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Ohashi

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[54] **ROCKER SWITCH WITH POSITION INDICATOR**

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[73] Assignee: **Nihon Kaiheiki Industrial Company, Ltd.**, Tokyo, Japan

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[30] **Foreign Application Priority Data**

Nov. 12, 1973 Japan ..... 48-129831[U]

[52] **U.S. Cl.** ..... **200/308**; 116/124 L

[51] **Int. Cl.²** **H01H 9/16**

[58] **Field of Search** ..... 200/308, 315; 116/124 L

[56] **References Cited**

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Assistant Examiner—William J. Smith
Attorney, Agent, or Firm—Pierce, Scheffler & Parker

[57] **ABSTRACT**

This rocker switch comprises a switch body, an operating rocker button and a contacts-actuating converter, both of which latter are mounted rotatably relative to the switch body, said rocker button and said converter being interconnected so as to rotate mutually in reverse directions. An indicating window is provided centrally on the upper part of the rocker button, and a corresponding indicating surface is provided on the upper surface of said converter.

7 Claims, 7 Drawing Figures

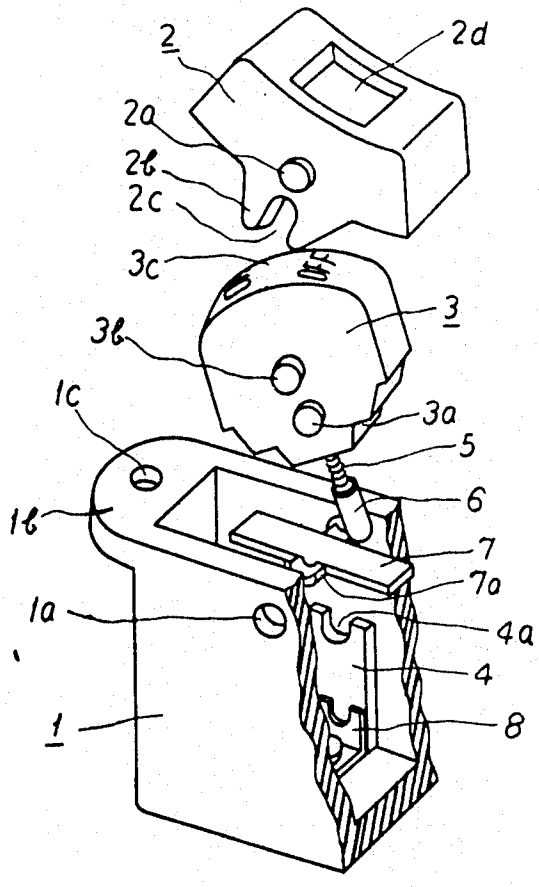


FIG. 1

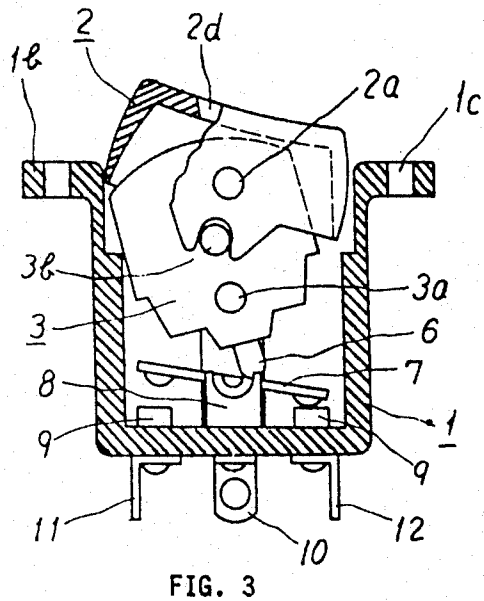


FIG. 2

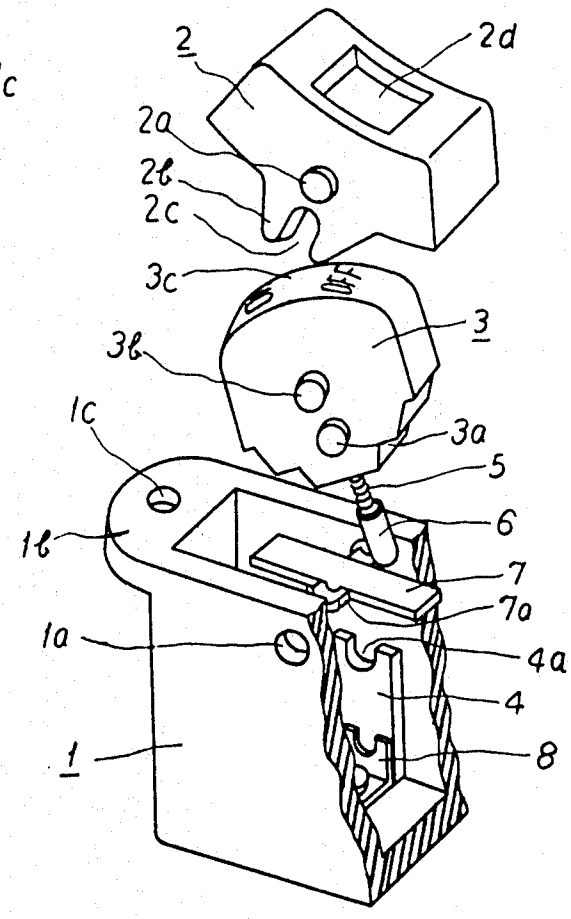


FIG. 3
PRIOR ART

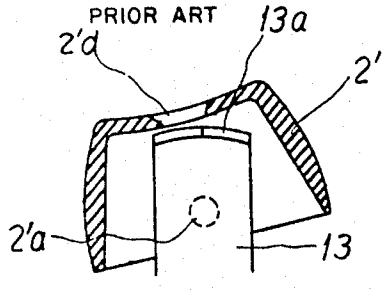


FIG. 4

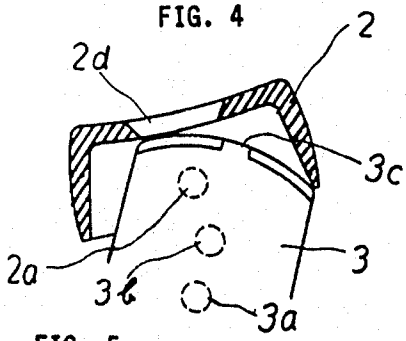


FIG. 5

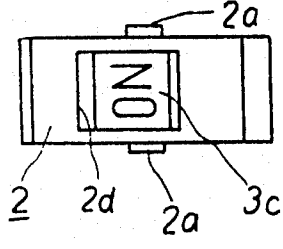


FIG. 6

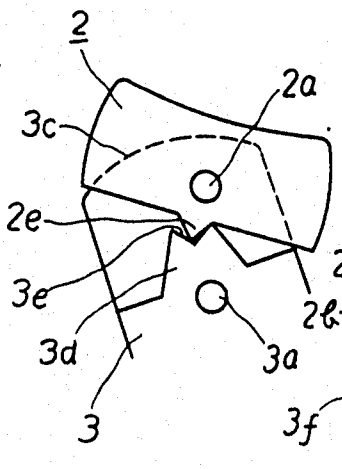


FIG. 7

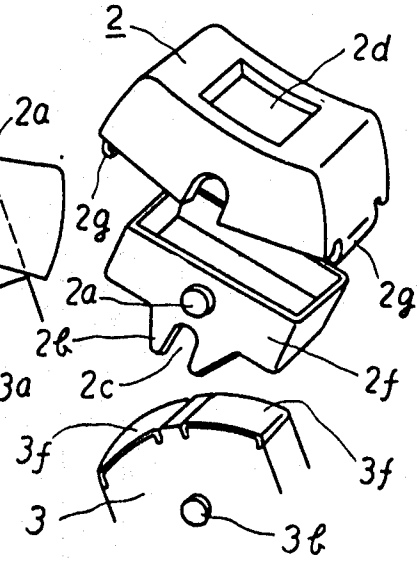


Fig. 8

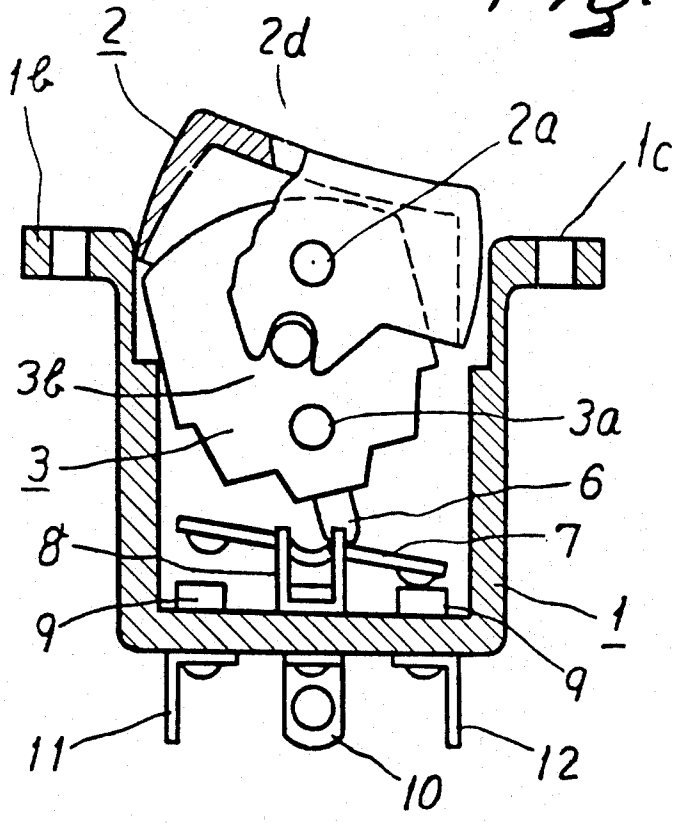
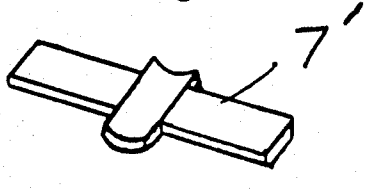


Fig. 9



ROCKER SWITCH WITH POSITION INDICATOR

This invention relates to the electrical switch art, and is concerned with the provision of a rocker switch having an improved indicating means.

The invention relates to an indicating device in a rocker-type push-button switch in which an indicating window is provided centrally on the upper surface of an operating button of the switch and correspondingly thereunder an indicating surface is provided presenting indicia (e.g., "OFF" and "ON" characters) thereon. The feature of the invention resides in that said operating button and a cooperating contacts-actuating converter disposed thereunder are interconnected so that when the operating button is rocked in the left (or right) direction the underlying converter is thereby rocked in the reverse direction, and the upper surface of said converter is utilized as an indicating surface, thereby enabling the indicating window to be made larger than conventional, thus making on and off conditions of the switch indicated very clearly and, hence, to prevent misreading of the indications.

The invention will now be more particularly described in the following, taken with the appended drawing, in which:

FIG. 1 is a cross-sectional front view of a switch according to the present invention;

FIG. 2 is an exploded perspective view of the structure shown in FIG. 1;

FIG. 3 is a schematic view of an indicating portion of the same kind devised prior to the present invention;

FIG. 4 is a schematic view of the corresponding portion according to the present invention;

FIG. 5 is a plan view of an essential portion of the switch;

FIG. 6 is a front view of an essential portion of another embodiment of the invention;

FIG. 7 is an exploded perspective view of an essential portion of still another embodiment of the invention;

FIG. 8 is a diagrammatic representation of a switch according to the present invention said switch having a central stable position for the rockable switch button; and

FIG. 9 is a perspective view showing the form of the contact member 7' of FIG. 8.

Referring to the drawings, in FIG. 1 — which shows an embodiment of the invention — on a case 1 of the switch there is mounted, so as to close the upper opening thereof, an operating rockable button 2 free to rock left-and right. To this end, on the front and rear surfaces of button 2 there are provided lugs 2*a* (FIG. 2) functioning as shaft journals, and in order to receive the lugs there are provided bearing apertures 1*a* in the upper portions of front and rear walls of case 1. Alternatively, instead of lugs 2*a*, a separately-made shaft-pin may be inserted through apertures 1*a*. It is noted that the rocker-type button has been styled a button because conventionally the form of its upper surface rises and falls in a manneer similar to a wave, but it is intended to include as an exception also such buttons having a plane form or the like, so far as their function is similar.

Below button 2, a contacts-actuating converter 3 is mounted, the same being free to rock left-and-right on case 1. To this end, lugs 3*a* are provided in the lower portions of front and rear surfaces of converter 3, for performing the shaft journal action, which lugs 3*a* are

placed on upper recesses 4*a* of vertical plates 4 secured to front and rear inner surfaces of case 1.

Alternatively, instead of lugs 3*a*, a separately made shaft-pin may be inserted through holes which may be bored similarly to and below shaft-holes 1*a*.

Button 2 and converter 3 are inter-connected so as to rotate mutually in reverse directions. To this end, centrally on front and rear surfaces of converter 3 there are provided lugs 3*b*, and correspondingly on the lower surfaces of front and rear walls of button 2 there are provided downward projections 2*b* in the central portions of which slots 2*c* are formed. When lugs 3*b* are inserted into slots 2*c*, as shown in FIG. 1, button 2 and converter 3 are inter-connected so that when button 2 is pushed on its left side upper portion, to rotate it counterclockwise, converter 3 is made to rotate clockwise by means of the lug-and-recess engagement 2*c* –3*b*. Lugs 3*b*, also, may be replaced by a separately formed shaft-pin.

On the lower surface of converter 3 there is formed an upwardly directed recess, into which recess there is inserted a slider 6 with the intervention of a spring 5. An underlying board-shaped movable contact-member 7 is rockably supported in a seesaw manner, on a bearing member 8 secured on the inner base surface of case 1, and the slider 6 is placed on the upper surface of contact member 7 under the pressure of spring 5 and free to move to the left and right. Stationary contacts 9 are secured on the inner base surface of case 1 at the left and right sides thereof, which contacts confront the left and right lower surfaces, respectively, of contact member 7 so as to make contact with them alternately.

On the lower surface of case 1 and adjacent the center there is secured a central terminal 10 which is connected to bearing member 8, and at the left and right sides there are secured terminals 11 and 12 which are connected to stationary contacts 9, 9.

In FIG. 1, projecting from the upper surface of case 1 to the left and to the right, there are formed flanges 1*b* in which holes 1*c* are bored for inserting screws in order to secure case 1 to a panel or the like.

Centrally on the upper surface of button 2 there is provided an indicating window 2*d*, and correspondingly the upper surface 3*c* of converter 3 coming close to the window 2*d* is utilized as an indicating surface. Namely, as seen in FIG. 2, at the left and right portions of the upper surface 3*c* there are marked indications suvh as, for example, ON and OFF. Such character indications may be replaced by marks or colors such as red and blue. Further, these characters and the like may, instead of being marked directly on the surface 3*c*, be applied separately on a sheet of paper or an indicating plate, which in turn is affixed to surface 3*c* or fitted into a shallow recess or groove formed on said surface. Furthermore, the window 2*d* may be closed by fitting thereon a transparent or semi-transparent member of glass, lens or the like, through which only light is permitted to pass.

FIG. 3 shows the outline of a prior art indicating device of the same general kind. In this FIG., within a rocker button 2' there is provided an indicating post fixed to the switch case. Centrally on the upper surface of button 2' there is opened an indicating window 2'*d* and confronting thereto on the upper surface of post 13 there is formed an indicating surface 13*a* on which indications such as ON and OFF are presented. Buttor 2' is supported free to rock about the axis 2'*a*. In this case, if the width of one side indicating section of indi

cating surface 13*a* is *w*, the arc length the button 2' moves from the leftwardly inclined position as shown to the opposite rightwardly inclined position must be *w*. If the arc length the button move were shorter than the above, the lefthand side indicating section on the surface 13*a* which must be concealed would not be completely concealed.

In contrast to the above, FIG. 4 shows the outline of an indicating device according to the present invention. In the FIG., the button 2 is inclined leftwardly and at the same time the converter 3 having indicating surface 3*c* is inclined rightwardly. Now, similarly as above stated, if the width of one side indicating section of the indicating surface 3*c* is *w*, the arc length through which the button 2 must move from the left as shown to the opposite (rightwardly inclined) position is *w*12, because at the same time the button 2 moves *w*12 to the right the indicating surface 3*c* moves *w*12 to the left and hence the relative movement of both becomes their sum *w*. Therefore, the result is that, relating to both figures, if widths of lef-and-right movement of buttons 2 and 2' are equal, the width of each indicating section on the indicating surface and the width of the indicating window in the case of the structure in FIG. 4 may be twice those in the case of FIG. 3. Thus, the fact that the widths of the indicating section and the indicating window may be made larger leads to the result that the characters or the like on the indicating surface may become larger than normal, and accordingly the indications will be made clearer. By the way, FIG. 5 is a plan view when seeing the indicating device shown in FIG. 4 from above, wherein it will be seen that the indication ON is disclosed very clearly.

In FIG. 6, which shows another embodiment of the invention, centrally on the lower surface of each of front and rear walls of button 2 there is provided a triangular projection 2*e*, and correspondingly, on each of front and rear surfaces of converter 3 and at a position suitably lowered from the upper end thereof there is formed a mountain-shaped piece 3*d*. The projection 2*e* is engaged with a groove 3*e* which is formed on the top piece 3*d*. When button 2 is rocked, projection 2*e* and groove 3*e* are correlated in a similar relation as the teeth of gear wheels interlock; thus, projection 2*e* drives piece 3*d*. Alternatively, in FIG. 2, groove 2*c* and lug 3*b* may be changed to the reverse relation, namely lugs may be provided on button 2 with upwardly directed grooves on converter 3.

In still another embodiment shown in FIG. 7, button 2 is made separately from an underlying rectangular cylinder frame 2*f*, which latter is detachably connected with button 2 by resiliently engaging a resilient projection 2*g* formed on each of the left and righthand lower surfaces of button 2 with the corresponding lower surface of frame 2*f*. On the upper surface of button 2 there is provided an indicating window 2*d*, while a shaft-lug 2*a*, projections 2*b* and a groove 2*c* are provided on each of the front and rear walls of frame 2*f*. Further, in this figure, on the upper surface of converter 3 there are fitted two, — left and right, — indicating plates 3*f*. That is to say, on the upper surface of converter 3 there are previously provided on each of the left and right half portions thereof two grooves in the front and rear direction, into which grooves downwardly bent pieces at the left and right side ends of each of separately prepared indicating plates 3*f* are inserted. On the upper surfaces of the left and right indicating plates 3*f* there are provided indications such as ON and OFF or the like. The upper surface of converter 3 shown in FIG. 4 is drawn so as to substantially coincide with that shown in FIG. 7.

Although in the above described embodiments button 2 and converter 3 are supported rotatably on switch case 1 or on its interior member 4, either one or both of said button 2 and said converter 3 may be supported rotatably on a cover or the like which is made separately from the switch case itself and is secured to the latter. It is only necessary that both be mounted rotatably relative to stationary portions of the switch. Further, converter 3 may be of transparent material with a lamp mounted therebeside or therebelow to illuminate the upper indicating surface of the converter, whereby the indication will be made still more clear.

According to the invention, not only is the indicating mechanism very simple, and hence strong and inexpensive, but also the width of the indicating portion on the upper surface of the operating button is permitted to be larger relative to a constant width of rotation of the button; therefore, the indication of ON and OFF or the like will be made very clear to prevent misreading. Further, and especially in the case of a small sized switch, the face that the indicating surface can be made larger displays a particlarly desirable effect. Furthermore this invention, due to its permissible wider indicating surface, may be easily applied to a three-stage conversion switch having also a centrally located stable position. This latter concept is represented in FIGS. 8 and 9. The switch illustrated in FIG. 8 differs from that illustrated in FIG. 1 in that the bearing member 8 of FIG. 1 is changed to 8' which latter is generally constructed by turning said part 8 of FIG. 1 90° about the vertical axis. Also, the upper surface of the plate 7 shown in FIG. 1 is, in the embodiment shown in FIGS. 8 and 9, changed so as to present a somewhat concave upper surface instead of the flat surface illustrated more particularly in FIG. 2. By these features the switch is given the characteristic that it has a third position intermediate off and on which intermediate position is stable.

I claim:

1. A rocker switch comprising a switch body, a rockable push-button mounted rotatably about an upper axis in said switch body, a contacts-actuating converter mounted rotatably about a lower axis in said switch body, said button and said converter being mutually connected by lug-and-recess engagement provided on said two members at a position intermediate between said upper and lower axis so that said two members are made to rotate mutually in reverse directions, an indicating window being provided centrally on the upper surface of said rockable push button, and a corresponding indicating surface being provided on the upper surface of said converter.

2. A rocker switch according to claim 1, in which said operating rockable push-button having the indicating window, said converter, and a contact member supported on a bearing member are mutually rockable in reverse directions in turn.

3. A rocker switch according to claim 1, in which said indicating window in the operating rockable push-button is provided with a transparent plate.

4. A rocker switch according to claim 1, in which said operating rockable push-button is made three-stage conversible having also a central stable position.

5. A rocker switch according to claim 1, in which said operating rockable push-button is composed of a rock-

able push-button portion and a frame member both of which are detachably connected.

6. A rocker switch according to claim 1, in which at least one indicating plate is detachably secured on the upper surface of said converter.

7. A rocker switch according to claim 1, in which indicia are provided on the upper surface of said converter so that they can be viewed through said indicating window of said operating wave-form button.

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