May 8, 1928. 1,669,283

J. R. CARLSON

ELECTRIC SWITCH

Filed Nov. 10, 1922

Fig. 1.

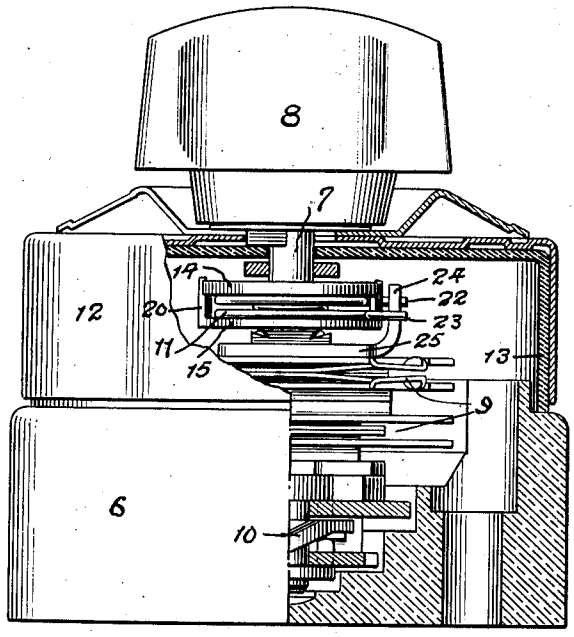


Fig. 2.

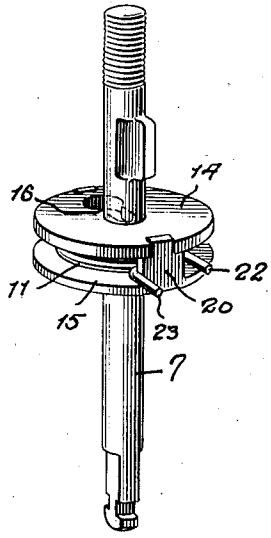


Fig. 3.

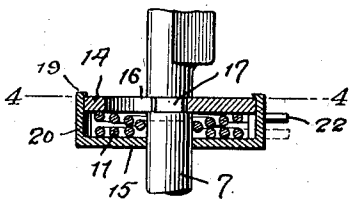


Fig. 5.

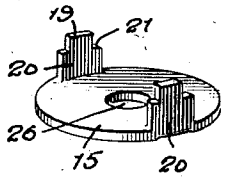
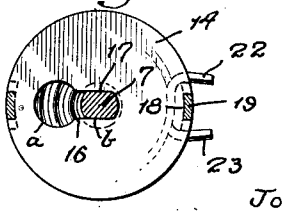


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

Application filed November 10, 1922. Serial No. 600,137.

My invention relates to electric switches, and particularly to rotary snap switches. The object of my invention is to provide an improved switch spring mounting on and actuating connection with the switch spindle.

In the accompanying drawings—

Fig. 1 is a broken side elevation of a switch to which my invention is applied in one form;

Fig. 2 is a perspective of the switch spindle illustrating the switch spring mounting thereon;

Fig. 3 is a vertical section therethrough;

Fig. 4 is a section on the line 4—4, Fig. 3; and

Fig. 5 is a perspective of one element of the mounting.

The present invention is particularly directed to the mounting on the switch spindle of the torsion spring through which actuating connection is established between the spindle and blades of a rotary snap switch. The construction of the spring is not of essential importance, but I have illustrated a spring of the character shown in the patent of Benjamin C. Perkins, 1,564,016, for which the present mounting is especially designed. The construction of the escapement mechanism and of the switch blades also forms no portion of my invention. For the sake of illustration, however, I have shown a switch of the type used for controlling the circuits of a heater element in an electric range.

Thus the insulating base 6 supports the rotary switch spindle 7 engaged by the operating handle 8. Switch blades 9 are freely rotatable on the spindle, and an escapement mechanism, generally indicated by the reference 10, is provided, by means of which the blades are temporarily detained during the wind-up of the driving spring 11 by the rotation of the spindle. The switch mechanism is as usual enclosed by the cover 12 with its insulating lining 13.

The present invention relates particularly to the means by which the switch spring is mounted upon and actuated by the spindle. For this purpose I provide a cage comprising a driving plate 14 and an associated dog plate 15, between which the spring 11 is confined. The driving plate 14 is pierced by a key aperture 16, the circular portion *a* of which is of such diameter that the plate may be freely passed over the spindle. The slot *b* of the aperture is of proper width to snugly engage the flats afforded by cuts 17 in opposite sides of the spindle 7, thus locking the driving plate on the spindle when the plate is shifted laterally to cause the flats 17 to enter the slot *b* of the aperture 16. In this position the spindle 7 is approximately concentric with the axis of the driving plate 14, which may be circular, as shown.

At appropriate points in the margin of the plate 14 are notches 18 to receive the reduced ends 19 of shouldered dogs 20 upstanding from the plate 15. In assembled position the shoulders 21 of the dogs 20 abut against the adjacent face of the plate 14, while the reduced ends of the lugs 19 project slightly through the latter and are spread to rivet the plates together with the spring 11 confined in the space between the plates.

One or the other of the dogs 20 is spanned and engaged under tension by the offsets 22 and 23 of the circumferentially overlapping ends of the switch spring 11. These offset ends 22 and 23 project outwardly beyond the dog 20 sufficiently to engage also the opposite sides of the cooperating dog 24 of the plate 25 secured to the switch blade element 9.

It is thus obvious that upon the rotation of the spindle 7, the switch spring cage is rotated with the spindle, and one or the other of the ends 22 and 23 of the spring is carried around therewith by the dog 20, while the other spring end is detained by the dog 24 of the switch blade element until the escapement mechanism 10 releases the latter and permits the same to rotate under the torsional effort of the spring. When the escapement mechanism 10 is of such character as to permit the rotation of the spindle in either direction, the operation is the same regardless of the direction of rotation of the spindle 7.

The construction presents various features of improvement. Thus in the finished switch the accurate location of the spring with reference to the operating dog 24 of the switch blade element is accurately determined, and there is no danger that the spring will work up or down on the spindle, with the accompanying danger of possible escape of its ends from the dog 24. The length of the dog 24 may therefore be reduced without incurring any danger of failure in the switch mecha-

nism. Secondly, should the switch spring become ruptured by any possibility, it is still retained by the cage and there is no danger that it may escape and bridge the contacts of the switch, thus causing a short circuit and dangerous conditions on the line.

From the manufacturing standpoint, the construction is an advantage, since both the plates 14 and 15 may be readily struck from sheet metal and formed to shape, and are thus economical to manufacture. Assembly is facilitated, since the driving plate 14 is readily slipped on the spindle and locked at 17. Moreover, when the spring is placed on the dog plate 15 and its offset ends 22 and 23 engaged under tension with and straddling one of the dogs 20, the spring is automatically retained in position on the plate 15. The latter thus forms an assembly unit which may be readily passed over the spindle and engaged with the driving plate 14. The plain bearing aperture 26 formed axially in the plate 15, not only centers the latter on the spindle, but also prevents lateral displacement of the plate 14. Its operating drive connection with the spindle is thus assured.

Obviously, there may be more than the two dogs 20 on the plate 15 for holding the parts assembled. It is not necessary that the plates 14 and 15 be shaped as discs although I prefer the latter, since this shape completely confines and supports the spring 11 at all points. Obviously further, the spring engaging dog of the mounting could be independent of the lugs 20 by which the plates are secured together.

Modifications in details of form and construction will readily occur to those skilled in the art, without departing from what I claim as my invention.

I claim—

1. In an electric switch, a spring drive mounting comprising a driving plate having a key slot opening therein to afford a free way for a switch spindle, and a spindle-engaging area adapted to be brought into operative engagement with the spindle by the lateral movement of the plate with respect thereto, means to permanently lock said plate in spindle-engaging position, a spring interposed between said means and driving plate, and an offset dog extending into the plane of the spring to engage an end of the latter and wind the spring on the rotation of the spindle.

2. In an electric switch, a rotary switch spindle having a flat, a switch spring and a spring mounting comprising a plate having a key slot engagement with the spindle flat, a second plate spaced therefrom and accommodating the spring therebetween, means for securing said plates together to prevent lateral movement and disengagement of the key slotted plate with respect to the spindle, and a dog associated with one of said plates to engage an end of the spring.

3. A switch spindle having a flatted area, a plate slotted for engagement with said spindle flat by transverse movement of the plate with respect to the spindle, a second plate apertured to accommodate the spindle but restrained against transverse movement with respect thereto, means uniting said plates, and a coil spring surrounding said spindle between the plates and having an offset end engaged with one of said plates.

4. A switch spindle having a flatted area, a plate slotted for engagement with said spindle flat by transverse movement of the plate with respect to the spindle, a second plate apertured to accommodate the spindle but restrained against transverse movement with respect thereto, spacer means uniting said plates, a coil spring arranged on the spindle between the plates and having its free ends overlapped and offset to engage opposite sides of certain of said spacer means.

5. In an electric switch, a spring mounting comprising a plate adapted for a driving engagement with a switch spindle, a second plate spaced from said driving plate, a spring arranged between said plates, one of said plates being recessed, and the other having offset shouldered lugs spacing the plates apart, the reduced ends of said lugs entering said recesses and being spread to rivet the plates together.

In testimony whereof I have signed my name to this specification.

JOHANNES R. CARLSON.