May 3, 1927. 1,626,692

A. RAWLING

SWITCH CONTACT

Filed Nov. 5, 1923

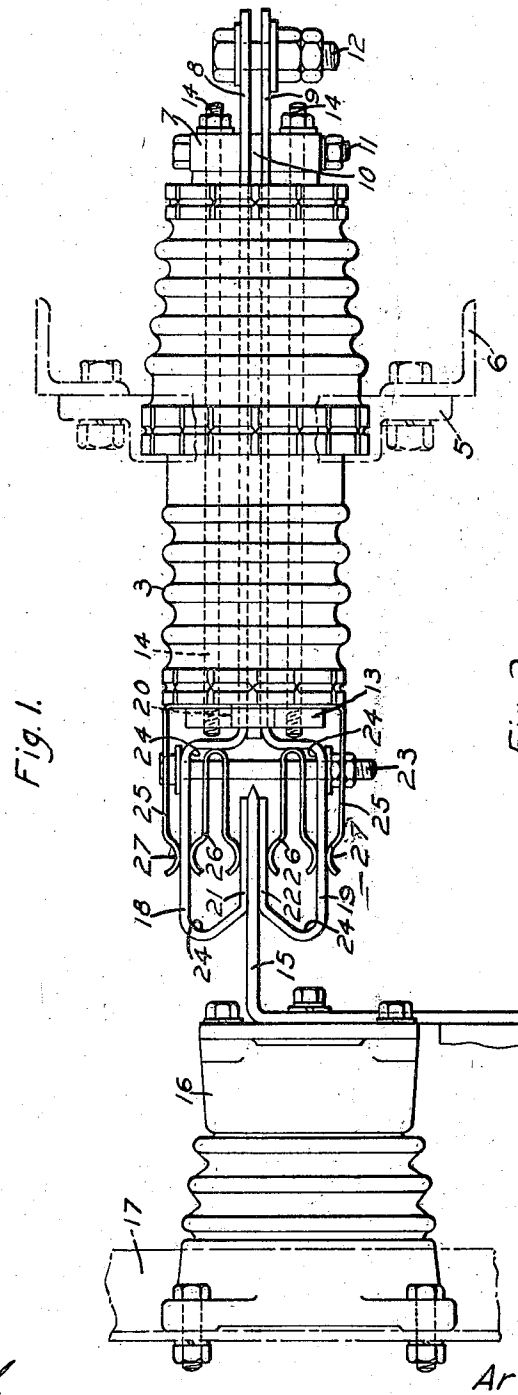

Fig. 1.

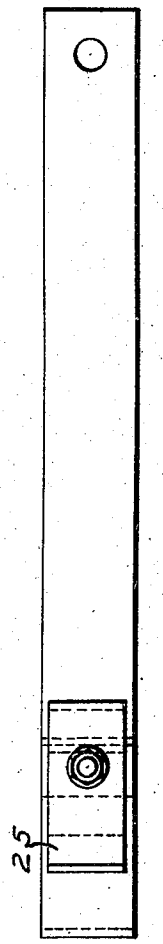

Fig. 2.

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UNITED STATES PATENT OFFICE.

ARTHUR RAWLING, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

SWITCH CONTACT.

Application filed November 5, 1923. Serial No. 672,808.

My invention relates to switch mechanism and particularly to contact mechanism used in circuit breakers of the truck panel type wherein the circuit breaker is carried by a truck enclosed within a cell or housing and which makes contact with fixed contact members when the truck is moved into operative position within the cell.

In a patent application of H. K. Ansing, Serial No. 592,767, filed October 6, 1922 (Case No. 10,099) and assigned to the Westinghouse Electric & Manufacturing Company, switch contact members are disclosed wherein an insulating bushing supports a contact jaw member in such manner that the jaw member is centered with respect to a fixed contact blade member when the contact jaw member is moved into engagement with the blade member. The contact jaw member comprises a pair of copper straps, each of which is provided with an inwardly directed reentrant contact portion which yieldingly engages the flat surface of the blade member which is embraced by the contact portions on opposite sides.

It has been found that this form of contact jaw member is very effective in securing good conductive contact between the jaw members and the blade member. However, it has been found that contact jaw members of this character are overstrained at the bends in the copper straps and particularly when the straps are heated by overload currents. The heating reduces the elasticity of the straps and reduces the contact pressure thereof.

It is an object of my invention to provide a contact jaw member of the character described with yielding reinforcing members such as steel springs for relieving the copper straps of the burden of maintaining close contact with the blade member, thereby increasing the life of the contact jaw members considerably.

Another object of my invention is to provide contact tensioning means that may be readily applied to standard constructions of the above specified type and which may readily be replaced in the event that they have been weakened by severe service. It will be seen that the tensioning springs are considerably cheaper than the copper straps and the cost of repair is materially reduced.

Another object of my invention is to provide a tensioning device for contact jaw members having the above-described characteristics that is inexpensive to manufacture and which may be applied to present contact jaw members without alteration thereof.

These and other objects that will be made apparent throughout the further description of my invention are attained by means of the switch contact members herein described and illustrated in the accompanying drawings, wherein

Figure 1 is an elevational view of the improved contact device, and

Fig. 2 is a plan view of the copper straps constituting the switch jaws of the contact device.

Referring to the drawings, the device comprises an insulating bushing 3 having an axial bore extending therethough and which is provided with a metal bracket 5 by means of which the bushing is attached to a frame structure 6 that constitutes a part of the truck upon which the circuit breaker embodying the contact device is carried.

The inner end of the bushing 3 is provided with a metal clamping device 7 that securely retains a pair of copper switch jaw straps 8 and 9. The straps are spaced apart by means of a spacing member 10 and the clamp member and the straps 8 and 9 are drawn tightly together by means of a bolt 11. The inner ends of the straps 8 and 9 are connected to a terminal device of the circuit breaker (not shown) by means of a clamp bolt 12.

The outer end of the bushing is provided with a metal washer 13 having threaded openings for receiving clamping bolts 14 that extend longitudinally through the bushing and which serve to attach the clamp member 7 thereto. The washer 13 is provided with an opening 20 through which the outer end of the contact straps 8 and 9 extends, the opening being of such size as to permit of limited lateral displacement of the flexible contact straps 8 and 9. By reason of the lateral displacement of the contact straps, the contact jaw members, which constitute integral parts of the straps, may be centered with respect to contact blade member 15 that is mounted upon an insulating bushing 16 that is secured to a frame

structure 17 which constitutes a part of the cell in which the circuit breaker truck is enclosed.

The outer ends of the contact straps 8 and 9 terminate in contact jaw members 18 and 19 respectively. The jaw members comprise off-set portions which constitutes the main portions of the contact jaw members and reentrant contact portions 21 and 22, that yieldingly engage the blade member 15 and embrace it between them. The contact jaw members 18 and 19 are normally biased toward one another and their separating movement is limited by means of a bolt 23 that extends through openings in the jaw members.

When the contact jaw member is moved toward the blade member 15, the end of which is slightly sharpened, the contact portions 21 and 22 are separated against tension thereof and yieldingly embrace the blade member. In order to reinforce the contact jaw members 18 and 19, and to relieve the strain of the material at the bends 24, I provide steel leaf springs 25 and 26 that engage opposite sides of the contact members 18 and 19 and which yieldingly press the contact portions 21 and 22 into engagement with the blade member 15.

The spring member 25 comprises a flat steel leaf of U-shape that is clamped between the insulating bushing 3 and the washer 13. The ends of the leaf spring 25 are beaded at 27 for the purpose of providing a rounded contact surface which reduces the frictional wear to a minimum. The leaf springs 26 are of U-shape and are inserted between the portions 18 and 21, and 19 and 22, of the contact jaw members and are normally compresed therebetween. The spring 25 is preferably of greater strength than the springs 26 in order to oppose the expansive effect of the springs 26, and, consequently, the full tension of the outer spring 25 is transmitted to the contact portions 21 and 22 through the medium of the springs 26. The steel springs are relatively wide and have an etxensive heat radiating surface and engage the contact jaw members with a line contact and consequently any tendency of the contact straps to heat the steel springs is reduced to a minimum.

By reason of this construction, contact jaw members of standard construction and a predetermined size may be used for conducting larger currents than has heretofore been practiced because the copper straps may be operated at higher temperatures without reducting the tension of the contact portions upon the blade member. Soft copper straps may be used in place of the former hardened straps if desirable.

It will be seen that the steel springs may be applied to contact jaw members of standard construction without necessitating any alteration thereof and that the bolt 23, that serves to limit the separating movement of the contact jaw members, also serves to retain the springs 26 in operative position. The rear ends of the springs 26 engage the contact straps and any tendency of the springs to rotate about the bolt 23 is prevented thereby. Should the temper of the steel springs become affected deterimentally by severe and protracted service, they may be readily replaced.

Heretofore, when the contact straps had become overheated their usefulness was destroyed by reason of the annealing action of the heat which affected the elasticity thereof. When this occurred it was necessary to remove the contact straps and replace them with tempered straps. This operation necessitated disconnecting the straps from the circuit breaker and removal of the bushing from the circuit-breaker truck, entailing a considerable loss of time and material. In order to replace the steel springs, it is only necessary to take down the outer end assembly from the bushing and replace new springs which are relatively inexpensive compared to the cost of copper contact straps.

While I have illustrated but one embodiment of my invention it will be apparent to those skilled in the art that various modifications, changes, substitutions, additions and omissions may be made in the apparatus illustrated without departing from the spirit and scope of my invention, as set forth in the appended claims.

I claim as my invention:

A contact jaw member comprising a support member, a pair of contact jaw members movably mounted upon the support member and having a reentrant contact portion overlapping the main portion for engaging and receiving a switch blade member therebetween, means for limiting separation of the jaw members and spring members disposed between the said contact portion and main portion of the jaw members and retained in operative position by the said means for yieldingly pressing the contact portions into engagement with the said switch blade member.

In testimony whereof, I have hereunto subscribed my name this 29th day of October, 1923.

ARTHUR RAWLING.