Aug. 24, 1937. E. A. HORN 2,091,204

FUSE BOX

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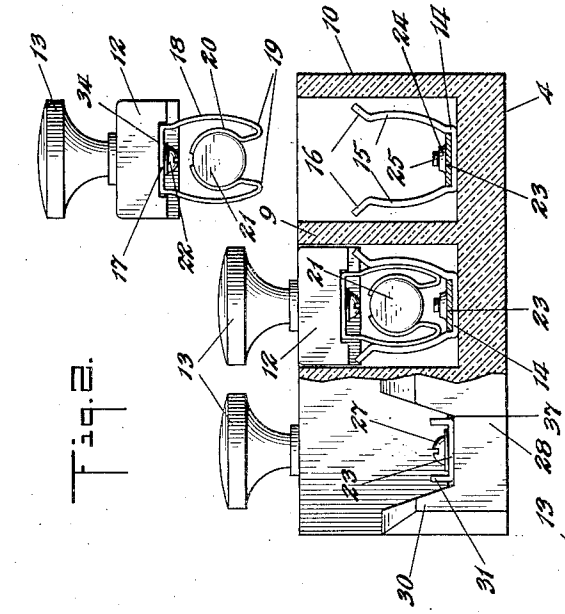


Fig. 2.

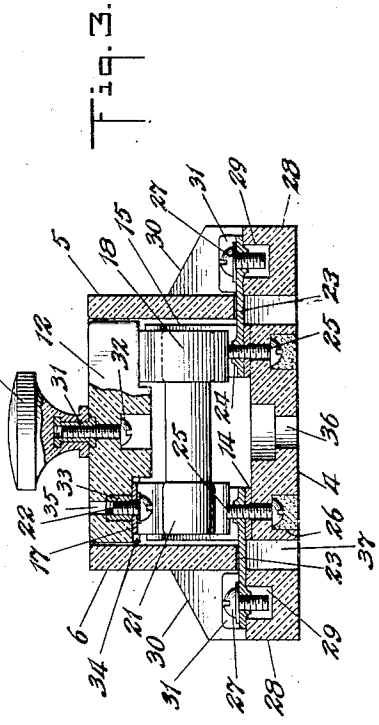


Fig. 3.

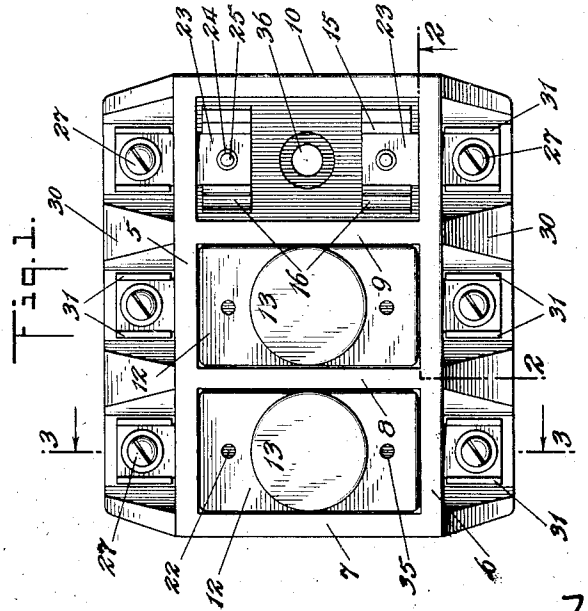


Fig. 1.

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FUSE BOX

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3 Claims. (Cl. 200—133)

This invention relates to fuse boxes and more particularly those of the multi-fuse type, such for example as may be inserted in a three phase power supply to electric power tools.

Objects of the present invention are to render the fuse box compact, particularly by reducing the height thereof; to render the same convenient, particularly by providing interchangeable and reversible fuse carriers; to simplify assembly, particularly by reducing the number of parts and eliminating loose parts such as nuts; and to facilitate connections to the fuse box by providing conveniently accessible binding posts therefor.

Other objects will be apparent from the following description, with reference to the accompanying drawing, in which,

Figure 1 is a top plan view of the fuse box according to the preferred embodiment of the present invention, one of the fuse carriers or fuse chamber covers being removed;

Figure 2 is an end elevation, partly in vertical section along the line 2—2 of Figure 1, and partly exploded to show the fuse carrier removed from the fuse chamber; and

Figure 3 is a longitudinal vertical section taken along the line 3—3 of Figure 1.

The fuse box according to the present invention comprises a block of molded insulation having a flat base 4 provided with upstanding end walls 5 and 6, between which extend side walls 7, 8, 9, and 10, thus defining three fuse chambers or wells of rectangular contour. An individual cover 12 of the same material is provided for each of the fuse chambers, being slightly smaller than the same so as to be let down thereinto, whereby the top of the cover 12 is flush with the top of the side and end walls of the respective chambers. A suitable handle 13, preferably of the same insulating material and rigid therewith, is provided for each of the covers 12.

Each end of each chamber is provided with a substantially U-shaped contact clip, having a flat base 14 resting on the bottom of the chamber constituted by the top of the base 4. Each of these contact clips comprises a pair of upstanding divergent arms 15 which are concave toward each other and terminate in further divergent top portions 16.

Cooperating with these contact clips are fuse clips secured to the respective ends of each fuse chamber cover 12. Each of these fuse clips comprises a flat base 17 having depending arms 18 concave toward each other. These arms are bent upwardly and inwardly as at 19 and are concave toward each other as at 20, to receive therebetween the metal end cap 21 of a cartridge fuse. The fuse clips are each secured to the cover 12 by a screw 22 passing through the base 17 thereof, thus forming therewith a carrier for the fuse.

It will be readily apparent from an inspection of Figure 2, that the fuse carrier clips are thinner and are therefore less rigid than the contact clips, although both are of resilient conducting material. Hence as the cover 12 is moved downward, the concave side walls 18 pass between the divergent clip ends 16 and are cammed inwardly thereby. The folds 19 are thus drawn toward each other, and as the concave fuse engaging portions 20 are free at their inner ends, these are wiped downwardly around the fuse cap 21 therebetween. This wiping action tends to insure adequate contact.

As the cover 12 is moved further downwardly, the widest point of the arms 18 passes the narrowest point or throat between the arms 15, and thereafter the resilience and shape of the cooperating clips causes a sort of snap action which brings the clips together in interfitting contact, and thereby brings the top of the cover 12 flush with the top of the fuse box.

The snap action, however, does not entirely release the compression of the fuse clip. In this closed position the arms 18 are still compressed toward each other by and between the arms 15, with the result that the portions 20 maintain the fuse caps under additional pressure, and the fuse cannot escape. Furthermore, when the cover is removed, carrying the fuse clips and the fuse with it, accidential displacement of the fuse is prevented by the residual initial compression of the portions 20, which extend around and engage under pressure the greater part of the periphery of the fuse caps.

For connecting the contact clips 15 into the circuit to be protected, a conductor strap 23 is provided at each end of each fuse chamber. These straps 23 pass through the end walls 5 and 6, respectively, the apertures 37 therefor being molded upwardly through the base 4.

The inner end of the conductor strap 23 overlies the base 14 of the contact clip, and is punched upwardly and tapped as at 24, over a central aperture in the base 14, to receive an assembly screw 25, which is inserted through a suitable shouldered aperture 26 in the base 4, thus securely clamping the base 14 of the contact clip therebetween, after which the apertures 26 are plugged with sealing wax or the like. The outer end of the strap 23 is laterally flanged up-

wardly as at 31, and is centrally punched downwardly and tapped to receive a screw 27 which serves as a binding post.

It should be noted that the base 4 is extended longitudinally at each end forming an extension 28, and the strap 23 overlies the same. The extension 28 is apertured as at 29 to provide clearance for the lower end of the binding post 27. Also, short buttresses 30 are provided, aligned with the side walls 7, 8, 9, and 10. Thus the extensions 28 and the buttresses 30 provide individual pockets separating and insulating the binding posts 27, but as these pockets are open at the top and end, they are conveniently accessible for connecting wires to the binding posts.

The base 4 is provided with apertures 36 for receiving bolts or screws to secure the same to a wall or other support. In the form shown, these apertures 36 are countersunk and provided one in the bottom of each of the fuse chambers. Thus even though the fuse boxes were to be bolted directly to a metal support, the live connections would be adequately insulated therefrom, particularly the binding posts 27, and as these are exposed at the top, they are readily accessible without removing the fuse box from its support.

To provide a rigid attachment for the knob 13, a tapped metal insert 31 is embedded or molded therein. This insert is partly cylindrical, but has square ends, the lower one of which extends into a square recess in the top of cover 12. A screw 32 is inserted upward through a shouldered central aperture in the cover 12 into the tapped bore of the insert 31.

The lower side of the cover 12 is of reduced thickness, or channeled transversely at each end, and the center of each end is further reduced or channeled longitudinally, forming a square recess 34 receiving the fuse clip base 17. A tapped and knurled insert 33 is embedded or molded centrally in the cover 12 above each such recess, to receive the screw 22 securing the base 17 thereto. Although the upper ends of the concave portions 20 are close together, the resilience of the fuse clip is sufficient to permit entrance and turning of a screw driver for installing the screw 22. The aperture of the insert 32 is continued open up through the cover 12 as at 35, to receive points for engaging the screws 22 and thus testing the fuses without removing the covers.

I claim:

1. A fuse box comprising a block of molded insulation having a base with end walls and side walls defining a fuse chamber, a contact clip at each end of said chamber having a pair of divergent arms extending upwardly therein and concave toward each other, a cover for said chamber having depending fuse clips at each end thereof with blades concave toward each other and receiving one end of the fuse therebetween, and portions outside thereof spaced therefrom substantially concentric therewith and having convex outer surfaces, said fuse clips being of spring material for greater yielding thereof than said contact clips so as to snap into interfitting contact therewith when the cover is closed, with the concave surfaces of said contact clips and the convex surfaces of said fuse clip portions in interfitting contact for the greater part of the depth of both.

2. In a device of the character described, a relatively rigid contact clip comprising a pair of upstanding divergent arms which are concave toward each other, and a relatively yieldable fuse clip comprising depending arms concave toward each other and bent upwardly and inwardly and again concave toward each other to receive between the inner concave portions the end cap of a cartridge fuse, the outer portions of said fuse clip being adapted to enter the concave portions of said contact clip and contact the same along a common curvature throughout the greater part of their respective lengths.

3. In a three phase fuse box having a base with two end walls and four side walls therebetween defining a plurality of parallel fuse chambers, a contact clip at each end of each chamber formed of a strip of relatively thick and rigid sheet metal and comprising a base and a pair of upstanding arms concave toward each other but diverging at their tops, a separate cover for each chamber having at each end a fuse clip formed of a strip of relatively thin and yieldable sheet metal and comprising depending arms concave toward each other and bent upwardly and inwardly and again concave toward each other to receive between the inner concave portions thereof the end cap of a cartridge fuse, the outer portions of said fuse clip on the cover being smoothly convex and adapted to yield upon entering said relatively rigid divergent tops of said chamber contact clip and cause said inner concave portions of the fuse clip in engagement with the fuse end cap to have a wiping action with respect to said fuse end cap, said outer portions of said fuse clip on the cover being smoothly convex and adapted upon further entry into said chamber contact clip to contact the same along a common curvature throughout the greater part of their respective lengths.

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