US005673066A

United States Patent [19]

Toda et al.

[11] Patent Number: 5,673,066

[45] Date of Patent: Sep. 30, 1997

[54] **COORDINATE INPUT DEVICE**

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[73] Assignee: **Alps Electric Co., Ltd.**, Tokyo, Japan

[21] Appl. No.: **317,688**

[22] Filed: **Oct. 5, 1994**

Related U.S. Application Data

[63] Continuation of Ser. No. 47,221, Apr. 14, 1993, abandoned.

[30] **Foreign Application Priority Data**

Apr. 21, 1992	[JP]	Japan	4-101351
Apr. 21, 1992	[JP]	Japan	4-101352
Apr. 21, 1992	[JP]	Japan	4-101353
Mar. 29, 1993	[JP]	Japan	5-093583

[51] **Int. Cl.^{6}** **G09G 5/08**

[52] **U.S. Cl.** **345/157**; 345/173; 341/34

[58] **Field of Search** .... 345/156, 157, 345/160, 173, 179, 180, 182, 174, 104, 145; 178/18, 19; 463/37; 273/178 B; D14/114, 100, 107; 341/34

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[57] **ABSTRACT**

A cursor control device is provided which has good operability and can reflect clearly an operator's natural motion in accordance with a qualified value (conversion coefficient). The cursor control device is constituted of an operation plate (5) with an operation surface (7), an operation pressure detector with a pressure-sensitive sensor (3) arranged on the back surface of the operation plate (5) to detect a touch pressure by a control member, and an arithmetic circuit. The arithmetic circuit performs an arithmetic operation of both the coordinate position and the moving rate of the control member using a detection signal from the operation pressure detector, and the movement of a cursor based on a first qualified value and a second qualified value. The first qualified value is determined according to the movement and the moving rate of a coordinate position. The second qualified value is determined according to the touch pressure of the control member.
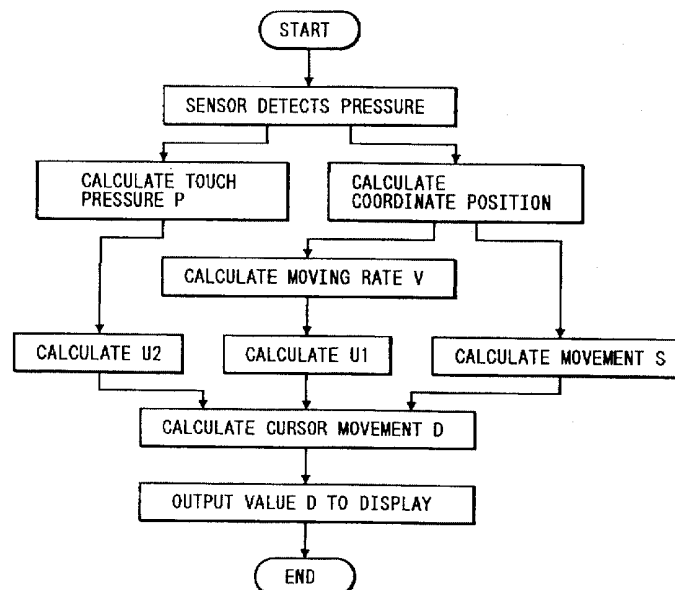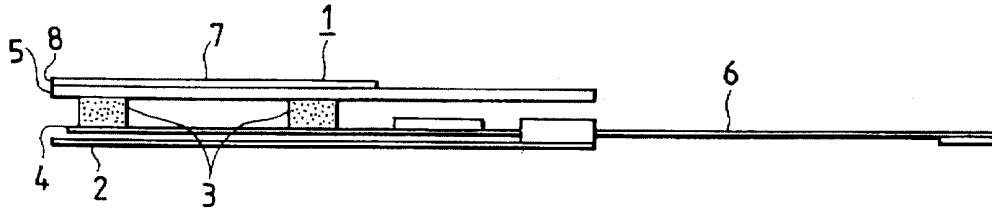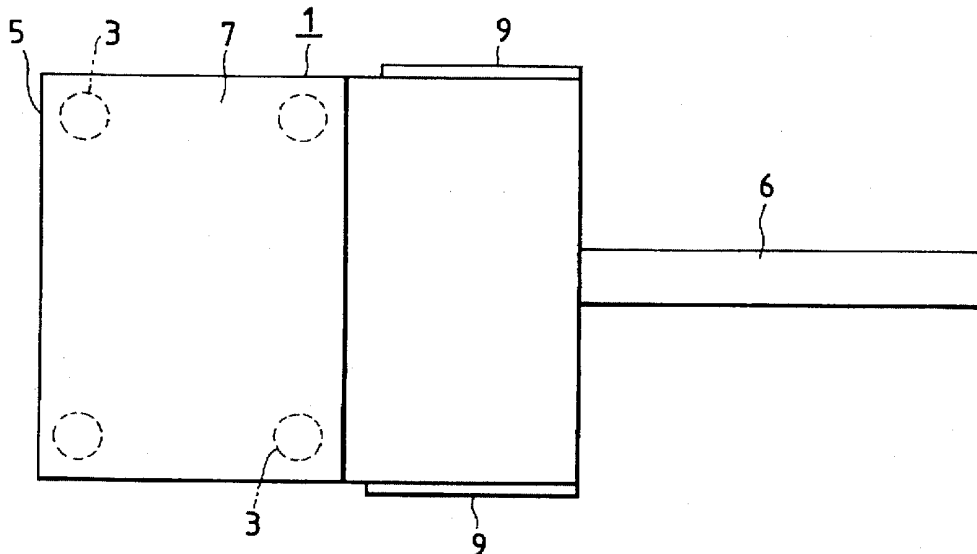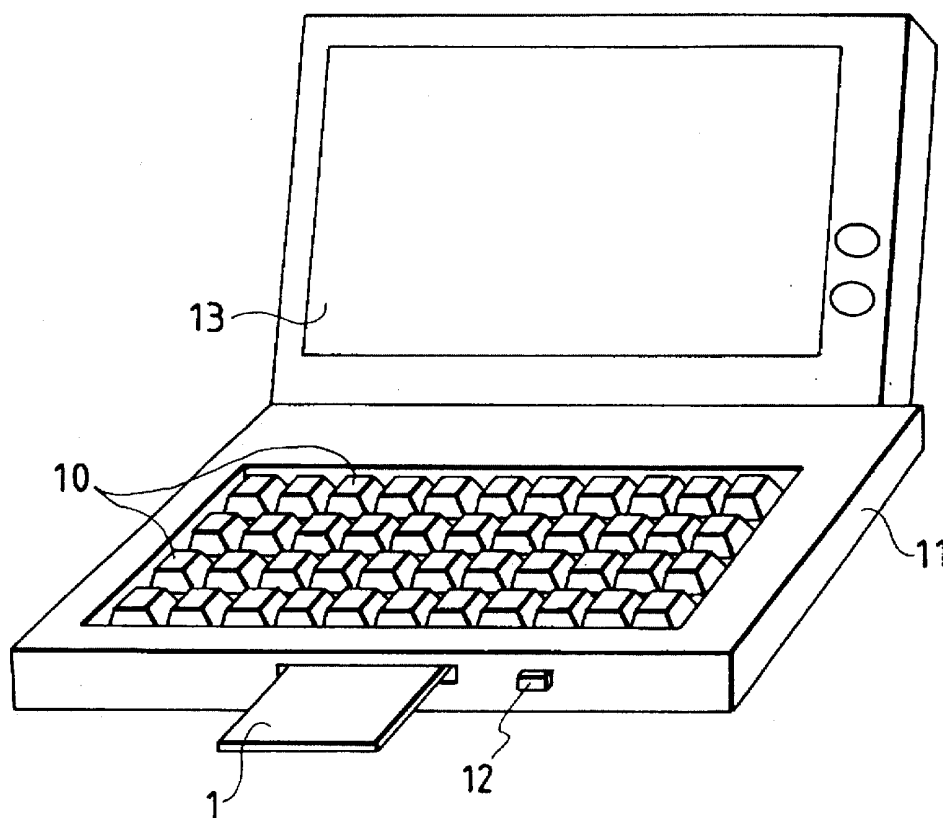
4 Claims, 19 Drawing Sheets

FIG. 1

FIG. 2

FIG. 3

FIG. 4

```
                    ┌─────────┐
                    │  START  │
                    └─────────┘
                         │
                         ▼
            ┌──────────────────────────┐
            │  SENSOR DETECTS PRESSURE  │
            └──────────────────────────┘
                  │              │
          ┌───────┘              └───────┐
          ▼                              ▼
  ┌──────────────────┐        ┌──────────────────┐
  │ CALCULATE TOUCH  │        │    CALCULATE     │
  │   PRESSURE P     │        │ COORDINATE POSITION │
  └──────────────────┘        └──────────────────┘
          │                    │       │      │
          │                    ▼       │      │
          │        ┌────────────────────────┐ │
          │        │ CALCULATE MOVING RATE V │ │
          │        └────────────────────────┘ │
          │              │                     │
          ▼              ▼                     ▼
  ┌─────────────┐  ┌─────────────┐  ┌──────────────────────┐
  │ CALCULATE U2│  │ CALCULATE U1│  │ CALCULATE MOVEMENT S │
  └─────────────┘  └─────────────┘  └──────────────────────┘
          │              │                     │
          └──────┐       │       ┌─────────────┘
                 ▼       ▼       ▼
        ┌───────────────────────────────┐
        │ CALCULATE CURSOR MOVEMENT D    │
        └───────────────────────────────┘
                         │
                         ▼
        ┌───────────────────────────────┐
        │  OUTPUT VALUE D TO DISPLAY     │
        └───────────────────────────────┘
                         │
                         ▼
                    ┌─────────┐
                    │   END   │
                    └─────────┘
```

FIG. 5

U1

FIRST QUALIFIED VALUE

0

V

MOVING RATE OF CONTROL MEMBER

FIG. 6

U2

SECOND QUALIFIED VALUE

0

P

TOUCH PRESSURE OF CONTROL MEMBER

DOCKET ALARM
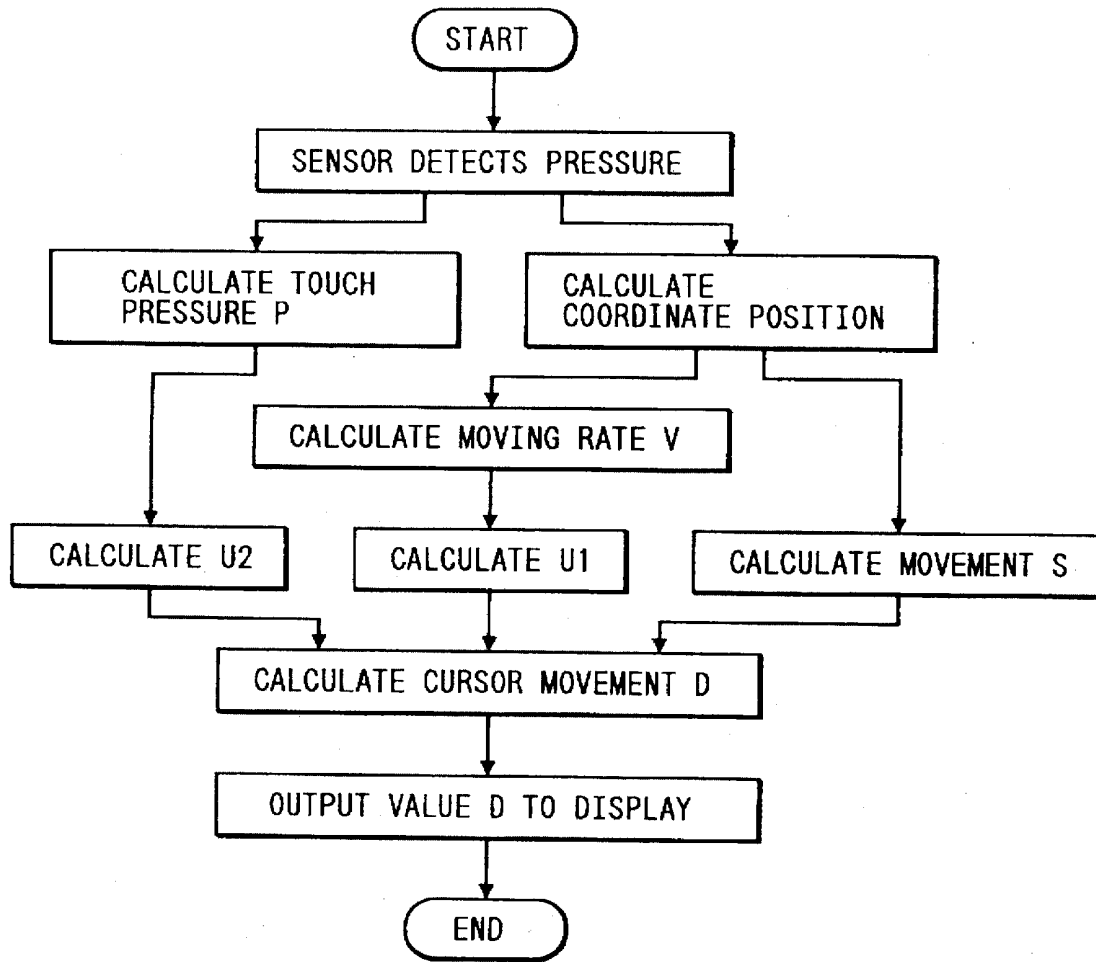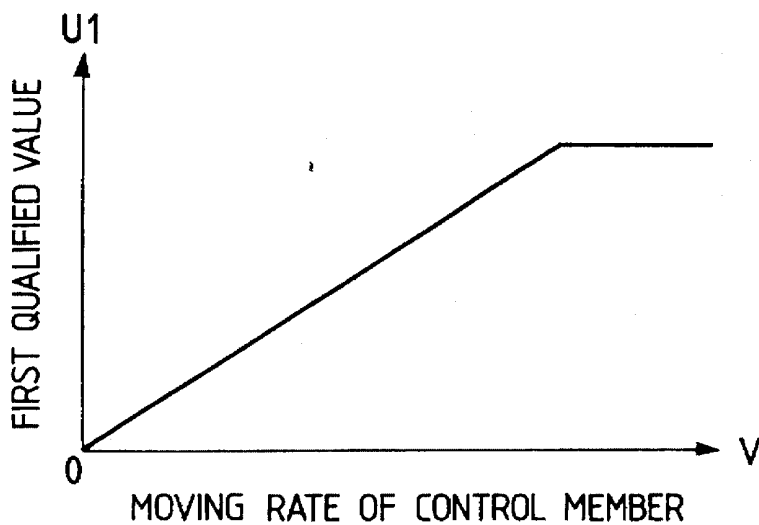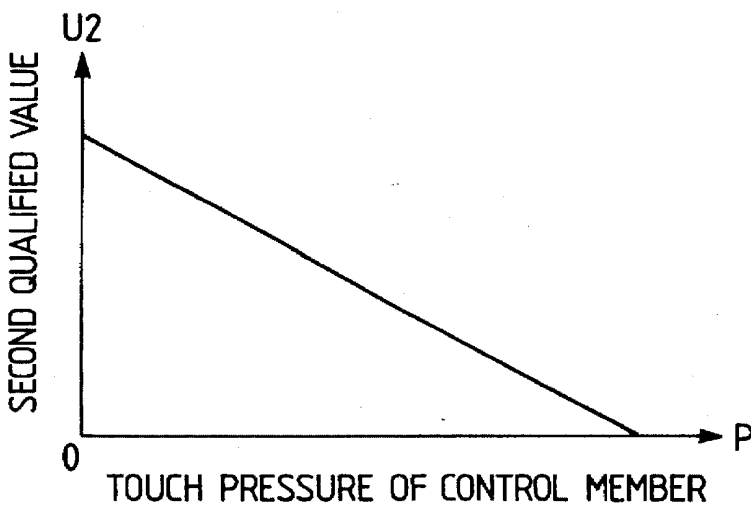
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