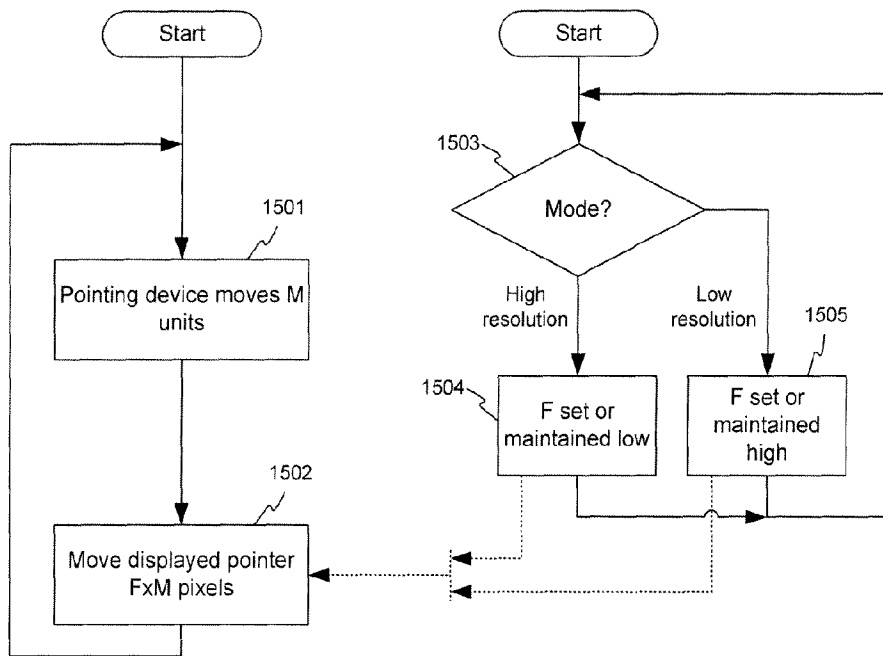


Figure 15

Description

FIELD OF THE INVENTION

[0001] The present invention is directed to controlling movement of an on-screen cursor, and more particularly to controlling such movement in accordance with different modes of movement.

BACKGROUND OF THE INVENTION

[0002] As computer displays become cheaper to manufacture, user are more apt to choose higher resolution displays. In fact, due to the low cost of displays, many users have begun to link two or more displays together to provide a larger total display area with a greater number of pixels. However, users have also discovered that, as the total display area becomes larger, it becomes more difficult to control the on-screen cursor of a graphical user interface. There are essentially two types of cursor movement needed to fully control the cursor. First, a user needs to control the cursor with sufficient precision. That is, the user should expect to be able to control the cursor at high resolution, such as on a pixel-by-pixel basis. Such high resolution requirements are already needed for many software applications today, and one can expect even higher resolution requirements for new and future applications. This is especially important when using drawing or handwritten digital ink applications. Second, the user should be able to conveniently move the cursor from one end of the display area to the other. For example, it is ineffective and tiring for the user to make repetitive mouse movements simply to move the cursor and navigate across the display.

[0003] Unfortunately, these two needs are not compatible with each other using conventional cursor control systems. If the mouse is configured to move the cursor with high precision, then the cursor will not move very far for any given mouse movement. Likewise, if the mouse is configured to move the cursor over long distances efficiently, then the cursor will not be precisely controllable over smaller distances.

SUMMARY OF THE INVENTION

[0004] Aspects of the present invention are directed to providing a pointing device that allows a displayed cursor or other displayed navigation control to be controlled in different modes, such as at different resolutions. The pointing device may include one or more sub-devices such as one or more pointing elements. For example, first and second pointing elements of the same pointing device may independently control the same navigation control using their own respective navigation modes. The pointing device may additionally or alternatively have switching capability to switch between navigation modes. In this way, a single pointing element may

be used to control the navigation control in accordance with various navigation modes. In either case, the pointing device may be part of a larger device such as a keyboard or computer, or the pointing device may be physically separate from other devices, such as physically separate from any keyboard.

[0005] Further aspects of the present invention are directed to allowing a user to use smaller muscle groups (e.g., fingers) to control the navigation control in a first navigation mode (e.g., at a higher resolution) and larger muscle groups (e.g., arms) to control the same navigation control in a second navigation mode (e.g., at a lower resolution).

[0006] Still further aspects of the present invention are directed to using multiple navigation engines, each implementing a different one of the navigation modes. Alternatively or additionally, a given navigation engine may have several sub-engines that each implement a different one of the navigation modes.

[0007] Still further aspects of the present invention are directed to providing a kit including both the pointing device and software that may include one or more of the above-discussed navigation engines.

[0008] These and other aspects of the invention will be apparent upon consideration of the following detailed description of illustrative embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The foregoing summary of the invention, as well as the following detailed description of illustrative embodiments, is better understood when read in conjunction with the accompanying drawings, which are included by way of example, and not by way of limitation with regard to the claimed invention.

[0010] Figure 1 is a functional block diagram of an illustrative digital computing environment in accordance with aspects of the present invention.

[0011] Figures 2 and 3 are illustrative computer displays showing a cursor-type navigation element displayed thereon.

[0012] Figures 4-12 are various views of illustrative pointing devices having first and second pointing elements and/or switches for switching between navigation modes.

[0013] Figure 13 is a plan view of an illustrative pointing device along with a wireless receiver with navigation mode switching capabilities.

[0014] Figure 14 is a plan view of an illustrative keyboard with navigation mode switching capabilities.

[0015] Figure 15 is a flowchart showing an illustrative method for implementing multi-modal cursor control.

[0016] Figure 16 is a functional block diagram of an illustrative set of navigation engines.

[0017] Figure 17 is a functional block diagram of an illustrative navigation engine having sub-engines.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

General Computing Platforms

[0018] Figure 1 is a functional block diagram of an example of a conventional general-purpose digital computing environment that can be configured and used to implement various aspects of the present invention. In Figure 1, an illustrative computer 100 includes a processing unit 110, a system memory 120, and a system bus 130 that couples various system components including the system memory to the processing unit 110. The computer 100 may be any type of computer, such as, but not limited to, a mainframe, a server, a personal computer, a laptop computer, or a palmtop computer.

[0019] Describing the details of the structure of the computer 100 in Figure 1, the system bus 130 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory 120 includes read only memory (ROM) 140 and random access memory (RAM) 150.

[0020] A basic input/output system 160 (BIOS), containing the basic routines that help to transfer information between elements within the computer 100, such as during startup, is stored in the ROM 140. The computer 100 also includes a hard disk drive 170 for reading from and writing to a hard disk (not shown), a magnetic disk drive 180 for reading from or writing to a removable magnetic disk 190, and an optical disk drive 191 for reading from or writing to a removable optical disk 192 such as a CD ROM or other optical media. The hard disk drive 170, magnetic disk drive 180, and optical disk drive 191 are connected to the system bus 130 by a hard disk drive interface 192, a magnetic disk drive interface 193, and an optical disk drive interface 194, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the computer 100.

[0021] It will be appreciated by those skilled in the art that other types of computer readable media that can store data that is accessible by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, random access memories (RAMs), read only memories (ROMs), and the like, may also be used in the example operating environment. The term "computer-readable medium," as used herein, is intended to include a single medium as well as a collection of physically separate media, such as, for example, a collection of CD ROMs, or a CD ROM in combination with a computer memory.

[0022] A number of program modules may be stored on the hard disk drive 170, magnetic disk 190, optical disk 192, ROM 140, and/or RAM 150, including an operating system 195, one or more application programs 196, other program modules 197, and/or program data

198. A user can enter commands and information into the computer 100 through input devices such as a keyboard 101 and pointing device 102. The keyboard 101 may have a plurality of buttons and/or other user input devices. The plurality of buttons may include a numeric section and an alphanumeric section. Other input devices may include a microphone, joystick, game pad, satellite dish, scanner, stylus, or the like. These and other input devices may be coupled to the processing unit 110 through a serial port interface 106 that is coupled to the system bus, or they may be coupled by other interfaces such as a parallel port, a game port, or a universal serial bus (USB). Further still, these devices may be coupled directly to the system bus 130 via an appropriate interface (not shown).

[0023] A monitor or other type of display 107 may also be connected to the system bus 130 via an interface, such as a video adapter 108. In addition to the monitor, personal computers typically include other peripheral output devices (not shown), such as speakers and printers. In a preferred embodiment, a stylus digitizer 165 and accompanying stylus 166 are provided in order to digitally capture freehand input. Although a direct connection between the stylus digitizer 165 and the serial port is shown, in practice, the stylus digitizer 165 may be coupled to the processing unit 110 directly, via a parallel port or other interface and the system bus 130 as known in the art. Furthermore, although the digitizer 165 is shown apart from the display 107, it is preferred that the usable input area of the digitizer 165 be co-extensive with the display area of the display 107. Further still, the digitizer 165 may be integrated in the display 107, or may exist as a separate device overlaying or otherwise appended to the display 107.

[0024] The computer 100 can operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 109. The remote computer 109 can be a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to the computer 100, although only a memory storage device 111 has been illustrated in Figure 1. The logical connections depicted in Figure 1 include a local area network (LAN) 112 and a wide area network (WAN) 113. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

[0025] When used in a LAN networking environment, the computer 100 is connected to the local network 112 through a network interface or adapter 114. When used in a WAN networking environment, the computer 100 typically includes a modem 115 or other means for establishing a communications over the wide area network 113, such as the Internet. The modem 115, which may be internal or external, is connected to the system bus 130 via the serial port interface 106. In a networked environment, program modules depicted relative to the computer 100, or portions thereof, may be stored in the

remote memory storage device.

[0026] It will be appreciated that the network connections shown are illustrative, and other techniques for establishing a communications link between the computers may be used. The existence of any of various well-known protocols such as TCP/IP, Ethernet, FTP, HTTP, and the like is presumed, and the system may be operated in a client-server configuration to permit a user to retrieve Internet web pages from a web-based server. Any of various conventional web browsers may be used to display and manipulate data on web pages.

The Cursor

[0027] Referring to Figure 2, the computer 100 may display a cursor 201 on the display 107. The cursor 201 may move in two dimensions within the area of the display 107. Typically, some type of pointing device is used to control the movement of the cursor 201. For example, the mouse 102 and/or stylus 166 may be used. As indicated by the broken line arrows, the cursor 201 may be moved a shorter distance 202 or a longer distance 203, depending upon how the user controls the pointing device. Although the broken line arrows 202, 203 indicate a particular direction in which the cursor 201 moves, the cursor 201 may move in any direction on the display 107.

[0028] Referring to Figure 3, the display 107 may be made up of a single physical display device or a plurality of individual display devices, such as display devices 107a and 107b. Often, such plural display devices are situated adjacent to one another so as to effectively increase the total amount of display area available. As shown in Figure 3, the cursor 201 may stay within a single one of the plural display devices 107a, 107b, or the cursor 201 may move across the plural display devices 107a, 107b as though they were one continuous display. Which display the cursor 201 is in may depend upon how much and where the cursor 201 is moved. For example, the cursor 201 may be moved rightward only a small amount (indicated by broken line arrow 302) and remain within display 107a. Or, if the cursor 201 moves rightward sufficiently such that the cursor 201 reaches the right edge of the display device 107a, the cursor 201 may be commanded continue to move rightward (indicated by broken line arrow 303) from the left edge of the display device 107b,

Other Types of Navigation Controls

[0029] The traditional displayed cursor 201 is just one of many possible types of displayed navigation control. Other techniques for navigating in a computer system may be used. For example, information on a computer may be organized in a virtual sphere, and rotation of the virtual sphere as displayed on the display 107 may control which portions of the information may be accessed. In this case, being able to manipulate the virtual sphere

(which would be a displayed navigation control) in different navigation modes (e.g., rotating the sphere at different speeds or resolutions depending upon the navigation mode) would be useful to allow the user to efficiently and precisely find to the desired portion of the information. Also, navigation through a virtual-reality interface may be made more efficient if different navigation modes may be accessed as described herein while navigating through such an interface. For example, in a virtual-reality interface, the user may navigate in three virtual dimensions, and the movement through those dimension may be controlled by the pointing device in accordance with a particular navigation mode. Many of the inventive aspects herein will be discussed illustratively with regard to controlling the cursor 201. However, these aspects may also be applied to other types of navigation controls.

Illustrative Multi-Modal Pointing Devices

[0030] Referring to Figure 4, a pointing device 400 may be provided that communicates with the computer 100 by requesting the computer 100 to move the cursor 201 (e.g., by sending the computer 100 data). As will be described below, one or more navigation engines running on the computer 100 may receive the data from the pointing device and move the cursor 201 in accordance with the data. To communicate the data, the pointing device 400 may be wirelessly coupled to the computer 100 or coupled via a wire. As is the case with many pointing devices, the pointing device 400 may not be integrated with a keyboard having an alphanumeric portion, such as the keyboard 101. Alternatively, the pointing device 400 may be integrated with a keyboard in a manner similar to how conventional pointing devices are combined with keyboards on conventional laptop computers. The illustrative pointing device 400 includes a body 401 such as a housing. The body 401 may be coupled to or include one or more buttons 402, 403. For example, the button 402 may be a conventional Left click button and the button 403 may be a conventional Right click button, as recognized by, e.g., WINDOWS brand operating systems and other operating systems. Thus, in such an operating system, the button 402 may be used to, e.g., select objects on the display 107, and the button 403 may be used to, e.g., summon context-dependent menus.

[0031] The body 401 of the pointing device 400 may be translated by a user with two degrees of freedom (in this example), as indicated by the four larger broken-line arrows in the upper right corner of Figure 4. Translation of an object is a type of movement in which the object is displaced as a whole, as opposed to mere rotation of the object about its central axis. For example, where the pointing device 400 is in a form similar to a conventional mouse, the pointing device 400 may be translated across a surface (e.g., a flat surface). In such an embodiment, the body 401 itself may be considered a primary pointing element, such that moving the primary

pointing element causes translation of the cursor 201. Where the body 401 rests on a surface (such as would a conventional mouse), a sensor of the primary pointing element detects the change in position of the body 401 along the surface. The sensor may be any type of sensor, such as a conventional trackball-type sensor or a conventional optical sensor, as are known in the art. The displayed cursor 201 may translate across the display 107 in accordance with user inputs to the primary pointing element, such as movements of the body 401. More generally, the navigation control (e.g., the cursor 201) may be moved on the display 107, or otherwise manipulated, in accordance with user inputs to the primary pointing element. Movement of the navigation control may include translation and/or rotation such as yaw, pitch, and/or roll.

[0032] The pointing device 400 may further include a secondary pointing element coupled to the body 401. The secondary pointing element may also control translation of the displayed cursor 201, or more generally, movement of the navigation control. Thus, the single pointing device 400 may include two different pointing elements integrated into the same device. The secondary pointing element may be in any of various forms. For example, the secondary pointing element may be a joystick 404. In this case, the joystick 404 may be moveable and/or tilt-able in various directions in two dimensions to control the movement of the cursor 201. For instance, where the user moves the joystick 404 in a direction such as toward the top of Figure 4, then the cursor 201 may translate in a direction toward the top of the display 107. Or, where the user moves the joystick 404 in a direction toward the left side of Figure 4, then the cursor 201 may translate in a direction toward the left of the display 107. In general, the secondary pointing element may detect the user's movements in a plurality of degrees of freedom and command the displayed cursor 201 to translate in accordance with the user's movements. The secondary pointing element (and thus the cursor 201) may be controlled with two, three, four, or more degrees of freedom. For example, two degrees of freedom may include forward/back and left/right. Three degrees of freedom may include, e.g., forward/back, left/right, and up/down. Four degrees of freedom may include, e.g., forward/back, left/right, up/down, and rotation about the up/down axis (or another axis).

[0033] Other examples of a secondary pointing element include, but are not limited to, a touch-sensitive surface 501 (Figure 5), a trackball 601 (Figure 6), or a tiltable scroll wheel (Figure 8). The touch-sensitive surface 501 senses movement of an object such as the user's finger across the touch-sensitive surface 501, and in response the pointing device 400 commands the displayed cursor 201 to translate in the display 107. Similarly, in response to the user moving the trackball 601, the pointing device 400 commands the displayed cursor 201 to translate in the display 107. Where the secondary pointing element is the tiltable scroll wheel 801, such

tiltable scroll wheels are known in the art, and are implemented in such products as the Microsoft brand Wireless Optical Mouse 2.0 mouse. Such tiltable scroll wheels may rotate forward and backward around a first axis and tilt about a second axis (which is typically perpendicular to the first axis). Conventionally, manipulating a tiltable scroll wheel causes a document to scroll or pan, but does not cause the cursor to translate. The cursor 201 may thereby be controlled to translate up and down, for example, by rotating the scroll wheel 801 backward and forward. The cursor 201 may further be controlled to translate left and right, for example, by tilting the scroll wheel 801 left and right. For any of these types of secondary pointing elements, the direction, speed, and/or distance that the cursor 201 translates in the display 107 depends upon the input that the user applies to the secondary pointing element.

[0034] The secondary pointing element may be located anywhere with respect to the body 401, such as on a top portion of the body 401 facing the expected direction of the user, or on the front, the back, or a side of the body 401, such as is shown in Figures 4-6. In general, it may be desirable to place the secondary pointing element so as to be easily accessible by the user while the user is handling the pointing device 400.

[0035] It is noteworthy that in Figures 4-6, for example, the user may control the primary pointing element with one set of muscles and the secondary pointing element with a second set of muscles. For instance, in Figure 4, the user may control the primary pointing element (in this case, movement of the body 401) using the user's arm and/or hand. Control of the secondary pointing element (in this case, movement of the joystick 404) may be performed with the user's fingers. Thus, in this example, a larger muscle group (in this case, the arm) controls one pointing element, and a smaller muscle group (in this case, the fingers) controls the other pointing element, on the same pointing device. This configuration can be especially useful where the primary pointing device is used to control the translation of the cursor 201 over larger distances (with a lower resolution of movement) and the secondary pointing device is used to control the translation of the cursor 201 over smaller, more precise distances (with a higher resolution of movement). Typically, a person's smaller muscle groups, such as fingers, may be more accurately controlled than a person's larger muscle groups, such as arms. Other muscle groups that may be used to control the translation of the cursor 201 include the user's wrists, torso, legs, feet, eyes, and head.

[0036] When using various muscle groups to control cursor movement, appropriate sensors may be implemented in the primary and/or secondary pointing elements. For example, where the position of the user's eyes is used as input to a pointing element, the pointing element may include a sensor that measures the position of the user's eyes. Such sensors are well-known. Or, where the position of the user's body in a room is

used as input to a pointing element, the pointing element may include, for example, a camera with a fisheye lens to determine the user's position.

[0037] Although the pointing device 400 has been illustrated in Figures 4-6 to generally have a similar overall appearance as a conventional mouse, a pointing device according to aspects of the invention may take any of a variety of forms. The pointing device may be in the form of a mouse, a stylus, a trackball, a joystick, a touch-sensitive surface, and/or any other type of pointing device. For example, Figure 7 shows an illustrative pointing device 700 in the form of a stylus. The pointing device 700 may interact directly with the display 107, especially where the display 107 is a touch-sensitive or proximity-sensitive surface (e.g., a display integrated with a digitizer). In this case, the cursor 201 may translate to wherever on the display 107 the tip of the stylus-like pointing device 700 is pointing. This is known as absolute tracking, because the pointing device 700 is able to control the absolute (as opposed to relative) position of the cursor 201. The pointing device 700 may alternatively interact less directly with the display 107 such as by emitting a laser beam 702 from a tip of the pointing device 700. The location of the laser beam 702 incident on the display 107 (where the display 107 senses the location of the laser beam 702) indicates where the cursor 201 should translate to. Again, this is an example of absolute tracking. The stylus-like pointing device 700 may alternately interact with the display 107 in other ways, such as electromagnetically.

[0038] The pointing device 700 may further include a secondary pointing element 701, which may be in any form such as, but not limited to, a joystick, a trackball, or a touch-sensitive surface. In the illustrated embodiment, the secondary pointing element 701 is disposed at one end of the stylus 700, and is in the form of a joystick-like device such as the "eraser" type pointing device conventionally used on many laptop keyboards. The secondary pointing element 701 may allow the user to exercise control over the cursor 201 in two dimensions using relative tracking. The user may press against the secondary pointing element 701 in a particular direction, thereby causing the cursor 201 to translate in a corresponding direction on the screen. In relative tracking, the cursor 201 is directed to translate in a particular direction, as opposed to being directed to move to a particular absolute location on the display 107. Thus, in relative tracking, the position of the cursor 201 depends upon the previous position of the cursor 201 before being directed to translate, whereas in absolute pointing this is not necessarily the case. The pointing device 700 may communicate data in accordance with the secondary pointing element 701 to the computer 100 via wire or wirelessly (as shown). Another example of a pointing element that may conveniently be used for absolute tracking is the touch-sensitive surface 501. In this case, the pointing device 400 may provide for both relative tracking (e.g., in accordance with move-

ment of the body 401) and absolute tracking (e.g., in accordance with an absolute position of the user's finger on the touch-sensitive surface 501) of the cursor 201.

[0039] Referring to Figure 8, another pointing device 800 may be switchable between two or more navigation modes. In this case, a secondary pointing element may or may not also be included. As shown, the illustrative pointing device 800 includes a scroll wheel 801 that not only scrolls up and down, but also tilts left and right (as indicated by the left and right broken line arrows near the scroll wheel 801). By rotating the scroll wheel 801, the display 107 may be scrolled. Also, typically various functions such as left and right scrolling may be implemented by tilting conventional scroll wheels left and right. In the present illustrative embodiment, however, tilting the scroll wheel 801 left or right switches between navigation modes.

[0040] A navigation mode defines how control of the pointing device 800 affects translation of the cursor 201 on the display 107. Navigation modes may define various aspects of cursor 201 translation, such as, but not limited to, the speed, translation resolution, translation distance, and/or acceleration of the cursor 201. A navigation mode may define these cursor translation aspects for either one or both of X and Y directions of cursor translation. For example, a first navigation mode may define the cursor translation aspects to be identical in the X and Y directions, while a second navigation mode may cause the cursor 201 to translate twice as fast in the X direction as in the Y direction for a corresponding user input in those directions. This navigation mode may be useful to select where, for example, the user desires to use several displays arranged horizontally so that there is a much larger distance to traverse in the X direction than in the Y direction. In general, various navigation modes may define the same or different cursor translation aspects in a first direction as compared with a second direction. Also, some navigation modes may define a linear relationship between manipulation (e.g., movement) of the pointing device 800 while other movement modes may define the relationship to be non-linear. Although switching between two navigation modes is discussed with regard to the present examples, three or more navigation modes may be available, and the user may be able to switch among three or more navigation modes.

[0041] Thus, for example, responsive to the user tilting the scroll wheel 801 to the left, a first navigation mode may be selected, and responsive to the user tilting the scroll wheel 801 to the right, a second different navigation mode may be selected. In the present example, the first navigation mode may be of a higher resolution than the second navigation mode. This means that, for the same user input upon the pointing device 800, the cursor 201 would translate a shorter distance across the display 107 in the first navigation mode than in the second navigation mode. For instance, where the pointing device 800 rests on a surface, the user may move the

pointing device 800 in a straight line pointing to the right and slightly toward the user. Such movement may be for a given distance on the surface and at a given speed and acceleration. In the first navigation mode, the cursor 201 may translate as indicated by the broken line arrow 202 in Figure 2. However, in the second navigation mode, and in response to exactly the same hypothetical user input, the cursor 201 may translate a longer distance as indicated by the broken line arrow 203. Similarly, a given user input may cause the cursor 201 to move as indicated by the broken line arrow 302 in Figure 3, while the same user input may cause the cursor 201 to move a greater distance as indicated by the broken line arrow 303.

[0042] Variations of the pointing device 800 are envisioned. For example, the pointing device 800 may have a dedicated switch 901, as shown in Figure 9. The switch 901 may be dedicated to switching between navigation modes, as opposed to the scroll wheel 801, which may be used not only for switching between navigation modes (e.g., left/right tilting), but also for scrolling (e.g., forward/back rotation). The switch 901 may be any type of user input element, such as, but not limited to, a push button, a two-position switch, a three-(or more) position switch, a sliding switch, a dial, a pressure-sensitive switch, a tilt-sensitive switch, or a touch-sensitive sensor. Also, the switch 901 may be disposed anywhere on the pointing device 800, although preferably in a location convenient (e.g., ergonomically practical) to the user while the user is handling the pointing device 800. For instance, the switch 901 may be on the rear of the pointing device 800 (as shown in Figure 8), on the left or right sides, on the front, or on the top (such as is the scroll wheel 801). Alternatively, one or both of the buttons 402, 403 may be used to switch between navigation modes. As previously discussed for the pointing device 400, the pointing device 800 may be in any form and is not limited to a mouse-type pointing device as shown in Figures 8 and 9.

[0043] Referring to Figure 10, the switch 901 may be embodied as a pressure-sensitive switch 1002. In the present example, the pointing device 800 may rest on a surface 1003, and the pressure-sensitive switch 1002 may detect whether the user is pressing the pointing device 800 down upon the surface 1003 with sufficient pressure (i.e., exceeding a predetermined pressure threshold). Depending upon whether the pointing device 800 is being pressed down sufficiently, either the first or the second navigation mode is applied to translation of the cursor 201. Thus, for example, when the user is translating the pointing device 800 across the surface 1003 but is not pressing down upon the pointing device 800 with sufficient pressure, then the cursor 201 translates across the display 107 in accordance with the first navigation mode. But, when the user is translating the pointing device 800 across the surface 1003 while pressing down upon the pointing device 800 with sufficient pressure, then the cursor 201 translates across the

display 107 in accordance with the second navigation mode. Also shown in Figure 10 is a sensor 1001 that senses movement of the pointing device 800 across the surface 1003. The sensor 1001 may be an optical sensor, a trackball sensor, or any other sensor. Such sensors are known in the art and used in, e.g., many conventional mice.

[0044] Referring to Figure 11, the pointing device 800 may further be configured to be usable even while in mid-air. In this instance, the pointing device 800 may include a sensor 1101 that can sense mid-air movements (e.g., mid-air translations and/or other movements) of the pointing device 800. Such sensors, e.g., gyroscopic sensors, are well known. In this case, the sensor 1001 or another sensor may detect whether or not the pointing device 800 is resting on the surface 1003. Thus, for example, a different navigation mode may be applied depending upon whether the pointing device 800 is resting upon and moving across the surface 1003 or moving in mid-air.

[0045] Referring to Figure 12, the pointing device 800 may be rotation-sensitive (in addition to being translation-sensitive). In other words, the pointing device 800 may be configured to detect whether the user is rotating the pointing device 800 (as indicated by the broken line arrows) clockwise or counter-clockwise. Such rotation may be made upon the surface 1003 or in mid-air, and may be around any desired axis such as the axis normal to the surface 1003. The sensor 1001 or another sensor may be configured to sense the rotation, or even the orientation of the pointing device 800 relative to a reference orientation. Various techniques may be used to measure the orientation of the pointing device 800, such as known magnetic, acoustical, or optical techniques. For example, the pointing device 800 may have a built-in magnetic compass or a gyroscope for tracking the orientation of the pointing device 800. Depending upon the direction of rotation or the absolute angle, different navigation modes may be selected and applied. Thus, for example, when the pointing device 800 is angled toward the left while being moved across the surface 1003, then the first navigation mode is applied to the cursor 201. On the other hand, when the pointing device 800 is angled toward the right while being moved across the surface 1003, then the second navigation mode is applied. In this way, a plurality of navigation modes may be associated with different respective angles of the pointing device 800 (or different respective angle ranges).

[0046] The computer 100 and/or pointing device 800 may be configured to sense a gesture that involves movement of the pointing device 800 in the clockwise or counter-clockwise direction. Thus, a gesture such as a quick small counter-clockwise rotation, for example, may select the first navigation mode, while a quick clockwise rotation may select the second navigation mode. Subsequent movements of the pointing device 800 would cause the cursor 201 to translate in accordance with the last-selected navigation mode. In general, any

gesture made with the pointing device may be used to select a navigation mode.

[0047] As previously mentioned, a pointing device may be coupled to the computer 100 via wire or wirelessly. As shown in Figure 13, the pointing device 400 (or 700 or 800) may be coupled to the computer 100 wirelessly through a base receiver 1301. Such base receivers are well known, such as the Microsoft brand Wireless Optical Desktop Receiver 2.0A. As shown, the base receiver 1301 may have a switch 1302 that allows the user to switch between the navigation modes. Alternatively, as shown in Figure 14, the keyboard 101 may have a switch 1401 that allows the user to switch between the navigation modes. Yet another location for a switch that functions like the switch 901 is on the computer 100 itself. The switches 1302 and 1401 may be any type of switch such as those described with regard to the switch 901, and may function in the same way as the switch 901.

[0048] Various examples of pointing devices and navigation modes have thus been described. However, aspects of the present invention are not limited to these examples. Pointing devices may have various combinations of first and second pointing elements. For example, some pointing elements that may preferably be used for lower resolution cursor control include, but are not limited to, an inertial sensor, a tilt sensor, a laser pointer or light gun and sensor, an optical sensor (such as a video camera), an acoustical sensor (such as an ultrasonic sensor), or an eye or face angle tracking sensor. These are pointing elements that may be controlled with larger muscle groups. Some pointing elements that may preferably be used for higher resolution cursor control include, but are not limited to, a trackball, a touchpad, a potentiometer, or a high-resolution wheel. These are pointing elements that may be controlled with smaller muscle groups. However, the present invention is not limited to using smaller or larger muscle groups, or to any particular types of pointing devices or pointing elements.

Multi-Modal Navigation Engine(s)

[0049] Referring to Figure 15, the computer 100 may control the cursor 201 in a plurality of different navigation modes, such as a high resolution navigation mode and a low resolution navigation mode. As previously discussed, other types of navigation modes may be used. In the present example, it will be assumed for illustrative purposes that the pointing device 400 as shown in Figure 8 will be used in conjunction with the flowchart of Figure 15. However, other embodiments of a pointing device may be used.

[0050] One or more navigation engines may reside in the computer 100. A navigation engine may be software, hardware, and/or firmware that receives information from the pointing device 400 and determines when and how to move the pointer 201 in response to the informa-

tion. To implement the multiple navigation modes, multiple navigation engines may be used (such as is shown in Figure 16), or a single navigation engine with multiple modes may be used (such as is shown in Figure 17). Referring to Figure 16, two or more separate navigation engines 1601 and 1602 may be configured to receive data from the pointing device (e.g., pointing device 400) indicating an amount of movement of the pointing device (or an amount of other user input to the pointing device). The data may be in accordance with the user's input upon a particular one or more of the pointing elements in the pointing device. Depending upon which navigation mode is applicable, a different one of the navigation engines 1601, 1602 determines how much to translate the cursor 201 and then actually translates the cursor 201. In Figure 17, a single navigation engine 1701 may have multiple portions each configured to implement a different one of the navigation modes. The multiple portions may be separately coded or may share portions of code. Depending upon which navigation mode is applicable, a different one of the portions of the navigation engine 1701 may determine how much to translate the cursor 201 and then actually translate the cursor 201.

[0051] The navigation engine(s) of the computer 100 may operate as illustratively follows. In step 1501, the pointing device 400 may be moved across a surface (such as the surface 1003) a distance of M units (such as M millimeters) in a particular direction. The pointing device 400 may provide data to the computer 100 indicating the amount and direction of movement. In response, in step 1502, the computer 100 may determine an amount and direction that the displayed cursor 201 should translate on the display 107, and actually translate the cursor 201. This amount may be some linear or non-linear function of the amount and/or direction of movement of the pointing device 100, and may further be a function of the active navigation mode. For example, the cursor 201 may be translated $F \times M$ pixels, where F is a multiplier that is defined by the active navigation mode. F may be constant or variable for each navigation mode. In general, for a higher resolution navigation mode, F will be smaller, and for a lower resolution navigation mode, F will be larger. Therefore, in the high resolution navigation mode, F will be larger, and for a given movement M, the cursor 201 translation $F \times M$ will be shorter (such as the movement indicated by the broken line arrow 202 in Figure 2). Likewise, in the low resolution navigation mode, F will be smaller, and for a given identical movement M, the cursor 201 translation $F \times M$ will be longer (such as the movement indicated by the broken line arrow 203 in Figure 2).

[0052] The pointing device 400 may further provide navigation mode data to the computer 100 indicating which of the navigation modes should be applied to the translation of the cursor 201. Such navigation mode data may be sent regularly or only when the navigation mode is to be changed or otherwise needs to be selected (such as at startup). Accordingly, in step 1503, the

computer 100 may determine which navigation mode is currently applicable and set (or maintain) the multiplication factor F as dictated by that navigation mode. For example, if the high resolution navigation mode is active, then in step 1504 F is set or maintained at a lower value (or set of values). If the low resolution navigation mode is active, then in step 1505, F is set or maintained at a higher value (or set of values).

Conclusion

[0053] Thus, various ways of controlling a cursor on a computer display have been described. Using aspects of the invention, a user may, for example, be able to control a cursor over shorter distances with precision while still being able to move the cursor over a much larger distance when desired. The user may be able to control the same cursor in these different ways without needing to change pointing devices or navigate through layered configuration menus. In fact, the user may be able to exercise various levels of control over the cursor "on the fly," with relatively minimal interruption to the user's other computer activities.

[0054] While illustrative systems and methods as described herein embodying various aspects of the present invention are shown by way of example, it will be understood, of course, that the invention is not limited to these embodiments. Modifications may be made by those skilled in the art, particularly in light of the foregoing teachings. For example, each of the elements of the aforementioned embodiments may be utilized alone or in combination with elements of the other embodiments. Also, the invention has been defined using the appended claims, however these claims are exemplary in that the invention is intended to include the elements and steps described herein in any combination or sub-combination. It will also be appreciated and understood that modifications may be made without departing from the true spirit and scope of the invention.

Claims

1. A pointing device configured to communicate with navigation software running on a computer having a display, the pointing device comprising:
 - a sensor configured to sense a physical input, the pointing device configured to request the navigation software to move a navigation control on the display in accordance with the physical input; and
 - a selector having a first state and a second state, the pointing device configured to request the navigation software to move the navigation control in accordance with a first navigation mode or a second navigation mode depending upon the state of the selector.

2. A kit, comprising:
 - the pointing device of claim 1; and
 - a computer-readable medium storing computer-executable instructions representing the navigation software.
3. The kit of claim 2, wherein the navigation software includes a first navigation engine and a second navigation engine, the first navigation mode utilizing the first navigation engine and the second navigation mode utilizing the second navigation engine.
4. The pointing device of claim 1, further including a Left click button and a Right click button in addition to the selector.
5. The pointing device of claim 1, wherein the selector has different physical positions each representing a different one of the first and second states.
6. The pointing device of claim 1, wherein the selector is an angular sensor configured to sense an angle of the pointing device.
7. The pointing device of claim 1, wherein in the first navigation mode the navigation control moves at a first sensitivity in accordance with the physical input, and in the second navigation mode the navigation control moves at a second different sensitivity in accordance with the same physical input.
8. The pointing device of claim 1, wherein the physical input is movement of the pointing device, and wherein in the first navigation mode the navigation control moves by an amount that has a first relationship with the movement of the pointing device, and in the second navigation mode the navigation control moves by an amount that has a second different relationship with the movement of the pointing device.
9. The pointing device of claim 8, wherein the navigation control moves linearly in accordance with the movement of the pointing device in both the first and second navigation modes.
10. The pointing device of claim 1, wherein the pointing device is configured to move upon a surface, the selector being responsive to an amount of pressure applied to the pointing device against the surface.
11. The pointing device of claim 1, wherein the selector is a scroll wheel rotatable around a first axis and tiltable around a second axis, the first and second states being selected by a tilt of the scroll wheel.
12. The pointing device of claim 1, wherein the pointing

- device is not integrated with a keyboard having an alphanumeric section.
13. The pointing device of claim 1, wherein the navigation control is a cursor. 5
14. A pointing device configured to communicate with navigation software running on a computer having a display, the pointing device comprising: 10
- a first sensor configured to sense movement of the pointing device with at least two degrees of freedom, the pointing device configured to request the navigation software to move a navigation control on the display in accordance with the movement of the pointing device; and 15
- a second sensor configured to sense a physical input with at least two degrees of freedom, the pointing device configured to request the navigation software to move the navigation control on the display in accordance with the physical input. 20
15. A kit, comprising: 25
- the pointing device of claim 14; and
a computer-readable medium storing computer-executable instructions representing the navigation software. 30
16. The pointing device of claim 14, wherein the first sensor is an optical sensor.
17. The pointing device of claim 14, wherein the first sensor is a trackball sensor. 35
18. The pointing device of claim 14, wherein the second sensor is a touch-sensitive surface, the physical input including movement across the surface. 40
19. The pointing device of claim 18, wherein the first sensor is either an optical sensor or a trackball sensor.
20. The pointing device of claim 14, wherein the second sensor is a joystick. 45
21. The pointing device of claim 20, wherein the first sensor is either an optical sensor or a trackball sensor. 50
22. The pointing device of claim 14, wherein the navigation control is a cursor.
23. A method in a computer, comprising steps of: 55
- controlling movement of a displayed navigation control at a first scale in response to user small-muscle-group movements; and
controlling movement of the displayed navigation control at a second different scale in response to user large-muscle-group movements.
24. The method of claim 23, wherein the small-muscle-group movements include movements of the user's arm and the large-muscle-group movements include movements of the user's finger.
25. The method of claim 23 wherein the large-muscle-group movements cause a pointing device to translate, but the large-muscle-group movements do not.
26. The method of claim 23, wherein the navigation control is a cursor.
27. An apparatus, comprising:
- a body;
a first pointing device configured to control two-dimensional movement of a displayed navigation control in response to movements of the body; and
a second pointing device physically coupled to the body and configured to control two-dimensional movement of the displayed navigation control in response to user input other than movements of the body.
28. The apparatus of claim 27, wherein the first pointing device is a mouse and the second pointing device is one of a touchpad, joystick, or trackball.
29. The apparatus of claim 27, wherein the first pointing device controls the displayed navigation control at a first scale and the second pointing device controls the displayed navigation control at a second different scale.
30. The apparatus of claim 27, wherein the apparatus is not integrated with a keyboard having an alphanumeric section.
31. The apparatus of claim 27, wherein the navigation control is a cursor.
32. A kit, comprising:
- the apparatus of claim 27; and
a computer-readable medium storing computer-executable instructions for performing steps comprising:
- receiving commands from the apparatus in accordance with the first and second pointing devices and;

moving the displayed navigation control in accordance with the commands.

33. A pointing device configured to communicate with navigation software running on a computer having a display, the pointing device comprising:

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a first pointing element configured to control a navigation control on the display using absolute tracking; and
a second pointing element configured to control the navigation control using relative tracking.

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34. The pointing device of claim 33, wherein the first pointing element includes a light gun, and the display is configured to sense a position of light emitted from the light gun incident on the display.

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35. A kit, comprising:

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the pointing device of claim 33; and
a computer-readable medium storing computer-executable instructions for performing steps comprising:

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receiving first data related to user input upon the first pointing element, and controlling the navigation control using absolute tracking in accordance with the first data;

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and
receiving second data related to user input upon the second pointing element, and controlling the navigation control using relative tracking in accordance with the second data.

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36. The pointing device of claim 33, wherein the navigation control is a cursor.

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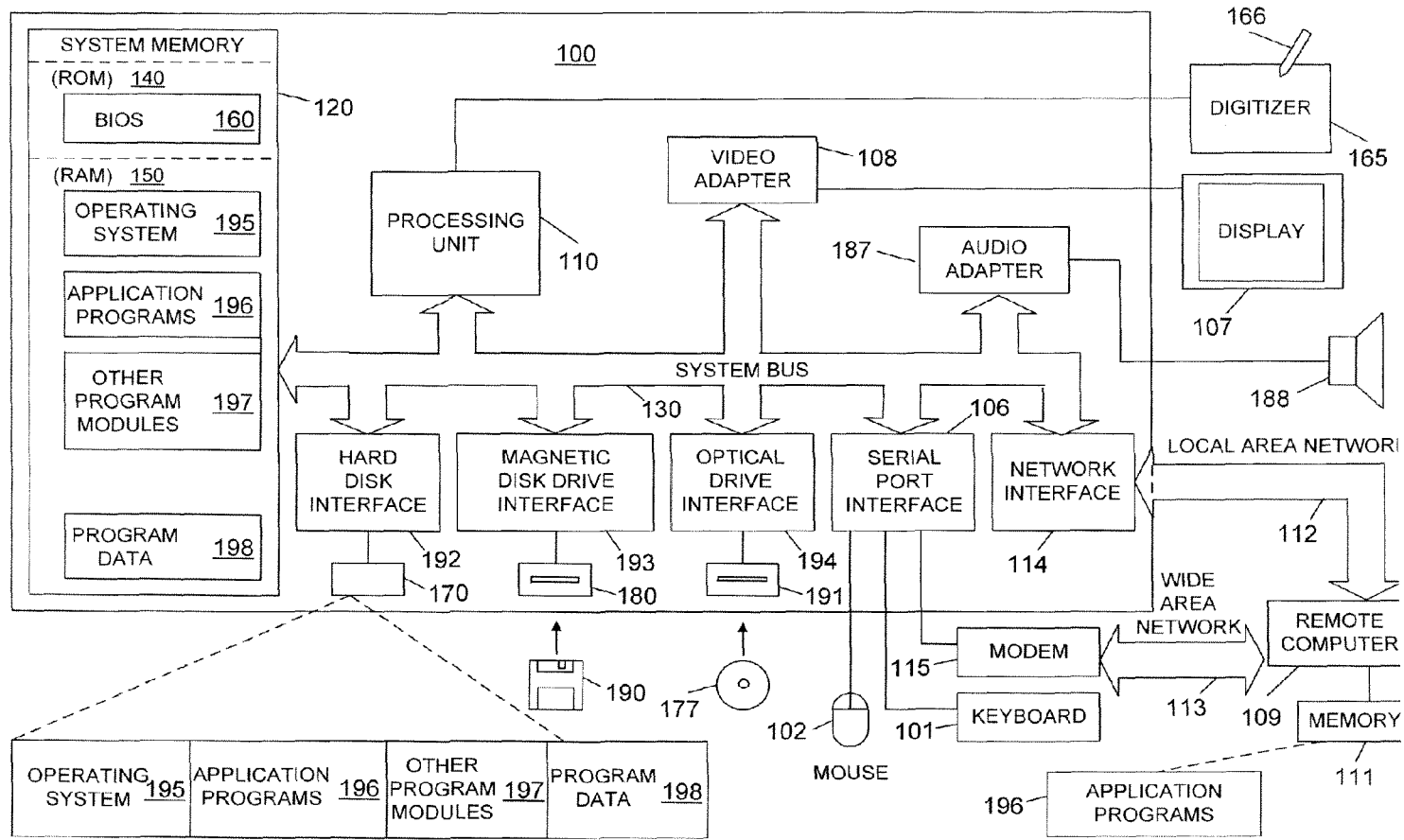


Figure 1

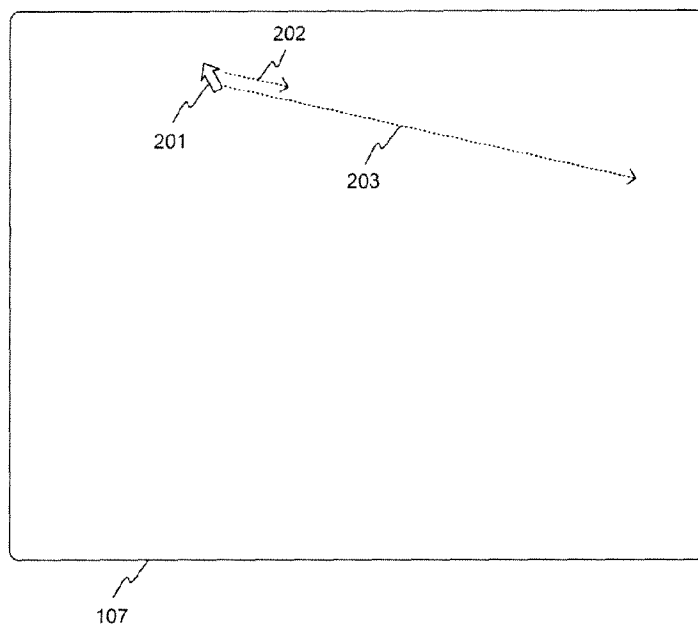


Figure 2

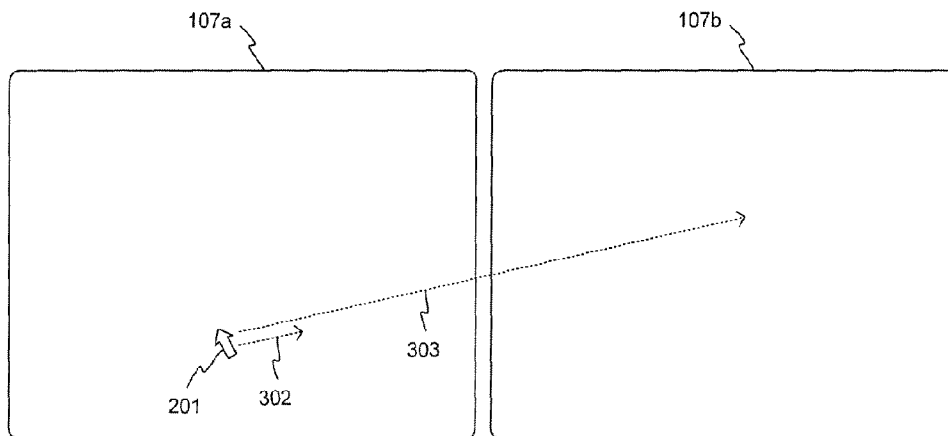


Figure 3

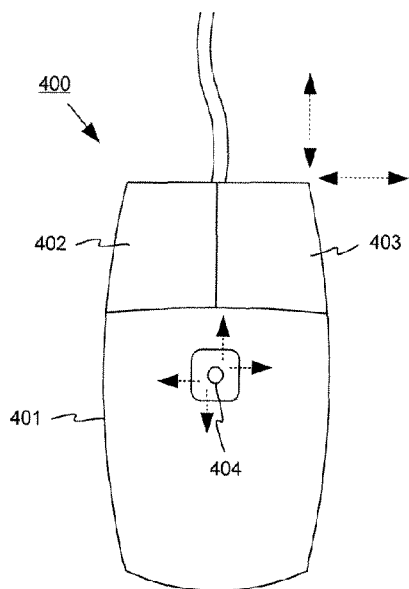


Figure 4

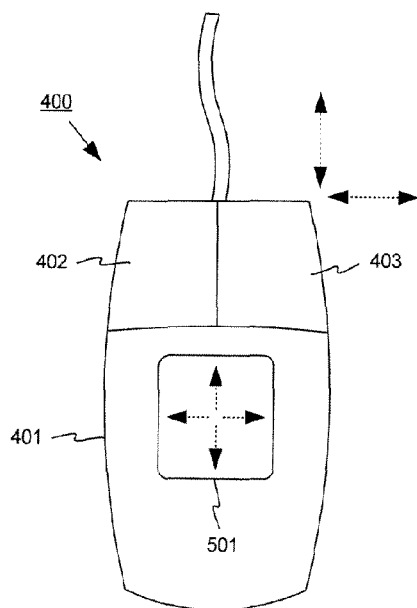


Figure 5

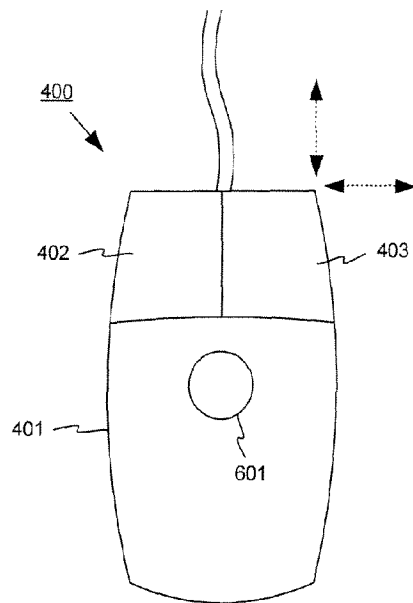


Figure 6

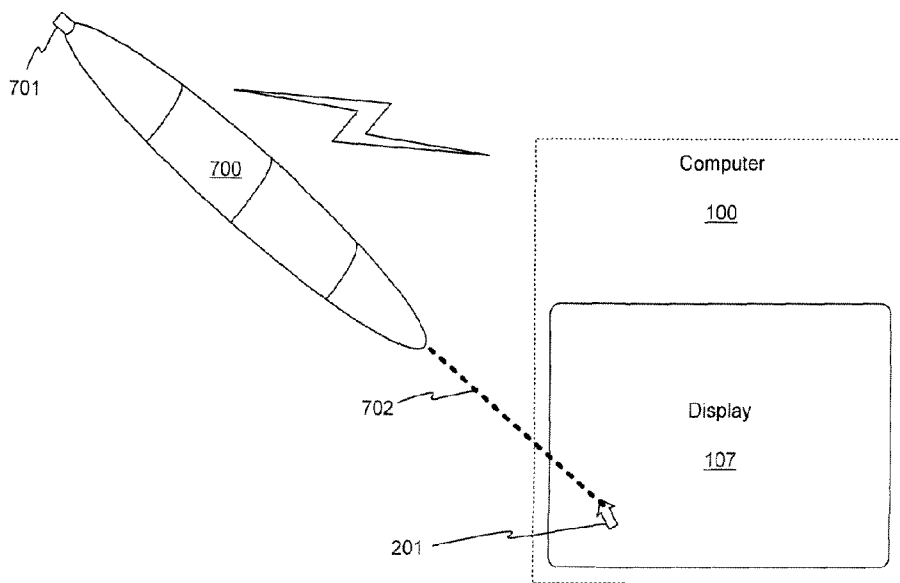


Figure 7

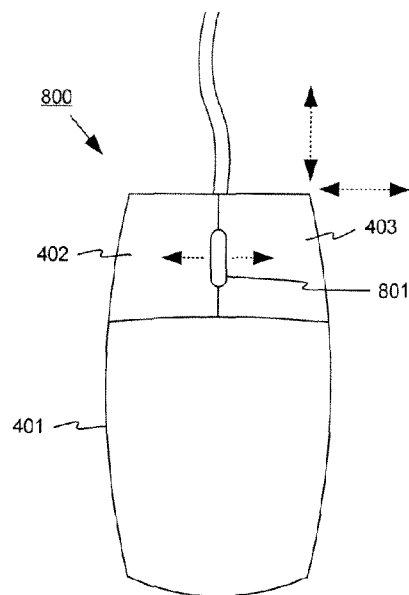


Figure 8

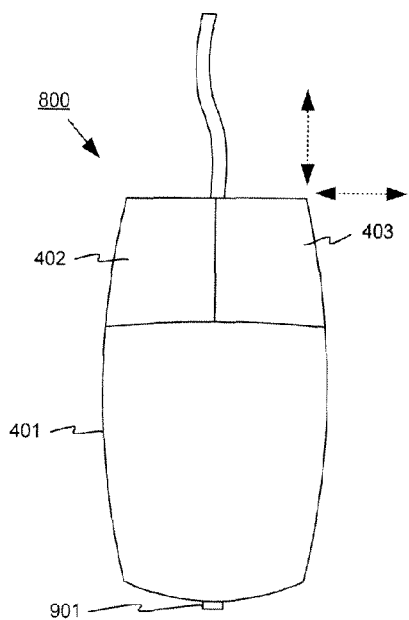


Figure 9

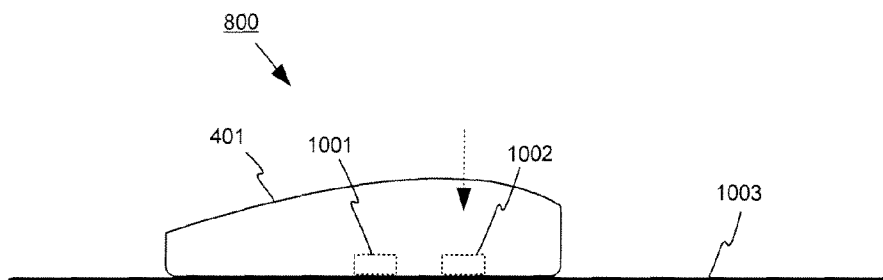


Figure 10

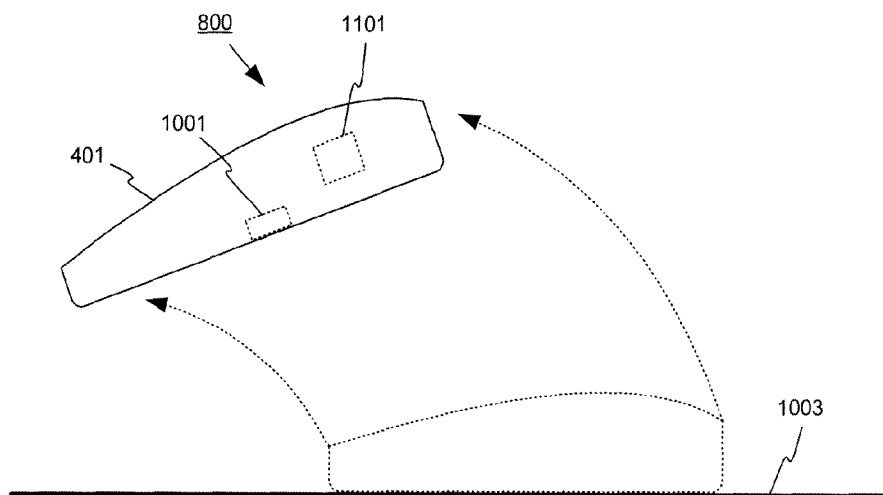


Figure 11

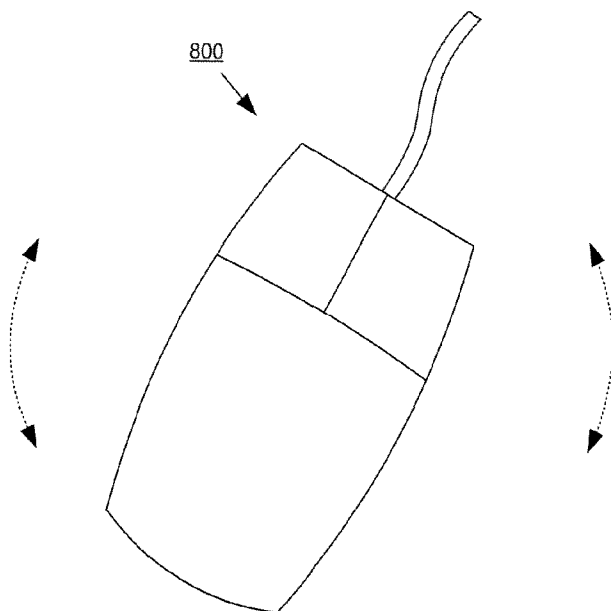


Figure 12

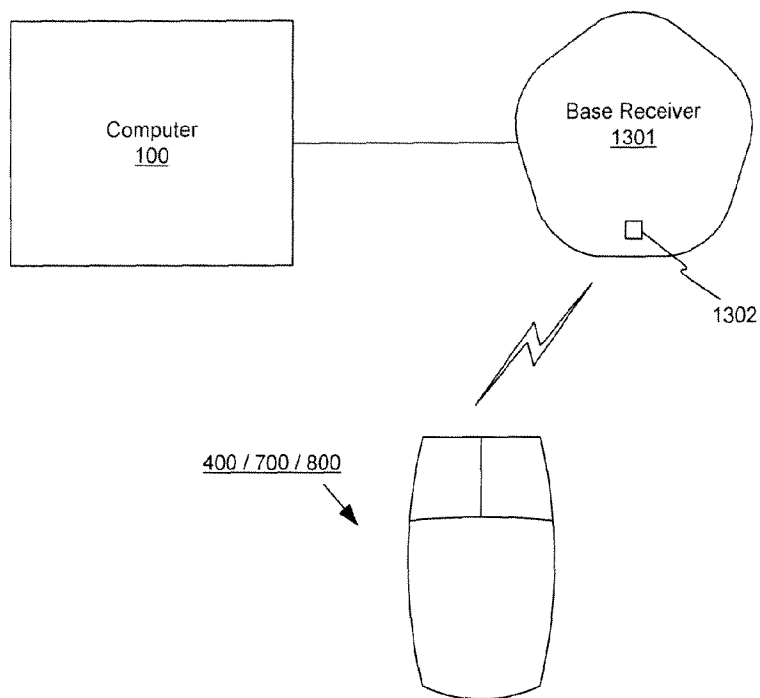


Figure 13

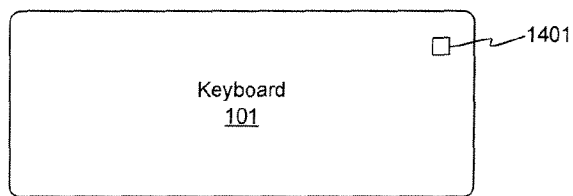


Figure 14

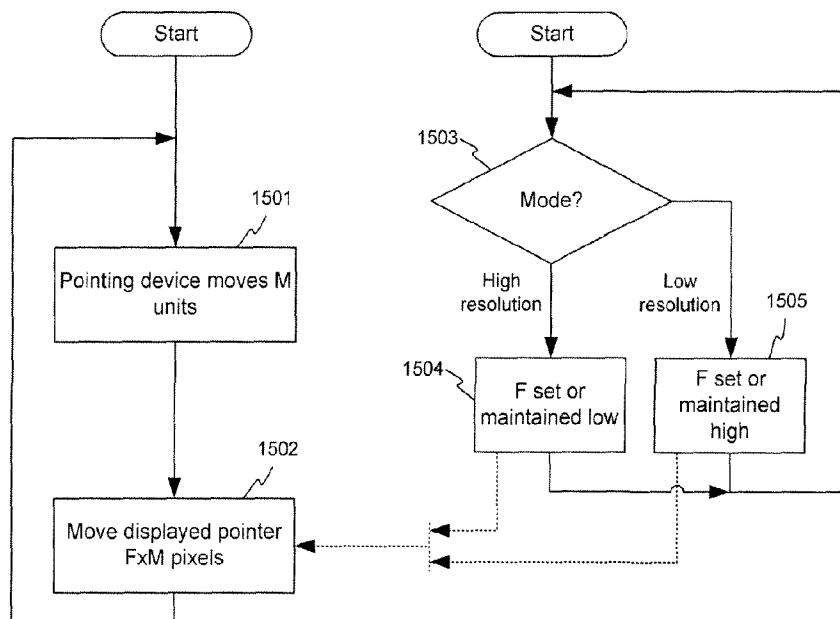


Figure 15

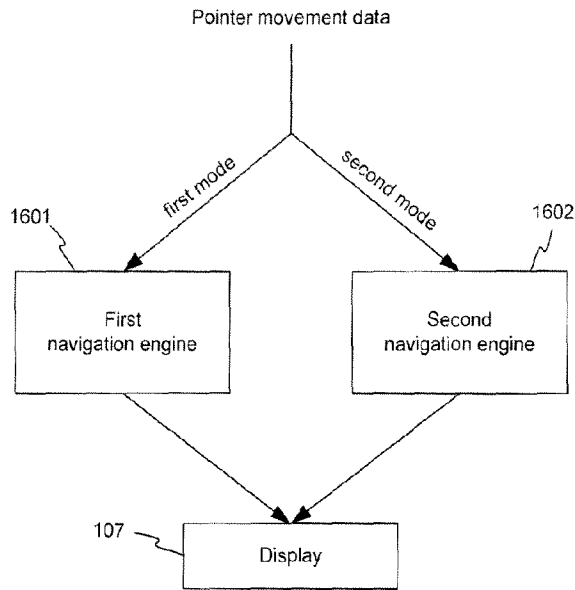


Figure 16

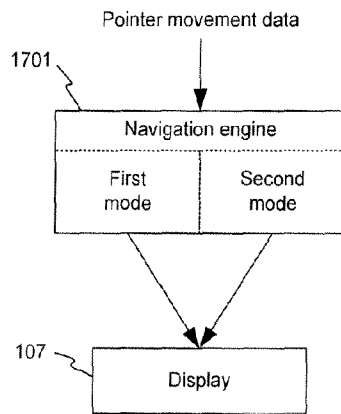


Figure 17



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- **Hayakawa, Takeshi**
Kyoto 601-8501 (JP)
- **Aoyagi, Norihiro**
Kyoto 601-8501 (JP)
- **Ishihara, Seiki**
Kyoto 601-8501 (JP)

(30) Priority: **01.05.2006 JP 2006127384**

(74) Representative: **Altenburg, Udo et al**
Patent- und Rechtsanwälte
Bardehle . Pagenberg . Dost .
Altenburg - Geissler
Galileiplatz 1
81679 München (DE)

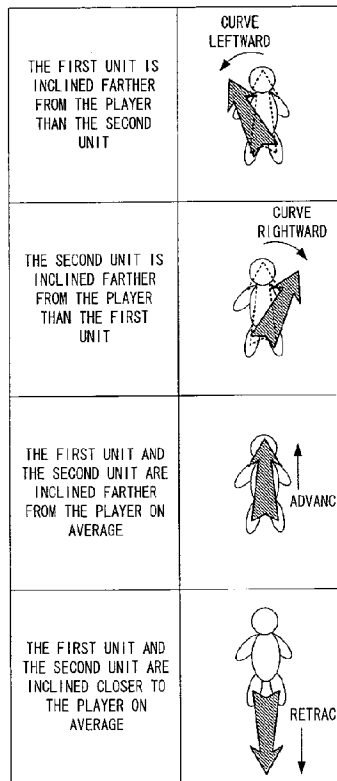
(71) Applicant: **NINTENDO CO., LTD.**
Kyoto 601-8501 (JP)

(72) Inventors:
• **Koizumi, Yoshiaki**
Kyoto 601-8501 (JP)

(54) **Game program and game apparatus**

(57) An inclination of a first unit is detected based on an output from a first acceleration sensor provided in a first unit of a controller, and an inclination of a second unit is detected based on an output from a second acceleration sensor provided in a second unit separate from the first unit. A difference between the inclinations of the first unit and the second unit is detected, and game control is performed using the detected difference. Thus, with a game apparatus using a plurality of acceleration sensors or a plurality of sensors capable of detecting a motion or a posture, a dynamic play is made possible with a high degree of freedom of motion and an intuitive motion input is realized.

FIG. 9



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Description**CROSS REFERENCE TO RELATED APPLICATION**

[0001] The disclosure of Japanese Patent Application No. 2006-127384, filed on May 1, 2006, is incorporated herein by reference.

BACKGROUND OF THE INVENTION**Field of the Invention**

[0002] The present invention relates to a game program and a game apparatus for executing game control by a plurality of acceleration sensors or a plurality of sensors capable of detecting a motion or a posture.

Description of the Background Art

[0003] Japanese Laid-Open Patent Publication No. 10-21000 (hereinafter, referred to as "patent document 1") discloses providing two acceleration sensors (for measuring accelerations along different axes or for measuring a straight line and a rotation) in one housing.

[0004] Japanese Laid-Open Patent Publication No. 2002-153673 (hereinafter, referred to as "patent document 2") discloses a technology for performing different game inputs using two acceleration sensors.

[0005] Japanese Laid-Open Patent Publication No. 6-277363 (hereinafter, referred to as "patent document 3") discloses a technology for using two levers as controllers.

[0006] Japanese Laid-Open Patent Publication No. 2001-170358 (hereinafter, referred to as "patent document 4") discloses a technology for setting a neutral position.

[0007] The technology disclosed in patent document 1 has a problem in that the motions of both hands of the player are fixed, and thus the freedom of motion of the player during the game play is limited (the player cannot perform a dynamic play).

[0008] The technology disclosed in patent document 2 merely allows separate inputs made using two acceleration sensors to be used for the game as independent inputs, which does not provide the game operation with any entertainment.

[0009] The technology disclosed in patent document 3 has a problem in that the freedom of motion of the player during the game play is limited.

[0010] The technology disclosed in patent document 4 is regarding one sensor and is not for setting a neutral position in a system including a plurality of sensors.

[0011] None of these technologies effectively uses the motion in a plurality of directions detected by a sensor.

[0012] The present invention is provided for solving at least one of the above-described problems.

SUMMARY OF THE INVENTION

[0013] Therefore, an object of the present invention is at least one of the following.

(1) To provide a game program and a game apparatus for, when executing game control during a game by a plurality of acceleration sensors or a plurality of sensors capable of detecting a motion or a posture, allowing the player to make a dynamic game input operation with a high degree of freedom of motion;

(2) To provide a game program and a game apparatus for allowing appropriate setting of a neutral position when executing game control by a plurality of sensors; and

(3) To provide a game program and a game apparatus which effectively use a plurality of directions detected by a plurality of sensors capable of detecting a motion.

[0014] The present invention has the following features to attain the objects mentioned above. The reference numerals in parentheses in this section of the specification indicate the correspondence with the embodiments described later for easier understanding of the present invention, and do not limit the present invention in any way.

[0015] A computer-readable storage medium according to one embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) which is an acceleration sensor or a gyrosensor provided in a first housing (71) and an output from a second sensor (761) which is an acceleration sensor or a gyrosensor provided in a second housing (77) separate from the first housing. The game program causes a computer (30) of a game apparatus (3) to function as:

first posture detection means for detecting a posture of the first housing based on an output from the first sensor (S104);

second posture detection means for detecting a posture of the second housing based on an output from the second sensor (S108);

posture difference detection means for detecting a difference between the posture of the first housing detected by the first posture detection means and the posture of the second housing detected by the second posture detection means (S116); and

game control means for executing game control using the difference detected by the posture difference detection means (S118).

[0016] Owing to the above-described structure, the player can freely move both of his/her hands during the play. Therefore, a dynamic play is made possible with a high degree of freedom of motion. Since the control is

executed by a posture difference, an intuitive motion input is allowed.

[0017] The game program may further cause the computer to function as posture average detection means for detecting an average of the posture of the first housing detected by the first posture detection means and the posture of the second housing detected by the second posture detection means (S124); and the game control means may execute the game control using both the difference detected by the posture difference detection means and the average detected by the posture average detection means (S126).

[0018] Owing to the above-described structure, the player can perform the game control freely with the motion of both hands.

[0019] For example, a first motion of a game object may be controlled based on the difference, and a second motion of the game object may be controlled based on the average. The "posture difference" may be, for example, a difference in the angle of rotation around a predetermined axis or a difference in the angle of rotation around a respective axis.

[0020] The game control means may comprise first motion control means for controlling a first motion of a game object using the difference detected by the posture difference detection means (S118); and the game program may further cause the computer to function as second motion control means for controlling a second motion of the game object based on an output from a switch provided in the first housing or the second housing (S164).

[0021] Owing to the above-described structure, the degree of freedom of posture during the play is improved.

[0022] The first sensor usable for detecting the posture of the first housing and the second sensor usable for detecting the posture of the second housing may be acceleration sensors;

the first posture detection means may detect an inclination of the first housing, and the second posture detection means may detect an inclination of the second housing; the first posture detection means may comprise first housing state determination means for determining whether or not the first housing is in a still state based on an output from the first sensor (S156);

when the first housing state determination means determines that the first housing is in a still state, the first posture detection means may output the inclination of the first housing detected based on the output from the first sensor as a valid detection result (S158);

the second posture detection means may comprise second housing state determination means for determining whether or not the second housing is in a still state based on an output from the second sensor (S156); and

when the second housing state determination means determines that the second housing is in a still state, the second posture detection means may output the inclination of the second housing detected based on the output from the second sensor as a valid detection result (S158).

[0023] Owing to the above-described structure, a sensor output due to an inadvertent motion during the play can be eliminated with certainty.

[0024] The housing state determination means determines that the housing is in a still state when, for example, the magnitude of the output vector from the acceleration sensor substantially matches the magnitude of the output vector obtained when the acceleration sensor detects only the gravity (with some extent of a tolerable error).

[0025] Only when the first housing state determination means determines that the first housing is in a still state and also the second housing state determination means determines that the second housing is in a still state, the game control means may execute the game control using the difference detected by the posture difference detection means.

[0026] A computer-readable storage medium according to another embodiment of the present invention has stored thereon a game program for executing game processing using an output from a first sensor (701) which is an acceleration sensor or a gyrosensor provided in a first housing (71) and an output from a second sensor (761) which is an acceleration sensor or a gyrosensor provided in a second housing (77) separate from the first housing. The game program causes a computer (30) of a game apparatus (3) to function as:

direction determination means for determining a direction of a game control vector based on an output from the first sensor (S410);

magnitude determination means for determining a magnitude of the game control vector based on an output from the second sensor (S414); and

game control means for executing game control using the game control vector, the direction and the magnitude of which are determined by the direction determination means and the magnitude determination means (S418).

[0027] Owing to the above-described structure, the player can freely move both of his/her hands during the play. Therefore, a dynamic play is made possible with a high degree of freedom of motion.

[0028] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion of the first housing based on an output from the first sensor (S236);

second motion operation detection means for detect-

ing a motion of the second housing based on an output from the second sensor (S250); simultaneous input detection means for detecting, based on the detection results of the first motion operation detection means and the second motion operation detection means, whether or not a motion of the second housing was detected within a simultaneous input acceptance time period which is counted from a timing determined in relation with the detection of a motion of the first housing (S254); and game control means for executing first game processing when the simultaneous input detection means detects that the motion of the second housing was detected within the simultaneous input acceptance time period after the motion of the first housing was detected (S256).

[0029] Owing to the above-described structure, the simultaneous motion operations can be used for the game input (with a timing difference between the simultaneous motion operations being tolerated).

[0030] The simultaneous input acceptance time period is a predetermined time period which is counted from a timing determined in relation with the detection of the motion of the first housing, and may be fixed or variable in accordance with the state or level of the game. The "timing which is determined in relation with the detection of the motion" is a predetermined timing during an input of a motion which is a target of detection; and is, for example, a time point at which such a motion was detected or a predetermined time point during such a motion to be detected (e.g., the start point or the end point of such a motion or a predetermined intermediate point during such a motion).

[0031] The first game processing may be executed as follows. The simultaneous input detection means detects, based on the detection results of the first motion operation detection means and the second motion operation detection means, whether or not a motion of the first housing was detected within a simultaneous input acceptance time period after the motion of the second housing was detected. When the simultaneous input detection means detects that a motion of the first housing was detected within such a time period, the game control means executes the first game processing.

[0032] When the simultaneous input detection means does not detect that a motion of the second housing was detected within the simultaneous input acceptance time period after the motion of the first housing was detected by the first motion operation detection means, the game control means may execute second game processing which is different from the first game processing (S216).

[0033] Owing to the above-described structure, the simultaneous motion operations and also a motion operation of one operation unit may be used for the game input.

[0034] When the simultaneous input detection means does not detect that a motion of the first housing was

detected within the simultaneous input acceptance time period after the motion of the second housing was detected by the second motion operation detection means, the game control means may execute third game processing which is different from the first game processing or the second game processing.

[0035] The game control means may execute the first game processing when the simultaneous input detection means detects that a motion of the second housing was detected within the simultaneous input acceptance time period, and may execute the second game processing at a time point when the simultaneous input acceptance time period passes without the simultaneous input detection means detecting that a motion of the second housing was detected within the simultaneous input acceptance time period.

[0036] The first motion operation detection means may not newly detect a motion of the first housing until an acceptance prohibition time period passes after a timing determined in relation with the detection of the motion of the first housing; and

the second motion operation detection means may not newly detect a motion input of the second housing until the acceptance prohibition time period passes after the motion of the second housing was detected.

[0037] Owing to the above-described structure, the problem is avoided that once a motion input operation is performed, inputs are continuously made for a while.

[0038] The acceptance prohibition time period is a predetermined time period which is counted from a timing determined in relation with the detection of the motion of the housing, and may be fixed or variable in accordance with the state or level of the game.

[0039] Neither the first motion operation detection means nor the second motion operation detection means may newly detect a motion of the first housing or the second housing until a post-simultaneous input acceptance prohibition time period passes after a timing determined in relation with the detection, by the simultaneous input detection means, of simultaneous inputs which means that within a predetermined time period after a motion of one of the first housing and the second housing was detected, a motion of the other was detected.

[0040] Owing to the above-described structure, when neither operation unit can make an input, the timing for permitting the re-start of the input is matched.

[0041] The post-simultaneous input acceptance prohibition time period is a predetermined time period which is counted from a timing determined in relation with the detection of simultaneous inputs by the simultaneous input detection means, and may be fixed or variable in accordance with the state or level of the game. The post-simultaneous input acceptance prohibition time period may be the same as, or longer than, the acceptance prohibition time period. The "timing determined in relation with the detection of simultaneous inputs" is a predetermined timing during simultaneous inputs as a target of detection; and is, for example, a time point at which such

simultaneous inputs were detected or a predetermined time point during such simultaneous inputs to be detected (e.g., the start point or the end point of such simultaneous inputs or a predetermined intermediate point during such simultaneous inputs).

[0042] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion detection means for detecting a motion and a strength thereof of the first housing based on an output from the first sensor (S236);

second motion detection means for detecting a motion and a strength thereof of the second housing based on an output from the second sensor (S250); simultaneous input detection means for detecting, based on the detection results of the first motion detection means and the second motion detection means, whether or not a motion of the second housing was detected within a simultaneous input acceptance time period which is counted from a timing determined in relation with the detection of a motion of the first housing (S254); and

game control means for, when the simultaneous input detection means detects that a motion of the second housing was detected within the simultaneous input acceptance time period which is counted from the timing determined in relation with the detection of the motion of the first housing, executing first game processing using the strength of the motion of the first housing detected by the first motion detection means and the strength of the motion of the second housing detected by the second motion detection means (S256).

[0043] Owing to the above-described structure, the simultaneous motion operations and the magnitudes of the motions can be used for the game input (with a timing difference between the simultaneous motion operations being tolerated).

[0044] The first game processing may be executed as follows. The simultaneous input detection means detects, based on the detection results of the first motion detection means and the second motion detection means, whether or not a motion of the first housing was detected within a simultaneous input acceptance time period after a timing determined in relation with the detection of the motion of the second housing. When the simultaneous input detection means detects that a motion of the first housing was detected within such a simultaneous input acceptance time period, the game control

means executes the first game processing using the strength of the motion of the first housing detected by the first motion detection means and the strength of the motion of the second housing detected by the second motion detection means.

[0045] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion of the first housing based on an output from the first sensor (S302);

second motion operation detection means for detecting a motion of the second housing based on an output from the second sensor (S318);

simultaneous input detection means for, when a motion operation on the first housing was performed, detecting whether or not a motion operation on the second housing was performed within a predetermined time period before the motion operation on the first housing, based on the detection results of the first motion operation detection means and the second motion operation detection means (S312); and

game control means for, (a) when the simultaneous input detection means detects that a motion operation on the second housing was performed within the predetermined time period before the motion operation on the first housing, causing a game object to perform a first motion; and (b) when the simultaneous input detection means does not detect that a motion operation on the second housing is performed within the predetermined time period before the motion operation on the first housing, causing a game object to perform a second motion which is different from the first motion (S314, S316).

[0046] Owing to the above-described structure, the simultaneous motion operations can be used for the game input (with a timing difference between the simultaneous motion operations being tolerated).

[0047] The first motion, the second motion or a third motion may be executed as follows. When a motion operation on the second housing is performed, the simultaneous input detection means detects whether or not a motion operation on the first housing was performed within a predetermined time period before the motion operation of the second housing, based on the detection results of the first motion operation detection means and the second motion operation detection means. When the simultaneous input detection means detects that the mo-

tion operation on the first housing was performed, the game control means causes the game object to perform the first motion. When the simultaneous input detection means does not detect that the motion operation on the first housing was performed, the game control means causes the game object to perform the third motion. Alternatively, each time the first motion operation detection means or the second motion operation detection means detects a motion of the first housing or the second housing, the simultaneous input detection means detects such a motion, so that the game control means causes the game object to perform the first motion, the second motion or the third motion.

[0048] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting an inclination and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting an inclination. The game program causes a computer (30) of a game apparatus (3) to function as:

reference value setting instruction detection means for detecting a reference value setting instruction from a player (S134);

reference value setting means for, when the reference value setting instruction detection means detects a reference value setting instruction, setting a first reference value and a second reference value based on an output value from the first sensor and/or an output value from the second sensor (S146);

first posture detection means for detecting a posture of the first housing based on an output value from the first sensor and the first reference value (S104, S112);

second posture detection means for detecting a posture of the second housing based on an output value from the second sensor and the second reference value (S108, S114);

posture difference detection means for detecting a difference between the posture of the first housing detected by the first posture detection means and the posture of the second housing detected by the second posture detection means (S116); and

game control means for executing game control using the difference detected by the posture difference detection means (S118).

[0049] Owing to the above-described structure, the player can play the game while being in any posture using two inclination sensors.

[0050] The reference setting means may set the output value itself from the sensor as the reference value, or may set a result obtained by calculating an inclination value from the output value as the reference value. When the first reference value and the second reference value

are the same, only one data may be stored.

[0051] The reference value setting means may set the first reference value and the second reference value at the same timing in accordance with the detection of a single reference value setting instruction by the reference value setting instruction detection means.

[0052] Owing to the above-described structure, it can be prevented that the same data is input as different data in error.

[0053] When the reference value setting instruction detection means detects the reference value setting instruction, the reference value setting means may set a value obtained by a predetermined calculation based on an output value from the first sensor and an output value from the second sensor, commonly as the first reference value and the second reference value.

[0054] Owing to the above-described structure, it can be prevented that the same data is input as different data in error.

[0055] The predetermined calculation is, for example, averaging. Weighting may be performed in accordance with, for example, the size or the shape of the first housing and the second housing, whether there is an operation section or not in each housing, or whether the respective housing is for the right hand or the left hand.

[0056] When the reference value setting instruction detection means detects the reference value setting instruction, the reference value setting means may set a value based on either an output value from the first sensor or an output value from the second sensor, commonly as the first reference value and the second reference value.

[0057] Owing to the above-described structure, it can be prevented that the same data is input as different data in error.

[0058] The first housing and/or the second housing includes a switch for allowing the player to input the reference value setting instruction; and

when the reference value setting instruction detection means detects the reference value setting instruction, the reference value setting means may commonly set the first reference value and the second reference value based on an output value from either the first sensor or the second sensor which does not include the switch used for inputting the reference value setting instruction.

[0059] Owing to the above-described structure, the influence of the vibration of the housing which occurs when a button is pressed can be eliminated.

[0060] The reference value setting means may comprise reference value setting time difference detection means for, when the reference value setting instruction detection means detects the reference value setting instruction, determining whether or not a difference between the inclination of the first housing and the inclination of the second housing is within a predetermined range, based on an output value from the first sensor and an output value from the second sensor (S148); and the reference value setting means, (a) when the refer-

ence value setting time difference detection means determines that the difference is within the predetermined range, may set the first reference value and the second reference value respectively based on the output value from the first sensor and the output value from the second sensor; and (b) when the reference value setting time difference detection means determines that the difference is not within the predetermined range, may execute error processing.

[0061] Owing to the above-described structure, it can be prevented that the same data is input as different data in error.

[0062] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) which is an acceleration sensor or a gyrosensor provided in a first housing (71) and an output from a second sensor (761) which is an acceleration sensor or a gyrosensor provided in a second housing (77) separate from the first housing. The game program causes a computer (30) of a game apparatus (3) to function as:

posture control means for controlling a posture of a game object based on an output from the first sensor (S410); and
 movement control means for controlling a movement of the game object based on an output from the second sensor (S416).

[0063] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor (S542);
 second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor (S570);

synthesized direction determination means for determining a synthesized direction by synthesizing the first motion direction detected by the first motion direction detection means and the second motion direction detected by the second motion direction detection means (S552); and
 game control means for executing game control using the synthesized direction determined by the synthesized

direction determination means (S554).

[0064] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) for detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing for detecting a motion. The game program causes a computer (30) of a game apparatus (3) to function as:

first strength detection means for detecting a strength of a motion of the first housing based on an output from the first sensor (S542);
 second strength detection means for detecting a strength of a motion of the second housing based on an output from the second sensor (S570);

synthesized strength determination means for determining a synthesized strength by synthesizing the strength of the motion of the first housing detected by the first strength detection means and the strength of the motion of the second housing detected by the second strength detection means (S552); and

game control means for executing game control using the synthesized strength determined by the synthesized strength determination means (S554).

[0065] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor (S542);
 second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor (S570);

motion direction relationship determination means for determining whether or not the first motion direction detected by the first motion direction detection means and the second motion direction detected by the second motion direction detection means fulfill a predetermined relationship (S550); and

game control means for, when the motion direction relationship determination means determines that the first motion direction and the second motion direction fulfill the predetermined relationship, executing game control

based on the motion direction and/or a motion strength of at least one of the first housing and the second housing (S552).

[0066] The motion direction relationship determination means may determine whether or not the first motion direction and the second motion direction substantially match each other, may determine whether or not the first motion direction and the second motion direction are substantially opposite to each other, or may determine whether or not the first motion direction and the second motion direction make a predetermined angle. The motion direction relationship determination means may compare two-dimensional directions (components of predetermined two directions) or two-dimensional directions.

[0067] When the motion direction relationship determination means determines that the predetermined relationship is fulfilled, the game control means may execute the game control based on the motion direction of either the first housing or the second housing, or based on the motion directions of both the first housing and the second housing (for example, by performing a predetermined calculation such as addition, averaging or the like). The game control means may execute the game control based on the motion strength instead of the motion direction, or based both on the motion direction and the motion strength.

[0068] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion of the first housing based on an output from the first sensor (S542);

second motion operation detection means for detecting a motion of the second housing based on an output from the second sensor (S570);

motion timing relationship determination means for determining, based on the detection results of the first motion operation detection means and the second motion operation detection means, whether or not a timing at which the motion of the first housing is detected and a timing at which the motion of the second housing is detected fulfill a predetermined relationship (S548); and

game control means for, when the motion timing relationship determination means determines that the timing at which the motion of the first housing is detected and the timing at which the motion of the second housing is detected fulfill the predetermined re-

lationship, executing game control based on a motion direction and/or a motion strength of at least one of the first housing and the second housing (S552).

[0069] The motion timing relationship determination means may determine, for example, whether or not the timing at which the motion of the first housing is detected and the timing at which the motion of the second housing is detected substantially match each other, or may determine whether or not these timings have a predetermined interval therebetween. When the motion timing relationship determination means determines that the predetermined relationship is fulfilled, the game control means may execute the game control based on the motion direction of either the first housing or the second housing, or based on the motion directions of both the first housing and the second housing (for example, by performing a predetermined calculation such as addition, averaging or the like). The game control means may execute the game control based on the motion strength instead of the motion direction, or based both on the motion direction and the motion strength.

[0070] The game control means may execute the game control based on the motion direction and/or the motion strength of both of the first housing and the second housing.

[0071] The game control means may execute the game control based on the motion direction and the motion strength of both of the first housing and the second housing.

[0072] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor (S542);

second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor (S570);

motion direction relationship determination means for determining whether or not the first motion direction detected by the first motion direction detection means and the second motion direction detected by the second motion direction detection means fulfill a predetermined relationship (S550); and

game control means for, when the motion direction rela-

tionship determination means determines that the first motion direction and the second motion fulfill the predetermined relationship, causing a game object to perform a specific motion (S554).

[0073] The motion direction relationship determination means may determine whether or not the first motion direction and the second motion direction substantially match each other, may determine whether or not the first motion direction and the second motion direction are substantially opposite to each other, or may determine whether or not the first motion direction and the second motion direction make a predetermined angle. The motion direction relationship determination means may determine which one of a plurality of relationship candidates is the relationship between the first motion direction and the second motion direction, and may determine one specific motion in accordance with the determination result.

[0074] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) for detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing for detecting a motion. The game program causes a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion and a strength thereof of the first housing based on an output from the first sensor (S236);

second motion operation detection means for detecting a motion and a strength thereof of the second housing based on an output from the second sensor (S250);

motion timing relationship determination means for determining, based on the detection results of the first motion operation detection means and the second motion operation detection means, whether or not a timing at which the motion of the first housing is detected and a timing at which the motion of the second housing is detected fulfill a predetermined relationship (S240); and

game control means for, when the motion timing relationship determination means determines that the timing at which the motion of the first housing is detected and the timing at which the motion of the second housing is detected fulfill the predetermined relationship, causing a game object to perform a specific motion (S242).

[0075] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a

motion in at least two axial directions. The game program causes a computer (30) of a game apparatus (3) to function as:

5 first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor (S748);

10 second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor (S782); and

15 game control means for, when the first motion direction detected by the first motion direction detection means is in a first range and the second motion direction detected by the second motion direction detection means is in a second range, executing game control based on the first motion direction and the second motion direction (S752, S786, S758).

[0076] The first range and the second range may not overlap or partially overlap, but do not completely overlap.

[0077] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion or a posture and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion or a posture. The game program causes a computer (30) of a game apparatus (3) to function as:

35 first game control means for executing first game processing based on an output from the first sensor (S410);

40 second game control means for executing second game processing based on an output from the second sensor (S416); and

45 reference sensor exchange means for changing the sensor referred to by the first game control means for executing the first game processing from the first sensor to the second sensor, and for changing the sensor referred to by the second game control means for executing the second game processing from the second sensor to the first sensor, in accordance with an instruction of a player (S404).

50 **[0078]** A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a sensor (701) at least capable of detecting a motion in two axial directions of a first axis direction and a second axis direction. The game program causes a computer (30) of a game apparatus (3) to function as:

motion detection means for detecting a motion in the first axis direction of the sensor (S742); and

game control means for, when the motion detection means detects a motion in the first axis direction, executing game processing based on an output from the sensor in the second axis direction at a time point or during a time period which is determined in relation with the detection of the motion (S718).

[0079] The "time point or time period which is determined in relation with the detection of the motion" may be (1) or (2) below. In order to keep the continuity between the motion input in the first axis direction and the motion input in the second axis direction, it is preferable that such a time point or time period is within a predetermined time period from a predetermined time point during the motion input in the first axis direction.

(1) A time point or time period which is determined based on a predetermined time point during the motion input in the first axis direction as a target of detection (the "predetermined time point during the motion input in the first axis direction as a target of detection" is a time point when the motion input in the first axis direction was detected, the start point or the end point of the motion input, a predetermined intermediate time point during the motion input, etc.).

(2) A predetermined time point or a predetermined time period during a motion in the second axis direction when the motion in the second axis direction is detected during the time period determined based on the predetermined time point during the motion input in the first axis direction as the target of detection.

[0080] The time point or time period in (1) above may be the following.

(a) A time point which is the same as a predetermined time point during the motion input in the first axis direction (hereinafter, such a predetermined time point will be referred to as "first time point");

(b) A time point before the first time point by a predetermined time period;

(c) A time point after the first time point by a predetermined time period;

(d) A time period of: the time point before the first time point by a predetermined time period - the first time period;

(e) A time period of: the first time point - the time point after the first time point by a predetermined time period;

(f) A time period of: the time point before the first time point by a first time period - the time point before the first time point by a second time period (first time period > second time period);

(g) A time period of: the time point after the first time point by a first time period - the time point after the first time point by a second time period (first time

period < second time period); and

(h) A time period of: the time point before the first time point by a first time period - the time point after the first time point by a second time period.

[0081] The time point or time period in (2) may be determined as follows. When detecting a "swing motion", the motion detection means detects whether or not a swing in the second axis direction is detected at the time point or during a time period represented by (a) through (h). When such a swing is detected, the "time point or time period in (2) may be:

a time period of the swing in the second axis direction, i.e., from the swing start until the swing end [acceleration rise → maximum → 0 → acceleration detection in the opposite direction → maximum in the opposite direction → 0]; or

a part thereof [e.g., a time period of: acceleration rise → maximum → 0; or a time period of: acceleration detection in the opposite direction → maximum in the opposite direction → 0].

[0082] In the case where the "time point or time period which is determined in relation with the detection of the motion" is a time point or time period before the first time point, the input is to be made as follows: after an input in the second axis direction is made, an input in the first axis direction is made, to validate the input in the second axis direction (even when an input in the second axis direction is made, such an input is not validated unless an input in the first axis direction is made thereafter). In the case where the "time point or time period which is determined in relation with the detection of the motion" is a time point or time period after the first time point, the input is to be made as follows: after an input in the first axis direction is made, an input in the second axis direction is accepted (even when an input in the second axis direction is made, such an input is not validated unless an input in the first axis direction is made beforehand). In the case where the "time point or time period which is determined in relation with the detection of the motion" is a time period crossing the first time point, the input is to be made as follows: an input in the second axis direction is made while making an input in the first axis direction to indicate that the input in the second axis direction is valid (unless an input in the second axis direction is made while making an input in the first axis direction, the input in the second axis direction is not validated).

[0083] The expression "executing game processing based on an output from the sensor in the second axis direction" may mean the following. In the case where the game processing is executed based on an output from the sensor in the second axis direction during a time period which is determined in relation with the detection of the motion, a sum/average (including a weighted average) /maximum value/integral of the outputs in the second axis direction during that time period are used, or a

difference between the continuous outputs during that time period is used.

[0084] A computer-readable storage medium according to still another embodiment of the present invention has stored thereon a game program for executing game control using an output from a sensor (701) capable of detecting a motion in three axial directions of a first axis direction, a second axis direction and a third axis direction. The game program causes a computer (30) of a game apparatus (3) to function as:

motion detection means for detecting a motion in the first axis direction of the sensor (S742); and

game control means for, when the motion detection means detects a motion in the first axis direction, executing game control using a direction represented by an output from the sensor in the second axis direction and an output from the sensor in the third axis direction at a time point or during a time period which is determined based on the time point when the motion was detected (S718).

[0085] When the motion detection means detects a motion in the first axis direction, the game control means may execute game control using an output from the sensor in the second axis direction at a time point or during a time period which is determined based on the time point when the motion was detected, and also using a magnitude of an output from the sensor in the first axis direction regarding the motion in the first axis direction.

[0086] When the motion detection means detects a motion in the first axis direction, the game control means may detect whether or not there is a motion in the second axis direction at a time point or during a time period which is determined based on the time point when the motion in the first axis direction was detected (S750) ; and when the motion in the second axis direction is detected, may execute game control using an output in the second axis direction.

[0087] The "sensor capable of detecting a posture" may be an acceleration sensor, a gyrosensor or the like. More specifically, the "sensor capable of detecting a posture" is a sensor capable of detecting a posture of itself (a posture of a housing including the sensor itself). The "posture" is typically an inclination (inclination with respect to the direction of gravity; i.e., an angle of rotation around the horizontal axis), but may be an angle of rotation around an axis other than the horizontal axis, for example.

[0088] The "sensor capable of detecting an inclination" may be an acceleration sensor, a gyrosensor or the like. More specifically, the "sensor capable of detecting an inclination" is a sensor capable of detecting an inclination of itself (an inclination of a housing including the sensor itself).

[0089] The "sensor capable of detecting a motion" may be an acceleration sensor, a gyrosensor or the like. More specifically, the "sensor capable of detecting a motion"

is a sensor capable of detecting a motion of itself (a motion of a housing including the sensor itself).

[0090] The "motion operation detection means" may detect that the housing was simply moved, or may detect that the housing made a predetermined motion (e.g., a swing).

[0091] Now, an acceleration sensor is influenced by an acceleration motion or a gravitational acceleration and detects an acceleration of a linear component in each of the sensing axis directions. By contrast, a gyroscope or a gyrosensor detects an angular velocity accompanying a rotation. The acceleration sensor, even when being rotated around the axis thereof, cannot detect an acceleration in each axis other than the gravitational acceleration. By contrast, the gyroscope cannot detect a linear acceleration which does not accompany a rotation. Therefore, when the acceleration sensor is merely replaced with a gyroscope, or when the gyroscope is merely replaced with an acceleration sensor, the same functions as those before the replacement are not provided. By performing additional complicated processing for absorbing the difference between the acceleration sensor and the gyroscope, the acceleration sensor may be replaced with a gyroscope or the gyroscope may be replaced with an acceleration sensor.

[0092] The acceleration sensor detects an acceleration of a linear component along each axis, and cannot directly detect a rotation or an inclination. Therefore, a rotation or an inclination of the posture of a device including an acceleration sensor is obtained by performing a predetermined calculation on the acceleration detected for each axis. For example, when the acceleration sensor is in a still state, a gravitational acceleration is always applied. Thus, an acceleration in accordance with the inclination of each axis with respect to the gravitational acceleration is detected. Specifically, when the acceleration sensor is in a horizontal still state, a gravitational acceleration of 1 G is applied to the Y axis of the acceleration sensor, and the gravitational acceleration in other axes is almost zero. When the acceleration sensor is inclined from the horizontal state, the gravitational acceleration is divided into the axes in accordance with the directions of the axes of the acceleration sensor and the angles of the axes with respect to the direction of gravity. At this point, an acceleration value of each axis of the acceleration sensor is detected. By performing a calculation on such an acceleration value of each axis, the posture of the acceleration sensor with respect to the direction of gravity can be calculated. A rotation is considered as a continuous change of the posture. Thus, a rotation angle can be calculated through software by calculating a change from an inclination of the posture at one point to an inclination of the posture at another point.

[0093] Using a gyroscope, a change from an inclination of the posture in one state until an inclination of the posture in another state can be calculated as follows, for example. At the start of the detection by the gyroscope, an inclination value is initialized. Angular velocity data

which is output from the gyroscope from this time point is integrated. Then, a change amount in the inclination from the initialized value is calculated. Thus, an angle with respect to the posture at the initialization point can be obtained. Namely, a relative angle with respect to a certain point can be obtained. When a posture of a device including a gyroscope with respect to the direction of gravity needs to be found, the initialization needs to be conducted where the device is in a state based on the direction of gravity (e.g., in a horizontal state). By contrast, a device including an acceleration sensor has an advantage that initialization is not necessary because the acceleration sensor uses the direction of gravity as the reference direction.

[0094] According to the present invention, the player can freely move both of his/her hands during the play. Therefore, a dynamic play is made possible with a high degree of freedom of motion. Since the control is executed by a posture difference, an intuitive motion input is realized.

[0095] These and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0096]

FIG. 1 is an external view of a game system 1 according to an embodiment of the present invention; FIG. 2 is a block diagram of a game apparatus 3; FIG. 3 is an isometric view of a controller 7 showing an external appearance thereof; FIG. 4 is an isometric view of a core unit 70 in a state where an upper housing thereof is removed; FIG. 5 is an isometric view of a sub unit 76 in a state where an upper housing thereof is removed; FIG. 6 is a block diagram illustrating a structure of the controller 7; FIG. 7 generally shows how to perform a game operation using the controller 7; FIG. 8 shows an exemplary game image in a first embodiment according to the present invention; FIG. 9 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the first embodiment; FIG. 10 is a memory map of a main memory in the first embodiment; FIG. 11 is a part of a flowchart illustrating a flow of processing executed by a CPU in the first embodiment; FIG. 12 is a flowchart illustrating neutral position setting processing in the first embodiment in detail; FIG. 13 is a part of the flowchart illustrating the flow of processing executed by the CPU in the first embodiment;

FIG. 14 is a flowchart illustrating the detection of inclination in the first embodiment in detail;

FIG. 15 shows an exemplary method for changing a directional vector in the first embodiment;

FIG. 16 shows an exemplary correspondence between the inclination of the operation unit and the detection result of the inclination in the first embodiment;

FIG. 17 shows an exemplary correspondence between the operation performed by the player and the motion of the character in a modification to the first embodiment;

FIG. 18 is a flowchart illustrating a flow of processing executed by the CPU in the modification to the first embodiment;

FIG. 19 shows an exemplary game image in a second embodiment according to the present invention;

FIG. 20 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the second embodiment; FIG. 21 is a memory map of the main memory in the second embodiment;

FIG. 22 is a part of a flowchart illustrating a flow of processing executed by the CPU in the second embodiment;

FIG. 23 is a part of the flowchart illustrating the flow of processing executed by the CPU in the second embodiment;

FIG. 24 is a part of the flowchart illustrating the flow of processing executed by the CPU in the second embodiment;

FIG. 25 is a flowchart illustrating the detection of swinging strength in the second embodiment in detail;

FIG. 26 shows an exemplary correspondence between the operation performed by the player and the motion of the character in a third second embodiment according to the present invention;

FIG. 27 is a memory map of the main memory in the third embodiment;

FIG. 28 is a part of a flowchart illustrating a flow of processing executed by the CPU in the third embodiment;

FIG. 29 is a part of the flowchart illustrating the flow of processing executed by the CPU in the third embodiment;

FIG. 30 is a flowchart illustrating the detection of swing operation in the third embodiment in detail;

FIG. 31 shows an exemplary correspondence between the operation performed by the player and the motion of the character in a fourth embodiment according to the present invention;

FIG. 32 is a memory map of the main memory in the fourth embodiment;

FIG. 33 is a part of a flowchart illustrating a flow of processing executed by the CPU in the fourth embodiment;

FIG. 34 is a flowchart illustrating the detection of in-

clination in the fourth embodiment in detail;
 FIG. 35 is a flowchart illustrating the detection of swing operation in the fourth embodiment in detail;
 FIG. 36 shows an exemplary correspondence between the inclination of the operation unit and the detection result of the inclination in the fourth embodiment;
 FIG. 37 shows an exemplary method for changing a directional vector in the fourth embodiment;
 FIG. 38 shows an exemplary correspondence between the operation performed by the player and the motion of the character in a fifth embodiment according to the present invention;
 FIG. 39 is a memory map of the main memory in the fifth embodiment;
 FIG. 40 is a part of a flowchart illustrating a flow of processing executed by the CPU in the fifth embodiment;
 FIG. 41 is a part of the flowchart illustrating the flow of processing executed by the CPU in the fifth embodiment;
 FIG. 42 is a part of the flowchart illustrating the flow of processing executed by the CPU in the fifth embodiment;
 FIG. 43 is a part of the flowchart illustrating the flow of processing executed by the CPU in the fifth embodiment;
 FIG. 44 is a flowchart illustrating the detection of swinging direction in the fifth embodiment in detail;
 FIG. 45 shows an exemplary method for changing a velocity vector in the fifth embodiment;
 FIG. 46 shows another exemplary method for changing a velocity vector in the fifth embodiment;
 FIG. 47 shows an exemplary operation performed by the player in a sixth embodiment according to the present invention;
 FIG. 48 a memory map of the main memory in the sixth embodiment;
 FIG. 49 is a part of a flowchart illustrating a flow of processing executed by the CPU in the sixth embodiment;
 FIG. 50 is a part of the flowchart illustrating the flow of processing executed by the CPU in the sixth embodiment;
 FIG. 51 is a part of the flowchart illustrating the flow of processing executed by the CPU in the sixth embodiment;
 FIG. 52 is a part of the flowchart illustrating the flow of processing executed by the CPU in the sixth embodiment;
 FIG. 53 is a flowchart illustrating trigger operation strength detection in the sixth embodiment in detail;
 FIG. 54 shows an exemplary method for changing a velocity vector in the sixth embodiment;
 FIG. 55 shows another exemplary method for changing a velocity vector in the sixth embodiment;
 FIG. 56 shows a correspondence between the operation performed by the player and the output from

the acceleration sensor in the sixth embodiment; and
 FIG. 57 shows another exemplary method for changing a velocity vector in the sixth embodiment.

5 DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0097] With reference to FIG. 1, a game system 1 according to one embodiment of the present invention will be described. FIG. 1 is an external view illustrating the game system 1. In the following example, the game system 1 includes an installation type game apparatus 3.

[0098] As shown in FIG. 1, the game system 1 includes a display (hereinafter, referred to as a "monitor") 2 such as a home-use TV receiver or the like, which includes speakers 2a, the installation type game apparatus (hereinafter, referred to simply as a "game apparatus") 3 connected to the monitor 2 via a connection cord, and a controller 7 for providing the game apparatus 3 with operation information. The game apparatus 3 is connected to a receiving unit 6 via a connection terminal. The receiving unit 6 receives transmission data which is wirelessly transmitted from the controller 7. The controller 7 and the game apparatus 3 are connected to each other via wireless communication. On the game apparatus 3, an optical disc 4 as an exemplary exchangeable information storage medium is detachably mounted. On a main top surface of the game apparatus 3, a power ON/OFF switch for the game apparatus 3, a reset switch for game processing, and an OPEN switch for opening a top lid of the game apparatus 3 are provided. When the player presses the OPEN switch, the lid is opened to allow the optical disc 4 to be mounted or dismounted.

[0099] Also on the game apparatus 3, an external memory card 5 is detachably mounted when necessary. The external memory card 5 includes a backup memory or the like for fixedly storing saved data or the like. The game apparatus 3 executes a game program or the like stored on the optical disc 4 and displays the result on the monitor 2 as a game image. The game apparatus 3 can also reproduce a state of a game played in the past using saved data stored on the external memory card 5 and display a game image on the monitor 2. The player using the game apparatus 3 can enjoy the game by operating the controller 7 while watching the game image displayed on the monitor 2.

[0100] The controller 7 wirelessly transmits transmission data to the game apparatus 3 connected to the receiving unit 6 from a communication section 75 (see FIG. 6) included in the controller 7 using, for example, the Bluetooth (registered trademark) technology. The controller 7 includes two control units (a core unit 70 and a sub unit 76) connected to each other via a bendable connection cable 79. The controller 7 is control means mainly for operating a player object appearing in a game space displayed on the monitor 2. The core unit 70 and the sub unit 76 each have operation sections such as a plurality of operation buttons, keys, a stick and the like. As described later, the core unit 70 includes an imaging infor-

mation calculation section 74 (see FIG. 6) for taking an image seen from the core unit 70. As an example of imaging target of the imaging information calculation section 74, two LED modules 8L and 8R are provided in the vicinity of the display screen of the monitor 2. The LED modules 8L and 8R output infrared light forward from the side of the monitor 2. In this example, the core unit 70 and the sub unit 76 are connected to each other via the bendable connection cable 79, but the sub unit 76 may include a wireless unit. In this case, the connection cable 79 is not necessary. When, for example, a Bluetooth (registered trademark) unit is mounted on the sub unit 76 as a wireless unit, operation data can be transmitted from the sub unit 76 to the core unit 70.

[0101] Next, with reference to FIG. 2, a structure of the game apparatus 3 will be described. FIG. 2 is a functional block diagram of the game apparatus 3.

[0102] As shown in FIG. 2, the game apparatus 3 includes a CPU (central processing unit) 30 (for example, a RISC CPU) for executing various programs. The CPU 30 executes a start program stored on a boot ROM (not shown) to initialize memories including a main memory 33, and then executes a game program stored on the optical disc 4 to perform game processing or the like in accordance with the game program. The CPU 30 is connected to a GPU (Graphics Processing Unit) 32, the main memory 33, a DSP (Digital Signal Processor) 34, and an ARAM (Audio RAM) 35 via a memory controller 31. The memory controller 31 is connected to a controller I/F (interface) 36, a video I/F 37, an external memory I/F 38, an audio I/F 39, and a disc I/F 41 via a predetermined bus. The controller I/F (interface) 36, the video I/F 37, the external memory I/F 38, the audio I/F 39 and the disc I/F 41 are respectively connected to the receiving unit 6, the monitor 2, the external memory card 5, the speaker 2a and a disc drive 40.

[0103] The GPU 32 performs image processing based on an instruction from the CPU 30. The GPU 32 includes, for example, a semiconductor chip for performing calculation processing necessary for displaying 3D graphics. The GPU 32 performs the image processing using a memory dedicated for image processing (not shown) or a part of the storage area of the main memory 33. The GPU 32 generates game image data or a movie to be displayed on the monitor 2 using such memories, and outputs the generated data or movie to the monitor 2 via the memory controller 31 and the video I/F 37 as necessary.

[0104] The main memory 33 is a storage area used by the CPU 30, and stores a game program or the like necessary for processing performed by the CPU 30 as necessary. For example, the main memory 33 stores a game program, various types of data or the like read from the optical disc 4 by the CPU 30. The game program, the various types of data or the like stored on the main memory 33 are executed by the CPU 30.

[0105] The DSP 34 processes sound data or the like generated by the CPU 30 during the execution of the

game program. The DSP 34 is connected to the ARAM 35 for storing the sound data or the like. The ARAM 35 is used when the DSP 34 performs predetermined processing (e.g., storage of the game program or sound data already read). The DSP 34 reads the sound data stored on the ARAM 35 and outputs the sound data to the speaker 2a included in the monitor 2 via the memory controller 31 and the audio I/F 39.

[0106] The memory controller 31 comprehensively controls data transfer, and is connected to the various I/Fs described above. The controller I/F 36 includes, for example, four controller I/Fs, each of which communicably connects an external device engageable with a connector thereof and the game apparatus 3 to each other. For example, the receiving unit 6 is engaged with such a connector and is connected to the game apparatus 3 via the controller I/F 36. The receiving unit 6 receives the transmission data from the controller 7 as described above, and outputs the transmission data to the CPU 30 via the controller I/F 36. The video I/F 37 is connected to the monitor 2. The external memory I/F 38 is connected to the external memory card 5, and is accessible to the backup memory or the like included in the external memory card 5. The audio I/F 39 is connected to the speaker 2a built in the monitor 2, such that the sound data read by the DSP 34 from the ARAM 35 or sound data directly output from the disc drive 40 is output through the speaker 2a. The disc I/F 41 is connected to the disc drive 40. The disc drive 40 reads data stored at a predetermined reading position of the optical disc 4 and outputs the data to a bus of the game apparatus 3 or the audio I/F 39.

[0107] With reference to FIG. 3, the controller 7 will be described. FIG. 3 is an isometric view showing an external appearance of the controller 7.

[0108] As shown in FIG. 3, the controller 7 includes the core unit 70 and the sub unit 76 which are connected to each other via the connection cable 79. The core unit 70 has a housing 71, which includes a plurality of operation sections 72. The sub unit 76 has a housing 77, which includes a plurality of operation sections 78. The core unit 70 and the sub unit 76 are connected to each other via the connection cable 79.

[0109] One of two ends of the connection cable 79 is provided with a connector 791 which is detachable with a connector 73 (see FIG. 4) of the core unit 70. The other end of the connection cable 79 is fixedly connected with the sub unit 76. The connector 791 of the connection cable 79 is engaged with the connector 73 provided on a bottom surface of the core unit 70, and thus the core unit 70 and the sub unit 76 are connected to each other via the connection cable 79.

[0110] The housing 71 of the core unit 70 is formed by plastic molding or the like. The housing 71 has a generally parallelepiped shape, and the overall size of the housing 71 is small enough to be held by one hand of an adult or even a child.

[0111] At a center of a front surface of the housing 71, a cross key 72a is provided as direction instruction

means. The cross key 72a is a cross-shaped four-direction push switch. The cross key 72a includes projecting operation portions corresponding to the four directions (top, bottom, right and left) and arranged at an interval of 90 degrees. The player selects one of the top, bottom, right and left directions by pressing one of the operation portions of the cross key 72a. Through an operation on the cross key 72a, the player can, for example, instruct a direction in which a player character or the like appearing in a virtual game world, or a cursor, is to move. Instead of the cross key 72a, a joystick capable of instructing any direction in 360 degrees may be provided.

[0112] Downward with respect to the cross key 72a on the front surface of the housing 71, a plurality of operation buttons 72b through 72g are provided. The operation buttons 72b through 72g are each an operation section for outputting a respective operation signal when the player presses a head thereof. For example, the operation buttons 72b through 72d are assigned functions of a first button, a second button, and an A button. The operation buttons 72e through 72g are assigned functions of a minus button, a home button and a plus button, for example. The operation buttons 72b through 72g are assigned various functions in accordance with the game program executed by the game apparatus 3.

[0113] Upward with respect to the cross key 72a on the front surface of the housing 71, an operation button 72h is provided. The operation button 72h is a power switch for remote-controlling the power of the game apparatus 3 to be on or off.

[0114] Downward with respect to the operation button 72c on the front surface of the housing 71, a plurality of LEDs 702 are provided. The controller 7 is assigned a controller type (number) so as to be distinguishable from the other controllers 7. For example, the LEDs 702 are used for informing the player of the controller type which is currently set to the controller 7 that he/she is using. Specifically, when the core unit 70 transmits transmission data to the receiving unit 6, one of the plurality of LEDs corresponding to the controller type is lit up.

[0115] On the front surface of the housing 71, sound holes for outputting a sound from a speaker 706 (see FIG. 4) described later are provided between the operation button 72b and the operation buttons 72e through 72g.

[0116] On a rear surface of the housing 71, an operation button (not shown) is provided at a position at which an index finger or middle finger of the player is located when the player holds the core unit 70. The operation button acts as, for example, a B button, and is used as, for example, a trigger switch in a shooting game.

[0117] On a top surface of the housing 71, an imaging element 743 (see FIG. 6) included in the imaging information calculation section 74 (see FIG. 6) is provided. The imaging information calculation section 74 is a system for analyzing image data which is taken by the core unit 70, and detecting the position of the center of gravity, the size and the like of an area having a high brightness

in the image data. The imaging information calculation section 74 has, for example, a maximum sampling period of about 200 frames/sec., and therefore can trace and analyze even a relatively fast motion of the core unit 70.

5 The structure of the imaging information calculation section 74 will be described later in detail. On a bottom surface of the housing 71, the connector 73 (FIG. 4) is provided. The connector 73 is, for example, a 32-pin edge connector, and is used for engaging and connecting the connector 791 of the connection cable 79.

10 **[0118]** Now, with reference to FIG. 4, an internal structure of the core unit 70 will be described. FIG. 4 is an isometric view of the core unit 70, illustrating a state where an upper housing (a part of the housing 71) of the core unit 70 is removed.

15 **[0119]** As shown in FIG. 4, a substrate 700 is fixed inside the housing 71. On a front main surface of the substrate 700, the operation buttons 72a through 72h, an acceleration sensor 701, the LEDs 702, the speaker 706, an antenna 754 and the like are provided. These elements are connected to a microcomputer 751 (see FIG. 6) or the like via lines (not shown) formed on the substrate 700 or the like. The acceleration sensor 701 is provided in a peripheral area of the substrate 700, not in a central area. Owing to such an arrangement, as the core unit 70 rotates around a longitudinal direction thereof as an axis, the acceleration sensor 701 detects an acceleration including a centrifugal force component in addition to a component of direction change of gravitational acceleration. As a result, the rotation of the core unit 70 can be determined at a high sensitivity based on the detected acceleration data through a predetermined calculation.

20 **[0120]** On a rear main surface of the substrate 700, the image information calculation section 74 and the connector 73 are provided.

25 **[0121]** With reference to FIG. 3 and FIG. 5, the sub unit 76 will be described. FIG. 5 is an isometric view of the sub unit 76, illustrating a state where an upper housing (a part of the housing 77) of the sub unit 76 is removed.

30 **[0122]** As shown in FIG. 3, the housing 77 of the sub unit 76 is formed by plastic molding or the like. The overall size of the housing 77 is small enough to be held by one hand of an adult or even a child.

35 **[0123]** On a front surface of the housing 77, a stick 78a is provided as direction instruction means. The stick 78a is an inclinable operation section protruding from the front surface of the housing 77. When being inclined, the stick 78a outputs a signal in accordance with the inclination direction. The player can instruct, for example, any direction or position by directing the tip of the stick 78a in any direction in 360 degrees. Thus, the player can instruct a direction in which a player character or the like appearing in the virtual game world, or a cursor, is to move. Instead of the stick 78a, a cross key may be provided.

40 **[0124]** On a top surface of the sub unit 76, a plurality of operation buttons 78d and 78e (see FIG. 5) are provided. The operation buttons 78d and 78e are each an

operation section for outputting a respective operation signal when the player presses a head thereof. For example, the operation buttons 78d and 78e are assigned functions of an X button and a Y button. The operation buttons 78d and 78e are assigned various functions in accordance with the game program executed by the game apparatus 3.

[0125] As shown in FIG. 5, a substrate is fixed inside the housing 77. On the front main surface of the substrate, the stick 78a, an acceleration sensor 761 and the like are provided. These elements are connected to the connection cable 79 via lines (not shown) formed on the substrate or the like.

[0126] With reference to FIG. 6, an internal structure of the controller 7 will be described. FIG. 6 is a block diagram showing a structure of the controller 7.

[0127] As shown in FIG. 6, the core unit 70 includes the communication section 75 therein in addition to the operation sections 72, the imaging information calculation section 74, the acceleration sensor 701, the speaker 706, the sound IC 707 and the amplifier 708 described above. The sub unit 76 includes the operation sections 78 and the acceleration sensor 761 described above, and is connected to the microcomputer 751 via the connection cable 79, the connector 791 and the connector 73.

[0128] The imaging information calculation section 74 includes an infrared filter 741, a lens 742, the imaging element 743 and an image processing circuit 744. The infrared filter 741 allows only infrared light to pass there-through, among light incident on the top surface of the core unit 70. The lens 742 collects the infrared light which has passed through the infrared filter 741 and outputs the infrared light to the imaging element 743. The imaging element 743 is a solid-state imaging device such as, for example, a CMOS sensor or a CCD, and takes an image of the infrared light collected by the lens 742. Accordingly, the imaging element 743 takes an image of only the infrared light which has passed through the infrared filter 741 for generating image data. The image data generated by the imaging element 743 is processed by the image processing circuit 744. Specifically, the image processing circuit 744 processes the image data obtained from the imaging element 743, senses an area thereof having a high brightness, and outputs the processing result data representing the detected position coordinate and size of the area to the communication section 75. The imaging information calculation section 74 is fixed to the housing 71 of the core unit 70. The imaging direction of the imaging information calculation section 74 can be changed by changing the direction of the housing 71. The connection cable 79 which connects the housing 71 and the sub unit 76 is bendable. Therefore, even when the direction or position of the sub unit 76 is changed, the imaging direction of the imaging information calculation section 74 is not changed. Based on the processing result data which is output from the imaging information calculation section 74, a signal in accordance with the position or

motion of the core unit 70 can be obtained.

[0129] In this example, the core unit 70 includes the acceleration sensor 701. The acceleration sensor 701 included in the core unit 70 is preferably a three-axial (X, Y and Z axes in FIG. 4) acceleration sensor. The acceleration sensor 761 included in the sub unit 76 is preferably a three-axial (X, Y and Z axes in FIG. 5) acceleration sensor. The three-axial acceleration sensors 701 and 761 each detect a linear acceleration in each of three directions, i.e., an X direction (left side surface toward right side surface), a Y direction (top surface toward bottom surface), and a Z direction (front surface toward rear surface). In other embodiments, two-axial acceleration detection means for detecting a linear acceleration in each of only the X direction and the Y direction (or directions along another pair of axes) may be used depending on the type of control signals used for game processing. Alternatively, one-axial acceleration detection means for detecting a linear acceleration in only the X direction (or other directions) may be used. For example, such three-axial, two-axial or one-axial acceleration sensors 701 and 761 may be available from Analog Devices, Inc. or STMicroelectronics N.V. The acceleration sensors 701 and 761 may be of a static capacitance coupling system based on the technology of MEMS (Micro Electro Mechanical Systems) provided by silicon precision processing. Alternatively, the three-axial, two-axial or one-axial acceleration sensors 701 and 761 may be based on an existing acceleration detection technology (e.g., piezoelectric system or piezoelectric resistance system) or any other appropriate technology developed in the future.

[0130] As apparent to those skilled in the art, the acceleration detection means used for the acceleration sensors 701 and 761 can detect only an acceleration along a straight line corresponding to each of the axes of the acceleration sensors 701 and 761 (linear acceleration sensors). Namely, a direct output from each of the acceleration sensors 701 and 761 is a signal indicating the linear acceleration (static or dynamic) along each of the axes thereof. Hence, the acceleration sensors 701 and 761 cannot directly detect a physical property such as, for example, a motion along a nonlinear path (e.g., an arc path), rotation, revolution, angular displacement, inclination, position or posture.

[0131] Nonetheless, those skilled in the art would easily understand from the description of this specification that further information on the core unit 70 or the sub unit 76 can be estimated or calculated by executing additional processing on an acceleration signal which is output from the acceleration sensor 701 or 761. For example, when a static acceleration (gravitational acceleration) is detected, an inclination of the object (core unit 70 or the sub unit 76) with respect to the gravitational vector can be estimated by performing calculations based on the inclination angle and the detected acceleration, using the output from the acceleration sensor 701 or 761. By combining the acceleration sensor 701 or 761 with the microcomputer 751 (or another processor) in this manner, the

inclination, posture or position of the core unit 70 or the sub unit 76 can be determined. Similarly, when the core unit 70 including the acceleration sensor 701 or the sub unit 76 including the acceleration sensor 761 is dynamically accelerated by a hand of the player or the like as described herein, various motions and/or positions of the core unit 70 or the sub unit 76 can be calculated or estimated by processing an acceleration signal generated by the acceleration sensor 701 or 761. In other embodiments, the acceleration sensor 701 or 761 may include a built-in signal processing device, or another type of dedicated processing device, for executing desired processing on an acceleration signal which is output from the built-in acceleration detection means, before the signal is output to the microcomputer 751. For example, when the acceleration sensor 701 or 761 is for detecting a static acceleration (e.g., a gravitational acceleration), the built-in or dedicated processing device may convert the detected acceleration signal to a corresponding inclination angle. The data indicating the acceleration detected by the acceleration sensor 701 or 761 is output to the communication section 75.

[0132] The communication section 75 includes the microcomputer 751, a memory 752, a wireless module 753, and the antenna 754. The microcomputer 751 controls the wireless module 753 for wirelessly transmitting the transmission data, while using the memory 752 as a storage area during processing. The microcomputer 751 also controls the operation of the sound IC 707 in accordance with the data transmitted from the game apparatus 3 to the wireless module 753 via the antenna 754. The sound IC 707 processes sound data or the like transmitted from the game apparatus 3 via the communication section 75.

[0133] Data from the core unit 70 including an operation signal from the operation section 72 (core key data), acceleration signals from the acceleration sensor 701 (core acceleration data), and the processing result data from the imaging information calculation section 74 are output to the microcomputer 751. Data transmitted from the sub unit 76 via the connection cable 79, including an operation signal from the operation section 78 (sub key data) and acceleration signals from the acceleration sensor 761 (sub acceleration data) are output to the microcomputer 751. The microcomputer 751 temporarily stores the input data (core key data, sub key data, core acceleration data, sub acceleration data, and the processing result data) in the memory 752 as transmission data which is to be transmitted to the receiving unit 6. The wireless transmission from the communication section 75 to the receiving unit 6 is performed at a predetermined time interval. Since game processing is generally performed at a cycle of 1/60 sec., the data collection and the wireless transmission need to be performed at a cycle of a shorter time period. Specifically, the game processing unit is 16.7 ms (1/60 sec.), and the transmission interval of the communication section 75 structured using the Bluetooth (registered trademark) technology is, for example, 5 ms. At the transmission timing to the

receiving unit 6, the microcomputer 751 outputs the transmission data stored on the memory 752 as a series of operation information to the wireless module 753. Based on the Bluetooth (registered trademark) technology or the like, the wireless module 753 converts a carrier wave of a predetermined frequency with the operation information and radiates the resultant very weak radio signal from the antenna 754. Namely, the core key data from the operation sections 72 in the core unit 70, the sub key data from the operation sections 78 in the sub unit 76, the core acceleration data from the acceleration sensor 701 in the core unit 70, the sub acceleration data from the acceleration sensor 761 in the sub unit 76, and the processing result data from the imaging information calculation section 74 are converted into a very weak radio signal by the wireless module 753 and radiated from the core unit 70. The receiving unit 6 of the game apparatus 3 receives the very weak radio signal, and the game apparatus 3 demodulates or decodes the very weak radio signal to obtain the series of operation information (the core key data, the sub key data, the core acceleration data, the sub acceleration data, and the processing result data). Based on the obtained operation information and the game program, the CPU 30 of the game apparatus 3 performs the game processing. In the case where the communication section 75 is structured using the Bluetooth (registered trademark) technology or the like, the communication section 75 can have a function of receiving transmission data which is wirelessly transmitted from other devices.

[0134] As shown in FIG. 7, in order to play the game using the controller 7 of the game system 1, the player holds the core unit 70 with one hand (for example, right hand) and holds the sub unit 76 with the other hand (for example, left hand).

[0135] As described above, the inclination, posture, position or motion (movement or swing) of the core unit 70 can be determined using the output from the acceleration sensor 701 of the core unit 70 (core acceleration data). More specifically, when the player moves his/her hand holding the core unit 70, for example, up, down, right or left, the core unit 70 acts as operation input means for making an input in accordance with the motion or direction of the player's hand. Also as described above, the inclination, posture, position or motion (movement or swing) of the sub unit 76 can be determined using the output from the acceleration sensor 761 of the sub unit 76 (sub acceleration data). More specifically, when the player moves his/her hand holding the sub unit 76, for example, up, down, right or left, the sub unit 76 acts as operation input means for making an input in accordance with the motion or direction of the player's hand. Owing to this arrangement, the player holding different units with his/her right hand and left hand can make inputs by moving both of his/her hands. The core unit 70 and the sub unit 76, which are obtained by dividing a conventional game controller, allow the player to move both of his/her hands freely and to make new operations which are not

possible with the conventional game controller. Since the degree of freedom of operations which can be made on the controller 7 is also significantly improved, realistic game operations can be realized.

[0136] In the above example, the controller 7 and the game apparatus 3 are connected with each other by wireless communication. Alternatively, the controller 7 and the game apparatus 3 may be electrically connected with each other via a cable. In this case, a cable connected to the core unit 70 is connected to a connection terminal of the game apparatus 3.

[0137] In the above example, the connection section 75 is provided in the core unit 70, but not in the sub unit 76 included in the controller 7. Alternatively, the sub unit 76 may include a communication section for transmitting transmission data to the receiving unit 6 wirelessly or in a wired manner. Still alternatively, the core unit 70 and the sub unit 76 may both include a communication section. For example, the communication section included in each of the core unit 70 and the sub unit 76 may wirelessly transmit transmission data to the receiving unit 6. The communication section in the sub unit 76 may wirelessly transmit transmission data to the core unit 70, and upon receiving the transmission data, the communication section 75 in the core unit 70 may wirelessly transmit transmission data of the core unit 70 and the transmission data from the sub unit 76 to the receiving unit 6. In these cases, the connection cable 79 is not necessary for electrically connecting the core unit 70 and the sub unit 76 with each other.

[0138] In the above example, the receiving unit 6 is connected to the connection terminal of the game apparatus 3 as receiving means for receiving transmission data wirelessly transmitted from the controller 7. The receiving means may be a receiving module provided in the game apparatus 3. In this case, the transmission data received by the receiving module is output to the CPU 30 via a predetermined bus.

[0139] Hereinafter, various embodiments of the present invention which are realized by the game system 1 will be described. For easier understanding, the core unit 70 will be referred to as a "first unit", the sub unit 76 will be referred to as a "second unit", the acceleration sensor 701 included in the core unit 70 will be referred to as a "first acceleration sensor", and the acceleration sensor 761 included in the sub unit 76 will be referred to as a "second acceleration sensor".

(First Embodiment)

[0140] FIG. 8 shows an exemplary image displayed in a first embodiment according to the present invention. On the screen of the monitor 2, a three-dimensional virtual game world including a character operated by the player (game object) is displayed. In this embodiment, the character is riding on a battle tank. The player can control the motion of the character by inclining the first unit or the second unit (i.e., rotating the first unit or the

second unit around a horizontal axis thereof). The following description will be given with the premise that a positive X axis direction of the acceleration sensor is a horizontal direction and the rightward direction with respect to the player, a positive Y axis direction is the vertical downward direction, and a positive Z axis direction is a horizontal direction and the forward direction with respect to the player. The relationship between the axial directions regarding the acceleration sensor and the directions in the real world is not limited to such a premise.

[0141] FIG. 9 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the first embodiment. When the first unit is inclined farther (FIG. 16) from the player than the second unit, the character curves leftward; whereas when the second unit is inclined farther from the player than the first unit, the character curves rightward. When the first unit and the second unit are inclined farther from the player on average (i.e., the average of the inclinations of the first unit and the second unit is farther from the player) with respect to the reference posture (for example, the posture vertical to the ground), the character advances; whereas when the first unit and the second unit are inclined closer (see FIG. 16) to the player on average with respect to the reference posture, the character retracts. In FIG. 9, the direction from the eye of the observer of the drawing toward the sheet of the paper is the advancing direction (forward direction) of the character, and the opposite direction is the retracting direction (rearward direction) of the character.

[0142] FIG. 10 shows an exemplary memory map of the main memory 33 in the first embodiment. The main memory 33 stores a game program 100, game image data 102, character control data 104, a first inclination value 106, a second inclination value 108, a first reference value 110, and a second reference value 112. The game program and the game image data 102 are stored on the optical disc 4, and are copied onto the main memory 33 for use when necessary. The first reference value 110 and the second reference value 112 may also be stored on the optical disc 4, and may be copied onto the main memory 33 for use when necessary.

[0143] The game image data 102 is data for generating a game image (polygon data, texture data, etc.) and includes data for generating a character image and data for generating a background image.

[0144] The character control data 104 is data for controlling a character, and includes current position data representing the current position of the character in the game world (three-dimensional virtual space), velocity data representing the magnitude of the moving speed of the character, and a directional vector representing the advancing direction of the character. The current position data is represented by a three-dimensional coordinate value, the velocity data is represented by a scalar value, and the directional vector is represented by a three-dimensional unit vector. Instead of the velocity data, a velocity vector may be used.

[0145] The first inclination value 106 represents an inclination of the first unit detected based on an output value from the first acceleration sensor. The second inclination value 108 represents an inclination of the second unit detected based on an output value from the second acceleration sensor. The first reference value 110 is a reference value for the inclination of the first unit. The second reference value 112 is a reference value for the inclination of the second unit.

[0146] With reference to the flowcharts in FIG. 11 through FIG. 14, a flow of processing executed by the CPU 30 based on the game program 100 will be described.

[0147] Referring to FIG. 11, when the execution of the game program 100 is started, the CPU 30 first executes neutral position setting processing in step S100. The neutral position setting processing is for determining the reference value for the inclination of the first unit (first reference value 110) and the reference value for the inclination of the second unit (second reference value 112). Hereinafter, with reference to FIG. 12, the neutral position setting processing will be described in detail.

[0148] Referring to FIG. 12, in step S134, the CPU 30 determines whether or not the player has pressed a setting button (a button for allowing the player to set the neutral position) based on the operation information transmitted from the controller 7. The setting button may be provided only in the first unit, only in the second unit or both in the first unit and the second unit. The neutral position may be set by the player uttering a voice to a microphone instead of pressing the setting button. In this embodiment, the setting button is provided in the first unit. When it is detected that the player has pressed the setting button, the processing is advanced to step S136. When it is not detected that the player has pressed the setting button, the processing in step S134 is repeated (i.e., the CPU 30 waits until the player presses the setting button).

[0149] In step S136, the CPU 30 waits for a certain time period (for example, 10 frames). The reason for this is that immediately after the player leaves his/her fingers from the setting button, the operation unit including the setting button (in this embodiment, the first unit) may possibly swing, in which case the first reference value is not correctly set.

[0150] In step S138, an output value (output vector) from the first acceleration sensor is obtained. In this embodiment, the output value in the X axis direction from the first acceleration sensor is Ax1, the output value in the Y axis direction from the first acceleration sensor is Ay1, and the output value in the Z axis direction from the first acceleration sensor is Az1. The output value may be set to be used as follows. Output values from the acceleration sensor for a predetermined time period (e.g., about 3 seconds) are always stored. When the player presses the setting button, the output value which was output a predetermined time period before may be used, or an average of the output values for a certain time period

before or after the player presses the setting button may be used (this is also applicable to the second acceleration sensor).

[0151] In step S140, it is determined whether or not the magnitude of the output vector (Ax1, Ay1, Az1) from the first acceleration sensor obtained in step S138 (i.e., $\sqrt{(Ax1^2 + Ay1^2 + Az1^2)}$) is within the range of 0.8 to 1.2, namely, whether or not the first unit is in a still state. The output vector from each of the first acceleration sensor and the second acceleration sensor is set to have a magnitude of 1.0 in a still state (i.e., in a state of being influenced only by the gravitational acceleration). Therefore, when the magnitude of the output vector from the first acceleration sensor is 1.0 or closer thereto, the first unit can be determined to be substantially still. By contrast, when the magnitude of the output vector from the first acceleration sensor is far from 1.0, the first unit can be determined to be moving. When the magnitude of the output vector from the first acceleration sensor is within the range of 0.8 to 1.2, the processing is advanced to step S142. When the magnitude of the output vector from the first acceleration sensor is not within the range of 0.8 to 1.2, the processing is returned to step S134. The reason is that when the first unit is moving, the first reference value cannot be correctly set. The range of 0.8 to 1.2 is exemplary. The determination in step S140 is whether or not the magnitude of the output vector is substantially close to 1.0. In this embodiment, the X direction component of the acceleration sensor (Ax) is not used. Therefore, the player basically plays without inclining the controller 7 in the X direction. Therefore, when the X direction component of the output from the first acceleration sensor obtained in step S138 is larger than a certain value, the processing may be returned to step S134 for the reason that the neutral position is not appropriate (this is also applicable to the second acceleration sensor).

[0152] In step S142, an output value (output vector) from the second acceleration sensor is obtained. In this embodiment, the output value in the X axis direction from the second acceleration sensor is Ax2, the output value in the Y axis direction from the second acceleration sensor is Ay2, and the output value in the Z axis direction from the second acceleration sensor is Az2.

[0153] In step S144, it is determined whether or not the magnitude of the output vector (Ax2, Ay2, Az2) from the second acceleration sensor obtained in step S142 (i.e., $\sqrt{(Ax2^2 + Ay2^2 + Az2^2)}$) is within the range of 0.8 to 1.2, i.e., whether or not the second unit is in a still state. When the magnitude of the output vector from the second acceleration sensor is within the range of 0.8 to 1.2, the processing is advanced to step S146. When the magnitude of the output vector from the second acceleration sensor is not within the range of 0.8 to 1.2, the processing is returned to step S134. The reason is that when the second unit is moving, the second reference value cannot be correctly set.

[0154] In step S146, $\arctan(Az1/Ay1)$, which represents the inclination of the first unit around the X axis

(horizontal axis) (such an inclination is represented by angle θ in FIG. 16), is calculated, and the calculated value is set as the first reference value 110. Similarly, $\arctan(Az2/Ay2)$, which represents the inclination of the second unit around the X axis (such an inclination is represented by angle θ in FIG. 16), is calculated, and the calculated value is set as the second reference value 112. ($Ay1$, $Az1$) may be set as a reference value.

[0155] In this embodiment, the first reference value 110 is set only based on the output value from the first acceleration sensor obtained in step S138. Alternatively, output values from the first acceleration sensor may be obtained at a plurality of different times, and the first reference value 110 may be set based on an average thereof. Owing to such an arrangement, even if the first unit is swinging when the neutral position is set, the influence of such a swing can be suppressed. This is also applicable to the second reference value 112.

[0156] In step S148, it is determined whether or not the difference between the first reference value 110 and the second reference value 112 is within a predetermined value. When the difference between the first reference value 110 and the second reference value 112 is within the predetermined value, the neutral position setting processing is terminated, and the processing is returned to step S102 in FIG. 11. When the difference between the first reference value 110 and the second reference value 112 exceeds the predetermined value, the processing is returned to step S134 to re-set the first reference value 110 and the second reference value 112.

[0157] The reason why the first reference value 110 and the second reference value 112 are re-set when the difference therebetween exceeds the predetermined value in step S148 is that when the first reference value 110 and the second reference value 112 having such values are used for the game, a high operability is not expected to be obtained. More specifically, in this embodiment, as shown in FIG. 9, when the first unit is inclined farther from the player than the second unit, the character curves leftward; whereas when the second unit is inclined farther from the player than the first unit, the character curves rightward. When the first reference value 110 and the second reference value 112 are largely different from each other, even when the first unit and the second unit are inclined parallel to each other, the character may curve leftward or rightward. This makes the player feel unnatural.

[0158] In the case of a game in which a large difference between the first reference value 110 and the second reference value 112 does not present any serious problem, the determination in step S148 may be omitted.

[0159] In this embodiment, when the player presses the setting button provided in the first unit, the first reference value 110 and the second reference value 112 are both set. The present invention is not limited to this. For example, the following arrangement is possible in the case where the first unit and the second unit each have a setting button. When the player presses the setting

button provided in the first unit, the first reference value 110 is set; and then when the player presses the setting button provided in the second unit, the second reference value 112 is set. In this case, however, the first reference value 110 and the second reference value 112 are likely to be largely different from each other. Therefore, it is preferable that the first reference value 110 and the second reference value 112 are set substantially at the same time as in this embodiment.

[0160] In this embodiment, the first reference value 110 and the second reference value 112 are separately set. In order to avoid the unnaturalness described above, a common value may be set as the first reference value 110 and the second reference value 112. For example, an average of $\arctan(Az1/Ay1)$ and $\arctan(Az2/Ay2)$ may be commonly set as the first reference value 110 and the second reference value 112 in step S146. Alternatively, either $\arctan(Az1/Ay1)$ or $\arctan(Az2/Ay2)$ may be calculated, and such a calculation result may be commonly set as the first reference value 110 and the second reference value 112. In this case, in order to avoid the influence of the swing of the operation unit when the player presses the setting button, it is preferable to commonly set the first reference value 110 and the second reference value 112 based on the output value from the acceleration sensor in the operation unit which does not include the setting button pressed by the player.

[0161] Returning to FIG. 11, when the neutral position setting processing is terminated, in step S102, the CPU 30 initializes various data used for the game processing (character control data 104, inclination value 106, etc.), and generates and displays a game image including the character on the screen of the monitor 2.

[0162] In step S104, an inclination of the first unit is detected. Hereinafter, the detection of the inclination will be described in detail with reference to FIG. 14.

[0163] Referring to FIG. 14, in step S154, an output value (output vector) from the acceleration sensor (here, the first acceleration sensor) is obtained. In this embodiment, the output value in the X direction component from the acceleration sensor is $Ax1$, the output value in the Y direction component from the acceleration sensor is $Ay1$, and the output value in the Z direction component from the acceleration sensor is $Az1$.

[0164] In step S156, it is determined whether or not the magnitude of the output vector ($Ax1$, $Ay1$, $Az1$) from the first acceleration sensor obtained in step S154 (i.e., $\sqrt{Ax1^2 + Ay1^2 + Az1^2}$) is within the range of 0.8 to 1.2, namely, whether or not the first unit is in a still state. When the magnitude of the output vector from the first acceleration sensor is within the range of 0.8 to 1.2, the processing is advanced to step S158. When the magnitude of the output vector from the first acceleration sensor is not within the range of 0.8 to 1.2, the processing is advanced to step S160.

[0165] In step S158, $\arctan(Az1/Ay1)$, which represents the inclination of the first unit around the X axis (such an inclination is represented by angle θ in FIG. 16),

is calculated, and the calculated value is returned as a return value for the detection of the inclination. The return value is stored on the main memory 33 as the first return value 106. Then, the processing is advanced to step S106 in FIG. 11.

[0166] In step S160, an error is returned as the detection result of the inclination for the reason that when the first unit is moving, the inclination of the first unit cannot be correctly detected. Then, the detection of the inclination is terminated. The processing is advanced to step S106 in FIG. 11.

[0167] In step S106, it is determined whether or not the detection result of the inclination in step S104 is an error. When the result is an error, the processing is advanced to step S150 in FIG. 13. When the result is not an error, the processing is advanced to step S108.

[0168] In step S108, the detection of the inclination is performed regarding the second unit similarly to step S104. Specifically, when the magnitude of the output vector from the second acceleration sensor (A_{x2} , A_{y2} , A_{z2}) is within the range of 0.8 to 1.2, the value of $\arctan(A_{z2}/A_{y2})$, which represents the inclination of the second unit around the X axis (such an inclination is represented by angle θ in FIG. 16), is stored on the main memory 33 as the second inclination value 108.

[0169] In step S110, it is determined whether or not the detection result of the inclination in step S108 is an error. When the result is an error, the processing is advanced to step S150 in FIG. 13. When the result is not an error, the processing is advanced to step S112.

[0170] In step S112, the first inclination value 106 is corrected based on the first reference value 110. Specifically, the difference between the first inclination value 106 and the first reference value 110 is calculated, and the calculation result is stored on the main memory 33 to update the first inclination value 106.

[0171] In step S114, the second inclination value 108 is corrected based on the second reference value 112. Specifically, the difference between the second inclination value 108 and the second reference value 112 is calculated, and the calculation result is stored on the main memory 33 to update the second inclination value 108.

[0172] In step S116, it is determined whether or not the value obtained by subtracting the second inclination value 108 from the first inclination value 106 is larger than S1 (positive threshold value). When the value obtained by subtracting the second inclination value 108 from the first inclination value 106 is larger than S1 (i.e., when the first unit is inclined farther from the player than the second unit), the processing is advanced to step S118. Otherwise, the processing is advanced to step S120.

[0173] In step S118, the directional vector is changed so as to cause the character to curve leftward. The directional vector can be changed by various methods. In this embodiment, for example, the method shown in FIG. 15 is used. A leftward curve vector, which is perpendicular both to the normal vector to the ground and to the

current directional vector at the current position of the character and has a predetermined magnitude, is obtained. The leftward curve vector and the current directional vector are synthesized to obtain a synthesized vector. A unit vector having the same direction as the synthesized vector is determined as a new directional vector.

[0174] In step S120, it is determined whether or not the value obtained by subtracting the second inclination value 108 from the first inclination value 106 is smaller than -S1. When the value obtained by subtracting the second inclination value 108 from the first inclination value 106 is smaller than -S1 (i.e., when the second unit is inclined farther from the player than the first unit), the processing is advanced to step S122. Otherwise, the processing is advanced to step S124.

[0175] In step S122, the directional vector is changed so as to cause the character to curve rightward.

[0176] In step S124, it is determined whether or not the average value of the first inclination value 106 and the second inclination value 108 is larger than S2 (positive threshold value). When the average value of the first inclination value 106 and the second inclination value 108 is larger than S2 (i.e., when the first unit and the second unit are inclined farther from the player on average with respect to the reference posture), the processing is advanced to step S126. Otherwise, the processing is advanced to step S128.

[0177] In step S126, positive velocity data is set in accordance with the average value of the first inclination value 106 and the second inclination value 108. For example, positive velocity data having an absolute value in proportion to the average value is set. Then, the processing is advanced to step S150 in FIG. 13.

[0178] In step S128, it is determined whether or not the average value of the first inclination value 106 and the second inclination value 108 is smaller than -S2. When the average value of the first inclination value 106 and the second inclination value 108 is smaller than -S2 (i.e., when the first unit and the second unit are inclined closer to the player on average with respect to the reference posture), the processing is advanced to step S130. Otherwise, the processing is advanced to step S132.

[0179] In step S130, negative velocity data is set in accordance with the average value of the first inclination value 106 and the second inclination value 108. For example, negative velocity data having an absolute value in proportion to the average value is set. Then, the processing is advanced to step S150 in FIG. 13.

[0180] In step S132, the velocity data is set to 0, and the processing is advanced to step S150 in FIG. 13.

[0181] Referring to FIG. 13, in step S150, the current position data is updated based on the velocity data and the directional vector. As a result, the character in the game world moves by the distance represented by the velocity data in the direction represented by the directional vector.

[0182] In step S152, the game image displayed on the monitor 2 is updated based on the current position data,

and the processing is returned to step S104 in FIG. 11. The above-described processing is repeated, so that the game image is changed when necessary in accordance with the operation performed by the player.

[0183] As described above, according to this embodiment, the player can freely move both of his/her hands. Owing to a high degree of freedom of motion realized by such an arrangement, a dynamic play is made possible. In addition, the character can be controlled by the inclination difference between two operation units. Therefore, the player can play intuitively and thus obtain a high operability.

[0184] In this embodiment, three-axial acceleration sensors are used. Even when one-axial acceleration sensors are used, the inclinations of the operation units can be detected (for example, the inclinations of the operation units can be detected by referring to only the output value in the Z axis direction in FIG. 16). Thus, substantially the same effects as those of this embodiment are provided.

[0185] In this embodiment, the inclination difference between the first unit and the second unit, and the average inclination value of the first unit and the second unit, are used to control the motion of the character. It is possible to use only the difference without using the average value. Hereinafter, a modification to the first embodiment in which only the inclination difference between the first unit and the second unit will be described.

[0186] FIG. 17 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the modification to the first embodiment. When the first unit is inclined farther from the player than the second unit, the character curves leftward; whereas when the second unit is inclined farther from the player than the first unit, the character curves rightward. When an acceleration button is pressed, the character's motion is accelerated in the advancing direction at that time.

[0187] With reference to FIG. 18, a flow of processing executed by the CPU 30 in the modification to the first embodiment will be described. In FIG. 18, substantially the same processing as that in FIG. 11 will bear the same reference numerals and the descriptions thereof will be omitted.

[0188] Before step S162, the character curves leftward or rightward in accordance with the inclination difference between the first unit and the second unit.

[0189] In step S162, the CPU 30 determines whether or not the player has pressed the acceleration button. The acceleration button may be provided only in the first unit, only in the second unit or both in the first unit and the second unit. When the player has pressed the acceleration button, the processing is advanced to step S164. When the player has not pressed the acceleration button, the processing is advanced to step S166.

[0190] In step S164, the velocity data is increased by a predetermined amount.

[0191] In step S166, the velocity data is decreased by a predetermined amount.

[0192] After step S164 or S166, substantially the same processing as that in FIG. 13 is executed.

[0193] As described above, according to this modification, the game can be played only using the inclination difference between the first unit and the second unit, without using any absolute value of the inclination of the first unit or the second unit. Therefore, the player can play the game with no problem even while lying on the floor. Thus, the degree of freedom of posture during the game is increased.

(Second Embodiment)

[0194] FIG. 19 shows an exemplary image displayed in a second embodiment according to the present invention. On the screen of the monitor 2, a three-dimensional virtual game world including a character operated by the player (game object) is displayed. In this embodiment, the character is riding on a sleigh, which is pulled by five dinosaurs (dinosaurs A through E). The player can control the motion of the character by swinging the first unit or the second unit. The following description will be given with the premise that the player holds the first unit with his/her left hand and holds the second unit with his/her right hand (the player may hold the first unit with his/her right hand and hold the second unit with his/her left hand).

[0195] FIG. 20 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the second embodiment. When only the first unit is swung, the character curves rightward (the advancing direction is changed rightward); whereas when only the second unit is swung, the character curves leftward (the advancing direction is changed leftward). When the first unit and the second unit are swung simultaneously, the character's motion is accelerated in the advancing direction at that time.

[0196] The game may be set such that when only the first unit is swung, the character advances leftward; when only the second unit is swung, the character advances rightward; and when the first unit and the second unit are swung at the same time, the character advances forward.

[0197] FIG. 21 shows an exemplary memory map of the main memory 33 in the second embodiment. The main memory 33 stores a game program 200, game image data 202, character control data 204, a first swinging strength value 206, a second swinging strength value 208, a first input flag 210, a second input flag 212, a simultaneous input flag 214, a first timer 216, a second timer 218, and a simultaneous input timer 220.

[0198] The game image data 202 and the character control data 204 are substantially the same as those in the first embodiment and will not be described here.

[0199] The first swinging strength value 206 represents a swinging strength of the first unit which is detected based on the output value from the first acceleration sensor. The second swinging strength value 208 represents a swinging strength of the second unit which is detected based on the output value from the second acceleration

sensor.

[0200] The first flag 210 is a flag representing that the first unit has been swung, and is turned on when the first unit is detected to have been swung. The second flag 212 is a flag representing that the second unit has been swung, and is turned on when the second unit is detected to have been swung. The simultaneous input flag 214 is a flag representing that the first flag and the second unit have been swung simultaneously, and is turned on when the first flag and the second unit are detected to have been swung simultaneously.

[0201] The first timer 216 is a value representing a time period from when the first unit is detected to have been swung (the number of frames). The second timer 218 is a value representing a time period from when the second unit is detected to have been swung (the number of frames). The simultaneous input timer 220 is a value representing a time period from when the first unit and the second unit are detected to have been swung simultaneously (the number of frames).

[0202] With reference to the flowcharts in FIG. 22 through FIG. 25, a flow of processing executed by the CPU 30 based on the game program 200 will be described. The processing in steps S202 through S266 is repeated frame by frame.

[0203] Referring to FIG. 22, when the execution of the game program 200 is started, in step S200, the CPU 30 first initializes various data used for the game processing (character control data 204, first swinging strength value 206, first input flag 210, first timer 216, etc.), and generates and displays a game image including the character on the screen of the monitor 2.

[0204] In step S202, it is determined whether or not the simultaneous input flag 214 is on. When the simultaneous input flag 214 is on, the processing is advanced to step S204. When the simultaneous input flag 214 is not on, the processing is advanced to step S210.

[0205] In step S204, "1" is added to the simultaneous input timer 220.

[0206] In step S206, it is determined whether or not the simultaneous input timer 220 is equal to or greater than 20. When the simultaneous input timer 220 is equal to or greater than 20, the processing is advanced to step S208. Otherwise, the processing is advanced to step S262 in FIG 24.

[0207] In step S208, the simultaneous input flag 214 is turned off, and the processing is advanced to step S262 in FIG 24.

[0208] As described above, after the simultaneous input flag 214 is turned on (i.e., after the first unit and the second unit are detected to have been swung simultaneously) until a 20 frame time period passes, neither the detection of the swinging strength of the first unit (step S236 described later) nor the detection of the swinging strength of the second unit (step S250 described later) is performed. Namely, neither the swing operation on the first unit nor the swing operation on the second unit by the player is accepted. Owing to such an arrangement,

one swing operation performed by the player is prevented from being detected continuously over a period of a plurality of frames.

[0209] In step S210, it is determined whether or not the first input flag 210 is on. When the first input flag 210 is on, the processing is advanced to step S212. When the first input flag 210 is not on, the processing is advanced to step S222.

[0210] In step S212, "1" is added to the first timer 216.

[0211] In step S214, it is determined whether or not the first timer 216 is 5. When the first timer 216 is 5 (i.e., when a 5 frame time period has passed after the first unit is detected to have been swung, without any swing of the second unit being detected; namely, when only the first unit was swung), the processing is advanced to step S216. When the first timer 216 is not 5, the processing is advanced to step S218.

[0212] In step S216, the directional vector is changed so as to cause the character to curve rightward. The directional vector can be changed in substantially the same manner as in the first embodiment.

[0213] In step S218, it is determined whether or not the first timer 216 is larger than 10. When the first timer 216 is larger than 10, the processing is advanced to step S220. When the first timer 216 is not larger than 10, the processing is advanced to step S222.

[0214] In step S220, the first input flag 210 is turned off.

[0215] As described above, after the first input flag 210 is turned on (i.e., after the first unit is detected to have been swung) until a 10 frame time period passes, the detection of the swinging strength of the first unit (step S236 described later) is not performed. Namely, the swing operation on the first unit by the player is not accepted. Owing to such an arrangement, one swing operation performed by the player is prevented from being detected continuously over a period of a plurality of frames.

[0216] As described in more detail later, when the second unit is detected to have been swung before a 5 frame time period passes after the first input flag 210 is turned on, the simultaneous input flag 214 is turned on at that time. Therefore, until a 20 frame time period passes after that, the swing operation on the first unit performed by the player is not accepted. When the simultaneous input flag 214 is turned off, the detection of the swinging strength of the first unit (step S236 described later) and the detection of the swinging strength of the second unit (step S250 described later) are resumed simultaneously. Therefore, the timing at which the acceptance of the swing operation on the first unit is resumed, and the timing at which the acceptance of the swing operation on the second unit is resumed, match each other.

[0217] In step S222, it is determined whether or not the second input flag 212 is on. When the second input flag 212 is on, the processing is advanced to step S224. When the second input flag 212 is not on, the processing is advanced to step S234 in FIG 23.

[0218] In step S224, "1" is added to the second input

timer 218.

[0219] In step S226, it is determined whether or not the second timer 218 is 5. When the second timer 218 is 5 (i.e., when only the second unit was swung), the processing is advanced to step 5228. When the second timer 218 is not 5, the processing is advanced to step S230.

[0220] In step S228, the directional vector is changed so as to cause the character to curve leftward.

[0221] In step S230, it is determined whether or not the second timer 218 is larger than 10. When the second timer 218 is larger than 10, the processing is advanced to step S232. When the second timer 218 is not larger than 10, the processing is advanced to step S234 in FIG. 23.

[0222] In step S232, the second input flag 212 is turned off.

[0223] As described above, after the second input flag 212 is turned on (i.e., after the second unit is detected to have been swung) until a 10 frame time period passes, the detection of the swinging strength of the second unit (step S250 described later) is not performed. Namely, the swing operation on the second unit by the player is not accepted. Owing to such an arrangement, one swing operation performed by the player is prevented from being detected continuously over a period of a plurality of frames.

[0224] As described in more detail later, when the first unit is detected to have been swung before a 5 frame time period passes after the second input flag 212 is turned on, the simultaneous input flag 214 is turned on at that time. Therefore, until a 20 frame time period passes after that, the swing operation on the second unit performed by the player is not accepted. When the simultaneous input flag 214 is turned off, the detection of the swinging strength of the first unit (step S236 described later) and the detection of the swinging strength of the second unit (step S250 described later) are resumed simultaneously. Therefore, the timing at which the acceptance of the swing operation on the first unit is resumed, and the timing at which the acceptance of the swing operation on the second unit is resumed, match each other. In other words, in this embodiment, even when the timing at which the first unit is detected to have been swung is slightly offset with respect to the timing at which the second unit is detected to have been swung, it is recognized that the first unit and the second unit were swung simultaneously. Even in this case, the timing at which the acceptance of the swing operation on the first unit is resumed, and the timing at which the acceptance of the swing operation on the second unit is resumed, match each other. Therefore, when the simultaneous swing operation is resumed and then another simultaneous swing operation is performed, the problem that it is detected that only the first unit or the second unit has been swung the second time is avoided. The time period in which the swing is not accepted (swing acceptance prohibition time period) after the simultaneous input flag 214 is turned on

may be a 10 frame time period (same as the swing acceptance prohibition time period after only the first unit or only the second unit is swung). In this embodiment, such a period starts when a later swing operation is detected, among the swing operation on the first unit and the swing operation on the second unit. Alternatively, a period of, for example, 20 frames may start when an earlier swing operation is detected. Still alternatively, such a period may start at an intermediate timing (a timing between the timing at which an earlier swing operation is detected and the timing at which a later swing operation is detected; for example, exactly the middle timing N).

[0225] Referring to FIG. 23, in step S234, it is determined whether or not the first input flag 210 is on. When the first input flag 210 is on, the processing is advanced to step S248. When the first input flag 210 is not on, the processing is advanced to step S236.

[0226] In step S236, the swinging strength of the first unit is detected. Hereinafter, the detection of the swinging strength of the first unit will be described in detail with reference to FIG. 25.

[0227] Referring to FIG. 25, in step S268, an output value (output vector) from an acceleration sensor (here, the first acceleration sensor) is obtained. In this embodiment, the output value in the X axis direction from the first acceleration sensor is Ax, the output value in the Y axis direction from the first acceleration sensor is Ay, and the output value in the Z axis direction from the first acceleration sensor is Az.

[0228] In step S270, it is determined whether or not the magnitude of the output vector (Ax, Ay, Az) from the first acceleration sensor obtained in step S268 (i.e., $\sqrt{Ax^2 + Ay^2 + Az^2}$) is larger than K (K is a predetermined value). When the magnitude of the output vector from the first acceleration sensor is larger than K (it is determined that a swing operation has been performed), the processing is advanced to step S272. When the magnitude of the output vector from the first acceleration sensor is not larger than K (it is determined that a swing operation has not been performed), the processing is advanced to step S274.

[0229] In step S272, the magnitude of the output vector from the first acceleration sensor is returned as a return value X for the detection of the swinging strength. Usually, as the first unit is swung more strongly, the magnitude of the output vector from the first acceleration sensor is larger. Therefore, the return value X reflects the swinging strength of the first unit. Then, the processing is advanced to step S238 in FIG. 23. In this embodiment, when the magnitude of the output vector exceeds K, the magnitude of the output vector at that time is immediately returned as the return value X. In a modification, the following processing may be executed. When the magnitude of the output vector exceeds K, a state flag indicating such a state is stored; and the output vector value when the magnitude of the output vector reaches the maximum value (the point at which the magnitude of the output vector starts decreasing after being maximized) may be

returned.

[0230] In this embodiment, the determination on the swing operation is made based on the magnitude of the output vector being equal to or greater than a predetermined value. The determination may be performed more precisely. This will be described in more detail. When a swing operation is made, the output from the acceleration sensor usually changes as follows. (a) 0 → (b) output is increased → (c) maximum → (d) output is decreased → (e) 0 → (f) output is increased in the opposite direction → (g) maximum in the opposite direction → (h) output is decreased in the opposite direction → (i) 0.

[0231] The history of output values for a predetermined time period from the current point may be always stored, so that it can be detected whether or not the history shows such a change. More simply, it may be detected that the history matches a part of such a change. In this case, which part of the change from (a) through (i) is to be used may be determined arbitrarily (any point other than (a) through (i), for example, a point when the output reaches a predetermined value while being increased, may be used).

[0232] Instead of the swing operation, a predetermined motion (an operation for providing a motion of a predetermined pattern) may be detected. Such an operation is, for example, an operation for moving the character in a predetermined direction. In this case also, the history of output values is stored, so that it can be detected whether or not the history matches the predetermined pattern.

[0233] The above-described modification is also applicable to embodiments of the present invention other than the second embodiment.

[0234] In step S274, a value representing "no swing operation" is returned as the detection result of the swing operation. Then, the processing is advanced to step S238 in FIG 23.

[0235] In step S238, it is determined whether or not the first unit was swung based on the detection result of the swing operation in step S236. When the first unit was swung, the processing is advanced to step S240. When the first unit was not swung, the processing is advanced to step S248.

[0236] In step S240, it is determined whether or not the second input flag 212 is on and also whether or not the second timer 218 is equal or smaller than 4. When the second input flag 212 is on and also the second timer 218 is equal or smaller than 4 (i.e., when the first unit and the second unit were swung substantially simultaneously), the processing is advanced to step S242. When the second input flag 212 is not on, or the second timer 218 is larger than 4, the processing is advanced to step S246. When the first unit is swung before a 4 frame time period passes after the second unit is swung, it is determined that "the first unit and the second unit were swung simultaneously" for the following reason. Even if the player intended to swing the first unit and the second unit simultaneously, such swing operations may not necessarily

be performed exactly simultaneously. Even when the timing at which the first unit is detected to have been swung is offset by several frames with respect to the timing at which the second unit is detected to have been swung, it is determined that "the first unit and the second unit were swung simultaneously". Thus, a better operability is obtained.

[0237] In step S242, the velocity data of the character is increased in accordance with the return value X for the detection of the swinging strength of the first unit in step S236 (value reflecting the swinging strength of the first unit) and the second swinging strength value 208 which is set in step S260 described later (value reflecting the swinging strength of the second unit). For example, the current velocity data may be multiplied by a numerical value in proportion to the return value X and by a numerical value in proportion to the second swinging strength value 208 so as to determine new velocity data. Alternatively, a numerical value obtained by multiplying the return X by a first coefficient, and a numerical value obtained by multiplying the second swinging strength 208 by a second coefficient, may be added to the current velocity data (the first coefficient maybe the same as, or different from, the second coefficient). Still alternatively, an average of the return value X and the second swinging strength value 208 is multiplied by a predetermined coefficient, and the resultant value may be added to the current velocity data.

[0238] As the return value for the detection of the swinging strength, the magnitude of only the component in a predetermined direction may be used among the output values from the acceleration sensor.

[0239] In step S244, the simultaneous input flag 214 is turned on. The simultaneous input timer 220 is reset to 0 to resume. The second input flag 212 is turned off.

[0240] In step S246, the first input flag 210 is turned on. The first input timer 216 is reset to 0 to resume. The return value X for the detection of the swinging strength of the first unit is set as the first swinging strength value 206.

[0241] In step S248, it is determined whether or not the second input flag 212 is on. When the second input flag 212 is on, the processing is advanced to step S250. When the second input flag 212 is not on, the processing is advanced to step S262 in FIG. 24.

[0242] In step S250, the swinging strength of the second unit is detected in substantially the same manner as in step S236. Namely, when the magnitude of the output vector from the second acceleration sensor is larger than K, the magnitude of the output vector from the second acceleration sensor (value reflecting the swinging strength of the second unit) is returned as a return value X for the detection of the swinging strength.

[0243] In step S252, it is determined whether or not the second unit was swung based on the detection result of the swing operation in step S250. When the second unit was swung, the processing is advanced to step S254. When the second unit was not swung, the processing is

advanced to step S262 in FIG. 24.

[0244] In step S254, it is determined whether or not the first input flag 210 is on and also whether or not the first timer 216 is equal or smaller than 4. When the first input flag 210 is on and also the first timer 216 is equal or smaller than 4 (i.e., when the first unit and the second unit were swung substantially simultaneously), the processing is advanced to step S256. When the first input flag 210 is not on, or the first timer 216 is larger than 4, the processing is advanced to step S260.

[0245] In step S256, the velocity data is increased in accordance with the return value X for the detection of the swinging strength of the second unit in step S250 (value reflecting the swinging strength of the second unit) and the first swinging strength value 206 which was set in step S246 above (value reflecting the swinging strength of the first unit). For example, the current velocity data may be multiplied by a numerical value in proportion to the return value X and by a numerical value in proportion to the first swinging strength value 208 so as to determine new velocity data.

[0246] In step S258, the simultaneous input flag 214 is turned on. The simultaneous input timer 220 is reset to 0 to resume. The first input flag 210 is turned off.

[0247] In step S260, the second input flag 212 is turned on. The second input timer 218 is reset to 0 to resume. The return value X for the detection of the swinging strength of the second unit is set as the second swinging strength value 208.

[0248] In step S262 in FIG. 24, the current position data is updated based on the velocity data and the directional vector. As a result, the character in the game world moves by the distance represented by the velocity data in the direction represented by the directional vector.

[0249] In step S264, the game image displayed on the monitor 2 is updated based on the current position data.

[0250] In step S266, the velocity data is decreased by a predetermined amount. This is performed in order to reflect the influence of the friction of the sleigh and the ground on the velocity of the character.

[0251] The above-described processing is repeated, so that the game image is changed when necessary in accordance with the operation performed by the player.

[0252] As described above, according to this embodiment, the player can freely move both of his/her hands. Owing to a high degree of freedom of motion realized by such an arrangement, a dynamic play is made possible. In addition, the player can control the character by swinging the operation units. Therefore, the player can play intuitively and thus obtain a high operability. As the operation units are swung more strongly, the acceleration of the character is larger. Thus, a more intuitive operation is realized.

[0253] In this embodiment, three-axial acceleration sensors are used. Even when one-axial acceleration sensors are used, the swing operations on the operation units and the swinging strength values thereof can be detected (for example, by referring to only the output value in the

Z axis direction in FIG. 16, it is detected that the operation units were swung, and the swinging strength values thereof are also detected). Thus, substantially the same effects as those of this embodiment are provided.

(Third Embodiment)

[0254] An image displayed in a third embodiment according to the present invention is, for example, substantially the same as the image shown in FIG. 19. In this embodiment, the player can control the motion of the character by swinging the first unit or the second unit.

[0255] FIG. 26 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the third embodiment. When the first unit is continuously swung, the character curves rightward; whereas when the second unit is continuously swung, the character curves leftward. When the first unit and the second unit are swung alternately, the character's motion is accelerated in the advancing direction at that time.

[0256] FIG. 27 shows an exemplary memory map of the main memory 33 in the third embodiment. The main memory 33 stores a game program 300, game image data 302, character control data 304, operation history information 306, and a swinging interval timer 308.

[0257] The game image data 302 and the character control data 304 are substantially the same as those in the first embodiment and will not be described here.

[0258] The operation history information 306 is information representing the type of the operation unit swung by the player (first unit or second unit) regarding the past two swings.

[0259] The swinging interval timer 308 is a value representing a time period from when the player swung the first unit or the second unit immediately previously (the number of frames).

[0260] With reference to the flowcharts in FIG. 28 through FIG. 30, a flow of processing executed by the CPU 30 based on the game program 300 will be described.

[0261] Referring to FIG. 28, when the execution of the game program 300 is started, in step S300, the CPU 30 first initializes various data used for the game processing (character control data 304, operation history information 306, swinging interval timer 308, etc.), and generates and displays a game image including the character on the screen of the monitor 2.

[0262] In step S302, the swinging strength of the first unit is detected. Hereinafter, the detection of the swinging strength of the first unit will be described in detail with reference to FIG. 30.

[0263] Referring to FIG. 30, in step S346, an output value (output vector) from an acceleration sensor (here, the first acceleration sensor) is obtained. In this embodiment, the output value in the X axis direction from the first acceleration sensor is Ax, the output value in the Y axis direction from the first acceleration sensor is Ay, and

the output value in the Z axis direction from the first acceleration sensor is Az.

[0264] In step S348, it is determined whether or not the magnitude of the output vector (Ax, Ay, Az) from the first acceleration sensor obtained in step S346 is larger than K (K is a predetermined value). When the magnitude of the output vector from the first acceleration sensor is larger than K, the processing is advanced to step S350. When the magnitude of the output vector from the first acceleration sensor is not larger than K, the processing is advanced to step S352.

[0265] In step S350, a value representing that "a swing operation was performed" is returned as the detection result of the swing operation. Then, the processing is advanced to step S304 in FIG. 28.

[0266] In step S352, a value representing "no swing operation" is returned as the detection result of the swing operation. Then, the processing is advanced to step S304 in FIG. 28.

[0267] In step S304, it is determined whether or not the first unit was swung based on the detection result of the swing operation in step S302. When the first unit was swung, the processing is advanced to step S306. When the first unit was not swung, the processing is advanced to step S318 in FIG. 29.

[0268] In step S306, the operation history information 306 is updated. Specifically, the pre-update value of the "operation unit swung currently" is set as the "operation unit swung immediately previously", and then the value representing the first unit is set as the "operation unit swung currently".

[0269] In step S308, the swinging interval timer 308 is reset to 0.

[0270] In step S310, it is determined whether or not the swing operation detected currently is "the first swing of the continuous swing operation". Specifically, the operation history information 306 is referred to. When neither the value representing the first unit nor the value representing the second unit is stored in the "operation unit swung immediately previously", it is determined that the swing operation detected currently is "the first swing of the continuous swing operation". In this embodiment, when the interval between the immediately previous swing operation and the current swing operation exceeds a 60 frame time period, it is determined that the swing operation detected currently is "the first swing of the continuous swing operation". When the swing operation detected currently is "the first swing of the continuous swing operation", the processing is advanced to step S318 in FIG. 29. Otherwise, the processing is advanced to step S312.

[0271] In step S312, it is determined whether or not the operation unit swung immediately previously is the first unit, by referring to the operation history information 306. When the operation unit swung immediately previously is the first unit (i.e., when the first unit is continuously swung), the processing is advanced to step S316. When the operation unit swung immediately previously is not

the first unit (i.e., when the operation unit swung immediately previously is the second unit; namely, the first unit and the second unit are swung alternately), the processing is advanced to step S314.

[0272] In step S314, the velocity data is increased by a predetermined amount. In a modification, the following processing may be executed. When the swing operation of the first unit is detected in step S302, the swinging strength is also detected as in the second embodiment. The velocity data is increased more largely as the swinging strength is greater. Alternatively, the swinging strength when the operation unit was swung immediately previously is stored, and the velocity data is increased based both on the immediately previous swinging strength and the current swinging strength of the first unit. (For example, the increasing amount of the velocity data is determined based on the sum or average of the two swinging strength values. A weighted average may be used; for example, the coefficient is decreased as the swinging strength data is older.) Still alternatively, as long as the first unit and the second unit are continuously swung alternately, the increasing amount of the velocity data is determined based on the sum or average of the swinging strength values of such a plurality of swings.

[0273] In step S316, the directional vector is changed so as to cause the character to curve rightward. In this step also, the following processing may be executed. As the swinging strength is greater, the character may curve at a larger angle. Alternatively, the swinging strength when the operation unit was swung immediately previously is stored, and the velocity data is increased based both on the immediately previous swinging strength and the current swinging strength of the first unit. Still alternatively, as long as the first unit and the second unit are continuously swung alternately, the angle of curving is determined based on the sum or average of the swinging strength values of such a plurality of swings.

[0274] Referring to FIG. 29, in step S318, the swing operation of the second unit is detected as in step S302.

[0275] In step S320, it is determined whether or not the second unit was swung based on the detection result of the swing operation in step S318. When the second unit was swung, the processing is advanced to step S322. When the second unit was not swung, the processing is advanced to step S334.

[0276] In step S322, the operation history information 306 is updated. Specifically, the pre-update value of the "operation unit swung currently" is set as the "operation unit swung immediately previously", and then the value representing the second unit is set as the "operation unit swung currently".

[0277] In step S324, the swinging interval timer 308 is reset to 0.

[0278] In step S326, it is determined whether or not the swing operation detected currently is "the first swing of the continuous swing operation". When the swing operation detected currently is "the first swing of the continuous swing operation", the processing is advanced to

step S334. Otherwise, the processing is advanced to step S328.

[0279] In step S328, it is determined whether or not the operation unit swung immediately previously is the second unit, by referring to the operation history information 306. When the operation unit swung immediately previously is the second unit (i.e., when the second unit is continuously swung), the processing is advanced to step S332. When the operation unit swung immediately previously is not the second unit (i.e., when the operation unit swung immediately previously is the first unit; namely, the first unit and the second unit are swung alternately), the processing is advanced to step S330.

[0280] In step S330, the velocity data is increased by a predetermined amount. In a modification, when the swing operation of the second unit is detected in step S318, the swinging strength may also be detected as in the second embodiment, so that the velocity data can be increased more largely as the swinging strength is greater.

[0281] In step S332, the directional vector is changed so as to cause the character to curve leftward. In this step also, as the swinging strength is greater, the character may curve at a larger angle.

[0282] In step S334, "1" is added to the swinging interval timer 308.

[0283] In step S336, it is determined whether or not the swinging interval timer 308 exceeds 60. When the swinging interval timer 308 exceeds 60, the processing is advanced to step S338. When the swinging interval timer 308 does not exceed 60, the processing is advanced to step S340.

[0284] In step S338, the operation history information 306 is cleared.

[0285] In step S340, the current position data is updated based on the velocity data and the directional vector. As a result, the character in the game world moves by the distance represented by the velocity data in the direction represented by the directional vector.

[0286] In step S342, the game image displayed on the monitor 2 is updated based on the current position data.

[0287] In step S344, the velocity data is decreased by a predetermined amount. Then, the processing is returned to step S302 in FIG. 28.

[0288] As described above, according to this embodiment, the player can freely move both of his/her hands. Owing to a high degree of freedom of motion realized by such an arrangement, a dynamic play is made possible. In addition, the player can control the character by swinging the operation units. Therefore, the player can play intuitively and thus obtain a high operability.

[0289] In this embodiment, three-axial acceleration sensors are used. As in the second embodiment, even when one-axial acceleration sensors are used, substantially the same effects as those of this embodiment can be provided.

[0290] In this embodiment, it is detected whether the first unit is continuously swung, the second unit is con-

tinuously swung, or the first unit and the second unit are alternately swung. Then, the game control is performed in accordance with the detection result. In a modification, it may be detected whether or not the continuous swinging is of a predetermined pattern. For example, predetermined game processing (for example, processing of allowing the character to make an attack) may be executed when a pattern of "the swing of the first unit → the swing of the second unit → the swing of the second unit → the swing of the first unit" is detected. (The pattern is not limited to this, and any other appropriate pattern may be set.)

[0291] In this embodiment, when the interval between two continuous swing operations is within a predetermined time period (for example, within a 60 frame time period), it is determined that the first unit and the second unit are alternately swung. The present invention is not limited to this. When a swing is made within a predetermined time period after the first swing, it may be determined that the same operation unit is continuously swung or two operation units are alternately swung. Alternatively, as the same operation unit is continuously swung for a longer time period, the interval for determining whether the swings are made continuously or alternately may be extended (or shortened).

(Fourth Embodiment)

[0292] An image displayed in a fourth embodiment according to the present invention is, for example, substantially the same as the image shown in FIG. 19. In this embodiment, one of the first unit and the second unit is used as an inclination unit, and the other is used as a swing unit. The player can control the motion of the character by inclining the inclination unit or by swinging the swing unit.

[0293] FIG. 31 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the fourth embodiment. When the inclination unit is inclined rightward, the character curves rightward; whereas when the inclination unit is inclined leftward, the character curves leftward. When the swing unit is swung, the character's motion is accelerated in the advancing direction at that time.

[0294] FIG. 32 shows an exemplary memory map of the main memory 33 in the fourth embodiment. The main memory 33 stores a game program 400, game image data 402, character control data 404, inclination unit designation data 406, and swing unit designation data 408.

[0295] The game image data 402 and the character control data 404 are substantially the same as those in the first embodiment and will not be described here.

[0296] The inclination unit designation data 406 is data representing which of the first unit and the second unit is to be used as the inclination unit. The swing unit designation data 408 is data representing which of the first unit and the second unit is to be used as the swing unit.

[0297] With reference to the flowcharts in FIG. 33

through FIG. 35, a flow of processing executed by the CPU 30 based on the game program 400 will be described.

[0298] Referring to FIG. 33, when the execution of the game program 400 is started, in step S400, the CPU 30 first initializes various data used for the game processing (character control data 404, etc.), and stores "1" representing the first unit in the inclination unit designation data 406 as an initial value and stores "2" representing the second unit in the swing unit designation data 408 as an initial value. The CPU 30 also generates and displays a game image including the character on the screen of the monitor 2.

[0299] In step S402, it is determined whether or not the player has input a unit role exchange instruction using an operation button or the like. When a unit role exchange has been instructed, the processing is advanced to step S404. When no unit role exchange has been instructed, the processing is advanced to step S406.

[0300] In step S404, the value of the inclination unit designation data 406 and the value of the swing unit designation data 408 are exchanged.

[0301] Owing to the above-described processing, the player can optionally change the role of the first unit and the role of the second unit in accordance with his/her preference or the situation in the game. Such an exchange of the role of the first unit and the second is also applicable to the other embodiments in substantially the same manner.

[0302] In step S406, an inclination of the inclination unit is detected. Hereinafter, the detection of the inclination of the inclination unit will be described in detail with reference to FIG. 34.

[0303] Referring to FIG. 34, in step S424, an output value (output vector) from an acceleration sensor provided in the inclination unit is obtained. In this embodiment, the output value in the X axis direction from the acceleration sensor is Ax, the output value in the Y axis direction from the acceleration sensor is Ay, and the output value in the Z axis direction from the acceleration sensor is Az.

[0304] In step S426, it is determined whether or not the magnitude of the output vector (Ax, Ay, Az) from the acceleration sensor obtained in step S424 is within the range of 0.8 to 1.2. When the magnitude of the output vector from the acceleration sensor is within the range of 0.8 to 1.2, the processing is advanced to step S428. When the magnitude of the output vector from the acceleration sensor is not within the range of 0.8 to 1.2, the processing is advanced to step S430.

[0305] In step S428, $\arctan(Az/Ay)$, which represents the inclination of the inclination unit around the Z axis (represented by angle θ in FIG. 36), is calculated, and the calculated value is returned as a return value for the detection of the inclination. Then, the processing is advanced to step S408 in FIG. 33.

[0306] In step S430, an error is returned as the detection result of the inclination. Thus, the detection of the inclination is terminated, and the processing is advanced

to step S408.

[0307] In step S408, it is determined whether or not the detection result of the inclination in step S430 is an error. When the result is an error, the processing is advanced to step S412. When the result is not an error, the processing is advanced to step S410.

[0308] In step S410, the directional vector is changed in accordance with the return value θ of the detection result of the inclination in step S406. The directional vector can be changed by various methods. In this embodiment, for example, the method shown in FIG. 37 is used. The current directional vector is rotated by the return value θ around the rotation axis, which is the normal vector to the ground at the current position of the character. The resultant vector is determined as a new directional vector.

[0309] In step S412, a swing operation of the swing unit is detected. Hereinafter, the detection of the swing operation will be described in detail with reference to FIG. 35.

[0310] Referring to FIG. 35, in step S432, an output value (output vector) from an acceleration sensor provided in the swing unit is obtained. In this embodiment, the output value in the X axis direction from the acceleration sensor is Ax, the output value in the Y axis direction from the acceleration sensor is Ay, and the output value in the Z axis direction from the acceleration sensor is Az.

[0311] In step S434, it is determined whether or not the magnitude of the output vector (Ax, Ay, Az) from the acceleration sensor obtained in step S432 is larger than K (K is a predetermined value). When the magnitude of the output vector from the acceleration sensor is larger than K, the processing is advanced to step S436. When the magnitude of the output vector from the acceleration sensor is not larger than K, the processing is advanced to step S438.

[0312] In step S436, a value representing that "a swing operation was performed" is returned as the detection result of the swing operation. Then, the processing is advanced to step S414 in FIG. 33.

[0313] In step S438, a value representing "no swing operation" is returned as the detection result of the swing operation. Then, the processing is advanced to S414 in FIG. 33.

[0314] In step S414, it is determined whether or not the swing unit was swung based on the detection result of the swing operation in step S412. When the swing unit was swung, the processing is advanced to step S416. When the swing unit was not swung, the processing is advanced to step S418.

[0315] In step S416, the velocity data is increased by a predetermined amount. In a modification, the following processing may be executed. When the swing operation of the swing unit is detected in step S412, the swinging strength is also detected as in the second embodiment. The velocity data is increased more largely as the swinging strength is greater.

[0316] In step S418, the current position data is updated based on the velocity data and the directional vector.

As a result, the character in the game world moves by the distance represented by the velocity data in the direction represented by the directional vector.

[0317] In step S420, the game image displayed on the monitor 2 is updated based on the current position data.

[0318] In step S422, the velocity data is decreased by a predetermined amount. Then, the processing is returned to step S402.

[0319] As described above, according to this embodiment, the player can freely move both of his/her hands. Owing to a high degree of freedom of motion realized by such an arrangement, a dynamic play is made possible. In addition, the character can curve by inclining the inclination unit and accelerated by swinging the swing unit. Therefore, the player can play intuitively and thus obtain a high operability.

[0320] In this embodiment, three-axial acceleration sensors are used. As in the first and second embodiments, even when one-axial acceleration sensors are used, substantially the same effects as those of this embodiment can be provided.

[0321] As described later, when the swing unit is swung, the swinging direction may be detected, so that the direction or the magnitude of acceleration of the character can be changed in accordance with the detected direction.

(Fifth Embodiment)

[0322] An image displayed in a fifth embodiment according to the present invention is, for example, substantially the same as the image shown in FIG. 19. In this embodiment, the motion of the character is controlled based on the direction in which the first unit and the second unit are swung (moved).

[0323] FIG. 38 shows an exemplary correspondence between the operation performed by the player and the motion of the character in the fifth embodiment. When either the first unit or the second unit is swung obliquely rightward and farther from the player (right-forward; "forward" is the direction in which the player is directed), the character is accelerated slightly right-forward; whereas when either the first unit or the second unit is swung obliquely leftward and closer to the player (left-rearward; "rearward" is the direction opposite to the direction in which the player is directed), the character is accelerated slightly left-rearward. In this embodiment, the character is basically accelerated in a direction (direction based on the forward direction with respect to the character in the virtual space) corresponding to the direction in which the operation unit is swung (direction based on the forward direction with respect to the player in the real world).

[0324] When the first unit and the second unit are simultaneously swung obliquely rightward and farther from the player, the character is accelerated largely right-forward. In this embodiment, when the first unit and the second unit are simultaneously swung in the same direction, the character is accelerated largely.

[0325] When one of the first unit and the second unit is swung rightward and the other unit is swung farther from the player, the character is accelerated slightly right-forward. In this embodiment, when the first unit and the second unit are simultaneously swung in different directions, the acceleration direction of the character is determined based on a direction obtained by synthesizing the swinging direction of the first unit and the swinging direction of the second unit.

[0326] When the first unit and the second unit are swung simultaneously in opposite directions, the character stops.

[0327] FIG. 39 shows an exemplary memory map of the main memory 33 in the fifth embodiment. The main memory 33 stores a game program 500, game image data 502, character control data 504, a first swinging directional vector 506, a second swinging directional vector 508, a first input flag 510, a second input flag 512, a simultaneous input flag 514, a first timer 516, a second timer 518, a simultaneous input timer 520, first sampling data 522, and second sampling data 524.

[0328] The game image data 502 is substantially the same as that described in the first embodiment and will not be described here.

[0329] The character control data 504 includes current position data, velocity vector representing the magnitude and the direction of the moving speed of the character, and a posture matrix representing the posture of the character. The current position data is represented by a three-dimensional coordinate value, and the velocity vector is represented by a three-dimensional vector. The posture matrix is a set of a forward vector which is a three-dimensional unit vector representing the forward direction with respect to the character, a rightward vector which is a three-dimensional unit vector representing the rightward direction with respect to the character, and an upward vector which is a three-dimensional unit vector representing the upward direction with respect to the character.

[0330] The first swinging directional vector 506 represents a direction in which the first unit is swung by the player. The second swinging directional vector 508 represents a direction in which the second unit is swung by the player.

[0331] The first input flag 510, the second input flag 512, the simultaneous input flag 514, the first timer 516, the second timer 518, and the simultaneous input timer 520 are substantially the same as those in the second embodiment and will not be described here.

[0332] The first sampling data 522 is sampling data on outputs from the first acceleration sensor provided in the first unit for the immediately previous 60 frames. The second sampling data 524 is sampling data on outputs from the second acceleration sensor provided in the second unit for the immediately previous 60 frames.

[0333] With reference to the flowcharts in FIG. 40 through FIG. 44, a flow of processing executed by the CPU 30 based on the game program 500 will be described.

[0334] Referring to FIG. 40, when the execution of the game program 500 is started, in step S500, the CPU 30 first initializes various data used for the game processing (character control data 504, first swinging directional vector 506, first input flag 510, first timer 516, first sampling data 522, etc.), and generates and displays a game image including the character on the screen of the monitor 2.

[0335] In step S502, an output value from the first acceleration sensor and an output value from the second acceleration sensor are obtained, and thus the first sampling data 522 and the second sampling data 524 are updated.

[0336] In step S504, it is determined whether or not the simultaneous input flag 514 is on. When the simultaneous input flag 514 is on, the processing is advanced to step S506. When the simultaneous input flag 514 is not on, the processing is advanced to step S512.

[0337] In step S506, "1" is added to the simultaneous input timer 520.

[0338] In step S508, it is determined whether or not the simultaneous input timer 520 is equal to or greater than 20. When the simultaneous input timer 520 is equal to or greater than 20, the processing is advanced to step S510. Otherwise, the processing is advanced to step S596 in FIG. 43.

[0339] In step S510, the simultaneous input flag 514 is turned off, and the processing is advanced to step S596 in FIG. 43.

[0340] In step S512, it is determined whether or not the first input flag 510 is on. When the first input flag 510 is on, the processing is advanced to step S514. When the first input flag 510 is not on, the processing is advanced to step S526.

[0341] In step S514, "1" is added to the first timer 516.

[0342] In step S516, it is determined whether or not the first timer 516 is 5. When the first timer 516 is 5 (i.e., when only the first unit was swung), the processing is advanced to step S518. When the first timer 516 is not 5, the processing is advanced to step S522.

[0343] In step S518, the velocity vector is changed based on the first swinging directional vector 506 detected in the step of detecting the swinging direction of the first unit (step S542 described later). The velocity vector can be changed by various methods. In this embodiment, for example, the method shown in FIG. 45 is used. Where an X axis value of the first swinging directional vector 506 is a1 and a Z axis value thereof is b1, the current vector is synthesized with a vector represented by (rightward vector x a1 + forward vector x b1). The resultant vector is determined as a new velocity vector. Therefore, as the X axis value of the first swinging directional vector 506 is larger, the character is accelerated in the direction of the rightward vector more largely. As the Z axis value of the first swinging directional vector 506 is larger, the character is accelerated in the direction of the forward vector more largely.

[0344] In step S520, the posture matrix is updated such

that the direction of the forward vector matches the direction of the velocity vector updated in step S518.

[0345] In step S522, it is determined whether or not the first timer 516 is larger than 10. When the first timer 516 is larger than 10, the processing is advanced to step S524. When the first timer 516 is not larger than 10, the processing is advanced to step S526.

[0346] In step S524, the first input flag 510 is turned off.

[0347] In step S526, it is determined whether or not the second input flag 512 is on. When the second input flag 512 is on, the processing is advanced to step S528. When the second input flag 512 is not on, the processing is advanced to step S540 in FIG 41.

[0348] In step S528, "1" is added to the second input timer 518.

[0349] In step S530, it is determined whether or not the second timer 518 is 5. When the second timer 518 is 5 (i.e., when only the second unit was swung), the processing is advanced to step S532. When the second timer 518 is not 5, the processing is advanced to step S536.

[0350] In step S532, the velocity vector is changed based on the second swinging directional vector 508 detected in the step of detecting the swinging direction of the second unit (step S570 described later), by substantially the same method as in step S518.

[0351] In step S534, the posture matrix is updated such that the direction of the forward vector matches the direction of the velocity vector updated in step S532.

[0352] In step S536, it is determined whether or not the second timer 518 is larger than 10. When the second timer 518 is larger than 10, the processing is advanced to step S538. When the second timer 518 is not larger than 10, the processing is advanced to step S540 in FIG. 41.

[0353] In step S538, the second input flag 512 is turned off.

[0354] Referring to FIG. 41, in step S540, it is determined whether or not the first input flag 510 is on. When the first input flag 510 is on, the processing is advanced to step S568. When the first input flag 510 is not on, the processing is advanced to step S542.

[0355] In step S542, the swinging direction of the first unit is detected. Hereinafter, the detection of the swinging direction of the first unit will be described in detail with reference to FIG. 44.

[0356] Referring to FIG. 44, in step S604, the first sampling data 522 is referred to. It is determined whether or not the magnitude of the vector represented by the X axis value and the Z axis value of the second newest detected value from the first acceleration sensor (Ax, Ay, Az) (the magnitude is $\sqrt{Ax^2 + Az^2}$) is larger than L (L is a predetermined value). (Hereinafter, such a vector represented by an X axis value and a Z axis value will be referred to as an "XZ vector".) When the magnitude of the XZ vector is larger than L (i.e., when the first unit is determined to have been swung), the processing is advanced to step S606. When the magnitude of the XZ vector is not larger

than L (i.e., when the first unit is determined not to have been swung), the processing is advanced to step S610.

[0357] In step S606, the first sampling data 522 is referred to. It is determined whether or not the magnitude of the XZ vector of the second newest detected value from the first acceleration sensor is larger than the magnitude of the XZ vector of the newest detected value from the first acceleration sensor. This is performed in order to detect the timing at which the maximum force was applied to the first acceleration sensor in a direction parallel to the XZ plane. When the player swings the first unit in a direction parallel to the XZ plane, a large force is applied to the first unit (first acceleration sensor) by the player immediately after the start of the swing and immediately before the end of the swing. Therefore, the magnitude of the XZ vector of the detected value regarding the first acceleration sensor is maximum immediately after the start of the swing and immediately before the end of the swing. When the magnitude of the XZ vector of the second newest detected value from the first acceleration sensor is larger than the magnitude of the XZ vector of the newest detected value from the first acceleration sensor (i.e., immediately after the magnitude of the XZ vector of the detected value regarding the first acceleration sensor is maximized), the processing is advanced to step S608. Otherwise, the processing is advanced to step S610.

[0358] In step S608, the XZ vector (A_x , A_z) of the second newest detected value from the first acceleration sensor is returned as a return value for the detection of the swinging direction. The XZ vector (A_x , A_z) represents the direction in which the force was applied to the first unit when the player swung the first unit (i.e., the direction in which the first unit was swung). Then, the processing is advanced to step S544 in FIG. 41.

[0359] Alternatively, the swinging direction may be detected by averaging the XZ vectors during the time period in which the XZ vector is larger than L.

[0360] The XZ vector detected by the direction of the swinging direction may be sometimes opposite to the actual swinging direction of the operation unit when a certain detection method is used. In such a case, a value obtained by multiplying the detected XZ vector by -1 may be returned as a return value for the detection of the swinging direction.

[0361] In step S610, a value representing "no swing operation" is returned as the detection result of the swing direction. Then, the processing is advanced to step S544 in FIG 41.

[0362] In step S544, it is determined whether or not the first unit was swung based on the detection result of the swing direction in step S542. When the first unit was swung, the processing is advanced to step S546. When the first unit was not swung, the processing is advanced to step S568.

[0363] In step S546, the return value for the direction of the swinging direction in step S542 (i.e., a vector representing the swinging direction of the first unit) is set as

the first swinging directional vector 506.

[0364] In step S548, it is determined whether or not the second input flag 512 is on and also whether or not the second timer 518 is equal or smaller than 4. When the second input flag 512 is on and also the second timer 518 is equal or smaller than 4 (i.e., when the first unit and the second unit were swung substantially simultaneously), the processing is advanced to step S550. When the second input flag 512 is not on, or the second timer 518 is larger than 4, the processing is advanced to step S566.

[0365] In step S550, it is determined whether or not an angle made by the first swinging directional vector 506 and the second swinging directional vector 508 (a vector representing the swinging direction of the second unit) which is set in step S574 described later is within the range of -30° to 30° . When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is within the range of -30° to 30° (i.e., when the first unit and the second unit were swung in substantially the same direction), the processing is advanced to step S552. When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is not within the range of -30° to 30° , the processing is advanced to step S558. The range of -30° to 30° is merely exemplary, and the range may be wider or narrower. Any range by which the first unit and the second unit are regarded as being swung in substantially the same direction is usable.

[0366] In step S552, the velocity vector is changed based on the first swinging directional vector 506 and the second swinging directional vector 508. The velocity vector can be changed by various methods. In this embodiment, for example, the method shown in FIG. 46 is used.

The first swinging directional vector 506 and the second swinging directional vector 508 are synthesized to obtain a synthesized swinging directional vector. Where an X axis value of the synthesized swinging directional vector is a_3 and a Z axis value thereof is b_3 , the current vector and a vector represented by (rightward vector $\times a_3$ + forward vector $\times b_3$) $\times \alpha$ (predetermined constant) are synthesized. The resultant vector is determined as a new velocity vector. α is a constant, and in step S552, $\alpha = 2$. Namely, in step S552, the new velocity vector is determined by synthesizing the current vector with a vector obtained by doubling the magnitude of the synthesized swinging directional vector. In step S552, a vector obtained by doubling the magnitude of the first swinging directional vector 506 or the second swinging directional vector 508 may be regarded as the synthesized vector.

[0367] In step S554, the posture matrix is updated such that the direction of the forward vector matches the direction of the velocity vector updated in step S552.

[0368] In step S556, the simultaneous input flag 514 is turned on. The simultaneous input timer 520 is reset to 0. The second input flag 512 is turned off.

[0369] In step S558, it is determined whether or not an angle made by the first swinging directional vector 506

and the second swinging directional vector 508 is either within the range of 150° to 180° or within the range of -150° to -180°. When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is either within the range of 150° to 180° or within the range of -150° to -180° (i.e., when the first unit and the second unit were swung in substantially the opposite directions), the processing is advanced to step S560. When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is neither within the range of 150° to 180° nor within the range of -150° to -180°, the processing is advanced to step S562. The ranges of 150° to 180° and -150° to -180° are merely exemplary, and the ranges may be wider or narrower. Any ranges by which the first unit and the second unit are regarded as being swung in substantially the opposite directions are usable.

[0370] In step S560, the velocity vector is changed to 0, and the processing is advanced to step S556.

[0371] In step S562, as in step S552, the first swinging directional vector 506 and the second swinging directional vector 508 are synthesized to obtain a synthesized swinging directional vector. Where an X axis value of the synthesized swinging directional vector is a_3 and a Z axis value thereof is b_3 , the current vector and a vector represented by (rightward vector $\times a_3$ + forward vector $\times b_3$) $\times \alpha$ (predetermined constant) are synthesized. The resultant vector is determined as a new velocity vector. In step S562, $\alpha = 1.5$. Namely, in step S562, the new velocity vector is determined by synthesizing the current vector with a vector obtained by multiplying the magnitude of the synthesized swinging directional vector by 1.5.

[0372] In step S564, the posture matrix is updated such that the direction of the forward vector matches the direction of the velocity vector updated in step S562.

[0373] In step S566, the first input flag 510 is turned on. The first input timer 516 is reset to 0.

[0374] Referring to FIG. 42, in step S568, it is determined whether or not the second input flag 512 is on. When the second input flag 512 is on, the processing is advanced to step S596 in FIG. 43. When the second input flag 512 is not on, the processing is advanced to step S570.

[0375] In step S570, the swinging direction of the second unit is detected. Hereinafter, the detection of the swinging direction of the second unit will be described in detail with reference to FIG. 44.

[0376] Referring to FIG. 44, in step S604, the second sampling data 524 is referred to. It is determined whether or not the magnitude of the XZ vector of the second newest detected value from the second acceleration sensor is larger than L. When the magnitude of the XZ vector is larger than L (i.e., when the second unit is determined to have been swung), the processing is advanced to step S606. When the magnitude of the XZ vector is not larger than L (i.e., when the second unit is determined not to have been swung), the processing is advanced to step

S610.

[0377] In step S606, the second sampling data 524 is referred to. It is determined whether or not the magnitude of the XZ vector of the second newest detected value from the second acceleration sensor is larger than the magnitude of the XZ vector of the newest detected value from the second acceleration sensor. When the magnitude of the XZ vector of the second newest detected value from the second acceleration sensor is larger than the magnitude of the XZ vector of the newest detected value from the second acceleration sensor (i.e., immediately after the magnitude of the XZ vector of the detected value regarding the second acceleration sensor is maximized), the processing is advanced to step S608. Otherwise, the processing is advanced to step S610.

[0378] In step S608, the XZ vector (A_x, A_z) of the second newest detected value from the second acceleration sensor is returned as a return value for the detection of the swinging direction. The XZ vector (A_x, A_z) represents the direction in which the force was applied to the second unit when the player swung the second unit (i.e., the direction in which the second unit was swung). Then, the processing is advanced to step S572 in FIG. 42.

[0379] In step S610, a value representing "no swing operation" is returned as the detection result of the swing direction. Then, the processing is advanced to step S572 in FIG. 42.

[0380] In step S572, it is determined whether or not the second unit was swung based on the detection result of the swing direction in step S570. When the second unit was swung, the processing is advanced to step S574. When the second unit was not swung, the processing is advanced to step S596.

[0381] In step S574, the return value for the direction of the swinging direction in step S570 (i.e., a vector representing the swinging direction of the second unit) is set as the second swinging directional vector 508.

[0382] In step S576, it is determined whether or not the first input flag 510 is on and also whether or not the first timer 516 is equal or smaller than 4. When the first input flag 510 is on and also the first timer 516 is equal or smaller than 4 (i.e., when the first unit and the second unit were swung substantially simultaneously), the processing is advanced to step S578. When the first input flag 510 is not on, or the first timer 516 is larger than 4, the processing is advanced to step S594.

[0383] In step S578, it is determined whether or not an angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is within the range of -30° to 30°. When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is within the range of -30° to 30° (i.e., when the first unit and the second unit were swung in substantially the same direction), the processing is advanced to step S580. When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is not within the range of -30° to 30°, the processing is advanced to step S586.

[0384] In step S580, as in step S552, a new velocity vector is determined by synthesizing the current vector and a vector obtained by doubling the magnitude of the synthesized swinging directional vector.

[0385] In step S582, the posture matrix is updated such that the direction of the forward vector matches the direction of the velocity vector updated in step S580.

[0386] In step S584, the simultaneous input flag 514 is turned on. The simultaneous input timer 520 is reset to 0. The first input flag 510 is turned off.

[0387] In step S586, it is determined whether or not an angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is within the range of 150° to 180° or within the range of -150° to -180° . When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is within the range of 150° to 180° or within the range of -150° to -180° (i.e., when the first unit and the second unit were swung in substantially the opposite directions), the processing is advanced to step S588. When the angle made by the first swinging directional vector 506 and the second swinging directional vector 508 is neither within the range of 150° to 180° nor within the range of -150° to -180° , the processing is advanced to step S590.

[0388] In step S588, the velocity vector is changed to 0, and the processing is advanced to step S584.

[0389] In step S590, as in step S562, a new velocity vector is determined by synthesizing the current vector and a vector obtained by multiplying the magnitude of the synthesized swinging directional vector by 1.5.

[0390] In step S592, the posture matrix is updated such that the direction of the forward vector matches the direction of the velocity vector updated in step S590.

[0391] In step S594, the second input flag 512 is turned on. The second input timer 518 is reset to 0.

[0392] Referring to FIG. 43, in step S596, the current position data is updated based on the velocity vector.

[0393] In step S598, the game image displayed on the monitor 2 is updated based on the current position data and the posture matrix.

[0394] In step S600, the posture matrix and the velocity vector are updated so as to reflect the influence of the topography. This is performed such that, for example, when the character goes up a steep slope, the character inclines its body slightly backward and the advancing direction of the character is along the slope.

[0395] In step S602, the velocity data is decreased by a predetermined amount. Then, the processing is returned to step S502 in FIG. 40.

[0396] The above-described processing is repeated, so that the game image is changed when necessary in accordance with the operation performed by the player.

[0397] The processing in this embodiment can be summarized as follows.

(1) When the first unit and the second unit are swung at different timings → the velocity vector is updated

based on the directional vectors of the respective units.

(2) When the first unit and the second unit are swung substantially simultaneously in substantially the same direction → the velocity vector is updated based on a vector obtained by doubling the magnitude of the synthesized swinging directional vector.

(3) When the first unit and the second unit are swung substantially simultaneously in different directions (excluding substantially the opposite directions) → the velocity vector is updated based on a vector obtained by multiplying the magnitude of the synthesized swinging directional vector by 1.5.

(4) When the first unit and the second unit are swung substantially simultaneously in substantially opposite directions → the velocity vector is made 0 (the character stops) .

[0398] In this manner, the game processing is made in different manners based on the swinging timing and the relative directions of the first unit and the second unit. This allows the player to make various inputs.

[0399] As described above, according to this embodiment, the player can freely move both of his/her hands. Owing to a high degree of freedom of motion realized by such an arrangement, a dynamic play is made possible. Since the player can control the character by swinging the operation units, the player can play intuitively and thus obtain a high operability. As the swing directions of two operation units swung simultaneously are closer to each other, the acceleration of the character is larger. Therefore, a more intuitive operation is realized.

[0400] In this embodiment, three-axial acceleration sensors are used. Even when two-axial acceleration sensors are used, the swinging directions of the operation units can be detected (for example, in the flow shown in FIG. 44, it is detected that the operation units were swung, and the swinging directions thereof are also detected, by referring to the output values in the two axes of the X axis and the Z axis). Thus, substantially the same effects as those of this embodiment are provided.

[0401] In this embodiment, one of the first unit and the second unit is swung, the character is accelerated in accordance with the swinging direction thereof. Alternatively, the game may be set such that when one of the first unit and the second unit is swung, the character is not accelerated; whereas when the first unit and the second unit are substantially simultaneously swung, the character is accelerated.

[0402] In this embodiment, when it is detected that the output from the acceleration sensor (specifically the XZ vector in this embodiment) is maximized, the swinging direction of the operation unit is detected based on the output from the acceleration sensor at that time or the vicinity thereof. The present invention is not limited to this. The swinging direction of the operation unit may be detected by any other method. For example, the following methods are usable. When the magnitude of the XZ vec-

tor from the acceleration sensor exceeds a predetermined value and then returns to 0, the sampling data during that time period is referred to, and thus the maximum value of the XZ vector from the acceleration sensor during that period may be set as the swinging directional vector. A vector obtained by averaging or synthesizing the XZ vectors during that period may be set as the swinging directional vector. Alternatively, the outputs from the acceleration sensor are integrated to calculate the moving speed of the operation unit. The swinging direction of the operation unit may be detected based on the outputs from the acceleration sensor during the time period in which the moving speed calculated in this manner is equal to or larger than a predetermined value.

[0403] In this embodiment, the swing operation is detected. The present invention is not limited to this. A motion of the operation unit may be detected, in which case the game control may be executed based on the direction and the timing of the motion.

(Sixth Embodiment)

[0404] An image displayed in a sixth embodiment according to the present invention is, for example, substantially the same as the image shown in FIG. 19. In this embodiment, the motion of the character is controlled based on the direction in which the first unit and the second unit are swung.

[0405] FIG. 47 shows an exemplary manner of operating the operation units in the sixth embodiment. In this embodiment, the player instructs a direction by performing a direction instruction operation (an operation of moving the operation unit horizontally), and then determines the direction which was input by the direction instruction operation by performing a trigger operation (an operation of moving the operation unit vertically downward). The correspondence between the direction in which the first unit and the second unit are moved by the direction instruction operation and the motion of the character is substantially the same as that shown in FIG. 38 except for several points. Hereinafter, a swing operation is used as an example of the operation for moving the operation units. The present invention is not limited to this, and any operation is usable as long as the motions of the operation units are detected and the motion of the character is controlled based on the direction and the magnitude of the detected motions.

[0406] FIG. 48 shows an exemplary memory map of the main memory 33 in the sixth embodiment. The main memory 33 stores a game program 703, game image data 704, character control data 705, a first swinging directional vector 709, a second swinging directional vector 710, a first input flag 711, a second input flag 712, a simultaneous input flag 714, a first timer 716, a second timer 718, a simultaneous input timer 720, first sampling data 722, second sampling data 724, a first trigger operation strength value 726, and a second trigger operation strength value 728.

[0407] The game image data 704, the character control data 705, the first swinging directional vector 709, the second swinging directional vector 710, the first input flag 711, the second input flag 712, the simultaneous input flag 714, the first timer 716, the second timer 718, the simultaneous input timer 720, first sampling data 722, and second sampling data 724 are substantially the same as those in the fifth embodiment and will not be described here.

[0408] The first trigger operation strength value 726 represents a swinging strength when a trigger operation is made on the first unit. The second trigger operation strength value 728 represents a swinging strength when a trigger operation is made on the second unit.

[0409] With reference to the flowcharts in FIG. 49 through FIG. 53, a flow of processing executed by the CPU 30 based on the game program 703 will be described.

[0410] Referring to FIG. 49, the processing in steps S700, S702, S704, S706, S708, S710, S712, S714 and S716 is substantially the same as that described in the fifth embodiment and will not be described here.

[0411] In step S718, the velocity vector is changed based on the first swinging directional vector 709 which is calculated in step S748 described later based on the first sampling data 722 (i.e., a vector representing the direction in which the first unit was swung by the player for making a direction instruction operation) and the first trigger operation strength value 726 which is set in accordance with the detection result of the swinging strength of the first unit obtained in step S742 described later (i.e., a vector representing the strength at which the first unit was swung by the player for making a trigger operation). The velocity vector can be changed by various methods. In this embodiment, for example, the method shown in FIG. 54 is used. Where an X axis value of the first swinging directional vector 709 is a_1 , a Z axis value thereof is b_1 , and the first trigger operation strength value 726 is β_1 , the current vector is synthesized with a vector represented by (rightward vector $\times a_1$ + forward vector $\times b_1$) $\times \beta_1$. The resultant vector is determined as a new velocity vector. Therefore, as the first trigger operation strength value 726 is larger, the character is accelerated more largely.

[0412] The processing in steps S720, S722, S724, S726, S728 and S730 is substantially the same as that described in the fifth embodiment and will not be described here.

[0413] In step S732, the velocity vector is changed based on the second swinging directional vector 710 which is calculated in step S782 described later based on the second sampling data 724 (i.e., a vector representing the direction in which the second unit was swung by the player for making a direction instruction operation) and the second trigger operation strength value 728 which is set in accordance with the detection result of the swinging strength of the second unit obtained in step S776 described later (i.e., a vector representing the

strength at which the second unit was swung by the player for making a trigger operation). The velocity vector is changed as follows, for example. Where an X axis value of the second swinging directional vector 710 is a_2 , a Z axis value thereof is b_2 , and the second trigger operation strength value 728 is β_2 , the current vector is synthesized with a vector represented by (rightward vector $\times a_2$ + forward vector $\times b_2$) $\times \beta$. The resultant vector is determined as a new velocity vector. Therefore, as the second trigger operation strength value 728 is larger, the character is accelerated more largely.

[0414] The processing in steps S734, S736, S738 and S740 (FIG. 50) is substantially the same as that described in the fifth embodiment and will not be described here.

[0415] Referring to FIG. 50, in step S742, the trigger operation strength of the first unit is detected. Hereinafter, the detection of the trigger operation strength of the first unit will be described in detail with reference to FIG. 53.

[0416] Referring to FIG. 53, in step S816, the first sampling data 722 is referred to. It is determined whether or not the magnitude of a Y axis value A_y of the second newest detected value from the first acceleration sensor (A_x , A_y , A_z) is larger than M (M is a predetermined value and is larger than 1). When the magnitude of the Y axis value A_y of the second newest detected value from the first acceleration sensor is larger than M (i.e., when a trigger operation is determined to have been made on the first unit), the processing is advanced to step S818. When the magnitude of the Y axis value A_y of the second newest detected value from the first acceleration sensor is not larger than M (i.e., when no trigger operation is determined to have been made on the first unit), the processing is advanced to step S822.

[0417] In step S818, the first sampling data 722 is referred to. It is determined whether or not the magnitude of the Y axis value of the second newest detected value from the first acceleration sensor is larger than the magnitude of the Y axis value of the newest detected value from the first acceleration sensor. This is performed in order to detect the timing at which the maximum force was applied to the first acceleration sensor in a direction of the Y axis. When the player swings the first unit in a direction of the Y axis, as shown in FIG. 54, the Y axis value of the detected value regarding the first acceleration sensor is minimum immediately after the start of the swing and maximum immediately before the end of the swing. Therefore, the determination result in step S818 is positive at time T1 in FIG. 56. When the magnitude of the Y axis value of the second newest detected value from the first acceleration sensor is larger than the magnitude of the Y axis value of the newest detected value from the first acceleration sensor (i.e., immediately after the magnitude of the Y axis value of the detected value regarding the first acceleration sensor is maximized), the processing is advanced to step S820. Otherwise, the processing is advanced to step S822.

[0418] In step S820, the Y axis value A_y of the second newest detected value from the first acceleration sensor

is returned as a return value for the detection of the triggering operation strength. The Y axis value A_y represents the magnitude of the force applied to the first unit when the player made a trigger operation on the first unit (i.e., the strength at which the first unit was swung). Then, the processing is advanced to step S744 in FIG. 50.

[0419] In step S822, a value representing "no trigger operation" is returned as the detection result of the trigger operation strength. Then, the processing is advanced to step S744 in FIG. 50.

[0420] In step S744, it is determined whether or not a trigger operation was made on the first unit based on the detection result of the trigger operation strength in step S742. When a trigger operation was made on the first unit, the processing is advanced to step S746. When no trigger operation was made on the first unit, the processing is advanced to step S774.

[0421] In step S746, a return value for the first trigger operation strength value (i.e., a value representing the strength at which the first unit was swung by the trigger operation made thereon) is set.

[0422] In step S748, a direction in which the first unit was swung for making a direction instruction operation is calculated based on the first sampling data 722, and the calculation result is set as the first swinging directional vector 709. Such a direction can be detected by various methods. FIG. 56 shows a change in the output value from the acceleration sensor in the X axis direction and the Z axis direction when the player swings the operation unit left-forward for making a direction instruction operation.

[0423] In this embodiment, the direction in which the operation unit was swung is detected by, for example, referring to the sampling data for the immediately previous 60 frames when a trigger operation is detected (T1 in FIG. 56). Specifically, the sampling data is referred to, to detect the time at which the signs of the X axis value and the Z axis value are inverted (T2 in FIG. 56). The XZ vectors represented by the X axis values and the Z axis values in the frames after time T2 are averaged. Thus, the direction in which the operation unit was swung is detected. In the example of FIG. 56, the average of the X axis values after time T2 is negative (which means that the operation unit was swung in the negative X axis direction), and the average of the Z axis values after time T2 is positive (which means that the operation unit was swung in the positive Z axis direction). The absolute values of these averages are substantially equal to each other. Therefore, it is found that the operation unit was swung in a direction which is 45° offset from the forward direction with respect to the player. In the case where the sampling data for the immediately previous 60 frames is not sufficient to detect time T2, the sampling data may be stored for a longer time period. However, even when the sampling data is stored for a sufficiently long time period, if no A_x or A_z output representing a direction instruction operation is obtained for a predetermined time period (tolerable time period) before the time point when

the trigger operation was detected (T1) (for example, when there is no output changing as shown in FIG. 56, or when the output value of Ax or Ay is simply 0), it can be determined that the direction instruction operation and the trigger operation are not continuously performed. In this case, it is preferable to make such operations invalid. The start of the swing operation, the end of the swing operation, or a time point in the middle of the swing operation may be the reference point of the tolerable time period, instead of the time point when the trigger operation was detected.

[0424] According to another method for detecting the direction in which the operation unit was swung for making a direction instruction operation, an average value of each of the X axis values and the Z axis values from the start of the swing operation until time T2 at which the signs are inverted in FIG. 56 may be obtained. In this case, the direction represented by the finally obtained XZ vector is opposite to the moving direction of the operation unit which was swung.

[0425] According to still another method for detecting the direction in which the operation unit was swung for making the direction instruction operation, the X axis value or the Z axis value from the acceleration sensor are not used as they are. A differential vector of the XZ vector from the acceleration sensor between the frames (the direction of the differential vector represents the moving direction of the operation unit) is calculated. The direction represented by a differential vector having the maximum magnitude may be determined as the direction in which the operation unit was swung for making the direction instruction operation.

[0426] When the operation unit is swung, as shown in FIG. 56, the value of each axis is changed from 0 → positive value → 0 → negative value → 0 or 0 → negative value → 0 → positive value → 0. Therefore, in the case where such a pattern is found during the immediately previous 60 frames based on the sampling data, it can be recognized that the direction instruction operation was performed before the trigger operation. Thus, the direction in which the operation unit was swung at the time of the direction instruction operation is detected. In this manner, more accurate detection is made possible.

[0427] In a modification to the processing in step S748, the following processing may be executed. When the direction in which the first unit was swung for making the direction instruction operation is detected, it is also determined based on the second sampling data 724 whether or not the second unit was also swung at the time of the direction instruction operation. When the second unit was also swung, the setting of the first swinging directional vector 709 is cancelled. In this case, a new operation requirement that "the first unit and the second unit should not be swung simultaneously at the time of a direction instruction operation" is imposed on the player.

[0428] In step S750, it is determined whether or not the magnitude of the first swinging directional vector 709 which was set in step S748 is larger than a predetermined

value. When the magnitude of the first swinging directional vector 709 is larger than the predetermined value, the processing is advanced to step S752. Otherwise, the processing is advanced to step S774 in FIG. 51.

[0429] In step S752, it is determined whether or not the direction of the first swinging directional vector 709 is either within the range of 0° to 90° or within the range of -90° to 0°. Where an X axis value of the first swinging directional vector 709 is Ax and a Z axis value thereof is Az, the direction of the first swinging directional vector 709 is represented by $\arctan(Ax/Az)$. When the first swinging directional vector 709 is either within the range of 0° to 90° or within the range of -90° to 0°, the processing is advanced to step S754. When the first swinging directional vector 709 is neither within the range of 0° to 90° nor within the range of -90° to 0°, the processing is advanced to step S774 in FIG. 51. Owing to such an arrangement, the range of directions in which the player can instruct by a direction instruction operation made on the first unit can be limited to the range of 0° to 90° (i.e., between the positive X axis direction and the positive Z axis direction) or the range of -90° to 0° (i.e., between the positive X axis direction and the negative Z axis direction). Namely, where the player holds the first unit with his/her right hand and holds the second unit with his/her left hand, the range in which the first unit is swung can be limited to a right area. As described later, the range in which the second unit is swung is limited to a left area. In this manner, the first unit and the second unit are assigned different roles, so that the first unit and the second unit are prevented from colliding against each other.

[0430] The processing in step S754 and S756 are the same as that described in the fifth embodiment and will not be described here.

[0431] In step S758, the velocity vector is changed based on the first swinging directional vector 709, the second swinging directional vector 710, the first trigger operation strength value 726, and the second trigger operation strength value 728. Specifically, as shown in FIG. 57, the first swinging directional vector 709 and the second swinging directional vector 710 are synthesized to obtain a synthesized swinging directional vector. Where the X axis value of the synthesized swinging directional vector is a3 and the Z axis value thereof is b3, the current vector is synthesized with a vector represented by (rightward vector × a3 + forward vector × b3) × α (predetermined constant) × β (predetermined constant). The resultant vector is determined as a new velocity vector. α is a constant, and in step S758, $\alpha = 2$. β is a value in proportion to the sum of the first trigger operation strength value 726 and the second trigger operation strength value 728. Therefore, as the sum of the first trigger operation strength value 726 and the second trigger operation strength value 728 is larger, the acceleration of the character is larger.

[0432] In step S758, a vector obtained by doubling the first swinging directional vector 709 or the second swinging directional vector 710 may be used as the synthesized

vector. Either one the first trigger operation strength value 726 or the second trigger operation strength value 728 may be used.

[0433] The processing in steps S760, S762 and S764 is substantially the same as that described in the fifth embodiment and will not be described here.

[0434] In step S766, the velocity vector is changed in substantially the same manner as in step S758. It should be noted that in step S760, $\alpha = 1.5$.

[0435] The processing in steps S768, S770 and S772 is substantially the same as that described in the fifth embodiment and will not be described here.

[0436] The processing in FIG. 51 and FIG. 52 is apparent to those skilled in the art based on the description regarding the flowchart in FIG. 50 and the fifth embodiment, and will not be described here.

[0437] As described above, according to this embodiment, the player can freely move both of his/her hands. Owing to a high degree of freedom of motion realized by such an arrangement, a dynamic play is made possible. Since the player can control the character by swinging the operation units, the player can play intuitively and thus obtain a high operability. As the swing directions of two operation units swung simultaneously are closer to each other, the acceleration of the character is larger. Therefore, a more intuitive operation is realized.

[0438] In this embodiment, three-axial acceleration sensors are used. Even when two-axial acceleration sensors are used, a direction instruction operation is detected based on the acceleration along one of the two axes, and a trigger operation is detected by the acceleration along the other axis. Therefore, substantially the same effects as those of this embodiment are provided.

[0439] In this embodiment, the motion of the character is controlled by two operation units of the first unit and the second unit. Alternatively, the motion of the character may be controlled by performing a direction instruction operation and a trigger operation using only one operation unit.

[0440] In this embodiment, a trigger operation is performed after a direction instruction operation. Alternatively, a direction instruction operation may be performed after a trigger operation. In this case, the game processing may be executed as follows. When a direction instruction operation is detected (i.e., when the outputs of A_x and A_z represent a direction instruction operation), it is determined whether or not A_y representing a trigger operation is found during a predetermined time period before that time point, by referring to the sampling data. When such A_y is found, the game processing is executed using a swinging directional vector provided by the direction instruction operation. Alternatively, the direction instruction operation and the trigger operation may be performed substantially. In this case, the game processing may be executed as follows. When either the direction instruction operation or the trigger operation is detected, it may be determined whether or not an output representing the other operation is found during a predetermined

time period before and after that time point, by referring to the sampling data. When there is such an output, the game processing is executed using the swinging directional vector provided by the direction instruction operation.

[0441] In this embodiment, when a trigger operation is detected, it is determined whether or not a direction instruction operation was performed during a predetermined time period before that time point, by referring to the sampling data. Alternatively, when a direction instruction operation is detected, it may be monitored whether or not a trigger operation is performed during a predetermined time period after that time point.

[0442] In the above embodiments, the player controls the game object. The present invention is not limited to this. For example, the inclination of a virtual camera which is set in the virtual game world may be changed in accordance with the output from the first acceleration sensor (inclination, etc.), and the motion of the game object may be changed in accordance with the output from the second acceleration sensor (swinging strength, swinging direction, etc.).

[0443] While the invention has been described in detail, the foregoing description is in all aspects illustrative and not restrictive. It is understood that numerous other modifications and variations can be devised without departing from the scope of the invention.

Claims

1. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) which is an acceleration sensor or a gyrosensor provided in a first housing (71) and an output from a second sensor (761) which is an acceleration sensor or a gyrosensor provided in a second housing (77) separate from the first housing, the game program causing a computer (30) of a game apparatus (3) to function as:

first posture detection means for detecting a posture of the first housing based on an output from the first sensor;

second posture detection means for detecting a posture of the second housing based on an output from the second sensor;

posture difference detection means for detecting a difference between the posture of the first housing detected by the first posture detection means and the posture of the second housing detected by the second posture detection means; and

game control means for executing game control using the difference detected by the posture difference detection means.

2. A computer-readable storage medium according to

claim 1, wherein:

the game program further causes the computer to function as posture average detection means for detecting an average of the posture of the first housing detected by the first posture detection means and the posture of the second housing detected by the second posture detection means; and
 the game control means executes the game control using both the difference detected by the posture difference detection means and the average detected by the posture average detection means.

- 3. A computer-readable storage medium according to claim 1, wherein:

the game control means comprises first motion control means for controlling a first motion of a game object using the difference detected by the posture difference detection means; and
 the game program further causes the computer to function as second motion control means for controlling a second motion of the game object based an output from a switch provided in the first housing or the second housing.

- 4. A computer-readable storage medium according to claim 1, wherein:

the first sensor usable for detecting the posture of the first housing and the second sensor usable for detecting the posture of the second housing are acceleration sensors;
 the first posture detection means detects an inclination of the first housing, and the second posture detection means detects an inclination of the second housing;
 the first posture detection means comprises first housing state determination means for determining whether or not the first housing is in a still state based on an output from the first sensor;
 when the first housing state determination means determines that the first housing is in a still state, the first posture detection means outputs the inclination of the first housing detected based on the output from the first sensor as a valid detection result;
 the second posture detection means comprises second housing state determination means for determining whether or not the second housing is in a still state based on an output from the second sensor; and
 when the second housing state determination means determines that the second housing is in a still state, the second posture detection means

outputs the inclination of the second housing detected based on the output from the second sensor as a valid detection result.

- 5. A computer-readable storage medium according to claim 4, wherein only when the first housing state determination means determines that the first housing is in a still state and also the second housing state determination means determines that the second housing is in a still state, the game control means executes the game control using the difference detected by the posture difference detection means.

- 6. A computer-readable storage medium having stored thereon a game program for executing game processing using an output from a first sensor (701) which is an acceleration sensor or a gyrosensor provided in a first housing (71) and an output from a second sensor (761) which is an acceleration sensor or a gyrosensor provided in a second housing (77) separate from the first housing, the game program causing a computer (30) of a game apparatus (3) to function as:

direction determination means for determining a direction of a game control vector based on an output from the first sensor;
 magnitude determination means for determining a magnitude of the game control vector based on an output from the second sensor; and
 game control means for executing game control using the game control vector, the direction and the magnitude of which are determined by the direction determination means and the magnitude determination means.

- 7. A computer-readable storage medium having stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion of the first housing based on an output from the first sensor;
 second motion operation detection means for detecting a motion of the second housing based on an output from the second sensor;
 simultaneous input detection means for detecting, based on the detection results of the first motion operation detection means and the second motion operation detection means, whether or not a motion of the second housing was detected within a simultaneous input acceptance

time period which is counted from a timing determined in relation with the detection of a motion of the first housing; and
 game control means for executing first game processing when the simultaneous input detection means detects that the motion of the second housing was detected within the simultaneous input acceptance time period after the motion of the first housing was detected.

8. A computer-readable storage medium according to claim 7, wherein when the simultaneous input detection means does not detect that a motion of the second housing was detected within the simultaneous input acceptance time period after the motion of the first housing was detected by the first motion operation detection means, the game control means executes second game processing which is different from the first game processing.

9. A computer-readable storage medium according to claim 8, wherein the game control means executes the first game processing when the simultaneous input detection means detects that a motion of the second housing was detected within the simultaneous input acceptance time period, and executes the second game processing at a time point when the simultaneous input acceptance time period passes without the simultaneous input detection means detecting that a motion of the second housing was detected within the simultaneous input acceptance time period.

10. A computer-readable storage medium according to claim 7, wherein:

the first motion operation detection means does not newly detect a motion of the first housing until an acceptance prohibition time period passes after a timing determined in relation with the detection of the motion of the first housing; and the second motion operation detection means does not newly detect a motion of the second housing until the acceptance prohibition time period passes after the motion of the second housing was detected.

11. A computer-readable storage medium according to claim 10, wherein:

neither the first motion operation detection means nor the second motion operation detection means newly detects a motion of the first housing or the second housing until a post-simultaneous input acceptance prohibition time period passes after a timing determined in relation with the detection by the simultaneous input detection means that, within a predetermined

time period after a motion of one of the first housing and the second housing was detected, a motion of the other was detected.

5 12. A computer-readable storage medium having stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion, the game program causing a computer (30) of a game apparatus (3) to function as:

15 first motion detection means for detecting a motion and a strength thereof of the first housing based on an output from the first sensor;
 second motion detection means for detecting a motion and a strength thereof of the second housing based on an output from the second sensor;
 20 simultaneous input detection means for detecting, based on the detection results of the first motion detection means and the second motion detection means, whether or not a motion of the second housing was detected within a simultaneous input acceptance time period which is counted from a timing determined in relation with the detection of a motion of the first housing; and
 25 game control means for, when the simultaneous input detection means detects that a motion of the second housing was detected within the simultaneous input acceptance time period after the motion of the first housing was detected, executing first game processing using the strength of the motion of the first housing detected by the first motion detection means and the strength of the motion of the second housing detected by the second motion detection means.

30 13. A computer-readable storage medium having stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion, the game program causing a computer (30) of a game apparatus (3) to function as:

35 first motion operation detection means for detecting a motion of the first housing based on an output from the first sensor;
 40 second motion operation detection means for detecting a motion of the second housing based on an output from the second sensor;
 45 simultaneous input detection means for, when a motion operation on the first housing was per-

formed, detecting whether or not a motion operation on the second housing was performed within a predetermined time period before the motion operation on the first housing, based on the detection results of the first motion operation detection means and thesecond motion operation detection means; and
game control means for,

- (a) when the simultaneous input detection means detects that a motion operation on the second housing was performed within the predetermined time period before the motion operation on the first housing, causing a game object to perform a first motion; and
- (b) when the simultaneous input detection means does not detect that a motion operation on the second housing was performed within the predetermined time period before the motion operation on the first housing, causing a game object to perform a second motion which is different from the first motion.

14. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting an inclination and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting an inclination, the game program causing a computer (30) of a game apparatus (3) to function as:

reference value setting instruction detection means for detecting a reference value setting instruction from a player;
reference value setting means for, when the reference value setting instruction detection means detects a reference value setting instruction, setting a first reference value and a second reference value based on an output value from the first sensor and/or an output value from the second sensor;
first posture detection means for detecting a posture of the first housing based on an output value from the first sensor and the first reference value;
second posture detection means for detecting a posture of the second housing based on an output value from the second sensor and the second reference value;
posture difference detection means for detecting a difference between the posture of the first housing detected by the first posture detection means and the posture of the second housing detected by the second posture detection

means; and
game control means for executing game control using the difference detected by the posture difference detection means.

15. A computer-readable storage medium according to claim 14, wherein the reference value setting means sets the first reference value and the second reference value at the same timing in accordance with the reference value setting instruction detection means detecting a single reference value setting instruction.

16. A computer-readable storage medium according to claim 14, wherein when the reference value setting instruction detection means detects the reference value setting instruction, the reference value setting means sets a value obtained by a predetermined calculation based on an output value from the first sensor and an output value from the second sensor, commonly as the first reference value and the second reference value.

17. A computer-readable storage medium according to claim 14, wherein when the reference value setting instruction detection means detects the reference value setting instruction, the reference value setting means sets a value based on either an output value from the first sensor or an output value from the second sensor, commonly as the first reference value and the second reference value.

18. A computer-readable storage medium according to claim 17, wherein:

the first housing and/or the second housing includes a switch for allowing the player to input the reference value setting instruction; and
when the reference value setting instruction detection means detects the reference value setting instruction, the reference value setting means commonly sets the first reference value and the second reference value based on an output value from either the first sensor or the second sensor which does not include the switch used for inputting the reference value setting instruction.

19. A computer-readable storage medium according to claim 14, wherein:

the reference value setting means comprises reference value setting time difference detection means for, when the reference value setting instruction detection means detects the reference value setting instruction, determining whether or not a difference between the inclination of the first housing and the inclination of the second

housing is within a predetermined range, based on an output value from the first sensor and an output value from the second sensor; and the reference value setting means,

(a) when the reference value setting time difference detection means determines that the difference is within the predetermined range, sets the first reference value and the second reference value respectively based on the output value from the first sensor and the output value from the second sensor; and

(b) when the reference value setting time difference detection means determines that the difference is not within the predetermined range, executes error processing.

20. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) which is an acceleration sensor or a gyrosensor provided in a first housing (71) and an output from a second sensor (761) which is an acceleration sensor or a gyrosensor provided in a second housing (77) separate from the first housing, the game program causing a computer (30) of a game apparatus (3) to function as:

posture control means for controlling a posture of a game object based on an output from the first sensor; and

movement control means for controlling a movement of the game object based on an output from the second sensor.

21. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor;

second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor;

synthesized direction determination means for determining a synthesized direction by synthesizing the first motion direction detected by the

first motion direction detection means and the second motion direction detected by the second motion direction detection means; and game control means for executing game control using the synthesized direction determined by the synthesized direction determination means.

22. A computer-readable storage medium having stored thereon a game program for executing game processing using an output from a first sensor (701) provided in a first housing (71) for detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing for detecting a motion, the game program causing a computer (30) of a game apparatus (3) to function as:

first strength detection means for detecting a strength of a motion of the first housing based on an output from the first sensor;

second strength detection means for detecting a strength of a motion of the second housing based on an output from the second sensor;

synthesized strength determination means for determining a synthesized strength by synthesizing the strength of the motion of the first housing detected by the first strength detection means and the strength of the motion of the second housing detected by the second strength detection means; and

game control means for executing game control using the synthesized strength determined by the synthesized strength determination means.

23. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor;

second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor;

motion direction relationship determination means for determining whether or not the first motion direction detected by the first motion direction detection means and the second motion

direction detected by the second motion direction detection means fulfill a predetermined relationship; and

game control means for, when the motion direction relationship determination means determines that the first motion direction and the second motion direction fulfill the predetermined relationship, executing game control based on the motion direction and/or a motion strength of at least one of the first housing and the second housing.

24. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion of the first housing based on an output from the first sensor;

second motion operation detection means for detecting a motion of the second housing based on an output from the second sensor;

motion timing relationship determination means for determining, based on the detection results of the first motion operation detection means and thesecond motion operation detection means, whether or not a timing at which the motion of the first housing is detected and a timing at which the motion of the second housing is detected fulfill a predetermined relationship; and game control means for, when the motion timing relationship determination means determines that the timing at which the motion of the first housing is detected and the timing at which the motion of the second housing is detected fulfill the predetermined relationship, executing game control based on a motion direction and/or a motion strength of at least one of the first housing and the second housing.

25. A computer-readable storage medium according to claim 23, wherein the game control means executes the game control based on the motion direction and/or the motion strength of both of the first housing and the second housing.

26. A computer-readable storage medium according to claim 24, wherein the game control means executes the game control based on the motion direction and/or the motion strength of both of the first housing and the second housing.

27. A computer-readable storage medium according to claim 23, wherein the game control means executes the game control based on the motion direction and the motion strength of both of the first housing and the second housing.

28. A computer-readable storage medium according to claim 24, wherein the game control means executes the game control based on the motion direction and the motion strength of both of the first housing and the second housing.

29. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor;

second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor;

motion direction relationship determination means for determining whether or not the first motion direction detected by the first motion direction detection means and the second motion direction detected by the second motion direction detection means fulfill a predetermined relationship; and

game control means for, when the motion direction relationship determination means determines that the first motion direction and the second motion fulfill the predetermined relationship, causing a game object to perform a specific motion.

30. A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) for detecting a motion and an output from a second sensor (761) provided in a second housing (77) separate from the first housing for detecting a motion, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion operation detection means for detecting a motion and a strength thereof of the first housing based on an output from the first

sensor;
 second motion operation detection means for detecting a motion and a strength thereof of the second housing based on an output from the second sensor;
 motion timing relationship determination means for determining, based on the detection results of the first motion operation detection means and the second motion operation detection means, whether or not a timing at which the motion of the first housing is detected and a timing at which the motion of the second housing is detected fulfill a predetermined relationship; and
 game control means for, when the motion timing relationship determination means determines that the timing at which the motion of the first housing is detected and the timing at which the motion of the second housing is detected fulfill the predetermined relationship, causing a game object to perform a specific motion.

- 31.** A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion in at least two axial directions and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion in at least two axial directions, the game program causing a computer (30) of a game apparatus (3) to function as:

first motion direction detection means for detecting a first motion direction representing a direction in which the first housing was moved based on an output from the first sensor;
 second motion direction detection means for detecting a second motion direction representing a direction in which the second housing was moved based on an output from the second sensor; and
 game control means for, when the first motion direction detected by the first motion direction detection means is in a first range and the second motion direction detected by the second motion direction detection means is in a second range, executing game control based on the first motion direction and the second motion direction.

- 32.** A computer-readable storage medium having stored thereon a game program for executing game control using an output from a first sensor (701) provided in a first housing (71) and capable of detecting a motion or a posture and an output from a second sensor (761) provided in a second housing (77) separate from the first housing and capable of detecting a motion or a posture, the game program causing a com-

puter (30) of a game apparatus (3) to function as:

first game control means for executing first game processing based on an output from the first sensor;
 second game control means for executing second game processing based on an output from the second sensor; and
 reference sensor exchange means for changing the sensor referred to by the first game control means for executing the first game processing from the first sensor to the second sensor, and for changing the sensor referred to by the second game control means for executing the second game processing from the second sensor to the first sensor, in accordance with an instruction of a player.

- 33.** A computer-readable storage medium having stored thereon a game program for executing game control using an output from a sensor (701) at least capable of detecting a motion in two axial directions of a first axis direction and a second axis direction, the game program causing a computer (30) of a game apparatus (3) to function as:

motion detection means for detecting a motion in the first axis direction of the sensor; and
 game control means for, when the motion detection means detects a motion in the first axis direction, executing game processing based on an output from the sensor in the second axis direction at a time point or during a time period which is determined in relation with the detection of the motion.

- 34.** A computer-readable storage medium having stored thereon a game program for executing game control using an output from a sensor (701) at least capable of detecting a motion in three axial directions of a first axis direction, a second axis direction and a third axis direction, the game program causing a computer (30) of a game apparatus (3) to function as:

motion detection means for detecting a motion in the first axis direction of the sensor; and
 game control means for, when the motion detection means detects a motion in the first axis direction, executing game control using a direction represented by an output from the sensor in the second axis direction and an output from the sensor in the third axis direction at a time point or during a time period which is determined based on the time point when the motion was detected.

- 35.** A computer-readable storage medium according to claim 33, wherein when the motion detection means

detects a motion in the first axis direction, the game control means executes game control using an output from the sensor in the second axis direction at a time point or during a time period which is determined based on the time point when the motion was detected, and also using a magnitude of an output from the sensor in the first axis direction regarding the motion in the first axis direction.

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36. A computer-readable storage medium according to claim 33, wherein when the motion detection means detects a motion in the first axis direction, the game control means detects whether or not there is a motion in the second axis direction at a time point or during a time period which is determined based on the time point when the motion in the first axis direction was detected; and when the motion in the second axis direction is detected, executes game control using an output in the second axis direction.

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FIG. 1

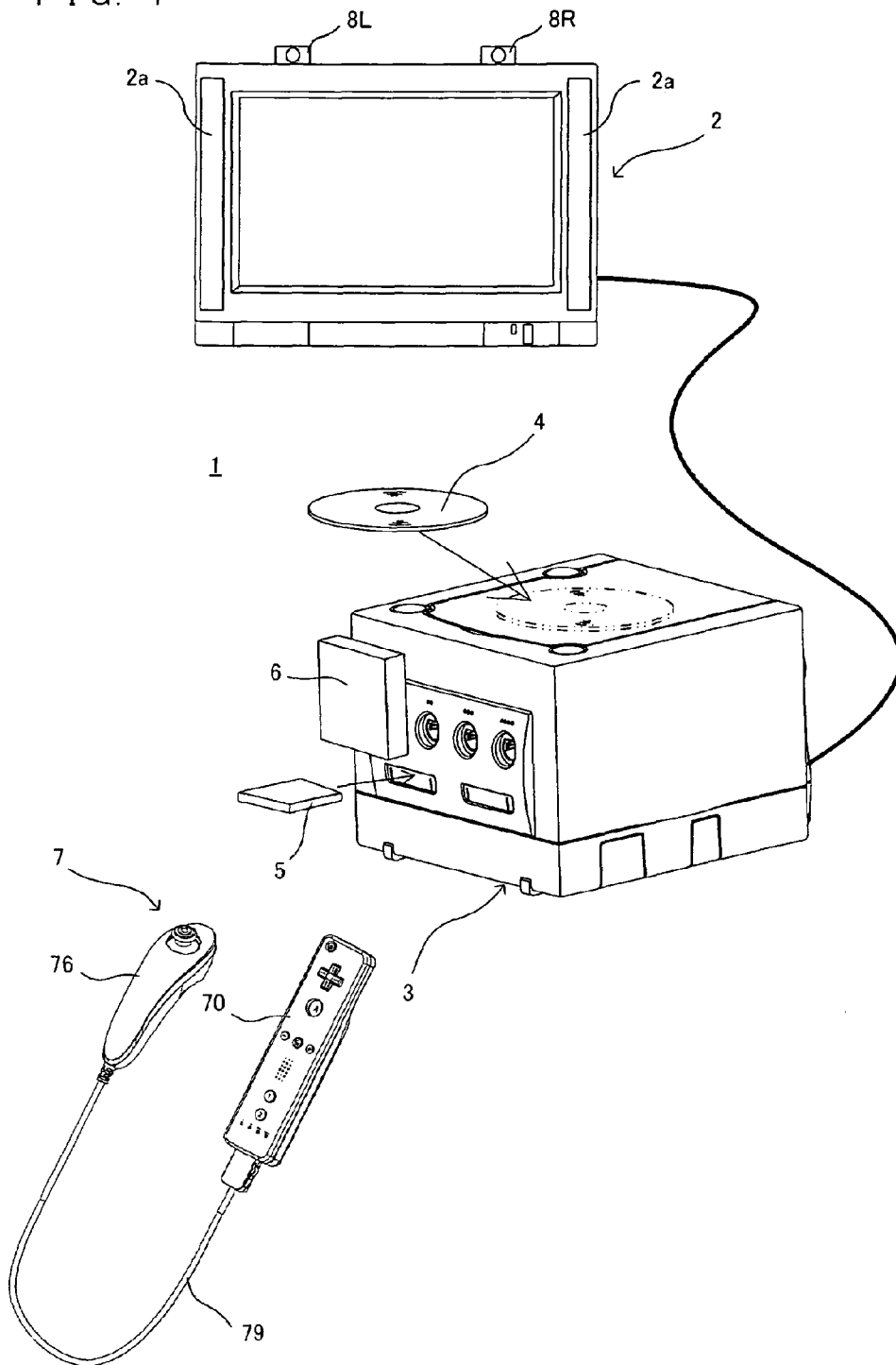


FIG. 2

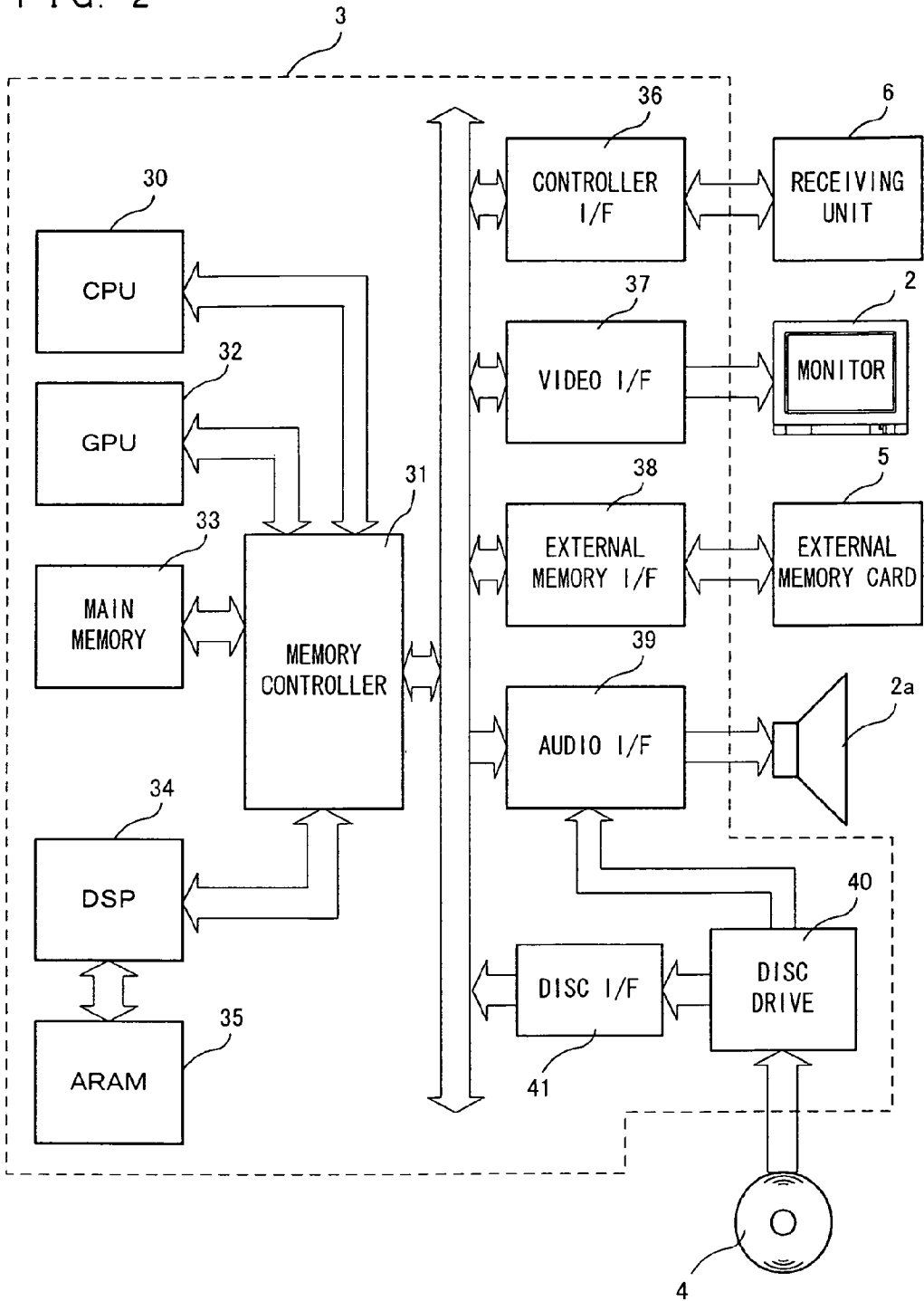


FIG. 3

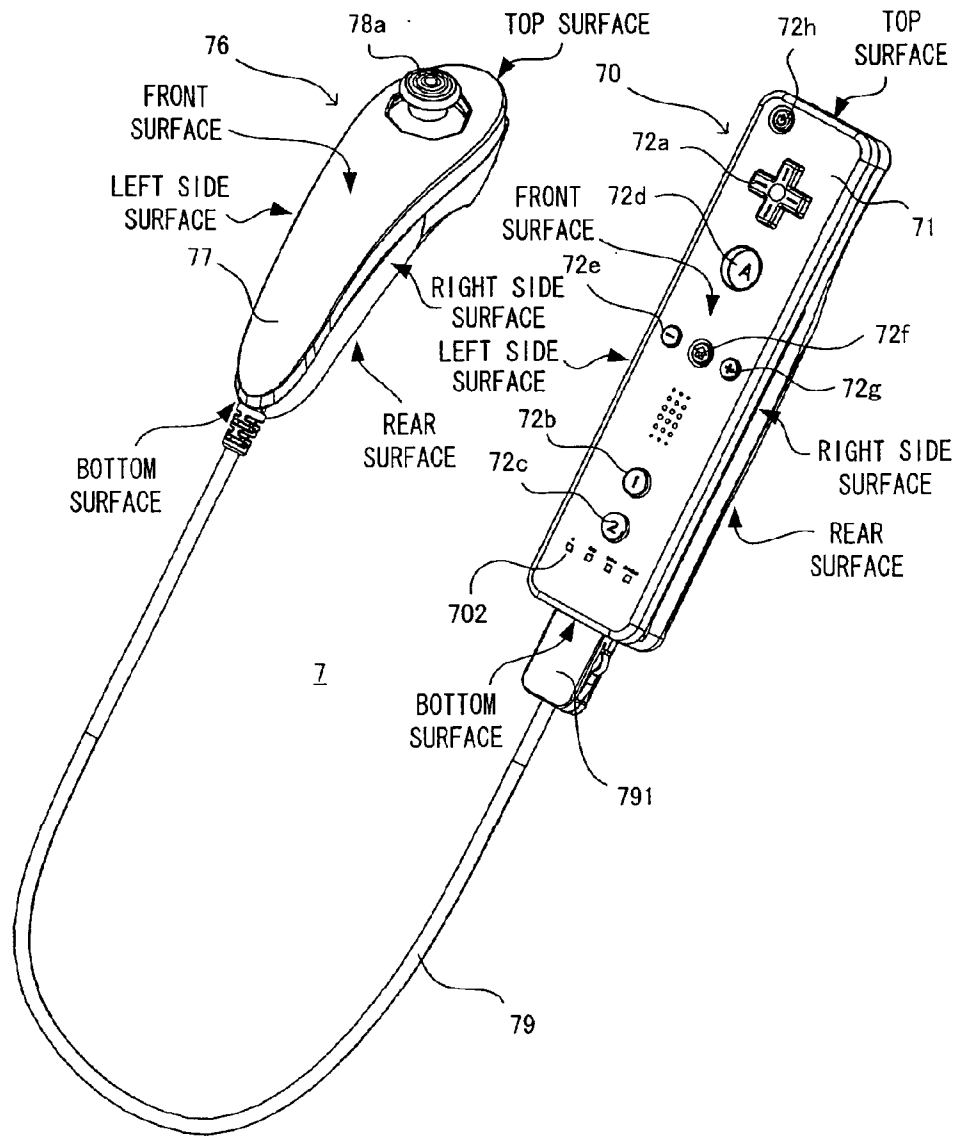


FIG. 4

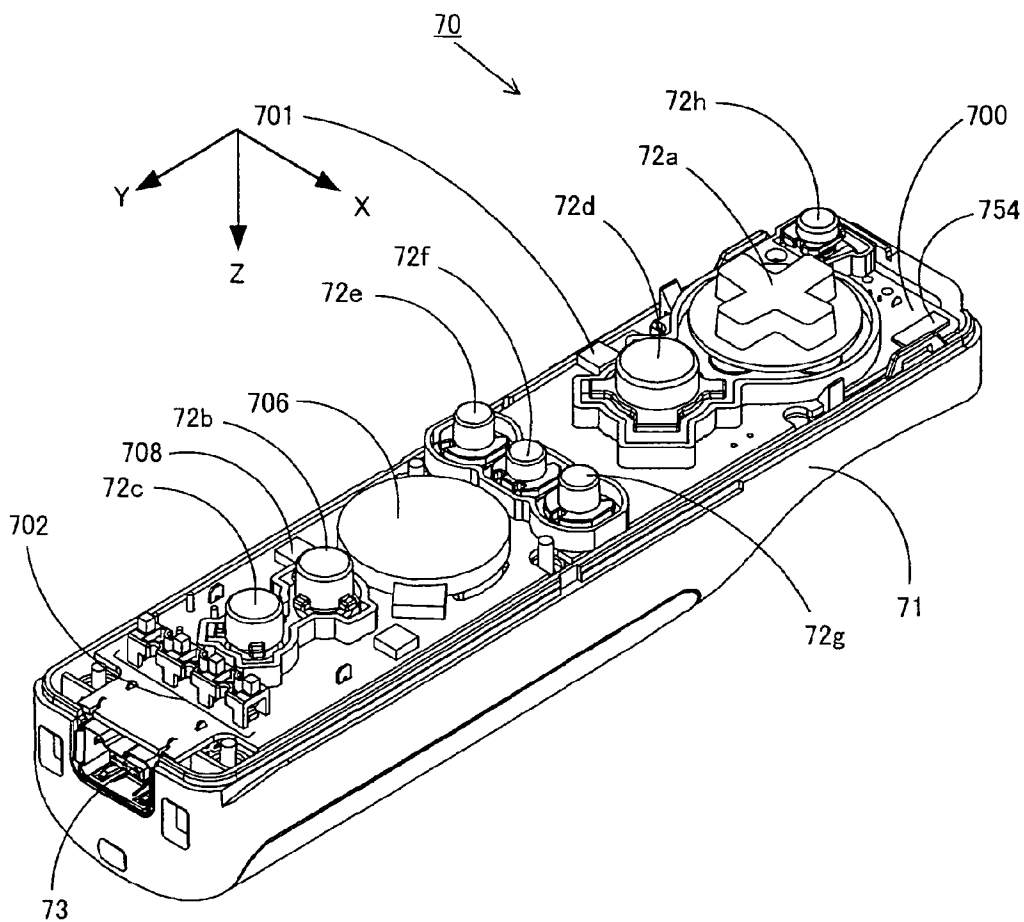


FIG. 5

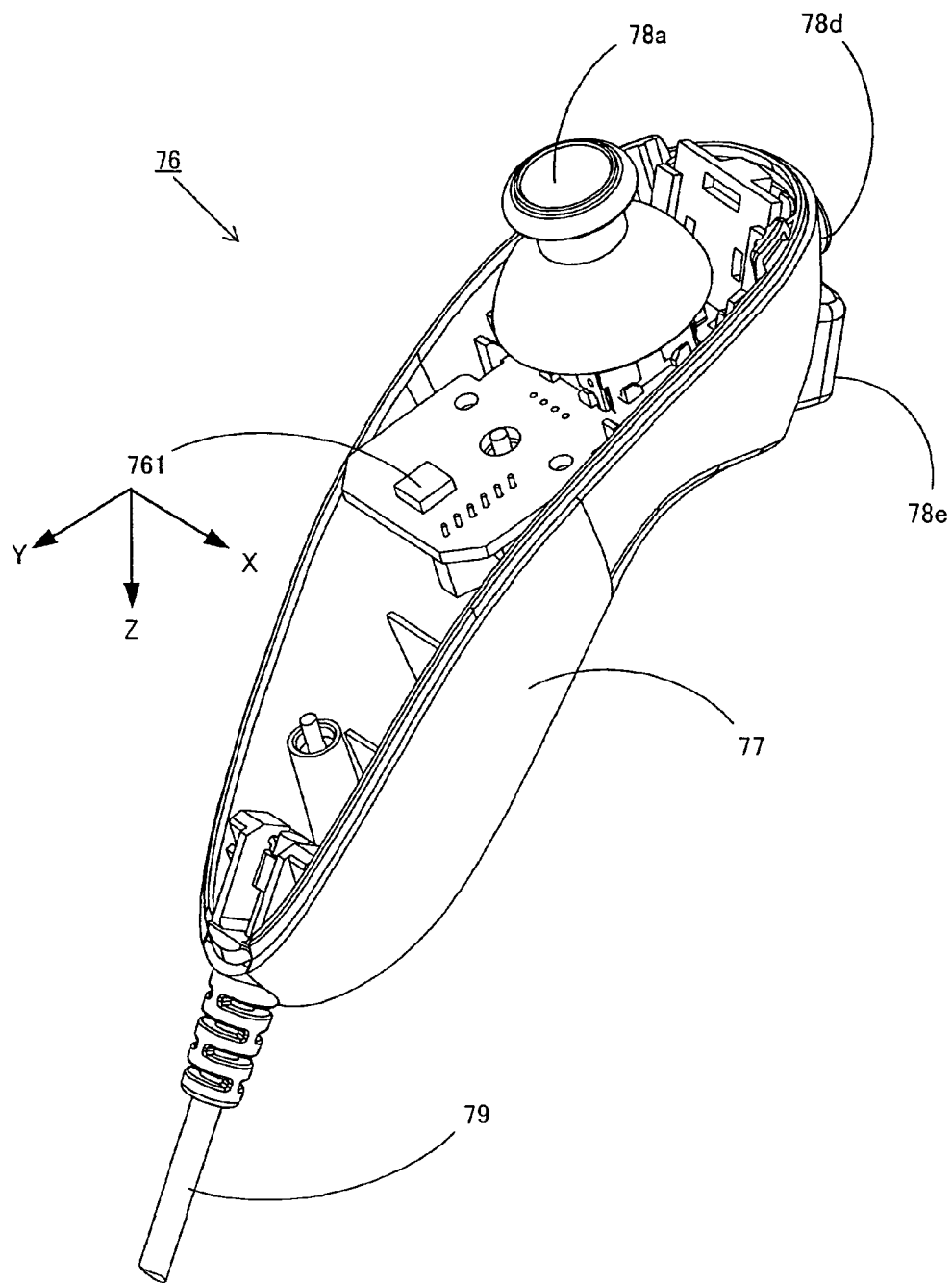


FIG. 6

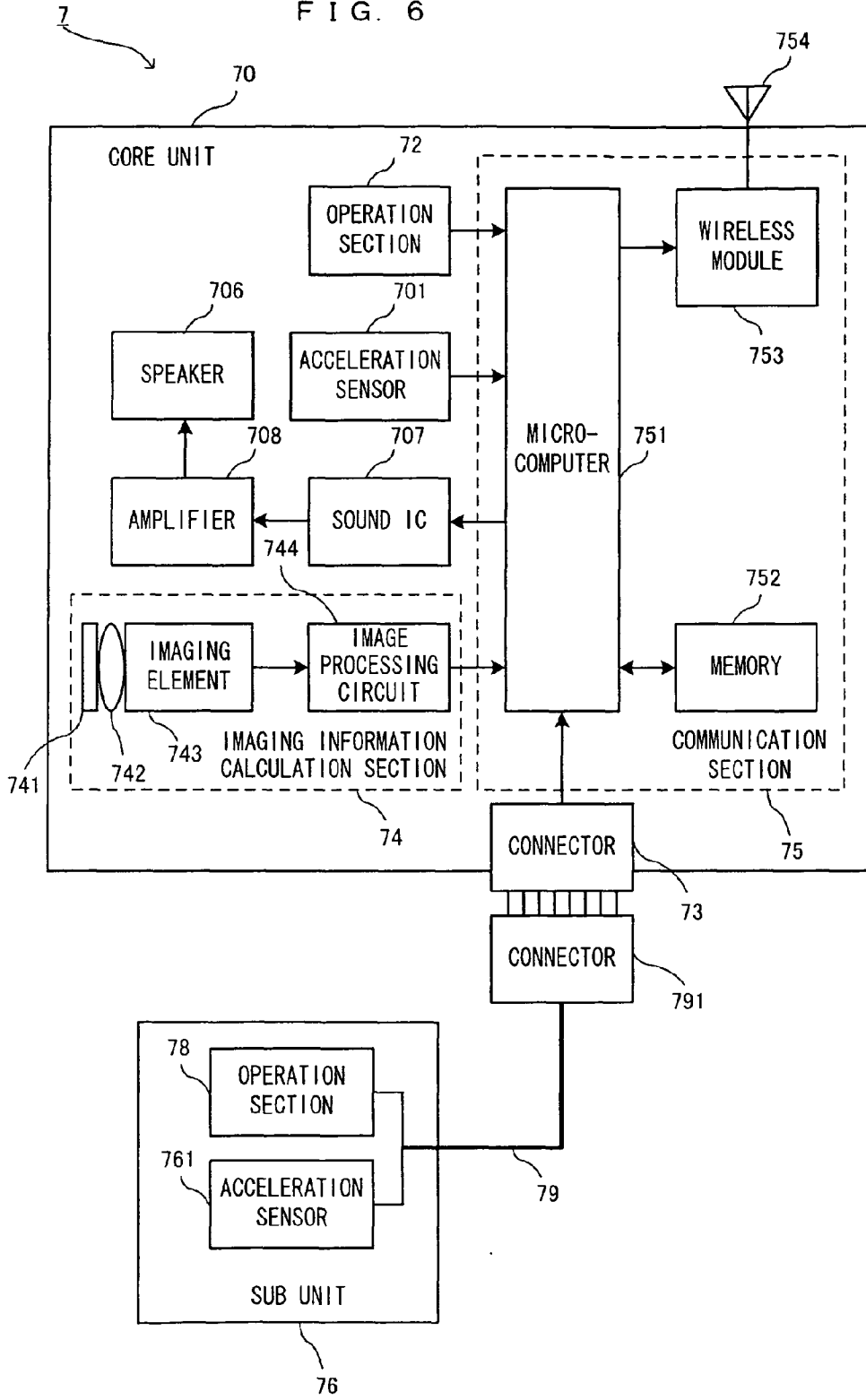


FIG. 7

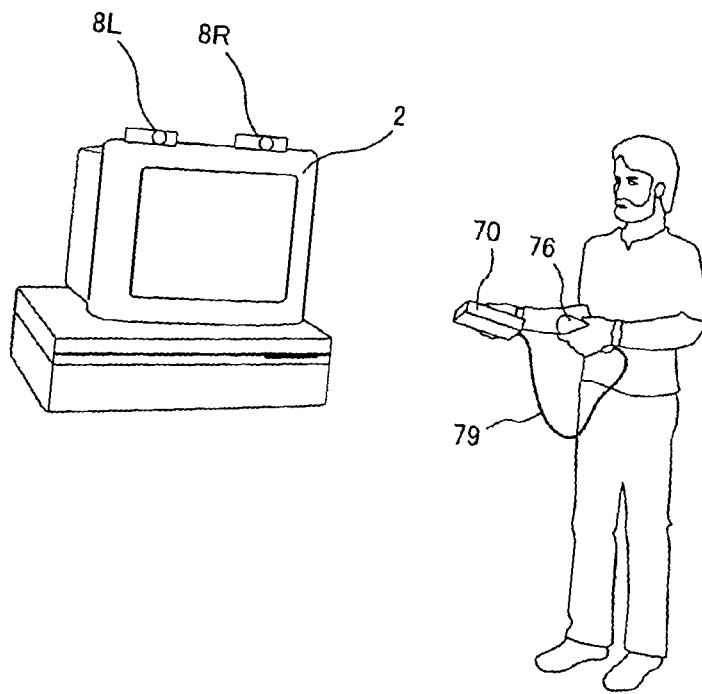


FIG. 8

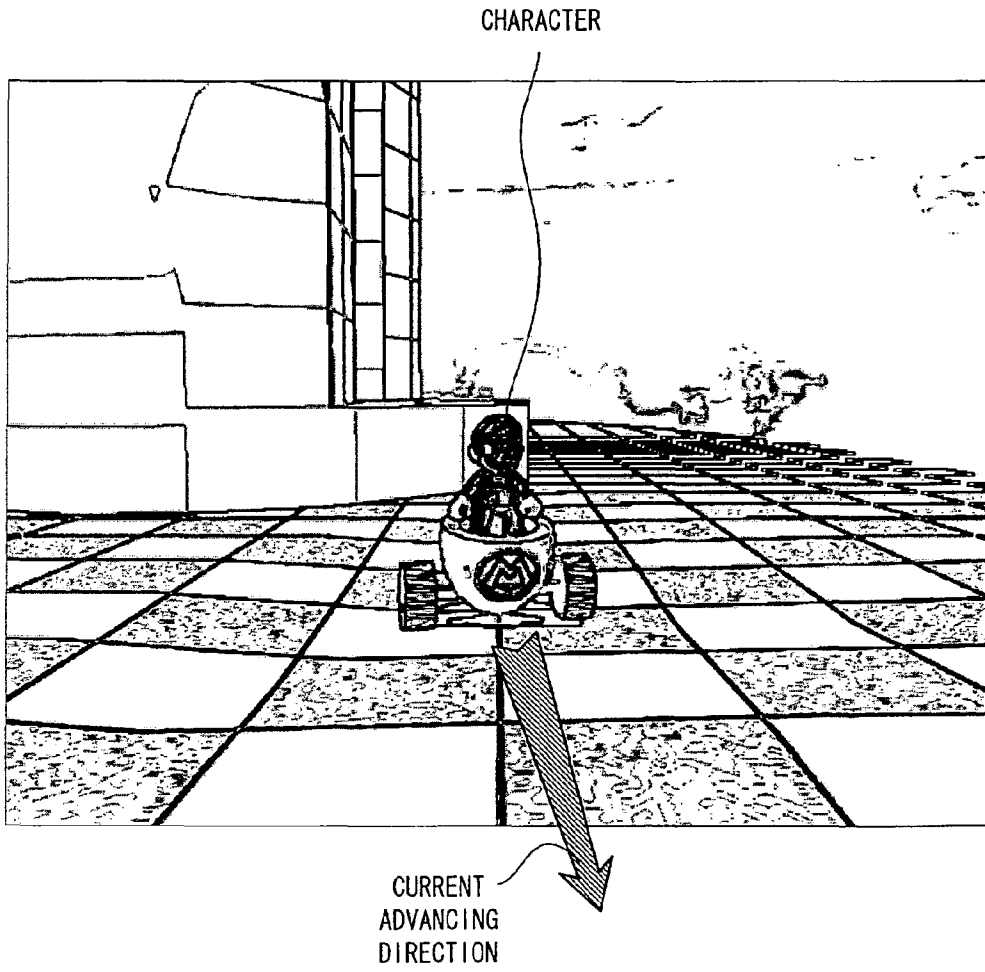


FIG. 9

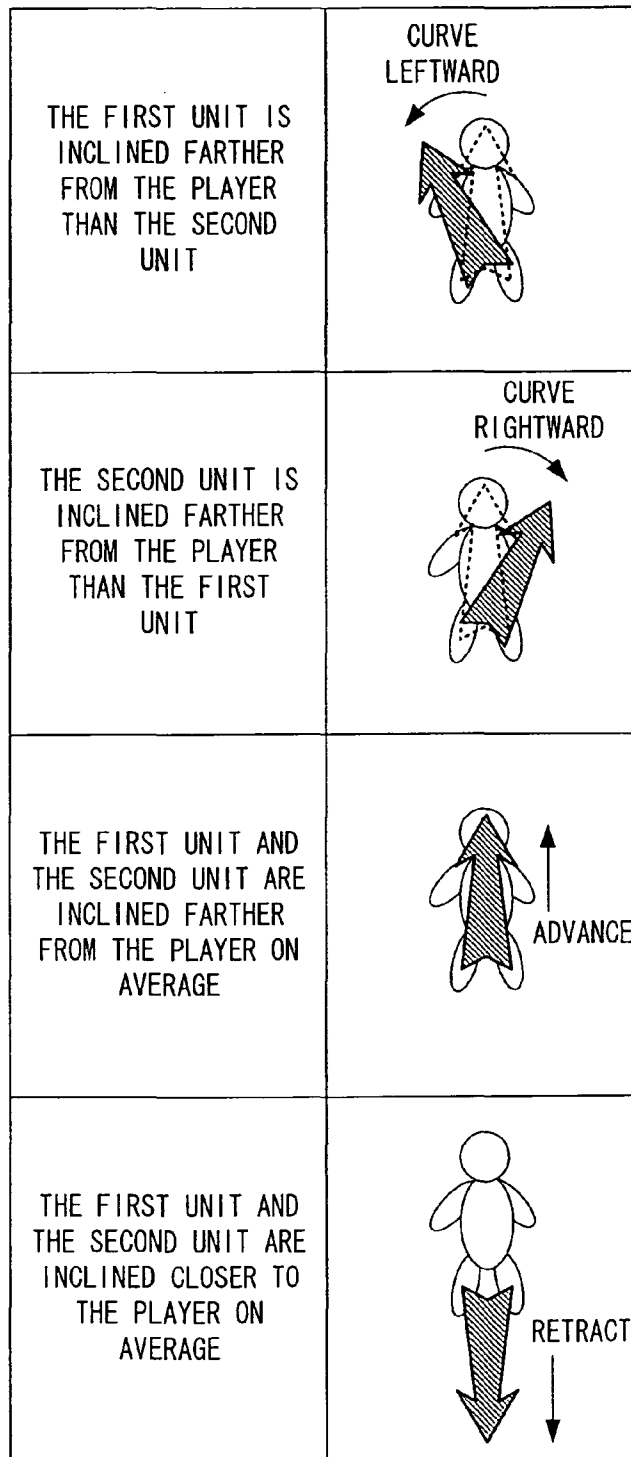


FIG. 10

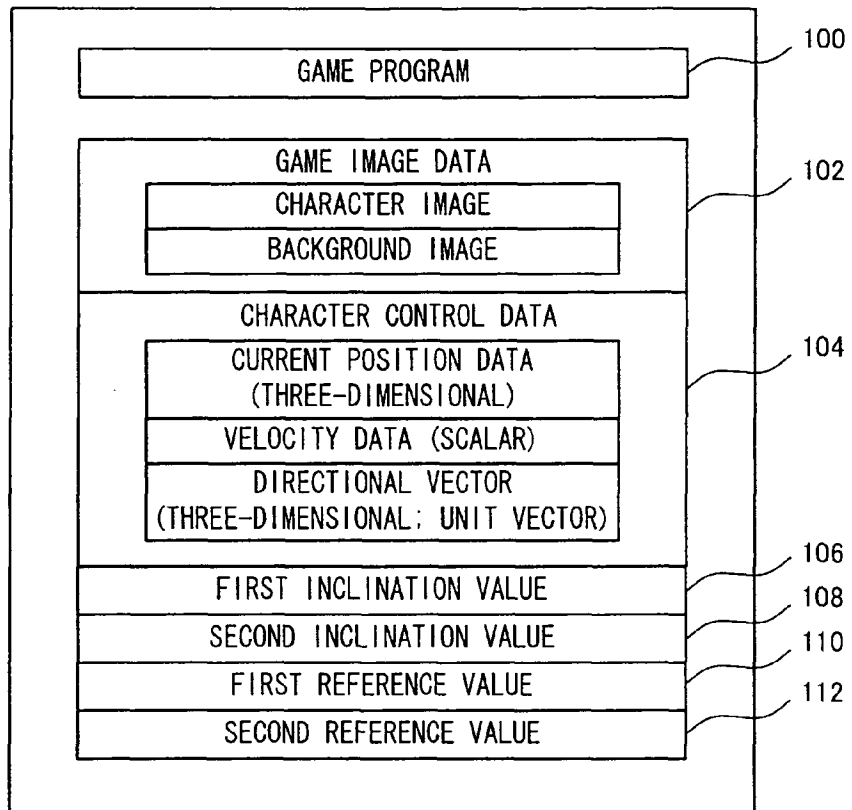


FIG. 11

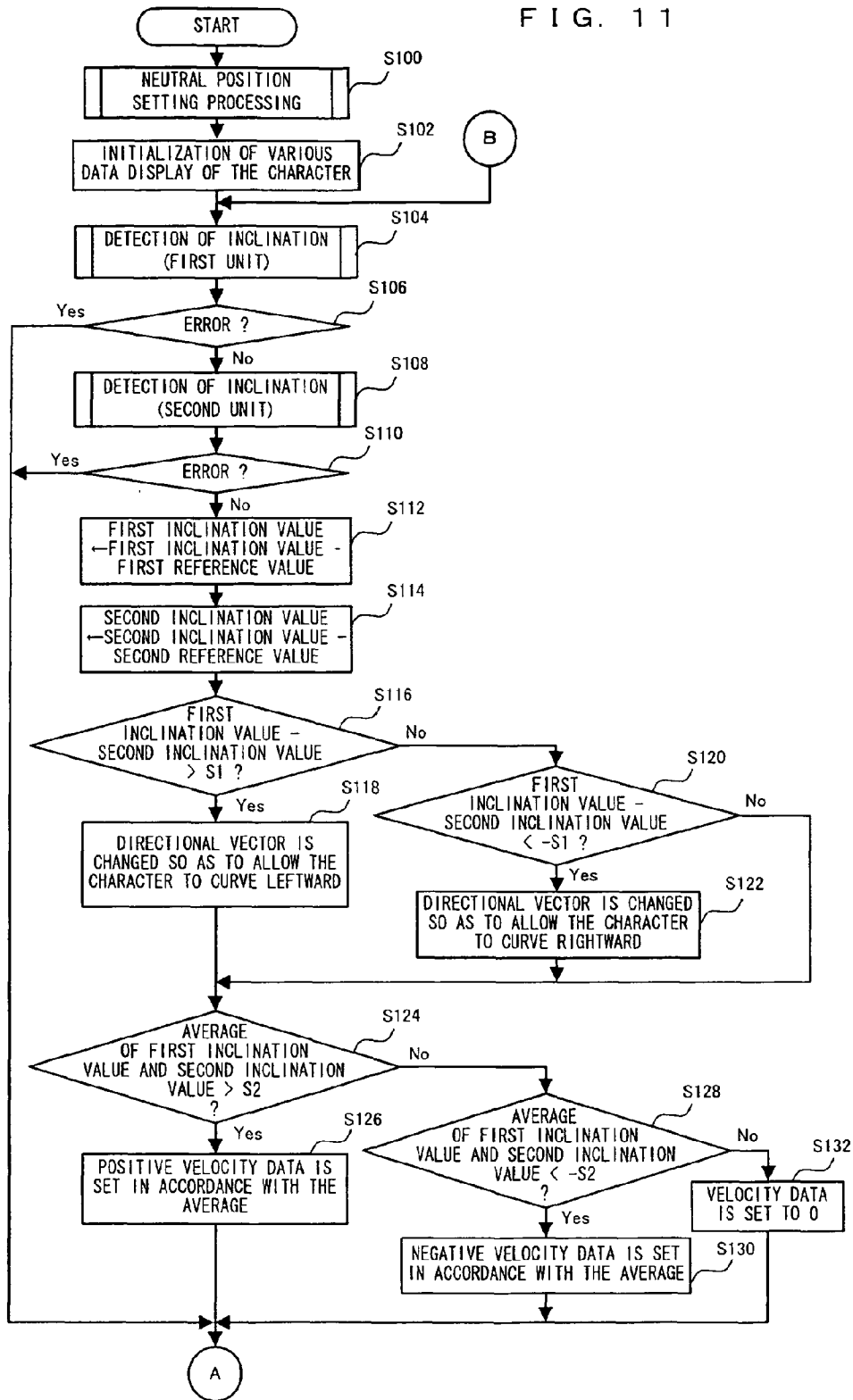


FIG. 12

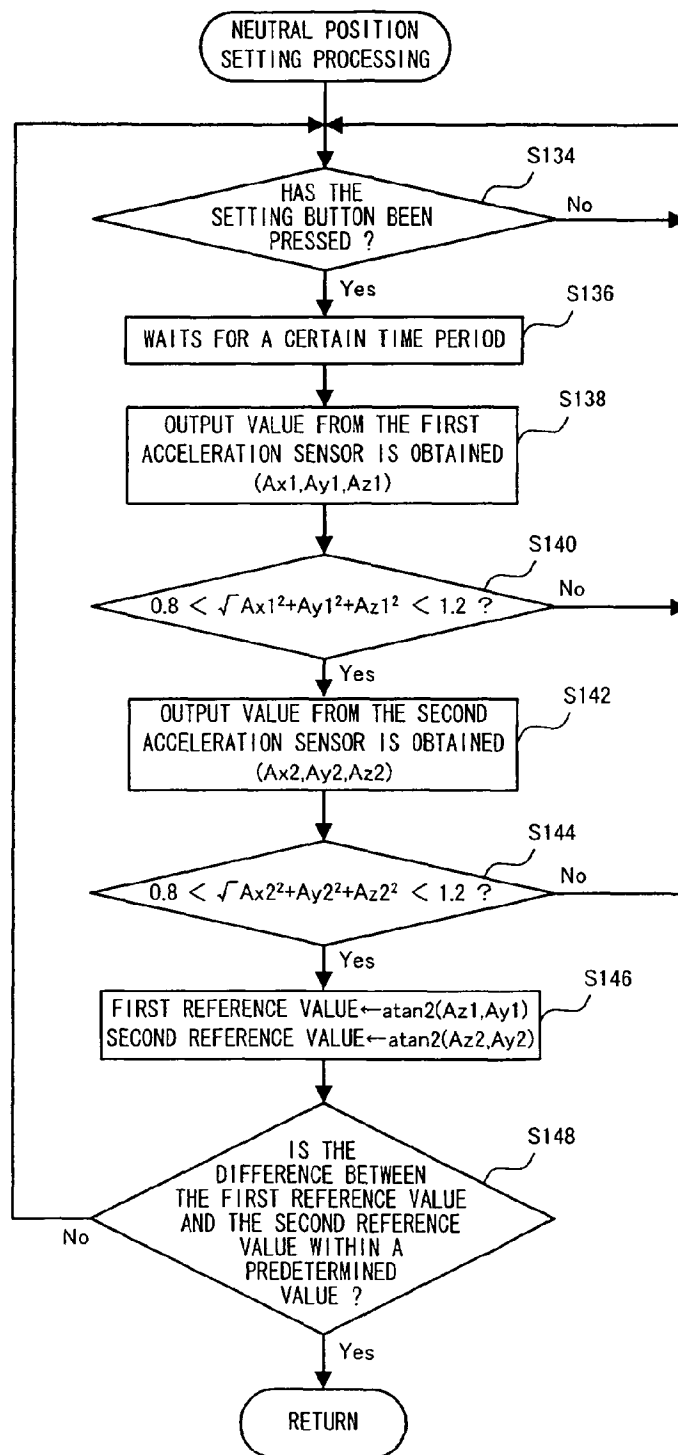


FIG. 13

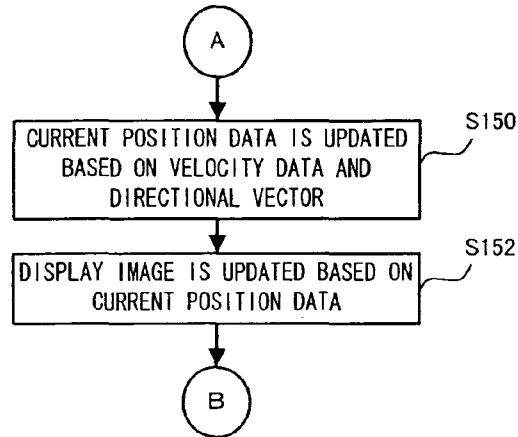


FIG. 14

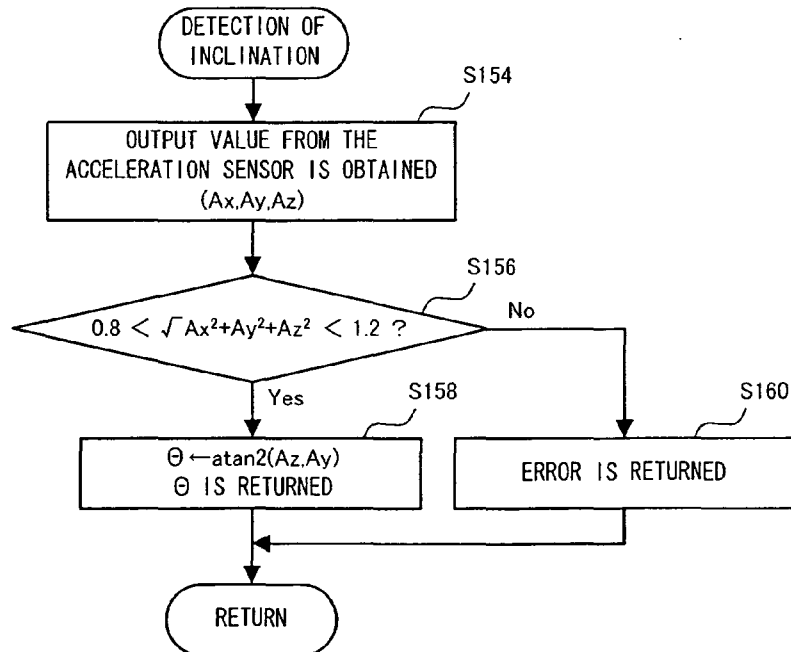


FIG. 15

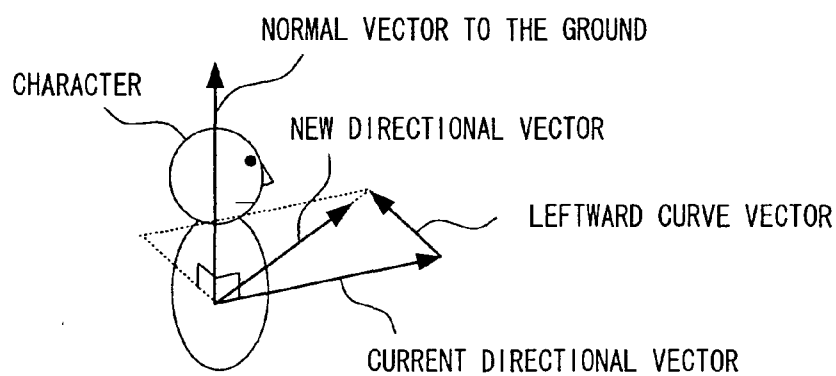


FIG. 16

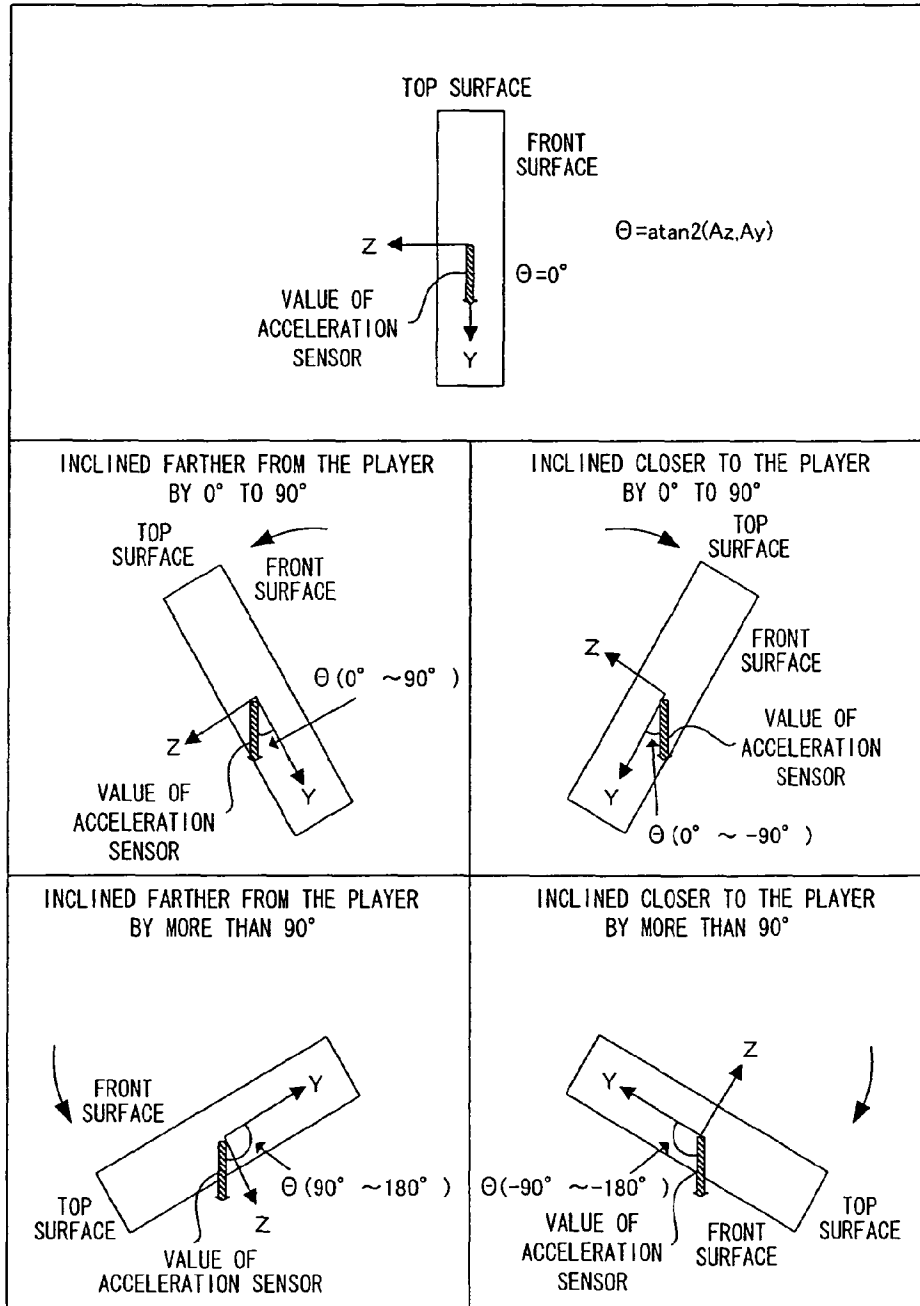


FIG. 17

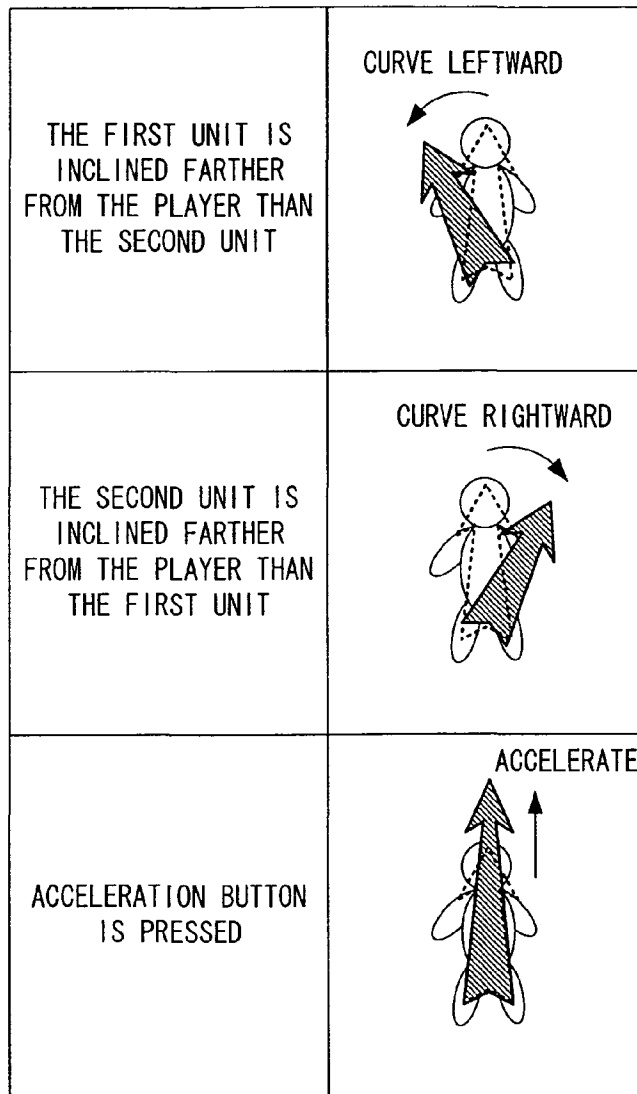


FIG. 18

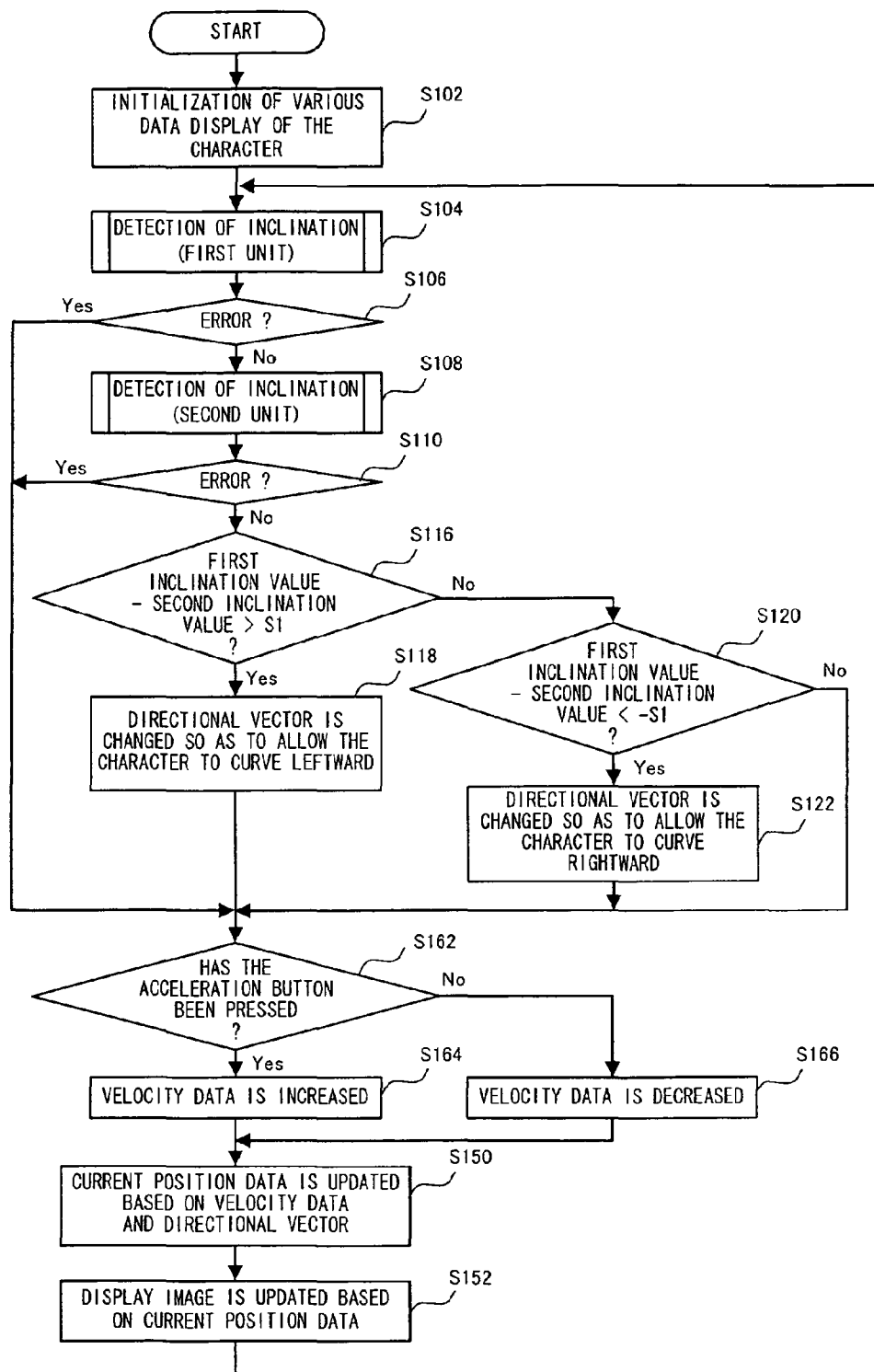


FIG. 19

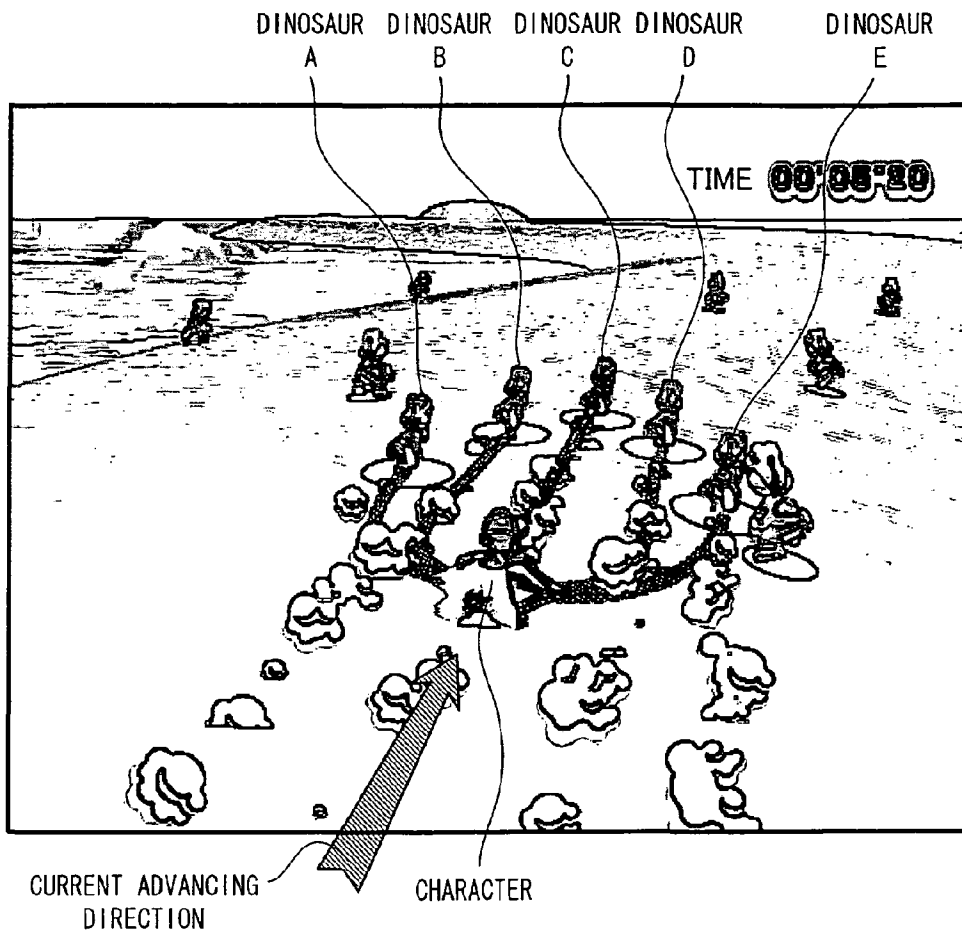


FIG. 20

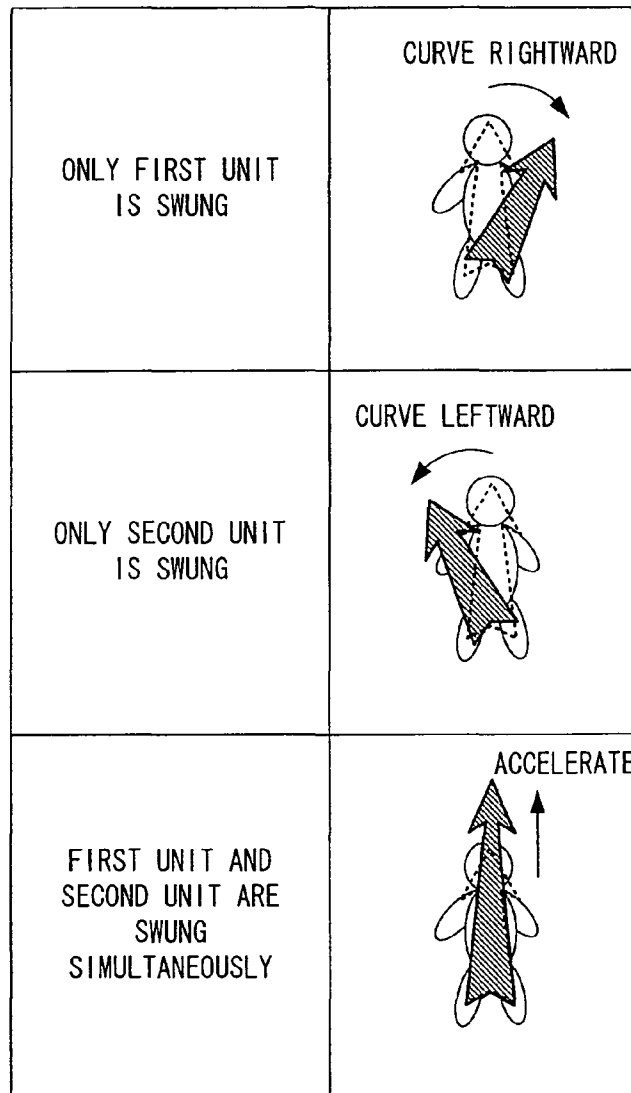


FIG. 21

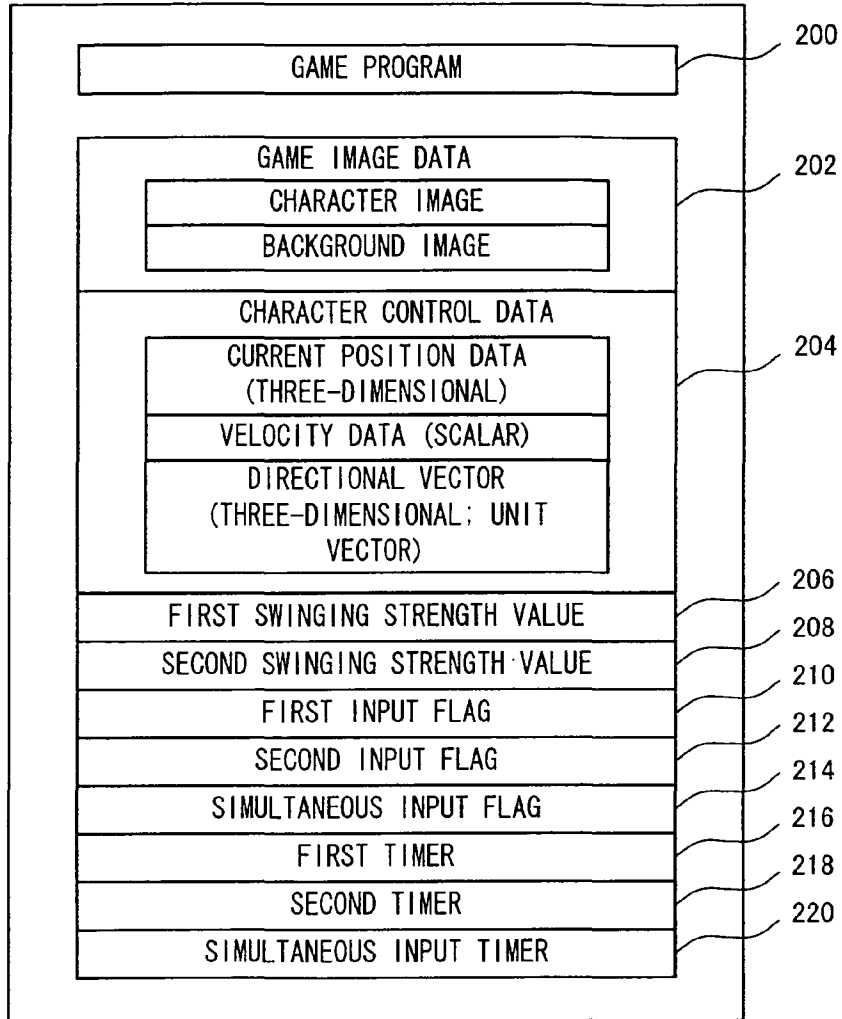


FIG. 22

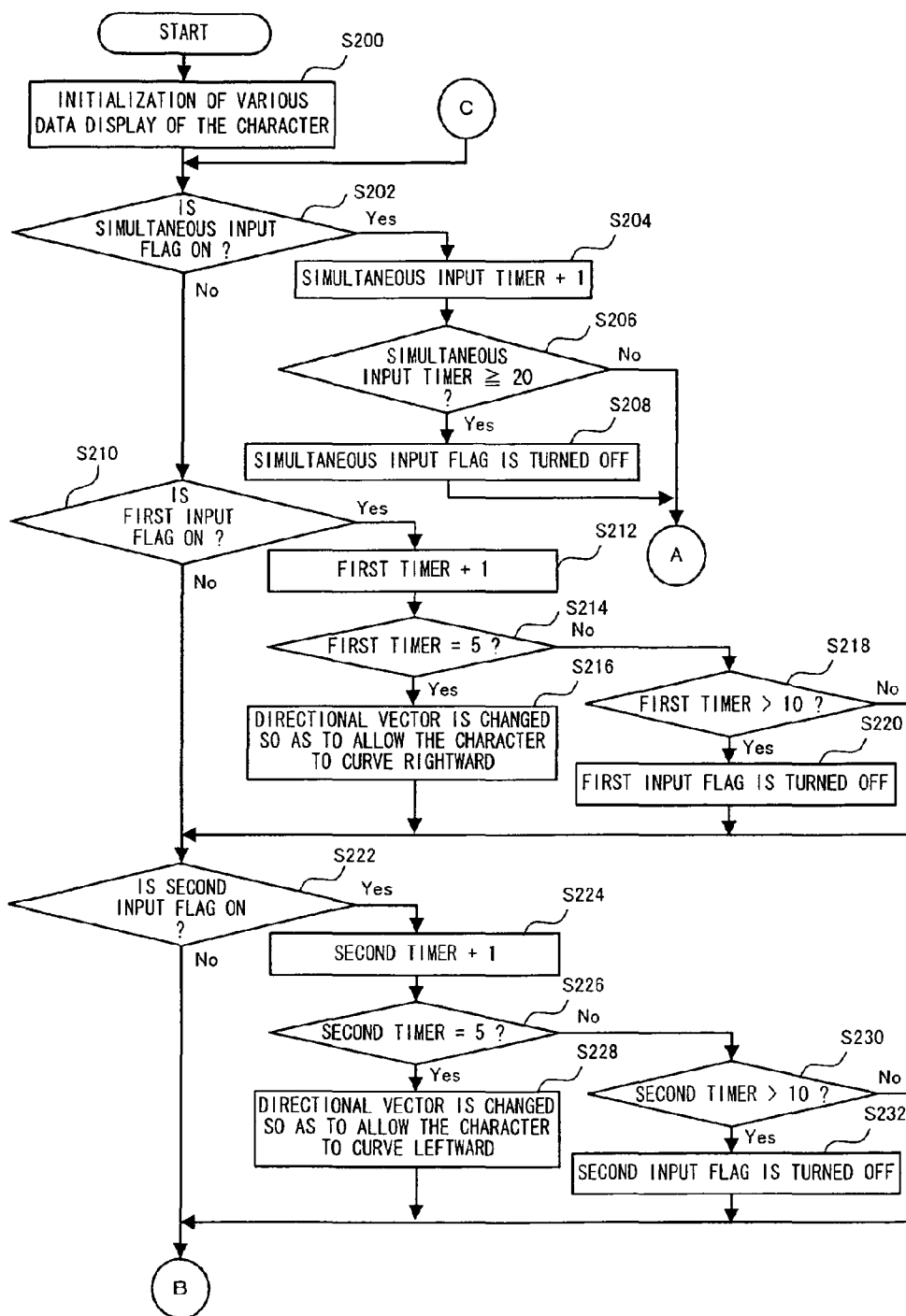


FIG. 23

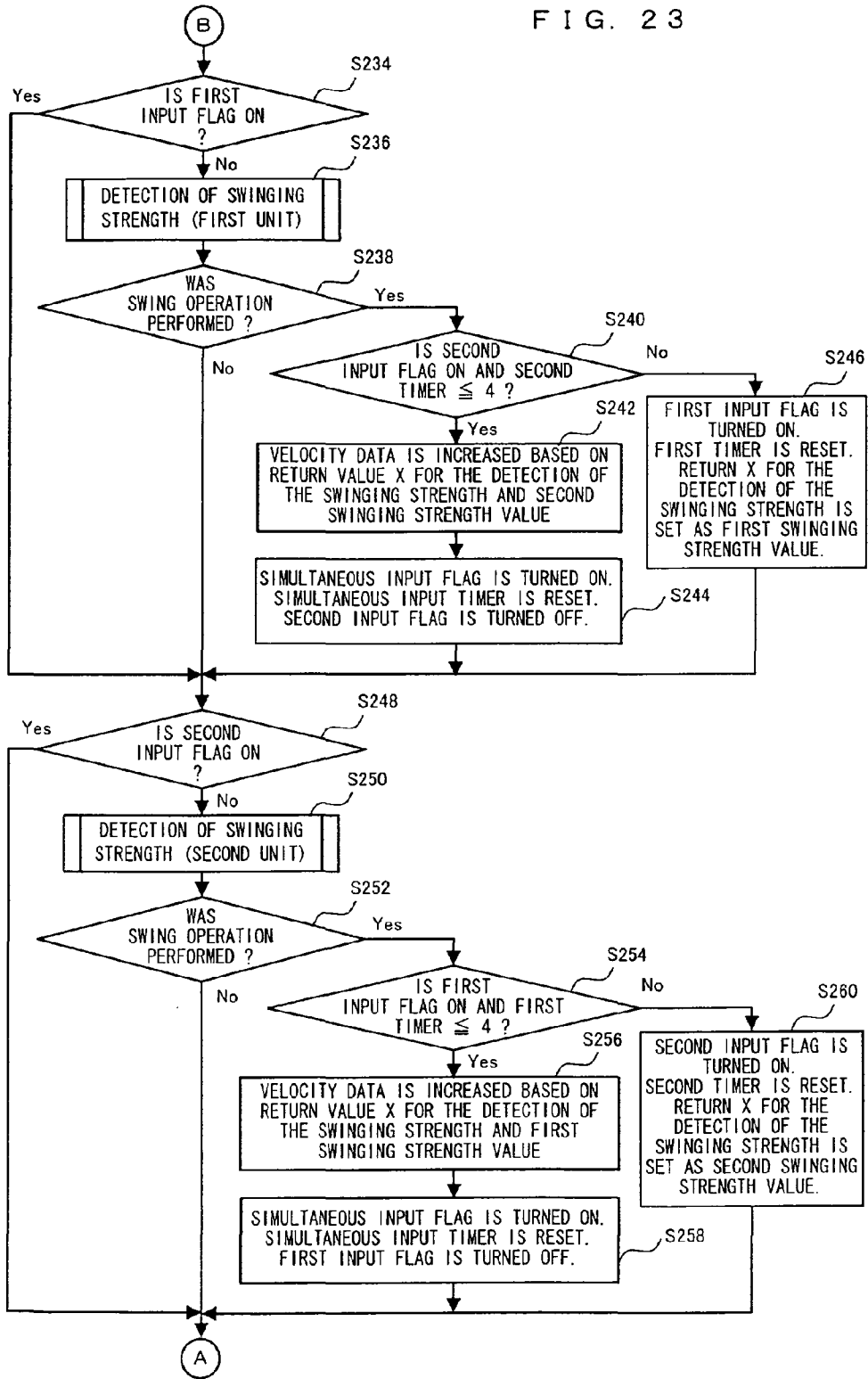


FIG. 24

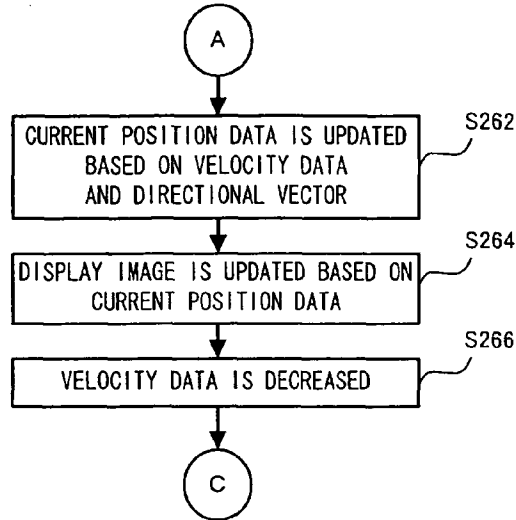


FIG. 25

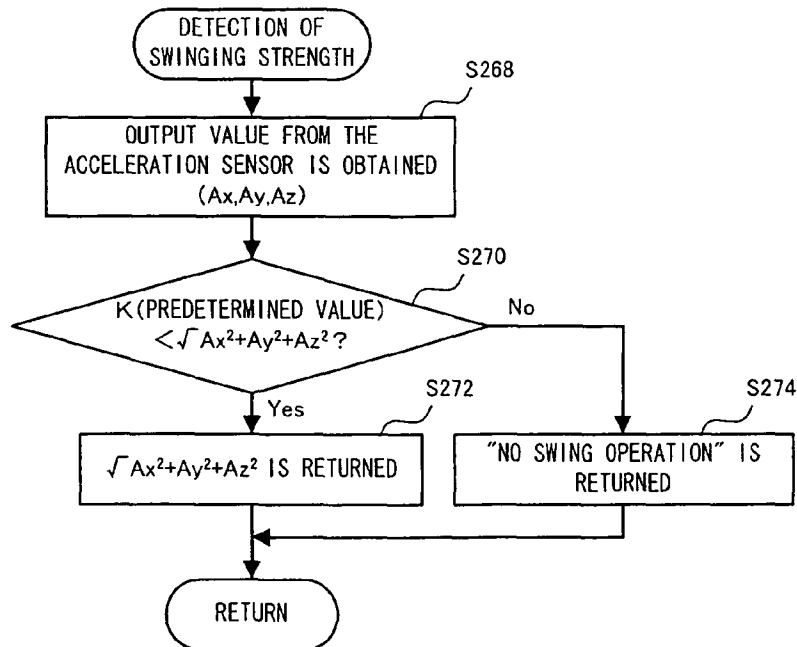


FIG. 26

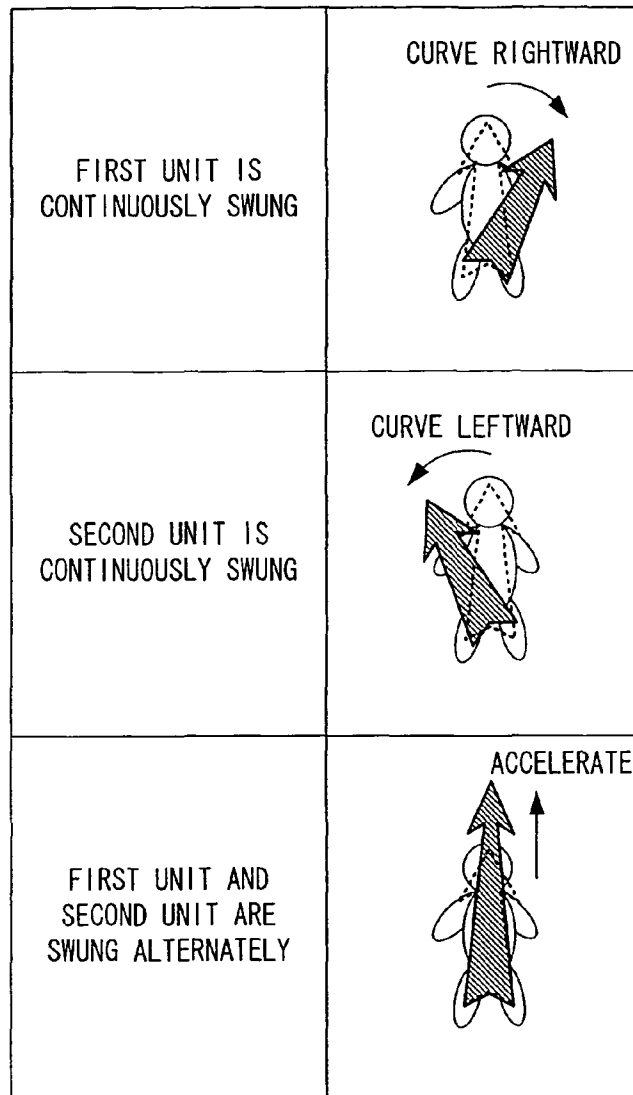


FIG. 27

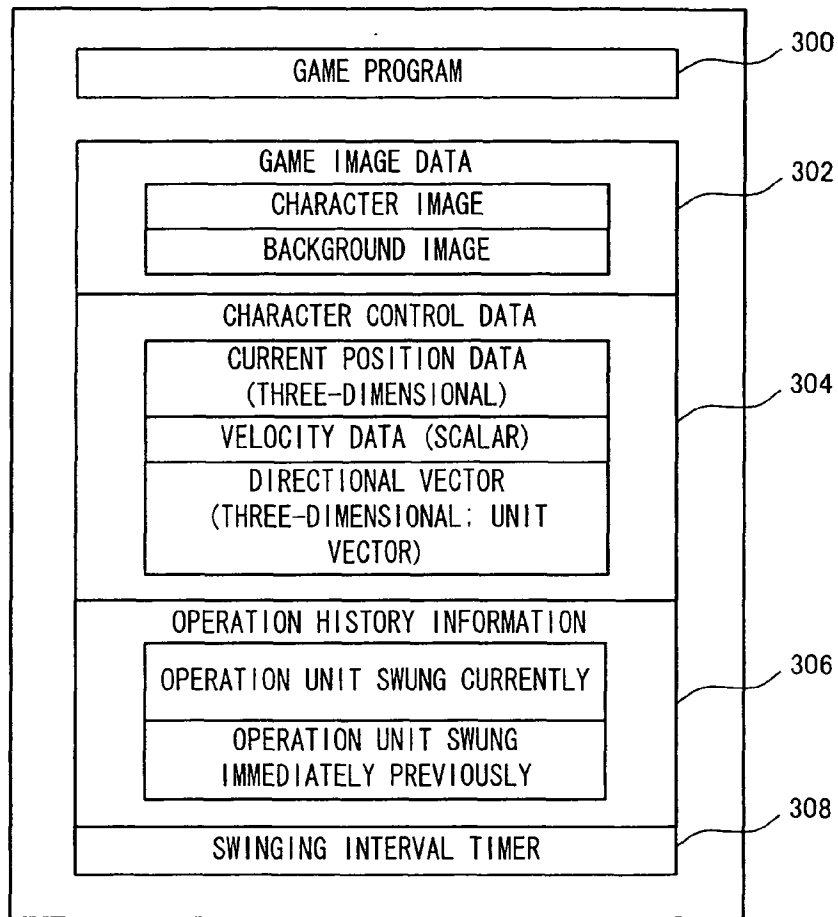


FIG. 28

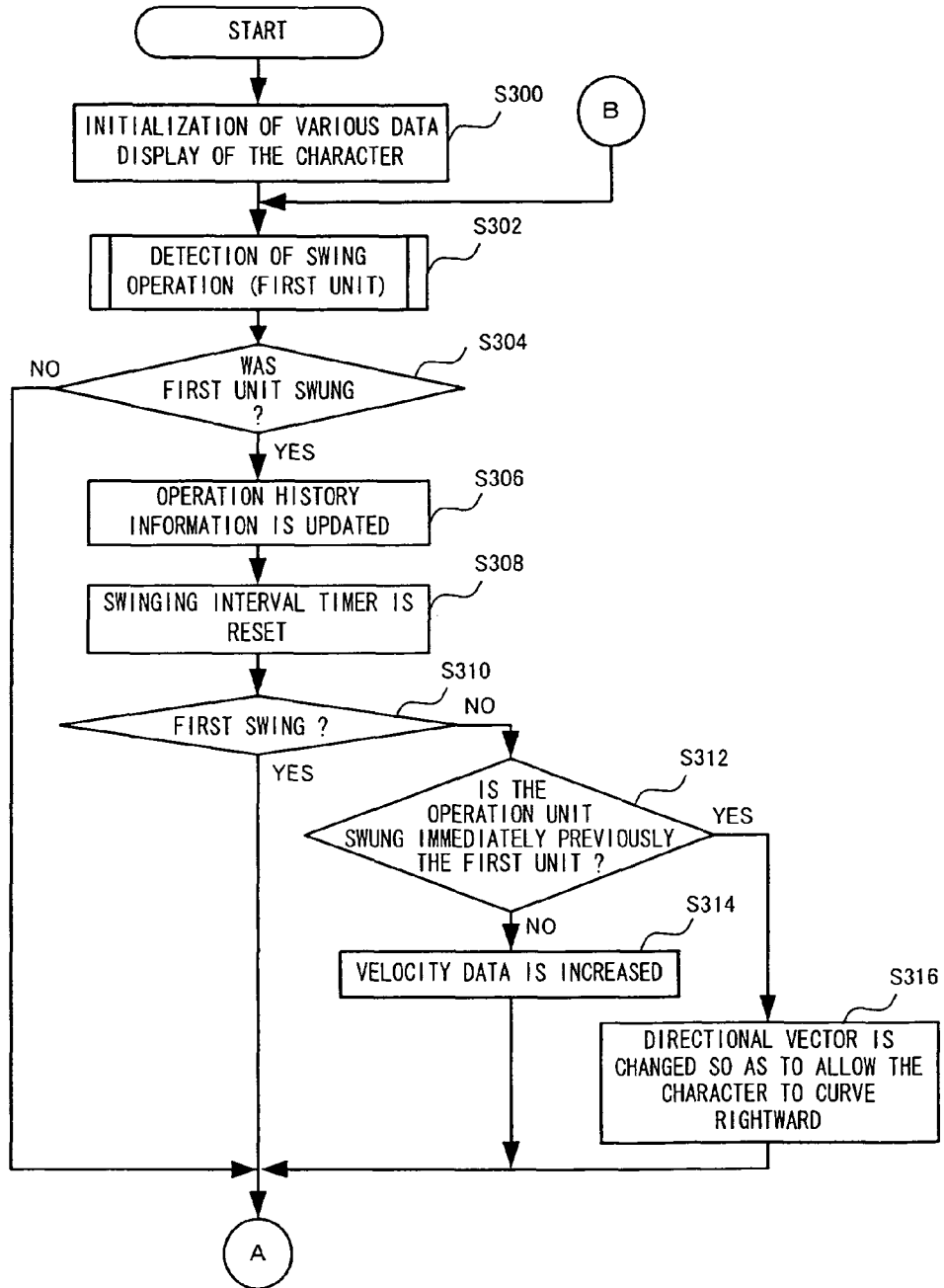


FIG. 29

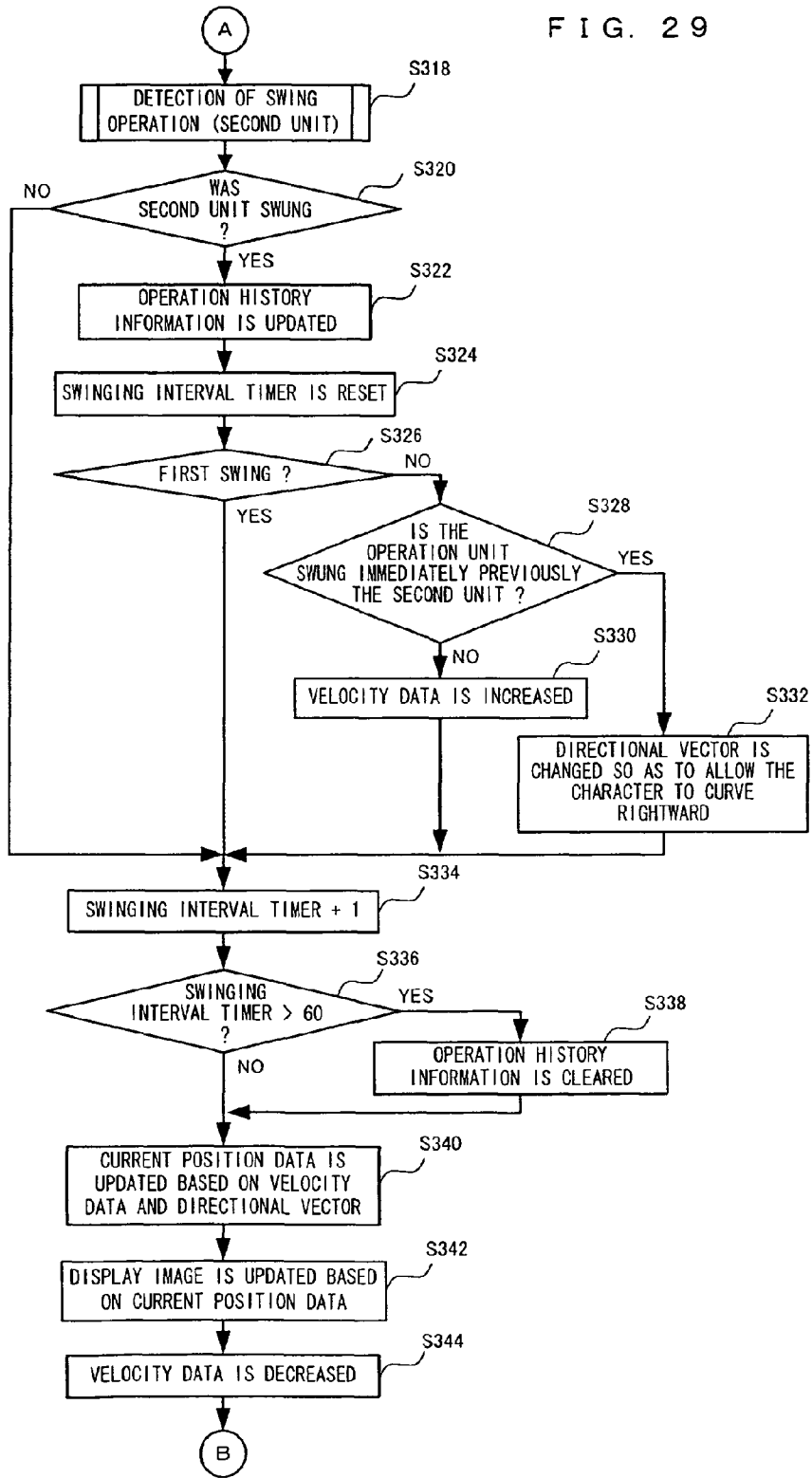


FIG. 30

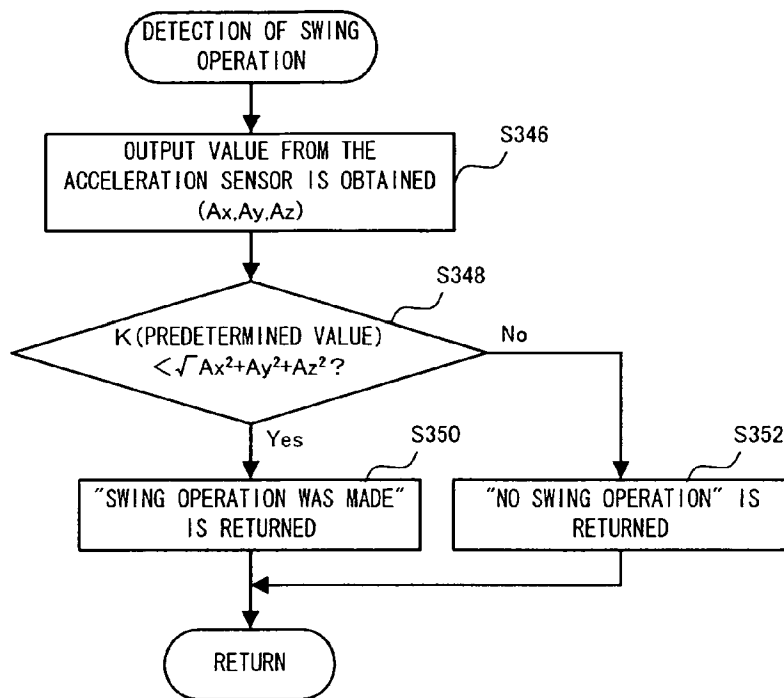


FIG. 31

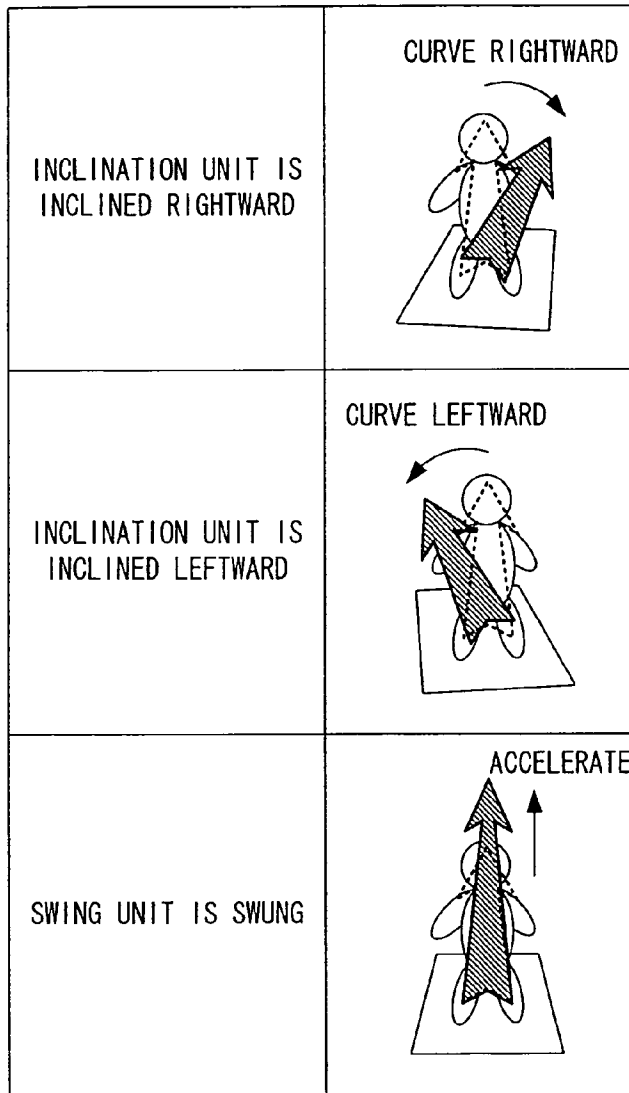


FIG. 32

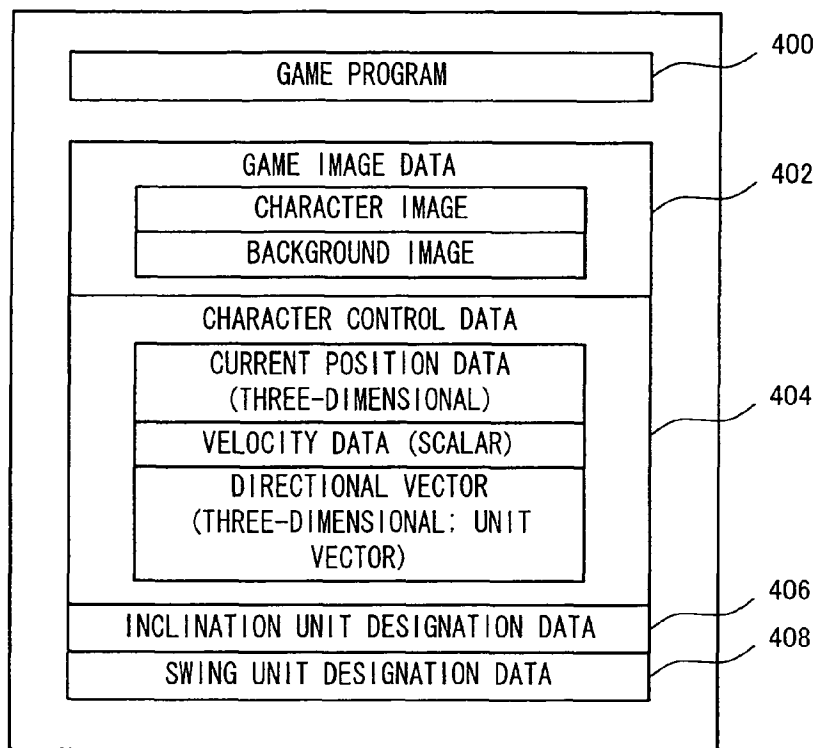


FIG. 33

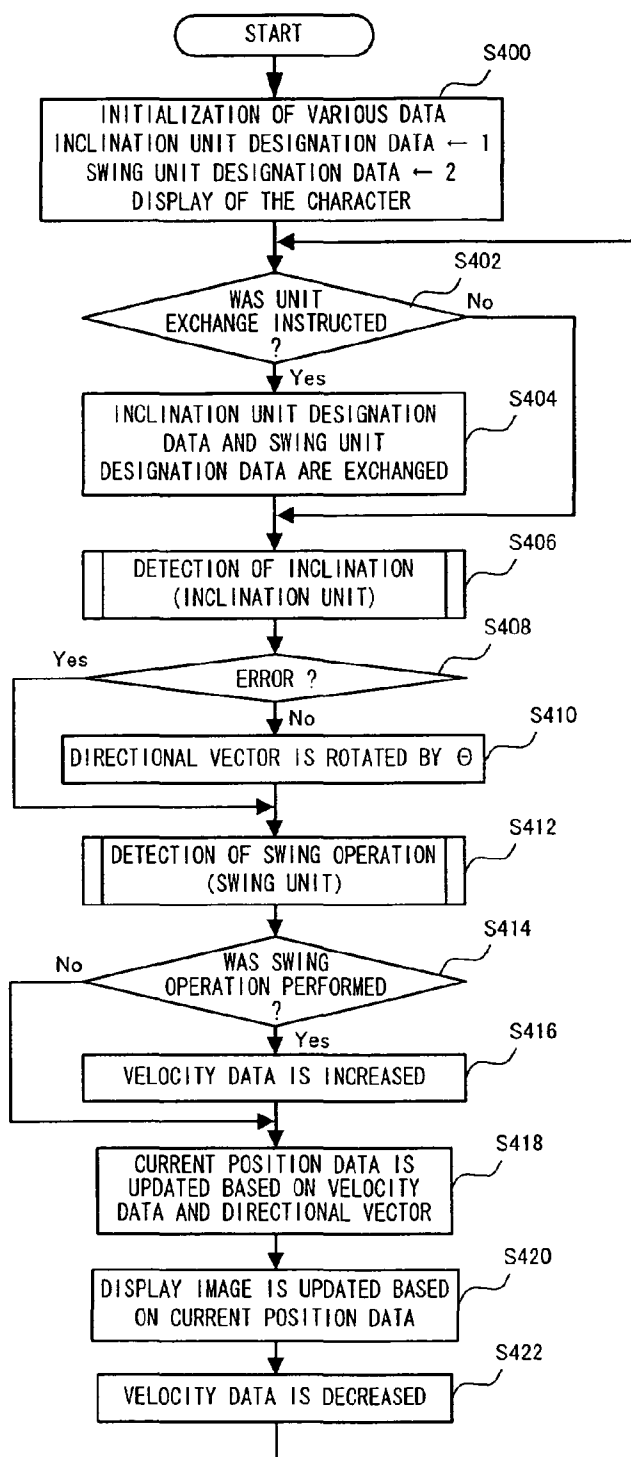


FIG. 34

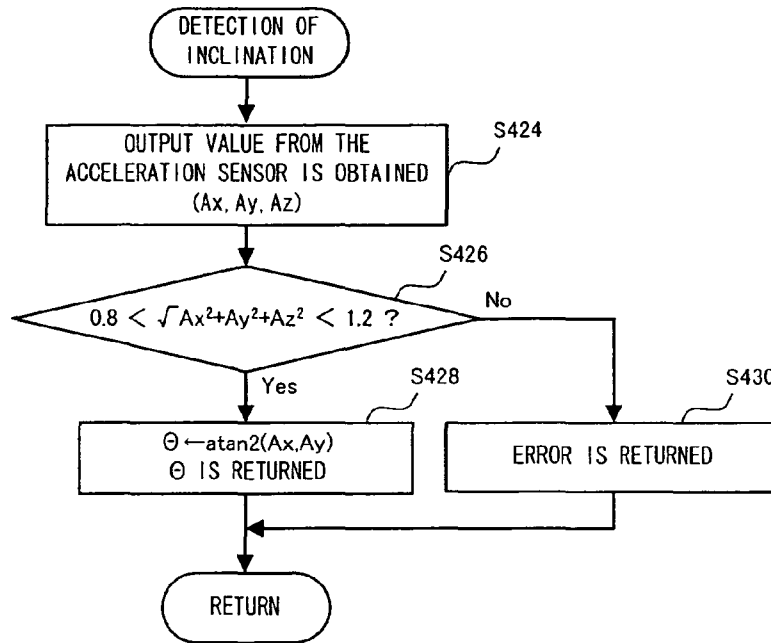


FIG. 35

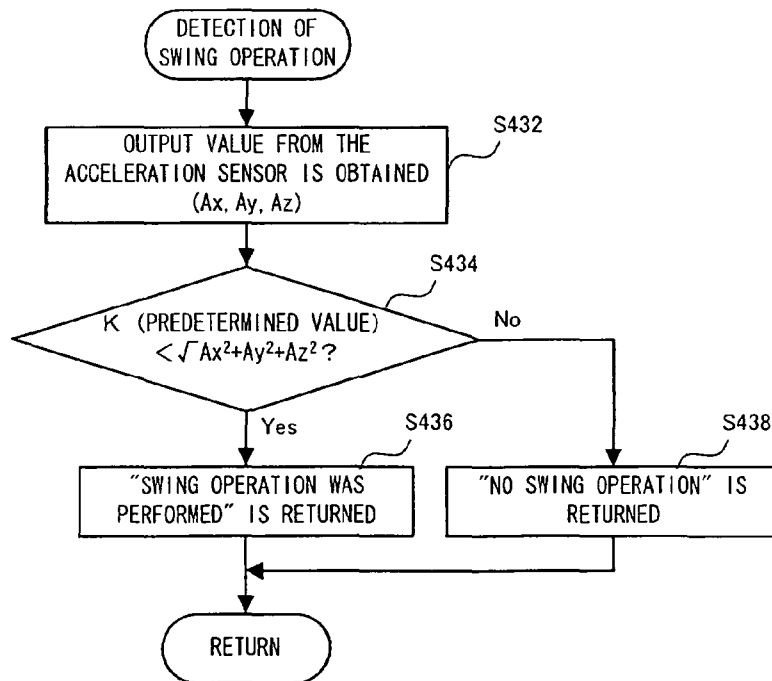


FIG. 36

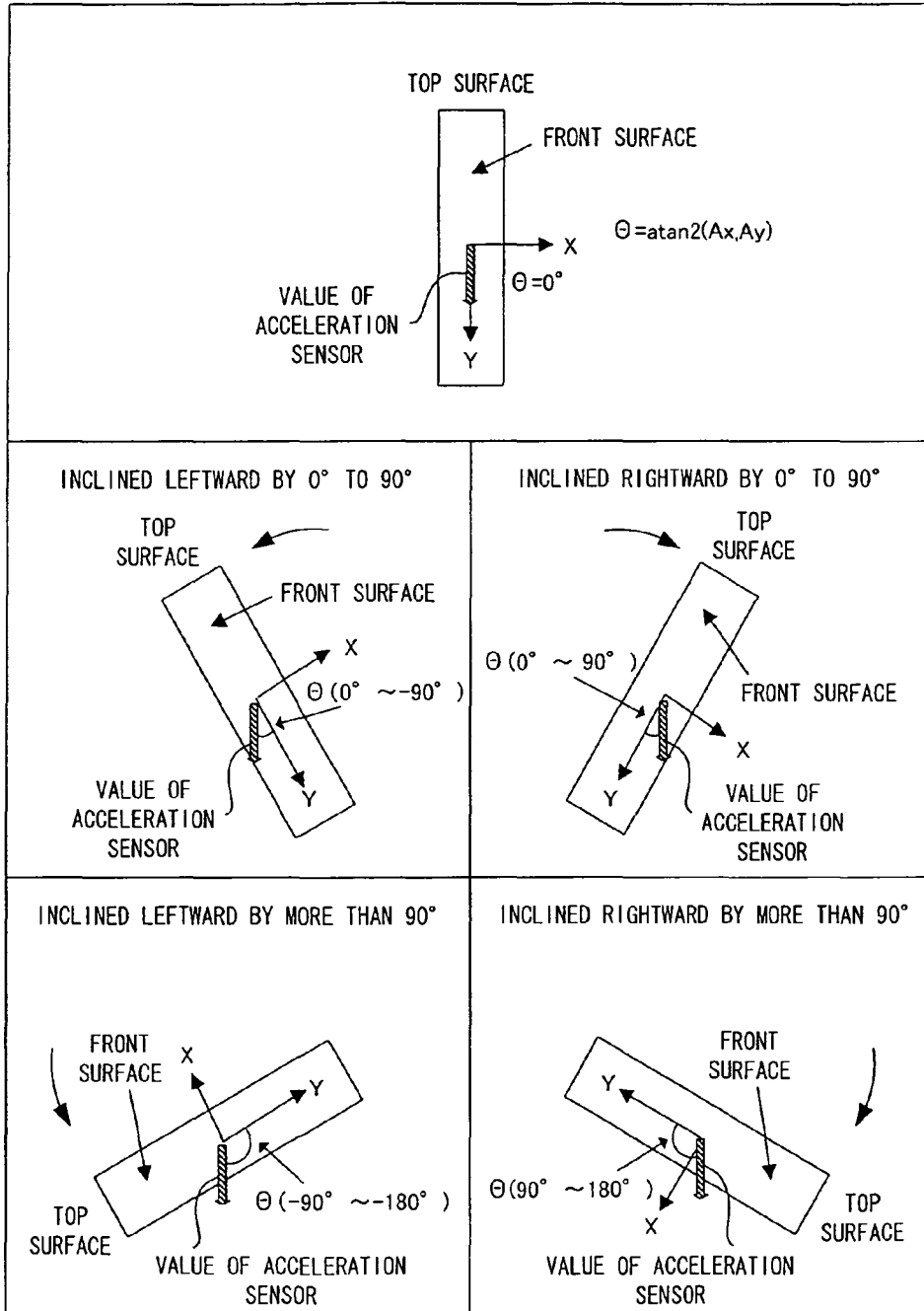


FIG. 37

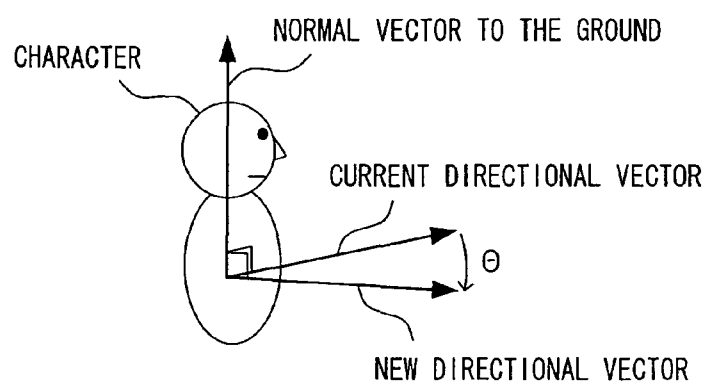


FIG. 38



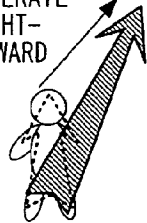


<p>ONE UNIT IS SWUNG OBLIQUELY RIGHTWARD AND FARTHER FROM THE PLAYER</p>	<p>SLIGHTLY ACCELERATE RIGHT-FORWARD</p> 
<p>ONE UNIT IS SWUNG OBLIQUELY LEFTWARD AND CLOSER TO THE PLAYER</p>	<p>SLIGHTLY ACCELERATE LEFT-REARWARD</p> 
<p>BOTH UNITS ARE SWUNG OBLIQUELY RIGHTWARD AND FARTHER FROM THE PLAYER</p>	<p>LARGELY ACCELERATE RIGHT- FORWARD</p> 
<p>ONE UNIT IS SWUNG RIGHTWARD AND THE OTHER UNIT IS SWUNG FARTHER FROM THE PLAYER</p>	<p>SLIGHTLY ACCELERATE RIGHT-FORWARD</p> 
<p>TWO UNITS ARE SWUNG IN OPPOSITE DIRECTIONS</p>	<p>STOP</p> 

FIG. 39

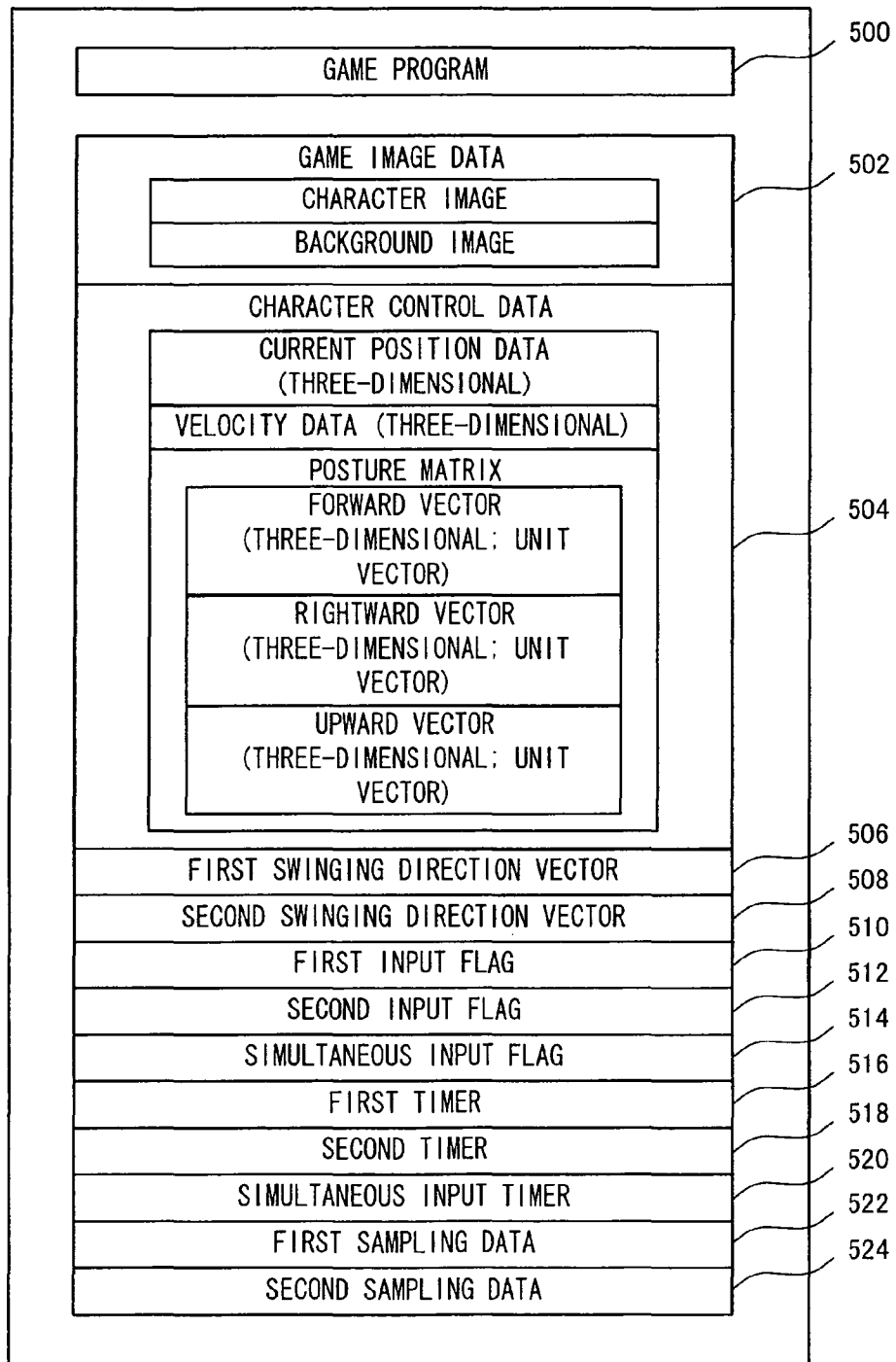


FIG. 40

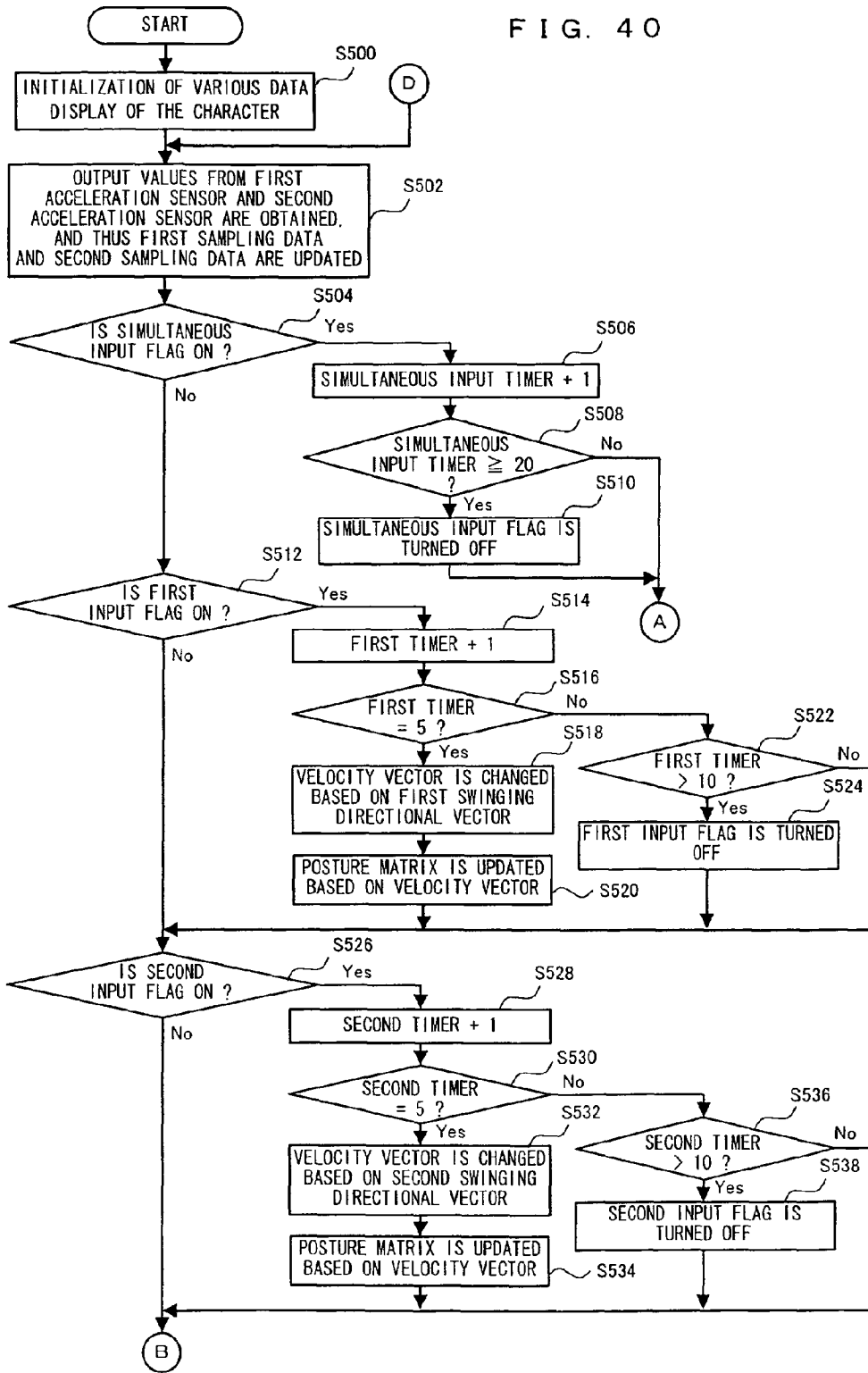


FIG. 41

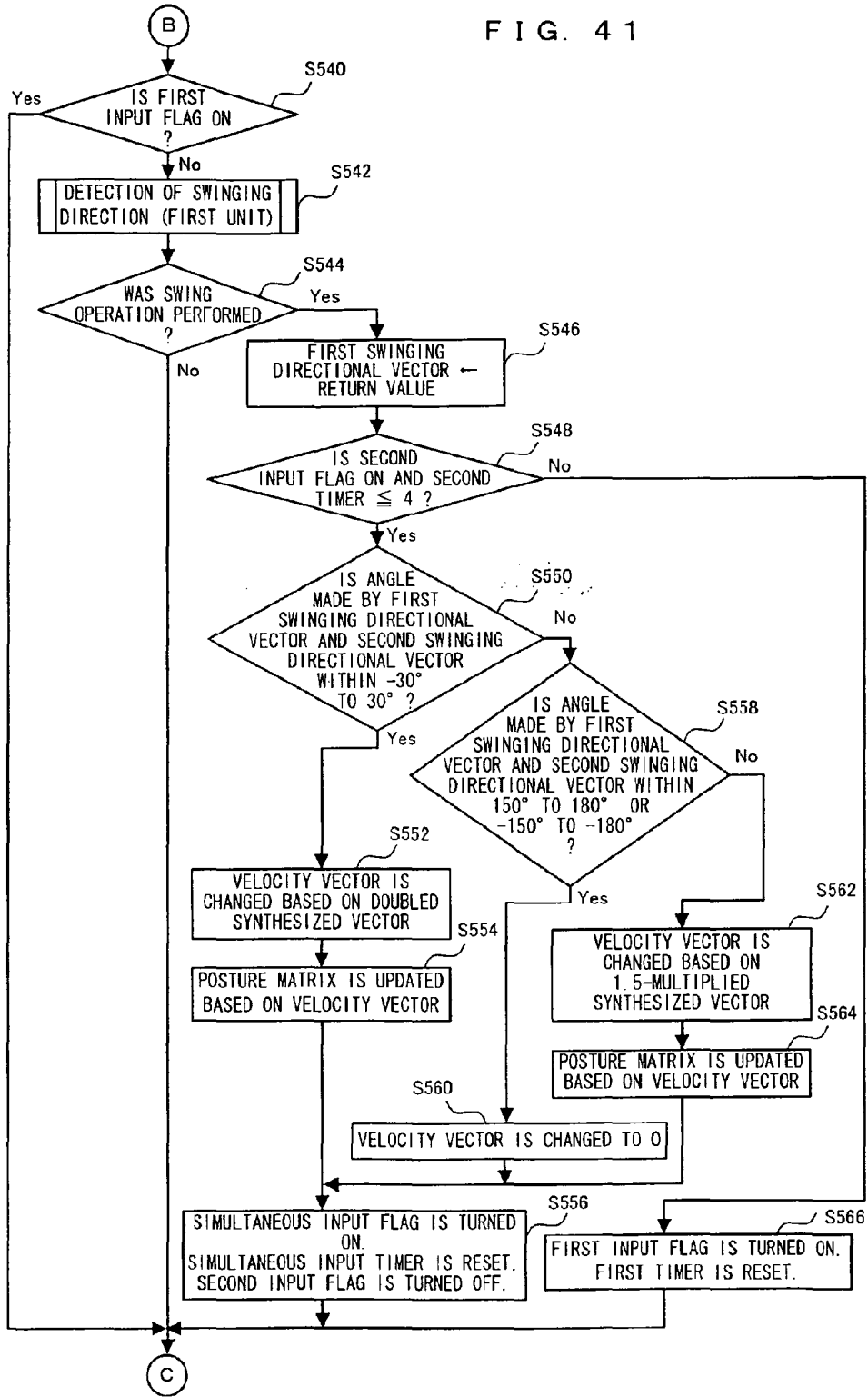


FIG. 42

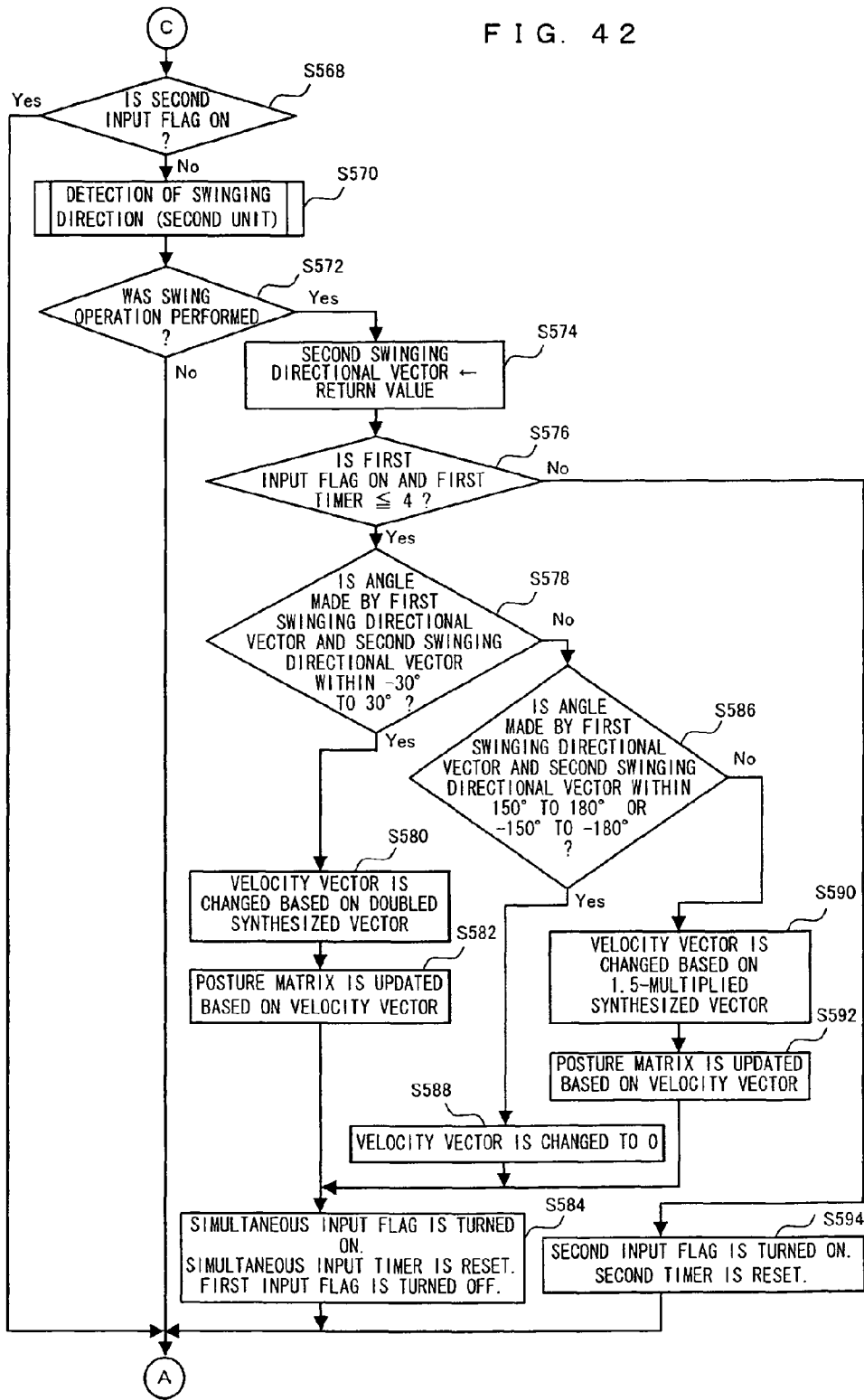


FIG. 43

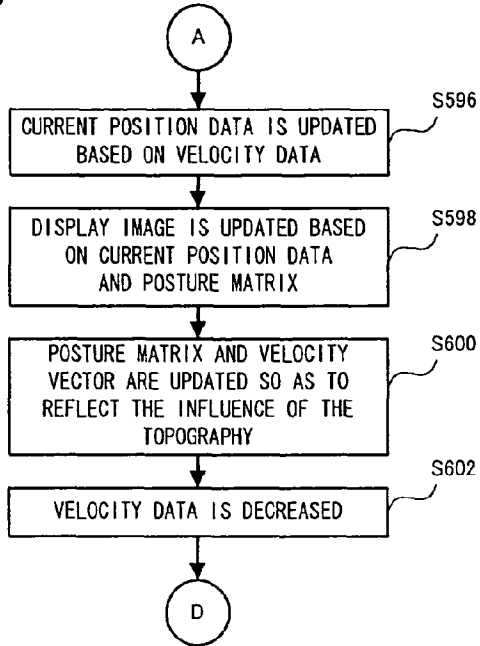


FIG. 44

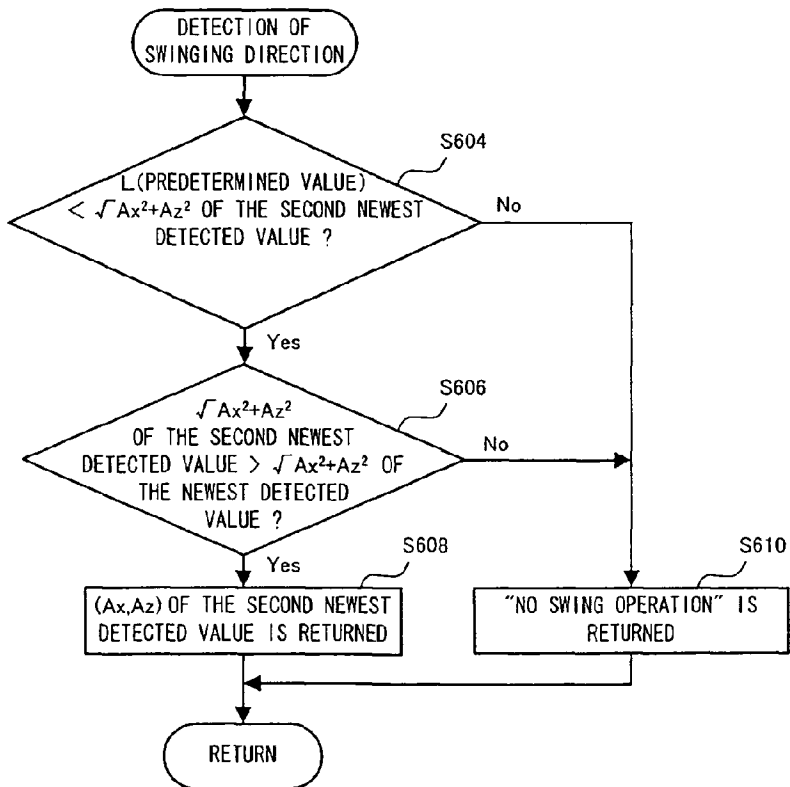


FIG. 45

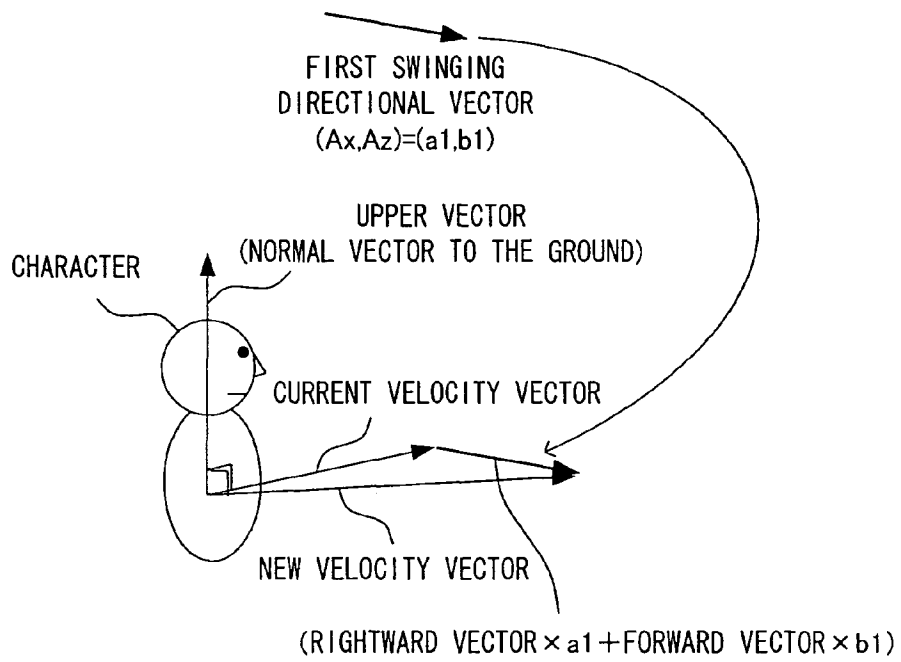


FIG. 46

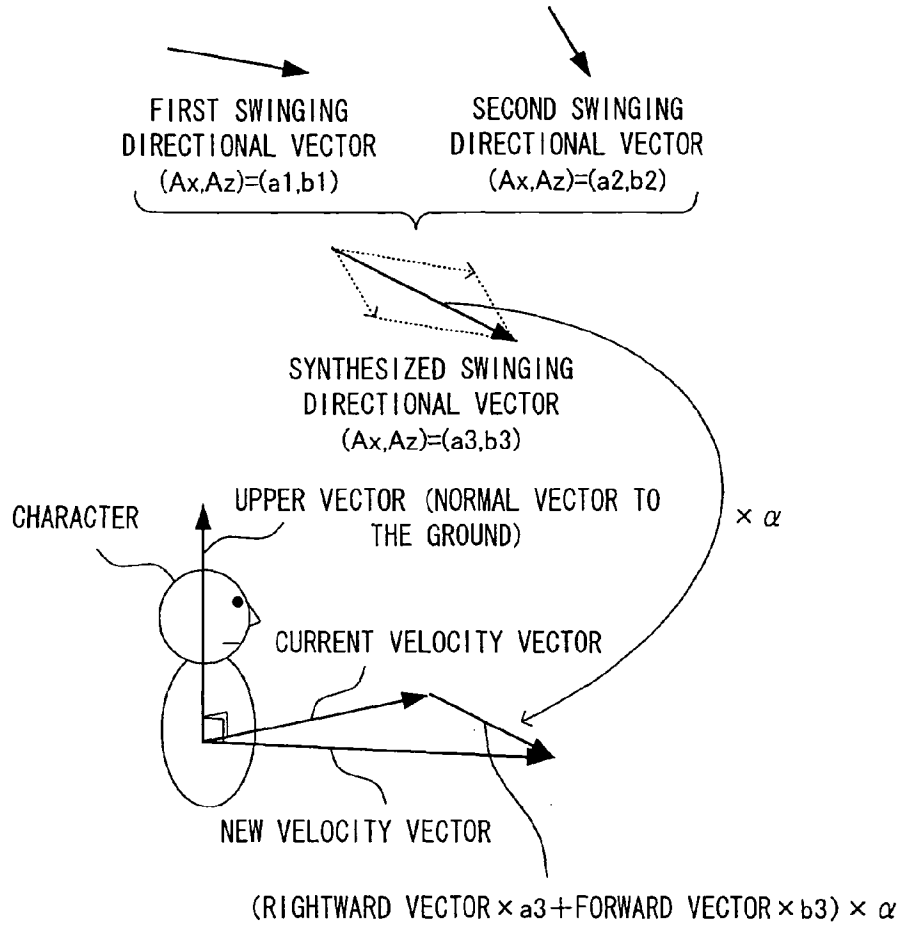


FIG. 47

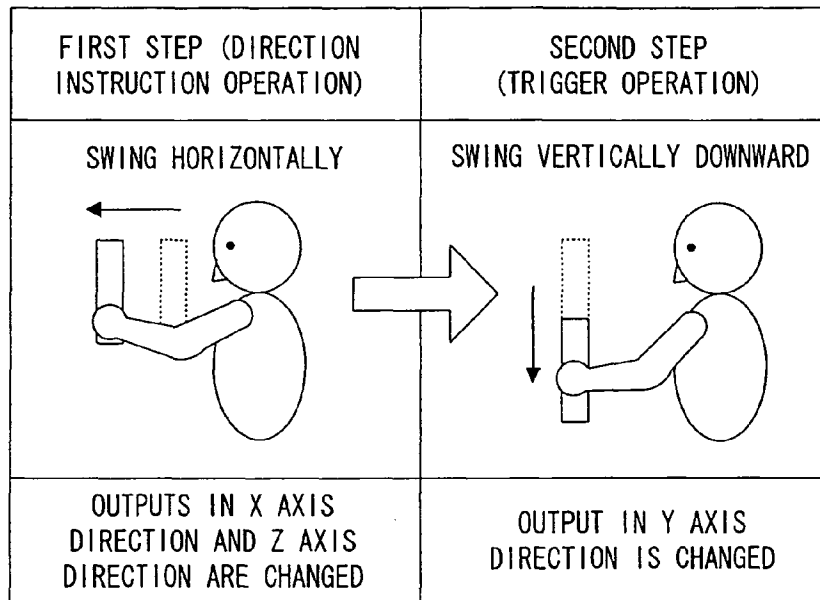


FIG. 48

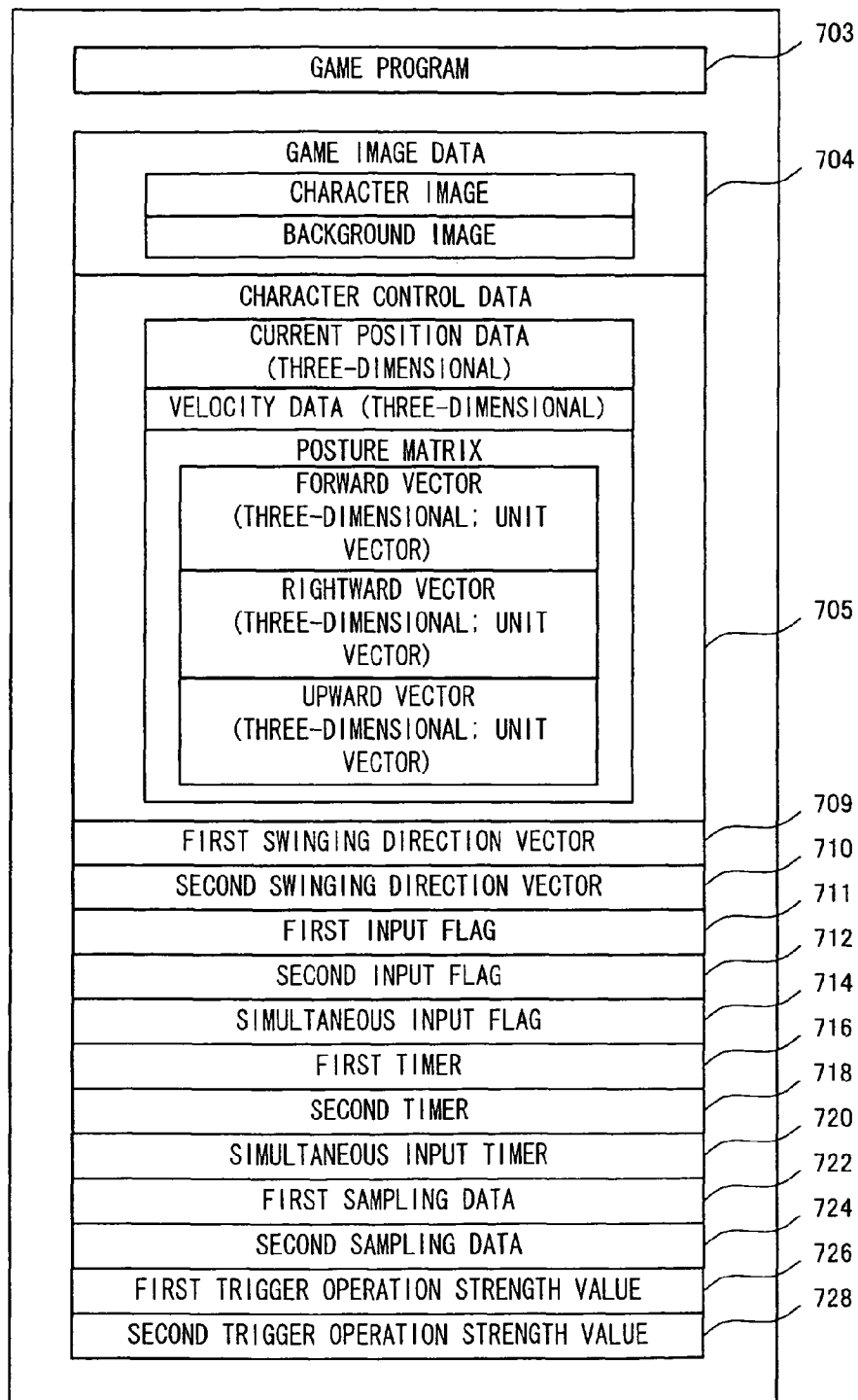


FIG. 49

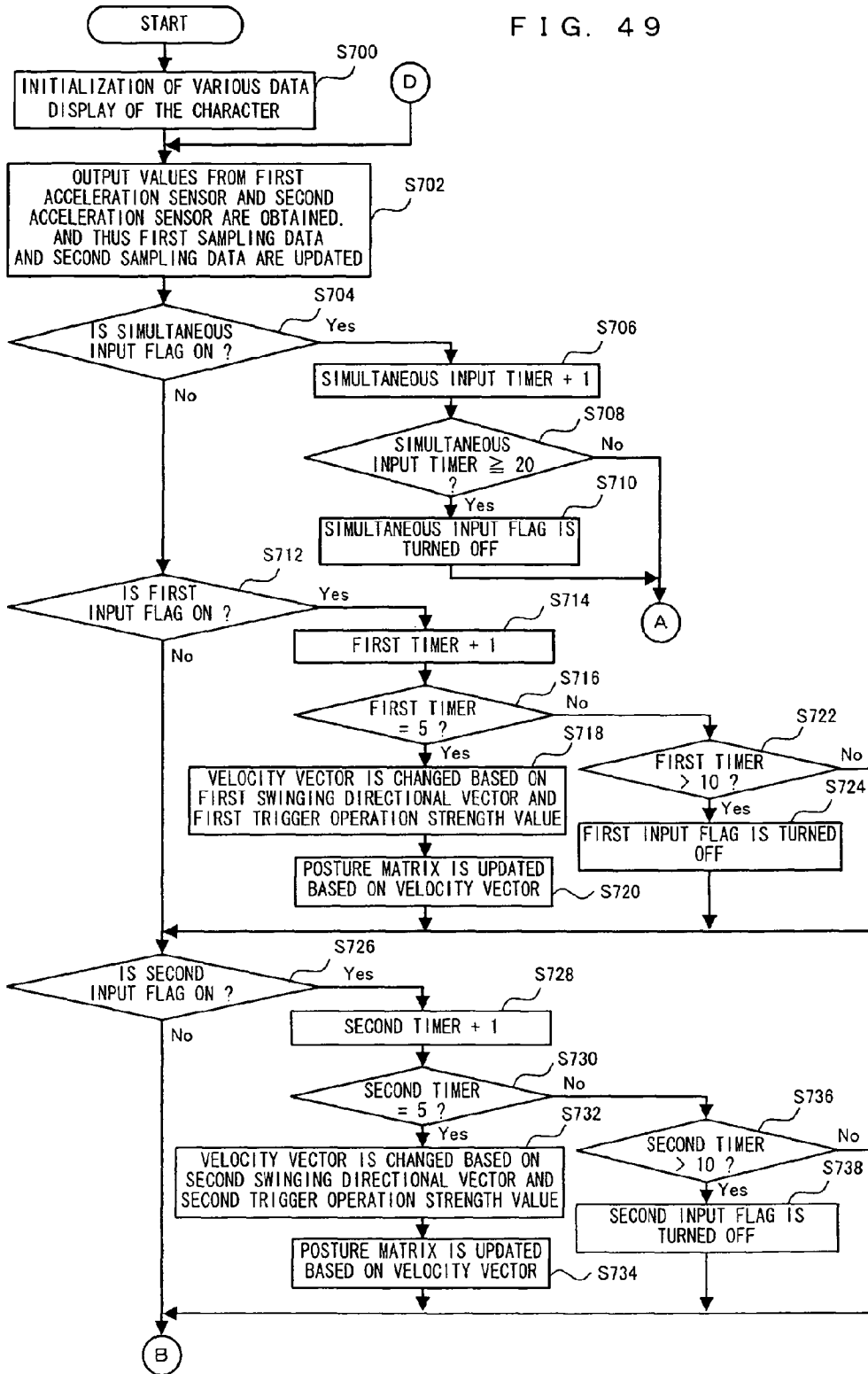


FIG. 50

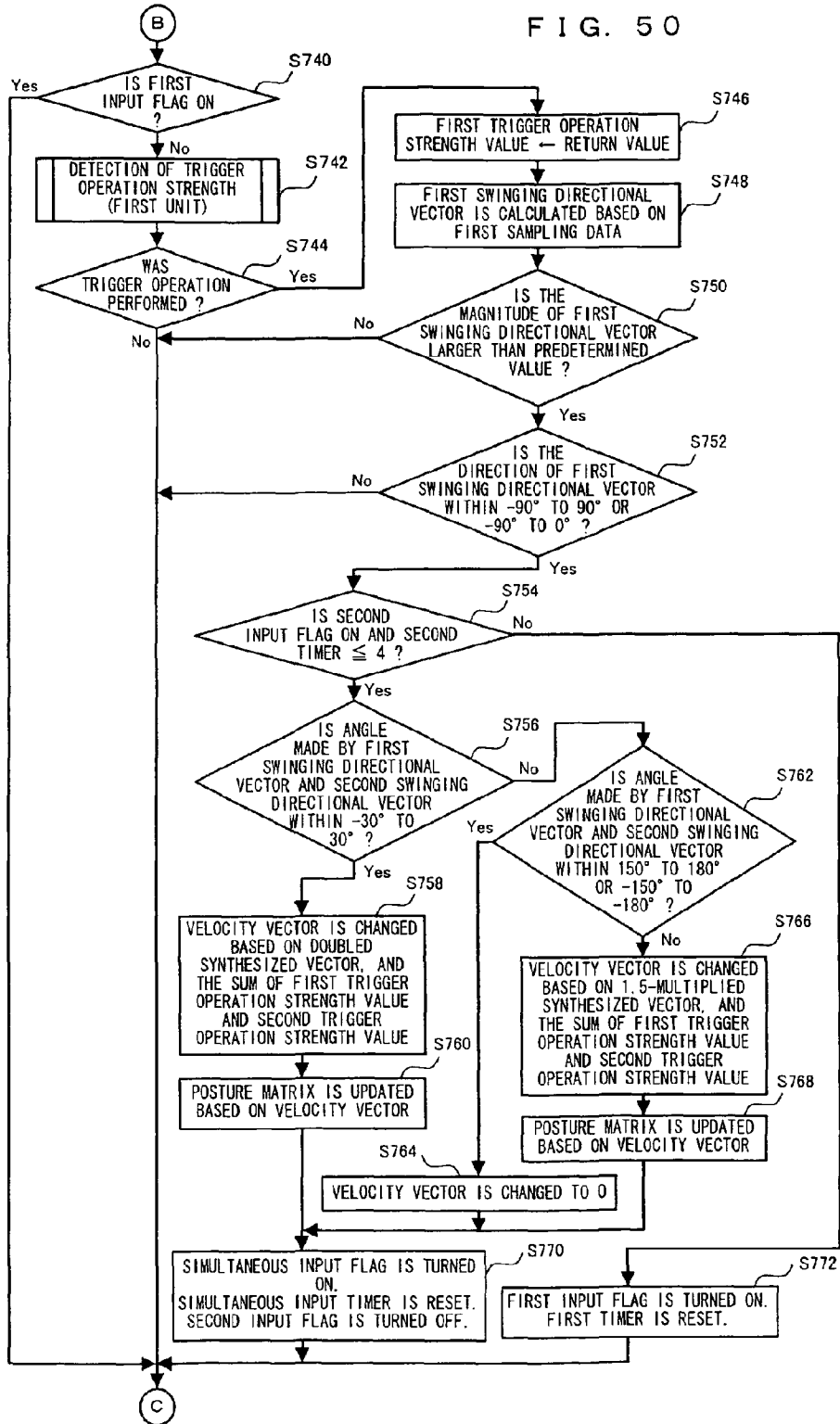


FIG. 51

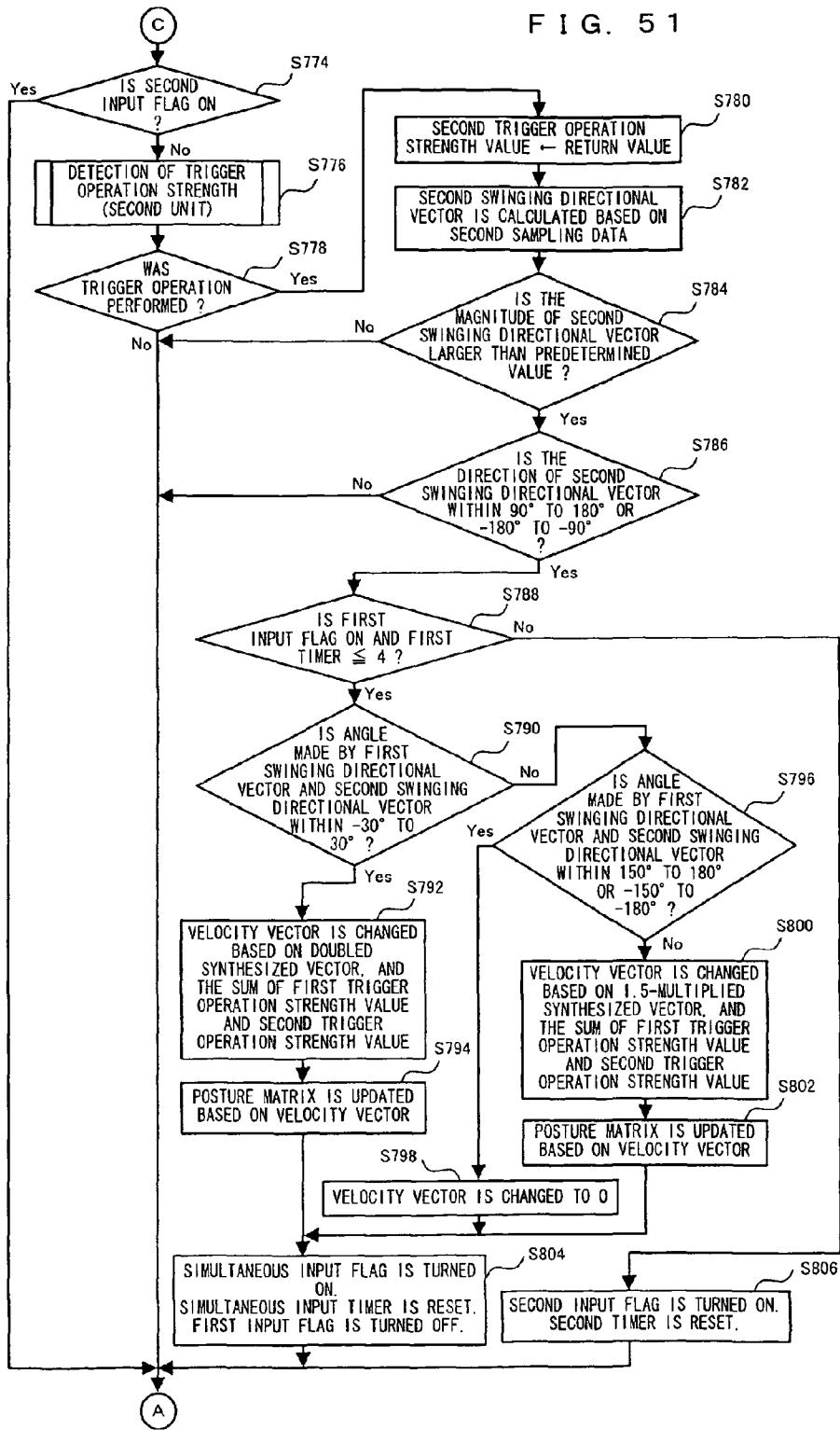


FIG. 52

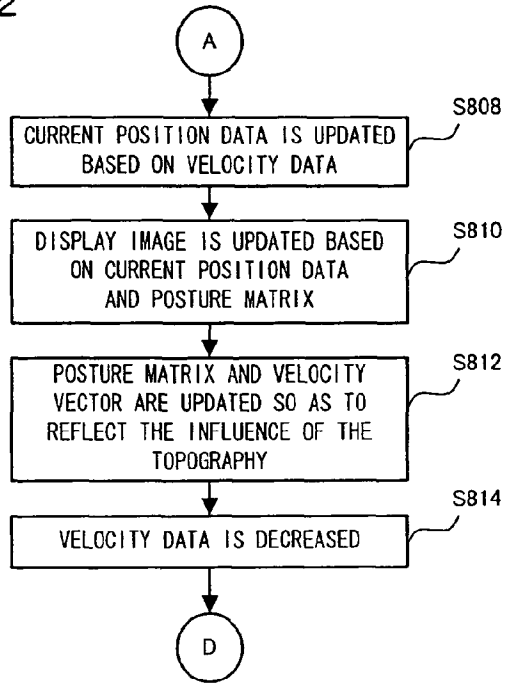


FIG. 53

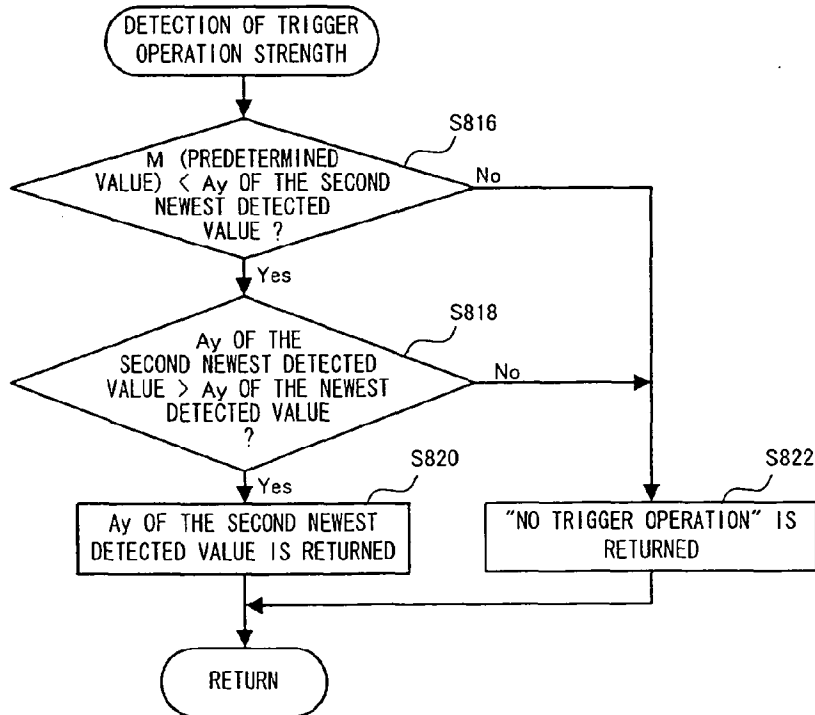


FIG. 54

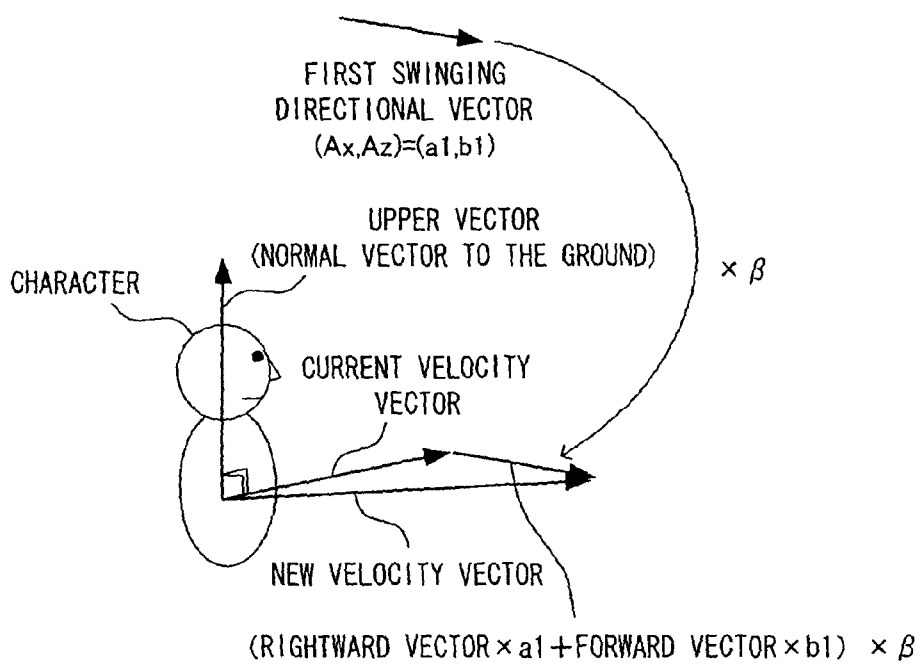


FIG. 55

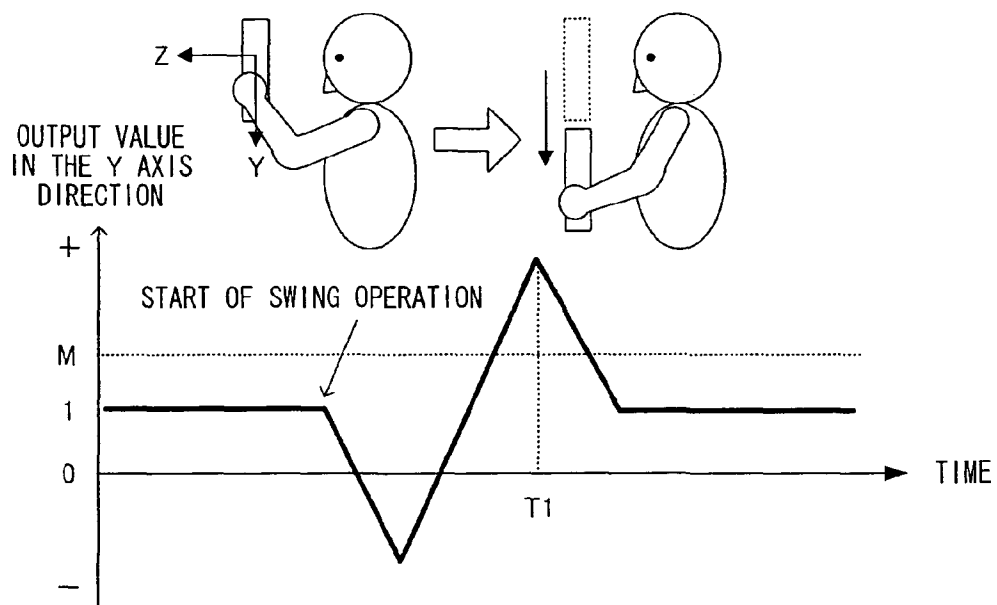


FIG. 56

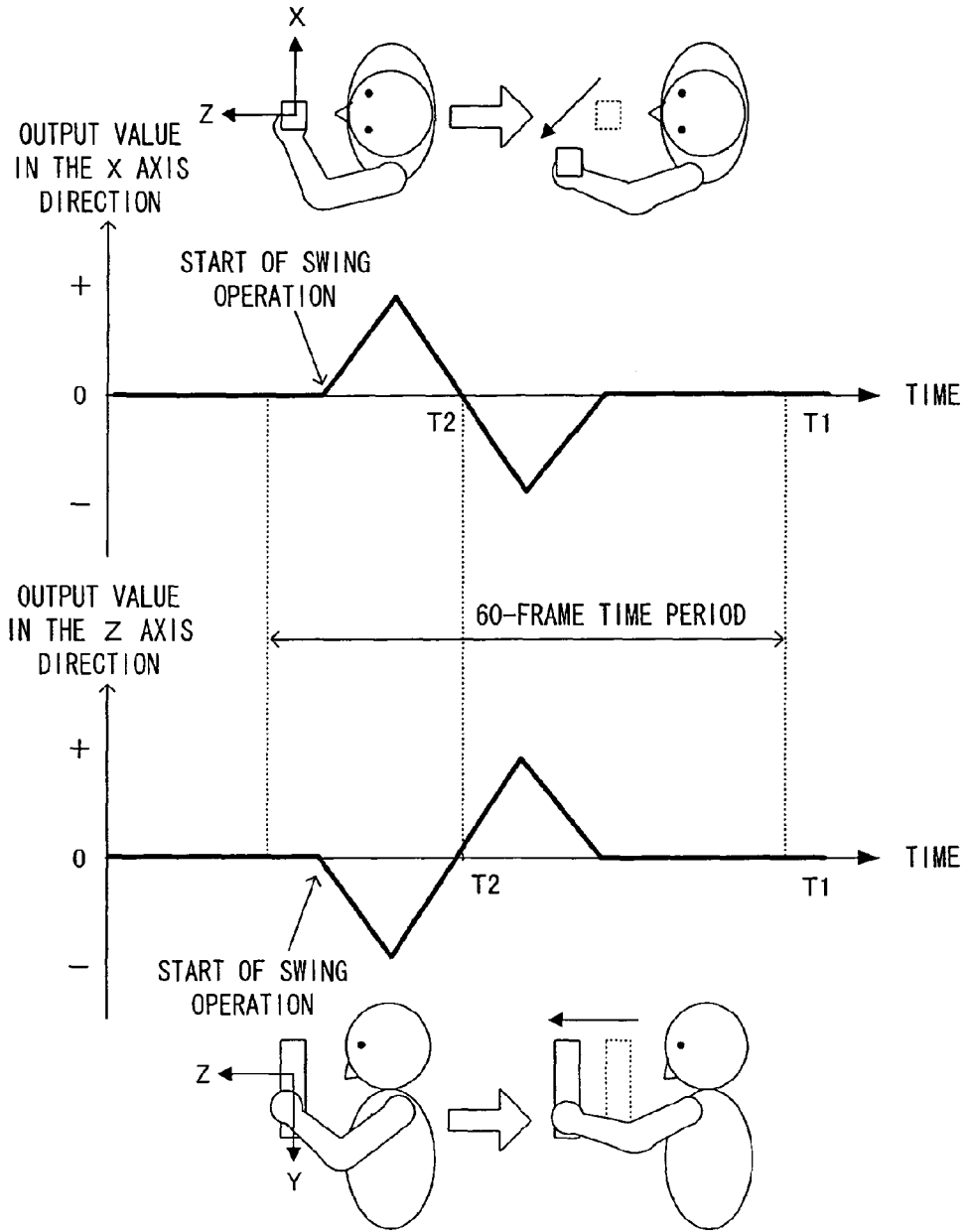
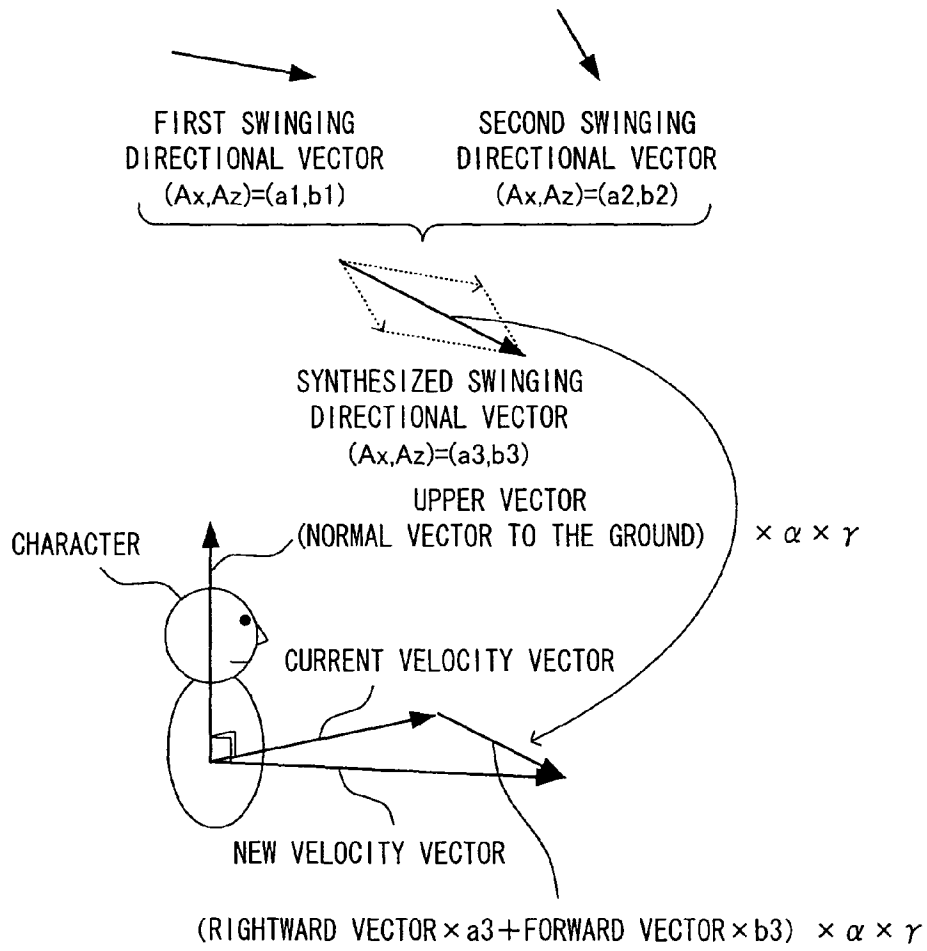


FIG. 57



REFERENCES CITED IN THE DESCRIPTION

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Camarillo, CA 93012 (US). **BRANTON, Steven, B.** [US/US]; 2114 El Jardin Avenue, Ventura, CA 93001 (US). **MOSSONTTE, Jeffrey** [US/US]; 2604 Vista Loop, Oxnard, CA 93030 (US).

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(74) Agents: **KALLIS, James, N.** et al.; Brooks & Kushman, 1000 Town Center, Twenty-Second Floor, Southfield, MI 48075 (US).

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(71) Applicant (for all designated States except US): **INTER-LINK ELECTRONICS, INC.** [US/US]; 546 Flynn Road, Camarillo, CA 93012 (US).

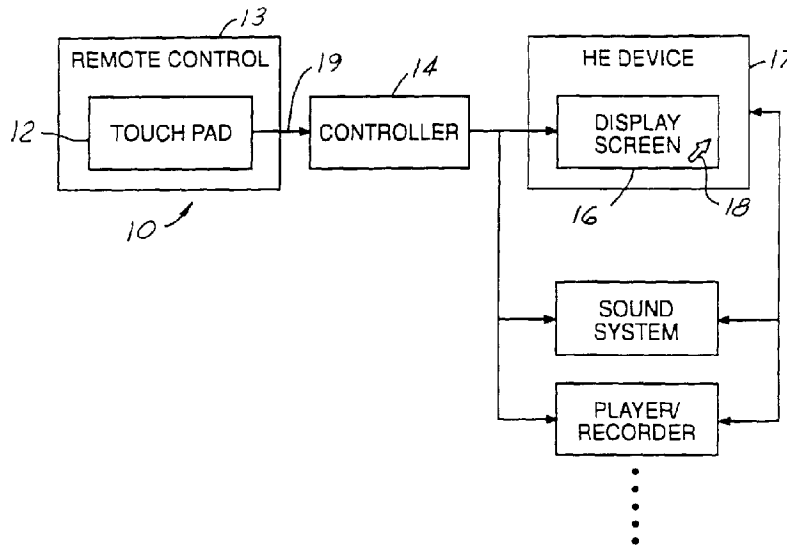
(72) Inventors; and

(75) Inventors/Applicants (for US only): **SEGAL, Jack, A.** [US/US]; 2604 Vista Loop, Oxnard, CA 93030 (US). **YATES, William, Allen** [US/US]; 2663 Riata Court,

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[Continued on next page]

(54) Title: REMOTE CONTROL HAVING TOUCH PAD TO SCREEN MAPPING



(57) Abstract: A remote control (13) for controlling a home entertainment (HE) device such as an Interactive television having a display screen (16). The remote control (13) includes a touch pad (12) mapped to the display screen (16) of the HE device as a function of the ratio of the areas of the touch pad (12) and the display screen (16) such that each location of the touch pad corresponds to a respective location of the display screen. The remote controller (14) further includes a controller operable with the touch pad (12) to enable a control function associated with a location of the display screen (16) in response to the corresponding location of the touch pad (12) being touched for controlling the HE device. The display screen may include on-screen keyboards, control panels and menus, an Internet page, an electronic program guide, and the like.

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Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

REMOTE CONTROL HAVING TOUCH PAD TO SCREEN MAPPING

Technical Field

The present invention generally relates to remote controls for
5 controlling home entertainment devices and, more particularly, to a remote control
having a touch pad mapped to the screen of a home entertainment (HE) device to
create a virtual touch screen for enabling an operator to control the HE device.

Background Art

Other than being remote, typical home entertainment (HE) device
10 remote controls are generally despised by human operators for a variety of
reasons. Typical HE remote controls are based on a button-centric paradigm and
usually contain too many buttons. This crowded geography causes considerable
confusion and intimidation and makes it difficult to find the desired button. It is
often dark in the room in which HE remote controls are used. This makes it
15 difficult or impossible to read the legends on the crowded button layout.

Normal HE viewing takes place at a distance of two meters or more
and the display being viewed is usually quite large such as a television (TV). The
legends on HE remote controls are usually twelve point type or smaller. For
many operators, changing viewing distance requires changing glasses or putting
20 on reading glasses.

Some remote controls have a trackball or button pointing device to
control a cursor on a TV screen. This approach has drawbacks in that the low
resolution of normal TVs requires a cursor that is large. The cursor also moves

in a jerky style because of the low refresh rate of the TV screen. Other remote controls have tried to solve the problems associated with typical remote controls by using a display in the remote control. The display is changed as required. However, the local display brings with it a new set of problems. An operator has
5 to read the display then press the appropriate area to select an item or another menu. The display also is costly and requires programming for each system or bi-directional communications.

Enhanced or interactive TV and related applications require the extensive use of graphic user interfaces (GUIs) and on-screen displays/menus. An
10 enhanced TV is a TV configured for cable video programming, Internet browsing, Internet telephony, electronic mail, video cassette recording, audio programming, and the like. The operator has to navigate through various menus to use the enhanced TV. Using up, down, right, and left arrow keys to navigate these menus is difficult, slow, and frustrating. The increasing number of television channels
15 has given rise to the electronic programming guide (EPG). Because an EPG is a dense grid of selections, using arrow keys to navigate is even more difficult.

Interactive TV also requires text and graphics entry. The current solution for text entry, a wireless keyboard, is undesirable in a living room because many people cannot type, the keyboard does not fit the decor of the living
20 room, there is no place to set the keyboard down to type on it, and people simply refuse to have computer related material in living rooms. In addition, typing is associated with work and is not desired to be in a room devoted to relaxation.

What is needed is a remote control having a touch pad mapped to an HE device display screen to create a virtual touch screen for enabling an

operator to control the HE device. In effect, the touch pad would provide an operator with the ability to virtually touch the HE device display screen to control the HE device without having to actually physically touch the HE device. Touching the HE device display screen to control the HE device is the most
5 intuitive interface. Further, the advantages of using a touch pad to control the HE device include allowing the operator to not need to look at the remote control during operation.

Summary of the Invention

Accordingly, it is an object of the present invention to provide a
10 remote control having a touch pad mapped to a home entertainment (HE) device display screen to create a virtual touch screen for enabling an operator to control the HE device without looking at the remote control.

It is another object of the present invention to provide a remote control having a touch pad mapped to a control panel displayed on the HE device
15 display screen such that each location of the touch pad corresponds to a respective portion of the control panel.

It is a further object of the present invention to provide a remote control having a touch pad mapped to an on-screen keyboard displayed on the HE device display screen such that each location of the touch pad corresponds to a
20 respective entry of the on-screen keyboard.

It is still another object of the present invention to provide a remote control having a touch pad mapped to an electronic program guide (EPG)

displayed on the HE device display screen such that each location of the touch pad corresponds to a grid area of the EPG.

5 It is still a further object of the present invention to provide a remote control having a touch pad mapped to an Internet page displayed on the HE device display screen such that each location of the touch pad corresponds to a link of the Internet page.

It is still yet another object of the present invention to provide a remote control having a touch pad and control buttons used in conjunction to enable control functions for controlling an HE device.

10 It is still yet a further object of the present invention to provide a remote control having a touch pad mapped to a graphical entry screen such that each location of the touch pad corresponds to a respective location of the graphical entry screen.

15 In carrying out the above objects and other objects, an embodiment of the present invention provides a remote control and an associated method for controlling a home entertainment (HE) device having a display screen. The remote control includes a touch pad mapped to the display screen of the HE device as a function of the ratio of the areas of the touch pad and the display screen such that each location of the touch pad corresponds to a respective location of the display screen. The remote controller further includes a controller operable with
20 the touch pad to enable a control function associated with a location of the display screen in response to the corresponding location of the touch pad being touched for controlling the HE device. The display screen may include on-screen

keyboards, control panels and menus, an Internet page, an electronic program guide, and the like.

Further, in carrying out the above objects and other objects, the present invention provides a remote control for controlling a television. The remote control includes a touch pad and a plurality of control buttons. The touch pad and the control buttons are used in conjunction to enable control functions for controlling the television.

These and other features, aspects, and embodiments of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings.

Brief Description of the Drawings

FIG. 1 illustrates a block diagram of a remote control for controlling a home entertainment (HE) device in accordance with the present invention;

FIG. 2 illustrates the absolute position mapping of the touch pad with respect to the display screen of the HE device in accordance with the present invention;

FIG. 3 illustrates the absolute control mapping of the touch pad with respect to the display screen in accordance with the present invention;

FIG. 4 illustrates a perspective view of a remote control for controlling HE devices in accordance with the present invention;

FIG. 5A illustrates a main menu displayed on the display screen of the HE device;

5 FIG. 5B illustrates the virtual control areas of the touch pad corresponding to the controls of the main menu displayed on the display screen of the HE device;

FIG. 6 illustrates the main menu having a highlighted VCR mode button;

10 FIG. 7A illustrates an electronic program guide (EPG) displayed on the display screen of the HE device when the HE device is in the cable programming mode;

15 FIG. 7B illustrates the virtual control areas of the touch pad corresponding to the grid areas of the EPG displayed on the display screen of the HE device;

FIG. 8A illustrates a cable program and cable control panel displayed on the display screen of the HE device when the HE device is in the cable programming mode;

FIG. 8B illustrates the virtual control areas of the touch pad mapped absolutely to the cable control panel displayed on the display screen of the HE device;

5 FIG. 9 illustrates a VCR program and VCR control panel displayed on the display screen of the HE device when the HE device is in the VCR mode;

FIG. 10 illustrates an Internet page and on-screen keyboard displayed on the display screen of the HE device when the HE device is in the Internet browsing mode;

10 FIG. 11 illustrates an Internet page and a graphical entry screen displayed on the display screen of the HE device when the HE device is in the Internet browsing mode;

FIG. 12A illustrates an audio receiver control panel displayed on the display screen of the HE device when the HE device is in the audio receiver mode;

15 FIG. 12B illustrates the virtual control areas of the touch pad mapped to the audio receiver control panel displayed on the HE device;

FIG. 13 illustrates an Internet telephony control panel displayed on the display screen of the HE device when the HE device is in the Internet telephony mode;

FIG. 14 illustrates an on-screen numerical keyboard displayed on the display screen of the HE device when the HE device is in the Internet telephony mode;

5 FIG. 15 illustrates an email panel displayed on the display screen of the HE device when the HE device is in the email mode;

FIG. 16 illustrates an email messaging panel and on-screen panel displayed in the display screen of HE device;

FIG. 17 illustrates the email messaging panel having a writing area displayed in the display screen of the HE device;

10 FIG. 18 illustrates a flow chart describing operation of the switching between absolute and relative modes of the display screen of the HE device; and

FIG. 19 illustrates a block diagram a remote control system in accordance with the present invention.

15 **Best Modes For Carrying Out The Invention**

Referring now to FIG. 1, a block diagram of a remote control system 10 for controlling a home entertainment (HE) device in accordance with the present invention is shown. HE remote control system 10 includes a touch pad 12 on a remote control 13, a controller 14, and a display screen 16. Touch pad 12 includes a touch pad surface area for an operator to touch. Touch pad 12

20

generates a signal in response to touching by an operator on the touch pad. The signal is indicative of the location of the touch on touch pad 12. The signal may also be indicative of the duration and the pressure of the touch on touch pad 12 for each location being touched.

5 Touch pad 12 is operable with display screen 16 such that the area of the touch pad is absolutely mapped to the area of the display screen. This means that each portion of touch pad 12 corresponds to a respective portion of display screen 16. For instance, the upper left portion of touch pad 12 corresponds to the upper left portion of display screen 16. Similarly, the middle
10 bottom portion of touch pad 12 corresponds to the middle bottom portion of display screen 16. Touch pad 12 is in an absolute mode when the area of the touch pad is absolutely mapped to the area of display screen 16.

In operation, the area of touch pad 12 is mapped to various control panels and menus displayed on display screen 16. This allows the operator to
15 manipulate touch pad 12 to select control function entries of the panels and menus displayed on display screen 16 while remaining visually focused on the display screen.

Preferably, display screen 16 has a much larger area than the area of touch pad 12. The absolute mapping between touch pad 12 and display screen
20 16 is scaled as a function of the ratio of the areas. Display screen 16 is preferably some or all of the display screen area of a HE device 17 such as a television (TV) screen, monitor, computer screen, or the like. HE device is part of an HE system that may include other HE devices such as a sound system, a player/recorder and the like. Display screen 16 may include a movable object such as a cursor 18 for

touch pad 12 to operate in a relative mode. Display screen 16 may be separated from HE device and coupled directly to touch pad 12.

Controller 14 is operable with touch pad 12 for receiving a signal 19 from the touch pad in response to an operator touching the touch pad. In the absolute mode, controller 14 highlights a portion of display screen 16 in response to a corresponding portion of touch pad 12 being touched. Controller 14 highlights a portion of display screen 16 to enable a control function corresponding to the highlighted portion of the display screen for controlling the HE device. Instead of highlighting portions of display screen 16, controller 14 may user color change, outlining, or other ways of distinguishing the selected portions of display screen 16. To enable touch pad to display screen mapping, remote control system 10 generally includes the following hardware: touch pad 12, communications, receiver, driver level software, video source selector, video overlay generator, and video to TV converter as is known in the art.

In the relative mode, controller 14 moves cursor 18 on display screen 16 to the location on display screen corresponding to the location of the touch on touch pad 12 in response to an operator touching the touch pad. Controller 14 controls the HE device to enable a control function corresponding to the location of cursor 18 on display screen 16 in response to an operator touching touch pad 12. Controller 14 may be coupled directly or remotely located from touch pad 12. Typically, touch pad 12 transmits infrared (IR) or radio frequency (RF) signals to communicate with controller 14. Traditional pointing devices such as a computer mouse use relative pointing letting the operator move a cursor from one place to another place on a display screen.

In the absolute mode, controller 14 highlights the portion of display screen 16 corresponding to the respective portion of touch pad 12 being touched independent of the display screen portion highlighted prior to the touch pad being touched. Wherever the operator touches touch pad 12 the corresponding portion of display screen 16 is highlighted regardless of where the operator touched the touch pad previously. That is, the touching movement on touch pad 12 is mapped absolutely on to display screen 16.

Referring now to FIG. 2, the absolute position mapping of touch pad 12 with respect to display screen 16 will now be described in further detail. As mentioned above, touch pad 12 is operable with display screen 16 such that the area of the touch pad is absolutely mapped to the area of either a portion of the display screen or the entire display screen. As an example, it will be assumed that the area of touch pad 12 is absolutely mapped to the entire area of display screen 16. Thus, each point of touch pad 12 has a corresponding absolute point on display screen 16. Touch pad 12 has an area defined by a width w_p and a height h_p . Display screen 16 has an area defined by a width w_d and a height h_d . A selected point of touch pad 12 such as point x_p, y_p has a corresponding absolute point x_d, y_d . The corresponding absolute point x_d, y_d of display screen 16 is related to the selected point x_p, y_p of touch pad 12 in accordance with the following equations:

$$x_d = x_p * (w_d / w_p)$$

$$y_d = y_p * (h_d / h_p).$$

That is, the x coordinate of the corresponding absolute point of display screen 16 (x_d) is equal to the x coordinate of the selected point of touch

pad 12 (x_p) multiplied by the ratio between the widths of the display screen (w_d) and the touch pad (w_p). Similarly, the y coordinate of the corresponding absolute point of display screen 16 (y_d) is equal to the y coordinate of the selected point of touch pad 12 (y_p) multiplied by the ratio between the heights of the display screen
5 (h_d) and the touch pad (h_p). As a result, each point of touch pad 12 has a corresponding absolute point on display screen 16.

If touch pad 12 is mapped to only a portion of the entire area of display screen 16 then the x coordinate of the corresponding absolute point of the portion of the display screen (x_d) is equal to the x coordinate of the selected point
10 of touch pad 12 (x_p) multiplied by the ratio between the widths of the portion of the display screen and the touch pad. The y coordinate of the corresponding absolute point of the portion of display screen 16 (y_d) is equal to the y coordinate of the selected point of touch pad 12 (y_p) multiplied by the ratio between the heights of the portion of the display screen and the touch pad.

15 Referring now to FIG. 3, the absolute control mapping of touch pad 12 with respect to display screen 16 will now be described in further detail. As mentioned above, the area of touch pad 12 is mapped to various control panels and menus displayed on display screen 16. This allows the operator to manipulate touch pad 12 to select control function entries of the panels and menus displayed
20 on display screen 16 while remaining visually focused on the display screen. The area of touch pad 12 is broken down into a plurality of virtual control areas (VC1, VC2, etc.). Display screen 16 (or a portion of the display screen) displays a plurality of virtual controls (VC1, VC2, etc.). Each virtual control area of touch pad 12 corresponds to a respective virtual control of display screen 16. For
25 instance, virtual control area VC1 of touch pad 12 corresponds to virtual control

VC1 of display screen 16 and virtual control area VC2 of the touch pad corresponds to virtual control VC2 of the display screen.

The entire area of touch pad 12 is mapped to virtual controls displayed on display screen 16 such that each point of the touch pad corresponds to a virtual control displayed on the display screen. Each virtual control area of touch pad 12 corresponds to a respective virtual control of display screen 16 as a function of the positions of the virtual control areas on the touch pad and the positions of the virtual controls on the display screen. For instance, virtual control area VC1 of touch pad 12 is in the upper left corner of the touch pad and corresponds to virtual control VC1 of display screen 16 located in the upper left corner of the display screen. Virtual control area VC6 of touch pad is in the right side of touch pad 12 and corresponds to virtual control VC6 of display screen 16 located in the right side of the display screen.

There are three virtual controls in the left side of display screen 16 (VC1, VC2, and VC3) so the left side of touch pad 12 includes three corresponding virtual control areas (VC1, VC2, and VC3). There are two virtual controls in the middle of display screen 16 (VC4, VC5) so the middle of touch pad 12 includes two corresponding virtual control areas (VC4, VC5). Finally, there is one virtual control in the right side of display screen 16 (VC6) so the right side of touch pad 12 includes one corresponding virtual control area (VC6).

In operation, the operator touches a point of touch pad 12 falling within a certain virtual control area. In response, the virtual control of display screen 16 corresponding to the certain virtual control area is selected or actuated. HE device 17 is then controlled as a function of the selected control.

Referring now to FIGS. 4 through 17, the operation of remote control system 10 in a typical enhanced TV environment will now be described according to an embodiment of the present invention. An enhanced TV is a TV system configured for cable video programming, Internet browsing, telephony, email messaging, video cassette recording (VCR), audio programming, and the like.

A perspective view of a remote control 13 for controlling HE devices in accordance with the present invention is shown in FIG. 4. Remote control 13 includes a touch pad 12 and a plurality of control buttons 24. An operator uses touch pad 12 and control buttons 24 in conjunction to operate with controller 14 for selecting a control function for controlling a HE device. In general, an operator uses touch pad 12 to highlight a selected portion of display screen 16. The operator then uses control buttons 24 to select the highlighted portion of display screen 16. Control buttons 24 include a select button 24a, an on-screen control button 24b, a main screen button 24c, an electronic program guide button 24d, a write button 24e, a type button 24f, a talk button 24g, a volume mute button 24h, and a power button 24i.

FIG. 5A illustrates a main menu 30 having a plurality of virtual controls displayed on display screen 16 of the HE device. Main menu 30 includes a visual panel 32 for visually showing a video image on the HE device. For instance, visual panel 32 shows cable or video programming. Main menu 30 further includes an HE device operating panel 34. HE device operating panel 34 includes a plurality of mode buttons 36. Main menu 30 further includes an electronic mail (email) panel 38 and an Internet telephony panel 40.

Each of mode buttons 36 corresponds to a mode of the HE device. For instance, modes of the HE device include an Internet browser mode, a cable mode, a VCR mode, and an audio receiver mode. In the Internet browser mode, the HE device functions as an access device for Internet communications. For
5 Internet communications the entire area of display screen 16 displays Internet pages. In the cable mode, the HE device functions as a television for receiving video/audio cable programming. For cable programming the entire area of display screen 16 displays video cable programming. In the VCR mode, the HE device
10 functions as a VCR and the entire area of display screen 16 shows video programming. In the audio receiver mode, the HE device functions as a stereo receiver for playing audio signals. In FIG. 5A, the HE device is in the cable mode as evidenced by cable mode button 36 being bigger than the other mode buttons 36. Visual panel 32 displays cable programming of a selected cable channel for the operator to view.

15 Referring now to FIG. 5B with continual reference to FIG. 5A, the area of main menu 30 is mapped to the area of touch pad 12. Each portion of main menu 30 corresponds to a respective portion of touch pad 12. The operator touches touch pad 12 using a finger or a stylus to highlight panels 32, 34, 38, and 40 of display screen 16. For instance, the operator touches virtual control area
20 32a in the upper left portion of touch pad 12 to highlight visual panel 32, virtual control areas 36a in the bottom portion of the touch pad to highlight operating panel 34, virtual control area 40a in the mid right portion of the touch pad to highlight Internet telephony panel 40, and virtual control area 38a in the upper right portion of the touch pad to highlight email panel 38.

When the operator touches a portion of touch pad 12 the panel closest to the corresponding touched portion of the touch pad is highlighted. If the operator moves his finger on touch pad 12 from a first panel towards a second panel the second panel is highlighted as soon as the operator's finger is closer to the second panel than to the first panel. To activate a panel the operator may either press select button 24a of remote control 13, press harder on touch pad 12, depress hard enough to activate a switch under the touch pad, quickly tap on touch pad, or the like.

FIG. 6 illustrates main menu 30 having a highlighted VCR mode button 36. In addition to highlighting panels 32, 34, 38, and 40 of main menu 16, an operator may highlight a mode button 36 of operating panel 34 by touching the portion of touch pad 12 corresponding to the location of the mode button on display screen 16. For example, if the operator touches the bottom middle right portion of touch pad 12, then VCR mode button 36 is highlighted as shown in FIG. 6. The operator may then select the highlighted VCR mode button 36 by pressing select button 24a on remote control 13. The entire display screen 16 then displays VCR programming in place of main menu 30 (not shown).

Upon selecting cable mode button 36, display screen 16 replaces main menu 30 with video cable programming. For instance, the entire area of display screen 16 displays a video picture and functions like a typical TV screen. While viewing the video cable programming the operator may desire to know which other programs are being provided on other cable channels. An electronic program guide (EPG) is a channel guide that enables a user to view a listing of the programs provided on the cable channels. The operator may access an EPG by

pressing guide button 24d on remote control 13 or a virtual control on display screen 16.

In response to guide button 24d being pressed display screen 16 displays an EPG 50 over cable video programming screen 52 as shown in FIG. 7A. Cable programming screen 52 displays the cable program. EPG 50 includes a plurality of grids such as channel grids 54 for listing cable channels and program title grids 56 for listing programs associated with the cable channels during given times. Highlighted program title grid 62 identifies the program playing on cable video programming screen 52. EPG 50 further includes day grids 58 for the operator to select a day to view the available programs for the selected day. EPG 50 further includes arrow keys 60 to move sets of grids of the EPG up and down or sideways.

Referring now to FIG. 7B with continual reference to FIG. 7A, the virtual control areas of touch pad 12 is mapped absolutely to EPG 50 and each grid of EPG 50 corresponds to a respective portion of touch pad 12. The operator touches a portion of touch pad 12 to highlight the corresponding grid of EPG 50. For example, the operator touches a virtual control area 54a in the left hand side of touch pad 12 to highlight a corresponding channel grid 54 of EPG 50. The operator may touch a virtual control area 56a of touch pad 12 to highlight a corresponding program title grid 56 of EPG 50. Similarly, virtual control areas 58a, 60a, 62a, and 64a are mapped to corresponding grids of EPG 50. As the operator touches different portions of touch pad 12 the corresponding grids of EPG 50 are highlighted.

In operation, the operator may touch virtual control area 64a in the middle portion of touch pad 12 to highlight program title grid 64. The operator may then select the program of program title grid 64 to view the program by pressing select button 24a of remote control 13. In response to program title grid 64 being selected the cable channel is changed to the associated channel and the program of program title grid 64 is displayed on the entire display screen 16. Concurrently, EPG 50 disappears from display screen 16. Instead of selecting the program of program title grid 64 to view the program the operator may select program title grid 64 to view information associated with the program by pressing guide button 24d of remote control 13. The information may include a description of the program, running time, and the like.

FIG. 8A illustrates a cable program being displayed on cable video programming screen 52 of display screen 16. While viewing the cable program on cable video programming screen 52 the operator may access an on-screen control panel 70 by selecting on-screen control button 24b of remote control 13. On-screen control panel 70 includes a numerical key pad 72, cable channel control arrows 74, and volume control arrows 76.

Referring now to FIG. 8B with continual reference to FIG. 8A, the virtual control areas of touch pad 12 is mapped absolutely to on-screen control panel 70 and each portion of the on-screen control panel corresponds to a respective portion of the touch pad. The operator touches a portion of touch pad 12 to highlight the corresponding portion of on-screen control panel 70. For example, the operator touches a virtual control area 72a of touch pad 12 to highlight numerical entry "6" of numerical key pad 72 of on-screen control panel 70. Similarly, virtual control areas 74a and 76a are mapped to corresponding

cable channel control arrows 74 and volume control arrows 76 of on-screen control panel 70. As the operator touches different portions of touch pad 12 the corresponding portions of on-screen control panel 70 are highlighted. The operator then highlights the "ENTER" entry of on-screen control panel 70 or
5 presses select button 24a of remote control 13 to select cable channel "6".

The operator may use numerical key pad 72 of on-screen control panel 70 to change the cable channel to view programming of another channel. The operator may use cable channel control arrows 74 to sequentially change the cable channels. The operator may use volume control arrows 76 to raise and
10 lower the volume.

At any time the operator may access main menu 30 by pressing main screen control button 24b of remote control 13. From main menu 30 the operator may select other HE device modes using operating panel 34. For example, the operator may select a player/recorder mode button 36 in operating
15 panel 34 to permit control system 10 to access a player/recorder such as a tape device, VCR, optical disk drive, magnetic disk drive, or the like. For example, FIG. 7 illustrates a VCR program being displayed on video programming screen 52 of display screen 16 while the HE device is in the VCR mode.

While viewing the video program on video programming screen 52
20 the operator may access an on-screen VCR control panel 80 by selecting on-screen control button 24b of remote control 13. On-screen VCR control panel 80 includes VCR control buttons 82 such as "PLAY", "STOP", and the like. The area of touch pad 12 is mapped absolutely to the area of on-screen VCR control panel 80. Each VCR control button 82 of on-screen VCR control panel 80

corresponds to a respective portion of touch pad 12. The operator touches a portion of touch pad 12 to highlight the corresponding VCR control button 82 of on-screen VCR control panel 80. For example, the operator touches the middle portion of touch pad 12 to highlight the "REW" VCR control button 82 of on-screen VCR control panel 80. As the operator touches different portions of touch pad 12 the corresponding VCR control buttons 82 of on-screen VCR control panel 80 are highlighted. In response to the operator selecting a VCR control button 82 the HE device performs the VCR control function associated with the selected VCR control button 82.

10 In addition to using on-screen controls 70 and 80 for enabling TV and VCR control functions, the operator may perform gestures on touch pad 12 to enable the same TV and VCR control functions. A gesture performed on touch pad 12 is a stroke on the touch pad that corresponds to an understood or recognizable pattern. In response to a gesture performed on touch pad 12, the touch pad generates a gesture signal. The gesture signal is indicative of the gesture performed on touch pad 12. Each gesture performed on touch pad 12 corresponds to a HE device control function. Controller 14 is operable with touch pad 12 for receiving a gesture signal from the touch pad in response to an operator performing a gesture on the touch pad. In response to an operator performing a gesture on touch pad 12 controller 14 controls the HE device to enable the control function corresponding to the gesture performed on the touch pad.

Gestures may be alphanumeric characters traced on touch pad 12. For instance, an operator may trace "9" on touch pad 12 to change the television channel to channel "9". The operator may also trace "M" to mute the volume of the television or trace "P" to play the VCR. Gestures may also be a stroke across

touch pad 12. For example, a stroke from the right to the left of touch pad 12 followed by a hold on the touch pad may correspond to a control function for turning up the volume of the television. A gesture may be a tap on touch pad 12. This gesture may correspond to stopping the VCR.

5 Using gestures to control HE devices has many advantages. The operator has access to commands with no need to look at remote control 13. Gestures decrease the number of buttons needed on remote control 13. Remote control 13 can be upgraded simply by adding recognizable gestures. Hardware changes are not required meaning that there is no need to add, subtract, or change
10 physical buttons or legends.

 In the Internet browser mode, the HE device functions as an access device for Internet communications and display screen 16 displays an Internet page 90 as shown in FIG. 8. In the Internet browser mode, a cursor 91 is displayed on Internet page 90 to enable the operator to navigate through the Internet page.
15 Because the area of an Internet page is typically bigger than the area of a display screen touch pad 12 is used in a relative mode when the HE device is in the Internet browser mode. In the relative mode, the operator moves cursor 91 by moving his finger across touch pad 12. Controller 14 moves cursor 91 to the location on Internet page 90 corresponding to the location of the touch on touch
20 pad 12 in response to an operator touching the touch pad.

 Touch pad 12 may also function in the absolute mode when the HE device is in the Internet browser mode. In the absolute mode, the area of touch pad 12 is mapped absolutely to the area of Internet page 90. Each portion of Internet page 90 corresponds to a respective portion of touch pad 12. The

operator highlights links on the Internet page 90 by moving his finger to the corresponding portion of touch pad 12. The operator may then select a highlighted link by using select button 24a of remote control 13.

5 While viewing Internet page 90 the operator may access an on-screen keyboard 92 by selecting on-screen control button 24b of remote control 13. On-screen keyboard 92 includes the alphanumeric keys found on a typical computer keyboard. The area of touch pad 12 is mapped absolutely to the area of on-screen keyboard 92. Each key of on-screen keyboard 92 corresponds to a respective portion of touch pad 12. The operator touches a portion of touch pad 10 12 to highlight the corresponding key of on-screen keyboard 92. For example, the operator touches the upper right portion of touch pad 12 to highlight key "P" of on-screen keyboard 92. As the operator touches different portions of touch pad 12 the corresponding keys of on-screen keyboard 92 are highlighted. On-screen keyboard 92 enables the operator to enter text into the input areas of Internet page 15 90. To enter text, the operator highlights a key and then presses the select button 24a of remote control 13. Controller 14 then enters the selected text into the input area of Internet page 90.

In addition to entering text by using on-screen keyboard 92, the operator may also enter text by writing letters using touch pad 12. As shown in 20 FIG. 9, a graphical entry screen 94 is displayed on Internet page 90 in response to the operator pressing write button 24e of remote control 13. Graphical entry screen 94 displays letters entered by the operator touching touch pad 12. The area of touch pad 12 is mapped absolutely to the area of graphical entry screen 94. In operation, the operator touches touch pad 12 to sketch out a character such as the 25 letter "R" shown in FIG. 11. After sketching out the character the operator

presses the select button 24a of remote control 13 to enter the character into the input area of Internet page 90. Controller 14 uses character recognition software to convert the handwritten letter to text and then enters the text into the input area of Internet page 90.

5 In the audio receiver mode, the HE device functions as a stereo receiver for playing audio signals and display screen 16 displays an audio receiver control panel 100 as shown in FIG. 12A. Audio receiver control panel 100 includes a receiver mode menu 102, a receiver control menu 104, and HE device operating panel 34. Receiver mode menu 102 includes a plurality of mode buttons
10 106 corresponding to a receiver mode. For instance, modes of the receiver include AM and FM radio, tape, phonograph, compact disc, and the like. Receiver control menu 104 includes control buttons 108 for controlling the volume and changing the radio stations in the audio receiver mode.

 Referring now to FIG. 12B with continual reference to FIG. 12a,
15 the area of audio receiver control panel 100 is mapped to the area of touch pad 12. Each menu of audio receiver control panel 100 corresponds to a respective portion of touch pad 12. As shown in FIG. 12B, touch pad 12 is broken down into three control areas corresponding to receiver mode menu 102, receiver control menu 104, and HE device operating panel 34 of audio receiver control
20 panel 100. Each control area of touch pad 12 has associated subareas corresponding to mode buttons 106, control buttons 108, and HE device selections of operating panel 34 in the audio receiver control panel 100. For instance, the operator touches a virtual control area 106a in touch pad 12 to highlight a mode
25 button 106 in receiver mode menu 102, a virtual control area 108a to highlight a control button 108 in receiver control menu 104, and a virtual control area 34a to

highlight a selection of operating panel 34. The operator may then select a highlighted button using select button 24a of remote control 13.

As mentioned above, main menu 30 further includes an email panel 38 and an Internet telephony panel 40. An HE device such as an enhanced TV provides the operator with the ability to communicate email and Internet telephony messaging. In the Internet telephony mode, the HE device functions as a telephone. Display screen 16 displays an Internet telephony control panel 110 as shown in FIG. 13. Internet telephone control panel 110 includes a telephone directory menu 112, a telephone directory control panel 114, and a telephone operating panel 116. The area of telephone control panel 110 is mapped to the area of touch pad 12. Each menu of telephone control panel 110 corresponds to a respective portion of touch pad 12. For instance, the operator touches the upper left portion of touch pad 12 to highlight a telephone entry 118 in telephone directory menu 112. The operator may then select the highlighted telephone entry by using select button 24a of remote control 13.

The operator may open received telephone messages by touching the area of touch pad 12 corresponding to telephone message area 120. In response, the HE device plays the recorded audible message. The operator may select a stored telephone number 118, dial the selected telephone number 122, talk and listen to the called party, and then hang up 124. To enter a telephone number that is not stored, the operator selects dial 122 and then enters the desired telephone number using an on-screen numerical keyboard 130 displayed on display screen 16 as shown in FIG. 14.

In the email mode, the HE device communicates email messages. Display screen 16 displays an email panel 140 as shown in FIG. 15. Email panel 140 includes an email directory menu 142. The area of email directory menu 142 is mapped to the area of touch pad 12. Each email entry of email directory menu 142 corresponds to a respective portion of touch pad 12. For instance, the operator touches the middle portion of touch pad 12 to highlight an email address entry 144 in email directory menu 142. The operator may then select the highlighted email entry by using select button 24a of remote control 13.

Upon selecting the highlighted email entry display screen 16 displays an email messaging panel 150 as shown in FIG. 16. The operator uses email messaging panel 150 to send email messages including text, drawings, voice clips, photographs, and the like. The area of touch pad 12 is mapped to email messaging panel 150 such that there is a one-to-one correspondence between each location of the touch pad and the email messaging panel in the same manner with reference to the other panels and menus described above. The operator may enter text by using on-screen keyboard 152 in the same manner described above with reference to the other on-screen keyboards. The operator may enter writing or drawings into a writing area 152 of email messaging panel 150 as shown in FIG. 17 by using touch pad 12. Photographs may be copied to writing area 152 and then edited by using touch pad 12. In essence, touch pad 12 enables the operator to write an email message. For example, the operator may write his signature to electronically sign for purchases made via Internet shopping, on line banking, signature input, or simply handwrite a personalized email message.

During operation of the HE device, the switching between the absolute mode and the relative mode is context sensitive. The operator will note

that during relative operation a cursor appears on display screen 16 and in absolute mode items, links, and the like will be highlighted when selected. The relative mode may be used for virtual screens that are larger than can be displayed on the display screen 16 at once. A typical application that uses the relative mode is the

5 Internet browser. The functionality of a relative cursor allows for multiple strokes to move the cursor. However, if the cursor is against the sides of the display screen 16 the cursor will move the display like a window over the larger document (i.e., pan and scroll) in the direction of the stroke across the touch pad 12. Once the cursor is placed over an object and the object is selected the mode may change

10 based on the context. If the selected item were a button type the button is depressed. If the selected item is a text entry based on user preferences an on-screen keyboard of a character recognizer absolute menu pops up. Upon the input of text the system closes the text input screen and returns to the relative mode for the Internet browser. Once the Internet browser or other application requiring the

15 larger display area is closed the menu would return to the absolute mode.

FIG. 18 illustrates a flow chart 160 describing operation of the switching between absolute and relative modes of display screen 16 according to an embodiment of the present invention. Flow chart 160 begins with receiving a new message as shown in block 162 and then incrementing the message count as shown in block 164. Decision block 166 then determines if touch pad 12 is

20 activated. If not, the message count is set to zero and the relative move is set to zero as shown in block 168. The pad position is then equal to the last touch pad position as shown in block 170.

If the touch pad is activated, then decision block 172 determines if

25 the current mode is the absolute mode. If yes, then the display screen position is

equal to the touch pad position divided by the maximum touch pad position multiplied by the display size as shown in block 174. If not, then decision block 176 determines if the message count is equal to one. If not, then the relative output is equal to the touch pad position minus the last touch pad position as shown in block 178. The touch pad position is then equal to the last touch pad position as shown in block 170.

FIG. 19 illustrates in further detail remote control system 10 in accordance with the present invention. Remote control 13 includes control logic 180 operable with touch pad 12, control buttons 24, and a transmitter 182. Control logic 180 is embodied as a microprocessor and memory. Controller 14 includes control logic 184 operable with an audio/video processor 186 and a receiver 188. Receiver 188 receives signals from transmitter 182 and passes them to control logic 184. Control logic 184 is also embodied as a microprocessor and memory. In response to the signals received from transmitter 182, control logic 184 controls audio/video processor 186 accordingly. In response, audio/video processor 186 controls display screen 16 and other controlled devices as a function of the received signals.

Thus it is apparent that there has been provided, in accordance with the present invention, a remote control having a touch pad mapped to the screen of a home entertainment (HE) device to create a virtual touch screen for enabling an operator to control the HE device that fully satisfies the objects, aims, and advantages set forth above. While the present invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such

alternatives, modifications, and variations as fall within the spirit and broad scope of the appended claims.

What Is Claimed Is:

1. A remote control for controlling a home entertainment (HE) device having a display screen, the remote control comprising:

5 a touch pad mapped to the display screen of the HE device as a function of the ratio of the areas of the touch pad and the display screen such that each location of the touch pad corresponds to a respective location of the display screen; and

10 a controller operable with the touch pad to enable a control function associated with a location of the display screen in response to the corresponding location of the touch pad being touched for controlling the HE device.

2. The remote control of claim 1 wherein:

the display screen includes control panels and each location of the touch pad corresponds to the control panel closest to the respective location of the display screen.

15 3. The remote control of claim 2 wherein:

at least one of the control panels includes control entries and the locations of the touch pad corresponding to the at least one of the control panels correspond to the control entries closest to the respective locations of the display screen.

20 4. The remote control of claim 1 wherein:

the display screen includes a control panel having control functions, wherein the touch pad is mapped to the control panel of the display screen as a

function of the areas of the touch pad and the control panel such that each location of the touch pad corresponds to a respective control function of the control panel.

5 5. The remote control of claim 1 wherein:
 the controller enables a control function in response to the
5 corresponding location of the touch pad being touched.

 6. The remote control of claim 1 wherein:
 the display screen includes an electronic program guide having a
plurality of grids, wherein the touch pad is mapped to the electronic program
guide of the display screen as a function of the ratio of the areas of the touch pad
10 and the electronic program guide such that each location of the touch pad
corresponds to a respective grid of the electronic program guide.

 7. The remote control of claim 6 wherein:
 the controller enables a grid of the electronic program guide in
response to the corresponding location of the touch pad being touched.

15 8. The remote control of claim 1 wherein:
 the display screen includes an on-screen keyboard having
alphanumeric keys, wherein the touch pad is mapped to the on-screen keyboard
as a function of the ratio of the areas of the touch pad and the on-screen keyboard
such that each location of the touch pad corresponds to a respective alphanumeric
20 key of the on-screen keyboard.

 9. The remote control of claim 8 wherein:

the controller enables an alphanumeric key of the on-screen keyboard in response to the corresponding location of the touch pad being touched.

5 10. The remote control of claim 1 wherein:
the display screen includes an Internet page having links, wherein the touch pad is mapped to the Internet page as a function of the ratio of the areas of the touch pad and the Internet page such that each location of the touch pad corresponds to a respective link of the Internet page.

10 11. The remote control of claim 10 wherein:
the controller enables a link of the Internet page in response to the corresponding location of the touch pad being touched.

15 12. The remote control of claim 1 wherein:
the display screen includes a graphical entry screen, wherein the touch pad is mapped to the graphical entry screen as a function of the ratio of the areas of the touch pad and the graphical entry screen such that each location of the touch pad corresponds to a respective location of the graphical entry screen.

13. The remote control of claim 12 wherein:
the controller draws on a location of the graphical entry screen in response to the corresponding location of the touch pad being touched.

20 14. The remote control of claim 1 wherein:
the display screen includes an email panel, wherein the touch pad is mapped to the email panel as a function of the ratio of the areas of the touch pad

and the email panel such that each location of the touch pad corresponds to a respective location of the email panel.

15. The remote control of claim 1 wherein:

5 the display screen includes an telephony panel, wherein the touch pad is mapped to the telephony panel as a function of the ratio of the areas of the touch pad and the telephony panel such that each location of the touch pad corresponds to a respective location of the telephony panel.

16. A remote control for controlling a home entertainment device having an electronic program guide displayed on a display screen, the electronic program guide having a plurality of grids, the remote control comprising:

10 a touch pad mapped to the electronic program guide as a function of the ratio of the areas of the touch pad and the electronic program guide such that each location of the touch pad corresponds to a respective grid of the electronic program guide.

17. The remote control of claim 16 wherein:

15 the touch pad is operable with a controller for enabling a grid of the electronic program guide in response to the corresponding location of the touch pad being touched.

18. A remote control for controlling a home entertainment device having an on-screen keyboard displayed on a display screen, the on-screen keyboard having a plurality of alphanumeric keys, the remote control comprising:

20 a touch pad mapped to the on-screen keyboard as a function of the ratio of the areas of the touch pad and the on-screen keyboard such that each

location of the touch pad corresponds to a respective alphanumeric key of the on-screen keyboard.

19. The remote control of claim 18 wherein:

5 the touch pad is operable with a controller for enabling an alphanumeric key of the on-screen keyboard in response the corresponding location of the touch pad being touched.

20. A remote control for controlling a home entertainment device having an Internet page displayed on a display screen, the Internet page having a plurality of links, the remote control comprising:

10 a touch pad mapped to the Internet page as a function of the ratio of the areas of the touch pad and the Internet page such that each location of the touch pad corresponds to a respective link of the Internet page.

21. The remote control of claim 20 wherein:

15 the touch pad is operable with a controller for enabling a link of the Internet page in response to the corresponding location of the touch pad being touched.

22. A remote control for controlling a television, the remote control comprising:

20 a touch pad; and
a plurality of control buttons, wherein the touch pad and the control buttons are used in conjunction to enable control functions for controlling the television.

23. The remote control of claim 22 wherein:

the touch pad is mapped to the display screen of the television as a function of the ratio of the areas of the touch pad and display screen such that each location of the touch pad corresponds to a respective location of the display screen, wherein a control function associated with a location of the display screen is selected by touching the corresponding location of the touch pad and then enabled using a control button.

24. A method for controlling a home entertainment (HE) device having a display screen, the method comprising:

touching a portion of a touch pad, wherein the touch pad includes a plurality of virtual control areas each associated with a corresponding virtual control on the display screen, wherein each portion of the touch pad is associated with a virtual control area of the touch pad; and

enabling a virtual control displayed on the display screen corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

25. The method of claim 24 further comprising:

controlling the HE device as a function of the enabled virtual control.

26. The method of claim 24 wherein:

each virtual control area of the touch pad is associated with a corresponding virtual control on the display screen as a function of the positions of the virtual control areas on the touch pad and the positions of the virtual controls on the display screen.

27. The method of claim 24 wherein:

the display screen includes an electronic program guide having a plurality of virtual control grid areas, wherein the touch pad is mapped to the electronic program guide as a function of the ratio of the areas of the touch pad
5 and the electronic program guide such that each virtual control area of the touch pad is associated with a corresponding virtual control grid area of the electronic program guide.

28. The method of claim 27 wherein:

enabling a virtual control includes enabling a virtual control grid
10 area of the electronic program guide corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

29. The method of claim 24 wherein:

the display screen includes an on-screen keyboard having a plurality
of virtual control alphanumeric keys, wherein the touch pad is mapped to the on-
15 screen keyboard as a function of the ratio of the areas of the touch pad and the on-
screen keyboard such that each virtual control area of the touch pad is associated
with a corresponding virtual control alphanumeric key of the on-screen keyboard.

30. The method of claim 29 wherein:

enabling a virtual control includes enabling a virtual control
20 alphanumeric key of the on-screen keyboard corresponding to the virtual control
area of the touch pad associated with the touched portion of the touch pad.

31. The method of claim 24 wherein:

the display screen includes an Internet page having a plurality of virtual control links, wherein the touch pad is mapped to the Internet page as a function of the ratio of the areas of the touch pad and the Internet page such that each virtual control area of the touch pad is associated with a corresponding
5 virtual control link of the Internet page.

32. The method of claim 31 wherein:

enabling a virtual control includes enabling a virtual control link of the Internet page corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

10 33. The method of claim 24 wherein:

the display screen includes an email panel having a plurality of virtual controls, wherein the touch pad is mapped to the email panel as a function of the ratio of the areas of the touch pad and the email panel such that each virtual control area of the touch pad is associated with a corresponding virtual control of
15 the email panel.

34. The method of claim 33 wherein:

enabling a virtual control includes enabling a virtual control of the email panel corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

20 35. The method of claim 24 wherein:

the display screen includes a telephony panel having a plurality of virtual controls, wherein the touch pad is mapped to the telephony panel as a function of the ratio of the areas of the touch pad and the telephony panel such that

each virtual control area of the touch pad is associated with a corresponding virtual control of the telephony panel.

36. A method for controlling a home entertainment (HE) device having an electronic program guide displayed on a display screen, the electronic program guide having a plurality of grid areas, the method comprising:

5 touching a portion of a touch pad, wherein the touch pad includes a plurality of virtual control areas each associated with a corresponding grid area of the electronic program guide, wherein each portion of the touch pad is associated with a virtual control area of the touch pad; and

10 enabling a grid area of the electronic program guide displayed on the display screen corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

37. The method of claim 36 further comprising:

15 controlling the HE device as a function of the enabled grid area of the electronic program guide.

38. A method for controlling a home entertainment (HE) device having an on-screen keyboard displayed on a display screen, the on-screen keyboard having a plurality of alphanumeric keys, the method comprising:

20 touching a portion of a touch pad, wherein the touch pad includes a plurality of virtual control areas each associated with a corresponding alphanumeric key of the on-screen keyboard, wherein each portion of the touch pad is associated with a virtual control area of the touch pad; and

enabling an alphanumeric key of the on-screen keyboard corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

39. The method of claim 38 further comprising:

5 controlling the HE device as a function of the enabled alphanumeric key of the on-screen keyboard.

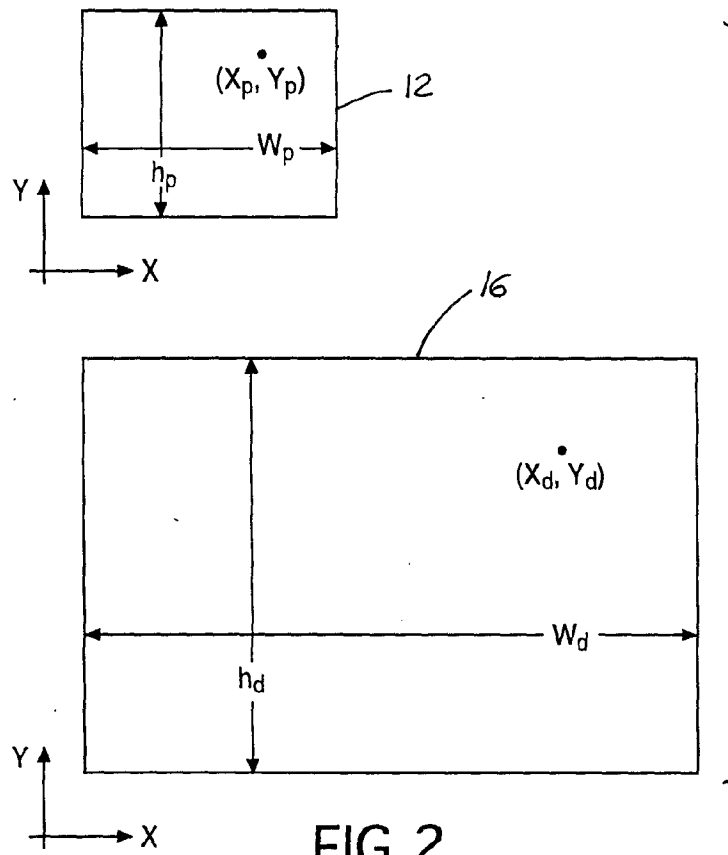
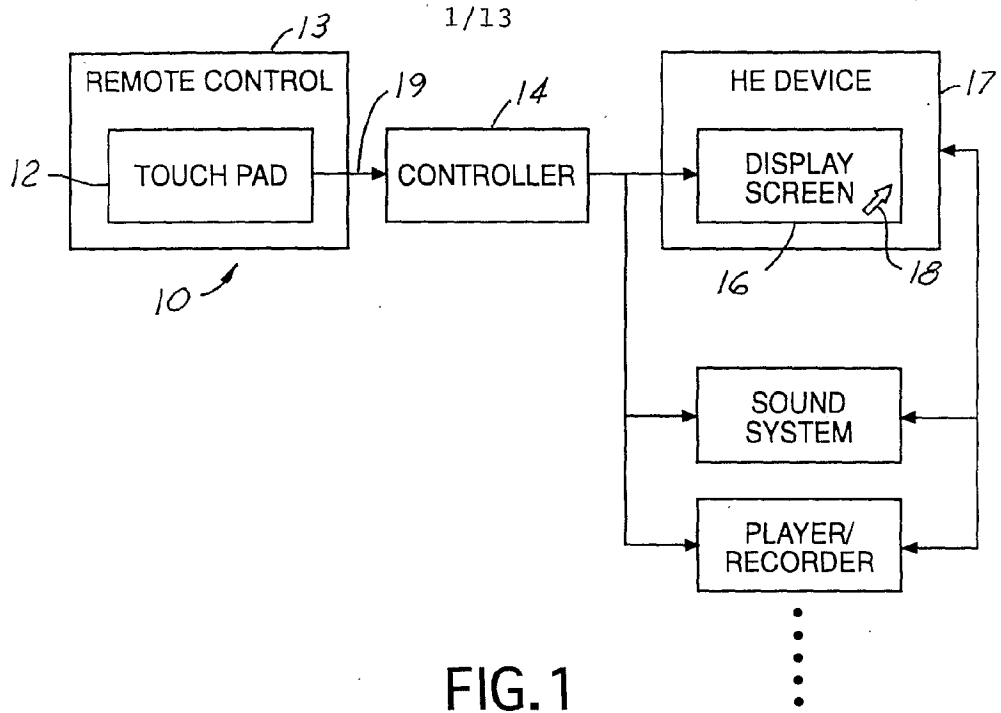
40. A method for controlling a home entertainment (HE) device having an Internet page displayed on a display screen, the Internet page having a plurality of links, the method comprising:

10 touching a portion of a touch pad, wherein the touch pad includes a plurality of virtual control areas each associated with a corresponding link of the Internet page, wherein each portion of the touch pad is associated with a virtual control area of the touch pad; and

15 enabling a link of the Internet page corresponding to the virtual control area of the touch pad associated with the touched portion of the touch pad.

41. The method of claim 40 further comprising:

controlling the HE device as a function of the enabled link of the Internet page.



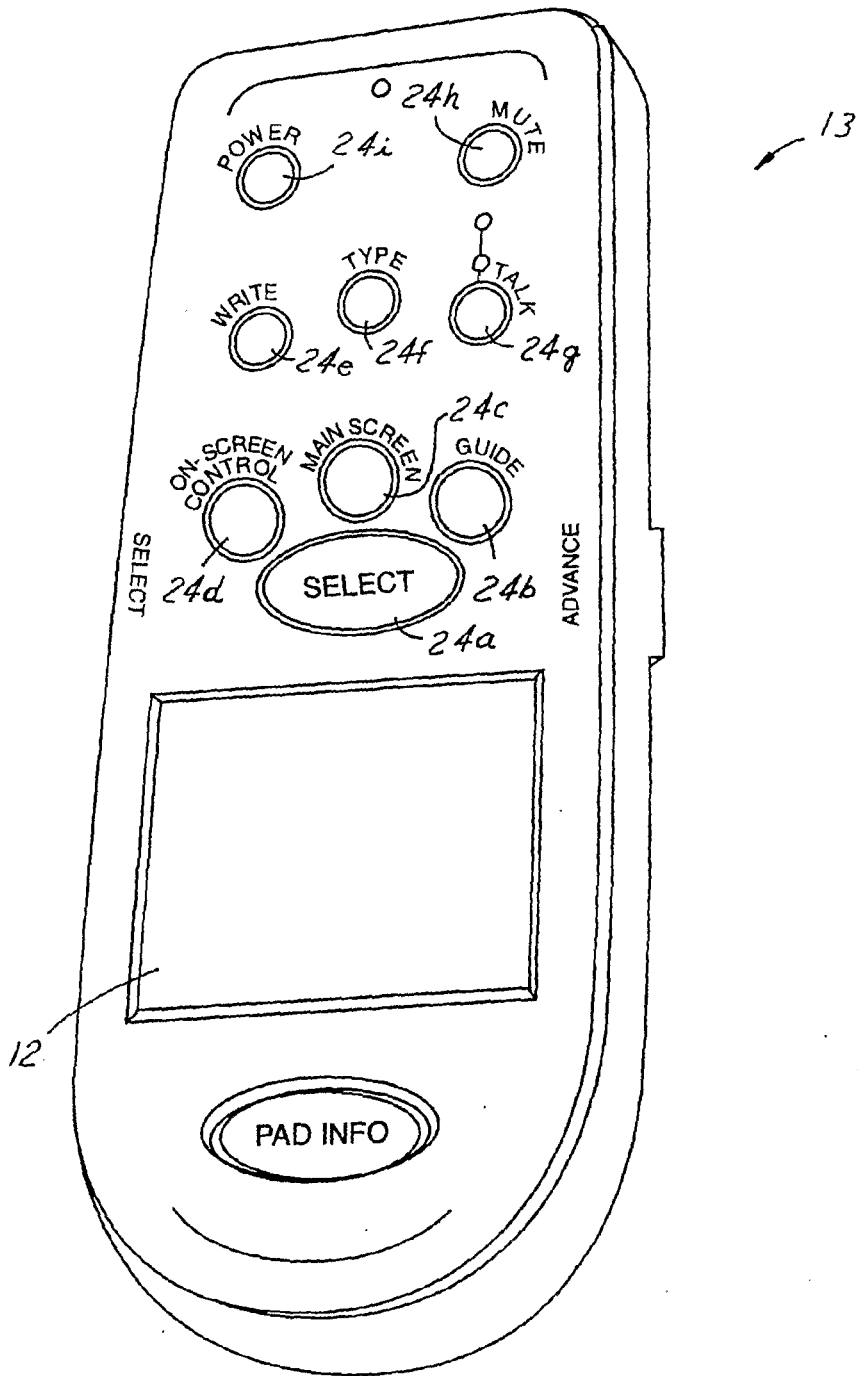


FIG. 4

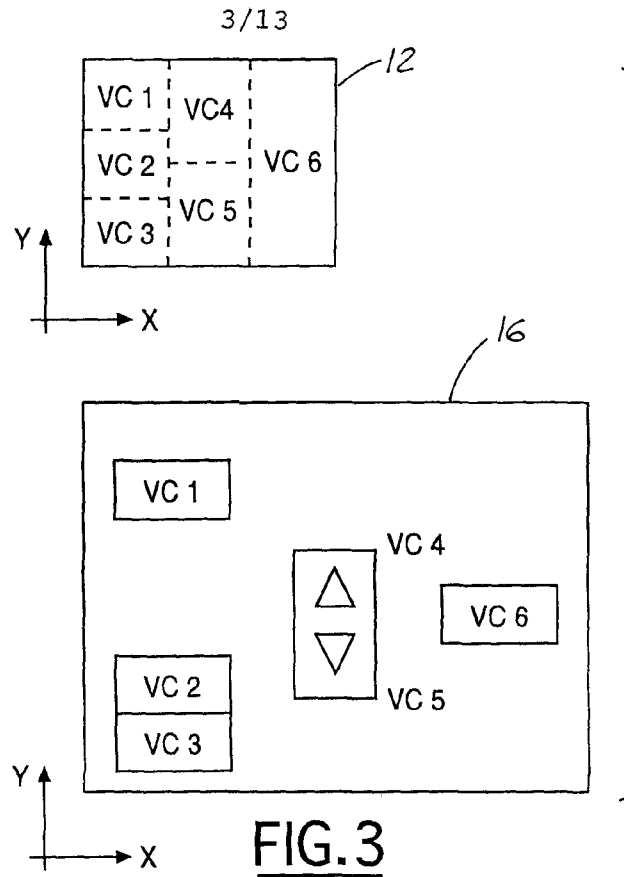


FIG. 3

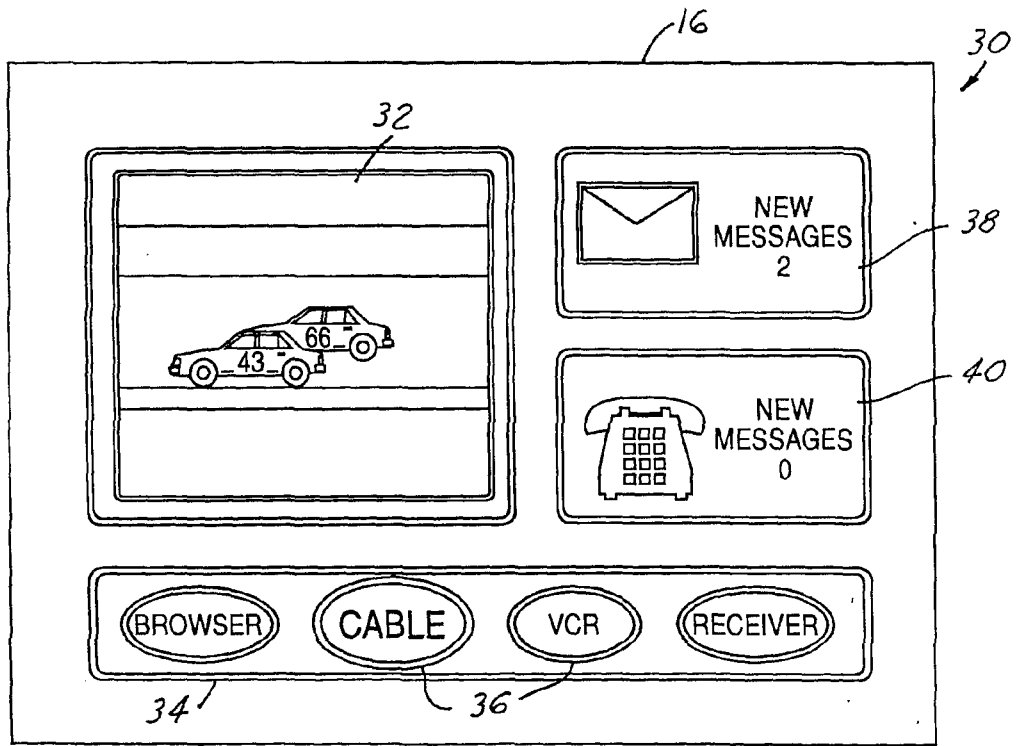


FIG. 5A

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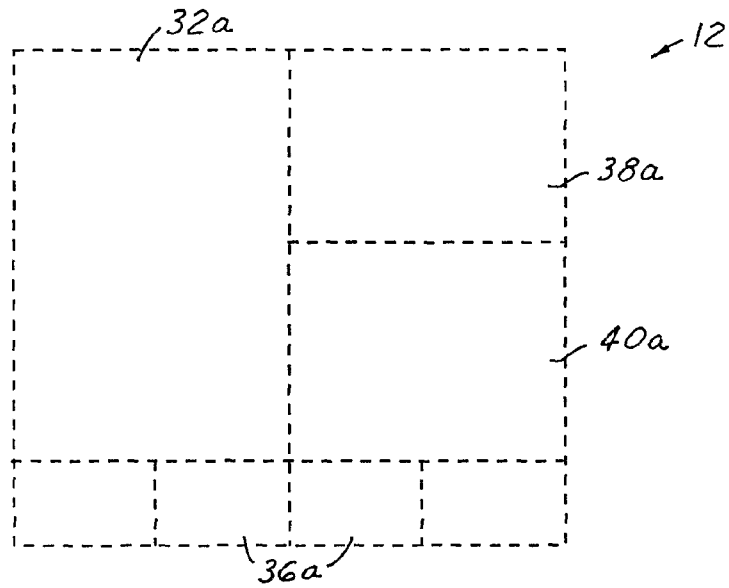


FIG. 5B

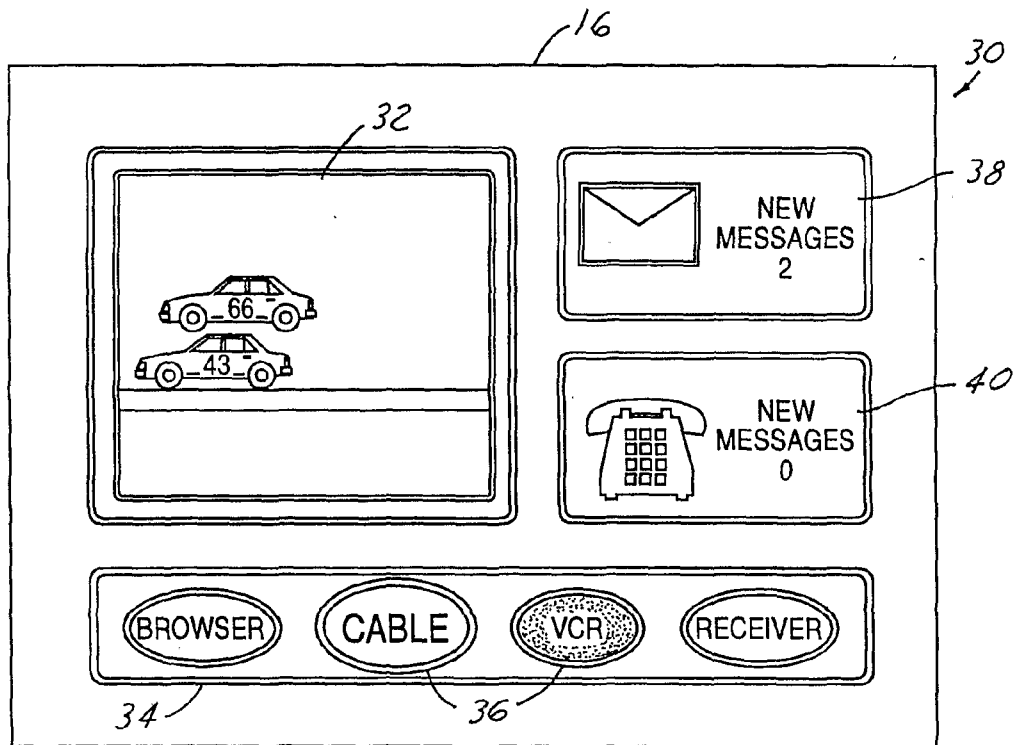


FIG. 6

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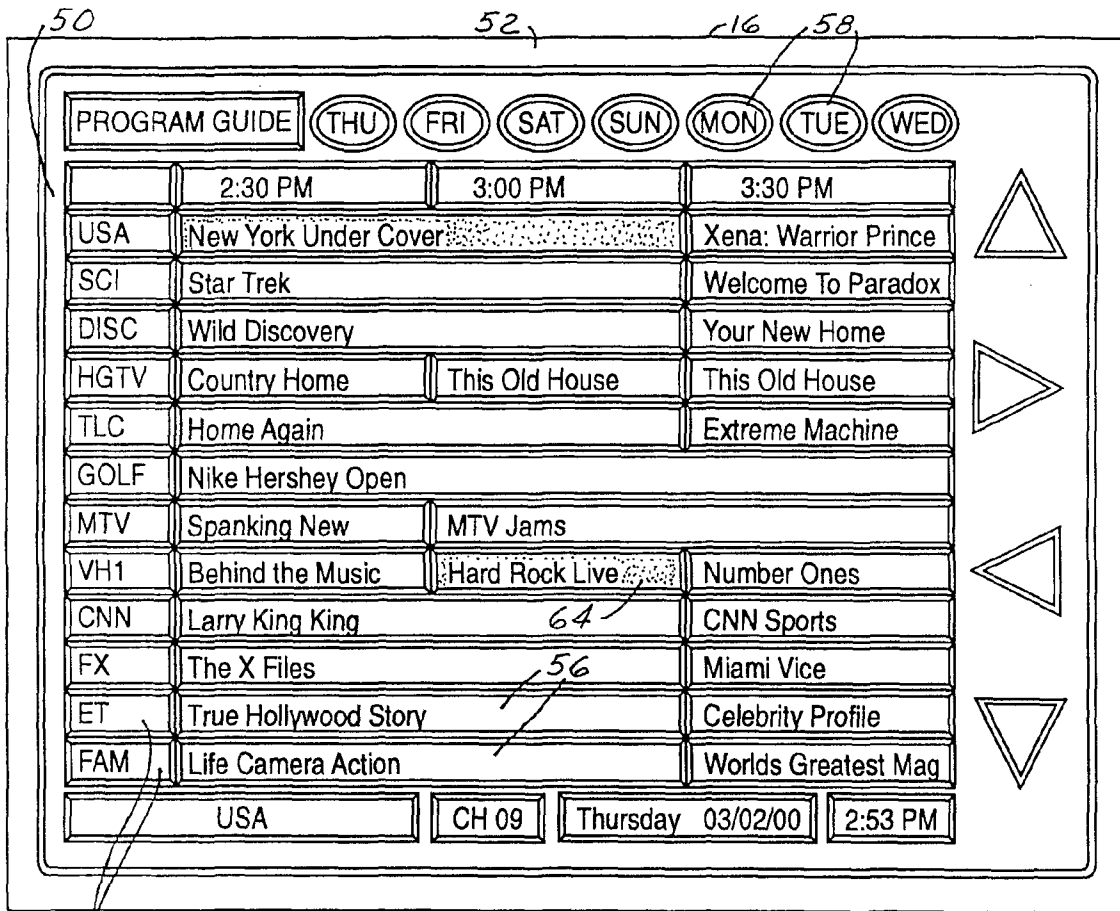


FIG. 7A

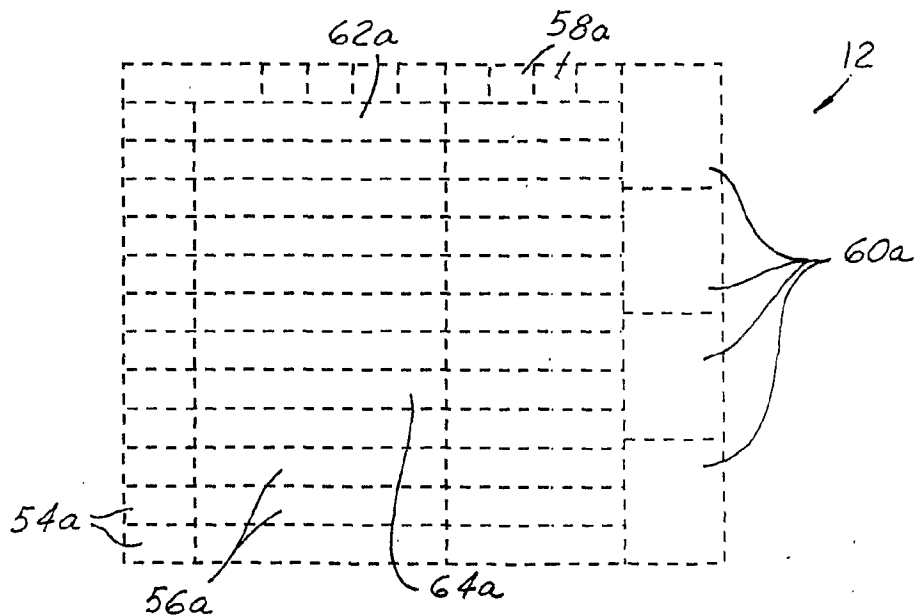


FIG. 7B

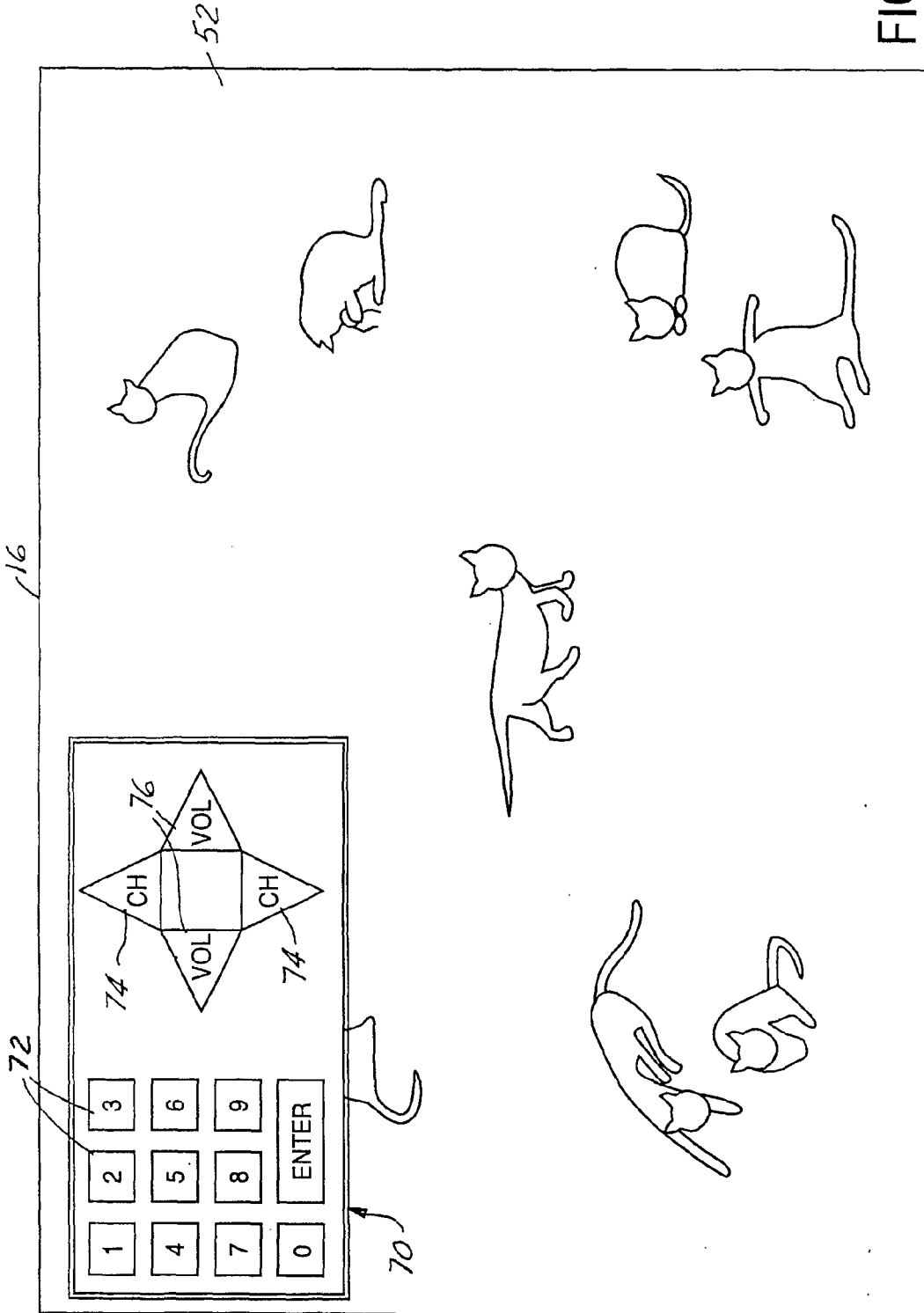


FIG. 8A

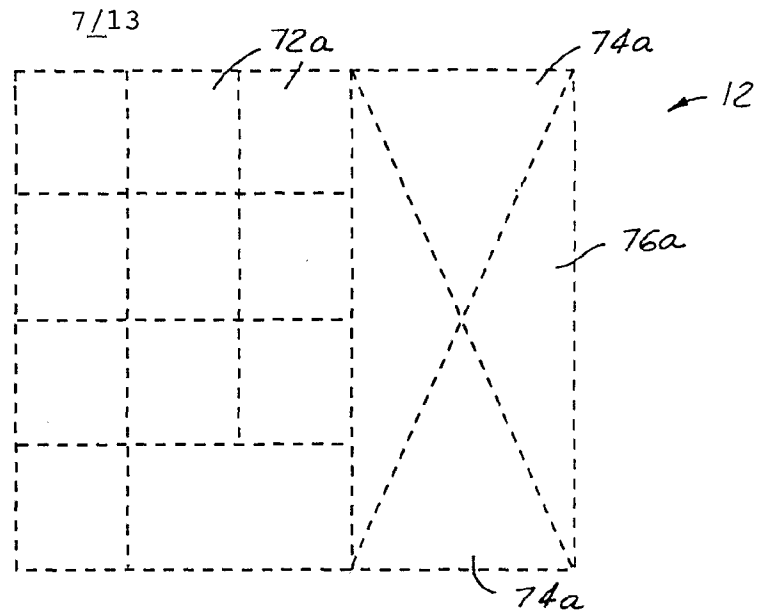


FIG. 8B

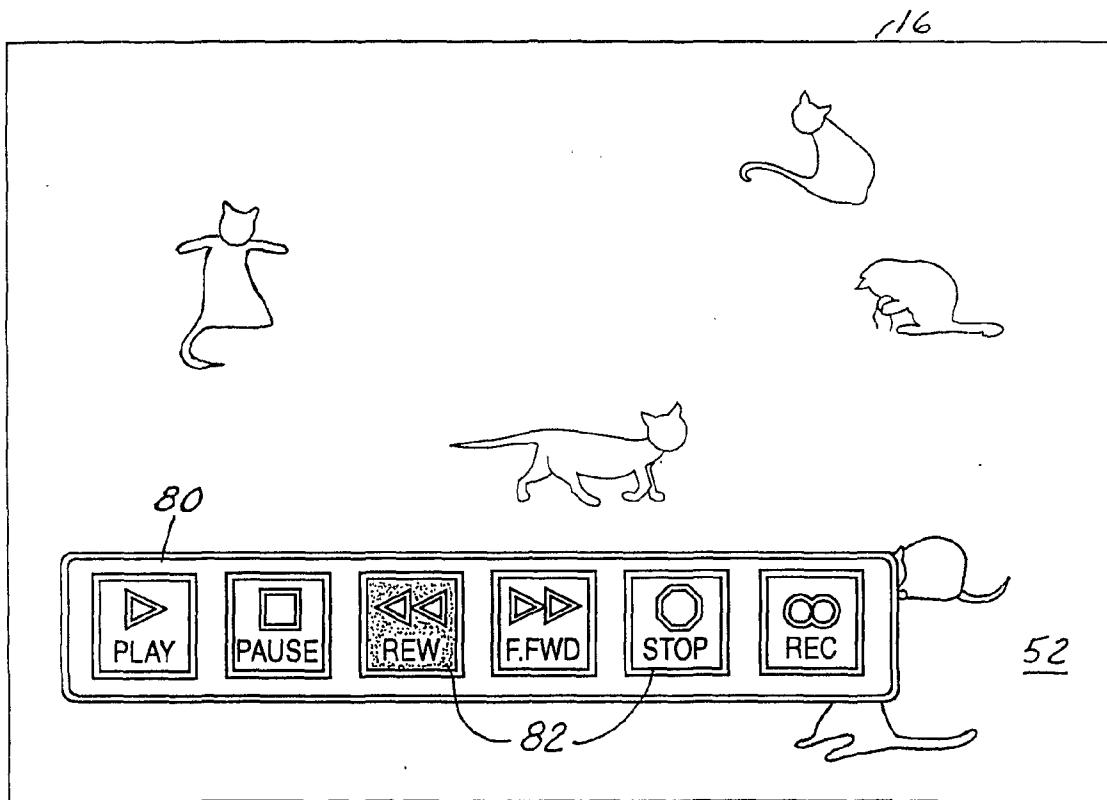


FIG. 9

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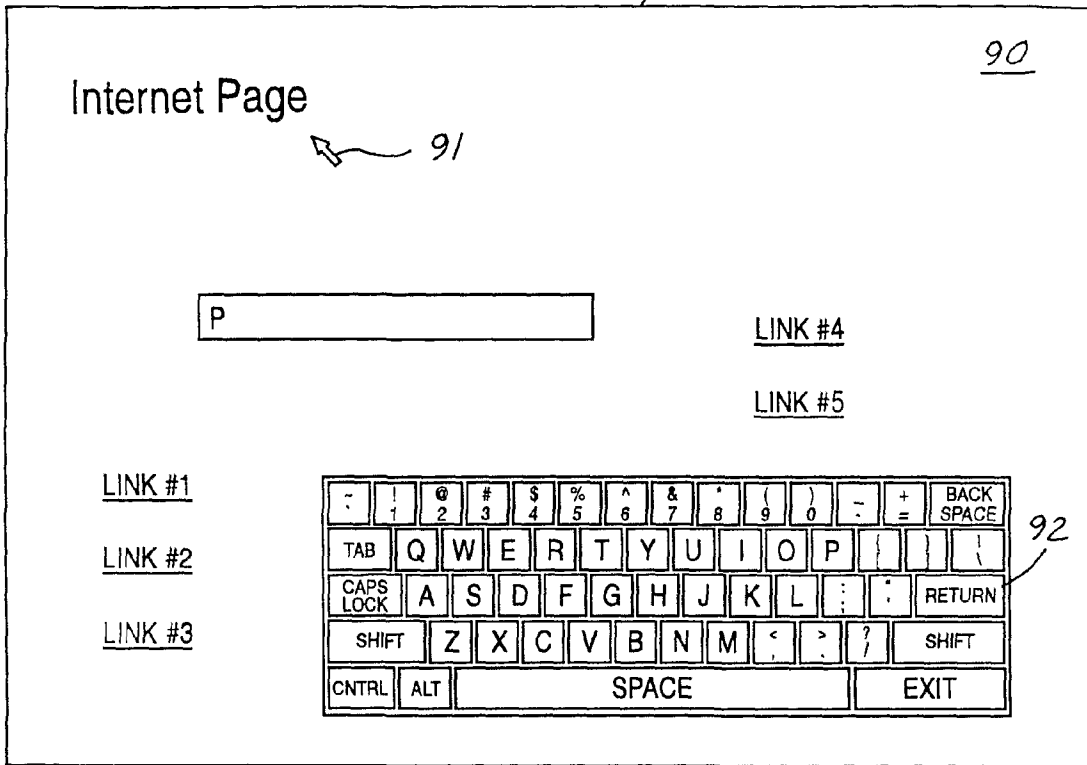


FIG. 10

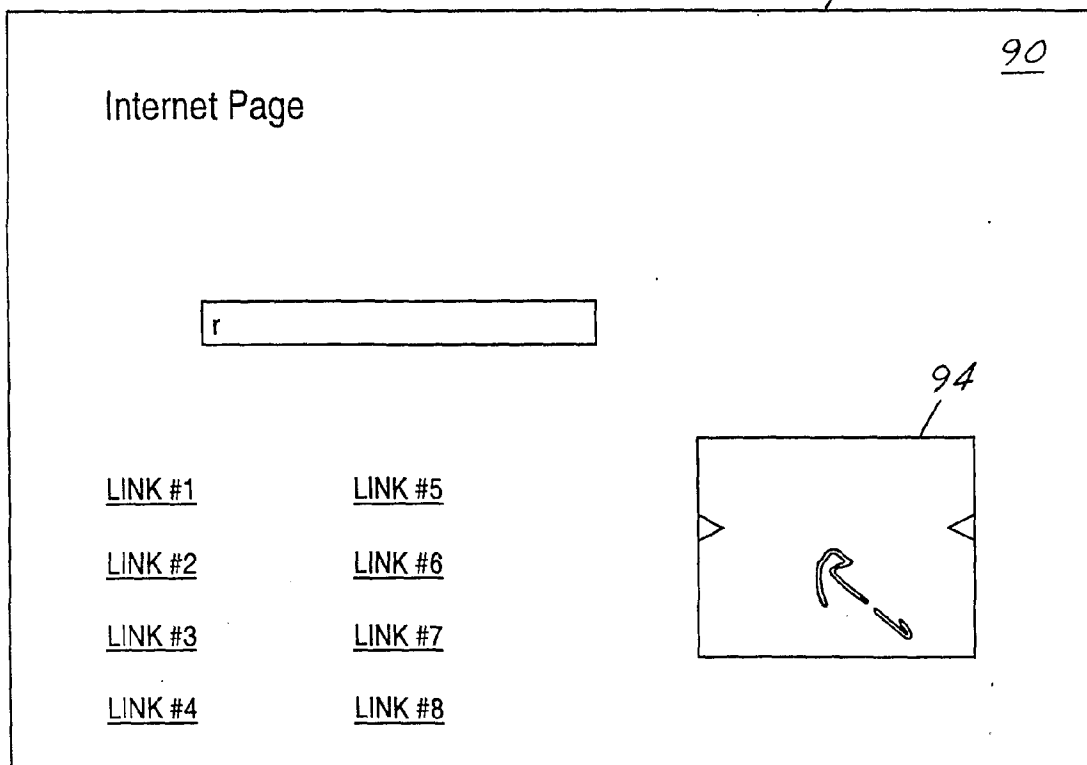


FIG. 11

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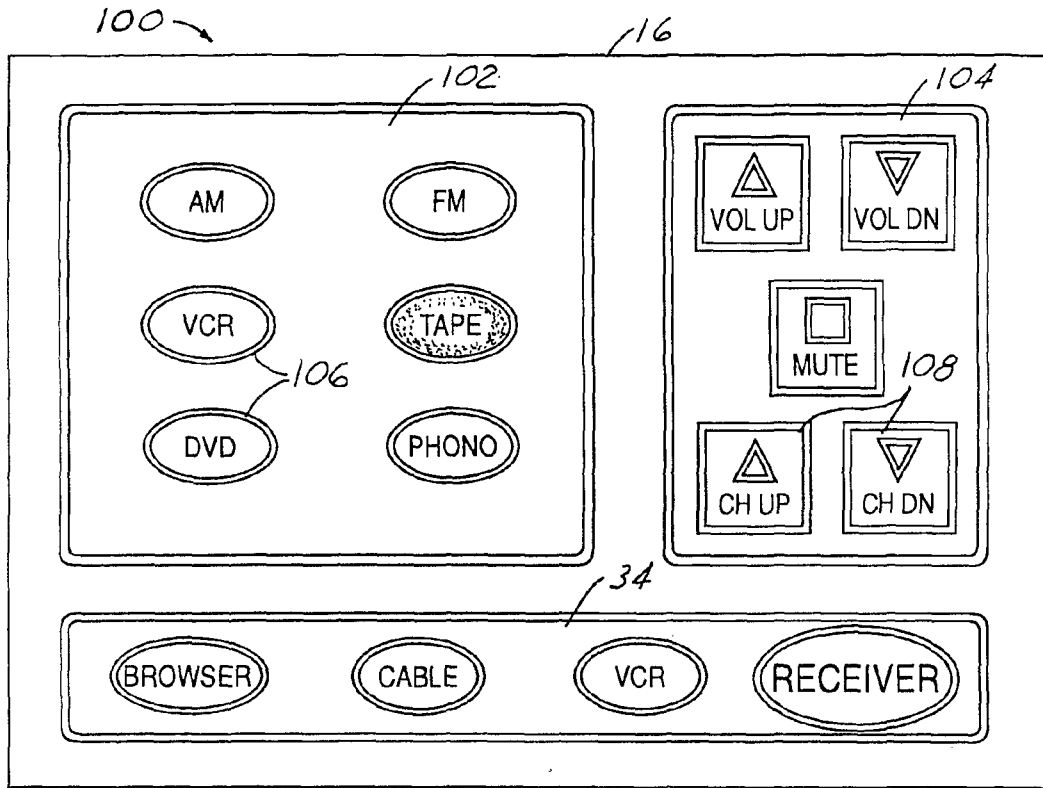


FIG. 12A

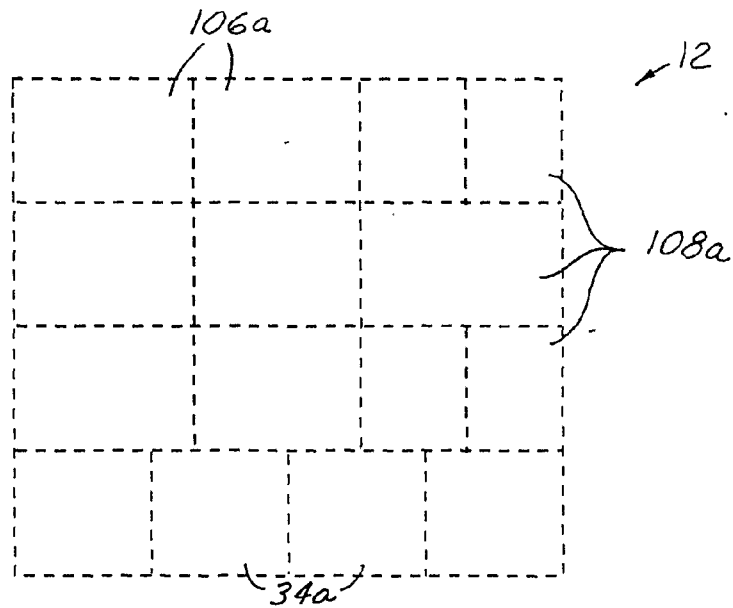


FIG. 12B

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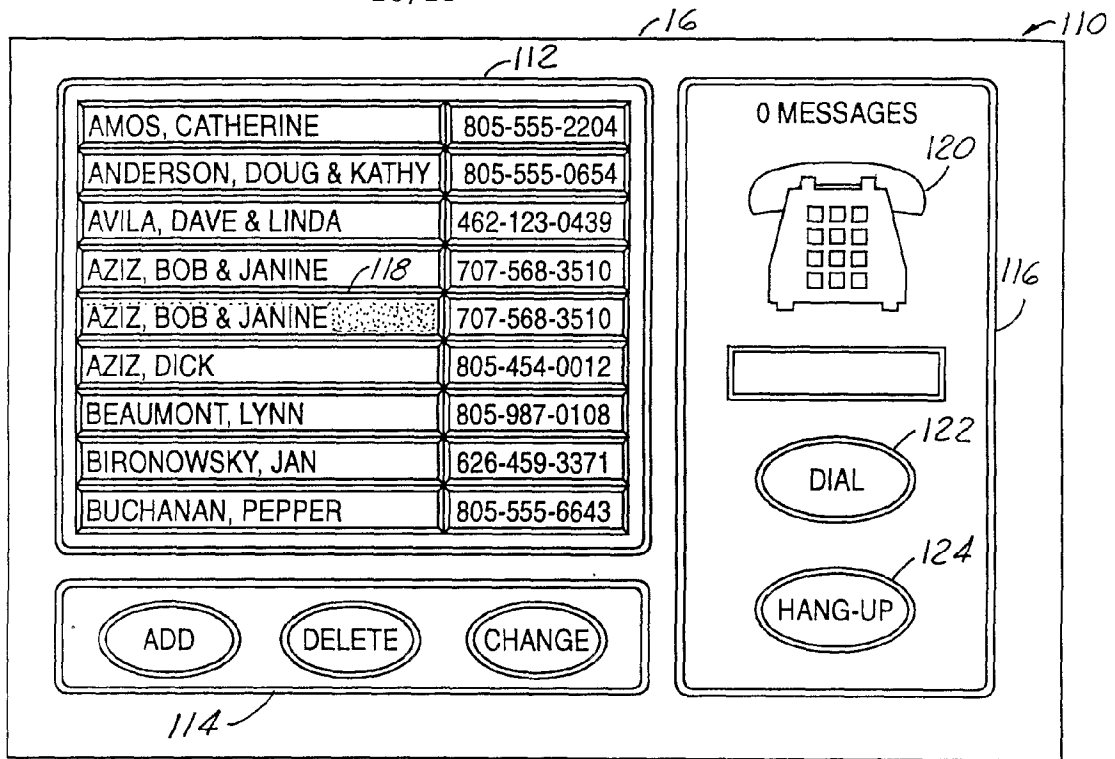


FIG. 13

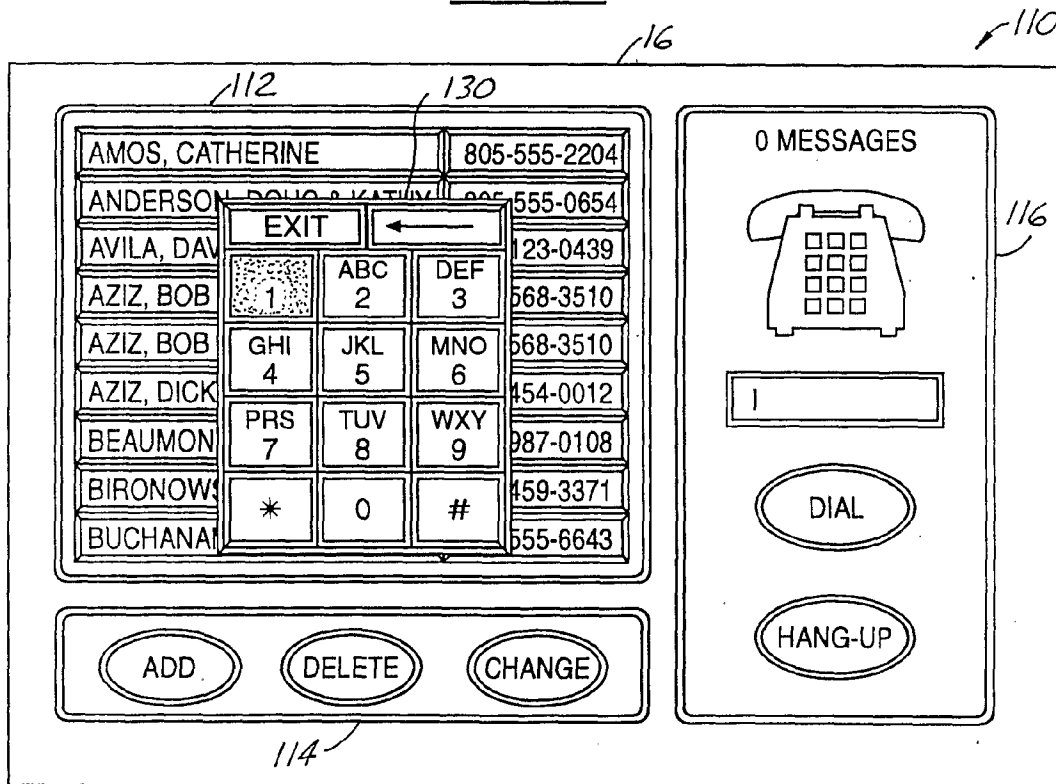


FIG. 14

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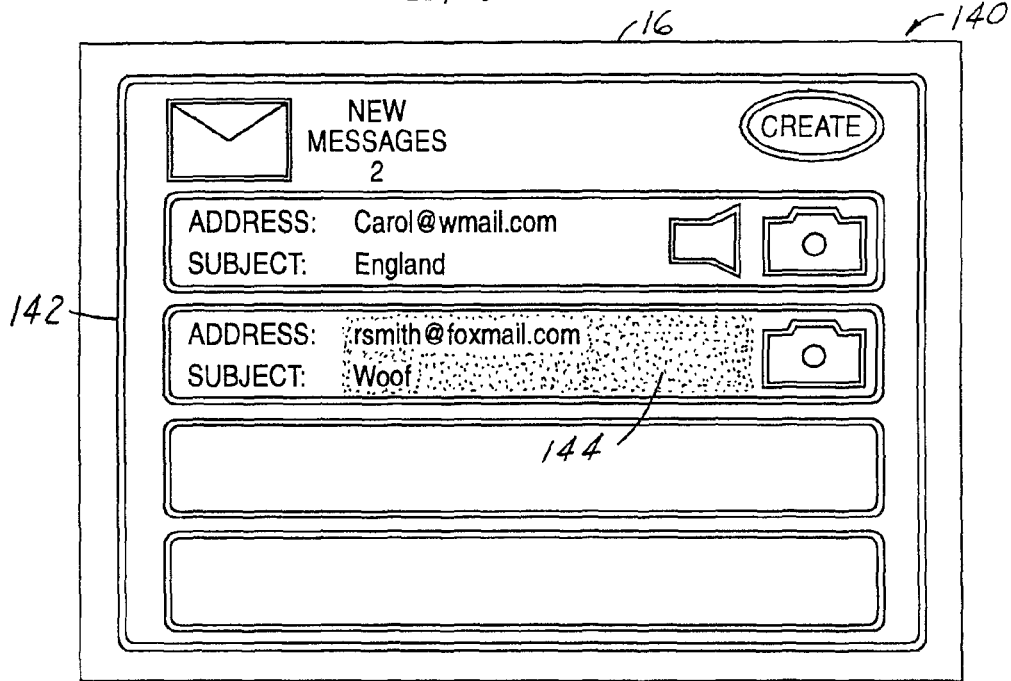


FIG. 15

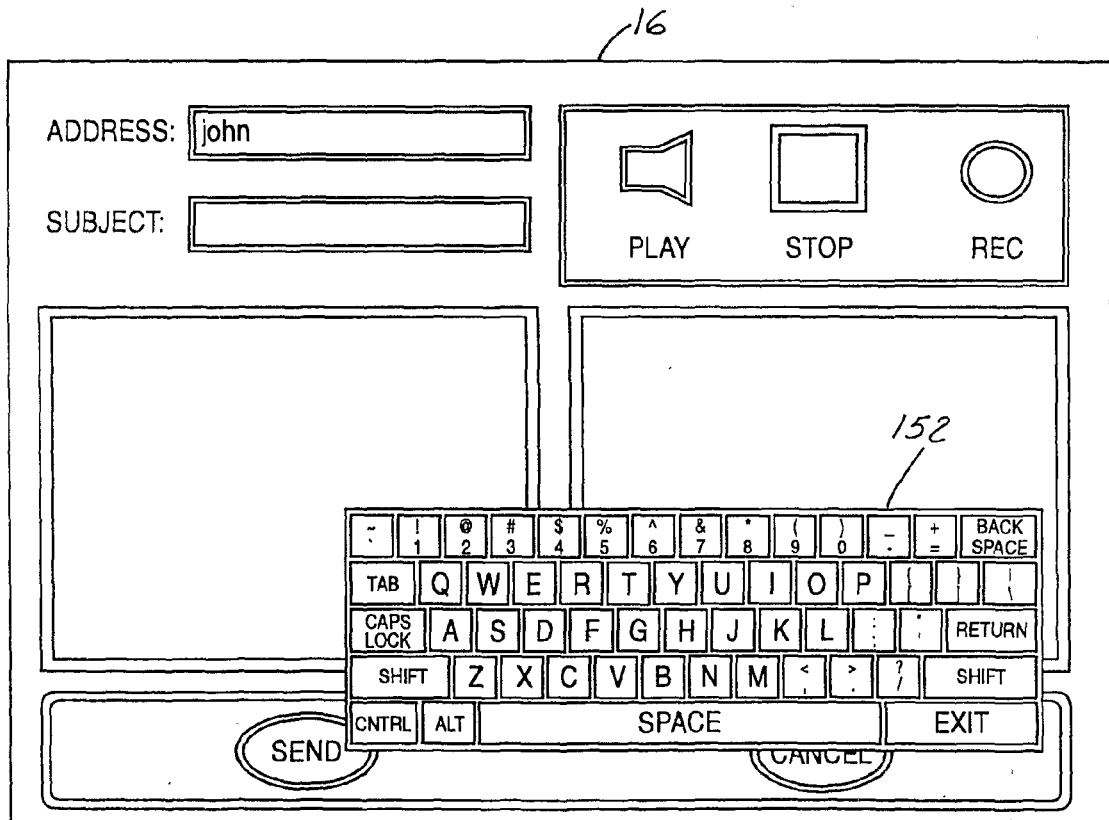


FIG. 16

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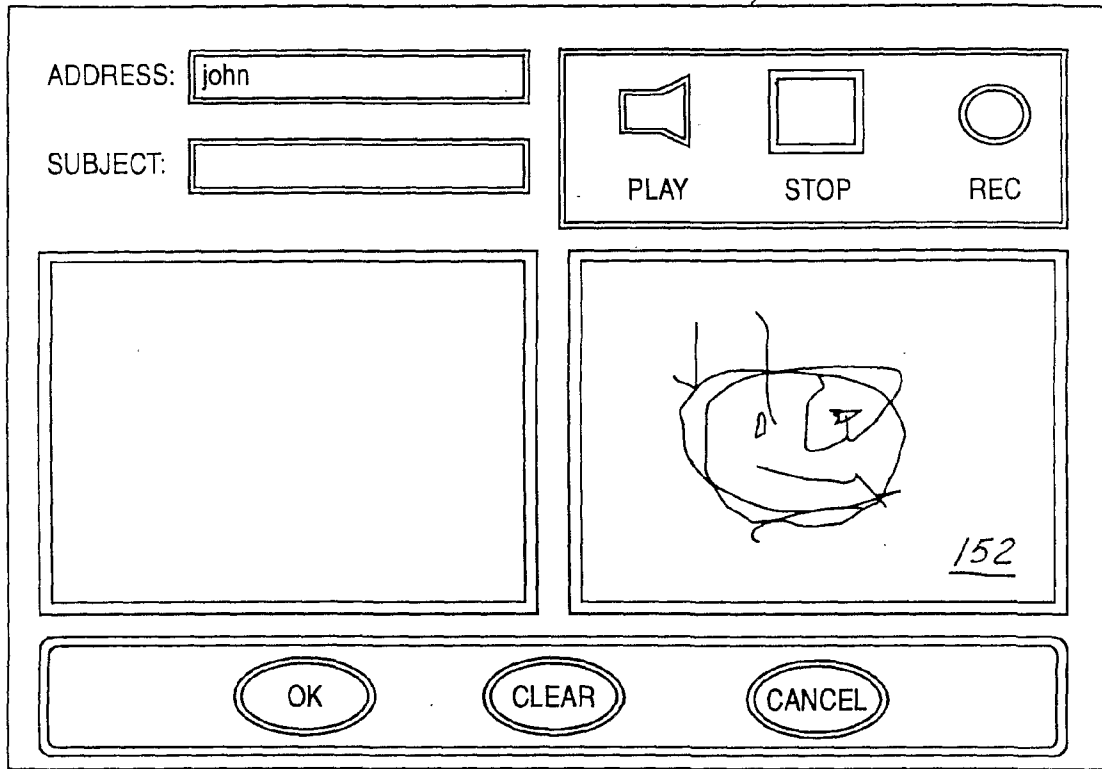


FIG. 17

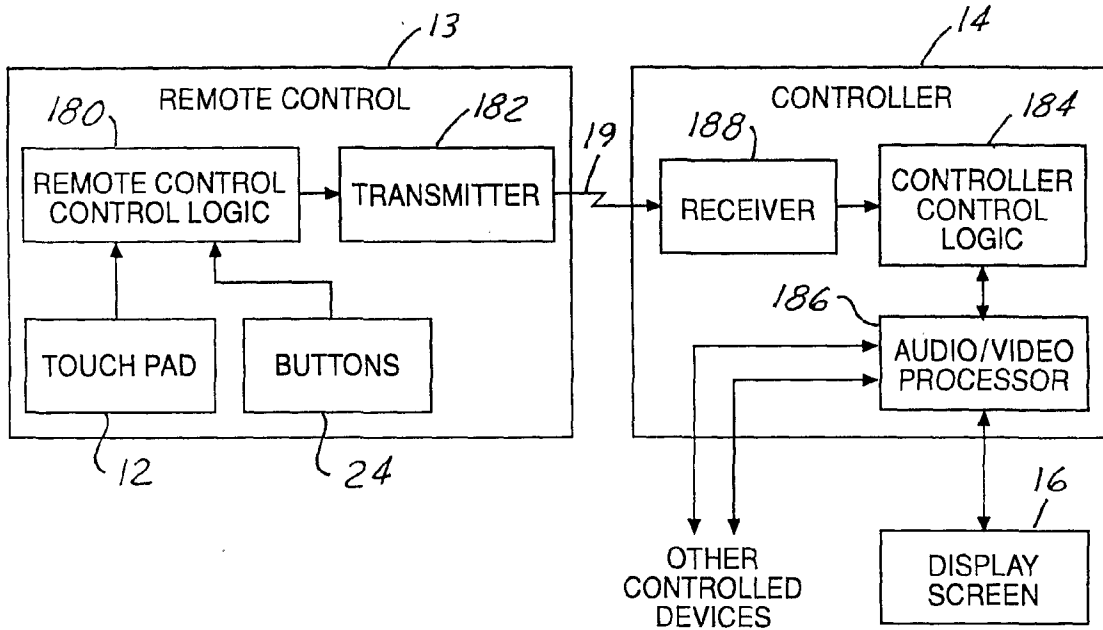


FIG. 19

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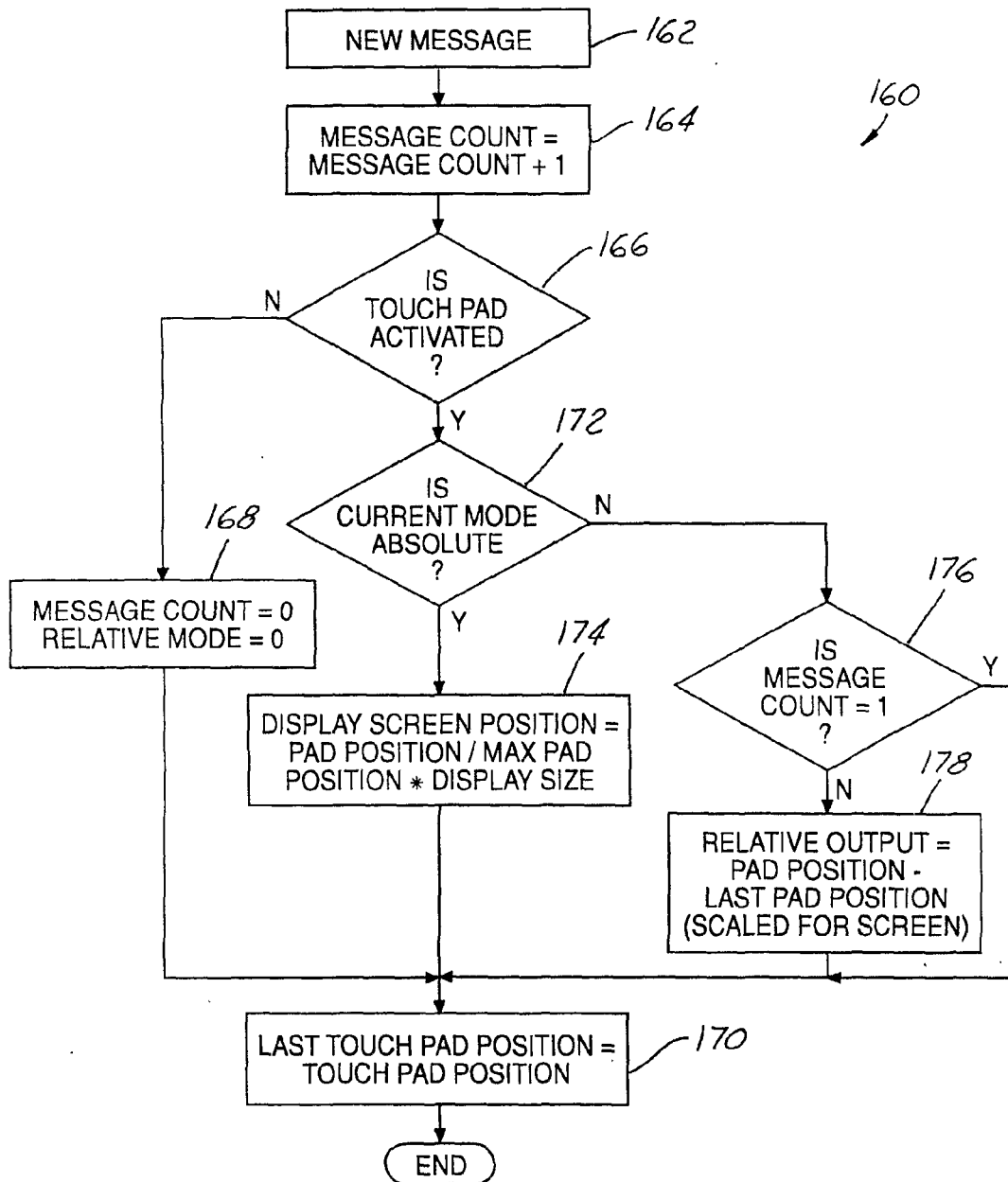


FIG. 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/11682

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) :G09G 5/00 US CL :345/173; 348/734 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 345/173, 174, 179, 182, 156, 158, 1, 2, 716-718, 773, 840; 348/734 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,545,857 A (LEE et al) 13 August 1996, col. 4, lines 18-56.	1-41
Y	US 5,777,605 A (YOSHINOBU et al) 07 July 1998, col. 5, lines 18-25 and col.9, lines 5-53.	1-41
Y	US 5,787,254 A (MADDALOZZO, JR. et al) 28 July 1998, col. 5, lines 18-48.	1-41
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principles or theory underlying the invention
"B"	earlier document published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	
"P"	document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family
Date of the actual completion of the international search 11 JUNE 2001		Date of mailing of the international search report 28 JUN 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer CHANH NGUYEN <i>Ruegenia Logan</i> Telephone No. (703) 308-6603

Electronic Acknowledgement Receipt

EFS ID:	18358040
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/Amelia khalaf
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	04-MAR-2014
Filing Date:	30-MAR-2009
Time Stamp:	11:54:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	US_IDS_Form_SB_08a1.pdf	612347 <small>1fbf92ca0b1c6045d1b8ffa669ca043bce9147ec</small>	no	4

Warnings:

Information:

CYWEE EX 2009 - 484

2	Non Patent Literature	EP_Search_Report.pdf	307043	no	7
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Information:					
3	Foreign Reference	EP1569082.pdf	940951	no	21
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5	Foreign Reference	WO0178054.pdf	1824080	no	54
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Warnings:					
Information:					
Total Files Size (in bytes):			8351687		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yong-jin KANG et al.

Application No.: 12/413,722

Group Art Unit: 2694

Filed: March 30, 2009

Examiner Jeffrey S. Steinberg

Customer No.: 38209

Confirmation No. 9676

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND
INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action mailed September 26, 2013, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 11 of this paper.

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An input apparatus, comprising:

a motion detector which detects a motion of the electronic apparatus;

an input unit which is more sensitive than the motion detector and which is disposed on the input apparatus to receive and receives user input by a user manipulation separate from the detected motion; and

a controller which generates a predetermined command by combining the detected motion and the user manipulation input to the input unit, and controls the generated predetermined command to be transmitted to an external device,

wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,

wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Previously Presented) The input apparatus as claimed in claim 1, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a touch input unit which is input with a user touch,

wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Previously Presented) The input apparatus as claimed in claim 1, wherein the input unit comprises a button unit having a plurality of buttons,

wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the electronic apparatus;

receiving a user input more sensitively than the motion by a user manipulation on an input unit disposed on the electronic apparatus such that the user manipulation is separate from the detected motion; and

generating a predetermined command by combining the detected motion and the user manipulation input, and controls the generated predetermined command to be transmitted to an external device,

wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction, wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch, wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation, wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Previously Presented) The method as claimed in claim 14, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user touch, wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Previously Presented) The method as claimed in claim 14, wherein the receiving operation receives a user button manipulation, wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:
a motion detector to detect a motion of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected motion;
an input unit disposed on the electronic apparatus to receive user manipulations separate from the detected motion for selecting the function of a plurality of functions and to generate second signals corresponding to the selected function;
a controller to combine the first and second signals into a single command to be transmitted to the external device in order to perform the selected function,
wherein, if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals.

29. (Currently Amended) An electronic apparatus, comprising:
a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit disposed on the electronic apparatus to receive user selection input of the function of the external device such that the user selection input is separate from the detected motion; and

a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The electronic apparatus of claim 1, wherein
the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected motion;

receiving user manipulations for selecting the function of a plurality of functions on an input unit disposed on the electronic apparatus such that the user manipulations are separate from the detected motion;

generating second signals corresponding to the selected functions;

combining the first and second signals into a single command to be transmitted to the external device in order to perform the selected function; and

generating a command by combining the first and second signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated.

35. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving user selection input of ~~to select~~ the function of the external device on an input unit disposed on the electronic apparatus such that the user selection input is separate from the detected translation and rotation;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input; and

transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

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Docket No.: 102-1567
Amendment dated December 26, 2013
Reply to the Office Action of September 26, 2013

39-41. (Cancelled)

REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1-5, 8-18, 21-26, 28-30, 32, 34, 35, and 38 are pending in the application. Claims 1, 14, 28, 29, 34, and 35 have been amended. Claims 6-7, 19-20, 27, 31, 33, 37, and 39-41 have been previously cancelled without prejudice or disclaimer. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC §102 to Liberty

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36 and 38 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2005/0253806 to Liberty et al. (hereinafter Liberty). Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Independent Claims 1, 14, 27, 28, 29, 34, and 35

Referring to independent claims 1, 14, 28, 29, 34, and 35, in the Office Action dated September 26, 2013, the Examiner alleges that Liberty teaches all of the limitations as previously presented in independent claims 1, 14, 28, 29, 34, and 35. However, it is respectfully submitted that Liberty does not teach or disclose all of the features as presently recited in independent claims 1, 14, 28, 29, 34, and 35, for at least the following reasons.

On pages 2-3 of the Office Action dated September 26, 2013, the Examiner relies on paragraph [0059] of Liberty as allegedly teaching the limitations as previously presented in independent claim 1, namely “an input unit which is more sensitive than the motion detector and receives user input by a user manipulation.”

Applicants submit that the above-cited portion of Liberty is directed to post-processing readings of a free space pointing device 400. More specifically, in Liberty, once calibrated sensor readings have been compensated for linear acceleration, processed into readings indicative of angular rotation of the free-space pointing device 400, and compensated for tilt, then post processing can be performed to compensate for various factors such as human

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tremor. In other words, Liberty allows human tremor to be removed from a motion of the free space pointing device 400 for more accurate readings of the free space pointing device 400.

However, Liberty does not address two separate inputs within the free space pointing device 400, such that a first input is a detected motion, and the second input is a user manipulation (separate from the detected motion) of an input unit disposed on the free space pointing device 400. In other words, Liberty merely analyzes a motion of the free space pointing device 400, performs various types of calibrations and compensations therefor, and then performs a final compensation for other factors experienced during the motion, such as human tremor. In other words, all the factors compensated for and calibrated in Liberty are directed only to a **single input of the motion** of the free space pointing device 400, and there is no separate input received by an input unit disposed on the free space pointing device 400 in Liberty.

Therefore, for at least the above reasons, Liberty does not teach or disclose, among other things, “an input unit which is more sensitive than the motion detector and which is disposed on the input apparatus to receive and receives user input by a user manipulation separate from the detected motion,” as presently recited in independent claim 1.

Also in the Office Action dated September 26, 2013, the Examiner provides substantially similar portions of Liberty to attempt to reject independent claims 14, 28, 29, 34, and 35, and therefore, Applicants respectfully submit that similar arguments above regarding claim 1 are also applied to independent claims 14, 28, 29, 34, and 35. Furthermore, independent claims 14, 28, 29, 34, and 35 have been amended in a manner similar to independent claim 1. Accordingly, Liberty also fails to teach or suggest every limitation of Applicants' claims 14, 28, 29, 34, and 35.

For the foregoing reasons, Liberty is inadequate grounds for rejecting Applicants' claims 1, 14, 28, 29, 34, and 35 under 35 U.S.C. § 102(b), and Applicants respectfully request reconsideration and withdrawal of this rejection and allowance of these claims.

Dependent Claims 2-5, 8-13, 15-18, 21-26, 30, 32, and 38

Dependent claims 2-5, 8-13, 15-18, 21-26, 30, 32, and 38 each depend from independent claims 1, 14, 29, and 35, respectively, and therefore contain each of the features recited in independent claims 1, 14, 29, and 35. Accordingly, since Liberty fails to teach or

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disclose independent claims 1, 14, 29, and 35, for the reasons discussed above, Applicants submit that Liberty also fails to teach or disclose dependent claims 2-5, 8-13, 15-18, 21-26, 30, 32, and 38. Applicants respectfully request withdrawal of this rejection and allowance of these claims.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,
STANZIONE & KIM, LLP

Dated: December 26, 2013
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: /Lev I. Iwashko/
Lev I. Iwashko
Registration No. 70,168

Electronic Acknowledgement Receipt

EFS ID:	17756859
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Seungman Kim/Amelia Khalaf
Filer Authorized By:	Seungman Kim
Attorney Docket Number:	102-1567
Receipt Date:	26-DEC-2013
Filing Date:	30-MAR-2009
Time Stamp:	12:46:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amendment.pdf	440747 24c8d62f7f6f56fbc8905aee337925423c5d d2b6	yes	13

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Amendment/Req. Reconsideration-After Non-Final Reject		1	1
Claims		2	10
Applicant Arguments/Remarks Made in an Amendment		11	13

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input checked="" type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	330
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	330

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	12/26/2013	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		
	Total (37 CFR 1.16(i))	* 30	Minus	** 40	= 0	X \$80 = 0
	Independent (37 CFR 1.16(h))	* 10	Minus	*** 14	= 0	X \$420 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
 /TAMMY d. MCBETH BROWN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/413,722	03/30/2009	Yong-jin KANG	102-1567	9676
38209	7590	09/26/2013	EXAMINER	
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006			STEINBERG, JEFFREY S	
			ART UNIT	PAPER NUMBER
			2694	
			NOTIFICATION DATE	DELIVERY MODE
			09/26/2013	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptomail@snkiplaw.com
patent@snkiplaw.com

Art Unit: 2694

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 8-18, 21-26, 28-30, 32, 34-36 and 38 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by a US Patent Application Publication by Liberty et al. (2005/0253806).

Regarding Claims 1 and 14 (Currently Amended), Liberty et al. discloses an input apparatus (Pg. 2, ¶[0008]) capable of performing a method, comprising:
a motion detector (Id.) which detects a motion of the electronic apparatus;
an input unit which is more sensitive than the motion detector (Pg. 7, ¶[0059], where detection of a hand tremor pattern is taught and used to limit an input based upon the identity of the user, which is determined by the individuality of the tremor) and receives user input by a user manipulation for ~~selecting a function among a plurality of functions;~~ and a controller which generates a predetermined command ~~to perform the selected function~~ by combining the detected motion and the user manipulation input to the input

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unit, the selected function and controls the generated predetermined command to be transmitted to an external device, wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal. (Pg. 13, ¶[0117], where the pressing of a button may not be allowed if a particular user is not operating the input device).

Regarding Claims 2 and 15 (Both Original), Liberty et al. discloses the input apparatus and a method as claimed in claims 1 and 14, respectively, and further discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Id.).

Regarding Claims 3 and 16 (Both Original), Liberty et al. discloses the input apparatus and is capable of the method disclosed as claimed in claims 2 and 15, respectively, and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 5, ¶[0041]).

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Regarding Claims 4 and 17 (Both Original), Liberty et al. discloses the input apparatus and is capable of the method disclosed as claimed in claims 3 and 16, respectively, and further discloses wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction (Id.), wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 17, Claim 21).

Regarding Claims 5 and 18 (Original), Liberty et al. discloses the input apparatus and is capable of the method as claimed in claims 4 and 17, respectively, and further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 1, ¶[0006]).

Regarding Claims 6 and 7 (Canceled).

Regarding Claim 8 (Currently Amended) Liberty et al. discloses the input apparatus as claimed in claim 1[[6]], and further discloses wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a

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predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 15, ¶[0124]).

Regarding Claim 9 (Currently Amended) Liberty et al. discloses the input apparatus as claimed in claim 1[[6]], and further discloses wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pgs. 14-15, ¶¶[0124-0125]).

Regarding Claims 10 and 23 (Both Currently Amended) Liberty et al. discloses the input apparatus and is capable of the method as claimed in claims 1[[6]] and 1449, respectively, and further discloses wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Regarding Claims 11, 21 and 24 (All Currently Amended) Liberty et al. discloses the input apparatus claimed in claim 1[[6]] and is capable of a methods as disclosed in Claim 1449 and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector

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and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claims 12, 22 and 25 (All Currently Amended) Liberty et al. discloses the input apparatus and is capable of the method as claimed in claims 1[[6]], 1419, and 1419, respectively, and further discloses wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Pgs. 14-15, ¶¶[0124-0125]).

Regarding Claims 13 and 26 (Both Original), Liberty et al. discloses the input apparatus and is capable of the method as claimed in claims 1 and 14, respectively, and further discloses wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Pgs. 15-16, ¶¶[0130-0131]).

Regarding Claims 19 and 20 (Both Canceled)

Regarding Claim 27 (Canceled).

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Regarding Claim 28 (Currently Amended), Liberty et al. discloses an electronic apparatus comprising:

a motion detector (Pg. 8, ¶[0066]) to detect a motion of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected motion; an input unit to receive user manipulations for selecting the function of a plurality of functions (Id.) and to generate second signals corresponding to the selected function; a controller to combine the first and second signals into a single command to be transmitted to the external device in order to perform the selected function wherein, if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals. (Id.).

Regarding Claim 29 (Previously Presented), Liberty et al. discloses an electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor (Pgs. 15-16, ¶[0130-0131]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; an input unit to receive user selection input of the function of the external device; and a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device. (Id.).

Regarding Claim 30 (Previously Presented), Liberty et al. discloses the electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal. (Id.).

Regarding Claim 31 (Cancelled).

Regarding Claim 32 (Previously Presented), Liberty et al. discloses the electronic apparatus of claim 1, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038]).

Regarding Claim 33 (Cancelled).

Regarding Claim 34 (Currently Amended), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:
detecting a motion of the electric apparatus for performing a function of an external device (Abstract); generating first signals corresponding to the detected motion (Pg. 2, ¶[0012]); receiving user manipulations for selecting the function of a plurality of functions (Pg. 2, ¶[0009]); generating second signals corresponding to the selected functions; ~~and~~ combining the first and second signals into a single command to be

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transmitted to the external device in order to perform the selected functioning and generating a command by combining the first and second signals if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated. (Pgs. 15-16, ¶¶[0130-0131]).

Regarding Claim 35 (Previously Presented), Liberty et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor (Pg. 5, ¶[0047]) and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; receiving user selection input of the function of the external device; generating a command to perform the selected function by combining the detected translation (Id.), the detected rotation and the user selection input; and transmitting the generated command to the external device. (Pg. 9, ¶[0096]).

Regarding Claim 36 (Original) Liberty et al. discloses an apparatus capable of performing the method of claim 35, comprising:

receiving a translation data signal and a rotation data signal into a converter. (Pg. 5, ¶[0041]).

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Regarding Claim 37 (Cancelled).

Regarding Claim 38 (Previously Presented), Liberty et al. discloses an apparatus capable of performing the method of claim 14, and further discloses wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pg. 4, ¶[0038])

Regarding Claim 39-41 (Cancelled).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey Steinberg/
Examiner, Art Unit 2694

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey Steinberg	Art Unit 2694	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-2005/0253806	11-2005	Liberty et al.	345/156
	B US-			
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
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FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

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BIB DATA SHEET
CONFIRMATION NO. 9676

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/413,722	03/30/2009	345	2694	102-1567		
APPLICANTS						
Yong-jin KANG, Suwon-si, KOREA, REPUBLIC OF; Sung-han LEE, Hwaseong-si, KOREA, REPUBLIC OF; Hyun-coog SHIN, Suwon-si, KOREA, REPUBLIC OF; Dae-hyun KIM, Suwon-si, KOREA, REPUBLIC OF; Eung-sik YOON, Suwon-si, KOREA, REPUBLIC OF;						
** CONTINUING DATA *****						
** FOREIGN APPLICATIONS *****						
REPUBLIC OF KOREA 2008-66996 07/10/2008						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
Verified and /JEFFREY S STEINBERG/ Acknowledged Examiner's Signature		Initials	KOREA, REPUBLIC OF	16	40	14
ADDRESS						
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006 UNITED STATES						
TITLE						
INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS						
FILING FEE RECEIVED 4550	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

Search Notes 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
345	156-178	2/14/2012	JSS
463	36-39	2/14/2012	JSS
348	14.05, 114, 734	2/14/2012	JSS
715	810 ,831 ,856	2/14/2012	JSS

SEARCH NOTES		
Search Notes	Date	Examiner
Consulted Steve Sherman, AU 2629	12/13/2012	jss
Consulted Kirk Hermann	5/12, 9/1&14/2013	jss

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
345	156-178	5/9/2013	JSS
463	36-39	5/8/2013	JSS
348	14.05, 114, 734	5/8/2013	JSS
715	810 ,831 ,856	5/8/2013	JSS

/J.S./ Examiner.Art Unit 2629	
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2. **** shows the word which can not be translated.
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CLAIMS

(57)[Claim(s)]

[Claim 1] Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of Xs axial direction of a Penn axis-coordinates system (Xs, Ys, Zs) which set Zs axis as a penholder, Ys axial direction, and Zs axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of Xs axis, the circumference of Ys axis, and a circumference of Zs axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on acceleration in the Penn axis-coordinates system (Xs, Ys, Zs) detected using an acceleration sensor in a state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on initial angle of rotation which an initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using a gyroscope, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in the Penn axis-coordinates system (Xs, Ys, Zs) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (Xg, Yg, Zg) made into Zg axis, An acceleration-error discrimination section calculates an inner product with an acceleration vector which a normal vector and a coordinate conversion calculating part of a writing surface converted and obtained when a pen point part touched a writing surface, If it distinguishes whether a threshold value previously determined as a size of a calculated inner product is compared, and it is necessary to correct angle of rotation, and an acceleration-error discrimination section needs to correct angle of rotation and an angle-of-rotation correction part will be distinguished, Angle of rotation under note is corrected so that a normal-axis direction component of an acceleration vector excluding gravitational acceleration from acceleration of Zg axial direction which a coordinate conversion calculating part converted and obtained may become zero, A Penn blocking force apparatus, wherein it feeds back corrected angle of rotation to a coordinate conversion calculating part and a movement magnitude calculating part computes a moving direction and migration length of a pen point part based on acceleration in a gravity coordinate system (Xg, Yg, Zg) which a coordinate conversion calculating part converted and acquired.

[Claim 2] Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of Xs axial direction of a

penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as a penholder, Y_s axial direction, and X_s axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and a circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, a writing acceleration correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on acceleration in a penholder coordinate system (X_s, Y_s, Z_s) detected using an acceleration sensor in a state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on initial angle of rotation which an initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using a gyroscope, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in a penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, An acceleration-error discrimination section calculates an inner product with an acceleration vector which a normal vector and a coordinate conversion calculating part of a writing surface converted and obtained when a pen point part touched a writing surface, It is distinguished whether a threshold value previously set to a size of a calculated inner product is compared, and it is necessary to correct acceleration in a gravity coordinate system (X_g, Y_g, Z_g), If an acceleration-error discrimination section needs to correct acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and a writing acceleration correction part will be distinguished, Acceleration in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that a normal-axis direction component of an acceleration vector excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part converted and obtained may become zero, A pen type input device, wherein a movement magnitude calculating part computes a moving direction and migration length of a pen point part based on acceleration in a gravity coordinate system (X_g, Y_g, Z_g).

[Claim 3] If an acceleration-error discrimination section needs to correct acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and the above-mentioned calculating part will be distinguished, The pen type input device according to claim 2 which corrects angle of rotation and is provided with an angle-of-rotation correction part which feeds back corrected angle of rotation to a coordinate conversion calculating part so that a normal-axis direction component of an acceleration vector excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part transformed and obtained may become zero.

[Claim 4] Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of X_s axial direction of a penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as a penholder, Y_s axial direction, and X_s axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and a circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on acceleration in a penholder coordinate system (X_s, Y_s, Z_s) detected using an acceleration sensor in a state of rest, A writing middle turn angle

calculating part computes angle of rotation under note based on initial angle of rotation which an initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using a gyroscope, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in a penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, It is distinguished whether the acceleration-error discrimination section needs to correct angle of rotation based on acceleration excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part converted and obtained when a pen point part touched a writing surface, If an acceleration-error discrimination section needs to correct angle of rotation and an angle-of-rotation correction part will be distinguished, Angle of rotation under note is corrected so that acceleration excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part converted and obtained may become zero, A pen type input device, wherein it feeds back corrected angle of rotation to a coordinate conversion calculating part and a movement magnitude calculating part computes a moving direction and migration length of a pen point part based on acceleration in a gravity coordinate system (X_g, Y_g, Z_g) which a coordinate conversion calculating part converted and acquired.

[Claim 5] Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of X_s axial direction of a penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as a penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and a circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, a writing acceleration correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on acceleration in a penholder coordinate system (X_s, Y_s, Z_s) detected using an acceleration sensor in a state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on initial angle of rotation which an initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using a gyroscope, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in a penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, It is distinguished whether the acceleration-error discrimination section needs to correct acceleration in a gravity coordinate system (X_g, Y_g, Z_g) based on acceleration excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part converted and obtained when a pen point part touched a writing surface, If an acceleration-error discrimination section needs to correct acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and a writing acceleration correction part will be distinguished, Acceleration under note in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that acceleration excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part converted and obtained may become zero, A pen type input device, wherein a movement magnitude calculating part computes a moving direction and migration length of a pen point part based on acceleration in a

gravity coordinate system (X_g, Y_g, Z_g).

[Claim 6] If an acceleration-error discrimination section needs to correct speed in a gravity coordinate system (X_g, Y_g, Z_g) and the above-mentioned calculating part will be distinguished, The pen type input device according to claim 5 which corrects angle of rotation and is provided with an angle-of-rotation correction part which feeds back corrected angle of rotation to a coordinate conversion calculating part so that a normal-axis direction component of an acceleration vector excluding gravitational acceleration from acceleration of Z_g axial direction which a coordinate conversion calculating part transformed and obtained may become zero.

[Claim 7] Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of X_s axial direction of a penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as a penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and a circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, a first integral part, a speed-error discrimination section, an angle-of-rotation correction part, and the second integrating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on acceleration in a penholder coordinate system (X_s, Y_s, Z_s) detected using an acceleration sensor in a state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using each gyroscope, and initial angle of rotation which an initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in a penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, A first integral part computes speed by integrating with acceleration excluding gravitational acceleration from acceleration in a gravity coordinate system (X_g, Y_g, Z_g) which converted a coordinate conversion calculating part, It is distinguished whether a speed-error discrimination section has the necessity of correcting angle of rotation based on speed in Z_g axial direction which a first integral part calculated and obtained when a pen point part touched a writing surface, If an angle-of-rotation correction part has the necessity that a speed-error discrimination section corrects angle of rotation and it will distinguish, Angle of rotation under note is corrected so that speed in Z_g axial direction which a first integral part integrated with and obtained may become zero, A pen type input device computing a moving direction and migration length of a pen point part by feeding back corrected angle of rotation to a coordinate conversion calculating part, and the second integrating part integrating with speed which a first integral part computed.

[Claim 8] Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of X_s axial direction of a penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as a penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and a circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, a first integral part, a speed-error discrimination section, a writing speed correction part, and the second integrating part, An initial angle-of-rotation calculating part asks

for initial angle of rotation of equipment based on acceleration in a penholder coordinate system (X_s, Y_s, Z_s) detected using an acceleration sensor in a state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using each gyroscope, and initial angle of rotation which an initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in a penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, A first integral part computes speed by integrating with acceleration excluding gravitational acceleration from acceleration in a gravity coordinate system (X_g, Y_g, Z_g) which converted a coordinate conversion calculating part, It is distinguished whether a speed-error discrimination section has the necessity of correcting acceleration in a penholder coordinate system (X_s, Y_s, Z_s), based on speed in Z_g axial direction which a first integral part calculated and obtained when a pen point part touched a writing surface, If a writing speed correction part has the necessity that a speed-error discrimination section corrects acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and it will distinguish, A pen type input device computing a moving direction and migration length of a pen point part by correcting speed in a gravity coordinate system (X_g, Y_g, Z_g) so that speed in Z_g axial direction which a first integral part integrated with and obtained may become zero, and the second integrating part integrating with speed in a gravity coordinate system (X_g, Y_g, Z_g).

[Claim 9]The above-mentioned calculating part is provided with an angular acceleration calculating part and an acceleration correction part, and an angular acceleration calculating part asks for rotation angle acceleration from the angular rate of rotation detected using three gyroscopes, An acceleration correction part computes an acceleration component by tilting centering on a pen point part of acceleration which used and detected three acceleration sensors based on the angular rate of rotation detected using three gyroscopes, rotation angle acceleration which an angular acceleration calculating part computed, and an attaching position of each acceleration sensor, Correct acceleration of a Penn axis-coordinates system (X_s, Y_s, Z_s) in a fitting location of an acceleration sensor based on an acceleration component by computed tilting, and it asks for acceleration of a Penn axis-coordinates system (X_s, Y_s, Z_s) in a pen point part, The Penn blocking force apparatus according to any one of claims 1 to 8 which converts acceleration by the Penn axis-coordinates system (X_s, Y_s, Z_s) of a pen point part for which an acceleration correction part corrected a coordinate conversion calculating part based on angle of rotation under note, and it asked to acceleration by a gravity coordinate system (X_g, Y_g, Z_g).

[Claim 10]The Penn blocking force apparatus according to claim 1, 3, 4, 6, or 7 which corrects angle of rotation when the above-mentioned calculating part has a correction discrimination section in comparison with a threshold value which defined previously a correction amount of angle of rotation by an angle-of-rotation correction part, and a correction discrimination section is below a threshold value which a correction amount defined previously, while taking notes of an angle-of-rotation correction part.

[Claim 11]The Penn blocking force apparatus according to claim 1, 3, 4, 6, or 7 which corrects angle of rotation which a writing middle turn angle calculating part computed based on average value of a correction amount of angle of rotation which the above-mentioned calculating part equipped with a correction amount averaging part which calculates average value of a correction amount of angle of rotation by an angle-of-rotation correction part, and a correction amount averaging part asked for an angle-of-rotation correction part.

[Claim 12]Have three acceleration sensors, three gyroscopes, and calculating parts, and three acceleration sensors output a signal which shows acceleration of Xs axial direction of a penholder coordinate system (Xs, Ys, Zs) which set Zs axis as a penholder, Ys axial direction, and Zs axial direction, respectively, Three gyroscopes output a signal which shows the angular rate of rotation of the circumference of Xs axis, the circumference of Ys axis, and a circumference of Zs axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on acceleration in a penholder coordinate system (Xs, Ys, Zs) detected using an acceleration sensor in a state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using a gyroscope, and initial angle of rotation which an initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts an axis extended in the gravitational acceleration direction in acceleration in a penholder coordinate system (Xs, Ys, Zs) which used and detected each acceleration sensor based on angle of rotation under note which a writing middle turn angle calculating part computed to acceleration in a gravity coordinate system (Xg, Yg, Zg) made into Zg axis, It is distinguished whether an acceleration-error discrimination section has the necessity of correcting angle of rotation based on acceleration and gravitational acceleration of Zg axial direction which a coordinate conversion calculating part converted and obtained when a pen point part touched a writing surface, If an angle-of-rotation correction part has the necessity that an acceleration-error discrimination section corrects angle of rotation and it will distinguish, Correct angle of rotation and corrected angle of rotation is fed back to a coordinate conversion calculating part so that acceleration of Zg axial direction may become equal to gravitational acceleration, A pen type input device, wherein acceleration of Zg axial direction converges gravitational acceleration on gravitational acceleration and a movement magnitude calculating part computes a moving direction and migration length of a pen point part based on acceleration which a coordinate conversion calculating part converted.

[Claim 13]The above-mentioned calculating part is provided with a nib speed zero primary detecting element and a speed correction part, and a nib speed zero primary detecting element distinguishes whether movement speed of a pen point part which integrated with and asked for acceleration by a gravity coordinate system (Xg, Yg, Zg) in a state of rest is zero, The pen type input device according to any one of claims 1 to 12 which a speed correction part corrects an initial angle of inclination when movement speed of a pen point part is not zero, and makes zero movement speed by a gravity coordinate system (Xg, Yg, Zg) in a state of rest.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the pen type input device which inputs a figure and a character.

[0002]

[Description of the Prior Art]As input devices, such as computer paraphernalia, a keyboard, a mouse, a digitizer, a light pen, a tablet, etc. are used. With the miniaturization of computer paraphernalia, the needs of personal digital assistant equipment grow and users are also increasing in number every year. Then, a small input device came to be called for.

[0003]There is a limit in the miniaturization of a keyboard in respect of a human interface, and practicality is low as an input device of personal digital assistant equipment. A mouse does not fit the input of a figure, a character, etc., although it can miniaturize as a pointing device.

[0004]For this reason, many input devices of the pen type using the tablet and the pen as an input device of personal digital assistant equipment are adopted. When it is going to miniaturize further the input device of the pen type using this tablet, the size of a tablet poses a problem. Then, the input device of tablet loess like the computer input unit of the pen type published by JP,H6-67799,A, for example, the data input unit published by JP,H7-84716,A, and the handwriting input device published by JP,H7-200127,A was developed.

[0005]The computer input unit of the pen type published by JP,H6-67799,A has corrected the influence by the rotation of the computer input unit of the pen type of the moving direction which investigated a moving direction and movement magnitude with the acceleration sensor, and the acceleration sensor detected with the piezoelectric vibration gyroscope, and movement magnitude. The data input unit published by JP,H7-84716,A has detected the moving direction and movement magnitude of equipment based on the signal which shows the polarity from a vibration gyroscope and amplitude which are arranged right-angled mutually. The handwriting input device published by JP,H7-200127,A is finding the moving direction and migration length of equipment based on the signal from two acceleration sensors.

[0006]It is considered as equipment provided with 2 sets of acceleration sensors which detect the acceleration of the 2-way which intersects perpendicularly on the plane orthogonal to a penholder, For example, in the pencil blocking force apparatus published by JP,H6-230886,A, after integrating with the output of 2 sets of acceleration sensors, the influence of the fitting location of an acceleration sensor was corrected, and the moving direction and movement magnitude of a pen point part are detected.

[0007]Although it is not related with a pen type input device, and is used for a game machine, for example and the movement speed of a human body head, a position, an attitude, etc. are detected, The position sensor published by JP,H7-294240,A, It had the gyroscope which detects the angular velocity of the circumference of the acceleration sensor which detects the acceleration of an X axial direction, Y axial direction, and Z axial direction, and the X-axis, the circumference of a Y-axis, and the circumference of the Z-axis, the strap-down system was calculated to the acceleration and the angular velocity group which these detected, and the

movement speed of a head, a position, an attitude, and direction are detected.

[0008]

[Problem to be solved by the invention]However, in the computer input unit of the pen type published by JP,H6-67799,A, the influence by the rotation of equipment is corrected, and when equipment is accompanied by a dynamic inclination, it cannot correct. Since it is accompanied by the dynamic inclination of equipment in the usual writing performance, a detection result may become inaccurate.

[0009]Since the data input unit published by JP,H7-84716,A detects the rotating operation of a wrist and inputs a moving direction and migration length, it is not suitable for the input of a figure etc.

[0010]In the handwriting input device published by JP,H7-200127,A, since there is no compensation means for the inclination of equipment, a detection result may become inaccurate.

[0011]After integrating with acceleration the pencil blocking force apparatus published by JP,H6-230886,A, it is correcting with it, but by integrating with the acceleration before correction, detection becomes difficult at an error and exact correction cannot be performed. It is not taking into consideration that the detection component of the acceleration in a pen point part changes with the inclinations of a penholder.

[0012]Since the movement speed of a head, a position, an attitude, and direction are detected spatially, have adopted complicated data processing, but the position sensor published by JP,H7-294240,A. In a pen type input device, since the miniaturization of equipment is demanded, easy data processing must detect the moving direction and migration length on a writing surface correctly.

[0013]It is made in order that this invention may eliminate this demerit, and it aims at obtaining the small pen type input device which detects a written input correctly with easy composition.

[0014]

[Means for solving problem]The pen type input device concerning this invention has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of X_s axial direction of the penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as the penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and the circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on initial angle of rotation which the initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using the gyroscope, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, An acceleration-error discrimination section calculates an inner product with the acceleration vector of Z_g axial direction which the normal vector and coordinate conversion calculating part of the writing surface converted and obtained

when the pen point part touched the writing surface, If it distinguishes whether the threshold value previously determined as the size of the calculated inner product is compared, and it is necessary to correct angle of rotation, and an acceleration-error discrimination section needs to correct angle of rotation and an angle-of-rotation correction part will be distinguished, Angle of rotation under note is corrected so that the normal-axis direction component of the acceleration vector excluding gravitational acceleration from the acceleration of Z_g axial direction which the coordinate conversion calculating part converted and obtained may become zero, Feeding back corrected angle of rotation to a coordinate conversion calculating part, a movement magnitude calculating part computes the moving direction and migration length of a pen point part based on the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which the coordinate conversion calculating part converted and acquired.

[0015]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of X_s axial direction of the penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as the penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and the circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, a writing acceleration correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on initial angle of rotation which the initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using the gyroscope, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, An acceleration-error discrimination section calculates an inner product with the acceleration vector which the normal vector and coordinate conversion calculating part of the writing surface converted and obtained when the pen point part touched the writing surface, It is distinguished whether the threshold value previously determined as the size of the calculated inner product is compared, and it is necessary to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g), If an acceleration-error discrimination section needs to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and a writing acceleration correction part will be distinguished, The acceleration in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that the normal-axis direction component of the acceleration vector excluding gravitational acceleration from the acceleration of Z_g axial direction which the coordinate conversion calculating part converted and obtained may become zero, A movement magnitude calculating part computes the moving direction and migration length of a pen point part based on the acceleration in a gravity coordinate system (X_g, Y_g, Z_g).

[0016]If an acceleration-error discrimination section needs to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and the above-mentioned calculating part will be distinguished, Angle of rotation is corrected so that the normal-axis direction component of the acceleration vector excluding gravitational acceleration from the acceleration of Z_g axial direction which the

coordinate conversion calculating part transformed and obtained may become zero, It has an angle-of-rotation correction part which feeds back corrected angle of rotation to a coordinate conversion calculating part, and the accumulated error of angle of rotation is prevented from occurring.

[0017]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of Xs axial direction of the penholder coordinate system (Xs, Ys, Zs) which set Zs axis as the penholder, Ys axial direction, and Zs axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of Xs axis, the circumference of Ys axis, and the circumference of Zs axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (Xs, Ys, Zs) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using the gyroscope, and initial angle of rotation which the initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (Xs, Ys, Zs) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (Xg, Yg, Zg) made into Zg axis, It is distinguished whether an acceleration-error discrimination section has the necessity of correcting angle of rotation based on the acceleration excluding gravitational acceleration from the acceleration of Zg axial direction which the coordinate conversion calculating part converted and obtained when the pen point part touched the writing surface, If an angle-of-rotation correction part has the necessity that an acceleration-error discrimination section corrects angle of rotation and it will distinguish, Angle of rotation under note is corrected so that the acceleration excluding gravitational acceleration from the acceleration of Zg axial direction which the coordinate conversion calculating part converted and obtained may become zero, Feed back corrected angle of rotation to a coordinate conversion calculating part, and a movement magnitude calculating part computes the moving direction and migration length of a pen point part based on the acceleration in the gravity coordinate system (Xg, Yg, Zg) which the coordinate conversion calculating part converted and acquired, Inclination of equipment is detected correctly and detection of an exact moving direction and movement magnitude is performed.

[0018]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of Xs axial direction of the penholder coordinate system (Xs, Ys, Zs) which set Zs axis as the penholder, Ys axial direction, and Zs axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of Xs axis, the circumference of Ys axis, and the circumference of Zs axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, a writing acceleration correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the

penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on initial angle of rotation which the initial angle-of-rotation calculating part computed, and the angular rate of rotation detected using the gyroscope, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, It is distinguished whether the acceleration-error discrimination section needs to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) based on the acceleration excluding gravitational acceleration from the acceleration of Z_g axial direction which the coordinate conversion calculating part converted and obtained when the pen point part touched the writing surface, If an acceleration-error discrimination section needs to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and a writing acceleration correction part will be distinguished, The acceleration in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that the acceleration excluding gravitational acceleration from the acceleration of Z_g axial direction which the coordinate conversion calculating part converted and obtained may become zero, A movement magnitude calculating part computes the moving direction and migration length of a pen point part based on the acceleration in a gravity coordinate system (X_g, Y_g, Z_g).

[0019]If an acceleration-error discrimination section needs to correct the speed in a gravity coordinate system (X_g, Y_g, Z_g) and the above-mentioned calculating part will be distinguished, Angle of rotation is corrected so that the normal-axis direction component of the acceleration vector excluding gravitational acceleration from the acceleration of Z_g axial direction which the coordinate conversion calculating part transformed and obtained may become zero, It has an angle-of-rotation correction part which feeds back corrected angle of rotation to a coordinate conversion calculating part, and the accumulated error of angle of rotation is prevented from occurring.

[0020]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of X_s axial direction of the penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as the penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and the circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, a first integral part, a speed-error discrimination section, an angle-of-rotation correction part, and the second integrating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using each gyroscope, and initial angle of rotation which the initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, A first integral part computes speed by integrating with the acceleration excluding gravitational

acceleration from the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which converted the coordinate conversion calculating part, It is distinguished whether a speed-error discrimination section has the necessity of correcting angle of rotation based on the component by the note of the speed in Z_g axial direction which the first integral part calculated and obtained when the pen point part touched the writing surface, If an angle-of-rotation correction part has the necessity that a speed-error discrimination section corrects angle of rotation and it will distinguish, Angle of rotation under note is corrected, corrected angle of rotation is fed back to a coordinate conversion calculating part so that the component by the note of the speed in Z_g axial direction which the first integral part integrated with and obtained may become zero, and the second integrating part computes the moving direction and migration length of a pen point part by integrating with the speed which the first integral part computed.

[0021]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of X_s axial direction of the penholder coordinate system (X_s, Y_s, Z_s) which set Z_s axis as the penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and the circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, a first integral part, a speed-error discrimination section, a writing speed correction part, and the second integrating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using each gyroscope, and initial angle of rotation which the initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, A first integral part computes speed by integrating with the acceleration excluding gravitational acceleration from the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which converted the coordinate conversion calculating part, It is distinguished whether a speed-error discrimination section has the necessity of correcting the acceleration in a gravity coordinate system (X_g, Y_g, Z_g), based on the speed in Z_g axial direction which the first integral part calculated and obtained when the pen point part touched the writing surface, If a writing speed correction part has the necessity that a speed-error discrimination section corrects the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and it will distinguish, The speed in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that the speed in Z_g axial direction which the first integral part integrated with and obtained may become zero, and the second integrating part computes the moving direction and migration length of a pen point part by integrating with the speed in a gravity coordinate system (X_g, Y_g, Z_g).

[0022]The above-mentioned calculating part is provided with an angular acceleration calculating part and an acceleration correction part, and an angular acceleration calculating part asks for rotation angle acceleration from the angular rate of rotation detected using three gyroscopes, An acceleration correction part computes the acceleration component by the tilting centering on the pen point part of acceleration which used and detected three acceleration sensors based on the

angular rate of rotation detected using three gyroscopes, the rotation angle acceleration which the angular acceleration calculating part computed, and the attaching position of each acceleration sensor, Correct the acceleration of the penholder coordinate system (X_s , Y_s , Z_s) in the fitting location of an acceleration sensor based on the acceleration component by the computed tilting, and it asks for the acceleration of the penholder coordinate system (X_s , Y_s , Z_s) in a pen point part, Based on angle of rotation under note, an acceleration correction part converts the acceleration by the penholder coordinate system (X_s , Y_s , Z_s) of the pen point part for which it corrected and asked to the acceleration by a gravity coordinate system (X_g , Y_g , Z_g), and a coordinate conversion calculating part loses the influence by the fitting location of an acceleration sensor.

[0023]It prevents the above-mentioned calculating part having a correction discrimination section in comparison with the threshold value which defined previously the correction amount of angle of rotation by an angle-of-rotation correction part, and an angle-of-rotation correction part correcting angle of rotation under note when a correction discrimination section is below the threshold value which the correction amount defined previously, and becoming more than the value which the correction amount defined previously.

[0024]Angle of rotation is prevented from the above-mentioned calculating part being provided with the correction amount averaging part which calculates the average value of the correction amount of angle of rotation by an angle-of-rotation correction part, and an angle-of-rotation correction part correcting angle of rotation which the writing middle turn angle calculating part computed based on the average value of the correction amount of angle of rotation for which the correction amount averaging part asked, and changing rapidly.

[0025]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, Three acceleration sensors output the signal which shows the acceleration of X_s axial direction of the penholder coordinate system (X_s , Y_s , Z_s) which set Z_s axis as the penholder, Y_s axial direction, and Z_s axial direction, respectively, Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of X_s axis, the circumference of Y_s axis, and the circumference of Z_s axis, respectively, A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s , Y_s , Z_s) detected using the acceleration sensor in the state of rest, A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using the gyroscope, and initial angle of rotation which the initial angle-of-rotation calculating part computed, A coordinate conversion calculating part converts the axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s , Y_s , Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in the gravity coordinate system (X_g , Y_g , Z_g) made into Z_g axis, It is distinguished whether an acceleration-error discrimination section has the necessity of correcting angle of rotation based on the acceleration and gravitational acceleration of Z_g axial direction which the coordinate conversion calculating part converted and obtained when the pen point part touched the writing surface, If an angle-of-rotation correction part has the necessity that an acceleration-error discrimination section corrects angle of rotation and it will distinguish, Correct angle of rotation and corrected angle of rotation is fed back to a coordinate conversion

calculating part so that the acceleration of Z_g axial direction may become equal to gravitational acceleration, The acceleration of Z_g axial direction converges gravitational acceleration on gravitational acceleration, and a movement magnitude calculating part computes the moving direction and migration length of a pen point part correctly based on the acceleration which the coordinate conversion calculating part converted.

[0026]The above-mentioned calculating part is provided with a nib speed zero primary detecting element and a speed correction part, and a nib speed zero primary detecting element distinguishes whether the movement speed of the pen point part which integrated with and asked for the acceleration by the gravity coordinate system (X_g, Y_g, Z_g) in a state of rest is zero, When the movement speed of a pen point part is not zero, a speed correction part corrects an initial angle of inclination, makes zero movement speed by the gravity coordinate system (X_g, Y_g, Z_g) in a state of rest, and it abolishes an accumulated error.

[0027]

[Mode for carrying out the invention]the pen type input device of this invention inputs a character, a sign, a figure, etc. into computer paraphernalia etc. -- it is. A pen type input device asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, Angle of rotation under note based on the angular rate of rotation detected using the gyroscope and computed initial angle of rotation is computed, The axis extended in the gravitational acceleration direction in the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) made into Z_g axis, The moving direction and migration length of a pen point part are computed based on the converted acceleration, and a hand is detected correctly.

[0028]Here, since integration treatment is included in the above-mentioned processing and an error may be produced, calculation of exact movement magnitude and migration length is performed by correcting the error.

[0029]A pen type input device has three acceleration sensors, three gyroscopes, and calculating parts, for example. Three acceleration sensors output the signal which shows the acceleration of X_s axial direction of a penholder coordinate system (X_s, Y_s, Z_s), Y_s axial direction, and Z_s axial direction, respectively. Three gyroscopes output the signal which shows the angular rate of rotation of the circumference of X_s axis of a penholder coordinate system (X_s, Y_s, Z_s), the circumference of Y_s axis, and the circumference of Z_s axis, respectively.

[0030]A calculating part is provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, a gravitational acceleration removing part, a writing surface contact discrimination section, an acceleration-error discrimination section, an angle-of-rotation correction part, and a movement magnitude calculating part, for example. An initial angle-of-rotation calculating part asks for initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest. A writing middle turn angle calculating part computes angle of rotation under note based on the angular rate of rotation detected using the gyroscope, and initial angle of rotation which the initial angle-of-rotation calculating part computed. A coordinate conversion calculating part converts the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under note which the writing middle turn angle calculating part computed to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g). A gravitational acceleration removing

part removes a gravitational acceleration component from the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which the coordinate conversion calculating part converted and acquired. A writing surface contact discrimination section will be distinguished if either contains a high frequency component, for example among the signals from three acceleration sensors and three gyroscopes, and the pen point part touches the writing surface. This is because the high frequency component of the signal from three acceleration sensors and three gyroscopes is what is depended on friction with a pen point part and a writing surface.

[0031]It is distinguished whether an acceleration-error discrimination section has the necessity of investigating the size of the component by the note of the acceleration of Z_g axial direction where the gravitational acceleration removing part removed and obtained the gravitational acceleration component, and correcting angle of rotation when the pen point part touches the writing surface. If an angle-of-rotation correction part has the necessity that an acceleration-error discrimination section corrects angle of rotation and it will be distinguished, it will correct angle of rotation so that the component by the note of the acceleration of Z_g axial direction whose gravitational acceleration removing part removed and obtained the gravitational acceleration component may become zero, and will feed it back to a coordinate conversion calculating part. A coordinate conversion calculating part converts again the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation which the angle-of-rotation correction part fed back to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g). A movement magnitude calculating part computes the moving direction and migration length of a pen point part based on the acceleration from which the gravitational acceleration removing part removed and obtained the gravitational acceleration component, and detects the hand of equipment correctly.

[0032]It may be made for a calculating part to be provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, a gravitational acceleration removing part, a first integral part, a writing surface contact discrimination section, a speed-error discrimination section, an angle-of-rotation correction part, and the second integrating part, for example.

[0033]A first integral part computes the speed of a pen point part by integrating with the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which converted the coordinate conversion calculating part. It is distinguished whether a speed-error discrimination section has the necessity of correcting angle of rotation based on the component by the note of the speed in Z_g axial direction which the first integral part calculated and obtained when the pen point part touched the writing surface. If an angle-of-rotation correction part has the necessity that a speed-error discrimination section corrects angle of rotation and it will distinguish, Angle of rotation under note is corrected, corrected angle of rotation is fed back to a coordinate conversion calculating part so that the component by the note of the speed in Z_g axial direction which the first integral part integrated with and obtained may become zero, and the speed under note is calculated again. The second integrating part computes the moving direction and migration length of a pen point part based on the speed which the first integral part computed. Thus, by using speed, the screen effect by an integration operator works and it can do strongly to a noise.

[0034]It may be made for a calculating part to be provided with an initial angle-of-rotation calculating part, a writing middle turn angle calculating part, a coordinate conversion calculating part, an acceleration-error discrimination section, an angle-of-rotation correction part, a gravitational acceleration removing part, and a movement magnitude calculating part as for a calculating part. It is distinguished whether an acceleration-error discrimination section has the

necessity of measuring gravitational acceleration for the size of the acceleration of Z_g axial direction which the coordinate conversion calculating part computed, and correcting angle of rotation, when the pen point part touches the writing surface. If an angle-of-rotation correction part has the necessity that an acceleration-error discrimination section corrects angle of rotation and it will be distinguished, it will correct angle of rotation and will feed it back to a coordinate conversion calculating part so that the acceleration of computed Z_g axial direction may become equal to gravitational acceleration. A gravitational acceleration removing part removes a gravitational acceleration component from the acceleration which the coordinate conversion calculating part converted. A movement magnitude calculating part computes the moving direction and migration length of a pen point part based on the acceleration of Ushiro from whom the gravitational acceleration removing part removed the gravitational acceleration component.

[0035]When, as for the acceleration-error discrimination section, the pen point part touches the writing surface, A gravitational acceleration removing part investigates the size of the component by the note of the acceleration of Z_g axial direction which removed and obtained the gravitational acceleration component, Instead of distinguishing whether there is any necessity of correcting angle of rotation, an inner product with the acceleration vector which the normal vector and coordinate conversion calculating part of the writing surface converted and obtained when the pen point part touched the writing surface is calculated, It may be made to distinguish whether there is any necessity of comparing the threshold value previously determined as the size of the calculated inner product, and correcting angle of rotation. Even if it is a case where the writing surface leans by this, it can be distinguished whether correction is correctly required, and a moving direction and migration length can be computed correctly.

[0036]It may be made for a calculating part to be provided with a writing acceleration correction part instead of an angle-of-rotation correction part. If a writing acceleration correction part has the necessity that an acceleration-error discrimination section corrects the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and it will be distinguished, it will correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) so that the acceleration of computed Z_g axial direction may become equal to gravitational acceleration. Since the acceleration by a gravity coordinate system (X_g, Y_g, Z_g) is corrected, it is not necessary to feed back the acceleration after correction, and compared with data processing by an angle-of-rotation correction part, arithmetic load can be made light.

[0037]

[Working example]Fig. 1 is a configuration diagram of the pen type input device 1 of one working example of this invention. In the following descriptions, the coordinate system which made the pen point part 8 the starting point as shown in Fig. 2, and set Z_s axis as the penholder 7 is called penholder coordinate system (X_s, Y_s, Z_s), and it describes biaxial [orthogonal to the penholder 7] as X_s axis and a Y_s axis. The coordinate system which sets Z_g axis as the axis extended in the gravitational acceleration direction is called gravity coordinate system (X_g, Y_g, Z_g), and biaxial [orthogonal to Z_g axis] is called X_g axis and Y_g axis. The surface which a writing surface, X_g axis, and Y_g axis constitute assumes that it is corresponding.

[0038]As shown in a figure, the pen type input device 1 has the acceleration sensor 2a, 2b, 2c, the gyroscopes 3a, 3b, and 3c, the processing part 4, the storage part 5, and the power supply section 6. The acceleration sensor 2a, 2b, and 2c are provided towards a X_{sa} axial direction respectively parallel to X_s axis, a Y_{sa} axial direction parallel to Y_s axis, and Z_s axial direction, and output the signal which shows the acceleration (A_{xs}, A_{ys}, A_{zs}) of a X_{sa} axial direction, a

Ysa axial direction, and a Zsa axial direction. The acceleration sensor 2a, 2b, and 2c have the just good linearity over acceleration detection, and any of the thing of a piezoresistance system, the thing of a piezo-electric system, or the thing of a capacitive sensing method may be sufficient as them at small size and high sensitivity. As for the gyroscopes 3a, 3b, and 3c, the circumference of a Xsb axis respectively parallel to Xs axis and a Xsa axis outputs the signal which shows the angular rate of rotation (omegaxs, omegays, omegazs) of the circumference of a Ysb axis parallel to Ys axis and a Ysa axis, and the circumference of Zs axis. The gyroscopes 3a, 3b, and 3c have a scale factor (accuracy of rotational movement detection), and a good and just small drift rate (stability of output offset), and any, such as a rotation gyroscope, a vibration gyroscope, or an optical gyroscope, may be sufficient as them.

[0039]The processing part 4 is provided with the input part 4a and the calculating part 4b as shown in Fig.3. The input part 4a has A/D converters 41a-41f, the highpass filters (it is called henceforth "HPF".) 42a-42f, and the low pass filters (it is called henceforth "LPF".) 43a-43f. A/D converters 41a-41f convert the acceleration sensor 2a, 2b, 2c, and the analog signal from the gyroscopes 3a, 3b, and 3c to a digital signal, respectively. The high frequency component of the signal from the acceleration sensor 2a produced according to the frictional force of the pen point part 8 and a writing surface, 2b, 2c, and the gyroscopes 3a, 3b, and 3c is extracted HPF42a-42f. The high frequency component of the signal from the acceleration sensor 2a produced according to the frictional force of the pen point part 8 and a writing surface, 2b, 2c, and the gyroscopes 3a, 3b, and 3c is intercepted LPF43a-43f. This is because a high frequency component occurs by friction with the pen point part 8 and a writing surface from the gyroscopes 3a, 3b, and 3c to the acceleration sensor 2a, 2b, 2c, and a signal.

[0040]The calculating part 4b has the stillness discrimination section 44, the writing surface contact discrimination section 45, the initial angle-of-rotation calculating part 46, the writing middle turn angle calculating part 47, the coordinate conversion calculating part 48, the gravitational acceleration removing part 49, the acceleration-error discrimination section 50, the angle-of-rotation correction part 51, the correction discrimination section 52, and the movement magnitude calculating part 53. The stillness discrimination section 44 distinguishes whether it is under [stillness] ***** based on the acceleration sensor 2a, 2b, 2c, and the signal from the gyroscopes 3a, 3b, and 3c. The writing surface contact discrimination section 45 will be distinguished if either contains a high frequency component among the signals from the three acceleration sensors 2a input via HPF42a-42f, 2b, 2c, and the three gyroscopes 3a, 3b, and 3c, and the pen point part 8 touches the writing surface.

[0041]The initial angle-of-rotation calculating part 46 computes initial value vectorphi= (phixo, phiyo, phizo) of an angle-of-rotation vector based on the acceleration Axso, Ayso, and Azso of a Penn axis-coordinates system (Xs, Ys, Zs) which used and detected each acceleration sensor 2a, 2b, and 2c on the occasion of a writing start. Hereafter, what was attached with vector near at hand in the description shall express a vector. An angle-of-rotation vector is similarly denoted by vectorphi, and it is considered as vectorphi= (phix, phiy, phiz). The writing middle turn angle calculating part 47 angle-of-rotation vector vectorphin-1 and the three gyroscopes 3a, 3b, and 3c which the writing middle turn angle calculating part 47 calculated when it sampled the initial value vectorphi of the angle-of-rotation vector which the initial angle-of-rotation calculating part 46 calculated, or last time. The angle-of-rotation vector vectorphin in the case of a sampling is computed this time based on the angular rate of rotation (omegaxs, omegays, omegazs) used and detected. The coordinate conversion calculating part 48 converts the coordinate system of the acceleration detected using the acceleration sensor from the Penn axis-coordinates system

(X_s, Y_s, Z_s) to a gravity coordinate system (X_g, Y_g, Z_g) using the angle-of-rotation vector vectorphin under note which the writing middle turn angle calculating part 47 computed. The gravitational acceleration removing part 49 removes the component of the gravitational acceleration g from the acceleration ($A_{xog}, A_{yog}, A_{zog}$) in a gravity coordinate system (X_g, Y_g, Z_g), and removes the influence by the gravitational acceleration g .

[0042]If the writing surface contact discrimination section 45 touches [the pen point part 8 and the writing surface], when having distinguished the acceleration-error discrimination section 50, It investigates whether the size of the acceleration of Z_g axial direction where the gravitational acceleration removing part 49 removed and obtained the gravitational acceleration component g is investigated, and the acceleration after conversion has an error, and it is distinguished whether there is any necessity of correcting the angle-of-rotation vector vectorphin. Since the component by a noise is contained in the acceleration of Z_g axial direction where the gravitational acceleration removing part 49 removed and obtained the gravitational acceleration component g here, It is distinguished whether the acceleration-error discrimination section 50 has the necessity of correcting angle of rotation by measuring the acceleration of Z_g axial direction where the threshold value and the gravitational acceleration removing part 49 which were previously defined based on the noise level removed and obtained the gravitational acceleration component g .

[0043]If the angle-of-rotation correction part 51 has the necessity that the acceleration-error discrimination section 50 corrects the angle-of-rotation vector vectorphin and it will distinguish, The correction amount of the angle-of-rotation vector vectorphin is calculated so that the acceleration of Z_g axial direction where the gravitational acceleration removing part 49 removed and obtained the gravitational acceleration component may become zero, If it distinguishes that the correction discrimination section 52 corrects based on the correction amount of the angle-of-rotation vector vectorphin searched for, the angle-of-rotation vector vectorphin will be corrected and it will feed back to the writing middle turn angle calculating part 47 and the coordinate conversion calculating part 48. As compared with the threshold value which defined previously the correction amount of the angle-of-rotation vector vectorphin which the angle-of-rotation correction part 51 searched for, the correction discrimination section 52 is instructed to the angle-of-rotation correction part 51 so that it may correct in within a threshold value. The movement magnitude calculating part 53 has the first integral part 53a and the second integrating part 53b. The first integral part 53a integrates with the acceleration from which the gravitational acceleration removing part 49 removed and obtained the gravitational acceleration component g , the speed of the pen point part 8 is found, and the second integrating part 53b computes the moving direction and migration length of the pen point part 8 by integrating with the speed of the pen point part 8 which the first integral part 53a computed.

[0044]It describes about the moving direction of the pen point part 8 and movement magnitude calculation in the pen type input device 1 of the above-mentioned composition.

[0045]It describes about the case where the initial value vectorphio of an angle-of-rotation vector is computed first from each acceleration sensor 2a, 2b, and the acceleration ($A_{xso}, A_{yso}, A_{zso}$) detected using 2c.

[0046]The angular rate of rotation of the circumference of Z_s axis is reset as $\text{phizo}=0$. At this time, the following relation is realized in a state of rest between each acceleration sensor 2a, 2b, the acceleration ($A_{xso}, A_{yso}, A_{zso}$) detected using 2c, and initial value vectorphio= ($\text{phixo}, \text{phiyo}, 0$) of an angle-of-rotation vector.

[0047]

[Mathematical formula 1]

[0048]The initial value vector ϕ_0 of the angle-of-rotation vector in a state of rest can be found from the above-mentioned formula.

[0049]Here, since three equations are formed to two unknown ϕ_{x0} (es) and ϕ_{y0} , even if it does not define the value of the gravitational acceleration g , the absolute value of ϕ_{x0} and ϕ_{y0} is computable [it can treat as an unknown also about the gravitational acceleration g , and]. The value of the gravitational acceleration g is calculated and the value of the calculated gravitational acceleration g is monitored, and it may be made to emit warning etc. when this value is changed largely.

[0050]When gravitational acceleration g is made into an unknown, the initial value vector ϕ_0 of an angle-of-rotation vector can be denoted, for example by a following formula.

[0051]

[Mathematical formula 2]

[0052]It describes about the case where the angle-of-rotation vector vector ϕ under note next based on the angular rate of rotation (ω_x , ω_y , ω_z) which used and detected angle-of-rotation vector vector ϕ_{-1} of the last sampling timing and the gyroscopes 3a, 3b, and 3c is computed.

[0053]The differential equation of the angle-of-rotation vector vector ϕ can be denoted by a following formula.

[0054]

[Mathematical formula 3]

[0055]Therefore, if a sampling period is set to T , a following formula can be obtained and the angle-of-rotation vector vector ϕ can be acquired. In the case of the 1st sampling after

calculating the initial value vector \mathbf{p}_{i0} of an angle-of-rotation vector, the initial value vector \mathbf{p}_{i0} of an angle-of-rotation vector is used as angle-of-rotation vector \mathbf{p}_{i-1} of the last sampling timing here, Angle-of-rotation vector \mathbf{p}_{i-1} calculated using the following formula by the last sampling timing is used the 2nd time and afterwards.

[0056]

[Mathematical formula 4]

[0057]Next, It is performed above. The acquired angle-of-rotation vector \mathbf{p}_i . It describes about the case where the acceleration (A_{xs}, A_{ys}, A_{zs}) of a Penn axis-coordinates system (X_s, Y_s, Z_s) which used and detected each acceleration sensor 2a, 2b, and the output of 2c on the basis is converted to the acceleration (A_{xg}, A_{yg}, A_{zg}) of a gravity coordinate system (X_g, Y_g, Z_g) .

[0058]For asking for the coordinate transformation matrix in a strap-down system from the angle-of-rotation vector \mathbf{p}_i , the following formula using a parameter $(\chi, \rho_{hx}, \rho_{hy}, \rho_{hz})$ is used.

[0059]

[Mathematical formula 5]

[0060]If the above-mentioned coordinate transformation matrix is used in consideration of the gravitational acceleration g , as shown in a following formula, the acceleration (A_{xs}, A_{ys}, A_{zs}) of a Penn axis-coordinates system (X_s, Y_s, Z_s) can be converted to the acceleration (A_{xg}, A_{yg}, A_{zg}) of a gravity coordinate system (X_g, Y_g, Z_g) .

[0061]

[Mathematical formula 6]

[0062]By integrating with the acceleration (A_{xg}, A_{yg}, A_{zg}) of the gravity coordinate system (X_g, Y_g, Z_g) acquired by converting as mentioned above twice, Penn's moving direction and migration length are computable.

[0063]When Penn is moving here in the writing surface top which is the level surface (under a note), the writing acceleration A_{zg} of Z_g axial direction must be zero. However, if the acceleration (A_{xs}, A_{ys}, A_{zs}) of the acceleration sensor 2a, 2b, and a Penn axis-coordinates system (X_s, Y_s, Z_s) detected using 2c is converted to the acceleration (A_{xg}, A_{yg}, A_{zg}) of a gravity coordinate system (X_g, Y_g, Z_g), The writing acceleration A_{zg} of Z_g axial direction may not become zero. One of the main factor of this is a gap of Penn's attitude. That is, if the detection result of Penn's attitude has error $\Delta\theta$ as shown in Fig.4, When converting the acceleration (A_{xs}, A_{ys}, A_{zs}) of a Penn axis-coordinates system (X_s, Y_s, Z_s) to the acceleration (A_{xg}, A_{yg}, A_{zg}) of a gravity coordinate system (X_g, Y_g, Z_g), it will convert to the coordinate system ($X_{\alpha}, Y_{\alpha}, Z_{\alpha}$) actually leaning from the level surface. This will have acceleration component vector $(0, 0, A_{\alpha z})$ in a Z_{α} axial direction.

[0064]The surface decided by apparent writing acceleration vector A_{α} and vector $A_{\alpha z}$ is a vertical plane, and considering rotation in this plane, correction vector $\Delta\theta$ (vector which turned to the shaft direction) is in the plane (level surface) which X_g axis and Y_g axis constitute. At this time, the rotational error of the circumference of Z_g axis is not taken into consideration. Then, correction vector $\Delta\theta$ can be expressed like a following formula.

[0065]

[Mathematical formula 7]

[0066]The acceleration signal which can be acquired is apparent writing acceleration vector A_{α} ($A_{\alpha x}, A_{\alpha y}, 0$) and vector $A_{\alpha z}$ ($0, 0, A_{\alpha z}$) in a coordinate system ($X_{\alpha}, Y_{\alpha}, Z_{\alpha}$).

[0067]Here, since the writing acceleration vector A ($A_{xg}, A_{yg}, 0$) and correction vector $\Delta\theta$ lie at right angles, a following formula is realized.

[0068]

[Mathematical formula 8]

[0069]The direction of the axis of rotation can be searched for based on the above-mentioned

formula.

[0070]

[Mathematical formula 9]

[0071]A following formula consists of a geometric relation.

[0072]

[Mathematical formula 10]

[0073]It can ask for correction vector $\Delta \text{vector}\phi$ based on an upper type.

[0074]

[Mathematical formula 11]

[0075]Here, it thinks that $\Delta \text{vector}\phi$ is sufficiently small and a following formula is obtained.

[0076]

[Mathematical formula 12]

[0077]Therefore, correction vector $\Delta \text{vector}\phi$ becomes like a following formula.

[0078]

[Mathematical formula 13]

[0079]The formula which expressed angle-of-rotation vector $\text{vector}\phi$ expressing the attitude of a pen with several 4 for rotating by correction vector $\Delta \text{vector}\phi$ is used. A following formula can be obtained if it sets with change part $\text{vector}\omega_{\text{to}=\Delta} \text{vector}\phi$ of an angle-of-rotation vector in several 4.

[0080]

[Mathematical formula 14]

[0081]About the operation in the case of detecting the moving direction and movement magnitude of the pen point part 8 using the pen type input device 1 of the above-mentioned composition, it describes with reference to the flow chart of [Fig.5](#).

[0082]When it becomes the sampling timing of the constant period defined previously, the stillness discrimination section 44 the acceleration (A_{xs} , A_{ys} , A_{zs}) and the angular rate of rotation (ω_{gaxs} , ω_{gayz} , ω_{gazs}) after digital conversion via A/D converters 41a-41f Reading (Step S1), It is distinguished whether it is a state of rest (Step S2).

[0083]If the stillness discrimination section 44 distinguishes from a movement state first, the initial angle-of-rotation calculating part 46 will compute the initial value vector ϕ_{i0} of an angle-of-rotation vector based on the acceleration sensor 2a, 2b, and the acceleration (A_{xs} , A_{ys} , A_{zs}) detected using 2c (Step S3). Here, while the stillness discrimination section 44 has distinguished from the state of rest, the initial angle-of-rotation calculating part 46 repeats the above-mentioned operation, and the number of times n of a sample in the meantime serves as zero.

[0084]Then, if it becomes the sampling timing of a constant period, the writing middle turn angle calculating part 47 will read the angular rate of rotation (ω_{gaxs} , ω_{gayz} , ω_{gazs}) detected using the gyroscopes 3a, 3b, and 3c via LPF43d-43f (step S4), The angular rate of rotation which angle-of-rotation vector vector ϕ_{i-1} and the three gyroscopes 3, 3b, and 3c which the writing middle turn angle calculating part 47 calculated when it sampled the initial value vector ϕ_{i0} of the angle-of-rotation vector which the initial angle-of-rotation angle calculating part 46 calculated, or last time, as already described detected. The angle-of-rotation vector vector ϕ_{in} in the case of a sampling is calculated based on (ω_{gaxs} , ω_{gayz} , ω_{gazs}) this time (Step S5).

[0085]The coordinate conversion calculating part 48 uses the angle-of-rotation vector vector ϕ_{in} under movement which the writing middle turn angle calculating part 47 computed, The acceleration (A_{xs} , A_{ys} , A_{zs}) in the acceleration sensor 2a, 2b, and the penholder coordinate system (X_s , Y_s , Z_s) detected using 2c is converted to the acceleration (A_{xg} , A_{yg} , A_{zg}) of the pen point part 8 in a gravity coordinate system (X_g , Y_g , Z_g) (Step S6). Thus, since the acceleration (A_{xs} , A_{ys} , A_{zs}) in a penholder coordinate system (X_s , Y_s , Z_s) is converted to the acceleration (A_{xg} , A_{yg} , A_{zg}) in a gravity coordinate system (X_g , Y_g , Z_g), the influence by the inclination of the penholder 7 is removable.

[0086]The gravitational acceleration removing part 49 removes the component of the gravitational acceleration g from the acceleration (A_{xg} , A_{yg} , A_{zg}) in the gravity coordinate system (X_g , Y_g , Z_g) converted and acquired, and removes the influence by the gravitational acceleration g (Step S7). When the writing surface contact discrimination section 45 distinguishes that the writing surface touches the pen point part 8 (Step S8), it the acceleration-error discrimination section 50, As already described, investigate the size of the acceleration of Z_g axial direction where the gravitational acceleration removing part 49 removed and obtained the gravitational acceleration component g , and it compares with the threshold value previously defined based on the noise level, It investigates whether the acceleration after conversion has an error, and it is distinguished whether there is any necessity of correcting the angle-of-rotation vector vector ϕ_{in} (step S9). Thus, malfunction can be prevented from arising by a noise by measuring the acceleration of Z_g axial direction where the threshold value and the gravitational acceleration removing part 49 which were previously defined based on the noise level removed and obtained the gravitational acceleration component g .

[0087]If the angle-of-rotation correction part 51 has the necessity that the acceleration-error discrimination section 50 corrects the angle-of-rotation vector vector ϕ_{in} and it will distinguish, Correction amount $\Delta\text{vector}\phi_i$ of the angle-of-rotation vector vector ϕ_{in} at the time of correcting so that the acceleration of Z_g axial direction where the gravitational acceleration removing part 49 removed and obtained the gravitational acceleration component may become zero is computed (Step S10). It distinguishes that the correction discrimination section 52

corrects as compared with the threshold value which defined previously correction amount $\Delta\text{vectorphi}$ of the angle-of-rotation vector vectorphi which the angle-of-rotation correction part 51 computed, and which was searched for when correction amount $\Delta\text{vectorphi}$ is below a threshold value (Step S11). Thus, since it is made to correct when correction amount $\Delta\text{vectorphi}$ is below a threshold value, the angle-of-rotation vector vectorphi can be prevented from changing with correction rapidly.

[0088]If it distinguishes that the correction discrimination section 52 corrects, as the angle-of-rotation correction part 51 was already described, it will correct the angle-of-rotation vector vectorphi , and will feed it back to the writing middle turn angle calculating part 47 and the coordinate conversion calculating part 48 (Step S12). The coordinate conversion calculating part 48 converts again the coordinate system of the acceleration sensor 2a, 2b, and the acceleration detected using 2c to a gravity coordinate system (X_g, Y_g, Z_g) using the fed-back angle-of-rotation vector vectorphi (Step S13). The gravitational acceleration removing part 49 removes a gravitational acceleration component from the converted acceleration (Step S14). Here, since the size of the acceleration of Z_g axial direction after correction of U_{shiro} who converted again has become below a threshold value, the repetition for convergence by feedback is not generated. Thereby, exact coordinate conversion can be performed. Here, since the angle-of-rotation vector after correction is fed back also to the writing middle turn angle calculating part 47, an accumulated error can be prevented from occurring in the case of next sampling timing.

[0089]If there is no necessity for correction of the angle-of-rotation vector vectorphi , the movement magnitude calculating part 53 will compute the moving direction and migration length of the Penn blocking force apparatus 1 by integrating with the acceleration (A_{xg}, A_{yg}, A_{zg}) after coordinate conversion twice to a gravity coordinate system (X_g, Y_g, Z_g) (Step S15). The calculating part 4b repeats the above-mentioned operation until an input process is completed (Step S16). Thus, since the acceleration after transforming correctly is used, a moving direction and migration length are correctly computable.

[0090]Although it distinguished whether there would be any necessity of correcting the angle-of-rotation vector vectorphi based on acceleration in the above-mentioned working example, it may be made to distinguish based on speed here. As shown, for example in [Fig. 6](#), the Penn blocking force apparatus 1 The stillness discrimination section 44, the writing surface contact discrimination section 45, the initial angle-of-rotation calculating part 46, the writing middle turn angle calculating part 47, the coordinate conversion calculating part 48, the gravitational acceleration removing part 49, the first integral part 53a, It has the calculating part 4b provided with the speed-error discrimination section 54, the angle-of-rotation correction part 51, and the correction discrimination section 52.

[0091]If the writing surface contact discrimination section 45 touches [the writing surface] the pen point part 8, when having distinguished the speed-error discrimination section 54, It is distinguished whether as compared with the threshold value which defined previously the speed in Z_g axial direction where the first integral part 53a integrated with and obtained the acceleration which removed and obtained the gravitational acceleration component by the gravitational acceleration removing part 49, there is any necessity of correcting angle-of-rotation vector vectorphi . If the angle-of-rotation correction part 51 has the necessity that the speed-error discrimination section 54 corrects angle-of-rotation vector vectorphi and it will be distinguished, instead of being acceleration, it will use speed and will correct angle-of-rotation vector vectorphi similarly with having already described. In this case, a noise component can be equalized and stopped by the integration operator by the first integral part 53a.

[0092]The acceleration sensor 2a, 2b, and the acceleration detected using 2c are corrected, and it may be made to lose the influence by the acceleration sensor 2a, 2b, and the fitting location of 2c being distant from the pen point part 8. The pen type input device 1, As shown in Fig.7, for example, the stillness discrimination section 44, the writing surface contact discrimination section 45, the angular acceleration calculating part 55, the acceleration correction part 56, the initial angle-of-rotation calculating part 46, the writing middle turn angle calculating part 47, the coordinate conversion calculating part 48, the gravitational acceleration removing part 49, the acceleration-error discrimination section 50, the angle-of-rotation correction part 51, It has the calculating part 4b provided with the correction discrimination section 52 and the movement magnitude calculating part 53.

[0093]The angular acceleration calculating part 55 asks for rotation angle acceleration from the angular rate of rotation detected using the three gyroscopes 3a, 3b, and 3c. The angular rate of rotation which detected the acceleration correction part 56 using three gyroscopes, The three acceleration sensors 2a, 2b, and the acceleration component by the tilting centering on the pen point part 8 of acceleration which used and detected 2c are computed based on the rotation angle acceleration which the angular acceleration calculating part 55 computed and the angular acceleration sensor 2a, 2b, and the fitting location of 2c, The acceleration sensor 2a, 2b, and the acceleration in the fitting location of 2c are corrected based on the acceleration component by the acceleration by the computed tilting, and it asks for the acceleration in the pen point part 8. For example, if the coordinates in the penholder coordinate system (Xs, Ys, Zs) of each acceleration sensor 2a, 2b, and the attaching position of 2c are set to (Xas, Yas, Zas), (Xbs, Ybs, Zbs), and (Xcs, Ycs, Zcs), Each acceleration sensor 2a, 2b, and the acceleration (Axs, Ays, Aza) detected using 2c can be converted to the acceleration (Axog, Ayog, Azog) in the gravity coordinate system (Xg, Yg, Zg) in the pen point part 8 with a following formula.

[0094]

[Mathematical formula 15]

[0095]The 2nd item and the 3rd item in a parenthesis are a correction term of the influence by the acceleration sensor 2a, 2b, and the attaching position of 2c being distant from the pen point

part 8 among the above-mentioned formulas. The acceleration correction part 56 calculates this correction term, and corrects the acceleration sensor 2a, 2b, and the acceleration (A_{xs} , A_{ys} , A_{za}) detected using 2c. Thus, since the influence by the acceleration sensor 2a, 2b, and the fitting location of 2c is corrected, a writing locus can be detected still more correctly.

[0096]In the above-mentioned working example, after removing a gravitational acceleration component from the acceleration (A_{xg} , A_{yg} , A_{zg}) converted to the gravity coordinate system (X_g , Y_g , Z_g), investigated whether there would be any necessity of correcting the angle-of-rotation vector vectorphin, but. Since the error has arisen also in the removed gravitational acceleration component when the error has arisen against the acceleration after coordinate conversion, an error may appear in the part correction results. Then, it may be made to investigate whether there is any necessity of correcting angle-of-rotation vector vectorphi including a gravitational acceleration component. The Penn blocking force apparatus 1, For example, as shown in [Fig.8](#), the stillness discrimination section 44, the writing surface contact discrimination section 45, the initial angle-of-rotation calculating part 46, the writing middle turn angle calculating part 47, the coordinate conversion calculating part 48, the acceleration-error discrimination section 50, the angle-of-rotation correction part 51, the correction discrimination section 52, the gravitational acceleration removing part 49, and the movement magnitude calculating part 53. It has the calculating part 4b which it has. The acceleration-error discrimination section 50 distinguishes whether there is any necessity of correcting the angle-of-rotation angle vector vectorphin based on the acceleration and gravitational acceleration of Z_g axial direction which the coordinate conversion calculating part 48 converted and obtained, when the pen point part 8 touches the writing surface. If the angle-of-rotation correction part 51 has the necessity that the acceleration-error discrimination section 50 corrects the angle of rotation vectorphin and it will distinguish, The angle of rotation vectorphin is corrected and the corrected angle of rotation vectorphin is fed back to the writing middle turn angle calculating part 47 and the coordinate conversion calculating part 48 so that the acceleration of Z_g axial direction may become equal to gravitational acceleration.

[0097]About operation of the above-mentioned formation part pen type input device 1, it describes with reference to the flow chart of [Fig.9](#).

[0098]If it becomes the sampling timing of the constant period it was determined previously that already described, the stillness discrimination section 44 will distinguish whether they are reading (Step S21) and a state of rest for digital conversion Ushiro's acceleration (A_{xs} , A_{ys} , A_{zs}) and the angular rate of rotation (ω_{gaxs} , ω_{gayz} , ω_{gazs}) (Step S22). If the stillness discrimination section 44 distinguishes from a movement state, the initial angle-of-rotation calculating part 46 will compute the initial value vectorphio of an angle-of-rotation vector based on the acceleration sensor 2a, 2b, and the acceleration (A_{xs} , A_{ys} , A_{zs}) detected using 2c (Step S23).

[0099]Then, if it becomes the sampling timing of a constant period, the writing middle turn angle calculating part 47 will read the angular rate of rotation (ω_{gaxs} , ω_{gayz} , ω_{gazs}) detected using the gyroscopes 3a, 3b, and 3c via LPF43d-43f (Step S24), The angular rate of rotation which angle-of-rotation vector vectorphin-1 and the three gyroscopes 3, 3b, and 3c which the writing middle turn angle calculating part 47 calculated when it sampled the initial value vectorphio of the angle-of-rotation vector which the initial angle-of-rotation angle calculating part 46 calculated, or last time, as already described detected. The angle-of-rotation vector vectorphin in the case of a sampling is calculated based on (ω_{gaxs} , ω_{gayz} , ω_{gazs}) this time (Step S25).

[0100]The coordinate conversion calculating part 48 uses the angle-of-rotation vector vectorphin under movement which the writing middle turn angle calculating part 47 computed, The acceleration (A_{xs} , A_{ys} , A_{zs}) in the acceleration sensor 2a, 2b, and the penholder coordinate system (X_s , Y_s , Z_s) detected using 2c is converted to the acceleration (A_{xg} , A_{yg} , A_{zg}) of the pen point part 8 in a gravity coordinate system (X_g , Y_g , Z_g) (Step S26). When the writing surface contact discrimination section 45 distinguishes that the writing surface touches the pen point part 8 (Step S27), it the acceleration-error discrimination section 50, The difference of the size of the acceleration and the gravitational acceleration g of Z_g axial direction is calculated, it investigates whether conversion Ushiro's acceleration has an error as compared with the threshold value previously determined as the difference, and it is distinguished whether there is any necessity of correcting the angle-of-rotation vector vectorphin (Step S28). If the angle-of-rotation correction part 51 has the necessity that the acceleration-error discrimination section 50 corrects the angle-of-rotation vector vectorphin and it will be distinguished, it will compute correction amount $\Delta\text{vectorphi}$ of the angle-of-rotation vector vectorphin so that the acceleration of Z_g axial direction may become equal to the gravitational acceleration g (Step S29). It distinguishes that the correction discrimination section 52 corrects as compared with the threshold value which defined previously correction amount $\Delta\text{vectorphi}$ of the angle-of-rotation vector vectorphin which the angle-of-rotation correction part 51 computed, and which was searched for when correction amount $\Delta\text{vectorphi}$ is below a threshold value (Step S30). When it distinguishes that the correction discrimination section 52 corrects, the angle-of-rotation correction part 51, The angle-of-rotation vector vectorphin is corrected, it feeds back to the writing middle turn angle calculating part 47 and the coordinate conversion calculating part 48, the processing (Steps S26-S31) from coordinate transformation processing is repeated, and the acceleration of Z_g axial direction is converged on the same size as the gravitational acceleration g . It can ask for the acceleration of a gravity coordinate system thereby still more correctly. Here, when not much many processings (Steps S26-S31) from coordinate transformation processing are repeated, it is good to set up the condition of convergence previously to end an operation when it converges into the fixed range previously appointed from calculation time becoming long.

[0101]If there is no necessity for correction of the angle-of-rotation vector vectorphin, the gravitational acceleration removing part 49 will remove the component of the gravitational acceleration g from the acceleration (A_{xg} , A_{yg} , A_{zg}) in a gravity coordinate system (X_g , Y_g , Z_g), and will remove the influence by the gravitational acceleration g (Step S32). The movement magnitude calculating part 53 computes the moving direction and migration length of the pen type input device 1 by integrating with coordinate conversion Ushiro's acceleration (A_{xg} , A_{yg} , A_{zg}) twice to a gravity coordinate system (X_g , Y_g , Z_g) (Step S33). The calculating part 4b repeats the above-mentioned operation until an input process is completed (Step S34). A moving direction and migration length can be computed thereby still more correctly.

[0102]The calculating part 4b of the pen type input device 1 may be provided with the correction amount averaging part 57 as shown, for example in [Fig.10](#), or it may be provided with the nib speed zero primary detecting element 58 and the speed correction part 59. The correction amount averaging part 57 averages sequentially the correction amount of the angle-of-rotation vector vectorphin which the angle-of-rotation correction part 51 searched for. An angle-of-rotation correction part corrects the angle-of-rotation vector vectorphin which the writing middle turn angle calculating part 47 computed based on the average value of the correction amount of the angle-of-rotation vector vectorphin which the correction amount averaging part searched for.

Thereby, the correction amount of the angle-of-rotation vector vectorphin changes rapidly, and detection can be prevented from occurring if it is a hand at all.

[0103]The nib speed zero primary detecting element 58 distinguishes whether the movement speed of the pen point part 8 which integrated with and asked for the acceleration by the gravity coordinate system (X_g, Y_g, Z_g) in a state of rest is zero. Based on the waveform of the speed of a gravity coordinate system (X_g, Y_g, Z_g) after the nib speed zero primary detecting element 58 detects a state of rest until it next detects a state of rest, the speed correction part 59, It asks for the straight line a as shown in 114 (a), it corrects so that inclination of this straight line may become zero, and it is made for speed to become zero by each state of rest, as shown in Fig.11 (b). Thereby, the accumulated error by integration can be corrected and it can ask for the writing locus of the pen point part 8 correctly.

[0104]When distinguishing the size of the acceleration A_{zg} of the gravitational acceleration direction by the acceleration-error discrimination section 50, If the acceleration A_{zg} is larger than the threshold value defined previously, correction by the angle-of-rotation correction part 51 will be performed, and smaller than a threshold value, when the size of writing acceleration is close to zero, it may be made to perform correction by the above-mentioned nib speed zero primary detecting element 58 and the speed correction part 59. Here, when applied to above neither, it is a case where there is no necessity for correction during air movement or a note correctly [the attitude of a pen] but. Such combination can perform efficient exact correction.

[0105]Although the above-mentioned working example is the description to the Penn blocking force apparatus 1 which adopted the strap-down system, it may be adopted to the Penn blocking force apparatus 1b which adopted the Euler system as shown in Fig.12. The Penn blocking force apparatus 1 which adopted the oiler system to the calculating part 4b, It has the stillness discrimination section 44, the writing surface contact discrimination section 45, the initial angle-of-rotation calculating part 46, the angle-of-rotation change calculating part 50, the writing middle turn angle calculating part 47, the coordinate conversion calculating part 48, the gravitational acceleration removing part 49, the acceleration-error discrimination section 50, the angle-of-rotation correction part 51, and the movement magnitude calculating part 53. The initial angle-of-rotation calculating part 46 asks for initial angle of rotation (ϕ_0, θ_0, ψ_0) based on the acceleration (A_{xs}, A_{ys}, A_{zs}) in the Penn axis-coordinates system (X_s, Y_s, Z_s) detected using the acceleration sensor 2a, 2b, and 2c in the state of rest. The angle-of-rotation change calculating part 50 asks for change ($\Delta\phi, \Delta\theta, \Delta\psi$) of angle of rotation based on the angular rate of rotation ($\omega_{gxs}, \omega_{gys}, \omega_{gzs}$) which used and detected the gyroscopes 3a, 3b, and 3c during the note. The writing middle turn angle calculating part 47 computes angle of rotation (ϕ, θ, ψ) under note based on change ($\Delta\phi, \Delta\theta, \Delta\psi$) of initial angle of rotation (ϕ_0, θ_0, ψ_0) which the initial angle-of-rotation calculating part 46 computed, and angle of rotation which the angle-of-rotation change calculating part 50 computed. The coordinate conversion calculating part 48b each acceleration sensor 2a, 2b, and the acceleration (A_{xs}, A_{ys}, A_{zs}) in the Penn axis-coordinates system (X_s, Y_s, Z_s) which used and detected 2c based on angle of rotation (ϕ, θ, ψ) under note which the writing middle turn angle calculating part 47 computed. It converts to the acceleration (A_{xg}, A_{yg}, A_{zg}) in a gravity coordinate system (X_g, Y_g, Z_g). It is distinguished whether the acceleration-error discrimination section 50 has the necessity of correcting angle of rotation compared with the threshold value which defined previously the size of the acceleration of Z_g axial direction after removing gravitational acceleration by the gravitational acceleration removing part 49, when the pen point part 8 touches the writing surface. If the angle-of-rotation

correction part 51 has the necessity that the acceleration-error discrimination section 50 corrects angle of rotation and it will be distinguished, it will correct angle of rotation and will feed it back to the coordinate conversion calculating part 48 so that the acceleration of computed Zg axial direction may become equal to gravitational acceleration. The movement magnitude calculating part 53 computes the moving direction and migration length of the pen point part 8 based on the acceleration after a gravitational acceleration removing part removes a gravitational acceleration component. By having such composition, a note is correctly detectable also with the Penn blocking force apparatus 1 which adopted the Euler system.

[0106]Although the writing surface contact discrimination section 45 detected whether the writing surface would touch the pen point part 8 as mentioned above based on the high frequency component of the signal from the angular acceleration sensor 2a, 2b, 2c, and the gyroscopes 3a, 3b, and 3c in the above-mentioned working example, When a pressure sensor etc. are provided to the pen point part 8 and a pressure sensor detects the pressure from a writing surface, it may be made to detect whether the pen point part 8 touches the writing surface.

[0107]Since correction angle degree $\Delta\phi$ is computed from the writing acceleration which each transformed in the above-mentioned working example and acceleration is transformed again, when correction starts, it must transform twice to the data of the time. Although it is accurate, since the operation is complicated, as this method reflects calculated correction vector $\Delta\phi$ in the following sampling timing, it may simplify data processing. For example, data processing can be simplified, holding arithmetic precision equally by using a following formula instead of several four.

[0108]

[Mathematical formula 16]

[0109]By using an upper type, data processing can be simplified and an equipment configuration can be simplified.

[0110]Although the surface which Xg axis and Yg axis all constitute considered the state where it was corresponding with the writing surface, in the above-mentioned working example, Since the surface which Xg axis and Yg axis constitute may not correspond with a writing surface, the acceleration-error discrimination section 50, When the pen point part 8 touches the writing surface as mentioned above, the gravitational acceleration removing part 49 investigates the size of the component by the note of the acceleration of Zg axial direction which removed and obtained the gravitational acceleration component, The inner product of the acceleration vector A_g and normal vector $vector_{rh}$ of a writing surface which the coordinate conversion calculating part 48 converted and obtained when the pen point part 8 touched the writing surface, as shown in [Fig. 13](#) instead of distinguishing whether there is any necessity of correcting angle of rotation is calculated, The threshold value previously determined as the size of the calculated inner product is compared, and it may be made to correct angle of rotation. Here, normal vector $vector_{rh}$ of a writing surface is a unit vector vertical to a writing plane. It expresses with a gravity coordinate system (Xg, Yg, Zg).

Since the writing acceleration vector vectorA_{xg} is on a writing surface when the surface which X_g axis and Y_g axis constitute is corresponding with the writing surface and X_g axis is considered, it is set to $(\text{vectorA}_{xg}) \cdot (\text{vectorh}) = 0$. Therefore, it becomes $(\text{vectorA}_{xg} + \text{vectorg}) \cdot (\text{vectorh}) = (\text{vectorA}_{xg}) \cdot (\text{vectorh}) + (\text{vectorg}) \cdot (\text{vectorh})$. Since both of $\text{vectorg}(s)$ and $\text{vectorh}(s)$ are understood, $(\text{vectorg}) \cdot (\text{vectorh})$ serve as a known value. If the inner product of the acceleration vector vectorA_g and normal vector vectorh of a writing surface is measured as mentioned above, the rightness of angle of rotation can be distinguished.

Specifically, if X_g axial direction is considered, for example, it will rotate so that the writing acceleration after pulling the gravitational acceleration vectorg from the acceleration vector vectorA_{xg} of a gravity coordinate system (X_g, Y_g, Z_g) , and the inner product of normal vector vectorh may become zero. Thereby, even if it is a case where the writing surface leans, a moving direction and migration length are correctly computable.

[0111] It may be made for the calculating part 4b of a Penn blocking force apparatus to be provided with the writing acceleration correction part 61 instead of the angle-of-rotation correction part 51, as shown in [Fig.14](#). If the writing acceleration correction part 61 has the necessity that the acceleration-error discrimination section 50 corrects the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and it will be distinguished, it will correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) so that the acceleration of computed Z_g axial direction may become equal to gravitational acceleration. Since the acceleration by a gravity coordinate system (X_g, Y_g, Z_g) is corrected, need to feed back the acceleration after correction and it is not necessary to re-calculate it, and compared with data processing by the angle-of-rotation correction part 51, arithmetic load can be made light.

[0112] It may be made for the calculating part 4b of a Penn blocking force apparatus to be provided with the writing speed correction part 62 instead of the writing acceleration correction part 61, as shown in [Fig.15](#). If the writing speed correction part 62 has the necessity that the acceleration-error discrimination section 50 corrects the speed in a gravity coordinate system (X_g, Y_g, Z_g) and it will be distinguished, it will correct the speed in a gravity coordinate system (X_g, Y_g, Z_g) so that the speed in computed Z_g axial direction may become zero.

[0113] Only by correcting the acceleration or speed in a gravity coordinate system (X_g, Y_g, Z_g) as mentioned above, if it is used for a long time, the accumulated error of angle of rotation may increase. Then, as shown, for example in [Fig.16](#), while correcting the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) in the writing acceleration correction part 61, angle of rotation is corrected in the angle-of-rotation correction part 51, and it may be made to prevent generating of an accumulated error. In this case, since acceleration is corrected separately, there is no necessity for a re-calculation and computing speed keeps quick.

[0114] The writing speed correction part 62 and the angle-of-rotation correction part 51 may be combined instead of combining the writing acceleration correction part 61 and the angle-of-rotation correction part 51.

[0115]

[Effect of the Invention] This invention computes initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using three acceleration sensors in the state of rest, as described above, Angle of rotation under note based on computed initial angle of rotation and the angular rate of rotation detected using the gyroscope is computed, The acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) , An inner product with

the acceleration vector obtained by transforming with the normal vector of a writing surface when the pen point part touched the writing surface is calculated, If it is necessary to distinguish whether the threshold value previously determined as the size of the calculated inner product is compared, and it is necessary to correct angle of rotation, and to correct angle of rotation and will distinguish, Angle of rotation under note is corrected so that the normal-axis direction component of the acceleration vector excluding gravitational acceleration from the acceleration of Z_g axial direction transformed and obtained may become zero, The moving direction and migration length of a pen point part are computed based on the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which fed back corrected angle of rotation, converted the coordinate system of acceleration again, and was converted and acquired, Since detection of an exact moving direction and movement magnitude without the influence of the attitude of equipment is performed, the hand erroneous detection to which gravitational acceleration rushes into writing acceleration, and makes it a cause can be prevented from occurring.

[0116] moreover -- in a state of rest -- 3 -- initial angle of rotation of equipment based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using this acceleration sensor, [compute and] Angle of rotation under note based on computed initial angle of rotation and the angular rate of rotation detected using the gyroscope is computed, The acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) , An inner product with the acceleration vector obtained by transforming with the normal vector of a writing surface when the pen point part touched the writing surface is calculated, If it is necessary to distinguish whether the threshold value previously determined as the size of the calculated inner product is compared, and it is necessary to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) , and to correct the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and will distinguish, The acceleration in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that the acceleration excluding gravitational acceleration from the acceleration of Z_g axial direction transformed and obtained may become zero, Since the moving direction and migration length of a pen point part are computed based on the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) and detection of an exact moving direction and movement magnitude without the influence of the attitude of equipment is performed, Gravitational acceleration rushes into writing acceleration and hand erroneous detection can be prevented from occurring.

[0117] Since angle of rotation will be corrected if there is the necessity of correcting the acceleration of a gravity coordinate system and it will distinguish, even if it uses it for a long time, the accumulated error of angle of rotation can be prevented from occurring.

[0118] Initial angle of rotation of equipment is computed based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, Angle of rotation under note based on the angular rate of rotation detected using the gyroscope and computed initial angle of rotation is computed, The acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g) , It is distinguished whether there is any necessity of correcting angle of rotation based on the component except a part for the gravitational acceleration of the acceleration of Z_g axial direction converted and obtained when the pen point part touched the writing surface, Angle of rotation under note is corrected so that the component except a part for the gravitational acceleration of the acceleration of Z_g axial direction converted and obtained may become zero,

when there is the necessity of correcting angle of rotation, The moving direction and migration length of a pen point part are computed based on the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) which fed back corrected angle of rotation, converted the coordinate system of acceleration again, and was converted and acquired, Since detection of an exact moving direction and movement magnitude without the influence of the attitude of equipment is performed, gravitational acceleration rushes into writing acceleration and detection after a hand can be prevented from occurring.

[0119]Initial angle of rotation of equipment is computed based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using three acceleration sensors in the state of rest, Angle of rotation under note based on computed initial angle of rotation and the angular rate of rotation detected using the gyroscope is computed, The acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g), It is distinguished whether it is necessary to correct the acceleration in a penholder coordinate system (X_s, Y_s, Z_s) based on the acceleration excluding gravitational acceleration from the acceleration of Z_g axial direction transformed and obtained when the pen point part touched the writing surface, If it is necessary to correct the acceleration in a penholder coordinate system (X_s, Y_s, Z_s) and will distinguish, The acceleration in a gravity coordinate system (X_g, Y_g, Z_g) is corrected so that the acceleration excluding gravitational acceleration from the acceleration of Z_g axial direction obtained by carrying out coordinate conversion conversion may become zero, Compute the moving direction and migration length of a pen point part based on the acceleration in a gravity coordinate system (X_g, Y_g, Z_g), and since detection of an exact moving direction and movement magnitude without the influence of the attitude of equipment is performed, gravitational acceleration rushes into writing acceleration, Hand erroneous detection can be prevented from occurring.

[0120]Since angle of rotation will be corrected if there is the necessity of correcting the speed in a gravity coordinate system (X_g, Y_g, Z_g) and it will distinguish, even if it uses it for a long time, the accumulated error of angle of rotation can be prevented from occurring.

[0121]Since it distinguishes whether it is necessary to correct angle of rotation using the speed which integrated with and obtained acceleration and angle of rotation is corrected if needed instead of distinguishing whether it is necessary to correct angle of rotation using acceleration, a noise component is equalized by integration and influence of a noise can be lessened.

[0122]It asks for initial angle of rotation of equipment based on the acceleration in the Penn axis-coordinates system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, Angle of rotation under note based on the angular rate of rotation detected using each gyroscope and computed initial angle of rotation is computed, The acceleration in the Penn axis-coordinates system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g), Speed is computed by integrating with the acceleration excluding gravitational acceleration from the acceleration in the gravity coordinate system (X_g, Y_g, Z_g) transformed and acquired, It is distinguished whether there is any necessity of correcting the acceleration in a gravity coordinate system (X_g, Y_g, Z_g), based on the speed in Z_g axial direction computed and obtained when the pen point part touched the writing surface, If there is the necessity of correcting the speed in a gravity coordinate system (X_g, Y_g, Z_g) and it will distinguish, Correct the speed in a gravity coordinate system (X_g, Y_g, Z_g) so that the speed in Z_g axial direction integrated with and obtained may become zero, and the moving direction and migration length of a pen point

part are computed based on the acceleration in a gravity coordinate system (X_g, Y_g, Z_g). Since detection of an exact moving direction and movement magnitude without the influence of the attitude of equipment is performed, Gravitational acceleration rushes into writing acceleration and hand erroneous detection can be prevented from occurring.

[0123]It asks for rotation angle acceleration from the angular rate of rotation detected using the gyroscope, The acceleration component by the tilting centering on the pen point part of acceleration which used and detected three acceleration sensors based on the angular rate of rotation detected using the gyroscope, the computed rotation angle acceleration, and the attaching position of each acceleration sensor is computed, Since the acceleration of the penholder coordinate system (X_s, Y_s, Z_s) in the fitting location of an acceleration sensor is corrected based on the acceleration component by the computed tilting and it asks for the acceleration of the penholder coordinate system (X_s, Y_s, Z_s) in a pen point part, the influence by the fitting location of an acceleration sensor is lost, and still more exact writing detection is performed -- things can be carried out.

[0124]Since it prevents correcting angle of rotation under note when it is below the threshold value as which the correction amount determined the correction amount of angle of rotation previously as compared with the threshold value defined previously, and becoming more than the value which the correction amount defined previously, change of rapid hand detection can be prevented from a correction amount changing rapidly and arising under the influence of a noise etc.

[0125]Since angle of rotation which calculated the average value of the correction amount of angle of rotation, and computed it based on the average value of the correction amount of angle of rotation for which it asked is corrected, angle of rotation can be prevented from changing rapidly.

[0126]Initial angle of rotation of equipment is computed based on the acceleration in the penholder coordinate system (X_s, Y_s, Z_s) detected using the acceleration sensor in the state of rest, Angle of rotation under note based on the angular rate of rotation detected using the gyroscope and computed initial angle of rotation is computed, The acceleration in the penholder coordinate system (X_s, Y_s, Z_s) which used and detected each acceleration sensor based on angle of rotation under computed note is converted to the acceleration in a gravity coordinate system (X_g, Y_g, Z_g). If there is the necessity of distinguishing whether there being any necessity of correcting angle of rotation based on the acceleration and gravitational acceleration of Z_g axial direction which were converted and obtained, and correcting angle of rotation when the pen point part touches the writing surface, Angle of rotation is corrected so that the acceleration of Z_g axial direction may become equal to gravitational acceleration, Corrected angle of rotation is fed back, the acceleration of Z_g axial direction is converged on gravitational acceleration, and since the moving direction and migration length of a pen point part are correctly computed based on the acceleration which transformed by performing coordinate conversion again, a moving direction and migration length can be computed still more correctly.

[0127]It is distinguished whether the movement speed of the pen point part which integrated with and asked for the acceleration by the gravity coordinate system (X_g, Y_g, Z_g) in a state of rest is zero, Since an initial angle of inclination is corrected and movement speed by the gravity coordinate system (X_g, Y_g, Z_g) in a state of rest is made into zero when the movement speed of a pen point part is not zero, an accumulated error can be abolished and a hand can be detected still more correctly.

[0128]

[Translation done.]

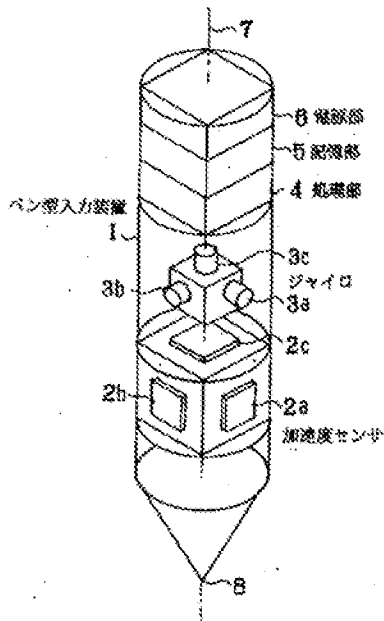
* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

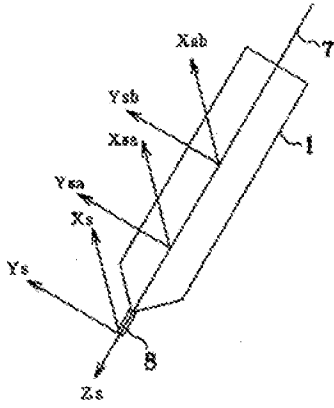
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

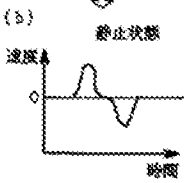
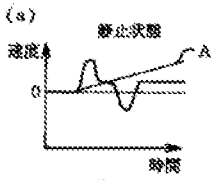
[Drawing 1]



[Drawing 2]

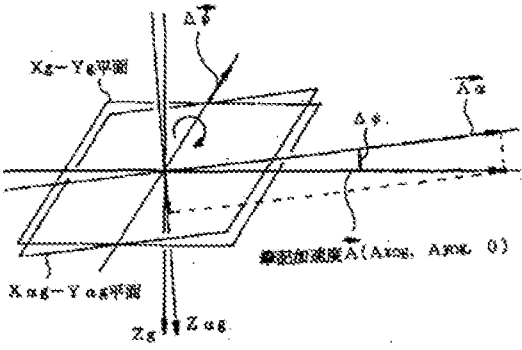


[Drawing 11]

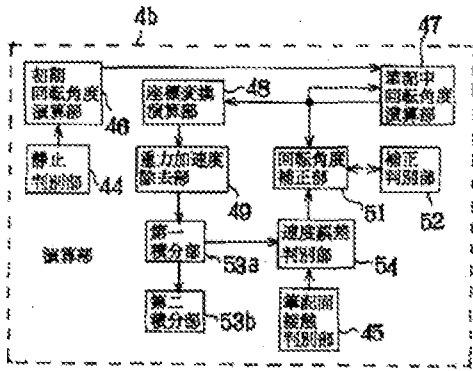


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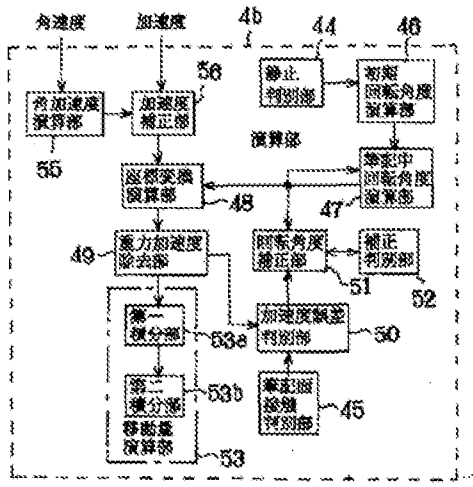
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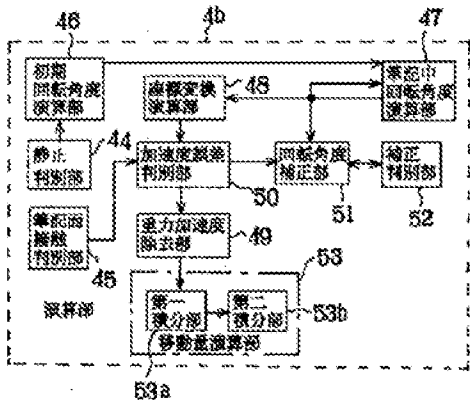
[Drawing 6]



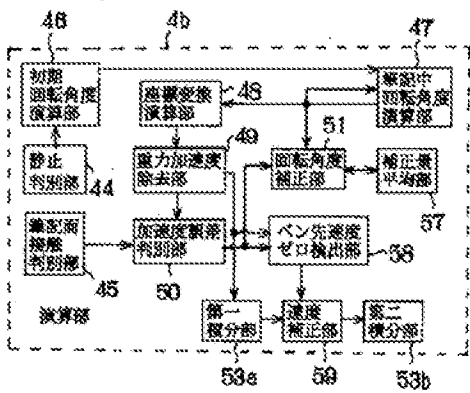
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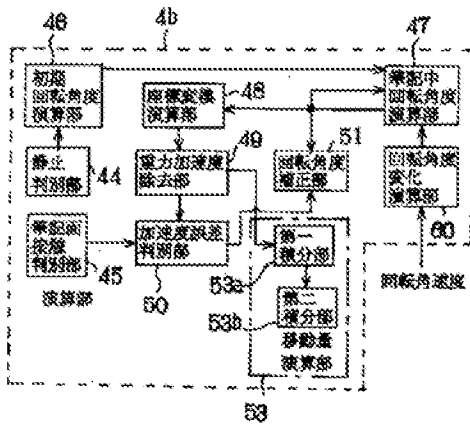
[Drawing 8]



[Drawing 10]

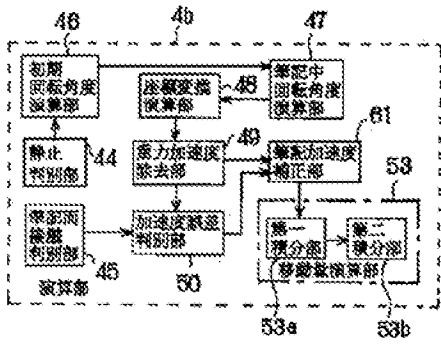


[Drawing 12]

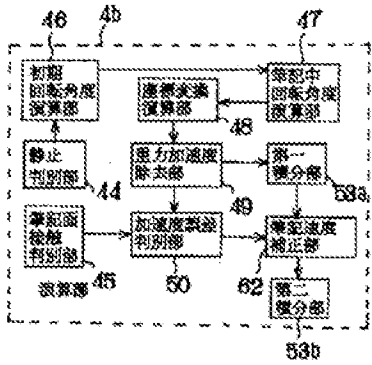


[Drawing 5]

[Drawing 14]

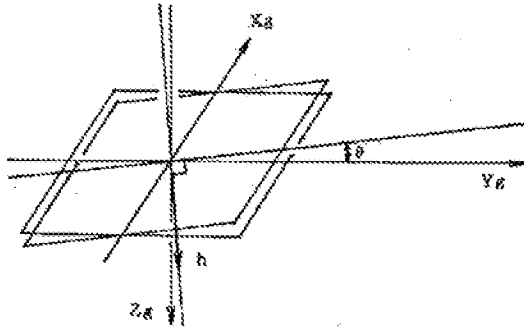


[Drawing 15]

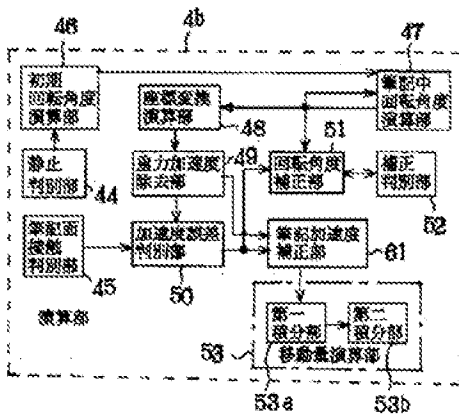


[Drawing 9]


[Drawing 13]



[Drawing 16]



[Translation done.]

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2694

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE									
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013					
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	36	✓	✓	✓	✓	✓					

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2694

✓	Rejected
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Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013	09/15/2013			
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	38	✓	✓	✓	✓	✓			
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
L2	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
L3	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
L4	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
L5	41974	L1 L2 L3 L4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
L6	1	L5 (accelerometer OR gesture OR cursor OR pointer OR arrow) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:03
L8	2	L5 ((INPUT with device) or (accelerometer OR gesture OR cursor OR pointer OR arrow)) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:06
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S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51

S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:52
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipul\$5) controller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
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S17	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S18	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S19	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S20	41974	S16 S17 S18 S19	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29

S21	1	S20 (input adj2 apparatus) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 16:29
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EAST Search History (Interference)

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9/ 17/ 2012 7:14:16 PM

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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

Application Number	12413722	Filing Date	2009-03-30	Docket Number (if applicable)	102-1567	Art Unit	2694
First Named Inventor	Yong-jin KANG et al.			Examiner Name	Jeffrey S. Steinberg		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
 Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

Other _____

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other _____

MISCELLANEOUS

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
 (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502827

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Lev I. Iwashko/	Date (YYYY-MM-DD)	2013-07-29
Name	Lev I. Iwashko	Registration Number	70168

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yong-jin KANG et al.

Application No.: 12/413,722

Group Art Unit: 2694

Filed: March 30, 2009

Examiner Jeffrey S. Steinberg

Customer No.: 38209

Confirmation No. 9676

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND
INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

BOX RCE

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT WITH REQUEST FOR CONTINUED EXAMINATION (RCE)

Sir:

In response to the Final Office Action mailed May 29, 2013, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 10 of this paper.

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An input apparatus, comprising:

a motion detector which detects a motion of the electronic apparatus;

an input unit which is more sensitive than the motion detector and receives user input by a user manipulation; ~~for selecting a function among a plurality of functions;~~ and

a controller which generates a predetermined command to ~~perform the selected function~~ by combining the detected motion and the user manipulation input to the input unit, ~~the selected function~~ and controls the generated predetermined command to be transmitted to an external device.

wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,

wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Canceled)

7. (Canceled)

8. (Currently Amended) The input apparatus as claimed in claim 16, wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Currently Amended) The input apparatus as claimed in claim 16, wherein the input unit includes a button unit having a plurality of buttons, wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Currently Amended) The input apparatus as claimed in claim 16, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Currently Amended) The input apparatus as claimed in claim 16, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Currently Amended) The input apparatus as claimed in claim 16, wherein the input unit comprises a button unit having a plurality of buttons,
wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the electronic apparatus;

receiving a user input more sensitively than the motion by a user manipulation; ~~for selecting a function among a plurality of functions;~~ and

generating a predetermined command ~~to perform the selected function~~ by combining the detected motion and the user manipulation input, ~~the selected function~~ and controls the generated predetermined command to be transmitted to an external device.

wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction, wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Canceled)

20. (Canceled)

21. (Currently Amended) The method as claimed in claim 1419, wherein the receiving operation receives a user touch, wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Currently Amended) The method as claimed in claim 1419, wherein the receiving operation receives a user button manipulation, wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Currently Amended) The method as claimed in claim 1419, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Currently Amended) The method as claimed in claim 1419, wherein the receiving operation receives a user touch, wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Currently Amended) The method as claimed in claim 1419, wherein the receiving operation receives a user button manipulation, wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Canceled)

28. (Currently Amended) An electronic apparatus comprising:
a motion detector to detect a motion of the electric apparatus for performing a function of an external device and to generate first signals corresponding to the detected motion;
an input unit to receive user manipulations for selecting the function of a plurality of functions and to generate second signals corresponding to the selected function;
a controller to combine the first and second signals into a single command to be transmitted to the external device in order to perform the selected function,
wherein, if the second signals are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated, the controller generates a command by combining the first and second signals.

29. (Previously Presented) An electronic apparatus, comprising:
a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

an input unit to receive user selection input of the function of the external device; and
a controller to generate a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

30. (Previously Presented) The electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. (Cancelled)

32. (Previously Presented) The electronic apparatus of claim 1, wherein
the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the electric apparatus for performing a function of an external device;

generating first signals corresponding to the detected motion;

receiving user manipulations for selecting the function of a plurality of functions;

generating second signals corresponding to the selected functions; and

combining the first and second signals into a single command to be transmitted to the external device in order to perform the selected function; and

generating a command by combining the first and second signals if the second signals

are generated and if the first signals are generated simultaneously or within a predetermined time after the second signals are generated.

35. (Previously Presented) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device;

receiving user selection input of the function of the external device;

generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input; and

transmitting the generated command to the external device.

36. (Original) The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Previously Presented) The method of claim 14, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

39-41. (Cancelled)

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REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1-5, 8-18, 21-26, 28-30, 32, 34-36 and 38 are pending in the application. Claims 1, 8-12, 14, 21-25, 28, and 34 have been amended. Claims 6, 7, 19, 20, 27, 37, and 39-41 have been cancelled without prejudice or disclaimer. Claims 31 and 33 have been previously cancelled without prejudice or disclaimer. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC §102 to Smith

Claim 41 has been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 7,233,316 to Smith et al. (hereinafter Smith). As stated above, independent claim 41 has been canceled without prejudice or disclaimer. As such, Applicants respectfully request withdrawal of this rejection.

Rejection under 35 USC §103 to Smith and Bisset

Claims 1-30 and 34-36 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Smith in view of U.S. Publication No. 2004/0090423 to Bisset. Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Independent Claims 1, 14, 27, 28, 29, 34, and 35

As stated above, independent claim 27 has been canceled without prejudice or disclaimer.

Referring to independent claims 1, 14, 28, 29, 34, and 35, in the Final Office Action dated May 29, 2013, the Examiner alleges that the combination of Smith and Bisset teaches all of the limitations as previously presented in independent claims 1, 14, 27, 28, 29, 34, and 35. However, it is respectfully submitted that Smith and Bisset do not teach or suggest all of the features as presently recited in independent claims 1, 14, 28, 29, 34, and 35, for at least the following reasons.

Applicants respectfully submit that Smith, as relied upon by the Examiner as allegedly teaching Applicants' "motion detector" and "controller," as recited in independent claim 1, is directed to a controller generating a command by combining an input manipulation signal and a detected motion signal. As such, Smith does not address "if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal." Instead, Smith is absolutely silent as to generating a command by combining an input manipulation signal and a detected motion signal if a user manipulation is input to the input unit and if a motion is detected by a motion detector simultaneously or within a predetermined time after the user manipulation is input, and merely generates a command by combining an input manipulation signal and a detected motion signal. Moreover, Smith does not address that an input unit is more sensitive than a motion detector. As such, it is very difficult and inconvenient to perform fine adjustment in Smith.

Therefore, for at least the above reasons, Smith does not teach or suggest, among other things, "an input unit which is more sensitive than the motion detector and receives user input by a user manipulation, and a controller which generates a predetermined command by combining the detected motion and the user manipulation input to the input unit, and controls the generated predetermined command to be transmitted to an external device, wherein if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal," as presently recited in independent claim 1.

On pages 4-5 of the Final Office Action dated May 29, 2013, the Examiner admits, and Applicants agree, that Smith does not teach all of the limitations as recited in independent claim 1. The Examiner relies on paragraphs [0040]-[0042] of Smith as allegedly teaching the limitations as previously presented in independent claim 1, namely generating "a predetermined command to perform the selected function by combining the detected motion and the selected function and control[ing] the generated predetermined command to be transmitted to an external device." The Examiner relies on Bisset as allegedly teaching the limitations lacking in Smith.

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Applicants submit that Bisset is directed to a menu of a display 3, 4, or 5 of a remote control unit 10 that is activated when any touch is detected on a touchpad 12. More specifically, a user may touch the touchpad 12 to activate a menu on the display 3, such that a channel function is selectable by the user via a touch. As such, the user may slide his/her finger across the touchpad 12 of Bisset in order to scroll through the different channels for quick channel selection.

However, Bisset does not address combining a motion of the remote control unit 10 with the touch function, and merely recites the feature regarding an input using a touch pad. In fact, Bisset is completely silent as to any type of motion functionality of the remote control, as moving the remote control in Bisset accomplishes absolutely nothing. In other words, Bisset only addresses touch functionality, but does not include any type of sensors to detect a motion of the remote control unit 10 such that a controller generates a command to perform a selected function by combining both a movement of the remote control unit 10 and a manipulation of the touchpad 12. Moreover, Bisset does not address that an input unit is more sensitive than a motion detector. As such, it is inconvenient to move a displayed pointer far in Bisset.

Therefore, for at least the above reasons, Bisset does not teach or disclose, among other things, “an input unit which is more sensitive than the motion detector and receives user input by a user manipulation, and a controller which generates a predetermined command by combining the detected motion and the user manipulation input to the input unit, and controls the generated predetermined command to be transmitted to an external device, wherein if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal,” as presently recited in independent claim 1. Accordingly, Bisset does not remedy the deficiencies of Smith.

Hence, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify or combine Smith and Bisset to provide every limitation of Applicants' claim. Thus, Smith and Bisset, separately or in combination, fail to teach or suggest every limitation of Applicants' claim 1, as presently recited.

Also in the Final Office Action dated May 29, 2013, the Examiner provides substantially similar portions of Smith and Bisset to attempt to reject independent claims 14, 28, 29, 34, and

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35, and therefore, Applicants respectfully submit that similar arguments above regarding claim 1 are also applied to independent claims 14, 28, 29, 34, and 35. Furthermore, independent claims 14, 28, and 34 have been amended in a manner similar to independent claim 1. Accordingly, Smith and Bisset, separately or in combination, also fail to teach or suggest every limitation of Applicants' claims 14, 27, 28, 29, 34, and 35.

For the foregoing reasons, Smith and Bisset are inadequate grounds for rejecting Applicants' claims 1, 14, 28, 29, 34, and 35 under 35 U.S.C. § 103(a), and Applicants respectfully request reconsideration and withdrawal of this rejection and allowance of these claims.

Dependent Claims 2-13, 15-26, 30 and 36

Dependent claims 2-5, 8-13, 15-18, 21-26, 30 and 36 each depend from independent claims 1, 14, 29, and 35, respectively, and therefore contain each of the features recited in independent claims 1, 14, 29, and 35. Accordingly, since Smith and Bisset fail to teach or suggest independent claims 1, 14, 29, and 35, for the reasons discussed above, Applicants submit that Smith and Bisset also fail to teach or suggest dependent claims 2-5, 8-13, 15-18, 21-26, 30 and 36. Applicants respectfully request withdrawal of this rejection and allowance of these claims.

Rejection under 35 USC §103 to Smith, Bisset and Westerman

Claims 32 and 38-40 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Smith in view of Bisset, and further in view of U.S. Publication No. 2008/0042986 to Westerman et al (hereinafter Westerman). Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Dependent Claims 32 and 38

Dependent claims 32 and 38 each depend from independent claims 1 and 35, respectively, and therefore contain each of the features recited in independent claims 1 and 35. Accordingly, since Smith and Bisset fail to teach or suggest independent claims 1 and 35, for the reasons discussed above, Applicants submit that Smith and Bisset also fail to teach or suggest dependent claims 32 and 38.

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Furthermore, Westerman does not remedy the deficiencies of Smith and Bisset. Therefore Applicants respectfully request withdrawal of this rejection and allowance of these claims.

Independent Claims 39 and 40

As stated above, independent claims 39 and 40 have been canceled without prejudice or disclaimer. Applicants respectfully request withdrawal of this rejection.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

STANZIONE & KIM, LLP

Dated: July 29, 2013
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: /Lev I. Iwashko/
Lev I. Iwashko
Registration No. 70,168

Electronic Patent Application Fee Transmittal

Application Number:	12413722
Filing Date:	30-Mar-2009
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Filer:	Patrick J. Stanzione/Amelia Khalaf
Attorney Docket Number:	102-1567

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
Total in USD (\$)				1200

Electronic Acknowledgement Receipt

EFS ID:	16438859
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/Amelia Khalaf
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	29-JUL-2013
Filing Date:	30-MAR-2009
Time Stamp:	14:51:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1200
RAM confirmation Number	1349
Deposit Account	502827
Authorized User	STANZIONE, PATRICK

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

CYWEE EX 2009-583

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCE_Transmittal_Updated_Electronic.pdf	697787 b42c2a622de0e8e878fab0c16816ec34da05b872	no	3

Warnings:

Information:

2	Amendment Submitted/Entered with Filing of CPA/RCE	Amendment_RCE.pdf	532816 2130fd2014ffc59ff92122265634932f7f5f4252	no	14
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Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	30632 c28136ba1a8d37003a890e1871f9423ac1d23f43	no	2
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Warnings:

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Total Files Size (in bytes): 1261235

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	07/29/2013	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total (37 CFR 1.16(i))	* 30	Minus	** 40	= 0	X \$80 = 0
	Independent (37 CFR 1.16(h))	* 10	Minus	*** 14	= 0	X \$420 = 0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/MINNIE JACKSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/413,722	03/30/2009	Yong-jin KANG	102-1567	9676
38209	7590	05/29/2013	EXAMINER	
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006			STEINBERG, JEFFREY S	
			ART UNIT	PAPER NUMBER
			2694	
			MAIL DATE	DELIVERY MODE
			05/29/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 2/8/2013 with respect to the rejection(s) of claim(s) 1-5, 13, 27-31 and 33-37 under 35 U.S.C. §102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection are made over a US Patent to Smith et al. (7,233,316) in view of a US Patent Application Publication by Bisset (2004/0090423); and a US Patent to Smith et al. (7,233,316) in view of a US Patent Application Publication by Bisset (2004/0090423), and further in view of a US Patent Application by WESTERMANN ET AL. (2008/0042986).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 41 is rejected under 35 U.S.C. 102(b) as being anticipated by a US Patent to Smith et al. (7,233,316).

Art Unit: 2694

Regarding Claim 41 (New), Smith et al. discloses an electronic apparatus comprising: A motion controlling system, comprising:
a first device which detects a motion of the first device, receives user input by a user manipulation, and transmits a first signal including information on the detected motion and received user input (Col. 14, ll. 32-35); and a second device which receives the transmitted first signal and generates a second signal for performing a predetermined function of the second device based on a combination of the information on the detected motion and the information on the received user input included in the first signal. (Col. 14, ll. 24-27).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-30 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over a US Patent to Smith et al. (7,233,316) in view of a US Patent Application Publication by Bisset (2004/0090423).

Regarding Claim 1 (Currently Amended), Smith et al. discloses an ~~input~~ electronic apparatus, comprising:

a motion detector (Col. 14, ll. 24-27 and 32-35) which detects a motion of the ~~input~~ electronic apparatus; an input unit which receives user input by a user manipulation (Col. 11, ll. 35-50) for selecting a function among a plurality of functions; and a controller (Col. 14, ll. 56-57) but fails to disclose generating a predetermined command to perform by combining using the detected motion ~~detected by the motion~~

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~~detector~~ and the selected function and controls the generated predetermined command to be transmitted to an external device~~received user input through the input unit.~~

Bisset teaches generating a predetermined command to perform by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

Smith et al. and Bisset are analogous because they are both concerned with the same endeavor, input devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Smith et al. with the teachings of Bisset, since such a modification would have added another feature to the remote and thereby increase its value to the consumer to the ultimate benefit of the manufacturer.

Regarding Claim 2 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 1, and Smith et al. further discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Cols. 5-6, ll. 63-1, respectively).

Regarding Claim 3 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 2, and Smith et al. further discloses wherein the input

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unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Col. 4, ll. 1-5).

Regarding Claim 4 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in claim 2, and Smith et al. further discloses wherein the input unit includes a direction manipulation input unit (Id., Col 2, ll. 42-44) which is input with a manipulation of a direction, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion (Id., Col 4, ll. 1-5), and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Id.).

Regarding Claim 5 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 4, and Smith et al. further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Col. 14, ll. 21-27).

Regarding Claim 13 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 1, and Smith et al. further discloses wherein the motion

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detector includes an acceleration sensor and an angular velocity sensor. (Col. 2, ll. 52-61).

Regarding Claim 27 (Currently Amended), Smith et al. discloses an electronic apparatus (Col. 14, ll. 49-51) comprising:
a motion detector (Col. 14, ll. 24-27 and 32-35) to detect motions of the electronic apparatus having low sensitivities (Col. 14, ll. 62-65); and a touch input unit disposed on the electronic apparatus to receive manipulations of an input unit of the electronic apparatus having high sensitivities (Col. 14, ll. 58-62) but fails to disclose selecting a function among a plurality of functions; and a controller which generates a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device.

Bisset teaches selecting a function among a plurality of functions (Pg. 1, ¶[0013]); and a controller which generates a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

Smith et al. and Bisset are analogous because they are both concerned with the same endeavor, input devices. It would have been obvious to one having ordinary skill in the

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art at the time the invention was made to modify the Display Device disclosed by Smith et al. with the teachings of Bisset, since such a modification would have added another feature to the remote and thereby increase its value to the consumer to the ultimate benefit of the manufacturer.

Regarding Claims 28 and 34 (Both Currently Amended), Smith et al. discloses an electronic apparatus comprising:

a motion detector (Col. 14, ll. 24-27 and 32-35) to detect a motion of the electric apparatus for performing a function of an external device and to generate first signals to correspond to the detected motions of the electronic apparatus; an input unit to ~~generate second signals to correspond to received~~ receive user manipulations for selecting the function of a plurality of functions on an input unit of the input electronic apparatus and to generate second signals corresponding to the selected function; ~~and~~ a controller to combine the first and second signals into a single command to be transmitted to a transmitter the external device in order to perform the selected function.

Bisset teaches generating a predetermined command to perform by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

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Smith et al. and Bisset are analogous because they are both concerned with the same endeavor, input devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Smith et al. with the teachings of Bisset, since such a modification would have added another feature to the remote and thereby increase its value to the consumer to the ultimate benefit of the manufacturer.

Regarding Claims 29 and 35 (Both Currently Amended), Smith et al. discloses an ~~input~~ electronic apparatus comprising: a motion sensor (Col. 14, ll. 24-27 and 32-35) to detect a translation of the electronic apparatus using an acceleration sensor (Col. 2, ll. 52-61).and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; an input unit to receive user selection input of the function of the external device; and a controller (Col. 2, ll. 52-61) but fails to disclose generateing a command to perform the selected function by combining and transmit information regarding the translation and the rotation to a controller the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

Bisset teaches generating a predetermined command to perform by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

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Smith et al. and Bisset are analogous because they are both concerned with the same endeavor, input devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by Smith et al. with the teachings of Bisset, since such a modification would have added another feature to the remote and thereby increase its value to the consumer to the ultimate benefit of the manufacturer.

Regarding Claims 30 (Currently Amended) **and 36** (Original), Smith et al. discloses the ~~input~~ electronic apparatus as claimed in Claim 29, as well as an apparatus capable of performing the method of Claim 35, respectively, and further discloses it comprising: a converter to receive a translation data signal and a rotation data signal. (Col. 3, ll. 59-63).

Claims 31, 33, and 37 (Both Cancelled).

Regarding Claims 6, 14 (Currently Amended) **and 26** (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 1, as well as an apparatus capable of performing a method, and Bisset further discloses wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

Regarding Claim 7 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 6, and Bisset further discloses wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

Bisset teaches wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal. (Id.).

Regarding Claim 8 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 6, and Bisset further discloses wherein the input unit includes a touch input unit which is input with a user touch, wherein, and Smith further discloses if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Id.).

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Regarding Claim 9 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 6, and Smith et al. further discloses wherein the input unit includes a button unit having a plurality of buttons (Col. 4, ll. 47-61), and Bisset further discloses wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pgs. 2-3, ¶¶[0040-0042]).

Regarding Claims 10 and 15 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 6, as well as an apparatus capable of performing the method of Claim 14, and Bisset further discloses wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.); and Smith et al. further discloses wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation. (Col. 4, ll. 1-5).

Regarding Claim 11 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 6, and Bisset further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is

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detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claim 12 (Original), the Smith et al.-Bisset Combination discloses the input apparatus as claimed in Claim 6, and Bisset further discloses wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Id.).

Regarding Claim 16 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 15, and Smith et al. further discloses wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch. (Col. 2, ll. 38-44).

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Regarding Claim 17 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 15, and Smith et al. discloses wherein the receiving operation receives a manipulation of a direction, wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction. (Id.).

Regarding Claim 18 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 17, and Smith et al. further discloses wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button. (Col. 14, ll. 21-27).

Regarding Claim 19 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in claim 14, and Smith et al. further discloses wherein the command generating operation generates a predetermined command by combining the detected motion and the input user manipulation. (Cols. 5-6, ll. 63-1, respectively).

Regarding Claim 20 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Bisset further

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discloses wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal. (Pgs. 2-3, ¶¶[0040-0042]).

Regarding Claim 21 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Bisset further discloses wherein the receiving operation receives a user touch, wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal. (Id.).

Regarding Claim 22 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Bisset further discloses wherein the receiving operation receives a user button manipulation, wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal. (Id.).

Regarding Claim 23 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Bisset further

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discloses wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal. (Id.).

Regarding Claim 24 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Bisset further discloses wherein the receiving operation receives a user touch, wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claim 25 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Bisset further discloses wherein the receiving operation receives a user button manipulation, wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal. (Id.).

Regarding Claim 26 (Original), the Smith et al.-Bisset Combination discloses an apparatus capable of performing the method as claimed in Claim 14, and Smith et al.

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further discloses, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor. (Col. 2, ll. 52-61).

2. Claims 32 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over a US Patent to Smith et al. (7,233,316) in view of a US Patent Application Publication by Bisset (2004/0090423), and further in view of a US Patent Application Publication by Westerman et al. (2008/0042986).

Regarding Claim 32 (Currently Amended), the Smith et al.-Bisset Combination discloses the electronic apparatus of Claim 1, comprising:

but fails to disclose the predetermined command is for a controller to generate a command to raise-raising or lowerlowering a volume of a to-be-controlled device the external device by moving up or down the electronic apparatus.

Westerman et al. teaches the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus.

(Pgs. 4-5, ¶[0038], where a Speaker is an electromechanical device).

Smith et al., Bisset and Westerman et al. are analogous because they are all concerned with the same endeavor, Input Apparatus. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device

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disclosed by the Smith et al.-Bisset Combination with the teachings of Westerman et al., since such a modification would have combined the inputs of motion detection and user manipulation thereby enhancing the value of the apparatus to the user to the ultimate benefit of the manufacturer.

Regarding Claim 38 (Currently Amended), Smith discloses an apparatus capable of performing the method of Claim 14 but fails to disclose wherein the predetermined command is for raising~~inputting a command using an input apparatus, the method comprising:~~

~~generating a command to raise or lower~~lowering a volume of ~~a to-be-controlled~~the external device by moving up or down the electronic apparatus.

Westerman et al. teaches wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus. (Pgs. 4-5, ¶[0038], where a Speaker is an electromechanical device).

Smith et al., Bisset and Westerman et al. are analogous because they are all concerned with the same endeavor, Input Apparatus. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Smith et al.-Bisset Combination with the teachings of Westerman et al., since such a modification would have combined the inputs of motion detection and user

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manipulation thereby enhancing the value of the apparatus to the user to the ultimate benefit of the manufacturer.

Regarding Claim 39 (Currently Amended), Smith et al. discloses an apparatus capable of performing a method of inputting a command using an electronic apparatus (Col. 14, ll. 49-51), the method comprising:

detecting a motion of the electronic apparatus (Col. 14, ll. 62-65); receiving a user manipulation to perform a selected function among a plurality of functions via a user manipulation input (Id., Col 4, ll. 1-5); but fails to disclose generating a command to perform the selected function by combining the detected motion and the selected function; ~~and controlling the generated predetermined command to be transmitted to an external device, and canceling the command generation prior to the selected function being executed~~ if no movement of the electronic apparatus is detected by a motion detector within a predetermined time.

Bisset teaches generating a predetermined command to perform by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

WESTERMAN ET AL. teaches canceling the command generation prior to the selected function being executed if no movement of the electronic apparatus is detected by a

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motion detector within a predetermined time. (Pg. 32, ¶[0288], where a timing threshold is disclosed).

Smith et al., Bisset and WESTERMAN ET AL. are analogous because they are both concerned with the same endeavor, input devices. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device disclosed by the Smith et al.-Bisset Combination with the teachings of Westerman et al., since such a modification would have automated the power supplied to a motion detector thereby saving power to the benefit of the consumer and the ultimate benefit of the manufacturer.

Regarding Claim 40 (Currently Amended), WESTERMAN ET AL. discloses a non-transitory computer readable medium to contain computer-readable codes as a program to perform a method (Pg. 30, ¶[0275], where a reprogrammable display is disclosed), and further discloses controlling the generated predetermined command to be transmitted to an external device and canceling, the command generation prior to the selected function being executed if no movement of the electronic apparatus is detected by a motion detector within a predetermined time. (Pg. 32, ¶[0288], where a timing threshold is disclosed).but fails to disclose the method comprising: detecting a motion of the electronic apparatus; receiving a user input by a user to perform a selected function among a plurality of functions and generating a predetermined command usingto

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perform the selected function by combining the detected motion and the input user input the selected function together

Bisset teaches generating a predetermined command to perform by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device. (Pgs. 2-3, ¶¶[0040-0042]).

33. (Cancelled)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey Steinberg/
Examiner, Art Unit 2694

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey Steinberg	Art Unit 2694	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-7,233,316	06-2007	Smith et al.	345/157
*	B US-2004/0090423	05-2004	Bisset, Stephen J.	345/169
*	C US-2008/0042986	02-2008	Westerman et al.	345/173
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				


*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.


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BIB DATA SHEET
CONFIRMATION NO. 9676

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/413,722	03/30/2009	345	2694	102-1567		
APPLICANTS						
Yong-jin KANG, Suwon-si, KOREA, REPUBLIC OF; Sung-han LEE, Hwaseong-si, KOREA, REPUBLIC OF; Hyun-coog SHIN, Suwon-si, KOREA, REPUBLIC OF; Dae-hyun KIM, Suwon-si, KOREA, REPUBLIC OF; Eung-sik YOON, Suwon-si, KOREA, REPUBLIC OF;						
** CONTINUING DATA *****						
** FOREIGN APPLICATIONS *****						
REPUBLIC OF KOREA 2008-66996 07/10/2008						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			KOREA, REPUBLIC OF	16	40	14
Verified and Acknowledged	/JEFFREY S STEINBERG/ Examiner's Signature	Initials				
ADDRESS						
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006 UNITED STATES						
TITLE						
INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS						
FILING FEE RECEIVED	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		
4550						

Search Notes 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
345	156-178	2/14/2012	JSS
463	36-39	2/14/2012	JSS
348	14.05, 114, 734	2/14/2012	JSS
715	810 ,831 ,856	2/14/2012	JSS

SEARCH NOTES		
Search Notes	Date	Examiner
Consulted Steve Sherman, AU 2629	12/13/2012	jss
Consulted Kirk Hermann	5/12/2013	jss

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
345	156-178	5/9/2013	JSS
463	36-39	5/8/2013	JSS
348	14.05, 114, 734	5/8/2013	JSS
715	810 ,831 ,856	5/8/2013	JSS

/J.S./ Examiner.Art Unit 2629	
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	37798	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
L2	3541	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
L3	2435	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
L4	4134	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
L5	46673	L1 L2 L3 L4	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/09 10:20
L6	161	L5 (control with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:20
L7	1	L5 ((combine control) with (motion adj1 detect\$2)) function	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:38
L8	1	L5 ((combine control) with (motion adj1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/09 10:39
S2	30558	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:50
S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51

S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:52
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipul\$5) contoller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
S15	1	"20080042986".pn.	US-PGPUB; USPAT	OR	OFF	2012/02/15 09:07
S16	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S17	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S18	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S19	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29

S20	41974	S16 S17 S18 S19	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 16:29
S21	1	S20 (input adj2 apparatus) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 16:29
S22	33849	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S23	3199	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S24	2264	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S25	3799	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S26	41974	S22 S23 S24 S25	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/17 19:03
S27	1	S26 (accelerometer OR gesture OR cursor OR pointer OR arrow) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:03
S28	2	S26 ((INPUT with device) or (accelerometer OR gesture OR cursor OR pointer OR arrow)) (command adj3 (based or result)with (motion ADJ1 detect\$2))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/09/17 19:06
S30	12	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 08:28
S31	4	"7233316".PN. "6346891".PN. "7782298".PN. "6603420".PN.	USPAT	OR	OFF	2012/09/18 08:29
S32	37	348/734.ccls. and accelerometer	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/09/18 20:08
S33	0	"10799918"	US-PGPUB; USPAT; USOCR; EPO;	AND	ON	2012/09/18 20:17


			JPO; DERWENT			
S34	1	("20060044282".PN.) (MOTION same input)	US-PGPUB	AND	ON	2012/09/20 14:31
S35	37728	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S36	3537	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S37	2433	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S38	4132	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S39	46596	S35 S36 S37 S38	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2013/05/08 17:28
S42	1	S39 (motion adj1 detect\$3) contoller (functions)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:28
S43	1	S39 (motion adj1 detect\$3) contol\$3 functions	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2013/05/08 17:33

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L9	0	"L5" ((combine control) with (motion adj1 detect\$2))	USPAT	AND	ON	2013/05/09 10:47

5/9/2013 10:47:49 AM

C:\Users\jsteinberg\Documents\EAST\Workspaces\12413722.wsp

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2694

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013				
	1	✓	✓	✓	✓				
	2	✓	✓	✓	✓				
	3	✓	✓	✓	✓				
	4	✓	✓	✓	✓				
	5	✓	✓	✓	✓				
	6	✓	✓	✓	✓				
	7	✓	✓	✓	✓				
	8	✓	✓	✓	✓				
	9	✓	✓	✓	✓				
	10	✓	✓	✓	✓				
	11	✓	✓	✓	✓				
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	33	✓	✓	✓	✓				
	34	✓	✓	✓	✓				
	35	✓	✓	✓	-				
	36	✓	✓	✓	✓				

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2694

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012	05/09/2013				
	37	✓	✓	✓	-				
	38	✓	✓	✓	✓				
	39	✓	✓	✓	✓				
	40	✓	✓	✓	✓				
	41				✓				

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yong-jin KANG et al.

Application No.: 12/413,722

Group Art Unit: 2694

Filed: March 30, 2009

Examiner Jeffrey S. Steinberg

Customer No.: 38209

Confirmation No. 9676

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND
INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action mailed November 8, 2012, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 11 of this paper.

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An ~~electronic input~~ apparatus, comprising:
a motion detector which detects a motion of the electronic apparatus;
an input unit which receives user input by a user manipulation for selecting a function among a plurality of functions; and
a controller which generates a predetermined command to perform the selected function by combining using the detected motion detected by the motion detector and the selected function and controls the generated predetermined command to be transmitted to an external device~~received user input through the input unit.~~

2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.

4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.

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5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

6. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit.

7. (Original) The input apparatus as claimed in claim 6, wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

8. (Original) The input apparatus as claimed in claim 6, wherein the input unit includes a touch input unit which is input with a user touch,
wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Original) The input apparatus as claimed in claim 6, wherein the input unit includes a button unit having a plurality of buttons,
wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Original) The input apparatus as claimed in claim 6, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Original) The input apparatus as claimed in claim 6, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Original) The input apparatus as claimed in claim 6, wherein the input unit comprises a button unit having a plurality of buttons,
wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:
detecting a motion of the electronic apparatus;
receiving a user input by a user manipulation for selecting a function among a plurality of functions; and
generating a predetermined command to perform the selected function by combining using the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device~~input-user input together~~.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

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16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Original) The method as claimed in claim 14, wherein the command generating operation generates a predetermined command by combining the detected motion and the input user manipulation.

20. (Original) The method as claimed in claim 19, wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.

21. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

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22. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,

wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. (Original) The method as claimed in claim 19, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user touch,

wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,

wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Currently Amended) An electronic apparatus comprising:
a motion detector to detect motions of the electronic apparatus having low sensitivities;
and

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a touch input unit disposed on the electronic apparatus to receive manipulations of an input unit of the electronic apparatus having high sensitivities and for selecting a function among a plurality of functions; and

a controller which generates a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device.

28. (Currently Amended) An electronic apparatus comprising:

a motion detector to detect a motion of the electric apparatus for performing a function of an external device and to generate first signals to correspond to the detected motions of the electronic apparatus;

~~an input unit to generate second signals to correspond to received~~ receive user manipulations for selecting the function of a plurality of functions on an input unit of the electronic apparatus and to generate second signals corresponding to the selected function;
and,

a controller to combine the first and second signals into a single command to be transmitted to ~~a transmitter~~ the external device in order to perform the selected function.

29. (Currently Amended) An electronic apparatus, comprising:

a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; and

an input unit to receive user selection input of the function of the external device; and
a controller to generate a command to perform the selected function by combining transmit information regarding the translation and the rotation to a controller; the detected translation, the detected rotation and the user selection input, and to transmit the generated command to the external device.

30. (Currently Amended) The ~~electronic~~ electronic apparatus of claim 29, comprising:

a converter to receive a translation data signal and a rotation data signal.

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31. (Cancelled)

32. (Currently Amended) The electronic apparatus of claim 1, wherein comprising: the predetermined command is for a controller to generate a command to raise-raising or lowerlowering a volume of a to-be-controlled devicethe external device by moving up or down the electronic apparatus.

33. (Cancelled)

34. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the electric apparatus for performing a function of an external device;

generating first signals to correspond-corresponding to the detected motionmotions of the electronic apparatus;

generating second signals to correspond to receivedreceiving user manipulations for selecting the function of a plurality of functions; on an input unit of the electronic apparatus

generating second signals corresponding to the selected functions; and

combining the first and second signals into a single command to be transmitted to a transmitterthe external device in order to perform the selected function.

35. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor for performing a function of an external device; and

receiving user selection input of the function of the external device;

transmit information regarding the translation and the rotation to a controller generating a command to perform the selected function by combining the detected translation, the detected rotation and the user selection input; and

transmitting the generated command to the external device.

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36. (Original) The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.

37. (Cancelled)

38. (Currently Amended) ~~A The method of claim 14, wherein the predetermined command is for raising inputting a command using an input apparatus, the method comprising: generating a command to raise or lower lowering a volume of a to-be-controlled the external device by moving up or down the electronic apparatus.~~

39. (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:
detecting a motion of the electronic apparatus;
receiving a user manipulation to perform a selected function among a plurality of functions via a user manipulation input;
generating a command to perform the selected function by combining the detected motion and the selected function; and
controlling the generated predetermined command to be transmitted to an external device; and
canceling the command generation prior to the selected function being executed if no movement of the electronic apparatus is detected by a motion detector within a predetermined time.

40. (Currently Amended) A non-transitory computer readable medium to contain computer-readable codes as a program to perform a method, the method comprising:
detecting a motion of the electronic apparatus;
receiving a user input by a user to perform a selected function among a plurality of functions; and
generating a predetermined command using to perform the selected function by combining the detected motion and the input user input the selected function together;

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controlling the generated predetermined command to be transmitted to an external device; and

canceling the command generation prior to the selected function being executed if no movement of the electronic apparatus is detected by a motion detector within a predetermined time.

41. (New) A motion controlling system, comprising:

a first device which detects a motion of the first device, receives user input by a user manipulation, and transmits a first signal including information on the detected motion and received user input; and

a second device which receives the transmitted first signal and generates a second signal for performing a predetermined function of the second device based on a combination of the information on the detected motion and the information on the received user input included in the first signal.

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REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1-30, 32, 34-36, and 37-41 are pending in the application. Claims 1, 14, 27-30, 32, 34, 35, and 38-40 have been amended. New claim 41 has been added. Claims 31, 33, and 37 have been cancelled without prejudice or disclaimer. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC §102 to Smith

Claims 1-5, 13, 27-31 and 33-37 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 7,233,316 to Smith et al. (hereinafter "Smith"). Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Independent Claims 1, 28, 29, 31, 34, 35, and 37

Referring to independent claims 1, 28, 29, 31, 34, 35, and 37, in the Office Action dated November 8, 2012, the Examiner alleges that Smith discloses all of the limitations as previously presented in independent claims 1, 28, 29, 31, 34, 35, and 37. However, it is respectfully submitted that Smith does not teach or disclose all of the features as presently recited in independent claims 1, 28, 29, 31, 34, 35, and 37, for at least the following reasons.

On page 2 of the Office Action dated November 8, 2012, the Examiner relies on columns 11 and 14 of Smith as allegedly teaching the limitations as previously presented in independent claim 1. More specifically, the Examiner appears to rely on a remote control 200 of Smith interacting with an options access display 410 as allegedly corresponding to Applicants' "input-electronic apparatus."

Applicants submit that Smith is directed to using the remote control 200 to allow a user to wirelessly control function icons that are displayed on the options access display 410. More specifically, a user first must launch the options access display 410 of Smith by either a wagging

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gesture 380 of the remote control 200 or by a dedicated button on the remote control 200. See column 5, lines 53-55 of Smith. Next, the user presses a trigger 210 (located on a bottom portion of the remote control 200 of Smith) in order to activate a “trigger-drag” functionality. As such, when the trigger 210 is pressed and held by the user, the options access display 410 recognizes that a virtual cursor is activated and allows the user to select, highlight, and scroll through a plurality of function icons via various movements (e.g., dragging, circling, checking, etc.) of the remote control 200. See FIG. 3 and column 5, lines 13-49 of Smith. Then, in order to select one of the function icons, a user must press a thumb button 205 (located on a top portion of the remote control 200 of Smith) when a particular function icon is highlighted.

However, Smith does not perform a selected function by combining a motion of the remote control 200 along with a user manipulation input related to the selected function through an input unit. More specifically, Smith is limited to requiring a user to: (1) activate the options access display 410 by either wagging the remote control 200 or a dedicated button thereon, (2) press the trigger 210 to activate the “trigger-drag” functionality, and then (3) select a function icon using the same thumb button 205. This is not the same as performing a selected function by **combining** a motion of an input apparatus **with** a user’s input that is related to the selected function and received from an input unit, for at least the reason that Smith does not specifically relate a user’s input to a selected function. In other words, Smith merely activates a motion-detection-based functionality of a remote control, and then uses the thumb button 205 as a generic button to select any function icon displayed on the options access display 410. However, the thumb button 205 is a generic button that has no relation to any particular function icon, and merely allows a user to select any of the function icons. As such, the thumb button 205 of Smith cannot be relied on as corresponding to Applicants’ “input unit” that receives a user manipulation input related to a selected function.

Therefore, for at least the above reasons, Smith does not teach or disclose, among other things, “a controller which generates a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device,” as presently recited in independent claim 1.

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Furthermore, presently cancelled claim 6, which was rejected by the Examiner as being unpatentable over Smith and Pinhanez, has been somewhat incorporated into independent claim 6. On page 8 of the Office action dated November 8, 2012, the Examiner relies on paragraph [0038] of Pinhanez as allegedly teaching a controller generating a predetermined command by combining a motion detected by a motion detector and a user manipulation input to the input unit.

Applicant submits that Pinhanez is directed to using a motion detection algorithm to detect when a user touches a surface of a screen 12. This is not the same as an input apparatus having controller that combines a motion detected by a motion detector with an input unit that receives a user manipulation input related to a selected function from among a plurality of functions. Instead, Pinhanez is limited to merely sensing when a point on the screen 12 is touched.

Therefore, for at least the above reasons, Pinhanez does not teach or suggest, among other things, “a controller which generates a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device,” as presently recited in independent claim 1, and therefore does not remedy the deficiencies of Smith.

Hence, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify or combine Smith and Pinhanez to provide every limitation of Applicants’ claim. Thus, Smith and Pinhanez, separately or in combination, fail to teach or suggest every limitation of Applicants’ claim 1, as presently recited.

On pages 4-5 of the Office Action dated November 8, 2012, in an attempt to reject independent claims 28, 29, 31, 34, 35, and 37, respectively, the Examiner provides similar sections of Smith as those provided in the rejection corresponding to independent claim 1. Furthermore, independent claims 28, 29, 31, 34, 35, and 37 have been amended in a manner similar to independent claim 1. Accordingly, Applicants respectfully submit that similar arguments above regarding claim 1 also apply to independent claims 28, 29, 31, 34, 35, and 37.

As noted above, it is submitted that Smith fails to teach, disclose, or suggest each of the elements of independent claims 1, 28, 29, 31, 34, 35, and 37, as presently recited, and it is

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respectfully submitted that Smith cannot be properly used to reject independent claims 1, 28, 31, 34, and 37 under 35 U.S.C. §102(b) or under 35 U.S.C. §103(a). Applicants respectfully request withdrawal of this rejection and allowance of these claims.

Independent Claims 27 and 33

Referring to independent claims 27 and 33, in the Office Action dated November 8, 2012, the Examiner alleges that Smith discloses all of the limitations as previously presented in independent claims 27 and 33. However, it is respectfully submitted that Smith does not teach or disclose all of the features as presently recited in independent claims 27 and 33.

On page 4 of the Office Action dated November 8, 2012, the Examiner relies on column 14 of Smith as allegedly teaching the limitations as previously presented in independent claim 27.

Applicants submit that the above-cited portion of Smith is directed to a user interface that exhibits asymmetry between responses to x-axis inputs and y-axis inputs. See column 12, lines 57-67 of Smith. More specifically, the remote control 200 of Smith applies its trigger-drag functionality differently, based on whether a user trigger-drags the remote control vertically or horizontally, in order to avoid unintendedumping from one column to another. In other words, the asymmetry of responses to x-axis inputs and y-axis inputs in Smith is only applied to the physical movement of the remote control 200. As such, Smith is absolutely silent as to the remote control including a touch input unit on the remote control 200 that has a different sensitivity from a motion of the remote control 200.

Therefore, for at least the above reasons, Smith does not teach or disclose, among other things, “a motion detector to detect motions of the electronic apparatus having low sensitivities, and a touch input unit disposed on the electronic apparatus to receive manipulations of an input unit of the electronic apparatus having high sensitivities,” as presently recited in independent claim 27.

On page 4 of the Office Action dated November 8, 2012, in an attempt to reject independent claim 33, the Examiner provides similar sections of Smith as those provided in the rejection corresponding to independent claim 27. Furthermore, independent claim 33 has been

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amended in a manner similar to independent claim 27. Accordingly, Applicants respectfully submit that similar arguments above regarding claim 27 also apply to independent claim 33.

As noted above, it is submitted that Smith fails to teach, disclose, or suggest each of the elements of independent claims 27 and 33, as presently recited, and it is respectfully submitted that Smith cannot be properly used to reject independent claims 27 and 33 U.S.C. §102(b). Applicants respectfully request withdrawal of this rejection and allowance of these claims.

Dependent Claims 2-5, 13, 30, and 36

Dependent claims 2-5, 13, 30, and 36 each depend from independent claims 1, 29, and 35, respectively, and therefore contain each of the features recited in independent claims 1, 29, and 35. Accordingly, since Smith fails to anticipate independent claims 1, 29, and 35, for the reasons discussed above, Applicants submit that Smith also fails to anticipate dependent claims 2-5, 13, 30, and 36. Applicants respectfully request withdrawal of this rejection and allowance of these claims.

Rejection under 35 USC §102 to Westerman

Claims 32 and 38-40 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2008/0042986 to Westerman et al. (hereinafter "Westerman"). Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Dependent Claims 32 and 38

Referring to previously independent (but now dependent) claims 32 and 38, in the Office Action dated November 8, 2012, the Examiner alleges that Westerman discloses all of the limitations as previously presented in independent claims 32 and 38. However, it is respectfully submitted that Westerman does not teach or disclose all of the features as presently recited in dependent claims 32 and 38, for at least the following reasons.

On page 6 of the Office Action dated November 8, 2012, the Examiner relies on paragraph [0038] of Westerman as allegedly teaching the limitations as previously presented in dependent claim 32.

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Applicants submit that the above-cited portion of Westerman is directed to a multi-touch surface apparatus for detecting a spatial arrangement of multiple touch devices on or near the surface of the multi-touch apparatus, comprising one of a rigid or flexible surface, a plurality of two-dimensional arrays of one of the sensing devices arranged on the surface in groups wherein the sensing devices within a group have their output nodes connected together and share the same integrating capacitor, charge depletion switch, and voltage-to-voltage translation circuitry, control circuitry for enabling a single sensor device from each two-dimensional array, means for selecting the sensor voltage data from each two-dimensional array, voltage measurement circuitry to convert sensor voltage data to a digital code, and circuitry for communicating the digital code to another electronic device.

However, it is clear that Westerman is absolutely silent as to generating a command to manipulate volume of a device by moving an electronic apparatus up and down. Instead, Westerman merely has a multi-touch surface apparatus that senses spatial arrangement of multiple touch devices on the multi-touch surface, which has nothing to do with volume control.

Therefore, for at least the above reasons, Westerman does not teach or disclose, among other things, “the electronic apparatus of claim 1, wherein the predetermined command is for raising or lowering a volume of the external device by moving up or down the electronic apparatus,” as presently recited in dependent claim 32.

On page 6 of the Office Action dated November 8, 2012, in an attempt to reject dependent claim 38, the Examiner provides similar sections of Smith as those provided in the rejection corresponding to dependent claim 32. Furthermore, dependent claim 38 has been amended in a manner similar to dependent claim 32. Accordingly, Applicants respectfully submit that similar arguments above regarding claim 32 also apply to dependent claim 38.

As noted above, it is submitted that Smith fails to teach, disclose, or suggest each of the elements of dependent claims 32 and 38, as presently recited, and it is respectfully submitted that Smith cannot be properly used to reject dependent claims 32 and 38 under 35 U.S.C. §102(b) or under 35 U.S.C. §103(a). Applicants respectfully request withdrawal of this rejection and allowance of these claims.

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Independent Claim 39

Referring to independent claim 39, in the Office Action dated November 8, 2012, the Examiner alleges that Westerman discloses all of the limitations as previously presented in independent claim 39. However, it is respectfully submitted that Westerman does not teach or disclose all of the features as presently recited in independent claim 39, for at least the following reasons.

On page 6 of the Office Action dated November 8, 2012, the Examiner relies on paragraph [0288] of Westerman as allegedly teaching all the limitations of independent claim 39, as previously presented. More specifically, the Examiner appears to rely on a timing threshold of Westerman as allegedly corresponding to Applicants' cancelling of a command generation if no movement is detected within a certain predetermined time.

Applicants submit that the above-cited portion of Westerman is directed to a decision diamond 782 that requires that a user touches a finger on a multi-touch surface and lift back off the multi-touch surface within a few hundred milliseconds for a key to be sent. In other words, Westerman allows a user to rest his fingers on the multi-touch surface without sending a signal indicating that a plurality of keys have been pressed, based on a duration of time the user's hands are resting on the multi-touch surface. See paragraph [0288] of Westerman.

However, the multi-touch surface apparatus of Westerman does not receive a user manipulation to perform a selected function among a plurality of functions such that a command to execute the selected function is cancelled based whether movement of an electronic apparatus is detected. Instead, Westerman is limited to merely sensing whether a user's fingers touch and are lifted back off the multi-touch surface within a predetermined time period before transmitting the key that was pressed. In other words, although Westerman monitors an amount of time the multi-touch surface is touched, Westerman does not address the aspect of cancelling a command to execute a function if no movement of the electronic apparatus is detected by a motion detector within a predetermined time.

Therefore, for at least the above reasons, Westerman does not teach or disclose, among other things, "detecting a motion of the electronic apparatus, receiving a user manipulation to perform a selected function among a plurality of functions via a user manipulation input,

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generating a command to perform the selected function by combining the detected motion and the selected function, controlling the generated predetermined command to be transmitted to an external device, and canceling the command generation prior to the selected function being executed if no movement of the electronic apparatus is detected by a motion detector within a predetermined time," as presently recited in independent claim 39.

As noted above, it is submitted that Westerman fails to teach or disclose each of the elements of independent claim 39 a presently recited, and therefore Westerman cannot be properly used to reject independent claim 39 under 35 U.S.C. §102(b). Applicants respectfully request withdrawal of this rejection and allowance of this claim.

Independent Claim 40

Referring to independent claim 40, in the Office Action dated November 8, 2012, the Examiner alleges that Westerman discloses all of the limitations as previously presented in independent claim 40. However, it is respectfully submitted that Westerman does not teach or disclose all of the features as presently recited in independent claim 40, for at least the following reasons.

On page 7 of the Office Action dated November 8, 2012, the Examiner relies on paragraph [0275] of Westerman as allegedly teaching all the limitations of independent claim 40, as previously presented. More specifically, the Examiner appears to rely on a reprogrammable display of Westerman as allegedly corresponding to Applicants' generation of a predetermined command using a detected motion together with user input.

Applicants submit that the above-cited portion of Westerman is directed to a multi-touch surface apparatus that may morph a key layout to a resting position of a user's hands. More specifically, by using proximity sensor arrays, a position of key symbols is reprogrammably displayed on the surface of the multi-touch surface by a visual display means in response to the location of the user's hands. See paragraph [0275] of Westerman.

However, the multi-touch surface apparatus of Westerman does not combine both a detected motion of a device and user input related to a selected function in order to generate a predetermined command to perform the selected function. Instead, Westerman is limited to merely repositioning a virtual keyboard based on a sensed location of the user's hands. As

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such, there is no selected function in Westerman that results in a predetermined command being generated by combining both a detected motion of a device and user input related to the selected function.

Therefore, for at least the above reasons, Westerman does not teach or disclose, among other things, “detecting a motion of the electronic apparatus, receiving a user input by a user to perform a selected function among a plurality of functions, generating a predetermined command to perform the selected function by combining the detected motion and the selected function, controlling the generated predetermined command to be transmitted to an external device, and canceling the command generation prior to the selected function being executed if no movement of the electronic apparatus is detected by a motion detector within a predetermined time,” as presently recited in independent claim 40.

As noted above, it is submitted that Westerman fails to teach or disclose each of the elements of independent claim 40, as presently recited, and therefore Westerman cannot be properly used to reject independent claim 40 under 35 U.S.C. §102(b). Applicants respectfully request withdrawal of this rejection and allowance of this claim.

Rejection under 35 USC §103 to Smith and Pinhanez

Claims 6-12 and 14-26 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Smith in view of U.S. Publication No. 2006/0044282 to Pinhanez et al. (hereinafter “Pinhanez”). Applicants request reconsideration and withdrawal of the above rejection for at least the following reasons.

Dependent Claims 6-12

As stated above, dependent claim 6 has been cancelled without prejudice or disclaimer. Regarding claims 7-12, Applicants traverse this rejection and assert that Smith and Pinhanez do not render obvious Applicants’ claims for at least the following reasons.

As discussed above with respect to independent claim 1, from which claims 7-12 depend, Smith fails to teach or disclose all the elements of claim 1. Furthermore, Pinhanez fails to remedy the deficiencies of Smith. Instead, as stated above, Pinhanez is directed to using a

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motion detection algorithm to detect when a user touches a surface of a screen 12. In other words, Pinhanez does not teach or suggest, among other things, “a controller which generates a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device,” as presently recited in independent claim 1. Accordingly, Smith and Pinhanez, separately or in combination, do not provide every limitation of independent claim 1. Therefore, it would not have been obvious to one of ordinary skill in the art to modify or combine Smith and Pinhanez to provide every limitation of Applicants’ claim.

For the foregoing reasons, Smith and Pinhanez are inadequate grounds for rejecting Applicants’ claims 7-12 under 35 U.S.C. § 103(a), and Applicants respectfully request reconsideration and withdrawal of this rejection and allowance of these claims.

Independent Claim 14

On page 8 of the Office Action dated November 8, 2012, the Examiner relies on columns 11 and 14 of Smith as allegedly teaching the limitations as previously presented in independent claim 14. More specifically, the Examiner appears to rely on a remote control 200 of Smith interacting with an options access display 410 as allegedly corresponding to Applicants’ “input-electronic apparatus.”

Applicants submit that Smith is directed to using the remote control 200 to allow a user to wirelessly control function icons that are displayed on the options access display 410. More specifically, a user first must launch the options access display 410 of Smith by either a wagging gesture 380 of the remote control 200 or by a dedicated button on the remote control 200. See column 5, lines 53-55 of Smith. Next, the user presses a trigger 210 (located on a bottom portion of the remote control 200 of Smith) in order to activate a “trigger-drag” functionality. As such, when the trigger 210 is pressed and held by the user, the options access display 410 recognizes that a virtual cursor is activated and allows the user to select, highlight, and scroll through a plurality of function icons via various movements (e.g., dragging, circling, checking, etc.) of the remote control 200. See FIG. 3 and column 5, lines 13-49 of Smith. Then, in order to select one of the function icons, a user must press a thumb button 205 (located on a top portion of the remote control 200 of Smith) when a particular function icon is highlighted.

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However, Smith does not perform a selected function by combining a motion of the remote control 200 along with a user manipulation input related to the selected function through an input unit. More specifically, Smith is limited to requiring a user to: (1) activate the options access display 410 by either wagging the remote control 200 or a dedicated button thereon, (2) press the trigger 210 to activate the “trigger-drag” functionality, and then (3) select a function icon using the same thumb button 205. This is not the same as performing a selected function by **combining** a motion of an input apparatus **with** a user’s input that is related to the selected function and received from an input unit, for at least the reason that Smith does not specifically relate a user’s input to a selected function. In other words, Smith merely activates a motion-detection-based functionality of a remote control, and then uses the thumb button 205 as a generic button to select any function icon displayed on the options access display 410. However, the thumb button 205 is a generic button that has no relation to any particular function icon, and merely allows a user to select any of the function icons. As such, the thumb button 205 of Smith cannot be relied on as corresponding to Applicants’ “input unit” that receives a user manipulation input related to a selected function.

Therefore, for at least the above reasons, Smith does not teach or disclose, among other things, “receiving a user input by a user manipulation for selecting a function among a plurality of functions, and generating a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device,” as presently recited in independent claim 14.

Also on page 8 of the Office action dated November 8, 2012, the Examiner relies on paragraph [0038] of Pinhanez as allegedly teaching a controller generating a predetermined command by combining a motion detected by a motion detector and a user manipulation input to the input unit.

Applicant submits that Pinhanez is directed to using a motion detection algorithm to detect when a user touches a surface of a screen 12. This is not the same as an input apparatus having controller that combines a motion detected by a motion detector with an input unit that receives a user manipulation input related to a selected function, in order to perform the

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selected function. Instead, Pinhanez is limited to merely sensing when a point on the screen 12 is touched.

Therefore, for at least the above reasons, Pinhanez does not teach or suggest, among other things, “receiving a user input by a user manipulation for selecting a function among a plurality of functions, and generating a predetermined command to perform the selected function by combining the detected motion and the selected function and controls the generated predetermined command to be transmitted to an external device,” as presently recited in independent claim 14, and therefore does not remedy the deficiencies of Smith.

Hence, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify or combine Smith and Pinhanez to provide every limitation of Applicants’ claim. Thus, Smith and Pinhanez, separately or in combination, fail to teach or suggest every limitation of Applicants’ claim 14, as presently recited.

As noted above, it is submitted that Smith and Pinhanez fail to teach or suggest each of the elements of independent claim 14, as presently recited, and it is respectfully submitted that Smith and Pinhanez cannot be properly used to reject independent claim 14 under 35 U.S.C. §103(a). Applicants respectfully request withdrawal of this rejection and allowance of this claim.

Dependent Claims 15-26

Dependent claims 15-26 each depend from independent claim 14, and therefore contain each of the features recited in independent claim 14. Accordingly, since Smith and Pinhanez fail to teach or suggest all of the elements of independent claim 14 for the reasons discussed above, Applicants submit that Smith and Pinhanez also fail to teach or suggest dependent claims 15-26. Applicants respectfully request withdrawal of this rejection and allowance of these claims.

New Claim 41

New independent claim 41 recites “a first device which detects a motion of the first device, receives user input by a user manipulation, and transmits a first signal including information on the detected motion and received user input, and a second device which

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receives the transmitted first signal and generates a second signal for performing a predetermined function of the second device based on a combination of the information on the detected motion and the information on the received user input included in the first signal.”

Support for this new claim can be found in paragraphs [0144]-[0156] of Applicants' specification.

Applicants affirm that none of the above-cited references teach, disclose, or suggest the limitations as recited in new claim 41, and Applicants respectfully request allowance of this new claim.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

STANZIONE & KIM, LLP

Dated: February 8, 2013
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: /Lev I. Iwashko/
Lev I. Iwashko
Registration No. 70,168

Electronic Acknowledgement Receipt

EFS ID:	14911533
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/Amelia Khalaf
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	08-FEB-2013
Filing Date:	30-MAR-2009
Time Stamp:	14:55:14
Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amendment_Filed.pdf	1294289 <small>0449e4d885d1c42f1c2646d1295516d7a33941b3</small>	yes	23

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Amendment/Req. Reconsideration-After Non-Final Reject		1	1
Claims		2	10
Applicant Arguments/Remarks Made in an Amendment		11	23

Warnings:

Information:

Total Files Size (in bytes):	1294289
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	SMALL ENTITY <input type="checkbox"/>	OR			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (j), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		OR	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	(Column 3)						
AMENDMENT	02/08/2013	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 38	Minus ** 40	= 0	X \$ =		OR	X \$62=	0
	Independent <small>(37 CFR 1.16(h))</small>	* 10	Minus *** 14	= 0	X \$ =		OR	X \$250=	0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)						
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	X \$ =		OR	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =		OR	X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
 /ANTHONY TYSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/413,722	03/30/2009	Yong-jin KANG	102-1567	9676
38209	7590	11/08/2012	EXAMINER	
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006			STEINBERG, JEFFREY S	
			ART UNIT	PAPER NUMBER
			2694	
			MAIL DATE	DELIVERY MODE
			11/08/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	12/413,722	KANG ET AL.	
	Examiner	Art Unit	
	Jeffrey Steinberg	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 18 July 2012.
- 2a) This action is **FINAL**.
- 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-40 is/are pending in the application.
- 5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-40 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 - 1. Certified copies of the priority documents have been received.
 - 2. Certified copies of the priority documents have been received in Application No. _____.
 - 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see REMARKS, filed 7/16/2012, with respect to the rejection(s) of claim(s) 1-40 under 35 U.S.C. §§102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection are made under 35 U.S.C. §102, in view of a US Patent to Smith et al. (7,233,316), and a US Patent to Westerman et al. (2008/0042986) as well as under 35 U.S.C. §103 also relying on a US Patent to Smith et al. (7,233,316) in view of a US Patent Application Publication by Pinhanez et al. (2006/0044282).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-5, 13, 27-31 and 33-37 are rejected under 35 U.S.C. 102(b) as being anticipated by a US Patent to Smith et al. (7,233,316).

Regarding Claim 1 (Currently Amended), Smith et al. discloses an input-electronic apparatus, comprising:

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a motion detector (Col. 14, ll. 24-27 and 32-35) which detects a motion of the input-electronic apparatus; an input unit which ~~is~~ receives user input ~~with~~ by a user manipulation (Col. 11, ll. 35-50); and a controller (Col. 14, ll. 56-57) which generates a predetermined command using ~~a~~ the motion detected by the motion detector and ~~a~~ the received user manipulation-input to through the input unit (Col. 14, ll. 61-62).

Regarding Claim 2 (Original), Smith et al. discloses the input apparatus as claimed in Claim 1, and further discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Id.).

Regarding Claim 3 (Original), Smith et al. discloses the input apparatus as claimed in Claim 2, wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Id., Col. 4, ll. 1-5).

Regarding Claim 4 (Original), Smith et al. discloses the input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit (Id., Col 2, ll. 42-44) which is input with a manipulation of a direction, wherein, if a motion is detected

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by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion (Id., Col 4, ll. 1-5), and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Id.).

Regarding Claim 5 (Original), Smith et al. discloses the input apparatus as claimed in Claim 4, and further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Col. 14, ll. 21-27).

Regarding Claim 13 (Original), Smith et al. discloses the input apparatus as claimed in Claim 1, and further discloses wherein the motion detector includes an acceleration sensor and an angular velocity sensor. (Col. 2, ll. 52-61).

Regarding Claims 27 and 33 (Both Currently Amended), Smith et al. discloses an input-electronic apparatus (Col. 14, ll. 49-51) comprising:
and further discloses a motion detector (Col. 14, ll. 24-27 and 32-35) to detect motions of the electronic apparatus having low sensitivities (Col. 14, ll. 62-65); and a touch input unit to receive manipulations of an input unit of the electronic apparatus having high sensitivities (Col. 14, ll. 58-62).

Regarding Claims 28 and 34 (Both Currently Amended), Smith et al. discloses an input-electronic apparatus comprising:
a motion detector (Col. 14, ll. 24-27 and 32-35) to generate first signals to correspond to

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detected motions of the input electronic apparatus; an input unit to generate second signals to correspond to received user manipulations on an input unit of the input electronic apparatus; and further discloses a controller to combine the first and second signals into a single command to be transmitted to a transmitter. (Col. 4, ll. 1-11).

Regarding Claims 29 and 35 (Currently Amended), Smith et al. discloses an ~~input~~ electronic apparatus comprising: a motion sensor (Col. 14, ll. 24-27 and 32-35) to detect a translation of the electronic apparatus using an acceleration sensor (Col. 2, ll. 52-61).and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller. (Col. 2, ll. 52-61).

Regarding Claims 30 and 36 (Both Amended), Smith et al. discloses the ~~input~~ electronic apparatus as claimed in Claim 29, as well as an apparatus capable of performing the method of Claim 35, respectively, and further discloses it comprising: a converter to receive a translation data signal and a rotation data signal. (Col. 3, ll. 59-63).

Regarding Claims 31 and 37 (Both Currently Amended), Smith et al. discloses an ~~input~~ electronic apparatus, also capable of a method to generate a pointer move command based on a-both of motion of the ~~input~~ electronic apparatus and touch ~~manipulation~~ input on the electronic apparatus. (Col. 4, ll. 1-5).

2. Claims 32 and 38-40 are rejected under 35 U.S.C. 102(b) as being anticipated by a US Patent Application Publication by Westerman et al. (2008/0042986).

Regarding Claim 32 (Currently Amended), Westerman discloses an ~~input~~ electronic apparatus comprising:

a controller to generate a command to raise or lower a volume of a to-be-controlled device ~~when the input~~ by moving up or down the electronic apparatus is moved up or down. (Pgs. 4-5, ¶[0038], where a Speaker is an electromechanical device).

Regarding Claim 38 (Currently Amended), Westerman discloses an apparatus capable of performing the method of inputting a command using an input apparatus, the method comprising:

generating a command to raise or lower a volume of a to-be-controlled device ~~when the input~~ by moving up or down the electronic apparatus is moved up or down. (Pgs. 4-5, ¶[0038], where a Speaker is an electromechanical device).

Regarding Claim 39 (Currently Amended), Westerman discloses a method of inputting a command using an ~~input~~ electronic apparatus, the method comprising:

receiving a user manipulation via a user manipulation input; and
canceling command generation if no ~~motion~~ movement of the electronic apparatus is detected by a motion detector within a predetermined time. (Pg. 32, ¶[0288], where a timing threshold is disclosed).

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Regarding Claim 40 (Currently Amended), Westerman discloses a non-transitory computer readable medium to contain computer-readable codes as a program to perform a method, the method comprising: detecting a motion of the ~~input~~ electronic apparatus; receiving a user ~~manipulation~~ input by a user; and generating a predetermined command using the detected motion and the input user ~~manipulation~~ input together. (Pg. 30, ¶[0275], where a reprogrammable display is disclosed).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 6-12 and 14-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over a US Patent to Smith et al. (7,233,316) in view of a US Patent Application Publication by Pinhanez et al. (2006/0044282).

Regarding Claims 6 and 14-26 (Original), Smith et al. discloses the input apparatus as claimed in Claim 1 as well as an apparatus capable of performing a method, but fails to disclose wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit.

Pinhanez et al. teaches wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit. (Pg. 4, ¶[0038]).

Smith et al. and Pinhanez et al. are analogous because they are both concerned with the same endeavor, Input Apparatus. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Display Device

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disclosed by Smith et al. with the teachings of Pinhanez et al., since such a modification would have combined the inputs of motion detection and user manipulation thereby enhancing the value of the apparatus to the user to the ultimate benefit of the manufacturer.

Regarding Claim 7 (Original), the Smith et al.-Pinhanez et al. Combination discloses the input apparatus as claimed in Claim 6, and Pinhanez et al. further discloses wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal. (Id.).

Regarding Claim 8 (Original), the Smith et al.-Pinhanez et al. Combination discloses the input apparatus as claimed in Claim 6, and Pinhanez et al. further discloses wherein the input unit includes a touch input unit which is input with a user touch, wherein, but fails to disclose if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Pg. 4, ¶[0038]).

Regarding Claim 9 (Original), the Smith et al.-Pinhanez et al. Combination discloses the input apparatus as claimed in Claim 6, and Smith et al. further discloses wherein the input unit includes a button unit having a plurality of buttons (Col. 4, ll. 47-61), and

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Pinhanez et al. further discloses wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pg. 4, ¶[0038]).

Regarding Claims 10 and 15 (Original), the Smith et al.-Pinhanez et al. Combination discloses the input apparatus as claimed in Claim 6, as well as an apparatus capable of performing the method of Claim 14, and Pinhanez et al. further discloses wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Id.); and Smith et al. further discloses wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation. (Col. 4, ll. 1-5).

Regarding Claim 11 (Original), the Smith et al.-Pinhanez et al. Combination discloses the input apparatus as claimed in Claim 6, and Pinhanez et al. further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the

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controller generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claim 12 (Original), the Smith et al.-Pinhanez et al. Combination discloses the input apparatus as claimed in Claim 6, wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Id.).

Regarding Claim 16 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 15, and Smith et al. further discloses wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch. (Id.).

Regarding Claim 17 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 15, wherein the receiving operation receives a manipulation of a direction, wherein, if a motion is detected, the command generating operation generates a move command to move the

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pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction. (Id.).

Regarding Claim 18 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button. (Col. 14, ll. 21-27).

Regarding Claim 19 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in claim 14, and Pinhanez et al. further discloses wherein the command generating operation generates a predetermined command by combining the detected motion and the input user manipulation. (Pg. 4, ¶[0038]).

Regarding Claim 20 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Pinhanez et al. further discloses wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal. (Id.).

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Regarding Claim 21 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Pinhanez et al. further discloses wherein the receiving operation receives a user touch, wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal. (Id.).

Regarding Claim 22 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Pinhanez et al. further discloses wherein the receiving operation receives a user button manipulation, wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal. (Col. 14, ll. 21-27).

Regarding Claim 23 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Pinhanez et al. further discloses wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the

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command generating operation generates a command by combining a detected motion signal and an input manipulation signal. (Pg. 4, ¶[0038]).

Regarding Claim 24 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Pinhanez et al. further discloses wherein the receiving operation receives a user touch, wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claim 25 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 19, and Pinhanez et al. further discloses wherein the receiving operation receives a user button manipulation, wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal. (Col. 14, ll. 21-27).

Regarding Claim 26 (Original), the Smith et al.-Pinhanez et al. Combination discloses an apparatus capable of performing the method as claimed in Claim 14, and Smith et al. further discloses, wherein the motion detecting operation detects a motion of the input

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apparatus using an acceleration sensor and an angular velocity sensor. (Col. 2, ll. 52-61).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey Steinberg/
Examiner, Art Unit 2694

/Alexander S. Beck/
Supervisory Patent Examiner, Art Unit 2694

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey Steinberg	Art Unit 2629	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-7,233,316	06-2007	Smith et al.	345/157
*	B US-2008/0042986	02-2008	Westerman et al.	345/173
*	C US-2006/0044282	03-2006	Pinhanez et al.	345/173
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			


FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012					
	1	✓	✓	✓					
	2	✓	✓	✓					
	3	✓	✓	✓					
	4	✓	✓	✓					
	5	✓	✓	✓					
	6	✓	✓	✓					
	7	✓	✓	✓					
	8	✓	✓	✓					
	9	✓	✓	✓					
	10	✓	✓	✓					
	11	✓	✓	✓					
	12	✓	✓	✓					
	13	✓	✓	✓					
	14	✓	✓	✓					
	15	✓	✓	✓					
	16	✓	✓	✓					
	17	✓	✓	✓					
	18	✓	✓	✓					
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	25	✓	✓	✓					
	26	✓	✓	✓					
	27	✓	✓	✓					
	28	✓	✓	✓					
	29	✓	✓	✓					
	30	✓	✓	✓					
	31	✓	✓	✓					
	32	✓	✓	✓					
	33	✓	✓	✓					
	34	✓	✓	✓					
	35	✓	✓	✓					
	36	✓	✓	✓					

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012	09/19/2012	10/17/2012					
	37	✓	✓	✓					
	38	✓	✓	✓					
	39	✓	✓	✓					
	40	✓	✓	✓					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yong-jin KANG et al.

Application No.: 12/413,722

Group Art Unit: 2629

Filed: March 30, 2009

Examiner Jeffrey S. Steinberg

Customer No.: 38209

Confirmation No. 9676

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND
INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action mailed March 14, 2012, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 10 of this paper.

Serial No.: 12/413,722
Docket No.: 102-1567
Amendment dated July 16, 2012
Reply to the Office Action of March 14, 2012

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An ~~input~~electronic apparatus, comprising:
a motion detector which detects a motion of the ~~input~~electronic apparatus;
an input unit which ~~is~~receives user input ~~with~~by a user manipulation; and
a controller which generates a predetermined command using a ~~the~~motion detected by the motion detector and a ~~the received~~user manipulation input ~~to~~through the input unit.
2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.
4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.
5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

Serial No.: 12/413,722
Docket No.: 102-1567
Amendment dated July 16, 2012
Reply to the Office Action of March 14, 2012

6. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit.

7. (Original) The input apparatus as claimed in claim 6, wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

8. (Original) The input apparatus as claimed in claim 6, wherein the input unit includes a touch input unit which is input with a user touch,
wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Original) The input apparatus as claimed in claim 6, wherein the input unit includes a button unit having a plurality of buttons,
wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Original) The input apparatus as claimed in claim 6, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Original) The input apparatus as claimed in claim 6, wherein the input unit comprises a touch input unit which is input with a user touch,

Serial No.: 12/413,722
Docket No.: 102-1567
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wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Original) The input apparatus as claimed in claim 6, wherein the input unit comprises a button unit having a plurality of buttons,

wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the ~~input~~electronic apparatus;
receiving a user ~~manipulation~~input by a user manipulation; and
generating a predetermined command using the detected motion and the input user ~~manipulation~~input together.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

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17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Original) The method as claimed in claim 14, wherein the command generating operation generates a predetermined command by combining the detected motion and the input user manipulation.

20. (Original) The method as claimed in claim 19, wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.

21. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation

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signal and a detected motion signal.

23. (Original) The method as claimed in claim 19, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,
wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Currently Amended) An ~~input~~electronic apparatus comprising:
a motion detector to detect motions of the electronic apparatus having low sensitivities;
and
a touch input unit to receive manipulations of an input unit of the electronic apparatus having high sensitivities.

28. (Currently Amended) An ~~input~~electronic apparatus comprising:
a motion detector to generate first signals to correspond to detected motions of the ~~input~~

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electronic apparatus;

an input unit to generate second signals to correspond to received user manipulations on an input unit of the input-electronic apparatus; and

a controller to combine the first and second signals into a single command to be transmitted to a transmitter.

29. (Currently Amended) An input-electronic apparatus comprising:
a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller.

30. (Currently Amended) The input-electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. (Currently Amended) An input-electronic apparatus to generate a pointer move command based on a-both of motion of the input-electronic apparatus and touch manipulation input on the electronic apparatus.

32. (Currently Amended) An input-electronic apparatus comprising:
a controller to generate a command to raise or lower a volume of a to-be-controlled device when the input by moving up or down the electronic apparatus is moved up or down.

33. (Currently Amended) A method of inputting a command using an input-electronic apparatus, the method comprising:
detecting motions of the electronic apparatus having low sensitivities; and
receiving manipulations of an input unit of the electronic apparatus having high sensitivities.

34. (Currently Amended) A method of inputting a command using an input-electronic apparatus, the method comprising:
generating first signals to correspond to detected motions of the input-electronic

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apparatus;

generating second signals to correspond to received user manipulations on an input unit of the ~~input~~-electronic apparatus; and

combining the first and second signals into a single command to be transmitted to a transmitter.

35. (Currently Amended) A method of inputting a command using an ~~input~~-electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller.

36. (Original) The method of claim 35, comprising:

receiving a translation data signal and a rotation data signal into a converter.

37. (Currently Amended) A method of inputting a command using an input apparatus, the method comprising:

generating a pointer move command based on ~~a~~-both of motion of the ~~input~~-electronic apparatus and touch manipulationon the electronic apparatus.

38. (Currently Amended) A method of inputting a command using an input apparatus, the method comprising:

generating a command to raise or lower a volume of a to-be-controlled device ~~when the~~ input by moving up or down the electronic apparatus is moved up or down.

39. (Currently Amended) A method of inputting a command using an ~~input~~-electronic apparatus, the method comprising:

receiving a user manipulation via a user manipulation input; and

canceling command generation if no ~~motion~~-movement of the electronic apparatus is detected by a motion detector within a predetermined time.

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40. (Currently Amended) A non-transitory computer readable medium to contain computer-readable codes as a program to perform a method, the method comprising:
detecting a motion of the input electronic apparatus;
receiving a user manipulation input by a user; and
generating a predetermined command using the detected motion and the input user manipulation input together.

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REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1-40 are pending in the application. Claims 1, 14, 27-35 and 37-40 have been amended. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC §101

Claim 40 has been rejected under 35 U.S.C. §101 for reciting “non-statutory” subject matter.

Applicants have amended independent claim 40 to address the Examiner’s concerns.

Rejection under 35 USC §102

Claims 1-4, 6-17 and 19-40 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2008/0042986 to Westerman et al. Reconsideration and withdrawal of these rejections are respectfully requested for at least the following reasons.

Referring to independent claims 1, 14, 27-35 and 37-40, on pages 2-9 of the Office Action dated March 14, 2012 (hereinafter, “Office Action”), the Examiner alleges that Westerman discloses all the limitations recited in independent claims 1, 14, 27-35 and 37-40. However, it is respectfully submitted that Westerman does not teach or disclose all of the features as presently recited in independent claims 1, 14, 27-35 and 37-40, for at least the following reasons.

On page 2 of the Office Action, the Examiner contends that “Westerman et al. discloses an input apparatus (Pg. 7, paragraph [0102] comprising and capable of performing a method using: an motion detector (Id.) which detects a motion of the input apparatus; an input unit which is input with a user manipulation (Id.); and a controller which generates a predetermined command using a motion detected by the motion detector and a user manipulation input to the input unit (Id.)”

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On page 7, paragraph [0102], Westerman states:

FIG. 1 is a system block diagram of the entire, integrated manual input apparatus. Sensor embedded in the multi-touch surface 2 detect proximity of entire flattened hands 4, fingertips thumbs, palms, and other conductive touch devices to the surface 2. In a preferred embodiment, the surface is large enough to comfortably accommodate both hands 4 and is arched to reduce forearm pronation.

Applicants note that FIG. 1 of Westerman is mis-labeled, juxtaposing element numbers 2 and 4, which does not change any of the description noted above. The input apparatus is further described in paragraph [0109] of Westerman that states:

The motion component extraction module 16 computes multiple degrees of freedom of control from individual finger motions during easily performable hand manipulations on the surface 2, such as hand translations, hand rotation about the wrist, hand scaling by grasping with the fingers, and differential hand tilting.”

Thus, regarding FIG. 1 Westerman merely illustrates and describes a stationary multi-touch surface 2, in which a user’s movement of fingers of one or two hands on the surface of the component 2 is detected and translated into different functions. However, there is no teaching or disclosure in Westerman that the actual movement, motion or displacement of the multi-surface component 2 is detected by a motion sensor, nor that the movement of the multi-surface component 2 is converted into a signal and transmitted a controller of the component 2.

For at least these reasons, Westerman does not teach or disclose that the multi-surface component 2 is a “remote controller” that includes a “an input unit which receives user input by a user manipulation” and “a controller which generates a predetermined command using the motion detected by the motion detector and the received user input through the input unit” as recited in independent claims 1, 14 and 40.

For at least the reasons discussed above, Westerman also does not teach or disclose at least “a motion detector to detect motions of the electronic apparatus having low sensitivities” as recited in independent claims 27 and 33.

Westerman also does not teach or disclose “a motion detector to generate first signals to correspond to detected motions of the electronic apparatus,” as presently recited in independent claims 28 and 34.

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For at least the reasons discussed above, Westerman also does not teach or disclose “a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller” as presently recited in independent claims 29 and 35.

For at least the reasons discussed above, Westerman does not teach or disclose at least, an “electronic apparatus to generate a pointer move command based on both of motion of the electronic apparatus and touch input on the electronic apparatus” as presently recited in independent claims 31 and 37.

Westerman also does not teach or disclose at least an “electronic apparatus including a controller to generate a command to raise or lower a volume of a to-be-controlled device by moving up or down the electronic apparatus” as presently recited in independent claims 32 and 38.

Westerman also does not teach or disclose, for at least the reasons discussed above, “receiving a user manipulation via a user manipulation input” and “canceling command generation if no movement of the electronic apparatus is detected by a motion detector within a predetermined time” as presently recited in independent claim 39.

Accordingly, since Westerman does not teach or disclose all of the elements set forth in independent claims 1, 14, 27-35 and 37-40, these claims are patentably distinguishable over Westerman. Thus, Westerman cannot be properly used to reject independent claims 1, 14, 27-35 and 37-40 under 35 U.S.C. §102(b) as submitted in the Office Action, and withdrawal of these rejections and allowance of these claims are respectfully solicited.

Applicants submit that dependent claims 2-4, 6-13, 15-17, 19-26, 30 and 36 are also deemed to be allowable due to at least their dependency on allowable independent claims 1, 14, 29 and 35 respectively. Accordingly, withdrawal of the rejection of these claims and allowance thereof are earnestly solicited.

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Rejection under 35 USC §103

Claims 5 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2008/0042986 to Westerman et al.

Applicants submit that dependent claims 5 and 18 are also deemed to be allowable due to at least their dependency on allowable independent claims 1 and 14, respectively. Accordingly, withdrawal of the rejection of these claims and allowance thereof are earnestly solicited.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

STANZIONE & KIM, LLP

Dated: July 16, 2012
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: /Jesse A. Fenty/
Jesse A. Fenty
Registration No. 60,633

Electronic Patent Application Fee Transmittal

Application Number:	12413722
Filing Date:	30-Mar-2009
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Filer:	Patrick J. Stanzione/aisha goins
Attorney Docket Number:	102-1567

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with \$0 paid	1251	1	150	CYWEE EX 2009 - 677 ¹⁵⁰

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				150

Electronic Acknowledgement Receipt

EFS ID:	13260368
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/aisha goins
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	16-JUL-2012
Filing Date:	30-MAR-2009
Time Stamp:	15:20:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$150
RAM confirmation Number	1951
Deposit Account	502827
Authorized User	STANZIONE,PATRICK

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

CYWEE EX 2009-679

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amdmt_7-16-12.pdf	474988 <small>2ac438f8b3e4ebff368342a811704d6738763782</small>	yes	13

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	9
Applicant Arguments/Remarks Made in an Amendment	10	13

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30516 <small>28e0567604dbe1d0bc7819a434946df4915569c9</small>	no	2
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Warnings:

Information:

Total Files Size (in bytes): 505504

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yong-jin KANG et al.

Application No.: 12/413,722

Group Art Unit: 2629

Filed: March 30, 2009

Examiner Jeffrey S. Steinberg

Customer No.: 38209

Confirmation No. 9676

For: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND
INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action mailed March 14, 2012, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 10 of this paper.

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Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An ~~input~~electronic apparatus, comprising:
a motion detector which detects a motion of the ~~input~~electronic apparatus;
an input unit which ~~is~~receives user input ~~with~~by a user manipulation; and
a controller which generates a predetermined command using a ~~the~~motion detected by the motion detector and a ~~the received~~user manipulation input ~~to~~through the input unit.
2. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. (Original) The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.
4. (Original) The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.
5. (Original) The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.

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6. (Original) The input apparatus as claimed in claim 1, wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit.

7. (Original) The input apparatus as claimed in claim 6, wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

8. (Original) The input apparatus as claimed in claim 6, wherein the input unit includes a touch input unit which is input with a user touch,
wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. (Original) The input apparatus as claimed in claim 6, wherein the input unit includes a button unit having a plurality of buttons,
wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. (Original) The input apparatus as claimed in claim 6, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. (Original) The input apparatus as claimed in claim 6, wherein the input unit comprises a touch input unit which is input with a user touch,

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wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. (Original) The input apparatus as claimed in claim 6, wherein the input unit comprises a button unit having a plurality of buttons,

wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. (Original) The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 (Currently Amended) A method of inputting a command using an electronic apparatus, the method comprising:

detecting a motion of the ~~input~~electronic apparatus;
receiving a user ~~manipulation~~input by a user manipulation; and
generating a predetermined command using the detected motion and the input user ~~manipulation~~input together.

15. (Original) The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. (Original) The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

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17. (Original) The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,
wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. (Original) The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. (Original) The method as claimed in claim 14, wherein the command generating operation generates a predetermined command by combining the detected motion and the input user manipulation.

20. (Original) The method as claimed in claim 19, wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.

21. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation

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signal and a detected motion signal.

23. (Original) The method as claimed in claim 19, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. (Original) The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,
wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. (Original) The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. (Currently Amended) An ~~input~~electronic apparatus comprising:
a motion detector to detect motions of the electronic apparatus having low sensitivities;
and
a touch input unit to receive manipulations of an input unit of the electronic apparatus having high sensitivities.

28. (Currently Amended) An ~~input~~electronic apparatus comprising:
a motion detector to generate first signals to correspond to detected motions of the ~~input~~

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electronic apparatus;

an input unit to generate second signals to correspond to received user manipulations on an input unit of the input electronic apparatus; and

a controller to combine the first and second signals into a single command to be transmitted to a transmitter.

29. (Currently Amended) An input electronic apparatus comprising:
a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller.

30. (Currently Amended) The input electronic apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. (Currently Amended) An input electronic apparatus to generate a pointer move command based on a both of motion of the input electronic apparatus and touch manipulation input on the electronic apparatus.

32. (Currently Amended) An input electronic apparatus comprising:
a controller to generate a command to raise or lower a volume of a to-be-controlled device when the input by moving up or down the electronic apparatus is moved up or down.

33. (Currently Amended) A method of inputting a command using an input electronic apparatus, the method comprising:
detecting motions of the electronic apparatus having low sensitivities; and
receiving manipulations of an input unit of the electronic apparatus having high sensitivities.

34. (Currently Amended) A method of inputting a command using an input electronic apparatus, the method comprising:
generating first signals to correspond to detected motions of the input electronic

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apparatus;

generating second signals to correspond to received user manipulations on an input unit of the ~~input~~-electronic apparatus; and

combining the first and second signals into a single command to be transmitted to a transmitter.

35. (Currently Amended) A method of inputting a command using an ~~input~~-electronic apparatus, the method comprising:

detecting a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller.

36. (Original) The method of claim 35, comprising:

receiving a translation data signal and a rotation data signal into a converter.

37. (Currently Amended) A method of inputting a command using an input apparatus, the method comprising:

generating a pointer move command based on ~~a~~-both of motion of the ~~input~~-electronic apparatus and touch manipulation input on the electronic apparatus.

38. (Currently Amended) A method of inputting a command using an input apparatus, the method comprising:

generating a command to raise or lower a volume of a to-be-controlled device ~~when the~~ input by moving up or down the electronic apparatus is moved up or down.

39. (Currently Amended) A method of inputting a command using an ~~input~~-electronic apparatus, the method comprising:

receiving a user manipulation via a user manipulation input; and

canceling command generation if no ~~motion~~-movement of the electronic apparatus is detected by a motion detector within a predetermined time.

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Amendment dated July 16, 2012
Reply to the Office Action of March 14, 2012

40. (Currently Amended) A non-transitory computer readable medium to contain computer-readable codes as a program to perform a method, the method comprising:
detecting a motion of the input electronic apparatus;
receiving a user manipulation input by a user; and
generating a predetermined command using the detected motion and the input user manipulation input together.

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Docket No.: 102-1567
Amendment dated July 16, 2012
Reply to the Office Action of March 14, 2012

REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1-40 are pending in the application. Claims 1, 14, 27-35 and 37-40 have been amended. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC §101

Claim 40 has been rejected under 35 U.S.C. §101 for reciting “non-statutory” subject matter.

Applicants have amended independent claim 40 to address the Examiner’s concerns.

Rejection under 35 USC §102

Claims 1-4, 6-17 and 19-40 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2008/0042986 to Westerman et al. Reconsideration and withdrawal of these rejections are respectfully requested for at least the following reasons.

Referring to independent claims 1, 14, 27-35 and 37-40, on pages 2-9 of the Office Action dated March 14, 2012 (hereinafter, “Office Action”), the Examiner alleges that Westerman discloses all the limitations recited in independent claims 1, 14, 27-35 and 37-40. However, it is respectfully submitted that Westerman does not teach or disclose all of the features as presently recited in independent claims 1, 14, 27-35 and 37-40, for at least the following reasons.

On page 2 of the Office Action, the Examiner contends that “Westerman et al. discloses an input apparatus (Pg. 7, paragraph [0102] comprising and capable of performing a method using: an motion detector (Id.) which detects a motion of the input apparatus; an input unit which is input with a user manipulation (Id.); and a controller which generates a predetermined command using a motion detected by the motion detector and a user manipulation input to the input unit (Id.)”

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On page 7, paragraph [0102], Westerman states:

FIG. 1 is a system block diagram of the entire, integrated manual input apparatus. Sensor embedded in the multi-touch surface 2 detect proximity of entire flattened hands 4, fingertips thumbs, palms, and other conductive touch devices to the surface 2. In a preferred embodiment, the surface is large enough to comfortably accommodate both hands 4 and is arched to reduce forearm pronation.

Applicants note that FIG. 1 of Westerman is mis-labeled, juxtaposing element numbers 2 and 4, which does not change any of the description noted above. The input apparatus is further described in paragraph [0109] of Westerman that states:

The motion component extraction module 16 computes multiple degrees of freedom of control from individual finger motions during easily performable hand manipulations on the surface 2, such as hand translations, hand rotation about the wrist, hand scaling by grasping with the fingers, and differential hand tilting.”

Thus, regarding FIG. 1 Westerman merely illustrates and describes a stationary multi-touch surface 2, in which a user’s movement of fingers of one or two hands on the surface of the component 2 is detected and translated into different functions. However, there is no teaching or disclosure in Westerman that the actual movement, motion or displacement of the multi-surface component 2 is detected by a motion sensor, nor that the movement of the multi-surface component 2 is converted into a signal and transmitted a controller of the component 2.

For at least these reasons, Westerman does not teach or disclose that the multi-surface component 2 is a “remote controller” that includes a “an input unit which receives user input by a user manipulation” and “a controller which generates a predetermined command using the motion detected by the motion detector and the received user input through the input unit” as recited in independent claims 1, 14 and 40.

For at least the reasons discussed above, Westerman also does not teach or disclose at least “a motion detector to detect motions of the electronic apparatus having low sensitivities” as recited in independent claims 27 and 33.

Westerman also does not teach or disclose “a motion detector to generate first signals to correspond to detected motions of the electronic apparatus,” as presently recited in independent claims 28 and 34.

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Reply to the Office Action of March 14, 2012

For at least the reasons discussed above, Westerman also does not teach or disclose “a motion sensor to detect a translation of the electronic apparatus using an acceleration sensor and detect a rotation of the electronic apparatus using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller” as presently recited in independent claims 29 and 35.

For at least the reasons discussed above, Westerman does not teach or disclose at least, an “electronic apparatus to generate a pointer move command based on both of motion of the electronic apparatus and touch input on the electronic apparatus” as presently recited in independent claims 31 and 37.

Westerman also does not teach or disclose at least an “electronic apparatus including a controller to generate a command to raise or lower a volume of a to-be-controlled device by moving up or down the electronic apparatus” as presently recited in independent claims 32 and 38.

Westerman also does not teach or disclose, for at least the reasons discussed above, “receiving a user manipulation via a user manipulation input” and “canceling command generation if no movement of the electronic apparatus is detected by a motion detector within a predetermined time” as presently recited in independent claim 39.

Accordingly, since Westerman does not teach or disclose all of the elements set forth in independent claims 1, 14, 27-35 and 37-40, these claims are patentably distinguishable over Westerman. Thus, Westerman cannot be properly used to reject independent claims 1, 14, 27-35 and 37-40 under 35 U.S.C. §102(b) as submitted in the Office Action, and withdrawal of these rejections and allowance of these claims are respectfully solicited.

Applicants submit that dependent claims 2-4, 6-13, 15-17, 19-26, 30 and 36 are also deemed to be allowable due to at least their dependency on allowable independent claims 1, 14, 29 and 35 respectively. Accordingly, withdrawal of the rejection of these claims and allowance thereof are earnestly solicited.

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Docket No.: 102-1567
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Reply to the Office Action of March 14, 2012

Rejection under 35 USC §103

Claims 5 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2008/0042986 to Westerman et al.

Applicants submit that dependent claims 5 and 18 are also deemed to be allowable due to at least their dependency on allowable independent claims 1 and 14, respectively. Accordingly, withdrawal of the rejection of these claims and allowance thereof are earnestly solicited.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,
STANZIONE & KIM, LLP

Dated: July 16, 2012
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: /Jesse A. Fenty/
Jesse A. Fenty
Registration No. 60,633

Electronic Patent Application Fee Transmittal

Application Number:	12413722
Filing Date:	30-Mar-2009
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Filer:	Patrick J. Stanzione/aisha goins
Attorney Docket Number:	102-1567

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with \$0 paid	1251	1	150	150
CYWEE EX 2009 - 694				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				150

Electronic Acknowledgement Receipt

EFS ID:	13257714
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/aisha goins
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	16-JUL-2012
Filing Date:	30-MAR-2009
Time Stamp:	15:10:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Amdmt_7-16-12.pdf	474988 2ac438f8b3e4ebff368342a811704d6738763782	yes	13

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject	1	1	
Claims	2	9	
Applicant Arguments/Remarks Made in an Amendment	10	13	

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30516	no	2
			b162f09a2a778aff284d8f94aab8233b6ef807f		

Warnings:

Information:

Total Files Size (in bytes):		505504
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)	SMALL ENTITY <input type="checkbox"/>		OR	SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		OR	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (j), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =			X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	SMALL ENTITY	
AMENDMENT	07/16/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 40	Minus ** 40	= 0	X \$ =		OR X \$60=	0
	Independent <small>(37 CFR 1.16(h))</small>	* 14	Minus ***14	= 0	X \$ =		OR X \$250=	0
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR	
					TOTAL ADD'L FEE		OR TOTAL ADD'L FEE	0

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	X \$ =		OR X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =		OR X \$ =	
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR	
					TOTAL ADD'L FEE		OR TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CURTIS NELLOMS JR/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722	Filing Date 03/30/2009	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	SMALL ENTITY <input type="checkbox"/>	OR			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (j), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		OR	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	(Column 3)						
AMENDMENT	07/16/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 40	Minus ** 40	= 0	X \$ =		OR	X \$60=	0
	Independent <small>(37 CFR 1.16(h))</small>	* 14	Minus *** 14	= 0	X \$ =		OR	X \$250=	0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

	(Column 1)	(Column 2)	(Column 3)						
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	X \$ =		OR	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =		OR	X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
 /CURTIS NELLOMS JR/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/413,722	03/30/2009	Yong-jin KANG	102-1567	9676
38209	7590	03/14/2012	EXAMINER	
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006			STEINBERG, JEFFREY S	
			ART UNIT	PAPER NUMBER
			2629	
			MAIL DATE	DELIVERY MODE
			03/14/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No. 12/413,722	Applicant(s) KANG ET AL.	
Examiner Jeffrey Steinberg	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 30 March 2009.
- 2a) This action is **FINAL**.
- 2b) This action is non-final.
- 3) An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) Claim(s) 1-40 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-40 is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 10) The specification is objected to by the Examiner.
- 11) The drawing(s) filed on 30 March 2009 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Regarding Claim 40: Claim 40 is rejected under 35 U.S.C. 101 because it recites "a computer readable medium" which is non-statutory in light of the specification. The Practitioner is advised that the claim should recite "a non-transitory computer readable medium."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-40 are rejected under 35 U.S.C. 102(b) as being anticipated by a US Patent Application Publication by Westerman et al. (2008/0042986).

Regarding Claims 1 and 14, Westerman et al. discloses an input apparatus (Pg. 7,

¶[[[0102]]) comprising and capable of performing a method using:

a motion detector (ld.) which detects a motion of the input apparatus; an input unit

Art Unit: 2629

which is input with a user manipulation (Id.) ; and a controller which generates a predetermined command using a motion detected by the motion detector and a user manipulation input to the input unit (Id.).

Regarding Claims 2 and 15, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 1 and 14, respectively, and further discloses wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit. (Id.).

Regarding Claims 3 and 16, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 2 and 15, respectively, and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, and further discloses wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch. (Pg. 8, ¶[[[0110]]].

Regarding Claims 4 and 17, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 2 and 15, respectively, as claimed in claim 2, and further discloses wherein the input unit includes a direction manipulation

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input unit which is input with a manipulation of a direction, and further discloses wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction. (Pg. 29, ¶[[0265]).

Regarding Claims 6 and 19, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 1 and 14, respectively, and further discloses wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit. (Pg. 5, ¶[[0040]).

Regarding Claims 7 and 20, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 6 and 19, respectively, and further discloses wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal. (Id.).

Regarding Claims 8 and 21, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 6 and 19, respectively, and further

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discloses wherein the input unit includes a touch input unit which is input with a user touch, wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal. (Id.).

Regarding Claims 9 and 22, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 6 and 19, respectively, and further discloses wherein the input unit includes a button unit having a plurality of buttons (Pgs. 5-6, ¶[[[0043]]), and further discloses wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector (Pg. 5, ¶[[[0040]]) simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal. (Pgs. 5-6, ¶[[[0043]]).

Regarding Claims 10 and 23, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 6 and 19, respectively, and further discloses wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal. (Pg. 5, ¶[[[0040]]).

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Regarding Claims 11 and 24, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 6 and 19, respectively, and further discloses wherein the input unit comprises a touch input unit which is input with a user touch, wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal. (Id.).

Regarding Claims 12 and 25, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims 6 and 19, respectively, and further discloses wherein the input unit comprises a button unit having a plurality of buttons, wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal. (Id.).

Regarding Claims 13 and 26, Westerman et al. discloses the input apparatus as claimed in claims 1 and 14, respectively, and further discloses wherein the motion detector includes an acceleration sensor (Fig. 37: 551-552, Pgs. 6 and 25, ¶¶[0045] and [0242], respectively) and an angular velocity sensor (Fig. 36: 524, Pgs. 7 and 23, ¶¶[0090] and [0233], respectively).

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Regarding Claims 27 and 33, Westerman et al. discloses an input apparatus and is capable of performing the method of inputting a command using said apparatus comprising:

a motion detector to detect motions of low sensitivities; and a touch input unit to receive manipulations of high sensitivities. (Pgs. 28-29, ¶¶[0264-0265], respectively).

Regarding Claims 28 and 34, Westerman et al. discloses an input apparatus and a method of inputting a command using said apparatus comprising:

a motion detector to generate first signals to correspond to detected motions of the input apparatus; an input unit to generate second signals to correspond to received user manipulations of the input apparatus; and a controller to combine the first and second signals into a single command to be transmitted to a transmitter. (Pgs. 6 and 32, ¶¶[0044 and 0291], respectively).

Regarding Claims 29 and 35, Westerman et al. discloses an input apparatus and a method of inputting a command using said apparatus comprising: a motion sensor to detect a translation using an acceleration sensor and detect a rotation using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller. (Fig. 36: 530-531, Pg. 24, ¶[0238]).

Regarding Claims 30 and 36, Westerman et al. discloses the input apparatus of Claim 29 and an apparatus capable of performing the method of Claim 35, respectively,

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comprising:

a converter to receive a translation data signal and a rotation data signal. (Pg. 24, ¶[0237]).

Regarding Claims 31 and 37, Westerman et al. discloses an input apparatus which is capable of performing a method to generate a pointer move command based on a motion of the input apparatus and touch manipulation. (Pg. 24, ¶[0238]).

Regarding Claims 32 and 38, Westerman et al. discloses an input apparatus capable of a method of inputting a command to said apparatus comprising:
a controller to generate a command to raise or lower a volume of a to-be-controlled device when the input apparatus is moved up or down. (Pgs. 4-5, ¶[0038], where a Speaker is an electromechanical device).

Regarding Claim 39, Westerman et al. discloses an apparatus capable of a method of inputting a command using an input apparatus, the method comprising:
receiving a user manipulation input; and canceling command generation if no motion is detected by a motion detector within a predetermined time. (Pg. 32, ¶[0288], where a timing threshold is disclosed).

Regarding Claim 40, Westerman et al. discloses a computer readable medium to contain computer-readable codes as a program to perform a method, the method

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comprising:

detecting a motion of the input apparatus; receiving a user manipulation; and
generating a predetermined command using the detected motion and the input user
manipulation. (Pg. 30, ¶[0275], where a reprogrammable display is disclosed).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148
USPQ 459 (1966), that are applied for establishing a background for determining
obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over a US Patent Application Publication by Westerman et al. (2008/0042986).

Regarding Claims 5 and 18, Westerman et al. discloses the input apparatus and is capable of performing a method as claimed in claims in claims 4 and 17. respectively, and further discloses wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button. (Pg. 6, ¶[[[0045], but fails to disclose where the cursor is commonly moved by a joy stick.).

The Examiner takes the position that the movement of a cursor is commonly accomplished by manipulation of a joy stick and is old and well known in the Art. At the time the invention was made it would have been obvious to one having ordinary skill in the art to modify the Display Device disclosed by Westerman et al. with the teachings of what is commonly practiced in the Art (Input Devices), since such a modification would have provided another input device thereby increasing the value of the product.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Steinberg whose telephone number is (571)270-7617. The examiner can normally be reached on M-TH 7:30-5:30.

Art Unit: 2629

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Beck can be reached on 571 272 7765. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander S. Beck/
Supervisory Patent Examiner, Art Unit 2629

/Jeffrey Steinberg/
Examiner, Art Unit 2629

Notice of References Cited	Application/Control No. 12/413,722	Applicant(s)/Patent Under Reexamination KANG ET AL.	
	Examiner Jeffrey Steinberg	Art Unit 2629	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-2008/0042986	02-2008	Westerman et al.	345/173
	B US-			
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			


FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

SEARCHED			
Class	Subclass	Date	Examiner
345	156-178	2/14/2012	JSS
463	36-39	2/14/2012	JSS
348	14.05, 114, 734	2/14/2012	JSS
715	810 ,831 ,856	2/14/2012	JSS

SEARCH NOTES		
Search Notes	Date	Examiner
Consulted Steve Sherman, AU 2629	12/13/2012	JSS

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

/J.S./
Examiner.Art Unit 2629


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BIB DATA SHEET
CONFIRMATION NO. 9676

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/413,722	03/30/2009	345	2629	102-1567		
APPLICANTS						
Yong-jin KANG, Suwon-si, KOREA, REPUBLIC OF; Sung-han LEE, Hwaseong-si, KOREA, REPUBLIC OF; Hyun-coog SHIN, Suwon-si, KOREA, REPUBLIC OF; Dae-hyun KIM, Suwon-si, KOREA, REPUBLIC OF; Eung-sik YOON, Suwon-si, KOREA, REPUBLIC OF;						
** CONTINUING DATA *****						
** FOREIGN APPLICATIONS *****						
REPUBLIC OF KOREA 2008-66996 07/10/2008						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
Verified and /JEFFREY S STEINBERG/ Acknowledged Examiner's Signature		Initials	KOREA, REPUBLIC OF	16	40	14
ADDRESS						
Stanzione & Kim, LLP 919 18th Street, NW Suite 440 Washington, DC 20006 UNITED STATES						
TITLE						
INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS						
FILING FEE RECEIVED 4550	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

EAST Search History

EAST Search History (Prior Art)


Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S2	30558	345/156-178.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:50
S3	2902	463/36-39.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S4	2135	348/14.05,114,734.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:51
S5	3530	715/810,831,836.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:52
S6	38091	S2 S3 S4 S5	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2012/02/14 11:53
S7	0	S6 (input adj2 apparatus) (motion adj1 detect\$3) (user with manipul\$5) controller (predetermin\$3 WITH command)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S10	1953	S6 (input adj2 apparatus)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:57
S11	210	S6 (input adj2 apparatus) motion detector	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:58
S13	133	S6 (input adj2 apparatus) motion detector command	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	AND	ON	2012/02/14 11:59
S14	1	"12413722"	US-PGPUB	AND	ON	2012/02/14 12:00
S15	1	"20080042986".pn.	US-PGPUB; USPAT	OR	OFF	2012/02/15 09:07

EAST Search History (Interference)

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Index of Claims 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012							
	1	✓							
	2	✓							
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	4	✓							
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	34	✓							
	35	✓							
	36	✓							

<i>Index of Claims</i> 	Application/Control No. 12413722	Applicant(s)/Patent Under Reexamination KANG ET AL.
	Examiner JEFFREY STEINBERG	Art Unit 2629

✓	Rejected
=	Allowed

-	Cancelled
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O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	02/15/2012							
	37	✓							
	38	✓							
	39	✓							
	40	✓							



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Table with 4 columns: APPLICATION NUMBER (12/413,722), FILING OR 371(C) DATE (03/30/2009), FIRST NAMED APPLICANT (Yong-jin KANG), ATTY. DOCKET NO./TITLE (102-1567)

CONFIRMATION NO. 9676

PUBLICATION NOTICE



38209
STANZIONE & KIM, LLP
919 18TH STREET, N.W.
SUITE 440
WASHINGTON, DC 20006

Title: INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

Publication No. US-2010-0007518-A1

Publication Date: 01/14/2010

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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 12/413,722, 03/30/2009, 2629, 4550, 102-1567, 40, 14

CONFIRMATION NO. 9676

38209
STANZIONE & KIM, LLP
919 18TH STREET, N.W.
SUITE 440
WASHINGTON, DC 20006

FILING RECEIPT



Date Mailed: 04/08/2009

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Applicant(s)

Yong-jin KANG, Suwon-si, KOREA, REPUBLIC OF;
Sung-han LEE, Hwaseong-si, KOREA, REPUBLIC OF;
Hyun-coog SHIN, Suwon-si, KOREA, REPUBLIC OF;
Dae-hyun KIM, Suwon-si, KOREA, REPUBLIC OF;
Eung-sik YOON, Suwon-si, KOREA, REPUBLIC OF;

Assignment For Published Patent Application

Samsung Electronics Co., Ltd, Suwon-si, KOREA, REPUBLIC OF

Power of Attorney: The patent practitioners associated with Customer Number 38209

Domestic Priority data as claimed by applicant

Foreign Applications

REPUBLIC OF KOREA 2008-66996 07/10/2008

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper Request to Retrieve Electronic Priority Application(s) (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

Projected Publication Date: 01/14/2010

Non-Publication Request: No

Early Publication Request: No

Title

INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD
APPLIED TO SUCH INPUT APPARATUS

Preliminary Class

345

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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Filer:	Patrick J. Stanzione/Aisha Goins
Attorney Docket Number:	102-1567

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Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220

Pages:

Claims:

Claims in excess of 20	1202	20	52	1040
Independent claims in excess of 3	1201	11	220	2420

Miscellaneous-Filing:

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD (\$)	4550

Electronic Acknowledgement Receipt

EFS ID:	5051150
Application Number:	12413722
International Application Number:	
Confirmation Number:	9676
Title of Invention:	INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS
First Named Inventor/Applicant Name:	Yong-jin KANG
Customer Number:	38209
Filer:	Patrick J. Stanzione/Aisha Goins
Filer Authorized By:	Patrick J. Stanzione
Attorney Docket Number:	102-1567
Receipt Date:	30-MAR-2009
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Payment Type	Deposit Account
Payment was successfully received in RAM	\$4550
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Application.pdf	112146 db9e25355e5d6948a10b9fefdf872567f5e4af03e	yes	34
Multipart Description/PDF files in .zip description					
	Document Description		Start		End
	Specification		1		26
	Claims		27		33
	Abstract		34		34
Warnings:					
Information:					
2	Drawings-only black and white line drawings	FIGS1-16.pdf	168185 842b0597a2c59018f1510cb5662f2f60b655524	no	16
Warnings:					
Information:					
3	Oath or Declaration filed	Declaration.pdf	123454 2ac83c43b911b85e34282d4fb70460ac6f50a5a4	no	2
Warnings:					
Information:					
4	Request for USPTO to retrieve priority docs	PTO_SB_38.pdf	145730 28128dd5057a2a7ced98a423bd22479383398d83	no	1
Warnings:					
Information:					
5	Transmittal of New Application	UtilityTransmittal.pdf	198004 d80ffc201640922f3b060c713f88a6e3155a30a5	no	1
Warnings:					
Information:					
6	Fee Worksheet (PTO-06)	fee-info.pdf	37856 a021adee340d9ea8139cfae88fa0f7de473493cb	no	2
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Application.pdf	112146 db9e25355e5d6948a10b9fefdf872567f5e4af03e	yes	34
Multipart Description/PDF files in .zip description					
	Document Description		Start		End
	Specification		1		26
	Claims		27		33
	Abstract		34		34
Warnings:					
Information:					
2	Drawings-only black and white line drawings	FIGS1-16.pdf	168185 842b0597a2c59018f1510cb5662f2f60b655524	no	16
Warnings:					
Information:					
3	Oath or Declaration filed	Declaration.pdf	123454 2ac83c43b911b85e34282d4fb70460ac6f50a5a4	no	2
Warnings:					
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4	Request for USPTO to retrieve priority docs	PTO_SB_38.pdf	145730 28128dd5057a2a7ced98a423bd22479383398d83	no	1
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5	Transmittal of New Application	UtilityTransmittal.pdf	198004 d80ffc201640922f3b060c713f88a6e3155a30a5	no	1
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6	Fee Worksheet (PTO-06)	fee-info.pdf	37856 a021adee340d9ea8139cfae88fa0f7de473493cb	no	2
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TITLE

INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority under 35 U.S.C. § 119 (a) from Korean Patent Application No. 10-2008-66996, filed on July 10, 2008, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

1. Field of the General Inventive Concept

[0002] The present general inventive concept relates to an input apparatus and an input method applied to such an input apparatus, and more particularly, to an input apparatus which detects various motions and may be input with user manipulations and an input method applied to such an input apparatus.

2. Description of the Related Art

[0003] A conventional remote controller or mouse is an input apparatus that receives user commands using a button, a wheel, a jog switch, or a touch pad. However, in recent years, a remote controller or mouse apparatus has been developed to provide a function of detecting motions and also providing a pointer function.

[0004] A remote controller capable of detecting various motions enables a user to use the remote controller more intuitively. However, since sensitivity for motion detection is low, it is difficult to minutely control a pointer simply by moving a remote controller. Also, user commands that can be input using the movement are limited.

[0005] Also, users need more intuitive interfaces. Therefore, there has been a demand for a method of allowing a user to use an input apparatus capable of motion detection in various manners.

SUMMARY

[0006] The present general inventive concept provides a method of allowing a user to use an input apparatus capable of motion detection in various manners. More specifically, the present

general inventive concept provides an input apparatus which generates a predetermined command using a motion detected by a motion detector and a user manipulation input to an input unit, and an input method applied to such an input apparatus.

[0007] Additional aspects and utilities of the present general inventive concept will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the general inventive concept.

[0008] An embodiment of the general inventive concept may be achieved by providing an input apparatus, including a motion detector which detects a motion of the input apparatus, an input unit which is input with a user manipulation, and a controller which generates a predetermined command using a motion detected by the motion detector and a user manipulation input to the input unit.

[0009] The controller may generate a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.

[0010] The input unit may include a touch input unit which is input with a user touch, and, if a motion is detected by the motion detector, the controller may generate a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller may generate a move command to move the pointer in the same direction as that of the input touch.

[0011] The input unit may include a direction input unit which is input with a manipulation of a direction, and, if a motion is detected by the motion detector, the controller may generate a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller may generate a move command to move the pointer in the same direction as the input direction.

[0012] The direction input unit may be at least one of a jog switch, a joystick and a direction button.

[0013] The controller may generate a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit.

[0014] If a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller may generate a single command by combining an input manipulation signal

and a detected motion signal.

[0015] The input unit may include a touch input unit which is input with a user touch, and, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller may generate a single command by combining an input touch signal and a detected motion signal.

[0016] The input unit may include a button unit having a plurality of buttons, and, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller may generate a command by combining a button manipulation signal and a detected motion signal.

[0017] If a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller may generate a single command by combining a detected motion signal and an input manipulation signal.

[0018] The input unit may include a touch input unit which is input with a user touch, and, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller may generate a single command by combining a detected motion signal and an input touch signal.

[0019] The input unit may include a button unit having a plurality of buttons, and, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller may generate a single command by combining a detected motion signal and a button manipulation signal.

[0020] The motion detector may include an acceleration sensor and an angular velocity sensor.

[0021] An embodiment of the general inventive concept may also be also achieved by providing a method of inputting a command using an input apparatus, the method including detecting a motion of the input apparatus, receiving a user manipulation, and generating a predetermined command using the detected motion and the input user manipulation.

[0022] The command generating operation may generate a move command to move a pointer displayed on a screen using both of the detected motion and the input user

manipulation.

[0023] The receiving operation may receive a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation may generate a move command to move the pointer in the same direction as that of the input touch.

[0024] The receiving operation may receive a manipulation of a direction, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation may generate a move command to move the pointer in the same direction as the input direction.

[0025] The manipulation of the direction may be input by at least one of a jog switch, a joystick and a direction button.

[0026] The command generating operation may generate a predetermined command by combining the detected motion and the input user manipulation.

[0027] If the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation may generate a single command by combining an input manipulation signal and a detected motion signal.

[0028] The receiving operation may receive a user touch, and, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation may generate a single command by combining an input touch signal and a detected motion signal.

[0029] The receiving operation may receive a user button manipulation, and, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation may generate a single command by combining a button manipulation signal and a detected motion signal.

[0030] If the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation may generate a single command by combining a detected motion signal and an input manipulation

signal.

[0031] The receiving operation may receive a user touch, and, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation may generate a single command by combining a detected motion signal and a input touch signal.

[0032] The receiving operation may receive a user button manipulation, and, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation may generate a single command by combining a detected motion signal and a button manipulation signal.

[0033] The motion detecting operation may detect a motion of the input apparatus using an acceleration sensor and an angular velocity sensor

[0034] A further embodiment of the general inventive concept may also be also achieved by providing an input apparatus including a motion detector that may detect motions of low sensitivities, and a touch input unit that may detect manipulations of high sensitivities.

[0035] A further embodiment of the general inventive concept may also be also achieved by providing an input apparatus including a motion detector that may generate first signals to correspond to detected motions of the input apparatus, an input unit that may generate second signals to correspond to detected user manipulations of the input apparatus, and a controller to combine the first and second signals into a single command to be transmitted to a transmitter.

[0036] A further embodiment of the general inventive concept may also be also achieved by providing an input apparatus including a motion sensor that may detect a translation using an acceleration sensor and detect a rotation using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller. The converter may receive a translation data signal and a rotation data signal.

[0037] A further embodiment of the general inventive concept may also be also achieved by providing an input apparatus including an input apparatus to generate a pointer move command based on a motion of the input apparatus and touch manipulation.

[0038] A further embodiment of the general inventive concept may also be also achieved by providing an input apparatus including a controller that may generate a command to raise or lower a volume of a to-be-controlled device when the input apparatus is moved up or down.

[0039] A further embodiment of the general inventive concept may also be also achieved by

providing a method of inputting a command using an input apparatus, the method including detecting motions of low sensitivities, and detecting manipulations of high sensitivities.

[0040] A further embodiment of the general inventive concept may also be also achieved by providing a method of inputting a command using an input apparatus, the method including generating first signals to correspond to detected motions of the input apparatus, generating second signals to correspond to detected user manipulations of the input apparatus, and combining the first and second signals into a single command to be transmitted to a transmitter.

[0041] A further embodiment of the general inventive concept may also be also achieved by providing a method of inputting a command using an input apparatus, the method including detecting a translation using an acceleration sensor and detect a rotation using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller. A translation data signal and a rotation data signal may be received into a converter.

[0042] A further embodiment of the general inventive concept may also be also achieved by providing a method of inputting a command using an input apparatus, the method including generating a pointer move command based on a motion of the input apparatus and touch manipulation.

[0043] A further embodiment of the general inventive concept may also be also achieved by providing a method of inputting a command using an input apparatus, the method including generating a command to raise or lower a volume of a to-be-controlled device when the input apparatus is moved up or down.

[0044] A further embodiment of the general inventive concept may also be also achieved by providing a method a command using an input apparatus, the method including receiving a user manipulation input, and canceling command generation if no motion is detected by a motion detector within a predetermined time.

[0045] A further embodiment of the general inventive concept may also be also achieved by providing a computer readable medium to contain computer-readable codes as a program to perform a method, the method including detecting a motion of the input apparatus, receiving a user manipulation, and generating a predetermined command using the detected motion and the input user manipulation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046] These and/or other aspects and utilities of the present general inventive concept will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

[0047] FIG. 1 is a block diagram illustrating an input apparatus which is capable of detecting motions according to an exemplary embodiment of the present general inventive concept;

[0048] FIG. 2 illustrates a process of generating a pointer move command according to an exemplary embodiment of the present general inventive concept;

[0049] FIG. 3 illustrates a process of generating a single command by combining a motion of an input apparatus and a user manipulation if the user manipulation is input in advance according to another exemplary embodiment of the present general inventive concept;

[0050] FIG. 4 illustrates a process of generating a single command by combining a motion of an input apparatus and a user manipulation if the motion of the input apparatus is input in advance according to still another exemplary embodiment of the present general inventive concept;

[0051] FIGS. 5A to 5C are views illustrating operations of moving an input apparatus in an upper right direction and then inputting a touch manipulation on a touch input unit in a lower right direction according to an exemplary embodiment of the present general inventive concept;

[0052] FIGS. 6A to 6C are views illustrating operations of moving the input apparatus in an upper right direction and then pressing a lower right direction button according to an exemplary embodiment of the present general inventive concept;

[0053] FIGS. 7A to 7C are views illustrating operations of moving an input apparatus in an upper right direction and then manipulating a jog switch in a lower right direction according to an exemplary embodiment of the present general inventive concept;

[0054] FIG. 8 is a view illustrating a result of operations of FIGS. 5 to 7 according to an exemplary embodiment of the present general inventive concept;

[0055] FIG. 9 is a view illustrating operations of writing the letter "V" on a touch input unit and then moving up an input apparatus according to another exemplary embodiment of the present general inventive concept;

[0056] FIG. 10 is a view illustrating operations of writing the letter "V" on a touch input unit

and then moving down an input apparatus according to another exemplary embodiment of the present general inventive concept;

[0057] FIG. 11 is a view illustrating operations of pressing a volume button and then moving up an input apparatus according to another exemplary embodiment of the present general inventive concept;

[0058] FIG. 12 is a view illustrating operations of pressing a volume button and then moving down an input apparatus according to another exemplary embodiment of the present general inventive concept;

[0059] FIG. 13 is a view illustrating operations of moving up an input apparatus and then writing the letter "V" on a touch input unit according to another exemplary embodiment of the present general inventive concept;

[0060] FIG. 14 is a view illustrating operations of moving down an input apparatus and then writing the letter "V" on a touch input unit according to another exemplary embodiment of the present general inventive concept;

[0061] FIG. 15 is a view illustrating operations of moving up an input apparatus and then pressing a volume button according to another exemplary embodiment of the present general inventive concept; and

[0062] FIG. 16 is a view illustrating operations of moving down an input apparatus and then pressing a volume button according to another exemplary embodiment of the present general inventive concept.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0063] Reference will now be made in detail to the embodiments of the present general inventive concept, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below in order to explain the present general inventive concept by referring to the numerals.

[0064] FIG. 1 is a block diagram illustrating an input apparatus which is capable of detecting various motions according to an exemplary embodiment of the present general inventive concept. As illustrated in FIG. 1, an input apparatus 100 includes a motion detector 110, an A/D converter 120, an input unit 130, a controller 140, a transmitter 150, a memory unit 160, and an input/output port unit 170.

[0065] The motion detector 110 detects various motions of the input apparatus 100 and is also called a motion sensor. The motion detector 110 includes an acceleration sensor 113 and an angular velocity sensor 116. The acceleration sensor 113 detects acceleration with respect to 3 axes and the angular velocity sensor 116 detects an angular velocity with respect to at least 2 axes. The angular velocity sensor 116 can also detect an angular velocity with respect to 3 axes.

[0066] The acceleration sensor 113 is a sensor that senses a dynamic force such as acceleration, vibration, or shock of an object. Since the acceleration sensor 113 can sense a minute movement of an object, it has been widely used in various applications and for various purposes.

[0067] The acceleration sensor 113 detects whether acceleration exists with respect to an x-axis, a y-axis, and a z-axis, and detects whether there is a movement of an object.

[0068] There are various types of acceleration sensors 113. The acceleration sensor 113 may be classified as an inertial sensor, a gyro sensor, and a silicon semiconductor sensor according to its detecting method. A vibration meter or a clinometer are other examples of acceleration sensor 113.

[0069] The angular velocity sensor 116 senses a rotation of an object. The angular velocity sensor 116 detects whether an angular velocity exists with respect to 2-axes or 3-axes, and detects whether there is a rotation of an object. There are various types of angular velocity sensors 116. For example, the angular velocity sensor 116 may be embodied by a gyro sensor. Also, a rotation angle can be sensed by a geomagnetic sensor.

[0070] In order to describe various motions of an object, a translation and a rotation should be considered. Accordingly, the motion detector 110 detects a translation using the acceleration sensor 113 and detects a rotation using the angular velocity sensor 116, thereby detecting motions and movements of the input apparatus 100.

[0071] The motion detector 110 may output a signal for a detected motion to the A/D converter 120. This is because the signal for the motion detected by the motion detector 110 may be configured of analog signals.

[0072] However, it should be noted that the motion detector 110 can output a digital signal as a signal for a detected motion. In this case, no analog/digital converting process would be required. In such a case, the A/D converter 120 would transmit the digital signals directly to the

controller 140, omitting analog-to-digital conversion.

[0073] Data or information signals are entered into the input unit 130 by a variety of manipulations from a user. Described herein, a user manipulation may be a manipulation that is input through the input unit 130 to perform a function such as a user wishes. For example, the user manipulation may include a physical touch on a touch input unit 132, an applied pressing of a button unit 134, a direction-manipulation of a joystick 136, a manipulation of a jog switch 138, a voice or sound input into a voice/sound input unit 142, or other stimuli from other inputs.

[0074] The input unit 130 may include the touch input unit 132, the button unit 134, the joystick, the jog switch 138, the voice/sound input unit 142, and an expandable unit 144. Besides these, the input unit 130 may include any other type of element that can receive a user manipulation. For example, the input unit 130 may further include a wheel, a track ball, a jog shuttle, a laser or light sensitive input unit, an electronic stimulus, or other user controlled manipulations.

[0075] In an exemplary embodiment, the touch input unit 132 is input with a touch from a user. More specifically, the touch input unit 132 may recognize a user touch as tap, stroke, or drag administered by a user's finger or other body part, or the user may use a medium such as a stylus or other writing utensil to manipulate the touch input unit 132. The touch input unit 132 may also recognize letters written by the user by any of these aforementioned methods, for example. The touch input unit 132 may be embodied by a touch pad, a touch screen, or the like, as is known in the art.

[0076] In another exemplary embodiment, the button unit 134 is input with a button manipulation from a user. The button unit 134 may be embodied as including number buttons, letter buttons, direction buttons and function buttons. Also, if the direction buttons are manipulated, the button unit 134 may be input with a manipulation about a direction from the user. The button unit 134 may include buttons made of various materials such as hard or soft plastic, polymer, rubber, or the like as is known in the art. The buttons may be included in a touch screen panel that allows different combinations and functionalities of buttons to be displayed depending on the type of host device to be used in association with the input apparatus 100. The meanings of the different buttons as well as numerous different button layout configurations may be stored in the memory unit 160.

[0077] Data or information signals may be input by the joystick 136 or other units within the input unit 130 by a variety of manipulations in response to directions from a user. For example,

the joystick 136 may be configured to move in a plurality of set angular directional movements, or the joystick may be configured to move and input directional data signals in a 360-degree circle. If the user manipulates the joystick 136 in a direction as he/she wishes, the joystick 136 outputs a signal representing the direction manipulated by the user.

[0078] The jog switch (e.g., USPN 7091430) 138 is input with a manipulation about a direction from a user. The jog switch 138 has a stick smaller than the joy stick 136, and may move with similar circular and angular movements to the joy stick 136. If the user manipulates the jog switch in a direction as he/she wishes, the jog switch 138 outputs a signal concerning the direction manipulated by the user.

[0079] As described above, the input unit 130 includes various types of input tools and methods for a user to input a variety of commands or instructions via the input apparatus 100. The signals output from the motion detector 110 and the input unit 130 may be analog or digital signals.

[0080] If an analog signal for a motion is input from the motion detector 110 and an analog signal for a user manipulation is input from the input unit 130, the A/D converter 120 converts these signals to a digital signal that is detectable by the controller 140. That is, the A/D converter 120 performs an analog/digital conversion with respect to the input analog signals. If digital signals are received, the A/D converter 120 omits the analog/digital conversion and transmits the received signals to the controller 140. If a combination of analog and digital signals are received, the A/D converter converts the analog signals to digital signals and transmits all the digital signals to the controller 140.

[0081] The transmitter 150 transmits a command generated by the controller 140 to a device which is to be controlled by the input apparatus 100 (hereinafter, referred to as a "to-be-controlled device"). The to-be-controlled device may be directly connected to the input apparatus 100 through a wire or other physical connection or may be remote controlled wirelessly or through another non-physical connection.

[0082] For example, an MP3 player, a PMP, and a mobile phone exemplify the to-be-controlled devices directly or remotely connected to the input apparatus 100. The input apparatus 100 may be a direct or remote controller of a TV that controls a TV at a remote distance. Other to-be-controlled devices that may be controlled directly or remotely include, but are not limited to, computer monitors, digital cameras and camcorders, PDAs, music players, digital telephones, or other devices with input or display screens.

[0083] If the input apparatus 100 is a remote controller, the transmitter 150 may adopt one of a radio frequency (RF) module, Zigbee, Bluetooth, and Infra-Red (IR), or other transmission modes known in the art.

[0084] The controller 140 controls the operations of the input apparatus 100. The controller 140 generates a predetermined command as a result of various motions detected by the motion detector 110 and a user manipulation input to the input unit 130. The controller 140 uses a memory unit 160 that may or may not be located within the controller 140 to permanently store program data, such as predetermined commands, and to temporarily store user motions detected by the motion detector 110, manipulations input via the input unit 130, and other data as needed. The input apparatus 100 may be programmed, through the input/output port unit 170 for example, to be upgraded with additional command sets or software. The input apparatus also includes the expandable input unit 144 to implement additional methods of inputting user manipulations via the input unit 130.

[0085] An example of a predetermined command is one to control a device connected with the input apparatus 100 or a device which is able to be remote controlled. That is, the controller 140 may generate a command to control a host device which is to be controlled by the input apparatus 100 using information input from at least one of the motion detector 110 and the input unit 130.

[0086] More specifically, the controller 140 may generate a move command to move a pointer displayed on a screen using various motions detected by the motion detector 110 and user manipulations input to the input unit 130.

[0087] The move command may be a command to move a pointer displayed on a TV or a monitor. The move command may use an absolute coordinate value method or a coordinate transformation value method.

[0088] As an example, the user manipulation input to the input unit 130 may be a user touch input through the touch input unit 132 or a direction manipulation input through a direction manipulation input unit.

[0089] The direction manipulation input unit mainly serves to manipulate directions. For example, the direction manipulation input unit may be direction buttons of the button unit 134, the joystick 136, or the jog switch 138.

[0090] In an exemplary case, the controller 140 generates a move command to move a

pointer in a same direction as that of a motion detected by the motion detector 110. Also, the controller 140 may generate a move command to move a pointer in the same direction as that of a touch input to the touch input unit 132. Also, the controller 140 may generate a move command to move a pointer in the same direction as a direction input through one of the direction manipulation input units.

[0091] Since a motion detected by the motion detector 110 is of low sensitivity but is easy to accelerate, it is advantageous that a user uses the motion detector 110 when moving a pointer quickly.

[0092] Also, since the touch input unit 132, the direction buttons of the button unit 134, the joystick 136, and the jog switch 138 are not easy to accelerate but their manipulations are of high sensitivities, they are used to minutely move a pointer.

[0093] For example, in order to move a pointer displayed on a TV quickly, the user simply moves the input apparatus 100 in a direction as he/she wishes. In addition, if a minute movement of the pointer is required to select a specific item in a desired direction, the user simply may use one of the touch input unit 132, the direction buttons of the button unit 134, the joystick 136, and the jog switch 138, or other input elements as described herein.

[0094] As described above, if the motion detector 110 and the input unit 130 are used to move a pointer displayed on a screen, the user can move the pointer more conveniently with the input apparatus 100 which is capable of detecting various motions.

[0095] The controller 140 combines the signals received from motions detected by the motion detector 110 and the signals received from a user manipulation input through the input unit 130, thereby generating a single command to be transmitted to the transmitter 150.

[0096] More specifically, if a user manipulation is input through the input unit 130 and if a motion is detected by the motion detector 110 simultaneously or within a predetermined time after the user manipulation is input, the controller 140 generates a single command by combining the input manipulation and the detected motion.

[0097] In another embodiment of the present general inventive concept, if no motion is detected for a predetermined time after a user manipulation is input, generating a command using the user manipulation is canceled. That is, a predetermined time after one of a detected motion and a user manipulation is input is a time limit by which the other one must be input.

[0098] Also, if a motion is detected by the motion detector 110 and if a user manipulation is

input through the input unit 130 simultaneously or within a predetermined time after the motion is detected, the controller 140 generates a single command by combining the detected motion and the input manipulation. On the other hand, if no user manipulation is input for a predetermined time after a motion is detected, generating a command using the detected motion is canceled.

[0099] The input unit 130 includes at least one of the touch input unit 132, the button unit 134, the joystick 136, and the jog switch 138, or other input elements as described herein. The various units within the input unit 130 may work independently, or may be combined on one input apparatus in different configurations.

[00100] In operation, the controller 140 activates both of the motion detector 110 and the input unit 130. That is, the controller 140 is controlled to always check which of the motion detector 110 and the input unit 130 receives an input.

[00101] In another embodiment, in order to initially detect a motion, the controller 140 may have the ability to activate only the motion detector 110 and may deactivate the input unit 130. After a motion is detected by the motion detector 110, the controller 140 may activate the input unit 130 for a predetermined time.

[00102] On the other hand, in order to initially detect a user manipulation of the input unit 130, the controller 140 may activate only the input unit 130 and may deactivate the motion detector 110. Also, after a user manipulation is detected at the input unit 130, the controller may activate the motion detector 110 for a predetermined time.

[00103] As described above, the input apparatus 100 capable of motion detection provides various functions.

[00104] Hereinafter, a process of generating a command to move a pointer using the input apparatus 100 capable of motion detection will be described with reference to FIGS. 1 and 2.

[00105] FIG. 2 illustrates a process of generating a pointer move command according to an exemplary embodiment of the present general inventive concept.

[00106] The motion detector 110 determines whether the input apparatus 100 is moved or not (operation S210). If the input apparatus 100 is moved (operation S210-Y), the motion detector 110 detects a motion of the input apparatus 100 (operation S220).

[00107] At operation S220, the motion detector 110 detects a translation using the acceleration sensor 113 and detects a rotation using the angular velocity sensor 116. Also, the

motion detector 110 transmits information about the translation and the rotation to the controller 140 (operation S225).

[00108] The controller 140 generates a move command to move a pointer in the same direction as that of the detected motion (operation S230). For example, the controller 140 projects a detected moving trajectory of the input apparatus 100 onto a plane corresponding to a screen of a TV and generates a pointer move command to move a pointer on the TV screen along the trajectory projected onto the plane.

[00109] The input apparatus 100 transmits the generated move command to a to-be-controlled device (operation S280). The to-be-controlled device may be directly connected to the input apparatus 100 or may be remote controlled by the input apparatus 100.

[00110] If the input apparatus 100 is not moved (operation S210-N), the input apparatus 100 determines whether a touch is input through the touch input unit 132 (operation S240). If a touch is input (operation S240-Y), the motion detector 110 transmits information about the touch to the controller 140 (operation S245). The controller 140 generates a pointer move command to move a pointer in the same direction as that of the input touch (operation S250). Then, the input apparatus 100 transmits the generated move command to the to-be-controlled device (operation S280).

[00111] If no touch is input (operation S240-N), the input apparatus 100 determines whether a user manipulation for direction is input through the input unit 130 (operation S260). If a user manipulation of a direction is input (operation S260-Y), the controller 140 generates a pointer move command to move a pointer in the same direction as that of the input manipulation (operation S270). Herein, the manipulation of a direction is made by at least one of the direction button of the button unit 134, the joystick 136, the jog switch 138, or other direction manipulation input units.

[00112] Then, the input apparatus 100 transmits the generated move command to a to-be-controlled device (operation S280).

[00113] The above-described process will now be described in detail with reference to FIGS. 1 5A-5C, 6A-6C, 7A-7C, and 8. FIGS. 5A to 5C are views illustrating operations of moving the input apparatus in an upper right direction and then inputting a touch manipulation in a lower right direction through the touch input unit. FIG. 8 is a view illustrating a result of manipulations of FIGS. 5A-5C, 6A-6C and 7A-7C.

[00114] In FIGS. 5A-5C, 6A-6C, 7A-7C, and 8 , the input apparatus 100 is a remote controller but is not limited to this.

[00115] FIGS. 5A to 5C, the input apparatus 100 is initially moved from one position as illustrated in FIG. 5A in an upper right direction to a second position illustrated in FIG. 5B. Accordingly, the motion detector 110 detects an upper right motion 510 of the input apparatus 100. As illustrated in FIG. 5C, it can be seen that a user 530 may also input a t lower right direction touch manipulation 520 to the touch input unit 132. Accordingly, the touch input unit 132 is input with a lower right direction touch manipulation 520.

[00116] The controller 140 illustrated in FIG. 1 may generate a pointer move command corresponding to the upper right motion 510 of the input apparatus 100 and the lower right direction touch manipulation 520. A movement of a pointer displayed on a screen of a to-be-controlled device is illustrated in FIG. 8.

[00117] As shown in FIG. 8, a pointer 800 is moved according to the upper right motion 510 of the input apparatus 100 and the lower right direction touch manipulation 520.

[00118] According to the upper right motion 510 of FIG. 5A, the pointer 800 of FIG. 8 moves along an upper right moving trajectory 810. Also, according to the lower right direction touch manipulation 520 illustrated in FIG. 5C, the pointer 800 of FIG. 8 moves along a lower right moving trajectory 820.

[00119] As described above, the input apparatus 100 may generate a pointer move command based on both motion and touch manipulation so that a user can move the pointer more precisely than is known in the related art using the motion of the input apparatus 100 and the touch manipulation.

[00120] The input apparatus 100 thus enables a speedy motion of the input apparatus 100 when moving a pointer speedily in a desired direction. Also, the input apparatus 100 enables a minute manipulation of a moving trajectory, the user can minutely move a pointer to a desired item using the touch manipulation.

[00121] Although this embodiment is realized by a motion of the input apparatus 100 and a manipulation of the touch input unit 132, other manipulations regarding directions can be used. Hereinafter, manipulations of the button unit 134 and the jog switch 138 will be described with reference to FIGS. 6A-6C and 7A-7C.

[00122] FIGS. 6A-6C are views illustrating operations of moving the input apparatus in an

upper right direction and then pressing a lower right direction button according to an exemplary embodiment of the present general inventive concept.

[00123] In FIGS. 6A-6C, the input apparatus is initially moved from one position in FIG. 6A in an upper right direction to a second position illustrated in FIG. 6B. Accordingly, the motion detector 110 detects an upper right motion 610 of the input apparatus 100. As illustrated in FIG. 6C, it can be seen that a user 530 may press a lower right direction button 620 on the button unit 134 to manipulate a pointer in a lower right direction.

[00124] The controller 140 illustrated in FIG. 1 may generate a pointer move command corresponding to the upper right motion 610 of the input apparatus 100 and a lower right direction button manipulation 620. The pointer displayed on the screen of the to-be-controlled device is moved as illustrated in FIG. 8.

[00125] As shown in FIG. 8, the pointer 800 moves according to the upper right motion 610 of the input apparatus 100 and the lower right direction button manipulation 620.

[00126] The pointer 800 of FIG. 8 moves along the upper right moving trajectory 810 according to the upper right motion 610 of FIG. 6A. Also, the pointer 800 of FIG. 8 moves along the lower right moving trajectory 820 according to the lower right direction button manipulation 620 of FIG. 6C.

[00127] As described above, the input apparatus 100 may generate a pointer move command using both of the motion and the button manipulation so that a user can move the pointer better than is known to the related art using the motion of the input apparatus and the button manipulation.

[00128] The input apparatus 100 thus enables a speedy motion of the input apparatus 100 when moving the pointer speedily in a desired direction. Also, the input apparatus 100 enables a minute manipulation of the moving trajectory, such that the user can minutely move a pointer to a desired item using the button manipulation.

[00129] FIGS. 7A-7C are views illustrating operations of moving the input apparatus in an upper right direction and then manipulating the jog switch in a lower right direction according to an exemplary embodiment of the present general inventive concept.

[00130] In FIGS. 7A-7C, the input apparatus 100 is initially moved from one position as illustrated in FIG. 7A in an upper right direction to a second position as illustrated in FIG. 7B. Accordingly, the motion detector 110 detects an upper right motion 710 of the input apparatus

100. As illustrated in FIG. 7C, it can be seen that the user 530 may manipulate the jog switch 138 in a circular downward right direction 720. Accordingly, the jog switch 138 is input with a downward right direction manipulation 720. The jog switch 138 may be manipulated clockwise or counter-clockwise to rotate 360 degrees.

[00131] The controller 140 illustrated in FIG. 1 may generate a pointer move command corresponding to the upper right motion 710 of the input apparatus 100 and the downward right direction manipulation 720. The pointer displayed on the screen of the to-be-controlled device is moved as illustrated in FIG. 8.

[00132] As illustrated in FIGS. 7A-7C and 8, the pointer 800 moves according to the upper right motion 710 of the input apparatus 100 and the downward right direction manipulation 720.

[00133] More specifically, the pointer 800 of FIG. 8 moves along the upper right moving trajectory 810 according to the upper right motion 710 illustrated in FIG. 7A. Also, the pointer 800 of FIG. 8 moves along the lower right moving trajectory 820 according to the downward right direction manipulation 720, as illustrated in FIG. 7C.

[00134] As described above, the input apparatus 100 may generate a pointer move command using both motion of the input apparatus 100 and manipulation of the jog switch 138, so that a user can move the pointer using the motion of the input apparatus 100 and the manipulation of the jog switch 138.

[00135] The input apparatus 100 thus enables a speedy motion of the input apparatus 100 when moving the pointer speedily in a desired direction. Also, the input apparatus 100 enables a minute manipulation of the moving trajectory, such that the user can minutely move a pointer to a desired item using the manipulation of the jog switch 138.

[00136] As described above, the input apparatus 100 capable of motion detection generates a pointer move command to move the pointer displayed on the screen using the detected motion and the user manipulation.

[00137] Hereinafter, with reference to FIGS. 1, 3, 4, and FIGS. 9 to 16, operations of the input apparatus capable of motion detection and generating a predetermined command by combining a detected motion and a user manipulation will be described.

[00138] With reference to FIGS. 1 and 3 and FIGS. 9 to 12, the case in which a user manipulation is initially input and then a motion of the input apparatus 100 is detected will be described.

[00139] FIG. 3 illustrates a process of generating a single command by combining a motion of the input apparatus and a user manipulation if the user manipulation is input before moving the input apparatus according to another exemplary embodiment of the present general inventive concept.

[00140] At first, the input apparatus 100 determines whether a user manipulation is input to the input unit 130 or not (operation S310). Herein, the input unit 130 includes at least one of the touch input unit 132, the button unit 134, the joystick 136, and the jog switch 138, or other input elements as described herein.

[00141] If a user manipulation is input (operation S310-Y), it is determined whether a motion of the input apparatus 100 is detected or not (operation S320). If a user manipulation is not input (operation S310-N), the input unit 130 continues to determine whether a user manipulation is input or not (operation S310).

[00142] If no motion of the input apparatus 100 is detected (operation S320-N), the input apparatus 100 determines whether a predetermined time elapses (operation S350). If a predetermined time does not elapse (operation S350-N), the input apparatus 100 continues to determine whether a motion of the input apparatus 100 is detected or not (operation S320). If a predetermined time elapses (operation S350-Y), the input unit 130 goes back to operation S 310 to determine whether a user manipulation is input or not.

[00143] That is, if a motion is not detected during a predetermined time after a user manipulation is input, an operation of generating a command using the input user manipulation is canceled. That is, a predetermined time after one of a detected motion and a user manipulation is input is a time limit by which the other one must be input.

[00144] Otherwise, if a motion of the input apparatus 100 is detected (operation S320-Y), the motion detector 110 transmits information about the translation and the rotation to the controller 140 (operation S325). The controller 140 of the input apparatus 100 generates a single command by combining the input user manipulation data signals and the detected motion data signals (operation S330). Next, the input apparatus 100 transmits the generated command to a to-be-controlled device (operation S340). Herein, the to-be-controlled device may be directly connected to the input apparatus 100 or may be remote controlled by the input apparatus 100.

[00145] The above process will be described with reference to FIGS. 9 to 12 on the example that the input unit 130 is the touch input unit 132 and the button unit 134.

[00146] With reference to FIGS. 9 and 10, a process will be described that if a user touch is input and if a motion is detected simultaneously or within a predetermined time after the touch is input, a single command may be generated by combining signal data from the input touch and the detected motion .

[00147] FIG. 9 is a view illustrating operations of writing the letter "V" on the touch input unit 132 and then the motion of moving or tilting up the input apparatus in an upward direction according to another exemplary embodiment of the present general inventive concept.

[00148] As illustrated in FIG. 9, if a user writes the letter "V" on a touch input unit 132 and simultaneously or within a predetermined time afterwards, the user moves or tilts the up the input apparatus 100, the controller 140 of the input apparatus 100 may generate a command to raise the volume of the to-be-controlled device.

[00149] FIG. 10 is a view illustrating operations of writing the letter "V" on the touch input unit 132 and then the motion of moving or tilting down the input apparatus in a downward direction according to another exemplary embodiment of the present general inventive concept.

[00150] As illustrated in FIG. 10, if a user writes the letter "V" on the touch input unit 132 and simultaneously or within a predetermined time afterwards, the user moves or tilts down the input apparatus 100, the controller 140 of the input apparatus 100 may generate a volume down command to lower the volume of the to-be-controlled device.

[00151] If the signals sent from the motion detector 110 and the input unit 130 are analog signals, the analog signals are directed to the A/D converter 120 to be converted to digital signals. If the signals sent from the motion detector 110 and the input unit 130 are digital signals, the digital signals are transmitted through the A/D converter 120, without conversion, to the controller 140. The controller 140 combines the one or more signals received from the A/D converter 120 into a single signal that is delivered to the transmitter 150.

[00152] The input apparatus 100 transmits the generated volume up or volume down command to control the volume of a TV or other to-be-controlled device where sound volume may be raised or lowered.

[00153] As described above, the input apparatus 100 may generate a single command by combining user touch and detected motion signal data from the manipulation and movement of the input apparatus 100.

[00154] In another embodiment of the present general inventive concept, volume adjustment

by writing the letter “V” on the touch input unit 132 is described. However, any other function can be adjusted in such a manner. For example, a command to change the channel may be generated by writing the letter “C”, and a command to adjust a zoom may be generated by writing the letter “Z”. Other sound qualities and letters may be input depending on the to-be-controlled device. For example, “B” may represent the bass tone to be raised or lowered when the to-be-controlled device is a stereo receiver or similar device, and “T” may represent treble. These and other letters or words of the Standard English alphabet may be written on the input touch unit 132 and recognized by the controller 140 based on program data stored in the memory unit 160. Additional standard and non-standard character sets and foreign language sets may be stored in the memory unit 160 or input via the input/output port 170 to be accessed by the controller 140 to determine a variety of written characters that may represent a variety of different commands. The memory unit 160 may store recognition software to detect variations in letters and characters, or characters in other languages.

[00155] Hereinafter, with reference to FIGS. 11 and 12, a process will be described that if a button manipulation is input from a user and if a motion is detected simultaneously or within a predetermined after the button manipulation is input, a command may be generated by combining signal data from the input button manipulation and the detected motion.

[00156] FIG. 11 is a view illustrating operations of pressing a volume button and then moving up the input apparatus 100 according to another exemplary embodiment of the present general inventive concept.

[00157] As illustrated in FIG. 11, if a user presses a “Vol” button on the button unit 134 and if the user moves or tilts up the input apparatus 100 simultaneously or within a predetermined time after pressing the “Vol” button, the input apparatus 100 generates a volume up command. That is, if the user moves up the input apparatus while pressing the “Vol” button on the button unit 134 or within a predetermined time after pressing the button, the user can turn up the volume of the to-be-controlled device.

[00158] FIG. 12 is a view illustrating operations of pressing the volume button and then moving down the input apparatus 100 according to another exemplary embodiment of the present general inventive concept.

[00159] As illustrated in FIG. 12, if a user presses the “Vol” button on the button unit 134 and if the user moves or tilts down the input apparatus 100 simultaneously or within a predetermined time after pressing the “Vol” button, the input apparatus 100 generates a volume down

command. That is, if the user moves down the input apparatus 100 while pressing the “Vol” button on the button unit 134 or within a predetermined time after pressing the button, the user can turn down the volume of the to-be-controlled device.

[00160] The input apparatus 100 transmits the generated volume up or volume down command to a TV to control the volume of the TV or other to-be-controlled device where sound volume may be raised or lowered.

[00161] As described above, the input apparatus 100 generates a single command by combining the user button manipulation and the detected motion.

[00162] In this embodiment a volume control by pressing the “Vol” button on the button unit 134 is described. However, any other function can be controlled in such a manner. For example, the input apparatus 100 may generate a command to change the channel if a “CH” button is pressed, or other buttons may be configured to control various functions of other to-be-controlled devices.

[00163] In this embodiment, the input apparatus 100 is moved or tilted up and down. However, any other direction of motion may be detected and combined with a user manipulation. The various directions of motion and other manipulation techniques and their corresponding command signals may be stored in the controller 140 or in the memory unit 160.

[00164] As described above, if a user manipulation is input and if a motion is detected simultaneously or within a predetermined time after the user manipulation is input, the input apparatus 100 generates a single command by combining the input manipulation and the detected motion.

[00165] Hereinafter, the case in which a motion of the input apparatus 100 is initially detected and then a user manipulation is input will be described with reference to FIG. 4 and FIGS. 13-16.

[00166] At first, the input apparatus 100 determines whether a motion is detected or not (operation S410). If a motion is detected (operation S410-Y), it is determined whether a user manipulation is input to the input unit 130 or not (operation S420). If a motion is not detected (operation S410-N), the input apparatus 100 continues to determine whether a motion of the input apparatus 100 is detected or not (operation S410). Herein, the input unit 130 includes at least one of the touch input unit 132, the button unit 134, the joystick 136, and the jog switch 138, or other input elements as described herein, for example.

[00167] If no user manipulation is input to the input unit 130 (operation S420-N), the input apparatus determines whether a predetermined time elapses or not (operation S450). If a predetermined time does not elapse (operation S450-N), the input apparatus continues to determine whether a user manipulation is input to the input unit 130 or not (operation S420). On the other hand, if a predetermined time elapses (operation S450-Y), the input apparatus 100 goes back to operation S410 to determine whether a motion of the input apparatus 100 is detected or not (operation S410).

[00168] That is, if a user manipulation is not input for a predetermined time after a motion of the input apparatus 100 is detected, the operation of generating a command using the detected motion is canceled. That is, a predetermined time after one of a detected motion and a user manipulation is input is a time limit by which the other one must be input.

[00169] On the other hand, if a user manipulation is input to the input unit 130 (operation S420-Y), the motion detector 110 transmits information about the translation and the rotation to the controller 140 (operation S425). The controller 140 of the input apparatus 100 generates a command by combining the input user manipulation signal data and the detected motion data signals (operation S430). Also, the input apparatus 100 transmits the generated command to a to-be-controlled device (operation S440). Herein, the to-be-controlled device may be directly connected to the input apparatus 100 or may be remote controlled by the input apparatus 100.

[00170] The above process will be described in detail with reference FIGS. 13 to 16 on the examples that the input unit 130 is the touch input unit 132 and the button unit 134.

[00171] With reference to FIGS. 13 and 14, a process will be described that if a motion of the input apparatus 100 is detected and if a user touch manipulation is input simultaneously or within a predetermined time after the motion is detected, a single command may be generated by combining data signals from the input touch and the detected motion.

[00172] FIG. 13 illustrates operations of moving or tilting up the input apparatus and then writing the letter "V" on the touch input unit 132 according to another exemplary embodiment of the present general inventive concept.

[00173] As illustrated in FIG. 13, if a user moves or tilts up the input apparatus 100 and simultaneously or within a predetermined time after that if the user writes the letter "V" on the touch input unit 132, the input apparatus 100 generates a volume up command.

[00174] FIG. 14 is a view illustrating operations of moving or tilting down the input apparatus

and then writing the letter "V" on the touch input unit according to another exemplary embodiment of the present general inventive concept.

[00175] As illustrated in FIG. 14, if a user moves or tilts down the input apparatus 100 and simultaneously or within a predetermined time after that if the user writes the letter "V" on the touch input unit 132, the input apparatus 100 generates a volume down command.

[00176] The input apparatus 100 transmits the generated volume up or volume down command to a TV to control the volume of the TV or other to-be-controlled device where sound volume may be raised or lowered.

[00177] As described above, the input apparatus 100 generates a single command by combining the user touch data signals and the detected motion data signals.

[00178] In this embodiment, the volume being controlled by writing the letter "V" on the touch input unit 132 is described. However, any other function can be controlled in such a manner. For example, the input apparatus 100 may generate a command to change the channel by writing the letter "C", and may generate a command to adjust a zoom by writing the letter "Z". Additionally, numerous other characters as described above may be stored in the controller 140 or memory unit 160 to implement other features of the present general inventive concept.

[00179] Hereinafter, with reference to FIGS. 15 and 16, a process will be described that if a motion of the input apparatus 100 is detected and if a user button manipulation is input simultaneously or within a predetermined time after the motion is detected, a single command may be generated by combining signal data from the input button manipulation and the detected motion.

[00180] FIG. 15 is a view illustrating operation of moving or tilting up the input apparatus 100 and then pressing the volume button according to another exemplary embodiment of the present general inventive concept.

[00181] As illustrated in FIG. 15, if a user moves or tilts up the input apparatus 100 and simultaneously or within a predetermined time after that if the user presses a "Vol" button on the button unit 134, the input apparatus 100 generates a volume up command.

[00182] FIG. 16 is a view illustrating operations of moving or tilting down the input apparatus 100 and then pressing the volume button according to another exemplary embodiment of the present general inventive concept.

[00183] As illustrated in FIG. 16, if a user moves or tilts down the input apparatus 100 and

simultaneously or within a predetermined time after that if the user presses the "Vol" button on the button unit 134, the input apparatus 100 generates a volume down command.

[00184] The input apparatus 100 transmits the generated volume up or volume down command to a TV to control the volume of the TV or other to-be-controlled device where sound volume may be raised or lowered.

[00185] As described above, the input apparatus 100 generates a single command by combining the user button manipulation signal data and the detected motion signal data.

[00186] In this embodiment, the volume control by pressing the "Vol" button of the button unit 134 is described. However, any other function can be controlled in such a manner. For example, the input apparatus 100 may generate a command to change the channel if a "CH" button is pressed.

[00187] In the above embodiment, only the up and down motions of the input apparatus 100 are detected. However, other direction motions can be detected to be combined with the user manipulation. For example, a motion may be detected as the input apparatus 100 moves horizontally, such as side-to-side.

[00188] In this embodiment, the input apparatus 100 may be a remote controller type device. In this case, a user may remotely control a to-be-controlled device using the input apparatus 100. The to-be-controlled device may be a TV, a DVD player, an MP3 or other music player, a home theater, a set-top box, a stereo receiver, a digital camera, a personal or laptop computer, a digital camcorder, or the like.

[00189] The present general inventive concept can also be embodied as computer-readable codes on a computer-readable medium. The computer-readable medium can include a computer-readable recording medium and a computer-readable transmission medium. The computer-readable recording medium is any data storage device that can store data as a program which can be thereafter read by a computer system. Examples of the computer-readable recording medium include read-only memory (ROM), random-access memory (RAM), CD-ROMs, magnetic tapes, floppy disks, and optical data storage devices. The computer-readable recording medium can also be distributed over network coupled computer systems so that the computer-readable code is stored and executed in a distributed fashion. The computer-readable transmission medium can transmit carrier waves or signals (e.g., wired or wireless data transmission through the Internet). Also, functional programs, codes, and code segments to accomplish the present general inventive concept can be easily construed by programmers

skilled in the art to which the present general inventive concept pertains.

[00190] Also, the input apparatus 100 may be mounted on a specific device. In an exemplary embodiment, a user may control the specific device using the input apparatus 100 mounted on the specific device. In this case, the specific device on which the input apparatus 100 is provided may be an MP3 player, a mobile phone, a PMP, or a PDA, for example.

[00191] For example, if the input apparatus 100 is provided on the MP3 player, the volume of the MP3 player may be raised by moving or tilting up the MP3 player while pressing a volume button of the MP3 player and the volume may be lowered by moving or tilting down the MP3 player while pressing the volume button.

[00192] As described above, according to the exemplary embodiments of the present general inventive concept, the input apparatus 100 which generates a predetermined command by combining a motion detected by the motion detector 110 and a user manipulation input to the input unit 130 and the input method applied to the input apparatus 100 are provided so that the user can use the input apparatus 100 capable of motion detection in various manners.

[00193] Although a few embodiments of the present general inventive concept have been illustrated and described, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the general inventive concept, the scope of which is defined in the appended claims and their equivalents.

CLAIMS

What is claimed is:

1. An input apparatus, comprising:
a motion detector which detects a motion of the input apparatus;
an input unit which is input with a user manipulation; and
a controller which generates a predetermined command using a motion detected by the motion detector and a user manipulation input to the input unit.
2. The input apparatus as claimed in claim 1, wherein the controller generates a move command to move a pointer displayed on a screen using a motion detected by the motion detector and a user manipulation input to the input unit.
3. The input apparatus as claimed in claim 2, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input to the touch input unit, the controller generates a move command to move the pointer in the same direction as that of the input touch.
4. The input apparatus as claimed in claim 2, wherein the input unit includes a direction manipulation input unit which is input with a manipulation of a direction,
wherein, if a motion is detected by the motion detector, the controller generates a move command to move the pointer in the same direction as the detected motion, and if a manipulation of a direction is input to the direction input unit, the controller generates a move command to move the pointer in the same direction as the input direction.
5. The input apparatus as claimed in claim 4, wherein the direction manipulation input unit is at least one of a jog switch, a joystick and a direction button.
6. The input apparatus as claimed in claim 1, wherein the controller generates a predetermined command by combining a motion detected by the motion detector and a user manipulation input to the input unit.

7. The input apparatus as claimed in claim 6, wherein, if a user manipulation is input to the input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the user manipulation is input, the controller generates a command by combining an input manipulation signal and a detected motion signal.

8. The input apparatus as claimed in claim 6, wherein the input unit includes a touch input unit which is input with a user touch,
wherein, if a user touch is input to the touch input unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the touch is input, the controller generates a command by combining an input touch signal and a detected motion signal.

9. The input apparatus as claimed in claim 6, wherein the input unit includes a button unit having a plurality of buttons,
wherein, if a button manipulation is input to the button unit and if a motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the controller generates a command by combining a button manipulation signal and a detected motion signal.

10. The input apparatus as claimed in claim 6, wherein, if a motion is detected by the motion detector and if a user manipulation is input to the input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input manipulation signal.

11. The input apparatus as claimed in claim 6, wherein the input unit comprises a touch input unit which is input with a user touch,
wherein, if a motion is detected by the motion detector and if a user touch is input to the touch input unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and an input touch signal.

12. The input apparatus as claimed in claim 6, wherein the input unit comprises a button unit having a plurality of buttons,

wherein, if a motion is detected by the motion detector and if a button manipulation is input to the button unit simultaneously or within a predetermined time after the motion is detected, the controller generates a command by combining a detected motion signal and a button manipulation signal.

13. The input apparatus as claimed in claim 1, wherein the motion detector includes an acceleration sensor and an angular velocity sensor.

14 A method of inputting a command using an input apparatus, the method comprising:
detecting a motion of the input apparatus;
receiving a user manipulation; and
generating a predetermined command using the detected motion and the input user manipulation.

15. The method as claimed in claim 14, wherein the command generating operation generates a move command to move a pointer displayed on a screen using both of the detected motion and the input user manipulation.

16. The method as claimed claim 15, wherein the receiving operation receives a user touch, and, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if a touch is input, the command generating operation generates a move command to move the pointer in the same direction as that of the input touch.

17. The method as claimed in claim 15, wherein the receiving operation receives a manipulation of a direction,

wherein, if a motion is detected, the command generating operation generates a move command to move the pointer in the same direction as that of the detected motion, and if the manipulation of the direction is input, the command generating operation generates a move command to move the pointer in the same direction as the input direction.

18. The method as claimed in claim 17, wherein the manipulation of the direction is input by at least one of a jog switch, a joystick and a direction button.

19. The method as claimed in claim 14, wherein the command generating operation generates a predetermined command by combining the detected motion and the input user manipulation.

20. The method as claimed in claim 19, wherein, if the user manipulation is input and if the motion is detected simultaneously or within a predetermined time after the user manipulation is input, the command generating operation generates a command by combining an input manipulation signal and a detected motion signal.

21. The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the user touch is input and if the motion is detected simultaneously or within a predetermined time after the user touch is input, the command generating operation generates a command by combining an input touch signal and a detected motion signal.

22. The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,
wherein, if the button manipulation is input and if the motion is detected by the motion detector simultaneously or within a predetermined time after the button manipulation is input, the command generating operation generates a command by combining a button manipulation signal and a detected motion signal.

23. The method as claimed in claim 19, wherein, if the motion is detected and if the user manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input manipulation signal.

24. The method as claimed in claim 19, wherein the receiving operation receives a user touch,
wherein, if the motion is detected and if the user touch is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and an input touch signal.

25. The method as claimed in claim 19, wherein the receiving operation receives a user button manipulation,
wherein, if the motion is detected and if the button manipulation is input simultaneously or within a predetermined time after the motion is detected, the command generating operation generates a command by combining a detected motion signal and a button manipulation signal.

26. The method as claimed in claim 14, wherein the motion detecting operation detects a motion of the input apparatus using an acceleration sensor and an angular velocity sensor.

27. An input apparatus comprising:
a motion detector to detect motions of low sensitivities; and
a touch input unit to receive manipulations of high sensitivities.

28. An input apparatus comprising:
a motion detector to generate first signals to correspond to detected motions of the input apparatus;
an input unit to generate second signals to correspond to received user manipulations of the input apparatus; and
a controller to combine the first and second signals into a single command to be transmitted to a transmitter.

29. An input apparatus comprising:
a motion sensor to detect a translation using an acceleration sensor and detect a rotation using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller.

30. The input apparatus of claim 29, comprising:
a converter to receive a translation data signal and a rotation data signal.

31. An input apparatus to generate a pointer move command based on a motion of the input apparatus and touch manipulation.

32. An input apparatus comprising:
a controller to generate a command to raise or lower a volume of a to-be-controlled device when the input apparatus is moved up or down.
33. A method of inputting a command using an input apparatus, the method comprising:
detecting motions of low sensitivities; and
receiving manipulations of high sensitivities.
34. A method of inputting a command using an input apparatus, the method comprising:
generating first signals to correspond to detected motions of the input apparatus;
generating second signals to correspond to received user manipulations of the input apparatus; and
combining the first and second signals into a single command to be transmitted to a transmitter.
35. A method of inputting a command using an input apparatus, the method comprising:
detecting a translation using an acceleration sensor and detect a rotation using an angular velocity sensor and transmit information regarding the translation and the rotation to a controller.
36. The method of claim 35, comprising:
receiving a translation data signal and a rotation data signal into a converter.
37. A method of inputting a command using an input apparatus, the method comprising:
generating a pointer move command based on a motion of the input apparatus and touch manipulation.
38. A method of inputting a command using an input apparatus, the method comprising:

generating a command to raise or lower a volume of a to-be-controlled device when the input apparatus is moved up or down.

39. A method of inputting a command using an input apparatus, the method comprising:

- receiving a user manipulation input; and
- canceling command generation if no motion is detected by a motion detector within a predetermined time.

40. A computer readable medium to contain computer-readable codes as a program to perform a method, the method comprising:

- detecting a motion of the input apparatus;
- receiving a user manipulation; and
- generating a predetermined command using the detected motion and the input user manipulation.

ABSTRACT OF THE DISCLOSURE

An input apparatus and a command inputting method are described. The input apparatus generates a predetermined command using a motion detected by a motion detector and a user manipulation input to an input unit. Accordingly, a user can use the input device capable of motion detection in various manners to control a number of to-be-controlled devices.

FIG. 1

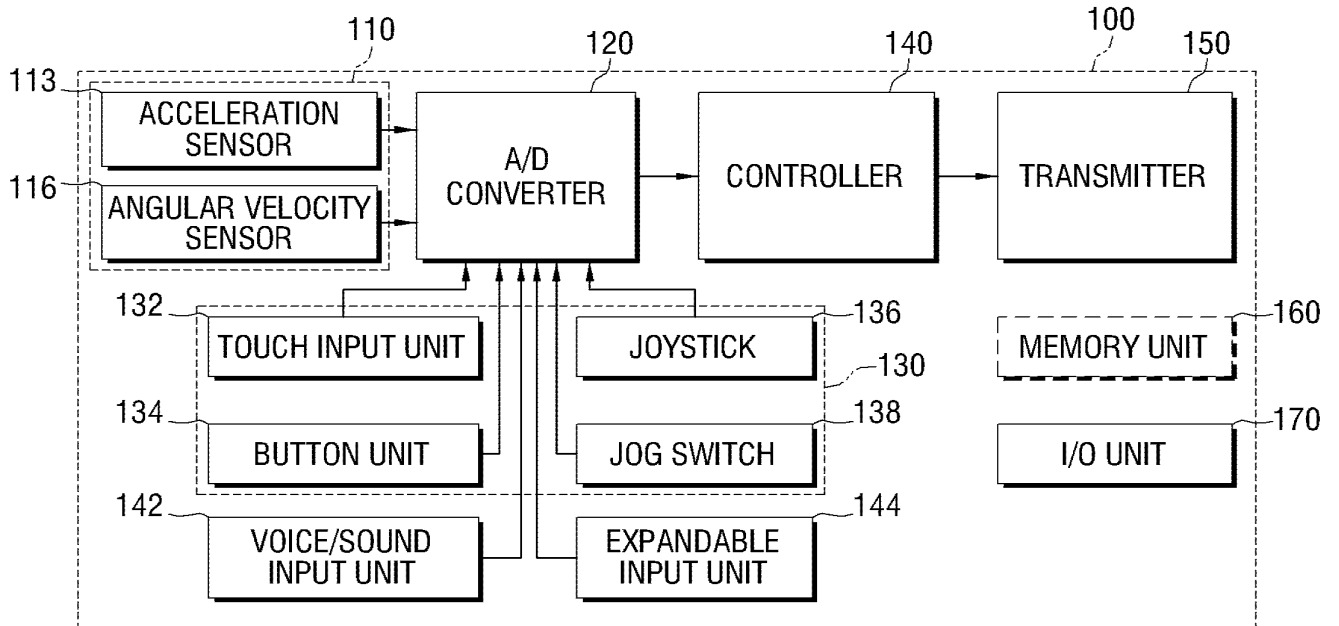


FIG. 2

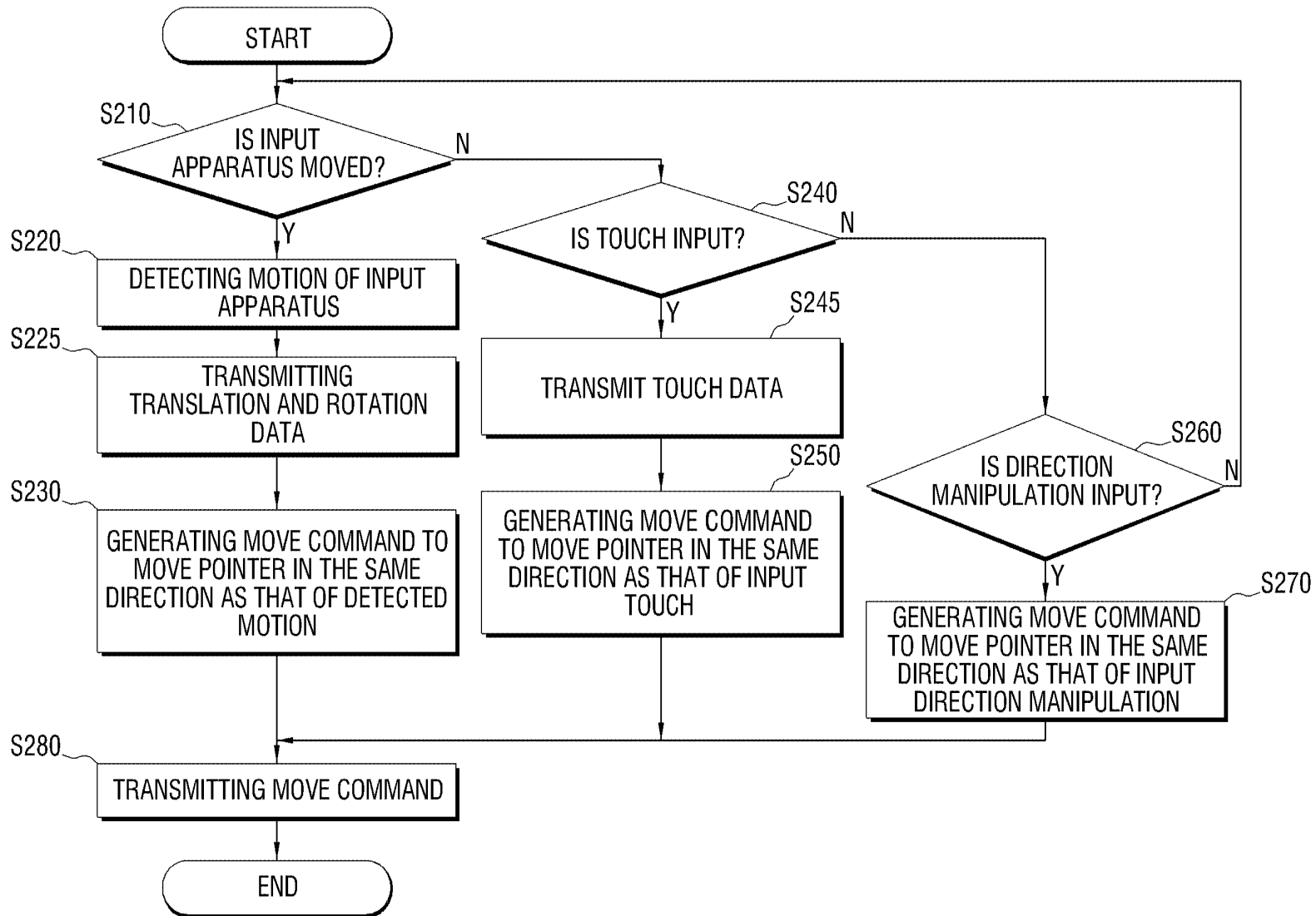


FIG. 3

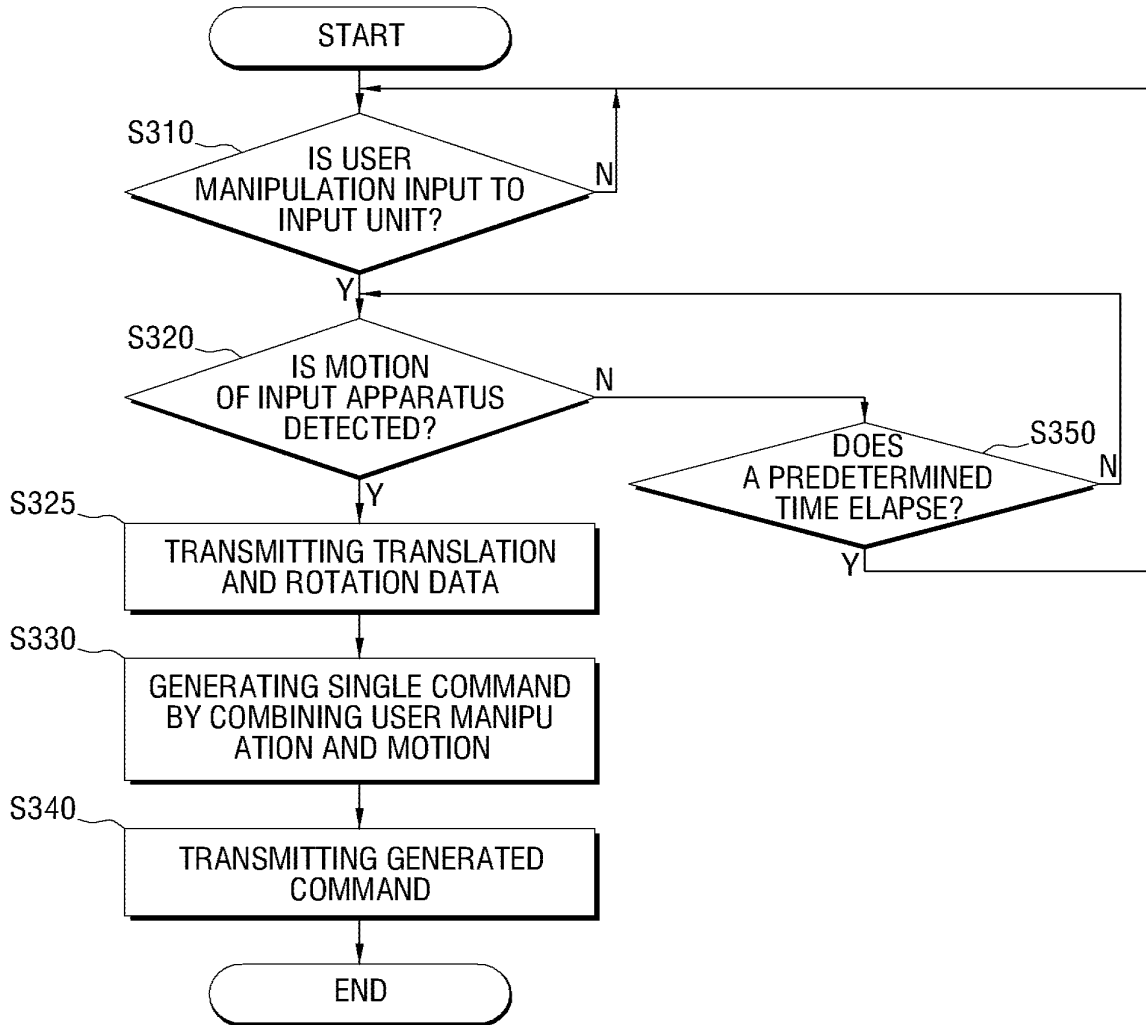


FIG. 4

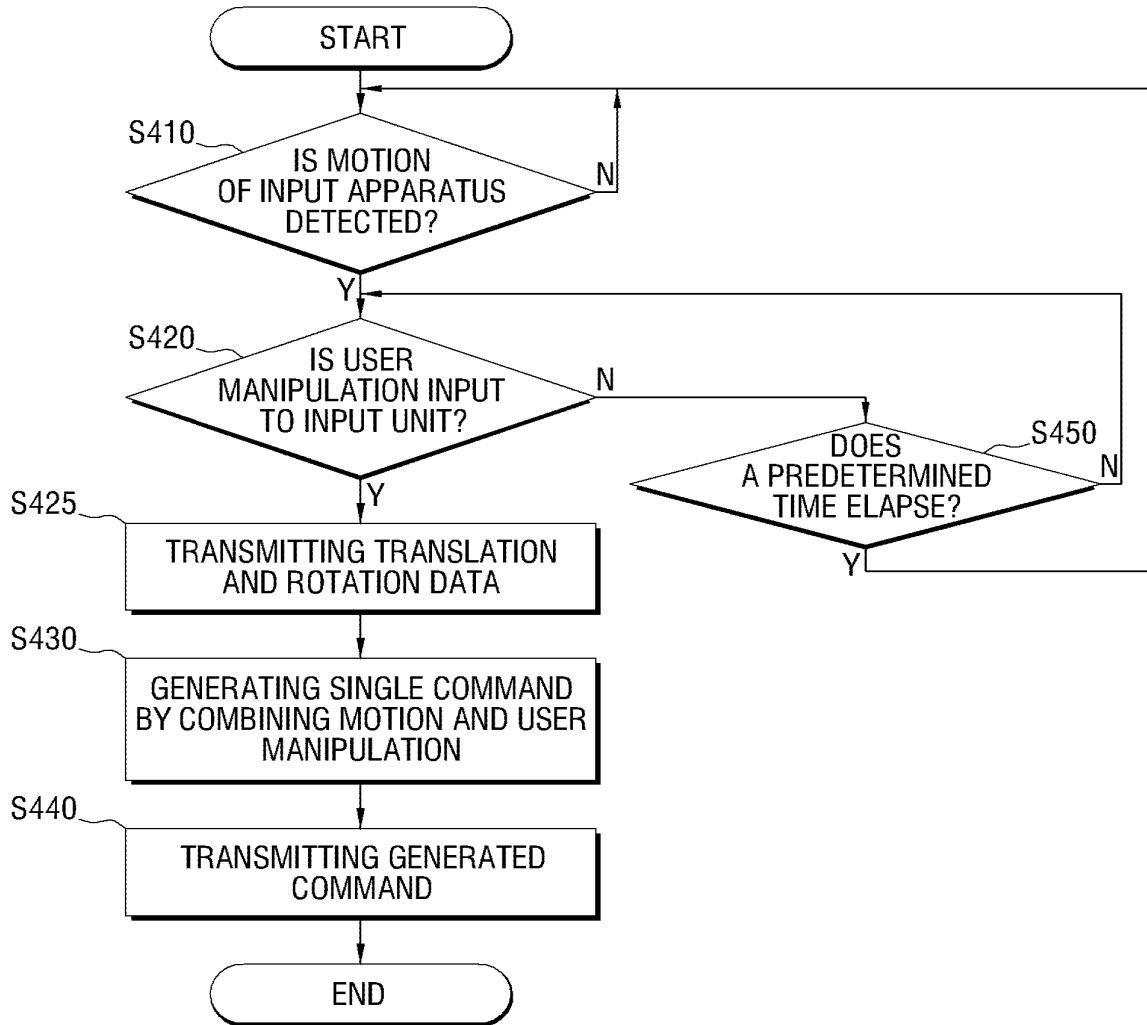


FIG. 5A

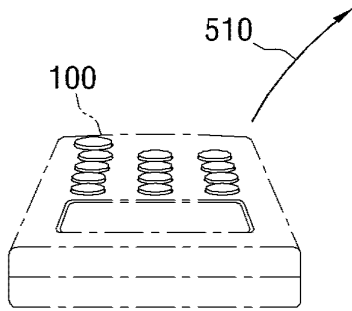


FIG. 5B

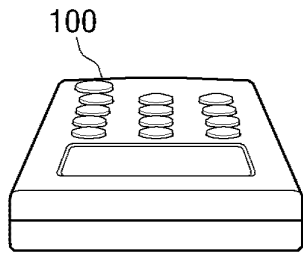


FIG. 5C

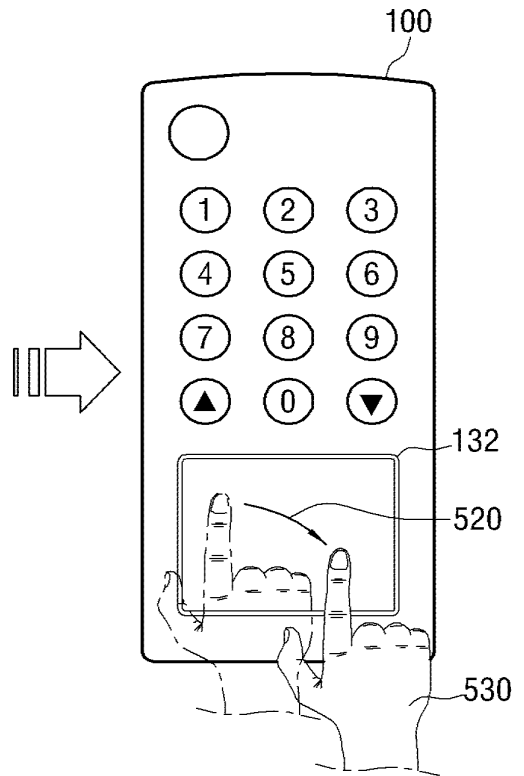


FIG. 6A

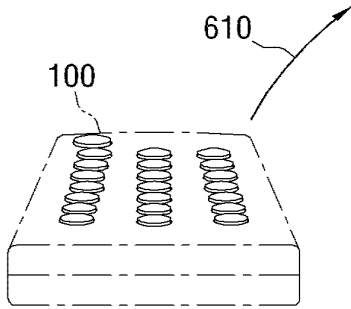


FIG. 6B

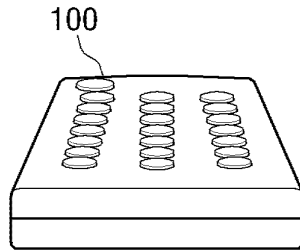


FIG. 6C

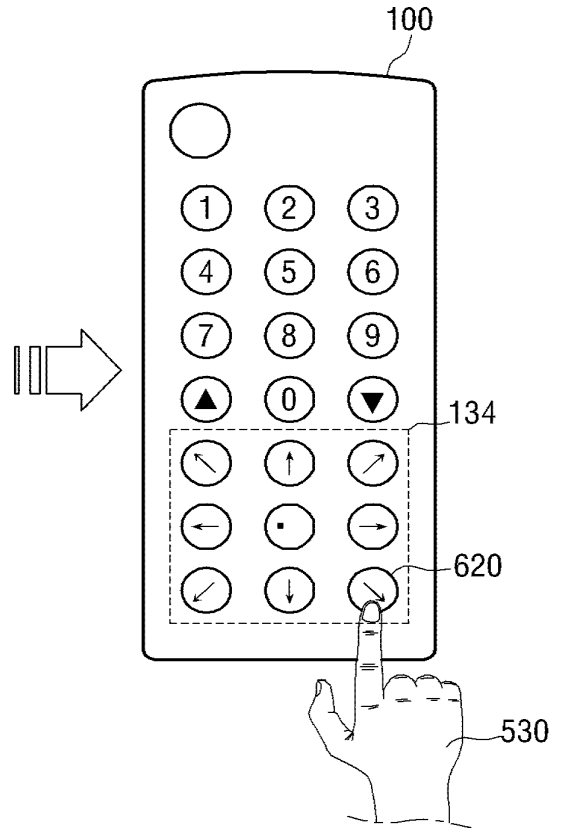


FIG. 7A

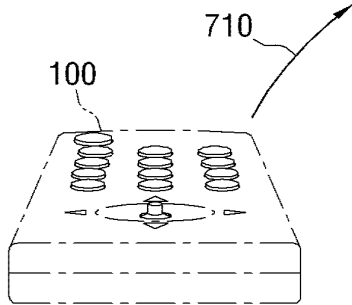


FIG. 7B

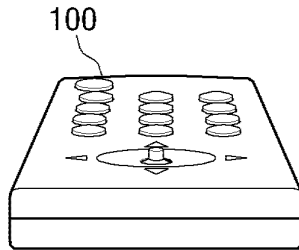


FIG. 7C

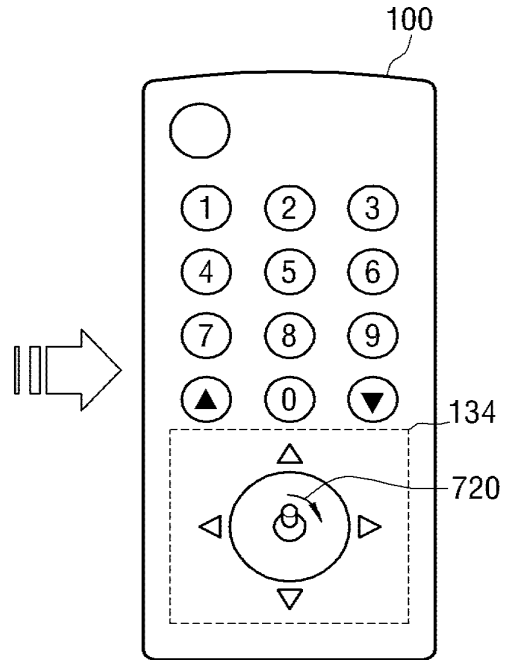


FIG. 8

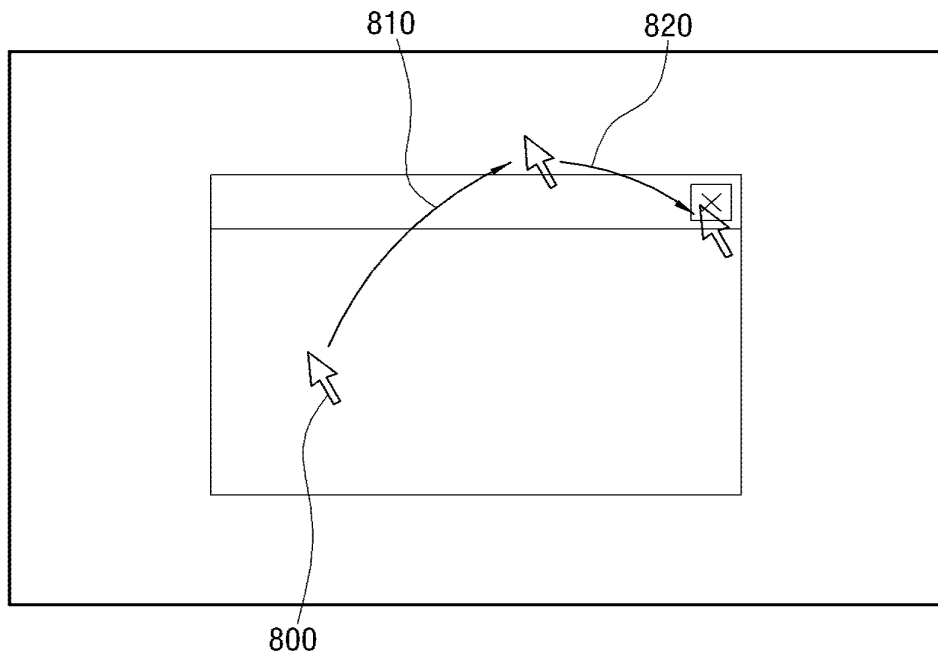


FIG. 9

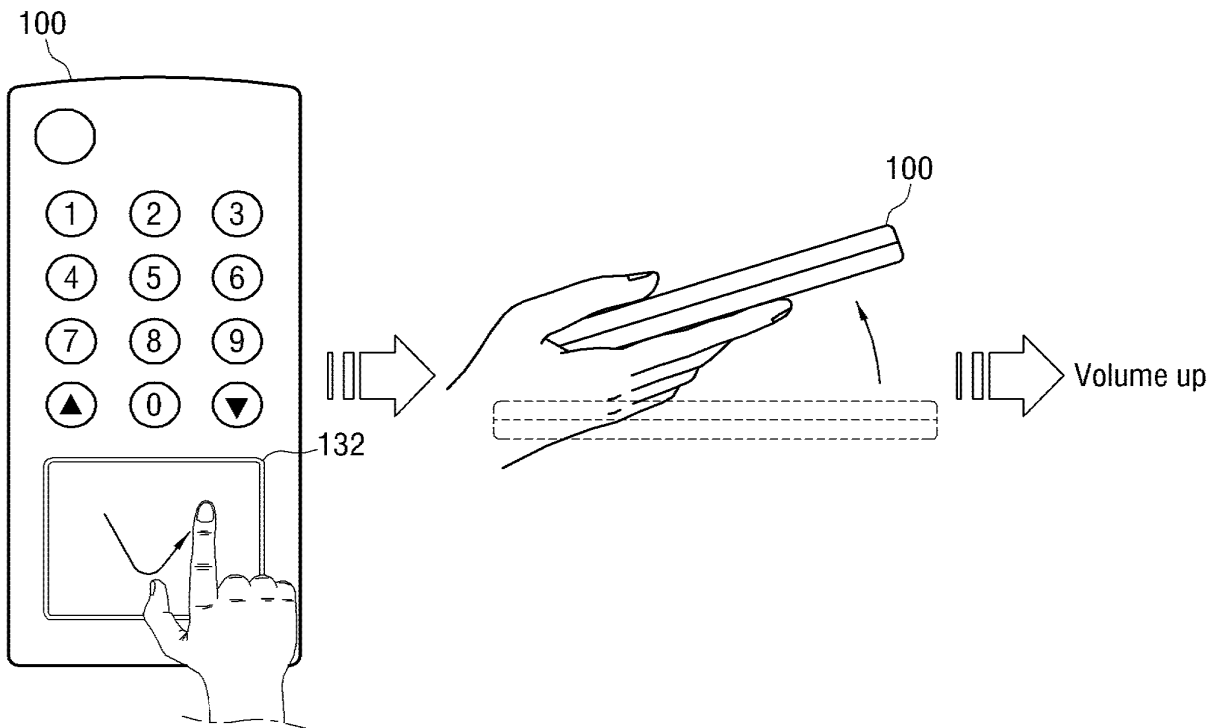


FIG. 10

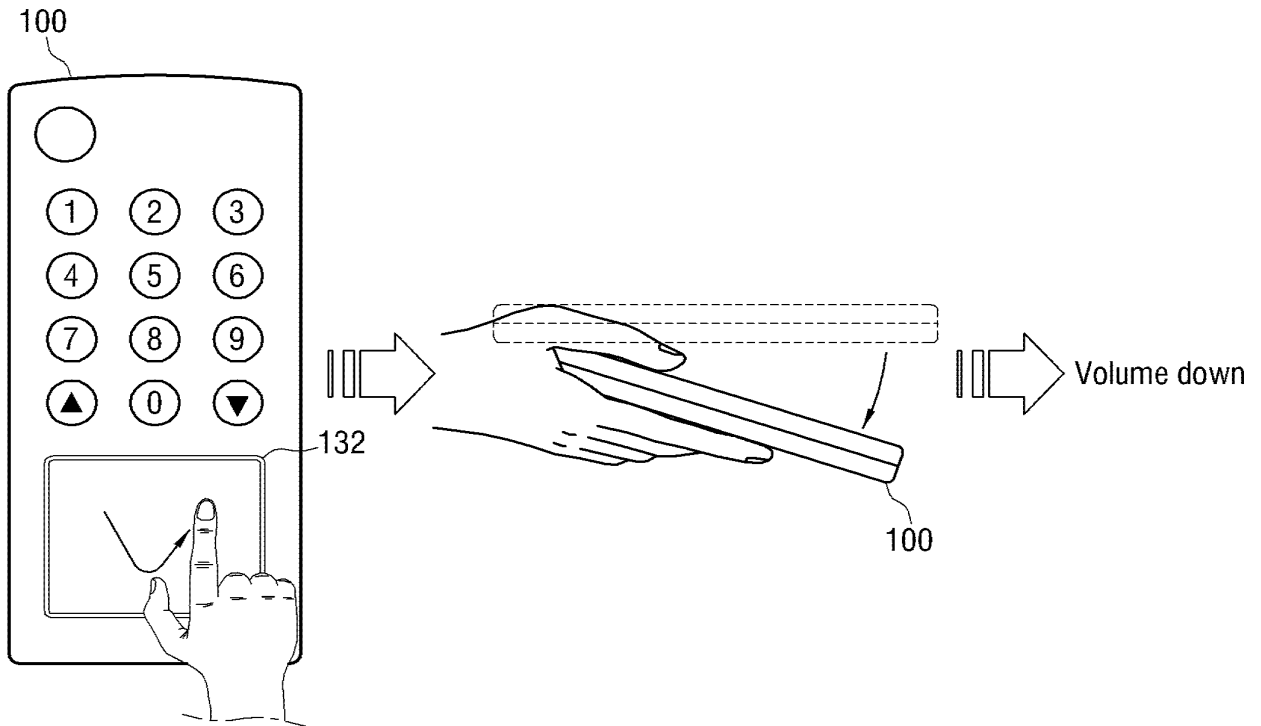


FIG. 11

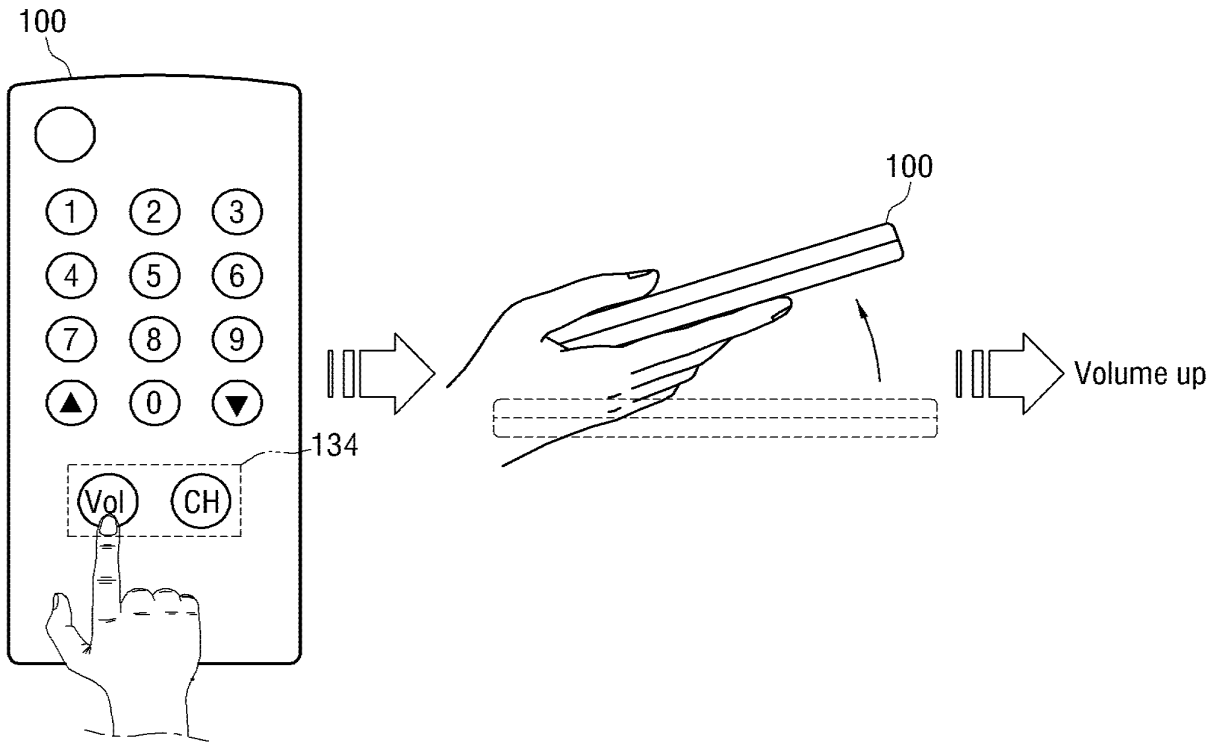


FIG. 12

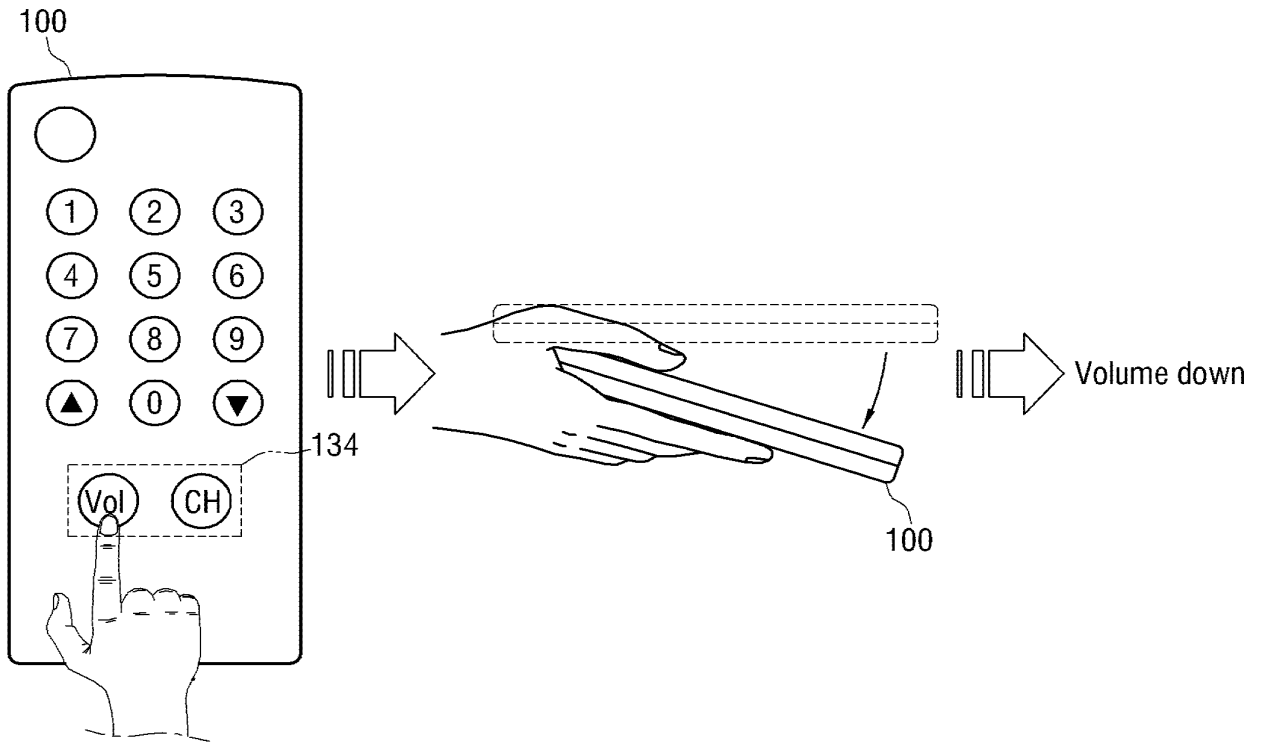


FIG. 13

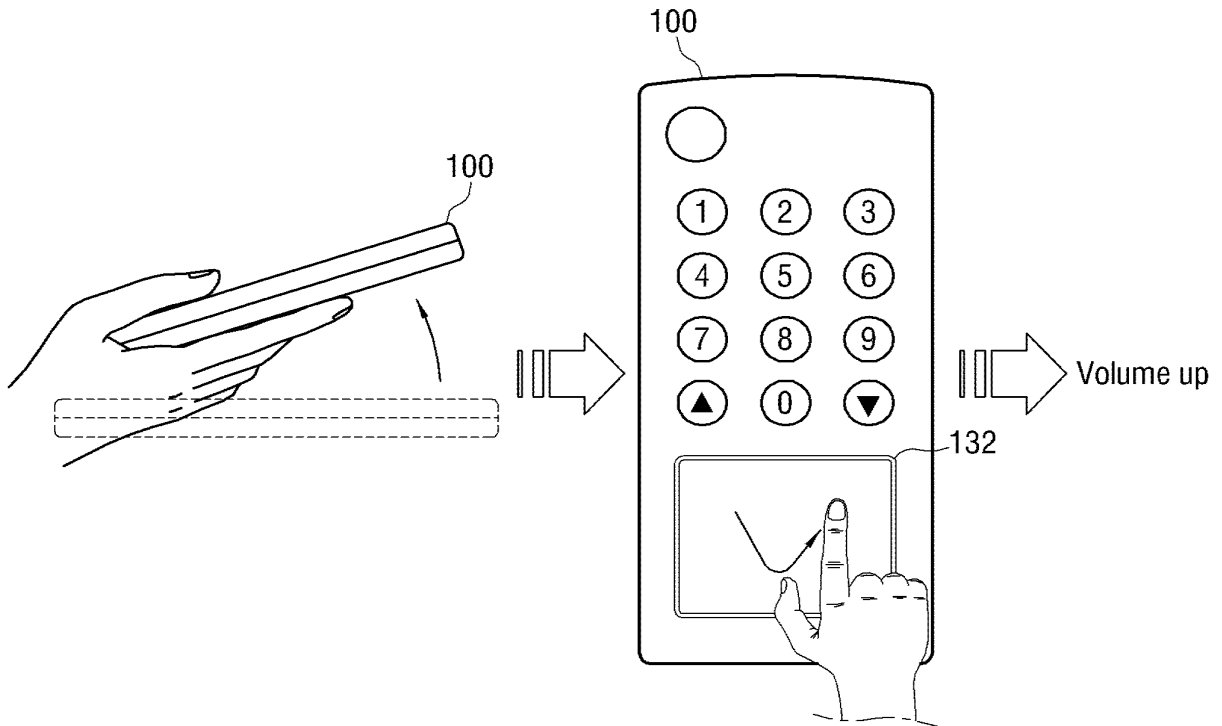


FIG. 14

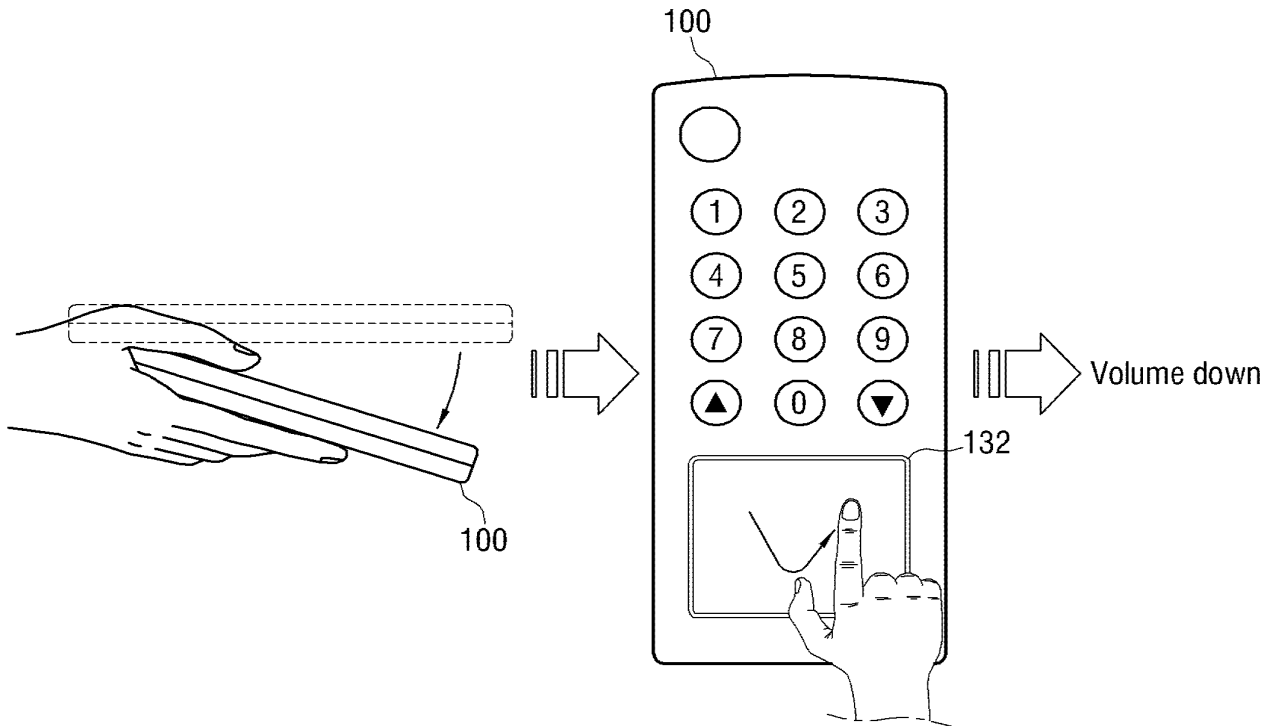


FIG. 15

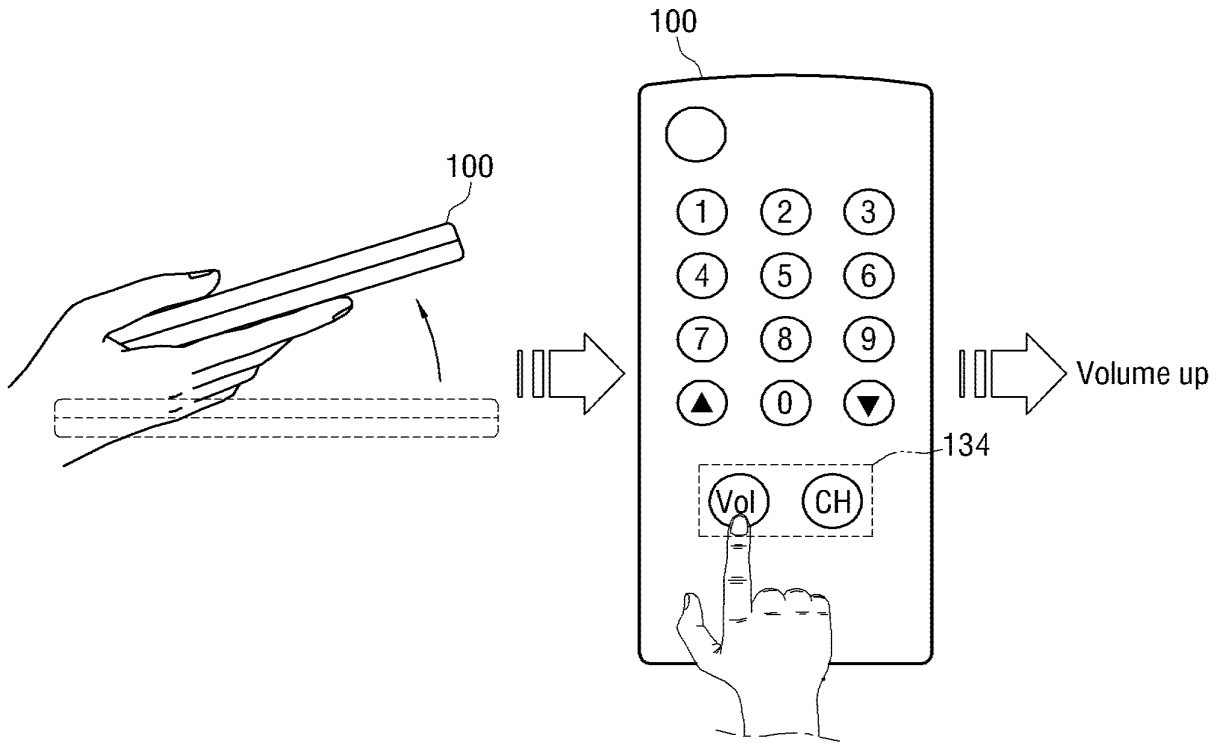
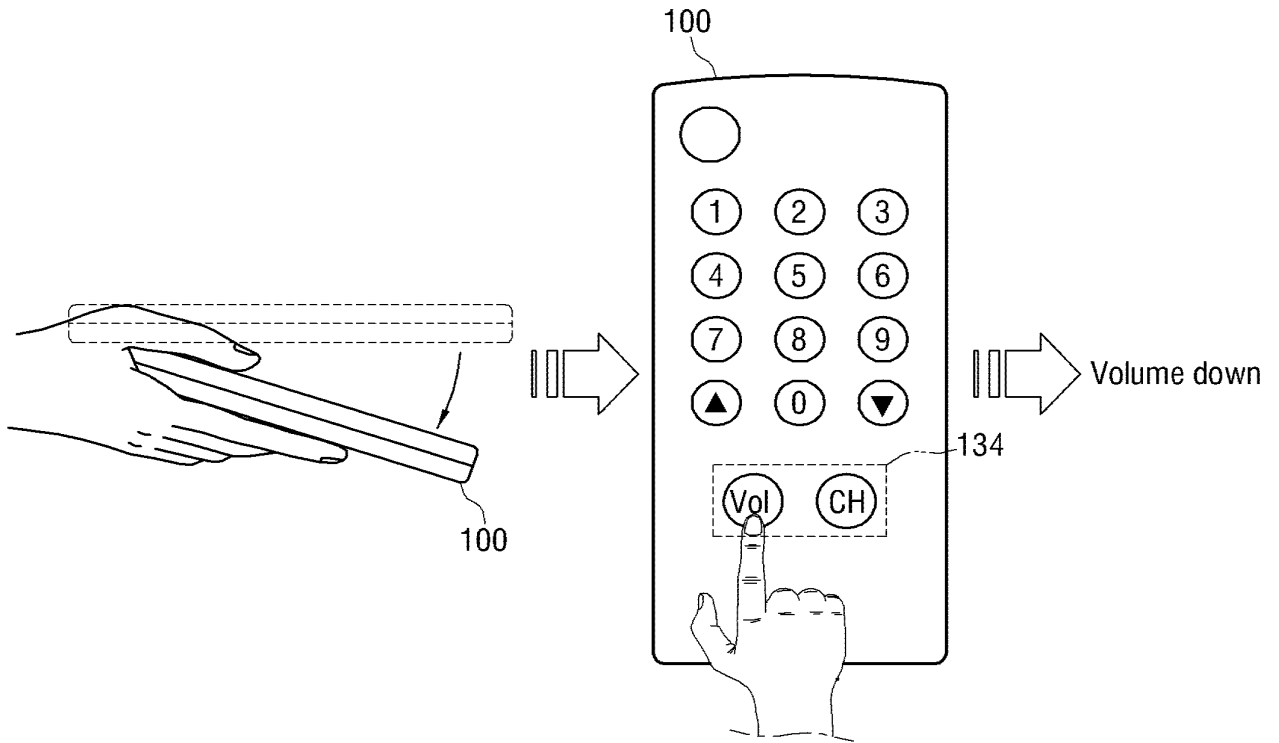


FIG. 16



COMBINED DECLARATION/POWER OF ATTORNEY FOR UTILITY/DESIGN PATENT APPLICATION

As a below named Inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe that I am the original, first and sole Inventor (if only one name is listed below) or an original, first and joint Inventor (If plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

INPUT APPARATUS USING MOTIONS AND USER MANIPULATIONS AND INPUT METHOD APPLIED TO SUCH INPUT APPARATUS

The specification of which is attached hereto, unless the following box is checked:

was filed on _____ as United States Application Number or PCT Application Number _____ and was amended on (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. § 1.56.

I hereby claim foreign priority benefit(s) under 35 U.S.C. § 119(a)-(c) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before the application on which priority is claimed.

Prior Foreign Application(s)

Priority NOT
Claimed

<u>2008-66996</u> (Number)	<u>Republic of Korea</u> (Country)	<u>10/July/2008</u> Day/Month/Year Filed
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I hereby claim the benefit under 35 U.S.C. § 120 or § 110(c) of any United States application(s), or § 365(c) of any PCT International application designating the United States listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
--------------------------	---------------	---------------------------------------

I hereby appoint the attorneys and agents of Stanzone & Kim, LLP under USPTO Customer No. 38,209 to prosecute the application and to transact all business in the Patent and Trademark Office connected therewith.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issues thereon.

Full name of sole or first inventor: Yong-jin KANG

Inventor's Signature: Yong Jin Kang Date: March 20, 2009

Residence: Suwon-si, Korea

Citizenship: Republic of Korea

Mailing address: 4-1511, Dongnam Apt., Maetan 4-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea

Full name of second inventor: Sung-han LEE

Inventor's Signature: Sung-han Lee Date: March 20, 2009

Residence: Hwaseong-si, Korea

Citizenship: Republic of Korea

Mailing address: 102-1103, Haenglim-maeul Samsung Raemian 1cha Apt., Gisan-dong, Hwaseong-si, Gyeonggi-do, Korea

Additional Inventors are being named on separately numbered sheets attached hereto.

COMBINED DECLARATION/POWER OF ATTORNEY FOR UTILITY/DESIGN PATENT APPLICATION

Full name of third inventor: Hyun-coog SHIN

Inventor's Signature: SHIN HYUN COOG Date: March 20, 2009

Residence: Suwon-si, Korea

Citizenship: Republic of Korea

Mailing address: 108-702, Hundai Apt., Gokbanjeong-dong, Gwonseon-gu, Suwon-si, Gyeonggi-do, Republic of Korea

Full name of fourth inventor: Dae-hyun KIM

Inventor's Signature: KIM DAE HYUN Date: March 20, 2009

Residence: Suwon-si, Korea

Citizenship: Republic of Korea

Mailing address: 3-1008, Doognam Apt., Maetan 4-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

Full name of fifth inventor: Eung-sik YOON

Inventor's Signature: Eung Sik Yoon Date: March 20, 2009

Residence: Suwon-si, Korea

Citizenship: Republic of Korea

Mailing address: WEST-404, Hyundai I-Park Apt., Yeongtong-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

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COMPLETE IF KNOWN

Application Number	
Filing Date	March 30, 2009
First Named Inventor	Yong-iin KANG
Art Unit	
Examiner Name	
Attorney Docket Number	102-1567

Send completed form to: Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313-1450

The undersigned hereby requests the USPTO retrieve an electronic copy of each of the following foreign applications for which benefit has been claimed under 35 U.S.C. 119(a)-(d) from a foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement:

Please retrieve (check all that apply)

- The following applications originally filed in participating offices (only list the Participating Office and the Participating Office Application Number (columns 1 and 2 below)):
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1. Participating Office with which the Priority Application, or the Copy, was filed (e.g., EPO)	2. Participating Office Application Number in which the Priority Application, or a Copy, was filed (e.g., 03101432)		3. Non-Participating Office Application Number (Priority Application), if applicable	
	App. No.	Filing Date	Office	App. No.
1. KIPO	2008-66996	2008-07-10		
2.				
3.				
4.				
5.				
6.				

This Request to Retrieve Electronic Priority Application(s) (Request) should be filed within the later of four months from the date of filing the above-identified application claiming foreign priority, or sixteen months from the filing date of the foreign application to which priority is claimed.

This Request should be submitted concurrently with the claim for priority, or thereafter. The USPTO will not attempt to retrieve the identified priority application(s) until applicant identifies the indicated priority application(s) on the oath or declaration or an application data sheet in compliance with 37 CFR 1.63(c).

Applicants are advised to consult Private PAIR (accessed through www.uspto.gov) to assure that the retrieval has been successful. The applicant remains ultimately responsible for the submission of the certified copy of the foreign application(s) within the period set forth in 37 CFR 1.55(a) (before the U.S. application issues as a patent) if the USPTO does not timely retrieve the identified priority application(s).

I hereby declare that I have the authority to grant access to the above-identified applications.

/Patrick J. Stanzione/

March 30, 2009

Signature

Date

Patrick J. Stanzione

202-775-1900

Printed or Typed Name

Telephone Number

Partner

40,434

Title

Registration Number, if applicable

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Filing Date: 03/30/09

Approved for use through 7/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/413,722
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APPLICATION AS FILED – PART I			SMALL ENTITY		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)				
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A	330
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	40	minus 20 = 20	X\$ 25		X\$50	1040
1 (37 CFR 1.16(h))	14	minus 3 = 11	X\$100		X\$210	2420
APPLICATION SIZE FEE (37 CFR 1.16(s))						
22-Aug			185		370	
			TOTAL	0	TOTAL	4550

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II					SMALL ENTITY		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =		
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =		
Application Size Fee (37 CFR 1.16(s))								
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				N/A		N/A		
				TOTAL ADD'T FEE		TOTAL ADD'T FEE		

APPLICATION AS AMENDED – PART II					SMALL ENTITY		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =		
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =		
Application Size Fee (37 CFR 1.16(s))								
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				N/A		N/A		
				TOTAL ADD'T FEE		TOTAL ADD'T FEE		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**