

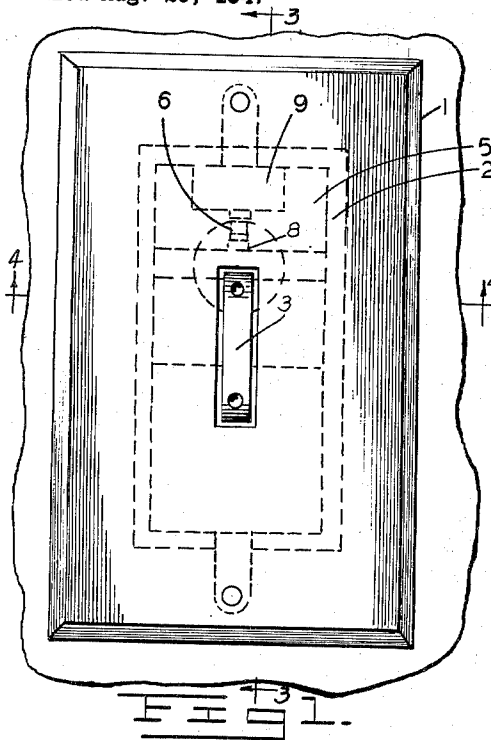
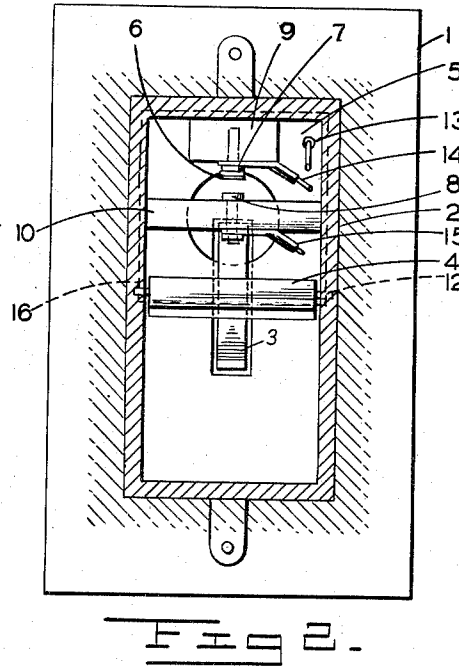
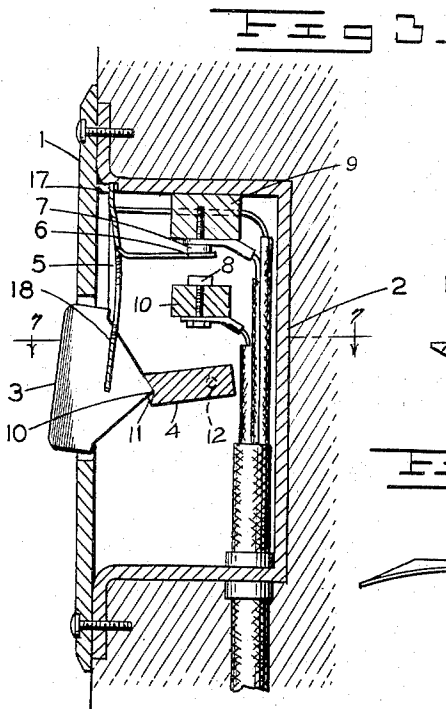
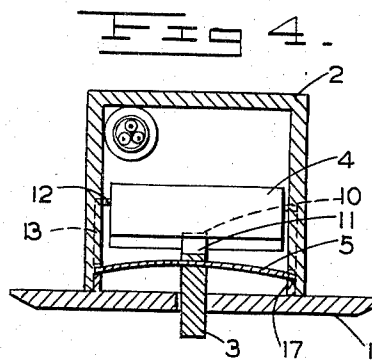
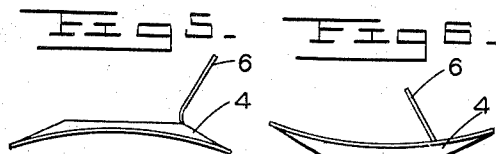
Oct. 3, 1950

F. J. TRAINOR
ELECTRIC SNAP SWITCH

2,524,408

Filed Aug. 25, 1947

2 Sheets-Sheet 1



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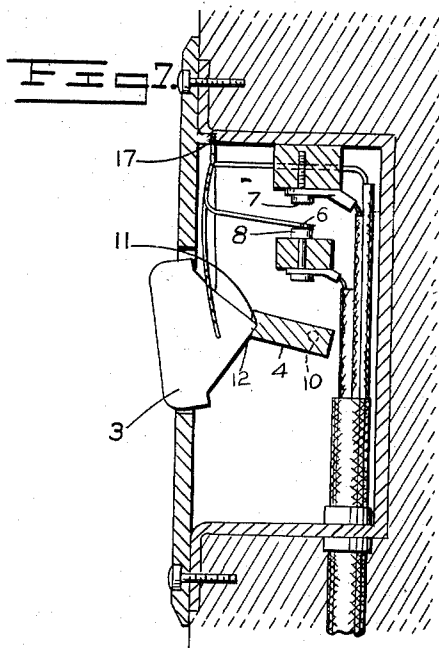
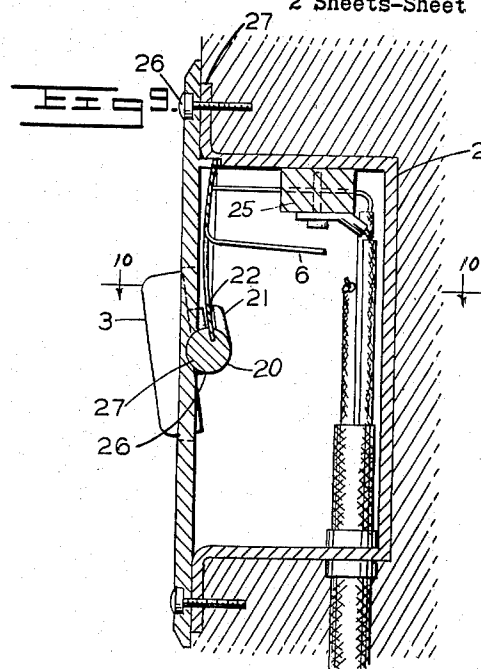
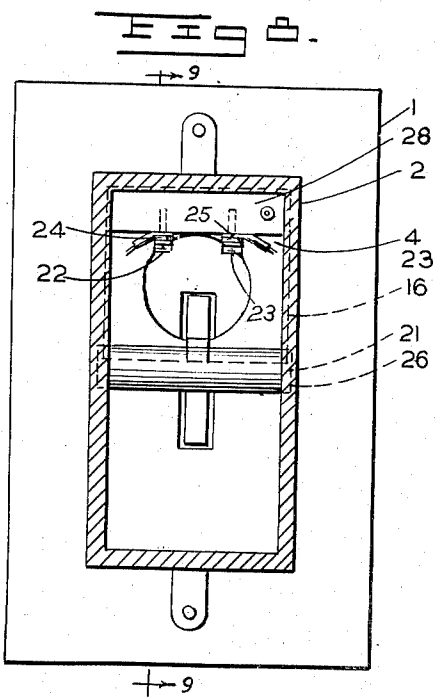
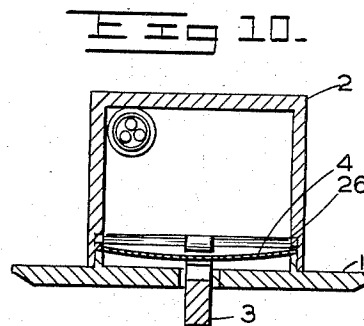
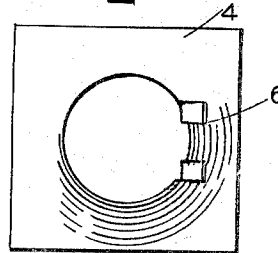
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2 Sheets-Sheet 2



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ELECTRIC SNAP SWITCH

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9 Claims. (Cl. 200—67)

1

2

My invention relates to an electric snap switch. The object of my invention is to provide an improved switch of the snap action type which consists of a few parts so constructed that they may be readily assembled together, and when so assembled, provide a compact, reliable and economical mechanism.

The following is a description of my invention, reference being had to the accompanying drawing in which:

Figure 1 is a front plan view of a single pole double throw switch embodying my invention;

Fig. 2 is a cross section as seen from the rear thereof;

Fig. 3 is a cross section on plane 3—3 of Fig. 1;

Fig. 4 is a cross section on plane 7—7 of Fig. 3;

Fig. 5 is a side view of the snap element in one contacting condition;

Fig. 6 is a side view of the same element in a second contacting condition;

Fig. 7 is a cross section similar to Fig. 3, being a cross section on the plane 3—3 of Fig. 1, and shows the mechanism in the second contacting condition;

Fig. 8 is a cross sectional rear view of a simplified version of my switch;

Fig. 9 is a cross section on plane 9—9 of Fig. 8;

Fig. 10 is a cross section on plane 10—10 of Fig. 9; and

Fig. 11 is a plan view of the snap element used in my switch.

In the drawing, Figure 1, the numeral 1 indicates a cover plate for the rectangular casing 2. A rocker-type handle 3 projects outwardly through an opening in the cover plate. This handle is provided with a wedge shaped portion on its rearward side having an apex or knife edge for purposes presently to become apparent. Just behind the rectangular handle portion in the wedge shape portion I provide a slot 18 to receive part of snap element 5. Rearwardly of the handle element 3, I provide a rocker bar 4 having pivots 12 supported in the bottom of recesses or grooves in the sidewalls of the casing 2. The outer edge of the rocker bar is provided with a generally convex or V-shaped recess to receive the apex or knife edge of the handle element.

The snap element 5 is a rectangular sheet of resilient metal such as Phosphor bronze, brass or any of the common springy metals and which preferably though not necessarily has a central aperture with a stretched or expanded as by peening, periphery which thereby causes the element to assume a convex shape. The convexity can be caused to snap from one side of the ele-

ment to the other side of the element by pressure applied inwardly of at least one edge on the convex side. I prefer to provide a central aperture in the snap element in order to obtain an easy snap action, which is obtained by a wave motion flowing around the central aperture rather than a spontaneous flexing of the entire disc.

I support three edges of this element, rather loosely in a recess provided in one end and two sides of the casing. The top of this recess is closed by portions 17 depending from the interior surface of the cover plate. The depending portions together with the opposing surface of the recess in the casing thereby provide a groove in which the edges of the snap element is loosely supported. The fourth edge, from the central aperture outward, is supported in the groove previously described in the handle element. It is apparent, looking at Fig. 3, that if the outwardly projecting part of the handle is pressed, that due to rocker bar 4, the pressure is converted into a rotary motion, applying pressure to a portion of the snap element from the convex side and thereby causing it first to move and then snap into its other convex condition. It is also apparent that the change in configuration of the snap element will cause contact arm 6 to spring inwardly, thereby breaking contact with contact 7, and making contact with contact 8.

By the arrangement of the casing, and switch mechanism with the switch handle being pivoted on the snap element and supported on the rocker arm, no special means are required to secure the switch handle in position, although the handle can be secured to the snap element by adhesive or other common and well known means, if desired.

The switch illustrated thus far is a single pole double throw switch in which a struck up tongue on the snap element is the throwing or moving pole. The switch need not be double throw but can be a simple single throw pair of contacts with the snap element being one contact, or both contacts can be laterally spaced apart and supported in one end wall of the casing and the tongue on the snap element need only be arranged to bridge the two contacts.

I show a modification of my switch in Figs. 9 to 11 which is exceedingly simple in construction, having only two parts in the moving mechanism. As seen from Figs. 9 and 10, the lateral walls of the casing 2 are provided with vertical grooves 21 having a width equal to the diameter of the unitary handle element axle 27, and this groove is of a depth of about three-fourths the diameter

of the aforesaid axle from the top of the casing. A complementary groove is provided in the casing cover 1, so that when the casing and cover are joined a bearing of the shape but slightly larger diameter than the handle element axle is formed. The center part of the handle element has a slotted projection integral with and radial to the handle element axle. As seen from Figs. 8 and 9, the inside edge of the top of the casing walls is provided with a rabbet or rectangular recess. The cover is provided with an integral depending ridge or boss of a size to neatly fit into the casing recess but of a height to leave a gap or groove for the reception of three of the edges of the snap element outer periphery. The handle element has a groove 22 in the aforesaid radial projection, which groove extends into the axle for a portion of its depth, thereby providing a support for the fourth side of the snap element.

The handle part of the handle element is a rocker arm having its outer surface parallel to the snap element axle receiving slot.

The stationary contacts are shown supported on an insulation bar 23 which can be integral with the casing which I contemplate will be molded of a thermo-setting composition such as phenolic condensate. The snap element tongues 6 make contact with and bridge the stationary contacts 24 and 25 when the upper part of the rocker arm handle 3, as shown in Fig. 9 is depressed. It is obvious that when the most outward part of the rocker handle is depressed that the snap element 4 causes the contact tongues to snap from contacting position to open position and vice versa.

It is therefore seen that I have provided a very simple and rugged switch which has only two parts in its assembly in addition to the casing, and the casing cover. The switch is assembled by first slipping the edge of the snap element into the groove in the handle element axle groove, next seating the handle element and snap element in the axle bearings and casing recess in one step and lastly, placing the casing cover in place. The cover may be secured in place by screws 26 in casing flange 27 which may be provided for the purpose, although I contemplate the use of any suitable fastening arrangement, this being no part of my invention.

While I have described my switch casing as being rectangular, it is apparent that it may be any shape. The snap element can be in the form of a round disc having a central aperture, in which case the interior of the housing or casing would be round in cross section.

What I claim as new and desire to secure by Letters Patent is:

1. In an electric switch a casing of insulating material having a central chamber circumscribed by lateral and end walls, a shallow rabbet recess on the upper inside edge of the adjacent walls and an end wall, a cover plate having rabbet receiving depending bosses on its under surface to provide with said rabbet recesses a groove, a convex resilient snap element adapted to seat in said groove, a rotatable switch handle element having a snap element receiving groove for applying pressure on the convex side of said snap element to thereby cause it to flex to the opposite convex condition; said handle having a wedge shape portion having a knife edge parallel to its axis of rotation; a rocker bar having pivot means to engage with said cavity side walls and having a generally V-shaped recess in its upper surface, said handle wedge shape portion knife edge en-

gaging said rocker-bar V-shaped recess, whereby a linear pressure on one end of said handle element is translated into rotary motion by said rocker bar to thereby rotate a part of said snap element to thereby cause it to flex from one convex condition to the other convex condition, electric contact means secured to said snap element; electric terminal means supported by said casing; said contact means adapted to establish continuity with said terminal means when said handle element is rotated in one direction and to break the said continuity when rotated in the opposite direction.

2. The device of claim 1, wherein said snap element is a sheet of resilient metal having a dish shape and an outer periphery of a configuration similar to the rabbet recess in said casing.

3. The device of claim 2, wherein said snap element has a central aperture having an expanded periphery whereby said snap element has two convex conditions of stability.

4. The device of claim 3, wherein said snap element electric contact means comprises at least one tongue struck up substantially normal to that portion of the element from which struck, and an electric contactor element affixed thereto proximate the free end thereof.

5. The device of claim 4, wherein the tongue is affixed to said snap element intermediate an edge and the center thereof.

6. In an electric switch, an insulating casing having side and end walls and a cover plate therefor, a groove provided at the junction of said side walls, one of said end walls and said cover; a resilient convex snap element having an outer periphery of a shape to fit a portion of its periphery in said groove, a handle member of insulating material having an axle and a radial groove in said axle, pivot means for said axle in said casing side walls, at least a portion of the remaining periphery of said snap element seating in said axle radial groove whereby rotation of said handle element causes said snap element to flex from one convex condition of stability to its second convex condition of stability.

7. The device of claim 6, wherein said casing pivot means for said handle member axle are recesses having a width slightly greater than the diameter of said axle and having a depth of half the diameter of said axle plus the distance of said snap element edge receiving groove from the interior plane surface of said cover.

8. In an electric switch, a snap element comprising a convex resilient metal disc having a central aperture circumscribed by an inner perimeter, and adapted to be supported by its outer perimeter, a substantially flat, resilient elongated arm having a first end and a second end, and being attached at the first end to a portion of said inner perimeter substantially normal to the portion of the disc adjacent thereto, at least one electrical contact having a contact face supported on a lateral face of the second end of said arm whereby motion of said disc from one convex condition to the other causes said contact to move in two directions which are parallel and normal to the contact face thereof.

9. In an electric switch, a snap element comprising a convex resilient metal disc having an aperture circumscribed by an inner perimeter and having an outer perimeter, means for supporting said disc by its outer perimeter, a substantially flat, resilient arm having a first end and a second end and being attached at the first

5

end to a portion of the inner perimeter substantially normal to the portion of the disc adjacent thereto, at least one electrical contact supported on the second end of said arm; bifurcated pivoted handle means embracing a portion of said disc, means for rotatably supporting said handle means, whereby rotation of said handle in one direction or the opposite direction causes the convex element to snap from one convex condition to the other convex condition or vice versa and thereby cause the contact to move with a component of motion parallel to the plane of support of the said outer perimeter.

FOSTER J. TRAINOR.

6

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