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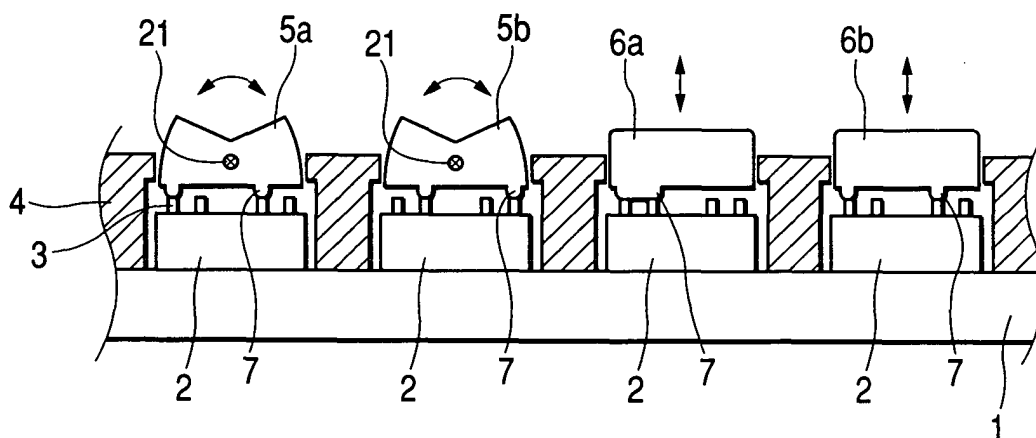
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(54) **Input device**

(57) An input device which is capable of changing the arrangement of a plurality of switches and in which a pushbutton switch and a rocker switch can be employed interchangeably is provided. A plurality of detecting switches 2 is mounted on a substrate 1 and knobs corresponding thereto are included, and the knobs comprise a rocker knob 5 and a pushbutton knob 6. Each set of detecting switches 2 has a plurality of driving pins 3 capable of independently switching contacts in two areas on the substrate 1, and each of the knobs has a

driving portion 7 for simultaneously manipulating certain pin patterns. The driving portion of the rocker knob 5 selectively manipulates the pin pattern selected from the driving pins 3 in one area and the pin pattern selected from the driving pins 3 in the other area, and the driving portion 7 of the pushbutton knob 6 manipulates the pin pattern selected from the driving pins 3 arranged in two areas. Each of two pin patterns selectively manipulated by the rocker knob 5 and each pin pattern manipulated by the pushbutton 6 are all different from each other.

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to an input device having a plurality of switches indicating various control contents, and more particularly to an input device capable of automatically determining the kind of each switch even though pushbutton switches and rocker switches are mixed.

2. Description of the Related Art

[0002] Conventionally, an input device having a plurality of switches has been used. As an example of the input device, there are various switches arranged on an instrument panel of a car. This switch is, for example, used for ON/OFF control of an air conditioner or temperature setting in the car. Also, recently, this switch may be used in the control of optional equipment of the car. This switch indicates a specific function, but is not necessarily limited to the same arrangement for different models or grades of car. In other words, the arrangement of each switch is desired to be changed such that a user may easily operate it, for any kind of function such as headlight optical axis control, fog lamp lighting control, opening and closing of a trunk and other various optional equipment.

[0003] Accordingly, up to now, an input device in which various kinds of switches can be exchanged has been suggested. As illustrated in Japanese Unexamined Patent Application Publication No. 10-334765, Japanese Unexamined Patent Application Publication No. 2001-236849 and Japanese Unexamined Patent Application Publication No. 10-269002, a plurality of sets of switches having a plurality of driving pins capable of independently switching contacts on the substrate are provided, the shapes of key tops mounted on the switches are different from each other, the differently combined driving pins can be driven in each key top, and a different identification signal is output from each switch. Thereby, the operation corresponding to the function of each key top can be performed by simply exchanging the key top in a modular manner.

[0004] However, in the above-mentioned conventional input device, only pushbutton switches were used. In the switchgear of a car, a rocker switch which can selectively perform two control functions is often used, in addition to the pushbutton switch. Since the conventional input device has a limitation that only one control function is performed in one switch, the rocker switch can be not incorporated thereinto as it is.

SUMMARY OF THE INVENTION

[0005] The present invention has been made in order

to solve the above-mentioned problem, and provide an input device which is capable of accommodating various arrangements of a plurality of switches and in which the pushbutton and the rocker switch can be employed interchangeably.

[0006] In order to solve the above-mentioned problems, the input device related to the present invention has a plurality of sets of detecting switches mounted on a substrate and a plurality of knobs arranged in correspondence with each set of detecting switches, and the plurality of knobs is composed of a rocker knob and a pushbutton knob,

wherein each set of the detecting switches has a plurality of driving pins capable of independently switching contacts in two areas on the substrate, and each of the knobs has a driving portion for simultaneously manipulating a pin pattern composed of one or more driving pin,

wherein the driving portion of the rocker knob selectively manipulates the pin pattern selected from the driving pins arranged in one of two areas on the substrate and the pin pattern selected from the driving pins arranged in the other of the two areas, and the driving portion of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in the two areas on the substrate,

wherein each of two pin patterns selectively manipulated by the rocker knob and the pin pattern manipulated by the pushbutton knob are all different from each other, and a different identification signal is output from each set of the detecting switches.

[0007] Also, the input device related to the present invention has a plurality of sets of detecting switches mounted on a substrate and a plurality of knobs arranged in correspondence with each set of detecting switches, and the plurality of knobs is composed of a rocker knob and a pushbutton knob,

wherein each set of the detecting switches has a plurality of driving pins capable of independently switching contacts, the plurality of driving pins are arranged in a first area and a second area on the substrate and are arranged in a third area on the substrate, and each of the knobs has a driving portion for simultaneously manipulating pin patterns composed of one or more driving pin,

wherein the driving portion of the rocker knob selectively manipulates the pin pattern selected from the driving pins arranged in the first area and the pin pattern selected from the driving pins arranged in the second area, and the driving portion of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in the first and second areas and including the driving pin arranged in the third area,

wherein each of two pin patterns selectively manipulated by the rocker knob and the pin pattern manipulated by the pushbutton knob are all different from each other, and a different identification signal is output from each set of the detecting switches.

[0008] Further, the input device related to the present invention has a plurality of sets of detecting switches mounted on a substrate and a plurality of knobs arranged in correspondence with each set of detecting switches, and the plurality of knobs is composed of a rocker knob and a pushbutton knob,

wherein each set of the detecting switches has a plurality of driving pins capable of independently switching contacts, the plurality of driving pins are arranged in a first area and a second area on the substrate and are arranged in a third area on the substrate, and each of the knobs has a driving portion for simultaneously manipulating pin patterns composed of one or more driving pin,

wherein the driving portion of the rocker knob selectively manipulates the pin pattern selected from the driving pins arranged in the first area and including the driving pin arranged in the third area, and the pin pattern selected from the driving pins arranged in the second area and including the driving pin arranged in the third area, and the driving portion of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in the first and second areas,

wherein each of two pin patterns selectively manipulated by the rocker knob and the pin pattern manipulated by the pushbutton knob are all different from each other, and a different identification signal is output from each set of the detecting switches.

[0009] Further, in the input device related to the present invention, the driving portion is provided with a protrusion at the bottom surface of the knob, and the protrusion is positioned to be substantially matched to the pin pattern allocated to the knob.

[0010] In addition, in the input device related to the present invention, the plurality of knobs arranged in correspondence with each set of the detecting switches can be attached or detached and can be exchanged with each other.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Fig. 1 is a schematic diagram of an input device according to an embodiment of the present invention; Fig. 2 is a front view of the input device before knobs are attached, according to the embodiment of the present invention;

Fig. 3 is an enlarged view of a detecting switch according to the embodiment of the present invention; Fig. 4 is a front view of the input device after knobs are attached, according to the embodiment of the present invention;

Fig. 5 is a sectional view of a portion of the input device to which a rocker knob is attached, according to the embodiment of the present invention;

Fig. 6 is a sectional view of a portion of the input device to which a pushbutton is attached, according

to the embodiment of the present invention;

Fig. 7 is a systematic diagram of an input device according to the embodiment of the present invention;

Fig. 8 is an enlarged view of a detecting switch according to a second embodiment of the present invention;

Fig. 9 is a sectional view of a portion to which a rocker knob is attached, according to a third embodiment of the present invention; and

Fig. 10 is a sectional view of a portion to which a pushbutton knob is attached, according to the third embodiment of the present invention.

15 DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] The embodiment of the present invention will now be described in detail with reference to the accompanying drawings. Fig. 1 is a schematic diagram conceptually illustrating an input device according to an embodiment of the present invention. As shown in this Figure, the input device related to the present invention is mounted on a substrate 1 and is provided with rocker knobs 5 or pushbutton knobs 6 each corresponding to a plurality of detecting switches 2 surrounded by a casing 4. In this embodiment, two rocker knobs 5a, 5b and two pushbutton knobs 6a, 6b are provided. Each detecting switch 2 is provided with a plurality of driving pins 3, and the rocker knob 5 or the pushbutton knob 6 manipulates a certain driving pin 3 by a driving portion 7 arranged in the bottom surface thereof. In this embodiment, the input device in which four detecting switches 2 are arranged and the rocker knob 5 or the pushbutton knob 6 respectively provided thereon can be exchanged with each other will be explained. Also, in this embodiment, four driving pins 3 are provided in one detecting switch 2. As mentioned below, the maximum number of functions that can exist in the input device is determined by the number of the driving pins 3 provided in one detecting switch 2.

[0013] As shown in Fig. 1, when the rocker knob 5 provided on the detecting switch 2 is pressed, it is rocked left and right about a rotary axis 21 and selectively manipulates a driving pin 3 by a driving portion 7 provided on the bottom surface thereof. On the other hand, when the pushbutton knob 6 is pressed from the top surface thereof, it manipulates the driving pin 3 by the driving portion 7 arranged on the bottom surface thereof. The pattern of the driving pin 3 simultaneously manipulated by the driving portion 7 is referred to as a pin pattern. In this embodiment, "3" denotes the manipulated driving pin 3, and "0" denotes the non-manipulated driving pin 3, thereby denoting a pin pattern. In manipulation of the rocker knob 5, since two manipulations are selectively performed, one rocker knob 5 is allocated two pin patterns. The pin pattern is determined by the shape of the driving portion 7.

[0014] For example, in Fig. 1, when the left side of

rocker knob 5a is depressed, only the leftmost driving pin 3 among four driving pins 3 provided on the detecting switch 2a is manipulated. Accordingly, when denoting the pin pattern from the left side, it becomes (1, 0, 0, 0). On the other hand, when depressing the right side of the rocker knob 5a, only the second driving pin 3 from the right side among four driving pins 3 provided on the detecting switch 2a is manipulated. Accordingly, when denoting the pin pattern from the left side, it becomes (0, 0, 1, 0). In other words, (1, 0, 0, 0) and (0, 0, 1, 0) are allocated to the rocker knob 5a as the associated pin patterns, and, accordingly, they can be selectively manipulated. Similarly, in Fig. 1, when the rocker knob 5b is manipulated to the left, the pin pattern is (0, 1, 0, 0), and when the rocker knob 5b is manipulated to the right, the pin pattern is (0, 0, 0, 1). These can be selectively manipulated.

[0015] The pin pattern (1, 1, 0, 0) is allocated to the pushbutton knob 6a, and two driving pins in the left side among four driving pins 3 can be simultaneously manipulated by the pushbutton. Also, the pin pattern (1, 0, 1, 0) is allocated to the pushbutton 6b, i.e., the leftmost driving pin 3 and the second driving pin 3 from the right side among four driving pins 3 are simultaneously manipulated by the pressing action.

[0016] In this way, a total of 6 unique patterns, that is, two pin patterns each allocated to the rocker knobs 5a, 5b and one pin pattern each allocated to the pushbutton knobs 6a, 6b are associated with different type of knobs. Thereby, since different detecting signals are output from the detecting switch 2 depending on which pin patterns are simultaneously manipulated, if it is identified, the function allocated to each rocker knob 5 or the pushbutton knob 6 is identified and performed without depending on the arrangement of knobs in the instrument panel.

[0017] From the fact that the rocker knob 5 selectively performs two manipulations, the area in which the driving pins 3 are arranged is divided into two areas and the rocker knob 5 manipulates the pin pattern selected from the driving pins 3 arranged in one side. In other words, in the case of Fig. 1, the detecting switch 2 is divided into a first area and a second area at the left half portion and the right half portion thereof, the pin pattern manipulating one of two driving pins 3 arranged in the first area is allocated in the case of depressing the rocker knob 5 to the left side, and the pin pattern manipulating one of two driving pins 3 arranged in the second area is allocated in case of manipulating the rocker knob 5 to the right side. On the other hand, the pin pattern applied to the pushbutton knob 6 is selected from four driving pins 3 arranged in the first area and the second area. Accordingly, these pin patterns are all different patterns.

[0018] Fig. 2 concretely illustrates the input device according to this embodiment, and shows the state before the rocker knobs 5 or the pushbutton knobs 6 are mounted. As shown in this Figure, a plurality of the detecting switches 2 are arranged in a housing unit 9, and press-

ing portions 25 corresponding to four driving pins 3 are provided in the respective detecting switches 2. As shown in Fig. 3, the pressing portions 25 are denoted by the symbols A through D, respectively, and will be described later. In the case of mounting the rocker knob 5 on the housing unit, the rocker knob 5 selectively manipulates any one of group A and B of the pressing portions 25 or group C and D of the pressing portions 25. That is, in Fig. 3, the detecting switch 2 is divided into the respective areas at the left half portion and the right half portion, and the rocker 5 selectively manipulates the pressing portion 25 arranged on the respective areas. Here, the left half portion of the detecting switch 2 is a first area 8a and the right half portion thereof is a second area. Also, as shown in Fig. 4, among four detecting switches 2, two detecting switches are equipped with rocker knobs 5, the remaining switches are equipped with pushbutton knobs 6, and these constitutes switches SW-A, SW-B, SW-C, and SW-D, respectively.

[0019] Fig. 5 is a sectional view of a portion of the input device to which a rocker knob is attached, according to the embodiment of the present invention. As shown in this Figure, this input device has substrate contacts 1a provided on the substrate, a lever portion 24 composed of a thin-plate-shaped elastic body, and pressing portions 25 comprising contacts 25a situated in locations corresponding to the substrate contacts 1a of the lever portion 24. In addition, a rocker portion 20 which is locked left and right about a rotary axis 21 and a slider 23 pressed down by the rocker portion 20 are provided. A plurality of protrusions 22 which are the driving portion 7 are provided at a certain location of the bottom surface of the rocker portion 20, and the slider 23 is pressed by the protrusions 22. The protrusions 22 are provided at the locations corresponding to the pin pattern allocated to the rocker knob 5. Since the pressing portion 25 is pressed by the manipulation of the rocker portion 20 through the slider 23, the contact 25a contacts the substrate contacts 1a corresponding to the pin pattern allocated to the rocker knob 5, and the switch is turned on.

[0020] In addition, a casing 36 for supporting the rocker knob 5 through the rotary axis 21 while allowing it to rotate laterally and for supporting the slider 23 is provided. The side portions of the case 36 are provided with ribs 35. The ribs 35 guide the pushbutton knob 6, if a pushbutton knob 6 is attached, and does not guide the rocker knob 5 if a rocker knob 5 is attached. But, when the rocker knob 5 is attached, it may be attached using the slide guide of the rib 35. Also, a cover 34 is provided on the casing 36 and the rib 35. The cover 34 is attached to be openable or closable with respect to the casing 36 and the rib 35, and is freely opened or closed when a user wants to exchange the rocker knob 5. As mentioned above, attaching or detaching or changing the arrangement of the rocker knobs 5 is performed in a state of installing the rocker knob 5 and the slider 23 into the casing 36.

[0021] Fig. 6 is a sectional view of a portion of the in-

put device in which a pushbutton knob 6 is attached, according to the embodiment of the present invention. The structure of the pushbutton knob 6 is similar to that of the prior art. The sectional shape of the pushbutton knob 6 is substantially rectangular, the top surface thereof protrudes as the pushbutton portion 30, and the side thereof is provided with a claw portion 31 for limiting the vertical movement. Also, the bottom surface thereof is provided with a protrusion portion 32 which is the driving portion 7 for pressing the pressing portion 25 at a certain location and a concave portion 33 is provided in a location corresponding to the other pressing portion 25. In case of manipulating the pushbutton knob 6, only the pressing portion 25 corresponding to the pin pattern allocated to the pushbutton knob 6 is pressed, the contact 25a contacts the substrate contact 1a corresponding thereto, and the switch is turned on.

[0022] Similar to the rocker knob 5, the pushbutton knob 6 is provided with the rib 35 and, in the top portion thereof, the cover 34 which can be opened and closed is provided. Accordingly, by opening the cover 34, pushbutton knobs 6 may be attached, detached, or rearranged. In addition, an engagement portion for engaging the slide guide attached in the rib 35 is provided to the claw portion 31 of the pushbutton knob 6, and performs as a guide during the operation of the pushbutton.

[0023] In addition, Fig. 7 is a systematic diagram of an input device according to the present invention. As shown in this Figure, depending on the pressing operation of the rocker knob 5 or the pushbutton knob 6, each switch outputs an inherent signal. Since SW-A and SW-B comprise the rocker knob 5, two kinds of signals are selectively output. Also, since SW-C and SW-D comprise the pushbutton knob 6, one kind of signal is output. The output signal is detected by a detecting means 10, and the control function according to the signal is determined by a function determining means 11 based on the detected signal and the control function stored in a storing means 13 and is output from a signal output means 12. The storing means 13 is composed of a storage medium such as a memory or a hard disk, and stores a table associating the pattern of the detected signal with the control function. Also, the detecting means 10 and the control determining means 11 may be composed of a CPU.

[0024] As mentioned above, in the detecting switch 2 accommodated in the housing unit 9, two pin patterns associated with the rocker knob 5 and the one pin pattern associated with the pushbutton knob 6 are all different from each other, and thus the detected signal is identified regardless of the arrangement of each knob. Also, each knob can be attached or detached and the arrangement thereof can be changed. That is, though the rocker knob 5 and the pushbutton knob 6 are mixed in the input device, the arrangement thereof can be freely changed.

[0025] However, in the present embodiment, although four driving pins 3 are provided to each of four detecting

switches 2 and different pin patterns are given, the maximum number of the detecting switches 2 which can be provided in the housing unit 9 is determined depending on the number of the driving pins 3 provided in the respective detecting switches 2. Hereinafter, this will be explained.

[0026] Table 1 shows the pin pattern which can be allocated to each detecting switch 2 by four driving pins 3. If pushbutton knobs 6 are mounted on all of the detecting switches 2, each pushbutton knob 6 may output one kind of signal, and thus fifteen pin patterns in Table 1 can be applied to the pushbutton knobs 6. In other words, the maximum number of the detecting switches 2 becomes 15.

[Table 1]

	A	B	C	D
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	0	0	0	1
6	0	0	1	1
7	1	0	1	0
8	1	0	0	1
9	0	1	1	0
10	0	1	0	1
11	1	1	1	0
12	1	1	0	1
13	1	0	1	1
14	0	1	1	1
15	1	1	1	1

[0027] In case of mixing and mounting the rocker knobs 5 and the pushbutton knobs 6 on the detecting switch 2, among four driving pins 3, one pin pattern or two pin patterns selected from the driving pins 3 of A and B arranged in the first area, and one pin pattern or two pin patterns selected from the driving pins 3 of C and D arranged in the second area are allocated to the rocker knob 5. Accordingly, one pattern among the patterns 1 to 3 and one pattern among the patterns 4 to 6 shown in Table 1 are allocated to the rocker knob 5. That is, in this case, the maximum number of rocker knobs 5 which can be mounted is three. The pin patterns allocated to the pushbutton knob 6 are the remaining patterns. Accordingly, in case of mounting one rocker knob 5, the maximum number of pushbutton knobs 6 which can be mounted is thirteen. If the number of the rocker knobs 5 is two, the maximum number of pushbutton knobs 6 is eleven and, if the number of the rocker knobs

5 is three, the maximum number of pushbutton knobs is nine.

[0028] Next, a second embodiment of the present invention will be explained. In the second embodiment, the basic structure of the input device is equivalent to that of the first embodiment. The second embodiment is different from the first embodiment in that a third area 8c is provided and one driving pin 3 is provided in the third area, in addition to the first area 8a and the second area 8b provided in each detecting switch 2 on the substrate 1, as shown in Fig. 8. The driving pin 3 in the third area 8c is given a pin pattern which is not manipulated by the rocker knob 5 but is necessarily manipulated when the pushbutton knob 6 is pressed. Thereby, whether the signal from the detecting switch 2 is generated by the rocker knob 5 or the pushbutton knob 6 can be determined depending on the existence of a signal from the driving pin 3 in the third area 8c, and more pin patterns can be given to the pushbutton knob 6. In other words, the maximum number of pushbutton knobs 6 can be increased.

[0029] Table 2 shows the pin pattern in the case of this embodiment. The pin patterns which can be given to the rocker knob 5 by four driving pins 3 are patterns 1 to 6 in Table 2; two pin patterns are allocated to the respective rocker knob 5, and thus the maximum number thereof is three, similar to the first embodiment. On the other hand, since the pin patterns of the pushbutton knob 6 are given so as to necessarily manipulate the driving pin 3 of E in Fig. 8, the patterns in Table 2 are the patterns 7 to 21 and the maximum number thereof is fifteen.

[Table 2]

	A	B	C	D	E
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	0	0	0	1	0
6	0	0	1	1	0
7	1	0	0	0	1
8	0	0	0	0	1
9	1	1	0	0	1
10	0	0	1	0	1
11	0	0	0	1	1
12	0	0	1	1	1
13	1	0	1	0	1
14	1	0	0	1	1
15	0	1	1	0	1

[Table 2] (continued)

	A	B	C	D	E
16	0	1	0	1	1
17	1	1	1	0	1
18	1	1	0	1	1
19	1	0	1	1	1
20	0	1	1	1	1
21	1	1	1	1	1

[0030] Also, in this embodiment, when manipulating the pushbutton knob 6, the pin pattern for necessarily manipulating the driving pin 3 arranged in the third area 8c is given. But, when manipulating the rocker knob 5, the pin pattern can be given so as to necessarily manipulate the driving pin 3 arranged in the third area 8c, and, when manipulating the pushbutton knob 6, the pin pattern which does not manipulate the driving pin 3 arranged in the third area 8c can be given. Also, in case it is desired to increase the maximum number of rocker knobs 5 which can be mounted, the pin pattern composed of only the driving pin 3 arranged in the first area 8a and the pin pattern composed of only the driving pin 3 arranged in the second area 8b from the pin patterns 1 to 12 in Table 2 can be applied. In this case, the maximum number of rocker knobs 5 becomes 6 and the maximum number of pushbutton knobs 6 becomes 9.

[0031] Next, a third embodiment according to the present invention will be explained. The basic structure of the input device in this embodiment is similar to that of the first embodiment, but has a difference in portions thereof. Also, the pin patterns manipulated by the driving portion 7 of the rocker knob 5 and the pushbutton knob 44 are equivalent to those of the first embodiment. Accordingly, only the difference will be explained hereinafter. This embodiment is different from the first embodiment in the configuration of the rocker knob 5 and the pushbutton knob 44. Figs. 9 and 10 show sectional views of portions where the rocker knob 5 and the pushbutton knob 44 are attached in this embodiment, respectively.

[0032] As shown in Fig. 9, this embodiment is similar to the first embodiment in that a case 42, a rib 40 and a cover are provided in the rocker knob 5. But, this embodiment is different from the first embodiment in that a flange 41 is provided on the rib 40 and an engagement portion 43 for engaging the flange 41 is provided in the case 42. The flange 41 is pressed down by the rib 40 when the user attaches or detaches the rocker knob 5, and is restored and engaged by a restoring force of the panel when engaging the flange 41 with the engagement portion 43. Accordingly, the rocker knob 5 can be attached or detached without opening or closing the cover.

[0033] As shown in Fig. 10, in the pushbutton knob

44, an engagement portion 46 arranged so as to form an escaping portion 47 in the side of the claw portion 31 of a pushbutton portion 45 is engaged with the flange 41 of the rib 40. The escaping portion 47 escapes from the protrusion portion of the flange 41 when the pushbutton portion 45 is pressed, and the engagement between the flange 41 and the pushbutton portion 45 is maintained when the pushbutton portion is pressed. By this configuration, the pushbutton knob 44 can be attached or detached without opening or closing the cover.

[0034] As mentioned above, the embodiments of the present invention were described, but the present invention is not limited to the above-mentioned embodiments and can be variously applied in the range of the technical spirit. For example, in the first and second embodiments, four or five driving pins 3 were described, but the number of the driving pins 3 is not specially limited if the driving pins 3 are provided in the first area 8a and the second area 8b, respectively. Also, the rocker knob 5 or the pushbutton knob 6 attached on the detecting switch 2 is not limited to the above-mentioned configuration, and, if it is configured to manipulate a certain pin pattern when pressed, various types of knobs can be applied.

[0035] Also, the function allocated to each knob can be variously set. In case of using the input device related to the present embodiment in the instrument panel of a car, the pushbutton knob 6 may have the function of a short cut key for matching a specific frequency in the manipulation of the radio or the function of a key for setting a specific temperature for the steering wheel heater or the control of an air conditioner. Accordingly, according to the present invention, it is possible that the switch for the steering wheel heater is provided in winter and replaced with the temperature setting key of the air conditioner in summer. In addition, the rocker knob 5 may have the function of increasing or decreasing the temperature set point of the air conditioner, the tuning function for a radio or the function of fast forward and rewind of the cassette in a cassette tape player. They can be exchanged with each other, including the pushbutton knob 6, and can optimize the manipulation of the switches arranged on an instrument panel. Further, application of the present invention is not limited to an instrument panel of a car, and can be applied if a plurality of switches has the control indication function.

[0036] As described above, according to the input device related to the present invention, the driving portion of the rocker knob manipulates the pin pattern selected from the driving pins arranged on one side among two areas on the substrate and the pin pattern selected from the driving pins arranged on the other side, and the driving portion of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in two areas on the substrate, and these pin patterns are all different patterns; thereby the output signal from each detecting switch can be identified although the rocker knob and the pushbutton knob are mixed, and the control function allocated to each knob can be performed.

In other words, in the input device in which the arrangement of a plurality of switches can be changed, the pushbutton switch and the rocker switch can be employed interchangeably.

[0037] Also, according to the input device related to the present invention, the driving pin is arranged in the third area as well as the first and second areas, and the pin pattern is set such that the driving pin of the third area is necessarily manipulated when manipulating the pushbutton knob or when manipulating the rocker knob, and thus more knobs can be arranged.

Claims

1. An input device having a plurality of-sets of detecting switches mounted on a substrate and a plurality of knobs arranged in correspondence with each set of detecting switches, and the plurality of knobs is composed of a rocker knob and a pushbutton knob, wherein each set of the detecting switches has a plurality of driving pins capable of independently switching contacts in two areas on the substrate, and each of the knobs has a driving portion for simultaneously manipulating a pin pattern composed of one or more driving pin, wherein the driving portion of the rocker knob selectively manipulates the pin pattern selected from the driving pins arranged in one of two areas on the substrate and the pin pattern selected from the driving pins arranged in the other of the two areas, and the driving portion of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in the two areas on the substrate, wherein each of two pin patterns selectively manipulated by the rocker knob and the pin pattern manipulated by the pushbutton knob are all different from each other, and a different identification signal is output from each set of the detecting switches.
2. An input device having a plurality of sets of detecting switches mounted on a substrate and a plurality of knobs arranged in correspondence with each set of detecting switches, and the plurality of knobs is composed of a rocker knob and a pushbutton knob, wherein each set of the detecting switches has a plurality of driving pins capable of independently switching contacts, the plurality of driving pins are arranged in a first area and a second area on the substrate and are arranged in a third area on the substrate, and each of the knobs has a driving portion for simultaneously manipulating pin patterns composed of one or more driving pin, wherein the driving portion of the rocker knob selectively manipulates the pin pattern selected from the driving pins arranged in the-first area and the pin pattern selected from the driving pins arranged in the second area, and the driving portion

of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in the first and second areas and including the driving pin arranged in the third area,

wherein each of two pin patterns selectively manipulated by the rocker knob and the pin pattern manipulated by the pushbutton knob are all different from each other, and a different identification signal is output from each set of the detecting switches.

3. An input device having a plurality of sets of detecting switches mounted on a substrate and a plurality of knobs arranged in correspondence with each set of detecting switches, and the plurality of knobs is composed of a rocker knob and a pushbutton knob,

wherein each set of the detecting switches has a plurality of driving pins capable of independently switching contacts, the plurality of driving pins are arranged in a first area and a second area on the substrate and are arranged in a third area on the substrate, and each of the knobs has a driving portion for simultaneously manipulating pin patterns composed of one or more driving pin,

wherein the driving portion of the rocker knob selectively manipulates the pin pattern selected from the driving pins arranged in the first area and including the driving pin arranged in the third area, and the pin pattern selected from the driving pins arranged in the second area and including the driving pin arranged in the third area, and the driving portion of the pushbutton knob manipulates the pin pattern selected from the driving pins arranged in the first and second areas,

wherein each of two pin patterns selectively manipulated by the rocker knob and the pin pattern manipulated by the pushbutton knob are all different from each other, and a different identification signal is output from each set of the detecting switches.

4. The input device according to any one of Claims 1 to 3, wherein the driving portion is provided with a protrusion at the bottom surface of the knob, and the protrusion is positioned to be substantially matched to the pin pattern allocated to the knob.

5. The input device according to any one of Claims 1 to 4, wherein the plurality of knobs arranged in correspondence with each set of the detecting switches can be attached or detached and can be exchanged with each other.

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FIG. 1

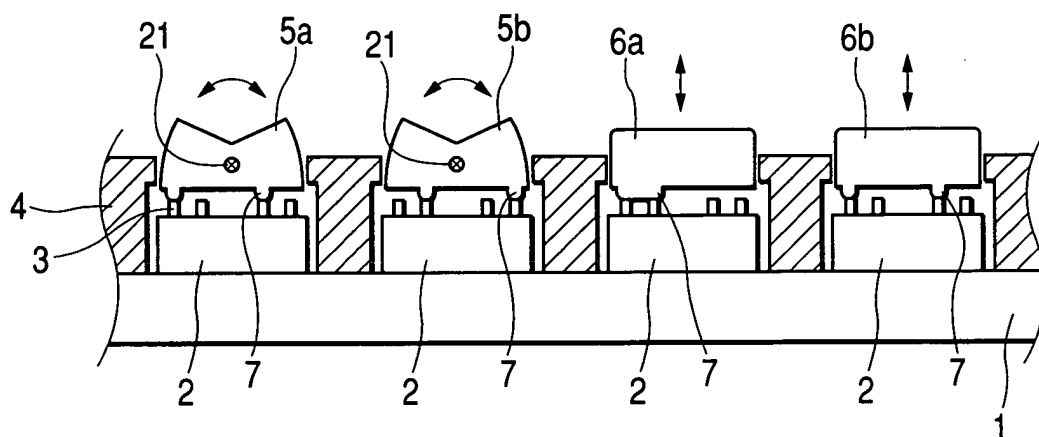


FIG. 2

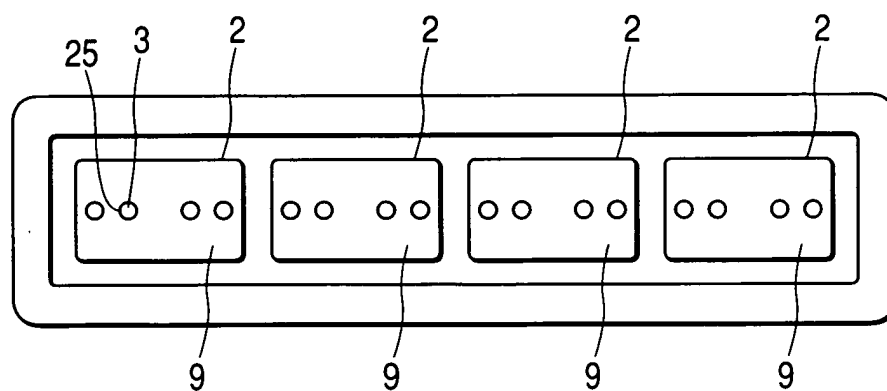


FIG. 3

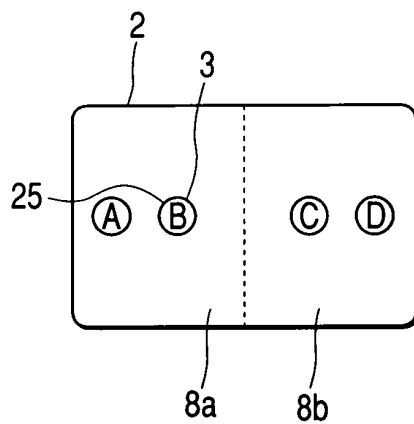


FIG. 4

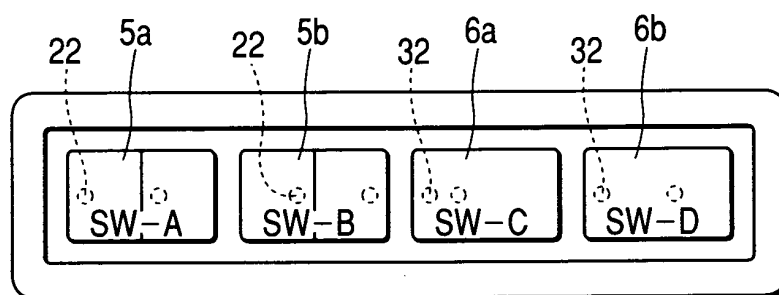


FIG. 5

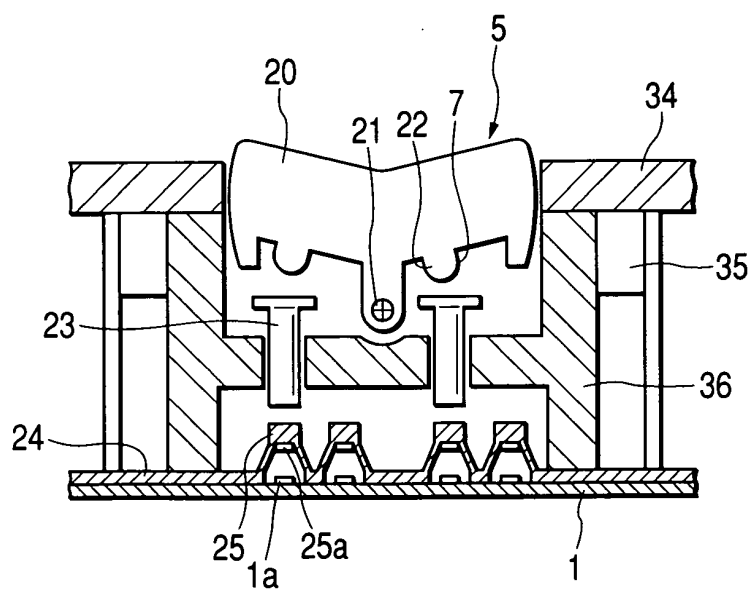


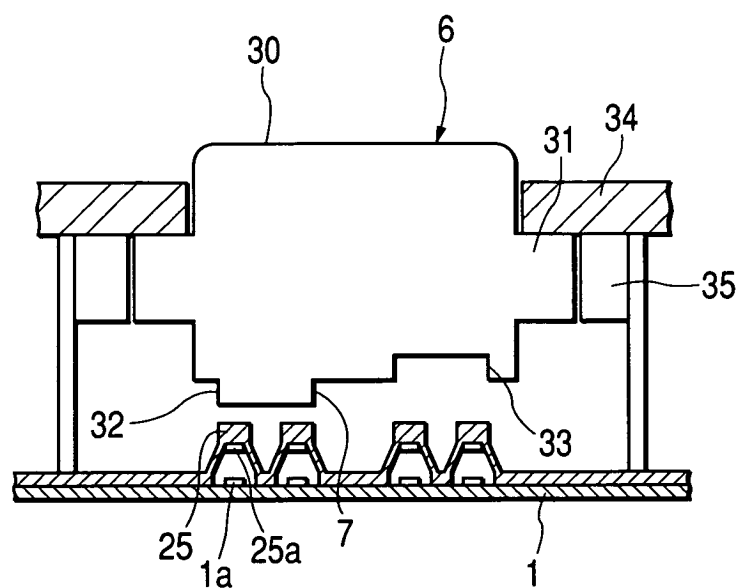
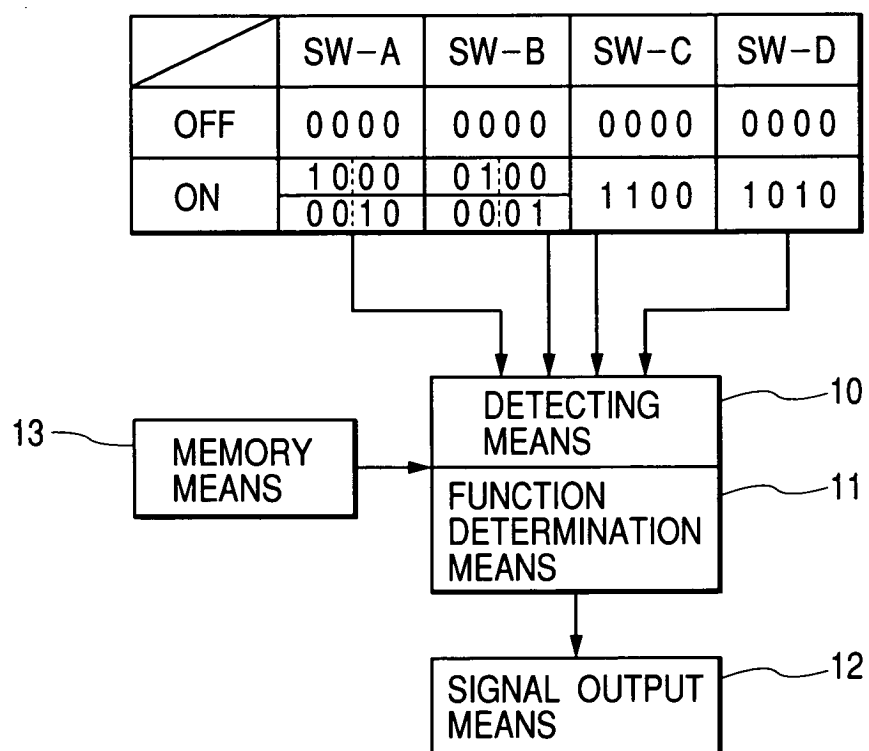
FIG. 6**FIG. 7**

FIG. 8

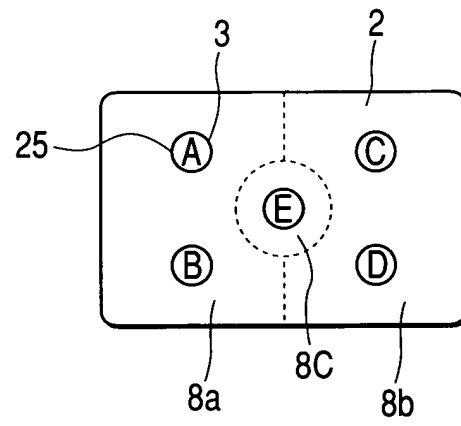


FIG. 9

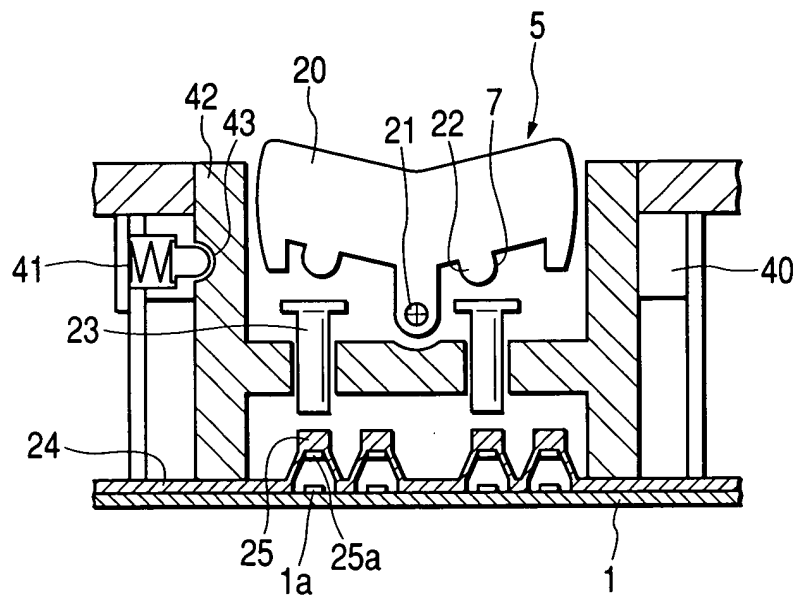
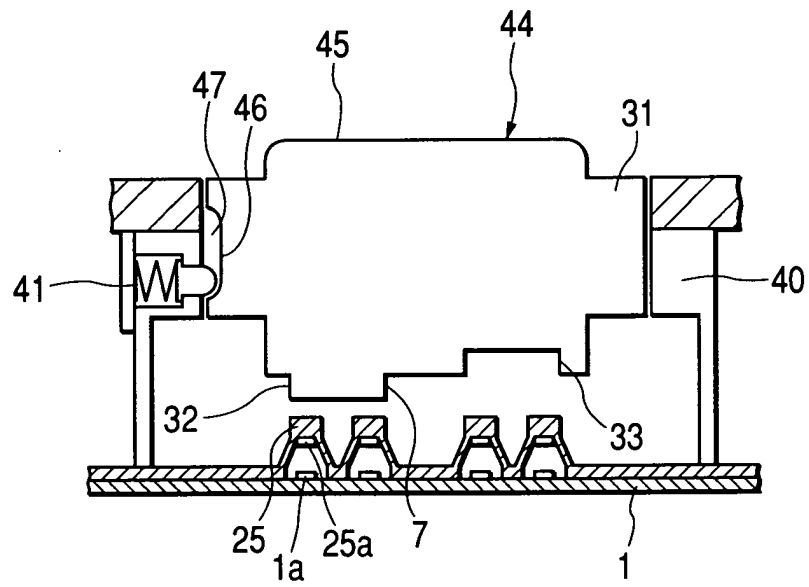


FIG. 10





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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 9032

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 1 109 183 A (ALPS ELECTRIC CO LTD) 20 June 2001 (2001-06-20) * paragraphs [0022] - [0027]; figures 1,3,4 *	1	H01H13/70
A	EP 1 000 834 A (ALPS ELECTRIC CO LTD) 17 May 2000 (2000-05-17) * column 7, lines 20-37; figures 2,3,5 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H01H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 July 2004	Examiner Glaman, C
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ON EUROPEAN PATENT APPLICATION NO.**

EP 04 00 9032

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27-07-2004

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 1109183	A	20-06-2001	JP	2001236849 A		31-08-2001
			EP	1109183 A2		20-06-2001
			US	2001004169 A1		21-06-2001

EP 1000834	A	17-05-2000	JP	2000142422 A		23-05-2000
			EP	1000834 A2		17-05-2000
			US	6349616 B1		26-02-2002

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82