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(54) **Rocker switch assemblies.**

(57) A rocker switch assembly, typically for a heater, has a mounting box (14) for a rocker switch (3) which has a pivoted mount (15, 17) for an enlarged rocker cap (16) to enhance the look and feel of the switch. The cap (16) may be used as an annunciator light (22) shutter, may have tabs (19) for coupling adjacent switches to act in unison and may be acted upon by an automatic gravity operated safety mechanism (24, 26).

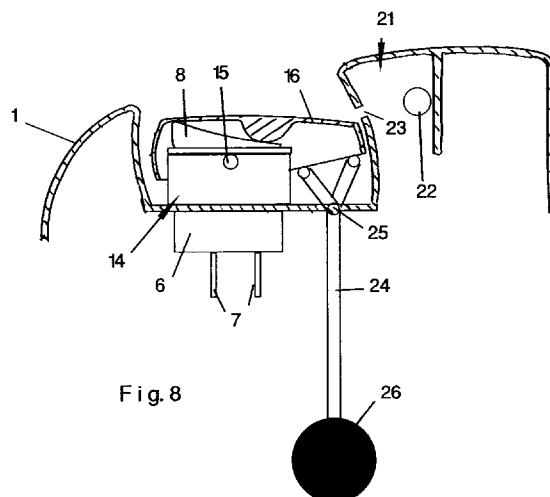


Fig. 8

The invention relates to rocker switch assemblies. Rocker switches are used as electrical toggle switches in industry, domestically and in automobiles, for example. Because of their wide application and large scale manufacture the unit price of rocker switches is relatively low. There are applications in which it is useful to take advantage of the low unit cost of rocker switches but where it is desirable to enhance them. Their use in domestic electric convector heaters is one example.

It is usual to provide a bank of switches in a convector heater to allow different options to be selected. For example, there may be an on/off switch; a fan switch; a 1 kW switch and a 2 kW switch. It is desirable to enhance the look, feel and operational effect of such rocker switches and this is an object of one embodiment of the invention.

According to the invention there is provided a rocker switch assembly comprising a rocker switch having a rocker and a rocker axis about which the rocker pivots in operation; a base; switch mounting means on the base for mounting the rocker switch; a rocker operating cap which overlies and extends beyond the rocker; and a cap pivot arrangement whereby the cap is mounted on the base to pivot about a cap axis substantially in line with the rocker axis. With this arrangement the cap can effectively extend the size of the rocker and be attractively moulded and coloured. It may be transparent and illuminated from below.

Preferably the base has a flat region and the switch mounting means comprises a pair of parallel walls upstanding from the flat region, the rocker switch being accommodated as a push fit between the walls and the cap pivot arrangement comprises a pair of spigots aligned with the rocker axis and a pair of notches which accommodate the spigots.

Alternative arrangements are envisaged. It is possible to arrange for the spigots to be on the cap and inwardly facing to be held under a lip of the rocker switch, the notches then being in the walls. Preferably, however, the spigots are on the walls and the notches are in the cap.

Preferably end walls link the ends of the said parallel walls to define an open-topped box which accommodates the rocker switch as a push fit. The base may have one or more apertures at the bottom of the box to allow at least terminals of the switch to be pushed through.

In a bank of switches it is useful to indicate those switches which are active in such a bank and it has been proposed to provide annunciator lamps for this purpose. However, provision of individual lamps for each switch is expensive. A preferred feature of the present invention seeks to provide a solution.

According to an aspect of the invention there is provided a rocker switch system comprising a plurality of rocker switch assemblies as described above

mounted side by side on a common base, each with a rocker operating cap and an annunciator light system for indicating which of the switches is on, the annunciator light system comprising a light channel including a light source and, for each switch, an aperture in the channel adjacent the respective switch cap, the aperture being obscured by the cap when the switch is in the off position and being revealed to show an annunciator light when the switch is in the on position.

Sometimes it is desirable to couple switches so that, for example, one particular switch is not allowed to be in the on position, say, if another switch is in the off position, for example. Such coupling is facilitated by the present invention since the caps provide relatively long lever arms which may be coupled by projecting tabs on one cap which act to rock an adjacent cap to the on or off position in accordance with the position of its own switch.

A problem peculiar to electric heaters is the danger of fires if they are overturned. For this reason a tilt switch has been proposed which automatically switches off the heater if it is overturned. Thus, according to another aspect of the invention there is provided a heater with an on-off rocker switch assembly as described above, the heater having a free-standing casing, there being provided a gravity operated linkage for the said on-off switch which mechanically couples the rocker cap for that switch with a pivoted plumb bob whereby tilting of the casing beyond predetermined limits causes the on-off switch to be automatically switched off.

The invention will further be described with reference to the accompanying drawings, of which:-

Figure 1 is a plan view of part of a convector heater incorporating a rocker switch system in accordance with the invention;

Figure 2 is a side view of one of the rocker switches of the convector heater of Figure 1;

Figure 3 is an end view of the rocker switch of Figure 2;

Figure 4 is a perspective view of part of the base and a mounting box of a rocker switch assembly of the heater of Figure 1;

Figure 5 is an exploded side view of a rocker switch assembly of the heater of Figure 1;

Figure 6 is an exploded plan view of the assembly of Figure 5;

Figure 7 is a plan view of the assembly of Figure 5; and

Figure 8 is a sectional side view of the on-off switch assembly of the convector heater of Figure 1.

Referring to Figure 1 there is shown part of the casing 1 of a convector heater which has a rotary thermostat control 2 and a rocker switch system comprising an on/off switch 3, a 1kW switch 4 and a 2kW switch 5.

Figure 2 is a cross-sectional side view of the rocker switch 3 and Figure 3 is an end view of the rocker switch 3, it being understood that the other switches are the same.

Referring to Figures 2 and 3 the rocker switch has a body 6 which houses switch contacts which connect and disconnect projecting terminals 7. The switch is operated by a rocker 8 pivoted at 9. At the ends of the body 6 are pairs of leaf springs 10 which serve as friction retainers when the body is press-fitted into an accommodating recess.

Figure 4 shows part of a flat region 11 of a base of the rocker switch assembly. Upstanding from the base are parallel side walls 12 and linking end walls 13 which form a box-shaped retainer 14 for the switch body 6. The bottom of the box is open to allow the base of the switch body to pass through. This is shown in Figure 5 where switch 3 is shown installed in retainer 14. Opposed spigots 15 project from the side walls 12 in line with the rocker axis 9. A rocker cap 16 fits over the rocker 8 and is located and pivoted on the spigots 15 by means of key-hole shaped notches 17 in opposed depending side-walls 18 of the cap. The cap is a press-fit on to the spigots and then forms an overlying and extending surface for the operation of the rocker switch. This enlarges and enhances the effective operating surface of the rocker switch.

Figure 6 is a plan view of the assembly with the cap 16 to one side of the rocker switch and Figure 7 is a plan view with the cap in place. These figures show tabs 19 projecting from the sides of the cap and these locate in corresponding recesses 20 in any adjacent cap. Two adjacent switches coupled by this means are switches 4 and 5 of Figure 1. Here tab 19a of the cap of switch 5 rests in the recess of the cap of switch 4. Thus, when switch 4 is switched off the caps of switches 4 and 5 are coupled to switch off switch 5 also. Tab 19b of the cap of switch 4 is located in the corresponding recess of the cap of switch 5. In this way when switch 5 is switched on switch 4 is coupled with it to be switched on also. The result is that switch 5 can be on only if switch 4 is on and switch 4 can be off only if switch 5 is off.

Referring now to Figure 8 there is shown a part sectional side view of the system of Figure 1. Along the front of the switch system runs a light channel 21 which has a single red neon lamp 22 in it. Adjacent the front of each cap is a backwardly facing aperture 23. When the switch is in the "off" position as shown in broken line then the aperture is obscured, the cap itself constituting a shutter. When the switch is in the "on" position as shown in full line then the aperture is revealed and this gives a visible annunciator light indication to the user.

Another feature shown in Figure 8 is an automatic gravity-operated safety switch. Beneath rocker cap of switch 3 is mounted a Y-shaped arm 24 pivoted at 25. At the end of the vertical limb of the arm 24 is a plumb

bob weight 26. The other limbs of arm 24 cooperate with the underside of the switch cap in such a way as to switch the switch 3 off automatically if the casing is tilted forward or back sufficiently. Thus, if the heater is knocked over it is automatically switched off.

Claims

1. A rocker switch assembly comprising a rocker switch having a rocker and a rocker axis about which the rocker pivots in operation; a base; switch mounting means on the base for mounting the rocker switch; a rocker operating cap which overlies and extends beyond the rocker; and a cap pivot arrangement whereby the cap is mounted on the base to pivot about a cap axis substantially in line with the rocker axis.
2. A rocker switch assembly as claimed in Claim 1 wherein the base has a flat region and the switch mounting means comprises a pair of parallel walls upstanding from the flat region, the rocker switch being accommodated as a push fit between the walls and the cap pivot arrangement comprises a pair of spigots aligned with the rocker axis and a pair of notches which accommodate the spigots.
3. A rocker switch assembly as claimed in Claim 2 wherein the spigots are on the walls and the notches are in the cap.
4. A rocker switch assembly as claimed in Claim 2 or Claim 3 wherein end walls link the ends of the said parallel walls to define an open-topped box which accommodates the rocker switch as a push fit.
5. A rocker switch assembly as claimed in Claim 4 wherein the base has one or more apertures at the bottom of the box to allow at least terminals of the switch to be pushed through.
6. A rocker switch system comprising a plurality of rocker switch assemblies as claimed in any of the preceding claims mounted side by side on a common base, each with a rocker operating cap and an annunciator light system for indicating which of the switches is on, the annunciator light system comprising a light channel including a light source and, for each switch, an aperture in the channel adjacent the respective switch cap, the aperture being obscured by the cap when the switch is in the off position and being revealed to show an annunciator light when the switch is in the on position.

7. A rocker switch system as claimed in Claim 6 or comprising a pair of rocker switch assemblies as claim in any of Claims 1 to 5 mounted side by side on a common base, the rocker caps having a coupling tab arrangement whereby a tap on one cap co-operates with the adjacent cap to ensure that one switch is switched on or off by switching the other switch on or off. 5
8. A rocker switch system or assembly as claimed in any of the preceding claims incorporated in an electric heater. 10
9. A rocker switch system or assembly as claimed in Claim 8 wherein the heater has a free-standing casing and one of the rocker switches is an on-off switch for the heater, there being provided a gravity operated linkage for the said on-off switch which mechanically couples the rocker cap for that switch with a pivoted plumb bob whereby tilting of the casing beyond predetermined limits causes the on-off switch to be automatically switched off. 15 20

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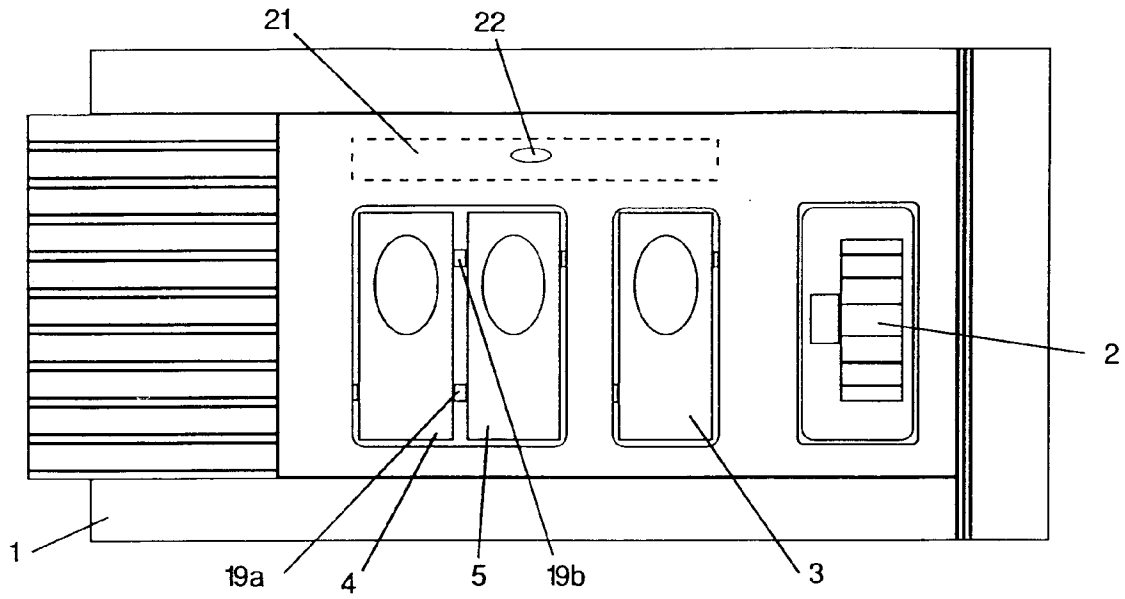


Fig. 1

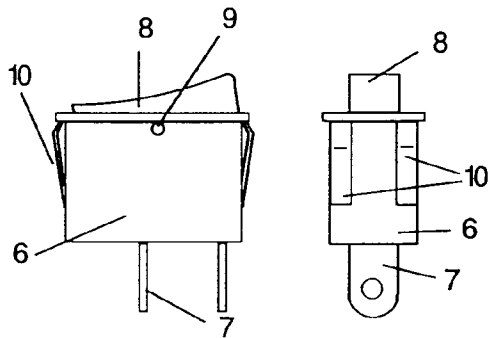


Fig. 2

Fig. 3

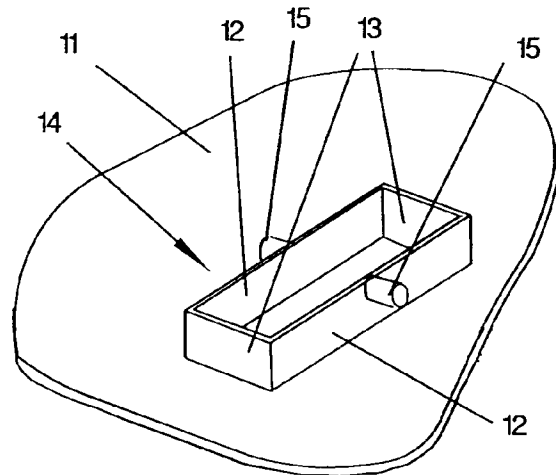


Fig. 4

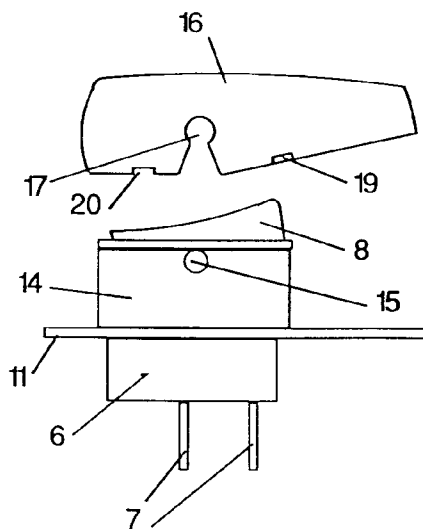


Fig. 5

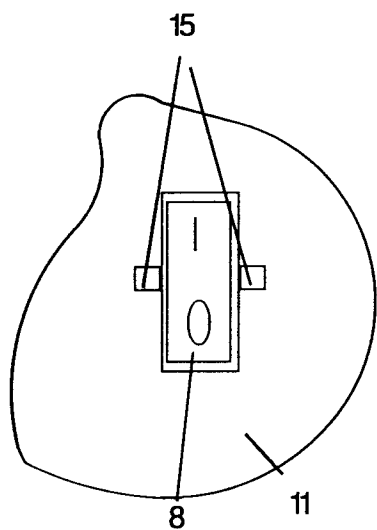
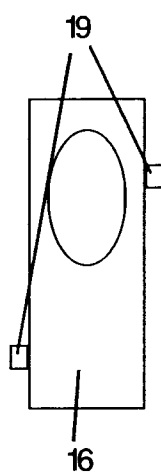


Fig. 6

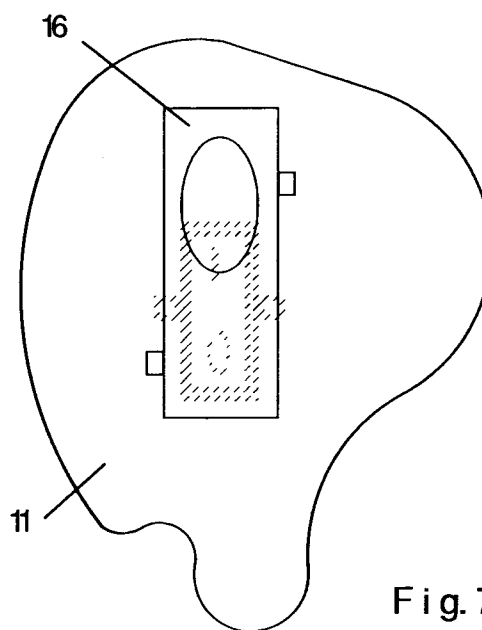


Fig. 7

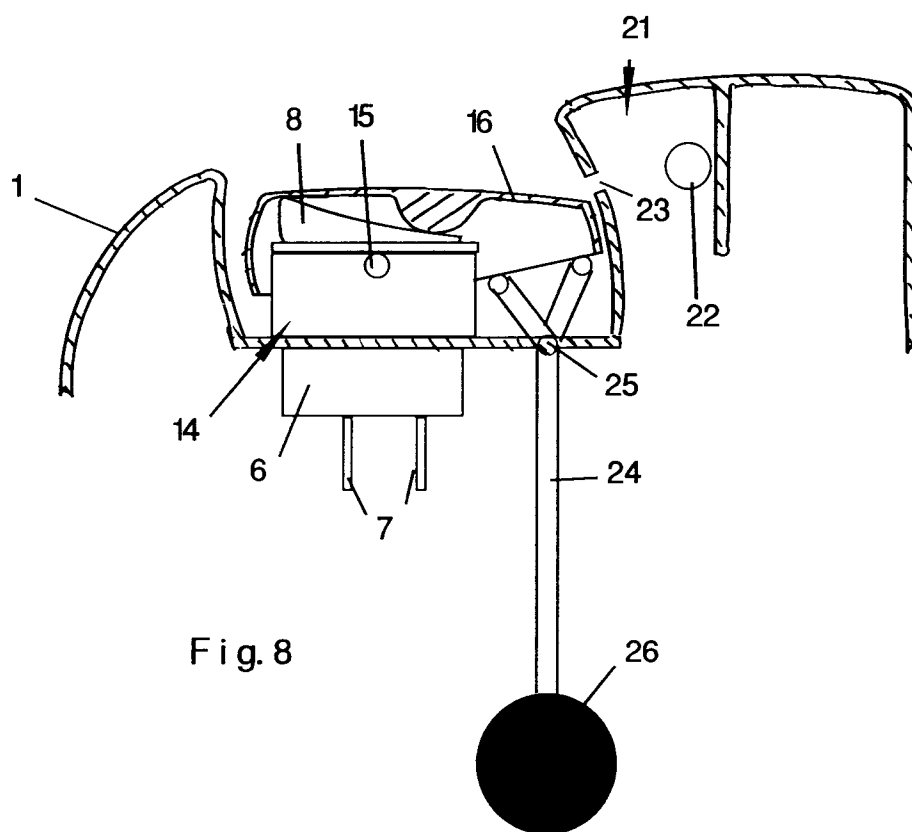


Fig. 8



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 8484

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.6)
Y	GB-A-2 064 223 (LUCAS INDUSTRIES) * claims 1,2; figure 2 * ---	1-5	H01H23/14 H01H35/02
Y	DE-A-42 14 794 (MARQUARDT GMBH) * abstract; figures 6,7 * ---	1-5	
Y	US-A-4 242 552 (GTE SYLVANIA WIRING DEVICES) * abstract; figures 2,9 * ---	1	
A	GB-A-1 214 756 (PHILIPS ELECTRONIC AND ASSOCIATED INDUSTRIES) * page 1, line 74 - line 88; figure 1 * ---	6,7	
Y	DE-U-19 42 979 (BUSCH-JAEGER) * claims 1,2; figures 3,4 * ---	1	
A	US-A-3 414 858 (EMERSON ELECTRIC CO.) * figures 1,5 * -----	8,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H01H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 January 1995	Examiner Janssens De Vroom, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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