June 18, 1940.

J. H. STALEY

2,205,314

SWITCH ACTUATING MEANS

Filed May 20, 1939

2 Sheets-Sheet 1

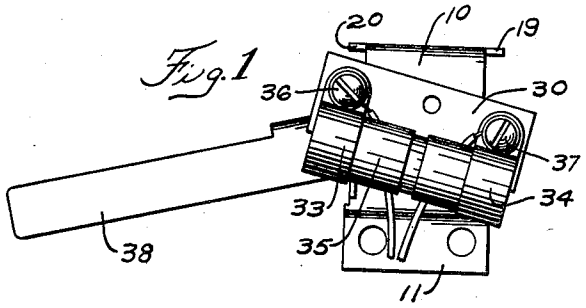


Fig. 1

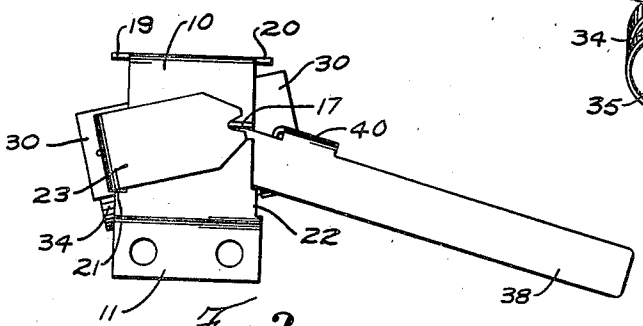


Fig. 2

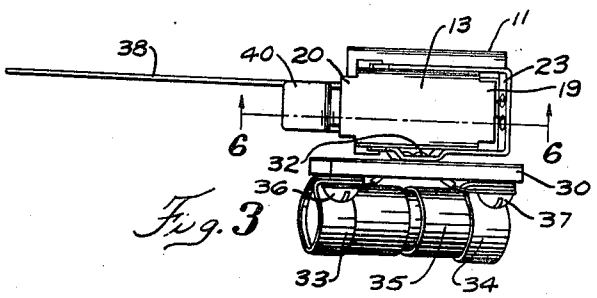


Fig. 3

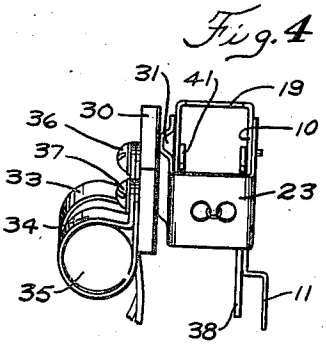


Fig. 4

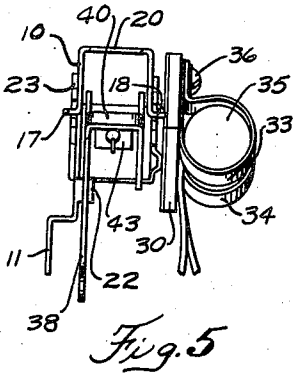


Fig. 5

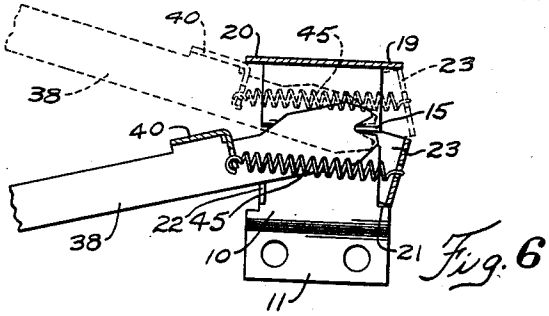


Fig. 6

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2 Sheets-Sheet 2

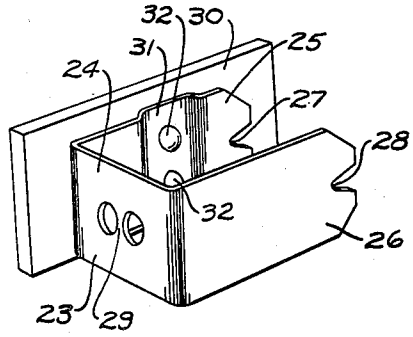


Fig. 8

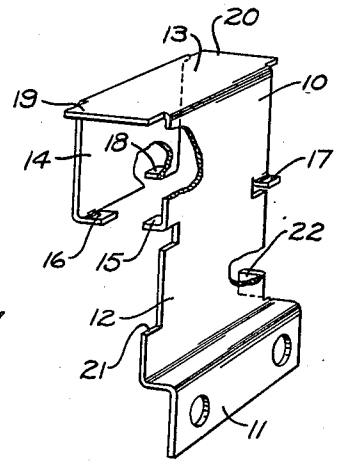


Fig. 7

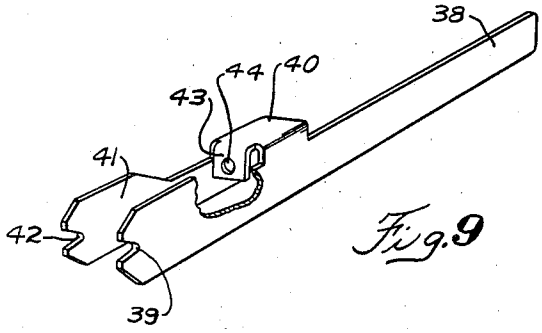


Fig. 9

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UNITED STATES PATENT OFFICE

2,205,314

SWITCH ACTUATING MEANS

Joseph H. Staley, Columbus, Ind.

Application May 20, 1939, Serial No. 274,693

1 Claim. (Cl. 74—97)

This invention relates to means for actuating a mercury tube switch following a predetermined travel of an actuating member. A primary object of the invention is to provide a structure that will give a positive quick action of the mercury switch and be extremely rugged and durable over a long period of time and yet be exceedingly simple in the manufacture of the individual parts and their assembly.

A further important object of the invention is to make the above indicated structure with a minimum number of parts and consequently a minimum number of operations in the manufacture thereof. In fact the structure, in the present form shown, reduces itself to three major elements united one with the other by means of an operating spring without any other uniting means such as screws, rivets, or the like.

These and other objects and advantages of the invention will become apparent to those versed in the art in the following description of one particular form of the invention as illustrated in the accompanying drawings, in which

Fig. 1 is a side elevation of a structure embodying the invention;

Fig. 2, a reverse side of the structure in elevation;

Fig. 3, a top plan view;

Fig. 4, an end elevation;

Fig. 5, an opposite end elevation;

Fig. 6, a longitudinal vertical section on the line 6—6 in Fig. 3;

Fig. 7, an end view in perspective of the central frame of the structure;

Fig. 8, an end view in perspective of the switch carrying rocker; and

Fig. 9, an end view in perspective of the shifting member.

Like characters of reference indicate like parts throughout the several views in the drawings.

A central frame 10, Fig. 7, is formed to have a mounting foot 11 from which extends in vertically offset relation a plate 12 to have a top plate 13 bent over integrally therefrom and at right angles thereto. From the outer edge of the top plate 13 is a side plate 14 extending integrally therefrom and bent downwardly into parallel spaced relation with the main plate 12. A lug 15 is cut from an edge of the plate 12 and bent around at right angles thereto to extend toward the opposite plate 14. A similar lug 16 is bent around from the lower edge of the plate 14 to be in the same plane with the lug 15, the lug 16 being formed adjacent that vertical edge of the plate 14 opposite the edge of the plate 12 at which edge the lug 15 is formed. These lugs 15 and 16 terminate by their inner ends to leave a space therebetween. At the other vertical edges of the plates 12 and 14 are formed the lugs 17 and 18 respectively, the lug 16 being cut out of the plate 12 and bent outwardly therefrom, and the lug 18 being turned around outwardly from the lower edge of the plate 14.

The free ends of the top plate 13 extend beyond the respective vertical edges of the plates 12 and 13 thereunder to form the respective projections 19 and 20. That edge of the plate 12 at which the lug 15 appears is offset below the lug 15 to provide the step 21. At the other edge of this plate 12 is a lug 22 turned inwardly from the plate to be substantially at right angles thereto, this lug 22 having its top edge substantially at the same elevation as that of the step 21. Also the lugs 15, 16, 17, and 18 lie in substantially the same horizontally disposed plane. Obviously the main frame 10 thus described may be formed from an originally flat blank of sheet metal and cut and bent to the form above described.

A switch rocker, generally designated by the numeral 23, Fig. 8, is formed to be generally U-shaped, to have a transverse wall 24 uniting the outer ends of the spaced apart legs 25 and 26. Each of the free ends of these legs is provided with a V-notch 27 and 28 respectively. The wall 24 is provided with a central post 29, herein shown as being formed by providing a pair of spaced apart holes through the wall 24 to leave the connecting piece of metal therebetween as this post.

One of the legs of this rocker 23 carries a switch mounting panel 30, the leg 25 in the present example being employed for this purpose. In order to provide clearance for the heads of rivets or screws, either of which may be employed to secure the panel 30 to the leg 25, the leg 25 is provided with an outwardly offset portion 31 within which the heads 32 of the rivets may be carried and still have those heads below the plane of the inner face of the leg 25.

On this panel 30 is mounted a pair of clips 33 and 34 within which the ends of a mercury tube switch 35 may be engaged. In the form herein shown, this switch 35 is a metal wall switch in which the two ends thereof form separate terminals. This switch 35 is of that construction as shown in my U. S. Letters Patent No. 1,906,118, issued April 25, 1933. In any event, the exact structure of the switch itself does not enter into this invention. These clips 33 and 34, in the pres-

ent form, are secured to the panel 30 by screws 36 and 37 passing through feet of the clips and screw-threadedly engaging the panel 30. These screws 36 and 37 also serve as terminals from which conductors or leads may be carried. As indicated, each of the clips 33 and 34 consists simply of a band encircling the switch 35 to have the clip ends drawn together by the screws to cause compressive engagement with the switch.

The actuating member of the device is indicated in Fig. 9 wherein there is a lever 38 terminating in a vertical end in which there is formed a V-notch 39. Spaced back of this notched end is a tie piece 40 extending integrally from the lever 38 substantially at right angles thereto across and downwardly to merge integrally into a vertically disposed arm 41 also having a V-notch 42 in its outer end corresponding to the notch 39. The outer faces of the lever 38 and the arm 41 are spaced apart in parallel vertical planes a distance permitting these two members to be entered between the plates 12 and 14 of the frame 10 to have the notches 39 and 42 fit over the lugs 15 and 16. From the edge of the tie piece 40 between the lever 38 and the arm 41 is a downturned ear 43 through which a hole 44 is formed. The lever 38 extends rearwardly from the frame 10 in the position thereof shown, as viewed in Fig. 7 and also in Fig. 2.

The rocker 23 is brought up to the piece 10 to have its legs 25 and 26 straddle the member 10 from the front side thereof, as viewed in Fig. 7, to bring the notches 27 and 28 up about the lugs 18 and 17 respectively. These two members thus located on the frame 10 are elastically tied together and held in engagement with their respective lugs by means of a spring 45, Fig. 6, one end of which is hooked around the post 29 of the rocker 23 and the other end of which engages through the hole 44 of the ear 43. This uniting of these two shiftable parts by the spring 45 completes the assembly.

The action is that as indicated in Fig. 6. When the lever 38 is pushed downwardly to carry it below the plane of the lugs 15, 16, 17, and 18, the spring 45 has its corresponding end pulled downwardly to flip the rocker 23 also downwardly to the position as indicated in Fig. 6 as well as in Figs. 1–5. The lower position of the lever 38 is limited by the lug 22 on the piece 10 while the lower limiting of the rocker 23 is limited by its cross piece 24 striking the step 21 on the same piece 10. Similarly when the lever 38 is pushed upwardly as indicated by the dash lines in Fig. 6, the action of the spring 45 will flip the rocker 23 upwardly to have its cross piece strike the plate extension 19 while the upward travel of the lever 38 is limited by its cross piece 40 striking the top plate extension 20. The panel 30 and consequently the switch 35 rocks with the rocker 23 to the "off" and "on" positions depending upon the direction in which the switch 35 is mounted between the clips 33 and 34.

While the structure has been described herein as having the mounting foot 11 below, this foot, of course, may be turned to be in an upper position or a laterally extending position, all depending upon the particular location and the particular use to which the structure may be put. This structure finds a wide range of uses, one particular use being that wherein a float on a liquid lifts and lowers the lever 38 to cut off and cut in a liquid level controlling device.

While I have herein shown and described my invention in the one particular form, it is obvious that structural changes may be employed without departing from the spirit of the invention and I, therefore, do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claim.

I claim:

In a snap acting switch mechanism, a U-shaped frame having a web and legs spaced apart and continuing from the web, a lug turned laterally outwardly from each leg from the same side edges thereof, a lug turned laterally inwardly from each opposite edge of the legs, all of said lugs being located substantially the same distance from and in a plane substantially parallel with said web, a U-shaped rocker telescoping with said legs from the edges thereof and rockably engaging the lugs at said same side edges, an operating lever having a V-shaped end telescoping with said legs in opposition to said rocker and rockably engaging the other set of said lugs, a spring tying together said rocker and said lever to pull them against their respectively engaged lugs, one of said legs having rocker stops spaced apart one on each side of and from said lugs thereon.

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