

## Foldable portable communication machine

### Abstract

**PROBLEM TO BE SOLVED:** To improve operability, to make a design to be clean-cut, to improve the strength of a casing case and to improve the formability of the casing. **SOLUTION:** A first easing 1, a second casing 2, a rocking axis 7 connecting the first easing 1 and the second easing 2 so that they can rock and a key 4 arranged on the rocking axis 7 are installed. A first face 8 that the first casing 1 has and a second face 9 that the second casing 2 has can be folded so that they are almost matched. The key 4 can be turned with a turning axis 13 as a center and the key 4 outputs a rotating direction. The number of keys arranged on the surface of the casing is reduced and the area of the opening part of the casing becomes small. The turning axis 13 is almost matched with the rocking axis 7. The key 4 can move in parallel to a direction 15 vertical to the turning axis 13 and it outputs on or off based on parallel movement. In the folded state, the key 4 is exposed to an outer part and a user can operate the key 4. A display part 19 is included in a third face 18 exposed to the outer part. When the key 4 is operated in the folded state, an operation situation is displayed on the display part 19.

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### Worldwide applications

2000 [JP](#)
**Application JP2000110660A events** 
**2000-04-12** Application filed by Nec Saitama Ltd, 埼玉日本電気株式会社

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### Claims (8)

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[Claims]

1. A first housing; a second housing; a swing shaft that swingably connects the first housing and the second housing; and a swing shaft disposed on the swing shaft. A key, wherein the first surface of the first housing and the second surface of the second housing can be folded so as to substantially coincide with each other; A foldable portable communication device, comprising: a rotatable shaft that is rotatable about the rotation shaft; and outputs a rotation direction of the key.
2. The foldable portable communication device according to claim 1, wherein the rotation axis substantially coincides with the swing axis.
3. The foldable portable communication device according to claim 2, wherein the key outputs an angle at which the key rotates.
4. The foldable portable communication device according to claim 2, wherein the key is movable in parallel in a direction perpendicular to the rotation axis, and outputs ON or OFF based on the parallel movement.
5. The foldable portable communication device according to claim 4, wherein the key is exposed to the outside when the first surface and the second surface substantially coincide with each other.
6. The display device according to claim 5, further comprising a display unit disposed on a third surface of the first housing, wherein the first surface and the second surface are substantially identical to each other when the first surface and the second surface substantially coincide with each other. A foldable portable communication device with three faces exposed to the outside.
7. The foldable portable communication device according to claim 6, wherein the display unit is a light emitting diode.
8. The foldable portable communication device according to claim 6, wherein the display unit is a liquid crystal display device.

### Description

#### DETAILED DESCRIPTION OF THE INVENTION

[0001]

BACKGROUND OF THE INVENTION 1. Field of the Invention The present invention relates to a foldable portable communication device, and more particularly to a foldable portable communication device having good operability and strength of a housing case. The present invention relates to a foldable portable communication device capable of further improving formability.

[0002]

2. Description of the Related Art Portable communication devices are required to be miniaturized in order to enhance their portability. A foldable portable communication device that is composed of a plurality of housings that can be connected by hinges and folded so that the size is small when not in use, easy to operate during use, and easy to see display is being developed.

[0003] Further, as the number of key buttons increases, the design of the portable communication device becomes complicated with the increase in the number of functions. To reduce the number of key buttons, menu selection is used for the operation. Scroll keys are useful for menu selection. The scroll key is also used for scrolling information displayed on the display unit of the portable communication device.

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[0005] In the known foldable portable communication device shown in FIG. 5, a display-side housing 101 having a display unit 105 and a button-side housing 102 having key buttons 106 and button-type scroll keys 104 have a hinge unit 103. Are connected so as to be foldable. With such a button-type scroll key 104, the user must press the key many times to scroll the item displayed on the display unit 105. Further, such a button-side housing 102 has a large opening area in which the button-type scroll key 104 is accommodated. Due to such openings, the strength of the housing is weakened, and when molding the case of the housing which is a molded product, the fluidity of the material is poor and the moldability is poor.

[0005]

SUMMARY OF THE INVENTION An object of the present invention is to provide a foldable portable communication device which has good operability and a simple design. It is another object of the present invention to provide a foldable portable communication device in which a housing case has high strength. It is still another object of the present invention to provide a foldable portable communication device with good moldability of a housing case.

[0006]

Means for solving the problem are described as follows. The technical items appearing in the expression are appended with numbers, symbols, etc. in parentheses (). The numbers, symbols, and the like are technical items that constitute at least one embodiment or a plurality of the embodiments of the present invention, in particular, the embodiments or the examples. Corresponds to the reference numerals, reference symbols, and the like assigned to the technical matters expressed in the drawings corresponding to the above. Such reference numbers and reference symbols clarify the correspondence and bridging between the technical matters described in the claims and the technical matters of the embodiments or examples. Such correspondence / bridge does not mean that the technical matters described in the claims are interpreted as being limited to the technical matters of the embodiments or the examples.

A foldable portable communication device according to the present invention swings a first housing (1), a second housing (2), and a first housing (1) and a second housing (2). Oscillating shaft (7) connected as possible

And a key (4) arranged on the pivot axis (7).

The key (4) can be folded so that the first surface (8) of the first housing (1) and the second surface (9) of the second housing (2) substantially match. ) Has a rotating shaft (13), is rotatable around the rotating shaft (13), and outputs the direction in which the key (4) rotates. With such an arrangement of the keys (4), the number of key buttons arranged on the housing surface is reduced, and the area of the opening of the housing case is reduced. The key (4) outputs two values depending on its rotation direction (14).

Preferably, the rotation axis (13) substantially coincides with the swing axis (7). Key (4) is key (4)

Outputs the angle at which. Since the rotation angle corresponds to the number of outputs, usability is improved.

The key (4) can move in parallel in a direction (15) perpendicular to the rotation axis (13), and outputs ON or OFF based on the parallel movement. With such a function, the number of key buttons arranged on the housing can be further reduced.

In a state where the first surface (8) and the second surface (9) are folded so as to substantially coincide with each other, the key (4) is exposed to the outside. In the folded state, the user presses the key (4)

Can be operated. Furthermore, the display unit includes a display unit (19) arranged on a third surface (18) of the first housing (1), and in a state where the first surface (8) and the second surface (9) are substantially coincident with each other, Third

The surface (18) is exposed to the outside. When the user operates the key (4) in the folded state, the operation status of the foldable portable communication device (10) is displayed on the display unit (19).

Such a display further improves usability.

The display section (19) is preferably a light emitting diode. More preferably, the display section (19) is a liquid crystal display device.

[0012]

DESCRIPTION OF THE PREFERRED EMBODIMENTS Corresponding to the drawings, an embodiment of a foldable portable communication device according to the present invention is formed of a display-side housing and a button-side housing, and is rotated by a hinge portion connecting these. An expression scroll key is provided. The display-side housing 1 has a display side surface 8 as shown in FIG.

The display section 5 is provided on the display side surface 8. Button side housing 2

Has a button side surface 9 and a plurality of key buttons 6 on the button side surface 9. The display-side housing 1 is a button-side housing 2

Are pivotally connected around a shaft 7 of the hinge portion 3. The portable communication device 10 includes a display side surface 8 of the display side housing 1.

And the button side surface 9 of the button-side housing 2 can be folded so as to substantially overlap with each other. Rotary scroll key 4

Are arranged on the hinge part 3.

FIG. 2 shows a cross section of the portable communication device 10. The display side housing 1 has a printed circuit board 11 inside. The button-side housing 2 has a printed circuit board 12 inside. The printed board 11 and the printed board 12 are electrically connected to each other by a flexible printed board or a cable (not shown) in order to perform the function of the portable communication device 10.

The rotary scroll key 4 has a rotating shaft 13, and has two rotating directions 1 around the rotating shaft 13.

4 is rotatable. The rotating shaft 13 is a shaft 7 of the hinge 3

It is generally consistent with. The rotary scroll key 4 is electrically connected to the printed board 11 or the printed board 12. The rotary scroll key 4 outputs the rotation direction and the rotation angle rotated by the user to the printed board 11 or the printed board 12. The rotary scroll key 4 has a switch unit 16. The rotary scroll key 4 can be pressed in a direction 15 that is substantially perpendicular to the rotation axis 8 and substantially perpendicular to the display side surface 8 or the button side surface 9. The switch unit 16 outputs ON or OFF based on whether or not the rotary scroll key 4 is pressed in the direction 15.

By providing the rotary scroll key 4 on the hinge part 3, the number of key buttons 6 arranged on the button side surface 9 of the button side housing 2 is reduced. The reduction in the number of key buttons 6 simplifies the design of the portable communication device 10,

The opening of the case of the button-side housing 2 is reduced. The reduction of the case opening improves the strength of the case. The case is manufactured by die molding. The reduction in the opening of the case further improves the flowability of the raw material during the molding of the case and improves the formability.

The function of the foldable communication device 10 is executed by menu selection using the rotary scroll key 4. A list of a plurality of items corresponding to the functions of the foldable communication device 10 is displayed on the display unit 5, and one of the items is selectively displayed so as to be distinguishable from other items. When the rotary scroll key 4 is rotated, the item selected and displayed changes according to the rotation angle. Rotary scroll key 4

Is pressed in the direction 15, the item selected and displayed is determined, and the function corresponding to the determined item is executed.

The rotary scroll key 4 is used for scrolling information displayed on the display unit 11. The information is exemplified by a telephone number, an address book, and the like. When the rotary scroll key 4 is rotated, the displayed information is scrolled according to the rotation angle.

With the button-type scroll key, the user must press the key several times to change the item. The rotary scroll key 4 allows the user to select an item only by rotating it with his / her finger, which is convenient.

In another embodiment of the foldable portable communication device according to the present invention, a rotary scroll key can be used in a folded state. As shown in FIG. 3, the rotary scroll key 4 is exposed to the outside when the foldable portable communication device 10 is folded. Surface 1 of display side housing 1

8 is provided with an LED 19. The surface 18 is a surface on the opposite side of the display side surface 8 of the display side housing 1.

When the rotary scroll key 4 is rotated with the foldable portable communication device 10 folded, the foldable portable communication device 10 has functions required in the folded state, such as adjustment of ringtone volume and sensitivity adjustment. Works. LED1

3 emits light based on this operation, blinking interval, color tone,

Alternatively, the user is notified of the operation status of the function by a change in illumination luminance. A liquid crystal display screen may be provided instead of the LED 19. In this case, the liquid crystal display screen displays the function in the folded state, and executes the function by selecting a menu.

In still another embodiment of the foldable portable communication device according to the present invention, a slide type scroll key is provided on a hinge portion. The sliding scroll key 2

1 has a rotating shaft 23, which substantially coincides with the shaft 7 of the hinge 3. The sliding scroll key 21 has two rotation directions 2 around a rotation axis 23. 4 and does not rotate more than a predetermined angle from the initial angle. The user can slide the scroll key 21

When the swing is stopped and the swing is stopped, the slide type scroll key 21 returns to the initial angle. The slide type scroll key 21 is electrically connected to the printed board 11 or the printed board 12. Sliding scroll key 21

Indicates the rotation direction rotated by the user

1 or output to the printed circuit board 12.

The slide type scroll key 21 has a switch unit 26. The sliding scroll key 21 is substantially perpendicular to the rotation axis 23 and

Alternatively, it can be pressed in a direction 25 substantially perpendicular to the button side surface 9. The switch unit 26 outputs ON or OFF based on whether or not the slide type scroll key 21 is pressed in the direction 25.

In the menu selection, the item selected and displayed changes as the slide type scroll key 21 is swung. If the slide type scroll key 21 has not returned to the initial angle, the selected and displayed item changes continuously. When the slide type scroll key 21 returns to the initial angle, the change of the item ends. When the slide type scroll key 21 is pressed in the direction 25, the item selected and displayed is determined, and a function corresponding to the determined item is executed.

[0024]

The foldable portable communication device according to the present invention has the following features.

The scroll keys are arranged on the hinge portion, and the number of key buttons arranged on the housing surface is reduced. The reduction in the number of key buttons simplifies the design and reduces the number of openings in the housing case. The reduction in the opening of the case improves the strength of the case, improves the fluidity of the material when forming the case, and improves the moldability.

[Brief description of the drawings]

FIG. 1 is a plan view showing a state in which a foldable portable communication device according to the present invention is opened.

FIG. 2 is a sectional view of the embodiment of the foldable portable communication device according to the present invention, in which a swing axis is a normal line and a plane including a rotary scroll key is a cut surface.

FIG. 3 is a plan view showing a state where the foldable portable communication device is folded.

FIG. 4 is a sectional view showing still another embodiment of the foldable portable communication device according to the present invention.

FIG. 5 is a plan view showing an embodiment of a known foldable portable communication device.

[Explanation of symbols]

DESCRIPTION OF SYMBOLS 1 ... Display side housing 2 ... Button side housing 4 ... Rotary scroll key 7 ... Swing axis 8 ... Display side surface 9 ... Button side surface 13 ... Rotation axis 14 ... Rotation direction 15 ... Direction 18 ... Surface 19 ... Display part

Continued on the front page F term (reference) 4E360 AA02 AB04 AB08 AB12 AB17 AB18 AB20 AB42 BA04 BB02 BC05 EA13 ED03 ED17 ED27 FA09 GA46 GA51 GB26 5K023 AA07 BB04 BB11 DD08 GG03 RR01

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Publication number	Priority date	Publication date	Assignee	Title
<a href="#">JP2003037664A *</a>	2001-07-25	2003-02-07	Omron Corp	Foldable electronic equipment
<a href="#">WO2005071926A1 *</a>	2004-01-27	2005-08-04	Matsushita Electric Industrial Co., Ltd.	Folding electronic device
<a href="#">US7359740B2</a>	2002-08-02	2008-04-15	Sharp Kabushiki Kaisha	Portable information processing apparatus
<a href="#">JP2009246556A *</a>	2008-03-28	2009-10-22	Kyocera Corp	Cellular phone
<a href="#">JP2009246555A *</a>	2008-03-28	2009-10-22	Kyocera Corp	Mobile electronic equipment
<a href="#">JP2009246554A *</a>	2008-03-28	2009-10-22	Kyocera Corp	Cellular phone
<a href="#">JP2009290847A *</a>	2008-06-02	2009-12-10	Kyocera Corp	Portable electronic apparatus
<a href="#">US7884664B2</a>	2008-08-29	2011-02-08	Brother Kogyo Kabushiki Kaisha	Input device, and multi-function peripheral
<a href="#">JP2011078125A *</a>	2010-12-06	2011-04-14	Kyocera Corp	Portable electronic apparatus
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Similar Documents

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US7110797B2	2006-09-19	Multifunction cellular phone
DE60222825T2	2008-01-24	Foldable electronic device
US6434404B1	2002-08-13	Detection of flip closure state of a flip phone
EP1298890B1	2006-07-19	Foldable portable information terminal

#### Priority And Related Applications

##### Priority Applications (1)

Application	Priority date	Filing date	Title
<a href="#">JP2000110660A</a>	2000-04-12	2000-04-12	Foldable portable communication machine

##### Applications Claiming Priority (1)

Application	Filing date	Title
<a href="#">JP2000110660A</a>	2000-04-12	Foldable portable communication machine

#### Legal Events

Date	Code	Title	Description
2004-01-06	A521	Written amendment	<b>Free format text:</b> JAPANESE INTERMEDIATE CODE: A523 <b>Effective date:</b> 20040105
2004-02-23	A02	Decision of refusal	<b>Free format text:</b> JAPANESE INTERMEDIATE CODE: A02 <b>Effective date:</b> 20040220

#### Concepts

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Name	Image	Sections	Count	Query match
▀ liquid crystal related substances		claims,description	4	0.000
▀ rock		abstract	1	0.000

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