Sept. 7, 1937. J. C. MERRYMAN 2,092,678

SWITCH

Filed March 20, 1936

Fig. 1.

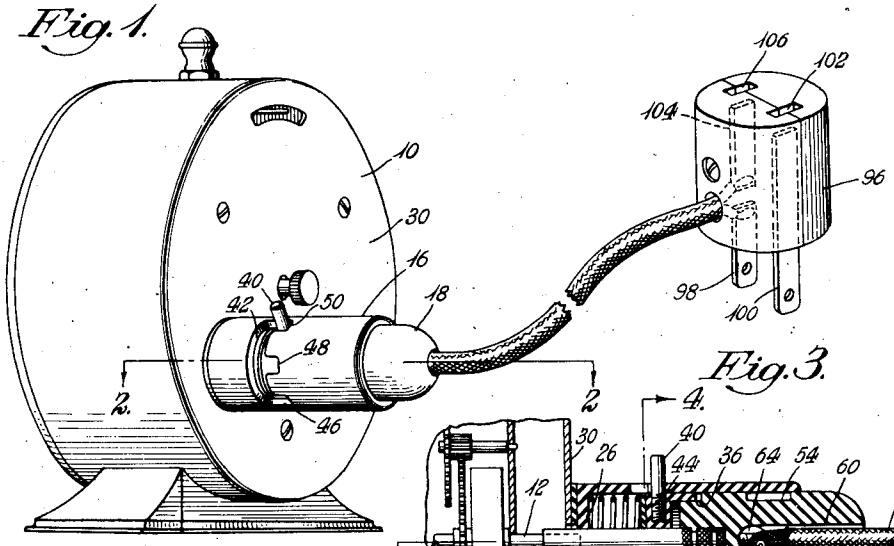


Fig. 3.

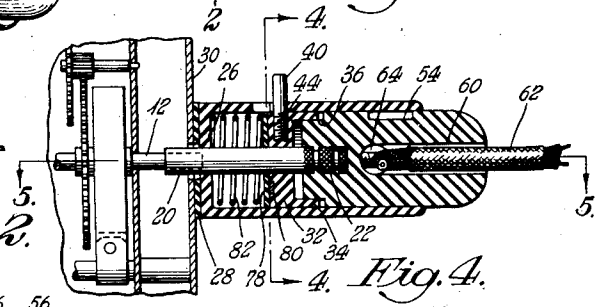


Fig. 2.

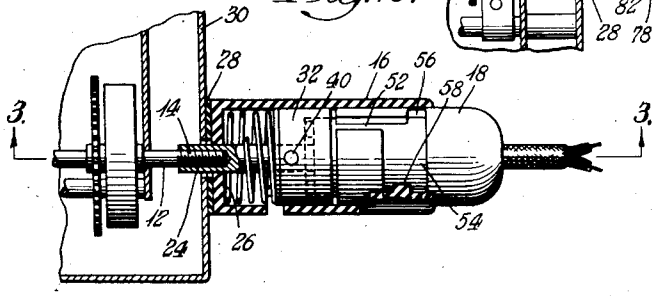


Fig. 4.

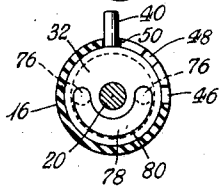


Fig. 6.

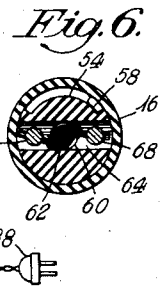


Fig. 5.

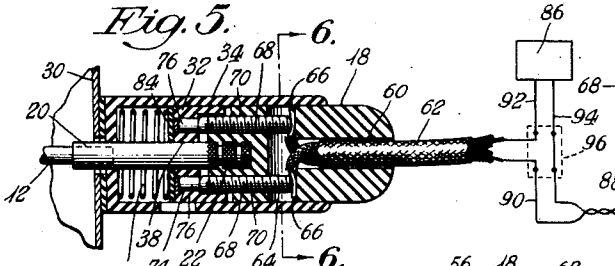
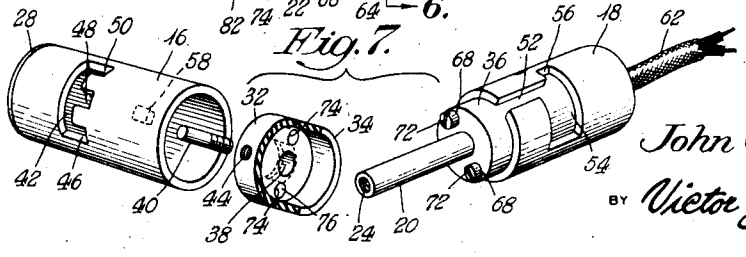


Fig. 7.



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2,092,678

SWITCH

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Application March 20, 1936, Serial No. 69,932

7 Claims. (Cl. 200—35)

My invention relates to time controlled circuits, and has among its objects and advantages the provision of an improved switch.

In the accompanying drawing:

Fig. 1 is a perspective view of an alarm clock showing my switch attached thereto;

Fig. 2 is a sectional view along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view along the line 3—3 of Fig. 2;

Fig. 4 is a sectional view along the line 4—4 of Fig. 3;

Fig. 5 is a sectional view along the line 5—5 of Fig. 3;

Fig. 6 is a sectional view along the line 6—6 of Fig. 5; and

Fig. 7 is a perspective view of the switch in a disassembled condition with one of the parts shown in section for the sake of clearness.

In the embodiment selected to illustrate my invention, I make use of a conventional alarm clock 10 including the usual alarm winding shaft 12 having a threaded end 14 for the reception of a winding nut. I remove the nut and connect the switch mechanism to the shaft. The switch comprises a tubular body 16 of insulating material within which I rotatably position a switch head 18 having one end projecting beyond the open end of the body 16. A shaft 20 has one end imbedded in the material of the switch head 18 as at 22. This end of the shaft 20 may be of irregular construction and is fixedly secured in the material of the head 18 when the latter is molded. The head 18 is of insulating material.

A threaded bore 24 is provided in the outer end of the shaft 20 for the reception of the threaded end 14 of the shaft 12. One end of the body 16 includes a wall 26 to which I attach a friction disc 28 positioned to engage the shell 30 of the clock. The wall 26 and the disc 28 are provided with aligned openings for loosely receiving the shaft 20. The disc 28 may comprise rubber cemented to the wall 26.

Within the body 16 I position a contact disc 32 having a flange 34 loosely positioned upon the reduced end 36 of the switch head 18. The disc 32 includes an opening 38 for loosely receiving the shaft 20 and may be rotated relatively to the body 16 and the switch head 18 through the medium of a lever 40 projecting through a slot 42 in the body 16. In Fig. 3, the lever 40 has threaded connection with a bore 44 in the disc 32.

In Figs. 1 and 3, the slot 42 communicates with three recesses 46, 48, and 50, representing the closed-opened, opened-closed-opened, and opened-closed switch adjustments, respectively. Adjustment of the lever 40 to one of the recesses 46, 48, or 50, determines the operation of the switch at the time for which the alarm is set. In the drawing, I illustrate a switch applicable to an alarm shaft 12 rotating in a clockwise direction when the alarm is released. For clocks having alarm shafts rotating in a counterclockwise direction, the threads of the bore 24 are reversed as well as the arrangement of the recesses 46 and 50, but the remaining switch structure remains the same.

Referring to Figs. 2 and 7, the switch head 18 is provided with a groove 52 communicating with a large groove 54 terminating in a smaller groove 56. I provide the inner wall of the body 16 with a lug 58 normally operating within the groove 54. Groove 52 is for the accommodation of the lug 58 when the switch head 18 is connected with the body 16. Rotation of the shaft 12, when the alarm is released imparts rotary motion to the switch head 18 relatively to the body 16 which is restrained from rotary motion because of the friction disc 28. Rotation of the switch head 18 is limited because of the lug 58 operating within the groove 54.

I provide the switch head 18 with an axial bore 60 for the reception of conducting wires 62. This bore communicates with a transverse bore 64 arranged to permit access to the ends 66 of the wires 62 for establishing conducting relation between the ends 66 and terminal pins 68. These pins are threaded and adjustably positioned within threaded openings 70 in the switch head 18. In Fig. 7, the pins 68 are slotted at 72 for the reception of a screw driver, whereby the pins may be turned down to press against the ends 66.

Two bores 74 are provided in the disc 32 for the reception of contact elements 76 arranged to engage the pins 68 (see Fig. 5). A conducting strip 78 is positioned within a recess 80 in the disc 32 for electrically connecting the elements 76. The circuit is closed whenever the elements 76 engage the pins 68 such as is illustrated in Fig. 5. To hold the elements 76 in firm engagement with the pins 68, I position a compression spring 82 within the body 16. One end of the spring bears against the wall 26 and the opposite end bears against a disc 84 positioned adjacent the disc 32. Both discs are of insulating material.

In Fig. 5, I illustrate the wires 62 as being electrically connected with a radio 86 and an outlet plug 88 through the medium of wires 90, 92, and 94. While I illustrate my switch in connection with a radio, it will be understood that the switch is applicable to other devices in cases where it is desired to control an electric circuit through the medium of a time controlled unit.

All the parts within the body 16 are shiftable longitudinally thereof. In connecting the switch with the shaft 12, the switch head 18 may be pushed inwardly against the tension of the spring 82 and rotated for positioning the lug 58 within the groove 56, at which time the outer end of the

shaft 20 projects considerably beyond the disc 28. In this position, the shaft 20 may easily be connected with the shaft 12 by rotating the switch head 18 in the proper direction. While in this position, the switch head may be manually controlled for opening and closing the circuit if desired.

After connection with the clock 10, the switch head 18 is rotated for moving the lug 58 out of the groove 56, at which time the switch head may be rotated within the limits defined by the lug 58 and the groove 54 (see Fig. 2). Rotation of the switch head 18 to free the lug 58 from the groove 56 adjusts the switch parts so that the tension of the spring 82 is transmitted to the wall 30 of the clock so that the body 16 is restrained from rotary motion.

Assuming that it is desired to close a circuit at a given time, and that the circuit should remain closed indefinitely, the lever 40 is shifted to the recess 50 and the switch head 18 rotated counterclockwise until restrained by the lug 58. When the alarm shaft 24 is released, the switch head 18 is rotated to bring the elements 76 into electrical contact with the pins 68. Such adjustment closes the circuit.

Shifting of the lever 40 to the recess 48 positions the elements 76 so that the circuit is open, but the circuit will be closed momentarily upon release of the alarm, while the pins 68 are passing across the elements 76. In cases where the circuit is to remain closed until a predetermined time, the lever 40 is adjusted to the recess 46, at which time the circuit will be broken when the alarm is released.

The disc 32 may be moved axially of the body 16 by pressing the lever 40 in the direction of the clock. The spring 80 urges the lever 40 to the selected recess 46, 48, or 50, as soon as the lever is released. In all adjusted positions of my switch, the switch head 18 is rotated counterclockwise in the same manner as when the lever 40 is positioned in the recess 50.

In Fig. 1, I have illustrated the wires 62 as being connected with a plug 96. This plug includes two prongs 98 and 100 designed for connection with the conventional wall outlet. Prong 100 extends substantially the full length of the plug body 96 for electrical connection with one prong of a conventional plug, which prong may be inserted in the opening 102. One of the wires 62 is connected with the prong 98, while the other wire is connected with a contact strip 104 arranged in operative relation with the second opening 106 co-operating with the opening 102 for the reception of the two prongs of the conventional plug.

My invention is designed for connection with conventional clocks. The switch may be quickly and easily connected with the alarm winding shaft by merely removing the winding nut. The spring tension incorporated in the switch structure holds the latter firmly against the clock so as to prevent relative rotary motion of the body 16. All the parts are related in such a manner as to provide an exceedingly compact and simple construction. Adjustment is a quick and easy operation because of the arrangement of the slots in the body 16 and the lever 40. Because of the simplicity of the construction, the switches may be manufactured at a low cost.

Without further elaboration, the foregoing will so fully explain my invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. An electric switch comprising a tubular member having an open end and a slot in its wall, the closed end of the tubular member being provided with an opening, a switch head rotatably mounted within the tubular member and having a grip portion projecting beyond said open end, contact members carried by said switch head, bridging means positioned inside the tubular member in operative relation with said contact members and being shiftable relatively to the tubular member and the switch head, the bridging means including an opening, adjusting means connected with said bridging means and projecting through said slot, and actuating means fixedly connected with said switch head and loosely projecting through the openings in said bridging means and the tubular member.

2. An electric switch comprising a tubular member having an open end and a slot in its wall, the closed end of the tubular member being provided with an opening, a switch head rotatably mounted within the tubular member and having a portion projecting beyond said open end, contact members carried by said switch head for connection with a source of current, a disc positioned inside the tubular member and being shiftable relatively to the tubular member and the switch head, said disc having an opening, a contact bridge carried by said disc and arranged in operative relation with said contact members, means connected with said disc and projecting through said slot for adjusting the disc, and means fixedly connected with said switch head and loosely projecting through the openings in said tubular member and the disc for connection with an operating unit.

3. An electric switch comprising a tubular member having one end closed and the other end open, the closed end being provided with an opening, a switch head rotatably positioned within the tubular member and having a portion projecting to the exterior thereof, said switch head being provided with a neck and contact members for connection with a source of current, a disc loosely positioned within the tubular member and having a flange loosely encircling said neck, said disc being provided with an opening and said tubular member having a slot, a lever connected with the disc and projecting through said slot, said disc being provided with bridging means arranged in operative relation with said contact members, and an actuating shaft fixedly connected with the switch head and projecting through the openings in said disc and the tubular member.

4. An electric switch comprising a tubular member having one end closed and the other end open, the closed end being provided with an opening, a switch head rotatably positioned within the tubular member and having a portion projecting to the exterior thereof, said switch head being provided with a neck having contact members for connection with a source of current, a disc loosely positioned within the tubular member and having a flange loosely encircling said neck, said disc being provided with an opening and said tubular member having a slot, a lever connected with the disc and projecting through said slot, to permit adjustment of the disc, said disc being provided with bridging means arranged in operative relation with said contact members, a shaft fixedly connected with the bridge head and projecting through the open-

ings in said disc and said closed end, resilient means positioned between the closed end and said disc for urging the latter in the direction of the switch head, said slot being of irregular configuration to provide abutments for the lever when the latter is shifted to different positions, to change the relative relation between the bridging means and the contact members, and means for limiting relative movement between the switch head and said tubular member.

5. The combination with a clock having a wall and a rotatable element projecting therethrough, of a switch body having a friction surface bearing against said wall, said body being of tubular shape with one end open, a rotatable member positioned inside the body and having contact members for connection with a source of current, a bridging member positioned within the body in operative relation with said contact members, and means for fixedly connecting the rotatable member with the rotatable element projecting from said wall for moving the contact members into and out of conducting relation with said bridging member when the element is rotated.

6. The combination with a clock having a wall and a rotatable element projecting therethrough, of a switch body having a friction surface bearing against said wall, said body being of tubular shape with one end open, a rotatable member positioned inside the body and having contact members for connection with a source of current, a bridging member positioned within the body in operative relation with said contact member, means for fixedly connecting the rotatable member with the rotatable element projecting from said wall for moving the contact members into and out of conducting relation with said bridging member when the element is rotated, said tubular body being provided with a slot in its wall, and a lever fixedly connected with said bridging member and projecting through said slot, to permit shifting of the bridging member relatively to the rotatable member for changing the conducting relation between the bridging member and said contact members.

7. An electric switch comprising a tubular body having a slot defining abutments representing closed-open, open-closed-open, and open-closed switch adjustments, a switch head rotatably mounted in said tubular body and having a pair of contact members for connection with an electric circuit, a bridging device movably related to the switch head and the tubular body and positioned within the same, an adjusting lever fixedly connected with said bridging device and projecting through said slot for selective engagement with said abutments, resilient means cooperating between the tubular body and said bridging device for urging the same against the switch head, and means fixedly connected with said switch head for connection with a time controlled operating member for rotating the switch head, to bring the bridging device into operative relation with said contact elements.

JOHN C. MERRYMAN.