June 6, 1933. C. W. KUHN 1,912,776

ELECTRIC SWITCH

Filed March 20, 1930

Fig. 1

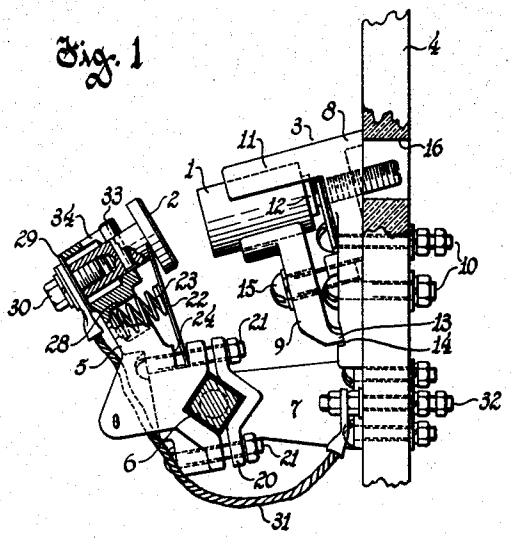


Fig. 2

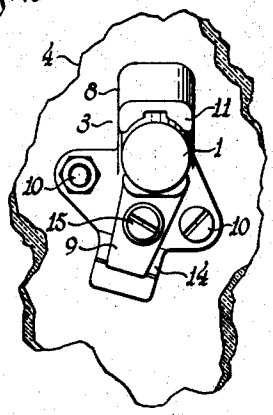


Fig. 3

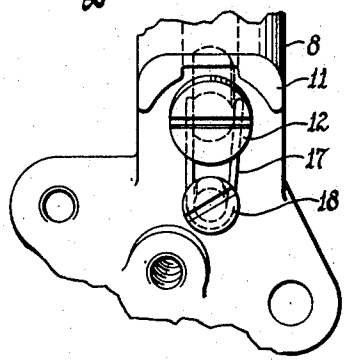


Fig. 4

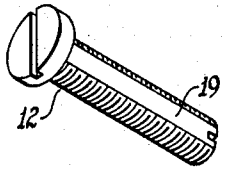
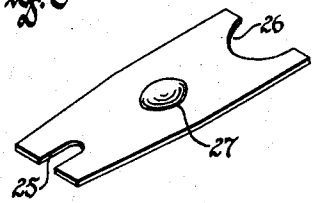


Fig. 5



INVENTOR.
Clarence W. Kuhn
BY Frank H. Hubbard
ATTORNEY

Patented June 6, 1933 1,912,776

UNITED STATES PATENT OFFICE

CLARENCE W. KUHN, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO CUTLER-HAMMER, INC., OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

ELECTRIC SWITCH

Application filed March 20, 1930. Serial No. 437,389.

This invention relates to improvements in electric switches, and while not limited thereto is particularly applicable to switches provided with cooperating carbon and metal contacts.

The invention has among its objects to provide improved means for supporting the contacts of such switches and for effecting relative adjustment thereof.

Another object is to provide a switch of the aforesaid character having a carbon contact holder which is of simple, rugged and inexpensive construction, and which requires a relatively small amount of machining to finish the same.

Another object is to provide a switch of the aforesaid character in which the metal contact has improved spring pressure means associated therewith.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates an embodiment of the invention which will now be described, it being understood that the embodiment illustrated is susceptible of modification without departing from the spirit and scope of the appended claims.

In the drawing,

Figure 1 is a side view of a switch mechanism embodying the invention, portions thereof being broken away and shown in section.

Fig. 2 is a front elevational view of the carbon contact holder shown in Fig. 1.

Fig. 3 is an enlarged front elevational view illustrating the contact adjusting means employed in the holder shown in Fig. 2.

Fig. 4 is a perspective view of the adjusting screw shown in Figs. 1 and 3, and

Fig. 5 is a perspective view of a plate which is associated with the movable contact shown in Fig. 1.

The switch illustrated in Fig. 1 includes stationary and movable contact elements, the former being provided with a cylindrical carbon contact 1 and the latter with a metal contact 2. Carbon contact 1 is carried by a holder 3 fixed to an insulating panel 4 and the metal contact 2 is carried by a lever 5 fixed to an operating shaft 6. Shaft 6 is rotatably mounted upon suitable brackets fixed to panel 4, one of which is illustrated at 7 in Fig. 1, and as is understood said shaft may be provided with operating means such as an electromagnet.

Holder 3 includes a bracket 8 which is secured to panel 4 by bolts 10, one of which serves as a terminal, and contact 1 is secured to said bracket by a strut member 9. As shown in Fig. 1 bracket 8 is provided with a forwardly extending projection 11 having a concave face for engaging the upper side of contact 1, and the same carries an adjustable screw 12 which forms an abutment for the rear face of said contact. Strut member 9 is arranged to engage the underside of contact 1 and the upper end thereof is provided with a concave contact engaging face while the lower end thereof is provided with a heel projection 13 which is fulcrumed in a recess 14 in the front face of bracket 8. Strut member 9 is provided with an opening intermediate its ends for receiving a clamping screw 15 which extends into a tapped opening in bracket 8.

As is apparent from Fig. 1, when strut member 9 is drawn towards bracket 8 by screw 15 the same tends to rock upon its heel projection 13 and the upper end thereof is adapted to engage contact 1 to force the same upwardly against projection 11, and inwardly against screw 12 to thereby securely hold said contact in position upon said bracket.

Screw 12 is provided with slots on opposite ends thereof to render the same adjustable by means of a screw driver, and as shown in Fig. 1 panel 4 is provided with an opening 16 to permit adjustment of said screw from the rear of the switch. Means is provided for yieldingly holding screw 12 in its adjusted position, such means comprising a U-shaped spring clip 17 which is secured to bracket 8 by a screw 18. As shown in Fig. 4 screw 12 has a flat face 19 on one side thereof, and as shown in Fig. 3 the ends of spring clip 17 engage said screw on opposite sides and are adapted to cooperate with face 19 to yieldingly hold said screw against rotation upon each half turn thereof.

As shown in Fig. 1 the lower end of lever 5 is provided with a hub portion which is fixed to a square insulated portion of shaft 6 by a cap member 20. Cap member 20 is secured to the hub portion of lever 5 on opposite sides of shaft 6 by bolts 21. The upper end of lever 5 is provided with an opening for receiving contact 2 and said contact is slidable within said opening and is biased inwardly with respect to said lever by a spring pressure device including a plate 22 and helical spring 23. As will be noted from Fig. 1 the opening for contact 2 in lever 5 is enlarged at the outer end to render said contact self-aligning with the face of contact 1.

As shown in Fig. 1 contact 2 has an enlarged head on the inner end thereof and the upper end of plate 22 engages the shoulder formed by said head while the lower end of said plate is fulcrumed within a recess 24 in the hub portion of lever 5. Recess 24 is of sufficient depth to expose the upper securing bolt 21 and as shown in Fig. 5 the lower end of plate 22 is provided with a recess 25 for receiving said bolt while the upper end of said plate is provided with a recess 26 for receiving contact 2. Also as shown in Fig. 5 plate 22 is provided with a projection 27 intermediate its ends for engaging the interior of spring 23 and said spring is held under compression between plate 22 and lever 5 and is arranged within a recess 28 in said lever. Thus, as is apparent, plate 22 is biased by spring 23 to move contact 2 inwardly with respect to lever 5.

Inward movement of contact 2 with respect to lever 5 is limited by a washer 29 which is fixed to the outer end of contact 2 by a bolt 30. Bolt 30 also serves to secure one end of a flexible terminal 31 to said contact, the opposite end of said terminal being secured to a binding post 32 fixed to panel 4. Contact 2 is held against rotation with respect to lever 5 by a pin 33 which is fixed to said contact and is slidable within a slot 34 in the upper end of said lever.

In connection with the foregoing it should be noted that the securing and adjusting means for contact 1 is readily accessible from the front of the switch to permit removal of the contact for adjustment or repair. Also it should be noted that contact 2 is readily accessible in case it is necessary to renew or repair the same, and that the spring 23 associated therewith is protected by plate 22 against burning or heating by the arc formed between the switch contacts.

It should also be noted in connection with the foregoing that the above described securing means for the carbon contact can be applied to switches wherein the carbon contact is fixed to the movable switch element and while such securing means is particularly adapted for use in connection with carbon contacts the same can also be used for securing metal contacts.

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

1. In a contact device for electric switches, the combination with an elongated contact of substantially uniform cross sectional area throughout its length, of a supporting member therefor having an abutment for engaging the same on one side thereof, and a rigid strut member for engaging said contact on the opposite side thereof, said strut member being mounted upon said supporting member and being slidable on said contact to forcibly hold the latter in engagement with said abutment.

2. In a contact device for electric switches, the combination with an elongated contact of substantially uniform cross sectional area throughout its length, of a supporting member therefor having an abutment for engaging the same on one side thereof, and a rigid strut member for engaging said contact on the opposite side thereof, said strut member being pivotally mounted upon said supporting member and being slidable on said contact to forcibly hold the latter in engagement with said abutment.

3. In a contact device for electric switches, the combination with an elongated carbon contact of substantially uniform cross sectional area throughout its length, of a supporting member therefor having an adjustable part associated therewith for engaging the rear face of said contact and having a fixed abutment for engaging said contact on one side thereof, a rigid strut member for engaging said contact on the opposite side thereof, said strut member being pivotally mounted upon said supporting member and being movable inwardly with respect to said contact to forcibly hold the latter in engagement with said adjustable part and said abutment.

4. In a contact device for electric switches, the combination with an elongated carbon contact of substantially uniform cross sectional area throughout its length, of a supporting member therefor having an abutment thereon for engaging said contact on one side thereof, a rigid strut member for engaging said contact on the opposite side thereof, said strut member being pivotally mounted upon said supporting member and having a screw associated therewith for moving the same inwardly with respect to said contact to forcibly hold the latter in engagement with said abutment, and an adjustable screw carried by said supporting member for engaging the rear face of said contact, said screw having spring means associated therewith for yieldingly holding the same in its adjusted position.

In witness whereof, I have hereunto subscribed my name.

CLARENCE W. KUHN.