May 16, 1933. W. C. McWHIRTER 1,909,783

ELECTRICAL SWITCH

Filed Oct. 14, 1931

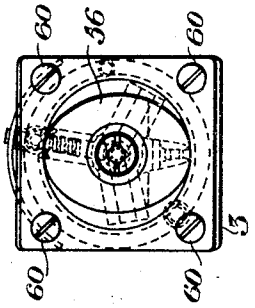


Fig.3.

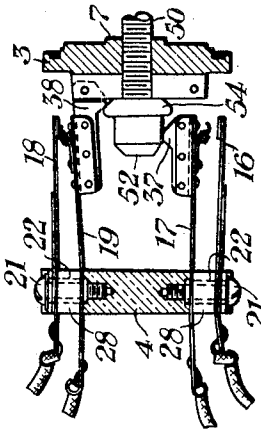


Fig.6.

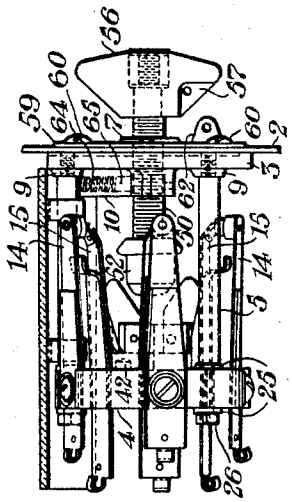


Fig.2.

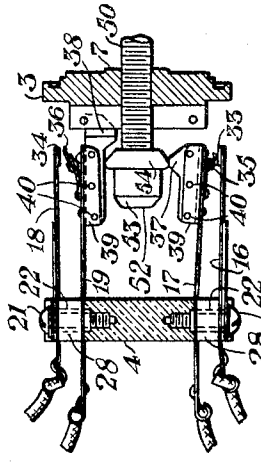


Fig.5.

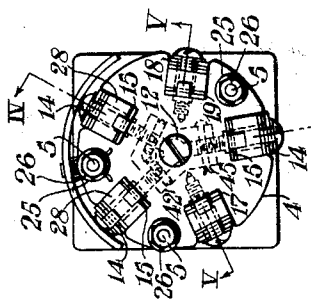


Fig.1.

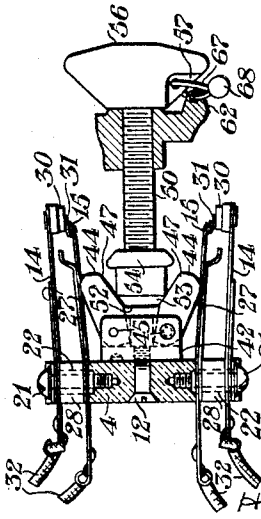


Fig.4.

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UNITED STATES PATENT OFFICE

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ELECTRICAL SWITCH

Application filed October 14, 1931. Serial No. 568,769.

My invention relates to electrical switches, and particularly to slow-speed time-release electrical switches of reduced size for railway interlocking machines.

I will describe one form of switch embodying my invention, and will then point out the novel features thereof in claims.

Fig. 1 is a rear elevational view of a switch embodying my invention. Fig. 2 is a side view of the switch shown in Fig. 1, taken at right angles thereto. Fig. 3 is a front elevational view of the switch shown in the previous figure, and Figs. 4 and 5 are views taken, respectively, along the lines IV—IV and V—V of Fig. 1. Fig. 6 is a view similar to Fig. 5, showing the parts in a different position from the position in which they are shown in Fig. 5.

Similar reference characters refer to similar parts in each of the several views.

The switch, which is adapted for mounting on a suitable support, such as a panel 2, as shown only in Fig. 2, comprises a supporting frame including a front member 3, a rear member 4, and side members 5.

The front member 3, preferably of metal and in the form of a plate or disk, comprises an internally screw-threaded central boss 7, laterally-spaced internally screw-threaded bosses 9, and a radially-apertured portion 10.

The rear member 4, preferably of dielectric material and in the form of a plate or disk, has an axial aperture for the reception of a screw 12, rectangular perimetral slots for the reception of elongated resilient contact arms 14 to 19, inclusive, radial openings in the slots for the reception of screws 21 and insulating sleeves 22, and openings for the reception of the side members 5. The latter are preferably in the form of cylindrical rods having screw-threaded forward ends in the bosses 9 of the front plate 3 and rear ends extending through the member 4 and secured thereto, as by washers 25 and nuts 26. The frame or support formed by the members 3, 4 and 5 is of rigid squirrel-cage form, and between and substantially parallel to the rods 5, the contact arms 14 to 19 are disposed.

There are three of the contact arms 14 angularly spaced about the disk 4 and a cooperating parallel arm 15 for each thereof separated therefrom by insulating blocks 28. Relatively strong reinforcing springs 27 bias the arms inwardly toward the open position thereof. All of the arms project from the rear member 4 toward the forward disk 3. The arms 14 carry laterally-inwardly projecting contact elements or buttons 30 for cooperation with contact elements 31 on the arms 15, and all of the arms project rearwardly from the rear disk 4 for the reception of circuit conductors 32.

The arms 16 and 18, similarly constructed and disposed on the disk 4, are each angularly positioned between two of the arms 14 and similarly have cooperating arms 17 and 19, respectively, as shown in Fig. 5. Contact elements 33 and 34 on the arms 16 and 18, respectively, cooperate with contact elements 35 and 36 on the arms 17 and 19, respectively.

As shown most clearly in Fig. 5, the arms 17 and 19 carry longitudinally offset inwardly-projecting cams 37 and 38, respectively, preferably of insulating material, and secured to the arms, as by sheet metal channel elements 39 and pins 40.

The axial screw 12 in the rear disk 4 supports a bearing 42 to which levers 44 are pivoted by collar pins 45, the axis of the pins being in such direction that each of the levers 44 moves in a radial path intercepting one of the contact arms 15. Adjacent edges 47 of the levers 44 are tapered or sloped.

A main operating plunger 50, in the form of a screw, extends through the boss 7 of the front plate 3 and carries, at its inner end, an enlargement 52 having an annular wedge-like portion 53 and a laterally-projecting annular flange 54.

A handle or knob 56 is secured to the outer

end of the plunger screw 50 and has an apertured web 57 at its inner side. A plate 59 secured to the front side of the panel 2 and the disk 3, as by screws 60, is provided with an apertured upstanding leg 62. A helical spring 64 in the radially-apertured portion 10 of the front plate 3, is held therein at its outer end, and bears, at its inner end, against a brake member 65 that, in turn, bears against the screw 50.

As shown in Fig. 4, when the screw 50 is in its innermost position, the wedge portion 53 thereof holds the levers 47 in the radially outermost positions thereof against the arms 15, in which position, the contact elements 31 engage the contact elements 30 on the arms 14. In this position of the plunger 50, the wire 67 of a seal 68 interlinks the web 57 and the lug 62 to prevent unintentional or unauthorized manipulation of the switch.

When it is desired or necessary to operate the switch, the seal 68 is broken and the handle 56 operated to turn the screw 50 outwardly. This operation withdraws the wedge 53 from the levers 47 which, under the inward pressure of the resilient arms 15, move inwardly. The inward movement of the arms 15 disengages the contact elements 30 and 31.

Continual movement of the screw 50 in the outward direction to the right, as viewed in Figs. 5 and 6 successively brings the flange 54 into engagement with the cam 37 on the arm 17, and the cam 38 on the arm 19, to move the arms 17 and 19 outwardly. This action successively engages and disengages the contact elements 33 and 35 and engages the contact elements 34 and 36.

The screw-actuated plunger 50 moves throughout its stroke in accordance with the predetermined pitch of its screw threads. The arms 14 to 19, being disposed angularly about the plunger axis, economizes space, and provides for a greater number of arms in a given space.

Various arrangements of screw pitch and cam-surface area, as on the cam 37, may be provided to determine the time of operation and the duration of engagement between certain contact elements, and other modifications and combinations effective in accordance with the particular service and circuits which the device is adapted to control.

An example of a service in which the invention may be employed is in railway signaling practice, as emergency means, whereby a switch mechanism may be operated after the expiration of a relatively long time, in case of failure of a track circuit, or where a track circuit may be occupied by a train.

Undue speed of operation of the plunger is rendered difficult by the relatively fine pitch of the screw threads thereon, by the brake member 65, by the resistance to movement thereof offered by the cams 37 and 38 and by the shape of the handle 56 which is designed, as by providing it with oval contour, in plan view, and a smooth rounded periphery to prevent spinning by the operator.

While I have shown and described one form of an electrical switch embodying my invention various changes and modifications may be effected therein without departing from the spirit and scope of my invention, as set forth in the appended claims.

Having thus described my invention, what I claim is:

1. An electrical switch comprising contact arms, pivotally-mounted means for actuating certain ones of said arms; certain other arms being provided with longitudinally offset actuating means, respectively; and operating means including means for actuating said pivotally-mounted means and means for successively actuating said longitudinally-offset means.

2. An electrical switch comprising contact members, divergently movable pivoted members for moving certain ones of said contact members, certain other contact members including spaced actuating means, respectively; and operating means including means for actuating said pivotally-mounted means and means for successively actuating said spaced means.

3. An electrical switch comprising supporting means including front and rear portions, a plurality of elongated resilient contact arms insulatingly mounted on the rear portion and projecting toward the front portion, means pivotally mounted on the support adjacent to the rear portion severally for movement against certain ones of the arms; certain other arms having longitudinally offset cam portions, respectively; and a plunger mounted in the front portion carrying an inner-end element for actuating said pivoted means and side elements for actuating said cams.

4. An electrical switch comprising supporting means including front and rear portions, a plurality of elongated resilient contact arms insulatedly mounted on the rear portion and projecting toward the front portion, means pivotally mounted on the support adjacent to the rear portion severally for movement against certain ones of the arms; certain other arms having longitudinally offset cam portions, respectively; and a screw mounted in the front portion carrying an inner-end element for actuating said pivoted means and side elements for actuating said cams.

5. An electrical switch comprising a support including spaced substantially parallel plates and a plurality of laterally-spaced rods connecting the same, a plurality of elongated resilient contact arms secured to one of the plates and projecting toward the other, a plurality of levers pivotally mounted on said one plate between certain ones of said arms

for movement thereagainst, certain other arms having longitudinally-offset laterally-projecting cams, respectively, and a screw extending through said other plate carrying an annular inner-end wedge for oppositely moving said levers and an annular side flange for radially moving said cams.

6. An electrical switch comprising a movable switch element, a screw actuating member therefore, and a brake member cooperating with the screw actuating member to prevent too rapid operation of the screw actuating member.

In testimony whereof I affix my signature.

WILLIAM C. McWHIRTER.