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CIRCUIT BREAKER

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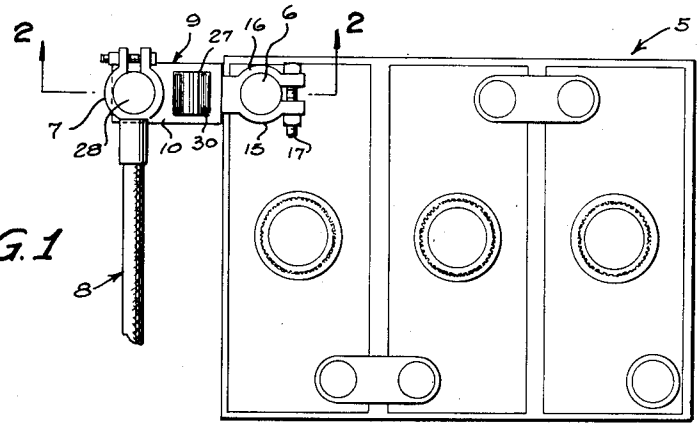


FIG. 1

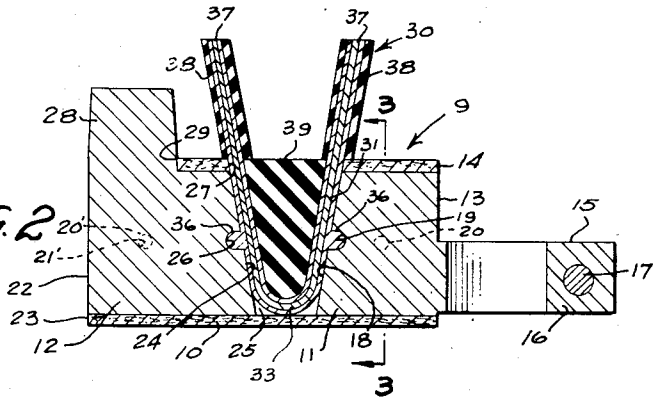


FIG. 2

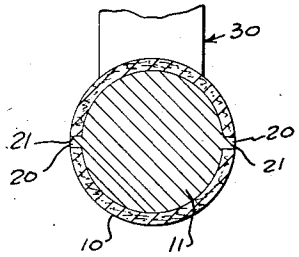


FIG. 3

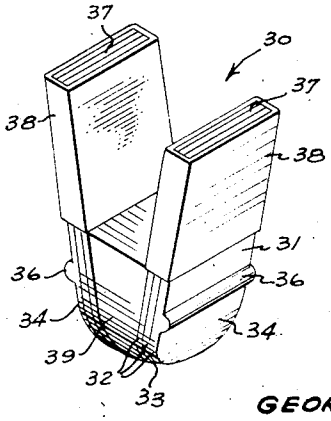


FIG. 4

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CIRCUIT BREAKER

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6 Claims. (Cl. 339—224)

This invention relates to improvements in electric circuit breakers, and more particularly to a device of this kind especially although not exclusively adapted to be interposed between and connected to the battery cable leading to the starter motor of an automobile electrical system and the related post of the battery, the device having a removable circuit closing element which when removed precludes the flow of current from the battery to the starter motor, the primary object of the invention being to provide a simple, practical and efficient device of this character which enables quickly and easily breaking the electrical circuit for the purpose of removing danger of fire and other damage, including depletion of the battery, resulting from short circuits in the electrical system, as well as enabling a mechanic to break the circuit while working upon components of the electrical system, and quickly and easily restore or close the circuit when desired.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, merely for purposes of illustration, a specific embodiment of the invention is set forth in detail.

In the drawings, wherein like numerals designate like throughout the several views:

Figure 1 is a top plan view showing the device installed on a battery terminal and related battery cable;

Figure 2 is an enlarged vertical longitudinal section taken on the line 2—2 of Figure 1;

Figure 3 is a transverse vertical section taken on the line 3—3 of Figure 2; and

Figure 4 is a perspective view of the removable element.

Referring in detail to the drawings, the number 5 generally designates a conventional automotive storage battery having a terminal or post 6 to which the clamp 7 of the usual battery cable 8, leading to the starter motor (not shown), is usually connected. In accordance with the present invention a circuit breaker device, generally designated 9, is interposed between and connected to the cable clamp 7 and the battery post 6.

The circuit breaker device 9 comprises a preferably fibre or other suitable insulating material cylindrical tube 10 forming an insulated casing for two lead or other suitable conductive material bodies 11 and 12. The body 11 has an outer end 13 flush with the adjacent end 14 of the tube 10 from which projects a battery post clamp 15 which is located below the axis of the body 11 and parallel thereto, and involves the usual split ring 16 and clamping bolt 17, by means of which the device 9 is electrically and structurally connected to the post 6 of the battery 5 to preferably project laterally therefrom as shown in Figure 1. The inner end 18 of the body 11 is plane and is axially spaced from the body 12, declines at a slight inward angle, and is formed with a transversely extending horizontal, rounded groove 19. The sides of the body 11 have legs 20 which project into holes 21 in the tube 10 to preclude rotation and longitudinal movement of the body 11 relative to the tube 10. Similar legs 20' on the

body 12 project through holes 21' in the tube 10 for the same purpose.

The body 12 has an outer end 22 flush with the adjacent end 23 of the tube 10, and an inner plane end 24 which declines at a similar but opposite angle from the inner end 18 of the body 11, whereby a truncated V-shaped chamber 25 is formed between the ends 18 and 24 and the bottom wall of the tube 10. The end 24 of the body 12 is formed with a groove 26 like the groove 19, and the top wall of the tube 10 is formed with a rectangular opening 27 registered with the wider or upper end of the chamber 25. The body 12 has at its outer end a projection 28, similar in form to the battery post 6, which rises from the body 12 through an opening 29 provided in the top wall of the tube 10, and on which is adapted to be clamped the clamp 7 of the battery cable 8, as shown in Figure 1. It will be obvious that the bodies 11 and 12 are both spaced from and insulated from each other so that current cannot flow from the battery 5 to the cable 8 without an extraneous connection being made between the bodies 11 and 12.

The device 9 provides for this purpose a removable connective or connector element or insert 30 which comprises a V-shaped conductive spring bar 31, preferably formed of flat copper laminations or strips 32 soldered or otherwise secured in superimposed relation. The spring bar 31 is proportioned to be inserted downwardly through the tube opening 27 into the chamber 25 with the apex portion 33 of the insert engaging the bottom of the chamber, the legs 34 of the insert being required to be somewhat compressed toward each other to accomplish the insertion. As a result, the legs 34 of the insert forcibly engage the inner ends 18 and 24 of the conductive bodies 11 and 12, respectively, and electrically connect these bodies and thereby close an electrical circuit from the battery post 6 to the cable 8 which can be quickly and easily broken, whenever desired, simply by pulling the insert 30 up out of the chamber 25. To secure in the insert 30 in connecting relation in the chamber 25 against displacement therefrom by vibration or the like, the legs 34 are provided on their outer sides with transverse ribs 36 which engage in the grooves 19 and 26 in the inner ends of the conductive bodies 11 and 12, respectively.

The legs 34 have free end portions 37 which project above the tube 10 when the insert 30 is in place in the chamber 25, which are covered with rubber or other suitable insulation, as indicated at 38, and which form finger pieces or grips for manual manipulation of the insert 30 into and out of connective position in the chamber 25.

To provide greater and more reliable tensioning of the legs 34 away from each other, a block 39 of compressible rubber is positioned between and secured in suitable manner to the lower part of the legs 34 and the apex portion 33.

What is claimed is:

1. In a circuit breaker a pair of conductive bodies, insulating means mounting said bodies in endwise relation with ends thereof facing in spaced relation, said facing ends being inclined at opposite angles with respect to the longitudinal axes of said bodies, and an insert comprising a V-shaped bar of conductive spring material having divergent arms normally tensioned away from each other at a distance greater than the distance between the facing ends of said conductive bodies, said V-shaped bar being removably inserted in the space between said facing ends with its arms in compressed condition and electrically engaging the facing ends of and electrically connecting said conductive bodies.

2. In a device of the character described, a non-conductive tube having a side wall, conductive bodies secured in opposite ends of said tube, said bodies having inner ends in spaced relation to each other, a V-shaped con-

ductive spring bar having an apex and arms diverging from each other in a direction away from said apex, said tube side wall having an opening between the inner ends of the conductive bodies, said conductive spring bar being engaged through said opening with said apex engaged with the tube side wall at a point opposite said opening and with the diverging arms compressed toward each other and engaging the inner ends of the conductive bodies.

3. In a device of the character described, a non-conductive tube having a side wall, conductive bodies secured in opposite ends of said tube, said bodies having inner ends in spaced relation to each other, a V-shaped conductive spring bar having an apex and arms diverging from each other in a direction away from said apex, said tube side wall having an opening between the inner ends of the conductive bodies, said conductive spring bar being engaged through said opening with said apex engaged with the tube side wall at a point opposite said opening and with the diverging arms compressed toward each other and engaging the inner ends of the conductive bodies, one of said conductive bodies having a battery post clamp thereon and the other conductive body a post arranged to be embraced by a battery cable clamp.

4. In a device of the character described, a non-conductive tube having a side wall, conductive bodies secured in opposite ends of said tube, said bodies having inner ends in spaced relation to each other, a V-shaped conductive spring bar having an apex and arms diverging from each other in a direction away from said apex, said tube side wall having an opening between the inner ends of the conductive bodies, said conductive spring bar being engaged through said opening with said apex engaged with the tube side wall at a point opposite said opening and with the diverging arms compressed toward each other and engaging the inner ends of the conductive bodies, each of said arms and the related inner ends of the conductive bodies having interengaged rib and groove means.

5. In a device of the character described, a non-conductive tube having a side wall, conductive bodies secured in opposite ends of said tube, said bodies having inner ends in spaced relation to each other, a V-shaped conductive spring bar having an apex and arms diverging from each other in a direction away from said apex, said tube side wall having an opening between the inner ends of the conductive bodies, said conductive spring bar being engaged through said opening with said apex engaged with the tube side wall at a point opposite said opening and with the diverging arms compressed toward each other and engaging the inner ends of the conductive bodies, each of said arms and the related inner ends of the conductive bodies having interengaged rib and groove means, comprising ribs on the arms and grooves in the inner ends of the conductive bodies.

6. In a device of the character described, a non-conductive tube having a side wall, conductive bodies secured in opposite ends of said tube, said bodies having inner ends in spaced relation to each other, a V-shaped conductive spring bar having an apex and arms diverging from each other in a direction away from said apex, said tube side wall having an opening between the inner ends of the conductive bodies, said conductive spring bar being engaged through said opening with said apex engaged with the tube side wall at a point opposite said opening and with the diverging arms compressed toward each other and engaging the inner ends of the conductive bodies, and a block of resilient compressible material positioned between and secured to the arms of said V-shaped conductive bar.

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