F. W. YOUNG.

SELF ADJUSTABLE CONTACT MAKER FOR ELECTRIC SWITCHES.

APPLICATION FILED DEC. 26, 1905.

1,001,796. Patented Aug. 29, 1911.

Fig. 1.

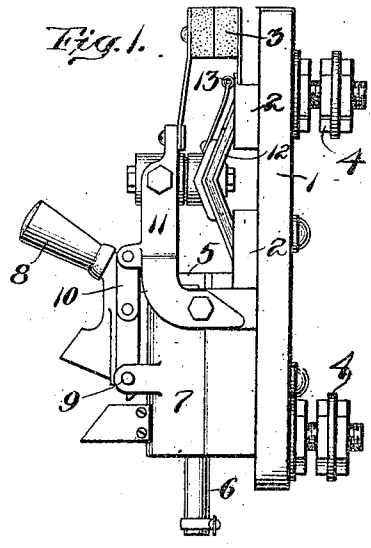
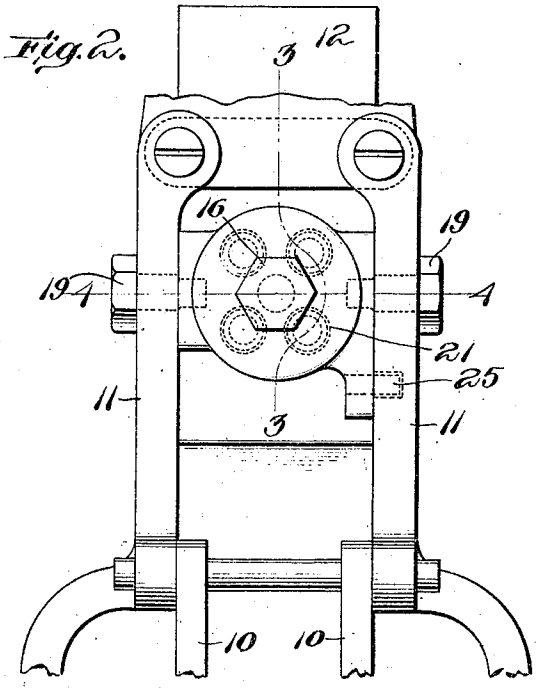


Fig. 2.



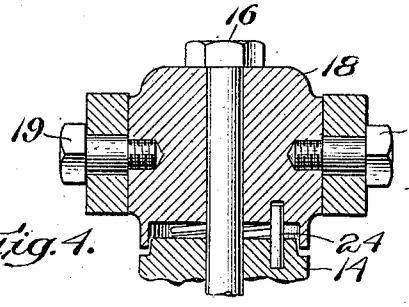


Fig. 4.

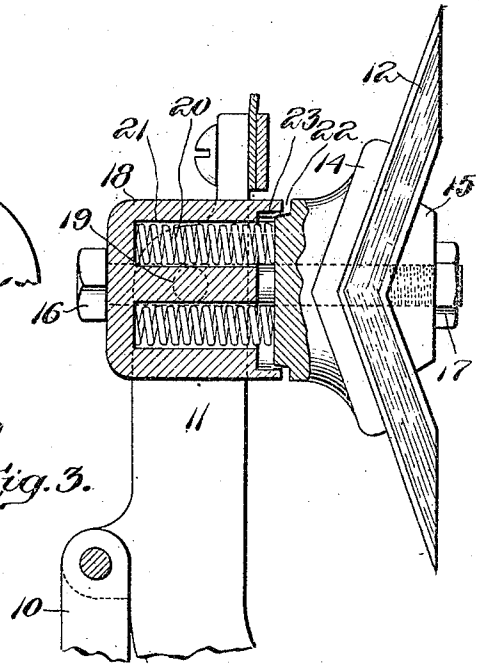


Fig. 3.

Witnesses:

Arthur F. Randell

M. A. Jones.

Inventor:

Franz W. Young,

by Geo. S. Maxwell

Attorney.

UNITED STATES PATENT OFFICE.

FRANZ W. YOUNG, OF EVERETT, MASSACHUSETTS, ASSIGNOR TO SEARS B. CONDIT, JR., OF BOSTON, MASSACHUSETTS.

SELF-ADJUSTABLE CONTACT-MAKER FOR ELECTRIC SWITCHES.

1,001,796. Specification of Letters Patent. **Patented Aug. 29, 1911.**

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To all whom it may concern:

Be it known that I, FRANZ W. YOUNG, a citizen of the United States, residing at Everett, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Self-Adjustable Contact-Makers for Electric Switches, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to electric switches, being herein shown as applied to the automatic circuit breaker type of switch, and has for its object the provision of means for maintaining perfect seating of the switch contact upon the contact blocks in that type of switch having a bridge-contact member.

The constructional details of my invention will be fully explained in the course of the following detailed description, reference being had to the accompanying drawings, in which I have shown a preferred embodiment of my invention.

In the drawings, Figure 1 represents in side elevation a circuit breaker having my invention applied thereto. Figs. 2, 3 and 4 are enlarged broken details showing my improvement in top plan, longitudinal and transverse section, the latter figures being taken on the dotted lines 3—3 and 4—4, Fig. 2, respectively.

Both from the manufacturer's standpoint and the user's standpoint, considerable difficulty has been commonly experienced in securing and maintaining proper alinement of the switch contact with the stationary contact blocks in a bridge-contact switch. For instance, if the castings were slightly out of true, it has been commonly necessary to readjust all the joints and pivots, true up the various bearing surfaces, and otherwise waste time and money in adjusting each individual circuit breaker, in order to bring the sliding contact of the ends of the laminated brush into flat rubbing pressure with the contact blocks. Also, in use, if the contact surface of the brush becomes burned or otherwise roughened or injured, it is necessary to file it off so as to maintain the flat rubbing contact above mentioned, and this has usually necessitated a careful adjustment of the pressure by tightening or loosening certain screws, and has necessitated repeated testing and experiments to insure that the pressure is even on both ends of the brush.

My invention aims to provide means for fitting the brushes once for all, so that there is no necessity for fitting each individual circuit breaker in the laborious manner above explained, at the factory, and also I have eliminated the laborious and skilled adjustment in use.

Referring to Fig. 1, it will be understood that the back plate 1, upper and lower contact blocks 2, auxiliary carbon contact 3, binding posts 4, trip 5, armature core 6, and armature inclosure 7, may be of any well known or preferred kind, as also the general features of this switch, which is herein shown as comprising a handle 8 pivoted at 9 and connected by a toggle link 10 to a switch-arm or lever 11, which carries at its free end a bridge-contact 12 and auxiliary contact 13.

Referring now to Figs. 2, 3 and 4, it will be seen that the laminated contact 12 is clamped between a back plate 14 and front plate 15, having complementary angular surfaces for maintaining the laminæ of the bridge 12 in proper position and all secured together by a bolt 16 and nut 17 on the threaded end thereof. Above the back plate 14 I provide a chambered cap or supporting barrel 18, pivoted on opposite trunnions or pivots 19 and carrying a plurality of comparatively heavy springs 20, preferably of considerable length, as shown in Fig. 3, and retained separated in the interior of the cap 18, as by means of pockets 21, as herein shown. In the type of switch herein explained, I have shown four of these springs arranged to get a proper counterbalancing effect, as shown in Fig. 2, and in pairs at the opposite sides of the longitudinal center and also in pairs at the opposite sides of the transverse center of the bridge and its supporting parts. In larger types of switch I employ six or more springs, while in smaller ones I employ one or more only, or other forms or kinds of yielding member, such as rubber, for instance. These springs 20 bear forcibly upon the top surface of the back plate 14, the adjacent edges of the back plate and cap being cut away or shouldered, as indicated at 22, 23, to permit limited yielding movement freely in any direction. A pin 24, or any other suitable means, may be provided

for preventing relative rotation of the parts on the bolt 16, and a pin 25 is provided to limit the swinging movement of the bridge on its pivots 19.

It will be understood that the yielding arrangement and construction will be varied to suit the various types of switches and circuit breakers, and that various modifications thereof may be made without departing from the spirit and scope of my invention as defined in the claims and explained in the description.

The practical side of my invention will be at once seen. If the contacting surfaces of the bridge 12 become injured or for other reasons are filed down, all that is necessary is to slightly slacken the bolt 16 in order to restore the bridge to its original distance from the switch-arm 11, unless the bolt is left always in slack adjustment, which is often preferable, inasmuch as the yielding construction provided by the springs 20 will tend automatically to giving the required even pressure for the opposite ends of said bridge. These ends or legs of the bridge or A-shaped contact have their engaging surfaces oblique to the general direction of their length. This eliminates entirely the necessity of repeated experiment and careful adjustment of pressure screws and other devices which have heretofore been commonly employed for bringing the correct even pressure upon the opposite ends of the bridge. It also does away with the necessity for the extreme accuracy of filing down the opposite ends of the brush, which has heretofore been necessary. In other words, it renders the bridge contact of the circuit breaker largely automatic and self-adjusting. Also from the manufacturing standpoint my invention is even more advantageous. The bridge pieces may all be made alike and simply clamped between the holding plates in usual manner, and then the parts assembled, whereupon all minor differences or inaccuracy in the arm casting 11 and the various pivots and connections thereof, will not materially affect the accuracy of the bridge inasmuch as the springs will permit the latter to aline properly and accurately with the contact blocks. This does away with the expensive and laborious fitting of each individual circuit breaker, heretofore necessary.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In an electric switch, separated contact blocks, a movable contact element for spanning same, a movable carrier for operating said movable contact element, and a backing support pivoted to said movable carrier affording a seat for said movable contact element, said backing support having provision to permit yielding of said movable contact element relative thereto in all directions.

2. In a electric switch, separated fixed contacts, a movable spanning contact element, a movable carrier therefor, a pivoted connection to permit said movable contact element to swing transversely in its plane of operative movement and another connection permitting said movable contact element to yield bodily and angularly in all directions relative to said carrier.

3. In an electric switch, separated fixed contacts, a movable spanning contact element, a carrier therefor mounted for movement bodily toward and from said fixed contacts, and interfitting connections between said movable contact element and said carrier formed to permit relative bodily yielding in the direction of its movement and self adjustment angularly in all directions between said parts, said interfitting connections including strongly resilient means acting upon substantial areas of the interfitting portions and offering substantial resistance to relative angular displacement of said members.

4. In an electric switch, separated contact blocks, a movable bridge-contact for spanning the same, a supporting arm for operating said bridge-contact, a spring-supporting device separate from the bridge-contact, pivoted in said arm, springs carried thereby, and means carried by said bridge-contact in engagement with said springs and movably connected to said separate supporting device, coöperating with said springs and device in automatically alining said bridge with the contact blocks as the supporting arm carries the bridge-contact into closed position.

5. In an electric switch, separated fixed contacts, a movable bridge-contact for spanning the same, a supporting arm for operating said bridge-contact, a cap pivoted to said arm forming a seat for said movable bridge-contact and springs housed in said cap disposed to act at separated points upon said bridge-contact to offer substantial resistance to angular displacement thereof.

6. In an electric switch, separated contact blocks in the plane of movement of the bridge-contact, a movable arched bridge-contact for spanning the same having its projecting ends provided with engaging surfaces oblique to the general direction of their length, a supporting arm for operating said bridge-contact, a spring-supporting device separate from the bridge-contact pivoted in said arm, springs carried thereby, and means carried by said bridge in engagement with said springs and movably connected to said supporting device, coöperating with said springs and device in automatically alining said oblique ends with the contact-blocks.

7. In an electric switch, separated contact

blocks, a movable bridge contact for spanning the same, a supporting arm for operating said bridge contact, a cap transversely pivoted in said arm, means movably connecting said bridge with said cap, and yielding means retained by said cap in pressing engagement against said bridge for equalizing the pressure of the latter.

8. In an electric switch, separated fixed contact blocks, a bridge-contact for spanning the same, a carrying lever therefor, a chambered cap pivoted transversely in said carrying lever, yielding means carried within said cap, and means retaining said bridge-contact in movable engagement with said yielding means.

9. In an electric switch, separated fixed contact blocks, a bridge-contact for spanning the same, a carrying lever therefor, a chambered cap pivoted transversely in said carrying lever, springs mounted in said cap in opposite pairs, and means connecting said bridge-contact centrally to said cap in yielding engagement with said springs.

In testimony whereof, I have signed my name to th[illegible] specification, in the presence of two subscribing witnesses.

FRANZ W. YOUNG.

Witnesses:
GEO. H. MAXWELL,
M. A. JONES.