

every group. Consequently, at the positions corresponding to the respective operation keys of the base frame portion 53, the element muscle portions G1 to G25 may present the sense of touch for giving the concave and convex feeling by the protuberant shape or the cave-in shape depending on the swelling of the element muscle portions G1 to G25 or by the original shape without conducting electricity with respect to operator's finger or the like.

[0341] It is needless to say that the electrode patterns 51a, 51b, 52a, 52b may be wired so as to correspond to the respective operation keys and are gathered at the terminal 512 without connecting the electrode patterns 51a, 51b and the electrode patterns 52a, 52b in parallel, and the voltage-level of the DC driving voltage may be variably applied to the element muscle portions G1 to G25 corresponding to the respective operation keys from the driving power supply 55A. By constitution in this manner, at the positions corresponding to the respective operation key of the base frame portion 53, the respective element muscle portions G1 to G25 may present the programmable sense of touch for giving the concave and convex feeling by the protuberant shape or the cave-in shape in which the amount of swelling of the element muscle portions G1 to G25 is variably adjusted or by the original shape without conducting electricity with respect to operator's finger or the like.

Embodiment 8

[0342] FIG. 37 shows a configuration of an input device 800 as an eighth embodiment. In this embodiment, there is provided the input device 800 in which the wiring pattern constituting the touch-sensitive sheet member is concurrently used with a portion of the wiring pattern constituting the display unit 29. Also, in this embodiment, the CPU 32 for controlling a touch-sensitive sheet member 180 for presenting a sense of touch executes the driving control so as to supply the driving voltage to an electrically conductive rubber 182 of the touch-sensitive sheet member 180 corresponding to the image contents displayed on the display unit 29, so that the electrically conductive rubber 182 is available at the electrode-forming positions corresponding to the image contents.

[0343] To the input device 800 shown in FIG. 37, the touch-sensitive sheet member 160 relating to the sixth embodiment is applied. In the input device 800, any information is inputted by the slide and/or press operation depending on the finger or the like of the operator 30 (operation body). The input device 800 includes the film portion 5, the input detection unit 45 and a display device 129 with the touch-sensitive variable sheet function.

[0344] The display device 129 has the function of the display unit 29 explained in the fifth embodiment and the facing electrodes structure of the touch-sensitive sheet member 160 explained in the sixth embodiment. The display device 129, similarly as the fifth embodiment, at a time of the input operation, displays the icon images of a key K1 of numeral "1" to a key K10 of numeral "0", a key K11 of symbol "*", a key K12 of a symbol "#", or the like, a key K13 of determination "O" of a cross key, a left facing arrow key K14 thereof, an upward facing arrow key K15 thereof, a right facing arrow key K16 thereof, a downward facing arrow key K17 thereof, a key K18 of "etc", a key K19 of "REW", a left facing arrow stop key K20, a right facing arrow stop key K21, a left facing fast-forward key K22, a fast-forward key K23, a reproduction key K24 and a stop key K25 or the like. As the display unit

129, a color organic EL display device or a liquid crystal display device (LCD device) is used.

[0345] The input detection unit 45 is provided on the upper portion of the display unit 129. The input detection unit 45 includes the operation surface. The input detection unit 45 is provided on the upper portion of the display unit 129 and operates so as to detect the slide position of the operator's finger or the like. As the input detection unit 45, for example, a capacitive touch panel is used. With respect to the input detection unit 45, anything is available only if the cursoring and the selection function can be distinguished. For example, other than the capacitive input device, it also may be a resistive touch panel, an input device of a surface acoustic wave system (SAW) or an optical system, a tact switch of a multi stage system or the like. Preferably, it may be enough if the input device has a constitution by which position detection information and press detection information can be applied to a control system.

[0346] The film portion 5 is provided on the upper portion of the input detection unit 45. As the film portion 5, there is used a transparent material having transmissivity and a refractive index which are approximately equal to transmissivity and a refractive index of the input detection unit 45. There is used, for example, a zeonor (trademark) having the film thickness of around 25 [μm]. The hardness thereof is around 20° to 40°.

[0347] FIG. 38 shows a configuration of the display device 129 with a touch-sensitive variable sheet function. FIG. 39 shows a configuration of a cross-section of the display device 129. The display device 129 shown in FIG. 38 includes a transparent touch-sensitive sheet member 180 which constitutes the touch-sensitive sheet member and a display unit 29 on the touch-sensitive sheet member 180. As the display unit 29, for example, an organic EL device is used.

[0348] The touch-sensitive sheet member 180 is provided to support the whole of the lower surface of the display unit 29, and is slid and/or pressed down along the operation surface of the display unit 29. It is needless to say that the touch-sensitive sheet member 180 may support a portion of the lower surface of the display unit 29.

[0349] The touch-sensitive sheet member 180 is provided with the structure of the muscular sheet portion 54A and the facing electrodes structure of the touch-sensitive sheet member 160 relating to the sixth embodiment. Further, a part of the wiring pattern of the display unit 29 is concurrently used with the wiring pattern of the touch-sensitive sheet member 180.

[0350] In this embodiment, the touch-sensitive sheet member 180 is constituted by layering the electrically conductive rubber 182 and an intermediate layer film 183 on a base film 181 as shown in FIG. 39. The base film 181 is composed of a polyethylene terephthalate (PET) based transparent material having the thickness of around 0.1 [mm] and an ITO film forming a wiring pattern group 57 which is patterned on the material. A wiring pitch of the wiring pattern group 57 is approximately around 1/2 to 1 times of an arrangement pitch of the display pixel.

[0351] The electrically conductive rubber 182 is bonded on the upper portion of the base film 181 by an adhesive agent or the like. As the electrically conductive rubber 182, a polymer material (artificial muscle) having transparency and also electric conductivity is used. The electrically conductive rubber 182 includes a flexible and strong electric conductive Embra (trademark) film and an electric conductive gel polymer