[0043] In the haptic-sense-generation input device according to the invention, the shaft is movable in an axial direction thereof, and a push-button switch that is manipulated when the shaft is moved in the axial direction and a printed wiring board that is mounted with the push-button switch are further provided.

[0044] With this configuration, the push-button switch can be manipulated stably and attached easily while the cost of the haptic-sense-generation input device is reduced.

[0045] The haptic-sense-generation input device according to the invention further comprises an illumination lamp mounted on a printed wiring board, for illuminating the manipulation knob.

[0046] With this configuration, the manipulation knob can be illuminated by the illumination lamp and the illumination lamp can be attached easily while the cost of the haptic-sense-generation input device is reduced.

[0047] In the haptic-sense-generation input device according to the invention, the printed wiring board is a single printed wiring board that is mounted with the push-button switch, the illumination lamp, and the rotation detecting means.

[0048] With this configuration, since the above components are mounted on the single printed wiring board, they can be attached easily while the cost of the haptic-sense-generation input device is reduced.

[0049] In the haptic-sense-generation input device according to the invention, the rotation detecting means is a light transmission type encoder.

[0050] With this configuration, the transmission type encoder having a simple structure can be attached easily while the cost of the haptic-sense-generation input device is reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0051] **FIG. 1** shows a haptic-sense-generation input device according to an embodiment of the invention in which the main part is shown in cross section;

[0052] **FIG. 2** is a sectional view taken along line **2-2** in **FIG. 1**;

[0053] **FIG. 3** illustrates a function of the haptic-sense-generation input device according to the embodiment and specifically shows a haptic sense that is generated during a radio tuning operation;

[0054] **FIG. 4** illustrates another function of the haptic-sense-generation input device according to the embodiment and specifically shows a haptic sense that is generated during a radio sound volume control operation;

[0055] **FIG. 5** illustrates still another function of the haptic-sense-generation input device according to the embodiment and specifically shows a haptic sense that is generated during a CD song selection operation;

[0056] **FIG. 6** illustrates a further function of the haptic-sense-generation input device according to the embodiment and specifically shows a haptic sense that is generated during an air-conditioner temperature setting operation;

[0057] **FIG. 7** is a chart showing the radio tuning operation in detail;

[0058] **FIG. 8** shows a conventional haptic-sense-generation input device in which the main part is shown in cross section; and

[0059] **FIG. 9** is a sectional view taken along line **9-9** in **FIG. 8**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0060] A haptic-sense-generation input device according to the present invention will be hereinafter described with reference to **FIGS. 1 and 2**. **FIG. 1** shows a haptic-sense-generation input device according to an embodiment of the invention in which the main part is shown in cross section. **FIG. 2** is a sectional view taken along line **2-2** in **FIG. 1**.

[0061] A generally cylindrical body **1** is made of a synthetic resin and is formed by molding. The body **51** is composed of a disc-shaped top wall **1***a*, a cylindrical side wall **1***d* that expends from the outer periphery of the top wall **1***a* in the vertical direction, a first bearing **1***b* that is provided at the center of the top wall **1***a* so as to project outward, a second bearing **1***c* that projects inward from the top surface **1***a*, a throug-hhole **1***e* that is formed through the top wall **1***a*, a fixing hole **1***f* that is formed through the top wall **1***a*, a support portion **1***g* that projects inward from a prescribed position of the side wall id, and a lid **1***h* that closes the opening of the side wall **1***d*. The body **1** has a relatively small volume.

[0062] A generally cylindrical manipulation knob **2** is made of a synthetic resin and is formed by molding. The manipulation knob **2** is composed of a disc-shaped top wall **2***a*, a cylindrical side wall **2***b* that extends from the outer periphery of the top wall **2***a* in the vertical direction, and a holding portion **2***c* that projects inward from the center of the top wall **2***a*.

[0063] The bottom portion of the inner surface of the side wall **2***b* of the manipulation knob **2** is provided with a first gear **2***f* that is an internal gear having a large diameter. The first gear **2***f* has a relatively large number of teeth.

[0064] A cylindrical rotary shaft **3** is made of a metal and is formed by cutting. The rotary shaft **3** is composed of a base portion **3***a*, a fixing portion **3***b* that is provided on one side of the base portion **3***a*, a groove portion **3***c* that is provided on the other side of the base portion **3***a*.

[0065] The rotary shaft **3** is integrated with the manipulation knob **2** by insert molding (the fixing portion **3***b* is inserted in the holding portion **2***c*). The base portion **3***a* of the rotary shaft **3** is inserted in and held by the first bearing **1***b* of the body **1** in a rotatable manner, and the groove portion **3***c* of the rotary shaft **3** projects from the first bearing **1***b*. The rotary shaft **3** serves as a shaft portion. The rotary shaft **3** may be fixed to the manipulation knob **2** by a fixing means such as a screw.

[0066] The groove portion **3***c* of the rotary shaft **3** is fitted in a fixing member **8** which is what is called a C-shaped washer, whereby the rotary shaft **3** is prevented from falling off the first bearing **1***b*.

[0067] The rotary shaft **3** is inserted in a resilient member **9** which is a coiled spring, and the resilient member **9** is