Dec. 29, 1931. E. F. GOETZ 1,839,095

DETACHABLE CONTACT

Filed Feb. 19, 1930

Fig. 1.

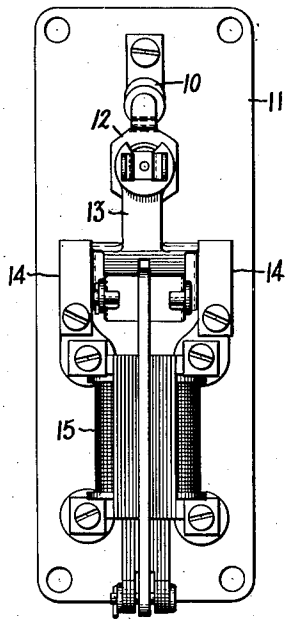


Fig. 2.

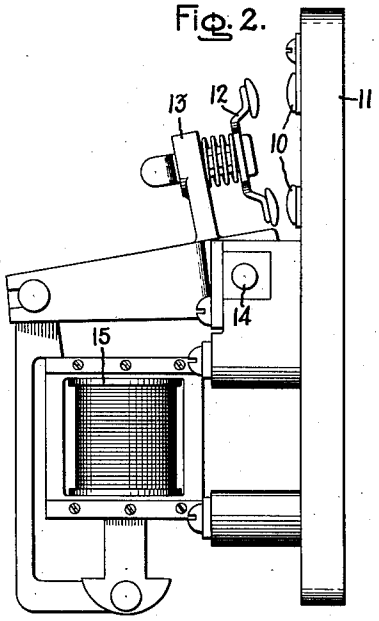


Fig. 3.

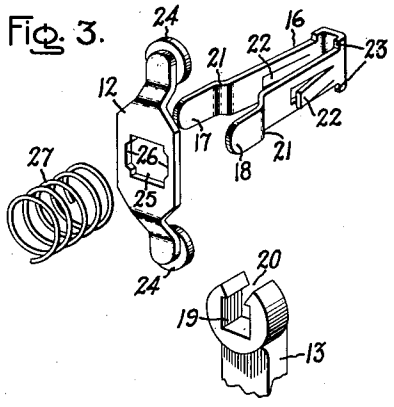
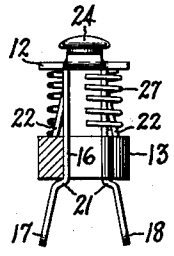


Fig. 4.



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UNITED STATES PATENT OFFICE

ERNEST F. GOETZ, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

DETACHABLE CONTACT

Application filed February 19, 1930. Serial No. 429,771.

The present invention relates to electrical contacts and has for its principal object the provision of an improved form of self-aligning resiliently mounted contact which may be readily and quickly removed without the use of tools.

In the usual form of removable contacts now in use in motor controllers, or the like, it is ordinarily necessary to unscrew a securing bolt or screw to permit the contact to be removed. Where the contact is made removable without the use of tools, the construction ordinarily is such that the contact parts are not removable as a unit but require handling several separable pieces. Moreover, the usual construction requires some form of pivotal mounting with a biased spring connection employed to maintain the contact in engagement with the pivot.

The present invention provides a resilient self-aligning removable contact construction in which the contact parts remain assembled as a unit when removed and also which avoid the necessity for any pivotal bearings.

Briefly, in accordance with the preferred form of the invention this is accomplished by providing a mounting pin with the contact slidably and tiltably mounted thereon to permit self-alignment. The mounting pin is provided with opposing spring portions adapted to be received in an opening in the supporting member and has suitable shoulders formed thereon to engage with the edges of the opening so as to secure the mounting pin firmly in the opening. A spring is provided for biasing the contact against the sliding and tilting movements so as normally to maintain the contact in a predetermined alignment with the cooperating contact.

In the accompanying drawings Fig. 1 is a front view of an electromagnetically operated switch provided with a yielding self-aligning removable contact embodying the present invention; Fig. 2 is a side view of the switch, Fig. 3 is a slightly enlarged prospective view of the several contact parts in disassembled relation, and Fig. 4 is a top view, partly in section, showing the contact parts in assembled relation.

As shown in Figs. 1 and 2, the switch has the stationary contacts 10 mounted in spaced-apart relation on the base 11 with the cooperating bridging contact 12 resiliently and removably mounted on the support 13 which is pivotally mounted in the bearings 14 and mechanically connected to be operated by the electromagnet 15.

As more clearly shown in Fig. 3 the yielding, quick detachable mounting of the contact 12 on the support 13 is accomplished by means of the special mounting pin 16. In the preferred form shown the mounting pin 16 is made of spring material in substantial U shape with the leg portions 17—18 extending in spaced-apart opposing relation such as to be received into the opening 19 formed in the support 13. The opening 19 preferably is in the form of a partially open non-circular slot with the partial opening 20 located at the end of the pivoted support 13.

In order to maintain the mounting pin 16 securely in the opening 19, the ends of the legs 17—18 are bent so as to form the sloping shoulders 21. The tongues 22 are punched out from the legs 17—18 so as to provide a pair of shoulders in such spaced relation with the shoulders 21 as to engage with the edges of the opening 19 when the mounting pin 16 is placed therein. The central yoke portion of the U-shaped pin 16 is provided with projections 23 so as to form a head for the pin.

The bridging contact 12, carrying the spaced-apart buttons 24 for engaging the spaced-apart stationary contacts 10, is provided with an opening 25 of a size and shape such as to permit the contact 12 to be slidably and tiltably mounted on the pin 16. In order to avoid interference with the tongues 22, the opposite sides of the opening 25 are provided with recesses 26 which slide over the tongues 22 when the contact 12 is mounted on the pin 16. The compression spring 27 is of a size sufficient to surround both legs 17—18 of the pin 16 and engage with the portion of the contact 12 adjacent the opening 25 so as to bias the same normally into engagement with the projections 23 forming the head of the pin.

To assemble the contact parts as shown in Fig. 4, the spring legs 17—18 of the pin are

first compressed and inserted through the opening 25 in the contact 12. This permits contact 12 to be slid into engagement with the projections 23 forming the head of the pin. The spring 27 is then slid over the compressed legs 17—18 of the pin into engagement with the contact 12. Upon releasing the spring legs 17—18, the outwardly bent portions forming the shoulders 21 engage with the spring 27 and thereby serve to hold the contact parts together as an assembled unit.

To mount the assembled contact unit in the slot 19 of the support 13, it is only necessary to grasp the ends of the legs 17—18 of the pin extending beyond spring 27 between the thumb and forefinger and draw these legs together until the distance therebetween permits the pin to pass through the partial opening 20 into the slot 19. Upon releasing the legs 17—18 of the pin, the spaced-apart pairs of shoulders 21 and 22 are forced into engagement with the edges of the slot 19 so as to firmly hold the pin in position as shown in Fig. 4. Due to the shape of the spring shoulders 21, a wedging action occurs which brings the ends of the tongues 22 into firm abutting relation with support 13 as shown in Fig. 4 irrespective of slight variations in the thickness of the support.

To remove the contact 12, it is only necessary to reverse the process just described. Thus, it will be apparent that the mounting and removing of the contact may be readily and quickly accomplished without the use of tools. With the mounting pin 16 formed of a flat spring strip as shown and both the opening 25 in the contact 12 and the slot 19 in the support 13 formed in rectangular shape as shown, the pin 16 is maintained in non-rotatable engagement with the support 13 and the contact 12 is maintained in non-rotatable sliding and tilting relation on the pin 16. This insures that the contact 12 is always maintained in substantial alignment with the stationary contact 10. Furthermore, the yielding of the biasing spring 27 permits the contact 12 to slide or tilt the amount required to insure self-alignment with the contacts 10 and thereby establish good current-conducting contact therewith.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A readily removable yielding contact including a support having an opening formed therein, a mounting pin having opposing yielding portions with spaced-apart shoulders formed thereon to engage the edges of the opening for releasably securing the pin therein, a contact mounted on the pin for sliding and tilting movement thereon, and a spring for biasing the contact against the sliding and tilting movement.

2. A readily removable yielding contact including a support having a partially open slot formed therein, a spring member having opposing portions adapted to yield to passing through the said partial opening into the said slot and provided with spaced-apart shoulders for engaging the edges of the slot to releasably secure the spring member therein, a contact mounted on the said opposing portions of the spring member for sliding and tilting movement thereon, and a spring surrounding the opposing portions of the spring member and interposing between the contact and support for biasing the contact against the sliding and tilting movement.

3. A readily removable yielding contact including a support having an opening formed therein, a substantially U-shaped spring member having spaced-apart shoulders on the opposite legs thereof to engage with the edges of the opening for releasably securing the member therein, a contact mounted on the spring member for sliding and tilting movements thereon, and a spring for biasing the contact against the sliding and tilting movements.

4. A readily removable yielding contact including a support having a non-circular partially open slot therein, a substantially U-shaped spring member having legs extending in substantially parallel spaced-apart relation for non-rotatably engaging with the slot in said support, spaced-apart shoulders forming in opposing relation on the legs of said spring member for engaging with the edges of the opening in said support, a contact having a non-circular opening therein to receive the legs of said spring member for sliding and tilting movements thereon, and a spring surrounding the legs of the spring member and interposed between the contact and support for biasing the contact against the sliding and tilting movements.

In witness whereof, I have hereunto set my hand this 18th day of February, 1930.

ERNEST F. GOETZ.