[0141] **FIG. 84** is a view illustrating the internal structure of an oscillatory actuator according to a sixth modification of the present invention.

[0142] **FIG. 85** is a perspective view illustrating the appearance of an ATM according to an eighth embodiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0143] Next, embodiments of the present invention will be explained. These embodiments show some aspects of the present invention. They do not limit the invention and can be changed as desired within the scope of the present invention.

[0144] [A: First Embodiment]

[0145] [A-1: Configuration of First Embodiment]

[0146] **FIG. 1** is a perspective view illustrating the appearance of a PDA **10** according to a first embodiment of the present invention. In the figure, a transparent touch panel **102** is overlaid on a display screen of a liquid crystal display panel **103***a* covering an opening of a main case **101**. A user inputs operation instructions to the PDA **10** by touching the touch panel **102** by his or her fingertip. Note that the touch operation on the touch panel **102** may also be of a mode using a pen or other operation tools. Further, the top surface of the main case **101** is provided with push-button type operation keys **104***a*, **104***b*, and **104***c* for inputting operation instructions to the PDA **101** such as for turning the main power on or off.

[0147] Next, **FIG. 2** is a block diagram illustrating the hardware configuration of the PDA **10** shown in **FIG. 1**. As shown in this figure, the PDA **10** has a touch panel **102**, a display unit **103**, a key input unit **111**, a memory **112**, a CPU (central processing unit) **113**, a drive signal generation circuit **114**, and an oscillatory actuator **115**.

[0148] The touch panel **102** outputs a signal showing a touched position on the touch panel **102** (hereinafter called a "touch signal") to the CPU **113** in response to a touch operation. Further, the display unit **103** has a liquid crystal display panel **103***a* and a drive circuit for controlling the display of the liquid crystal display panel **103***a*. The key input unit **111** outputs, to the CPU **113**, a key operation signal in response to the pressing operation of the operation keys **104***a* to **104***c* by the user. The memory **112** stores programs, data, etc. for controlling the PDA **10**. Further, the memory **112** stores waveform data of the drive signal for driving the oscillatory actuator **115**.

[0149] The CPU **113** executes a program stored in the memory **112** to control the parts of the device interconnected through a bus **116**. This CPU **113** executes a vibration control processing **1** (see **FIG. 5**). Upon detection of an operation input from the touch panel **102** or any one of operation keys **104***a* to **104***c*, it drives the oscillatory actuator **115** through the drive signal generation circuit **114** to cause the touch panel **102** or one of the operation keys **104***a* to **104***c* to vibrate.

[0150] The drive signal generation circuit **114** generates a drive signal for driving the oscillatory actuator **115** in accordance with waveform data supplied from the CPU **113**. Further, the drive signal generation circuit **114** applies a drive signal to the oscillatory actuator **115** in accordance with instructions from the CPU **113**.

[0151] The oscillatory actuator **115** is a linear oscillatory actuator of a so-called moving permanent magnet type which uses a permanent magnet as a movable weight (weight) and causes the movable weight to linearly reciprocate by electromagnetic force to cause generation of vibration. The oscillatory actuator **115** is driven by a drive signal applied from the drive signal generation circuit **114** and generates vibration.

[0152] **FIG. 3** is a sectional view schematically illustrating a state of placement of the oscillatory actuator **115** in the main case **101** of the PDA **10**. As shown in the figure, the top surface of the case **115***a* of the oscillatory actuator **115** is in contact with the liquid crystal display panel **103***a* and operation keys **104***a* to **104***c*. Further, the case **115***a* of the oscillatory actuator **115** is provided inside it with a cylindrical coil **121** fixed to the top surface of the case **115***a*, a columnar movable weight **122** made of permanent magnet and having an annular space in which the coil **121** fits, and a spring **123** for supporting the movable weight **122**.

[0153] Note that the case **115***a* of the oscillatory actuator **115** is sealed and functions as a magnetic shield. The function as such a magnetic shield is given to the case **115***a* by, for example, forming the case **115***a* by a conductive substance and grounding it or making it the same potential. Alternatively, the case **115***a* may be made of a magnetic member having a high-permeability.

[0154] The movable weight **122** is supported by the spring **123** in a state where the weight **122** is able to linearly reciprocate in the vertical direction in the figure in the space formed inside the case **115***a* of the oscillatory actuator **115**. The spring **123**, as shown in **FIG. 3**, is connected at one end to the case **115***a* (base member) that is in contact with the liquid crystal display panel **103***a* and operation keys **104***a* to **104***c* and is connected at its other end to the movable weight **122**. Note that a plurality of springs **123** may also be provided. Further, instead of the spring **123**, it is also possible to use a support member formed using an elastic body such as a rubber band.

[0155] The movable weight **122** linearly reciprocates in the vertical direction in the figure by the magnetic force generated from the coil **121** when an AC (alternating) current (drive signal) is applied to the coil **121**. By the counter force of the reciprocation of the movable weight **122**, vibrational acceleration occurs at the portion of the case **115***a* to which the spring **123** is connected. Note that the portion of the case **115***a* to which the spring **123** is connected receives a vibration component transmitted from the movable weight **122** through the spring **123** in addition to the counter force of the reciprocation along with the reciprocation of the movable weight **122**. The principle of generation of vibration by the oscillatory actuator **115** is however based on the use of the vibrational acceleration occurring by a counter force of the reciprocation of the movable weight **122**.

[0156] Due to this vibrational acceleration, vibration is transmitted to the liquid crystal display panel **103***a* and the operation keys **104***a* to **104***c*. The direction of the vibration is a direction perpendicular to the front surface of the touch panel **102** and matches with the direction by which the user