

[0069] FIG. 48 is a block diagram of the input device 900 explaining an operation example (No. 1) of the input device 900 relating to one operation key element;

[0070] FIG. 49 is a block diagram of the input device 900 explaining an operation example (No. 2) of the input device 900 relating to one operation key element;

[0071] FIG. 50 is a flowchart showing an input processing example of the input device 900;

[0072] FIGS. 51A to 51C are perspective and cross-sectional views of a mobile phone 110 as a tenth embodiment for showing a configuration thereof; and

[0073] FIGS. 52A to 52C are perspective and cross-sectional views of a variable sheet device 220 for braille as an eleventh embodiment for showing a configuration thereof.

DETAILED DESCRIPTION

[0074] The following will describe embodiments of a touch-sensitive sheet member, an input device and an electronic apparatus with reference to drawings.

Embodiment 1

[0075] FIG. 1 shows a configuration of a touch-sensitive sheet member 100 as a first embodiment. The touch-sensitive sheet member 100 shown in FIG. 1 is applicable to an electronic apparatus such as a digital camera, a video camera, a mobile phone, a mobile terminal device, a desk-top type PC, a note type PC, an automatic teller machine, and a braille block apparatus. The touch-sensitive sheet member 100 includes a base member 1, a flow channel panel 2 and an air-circulation unit 3. The base member 1 constitutes a body and has a sheet shape and predetermined hardness. For the base member 1, for example, a transparent and soft silicon rubber member having hardness 20° to 40° is used.

[0076] In spots or predetermined positions of base member 1, apertures p_i ($i=1$ to 24) for representing a sense of touch are arranged. The apertures p_1 to p_{24} constitute a sense-of-touch-representing unit and have predetermined size(s). In this embodiment, the plural apertures p_1 to p_{24} each having an aperture diameter ϕ of a predetermined size are perforated in the predetermined positions of the base member 1, which constitute the sense-of-touch-representing unit that represents a sense of touch. The apertures p_1 to p_{12} , for example, are arranged like an array pattern in a lower region of a surface of the base member 1, the apertures p_{13} to p_{17} are arranged like a cross pattern in an upper region of the surface thereof and the apertures p_{18} to p_{24} are aligned along the right end side.

[0077] The flow channel panel 2 is provided in the downward of the base member 1 and introduces air to a plurality of the apertures p_1 to p_{17} and/or p_{18} to p_{24} which are perforated in the base member 1. The flow channel panel 2 contains a substrate 2c and a panel body 2k having flow channels 2a and 2c. The flow channel 2a communicates to the apertures p_1 to p_{12} which are arranged like an array pattern in a lower region of a surface of the base member 1 and the apertures p_{13} to p_{17} which are arranged like a cross pattern in an upper region of the surface thereof. The flow channel 2b communicates to the apertures p_{18} to p_{24} which are aligned along the right end side thereof (referred to as FIG. 4). The substrate 2c is provided in the downward of the flow channel panel 2, but this substrate 2c may be omitted if sufficient strength of a bottom portion of the panel body 2k can be secured.

[0078] An air-circulation unit 3 constituting a medium-supplying unit is connected to the flow channel panel 2 and the air-circulation unit 3 sends air to the apertures p_1 to p_{17} and/or p_{18} to p_{24} or takes in air from the apertures p_1 to p_{17} and/or p_{18} to p_{24} . The air-circulation unit 3 includes a flow channel changeover unit 3a and a blower 3b. The air-circulation unit 3 has a programmable function for sending air to the apertures for every group such as the group of apertures p_1 to p_{17} and the group of apertures p_{18} to p_{24} which are perforated in the base member 1 or for taking in air from the apertures for every group such as the group of apertures p_1 to p_{17} and the group of apertures p_{18} to p_{24} . The air-circulation unit 3 may send air to the apertures p_1 to p_{24} individually or may take in air from the apertures p_1 to p_{24} individually.

[0079] In the embodiment, the apertures p_1 to p_{12} which are arranged like an array pattern in the lower region of the surface of the base member 1 and the apertures p_{13} to p_{17} which are arranged like a cross pattern in the upper region of the surface thereof are treated as a first group, to which the air is sent. The apertures p_{18} to p_{24} which are aligned along the right end side are treated as a second group.

[0080] The flow channel changeover unit 3a is connected to the flow channel panel 2 and changes over the flow channels 2a, 2b which communicate to the apertures p_1 to p_{17} of the first group and the apertures p_{18} to p_{24} of the second group, which are mentioned above, corresponding to another function. As a drive-power of the changeover use, for example, a sheet coil type motor or a solenoid member applied with the same principle as that of the sheet coil type motor may be used.

[0081] The blower 3b constituting an air pressure adjustor is connected to the flow channel changeover unit 3a. The blower 3b sends the air (medium) to the seventeen apertures p_1 to p_{17} and the seven apertures p_{18} to p_{24} of the base member 1 for every group through the flow channel changeover unit 3a and the flow channel panel 2, or takes in the air from the apertures p_1 to p_{17} and p_{18} to p_{24} for every group. In this embodiment, the blower 3b supplies the air to the apertures. Alternatively, the blower may send the air to the apertures p_1 to p_{24} individually or takes in the air from the apertures p_1 to p_{24} individually. As the blower 3b, a blower using a piezoelectric device is used.

[0082] FIGS. 2A and 2B show an air supply example in the touch-sensitive sheet member 100. According to the touch-sensitive sheet member 100 shown in FIG. 2A, the blower 3b supplies the air to the plurality of apertures p_1 to p_{24} of the base member 1 through the flow channel changeover unit 3a and the flow channel panel 2. The flow channel changeover unit 3a contains a valve core portion 301, valve changeover units 302, 303, valve bodies 304, 305 and the like. The valve core portion 301 has, for example, a rectangle sectional shape and is made of a core member that is formed by molding a resin or a light metal by a die.

[0083] Each of the valve changeover units 302, 303 is provided so as to form room having a fan shape within the valve core portion 301. An air-intake tube 314 is provided in the valve changeover units 302, 303 with it communicating to the blower 3b and takes in the air from the blower 3b. In the valve changeover unit 302, the valve body 304 and an air-exhaust port 306 are provided. The valve body 304 operates so as to shut off or open the air-exhaust port 306 by obtaining a drive-power of a driving unit 3c of a motor, a solenoid or the like. The air-exhaust port 306 communicates to the flow chan-