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W. E. HILL ET AL

2,427,908

ELECTRIC FUSE BOX

Filed Jan. 24, 1945

2 Sheets-Sheet 1

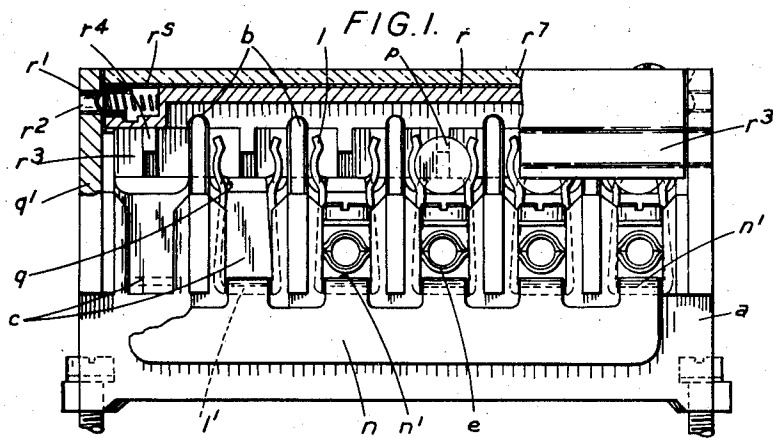


FIG. 2.

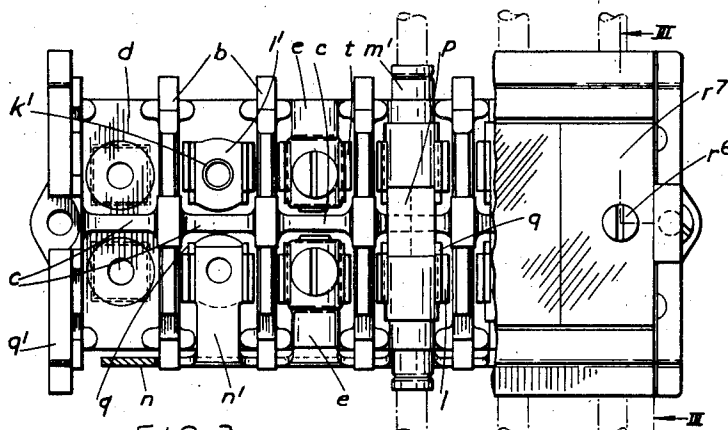


FIG. 3.

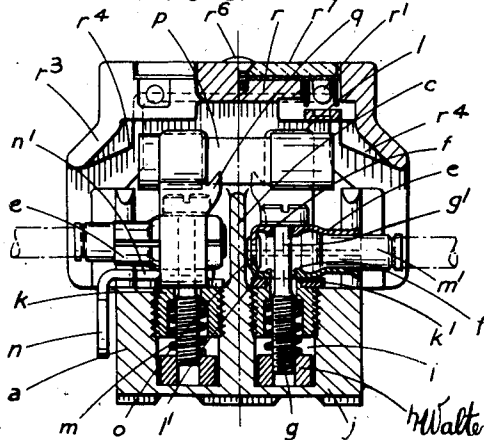
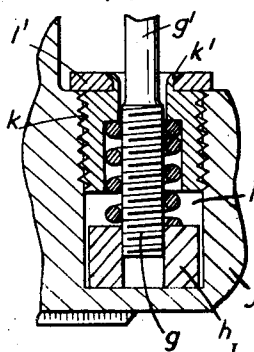


FIG. 10.



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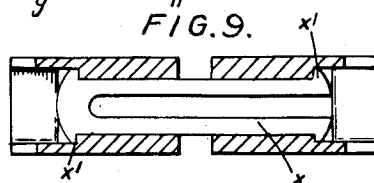
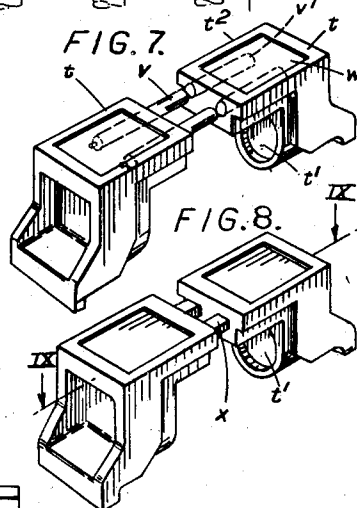
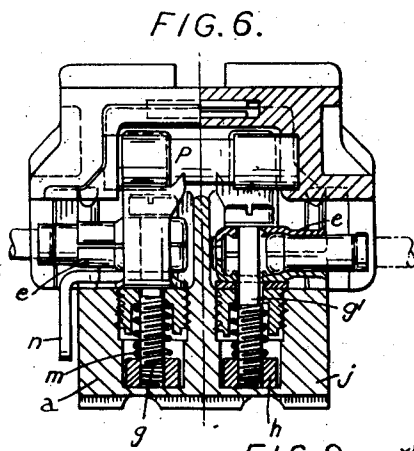
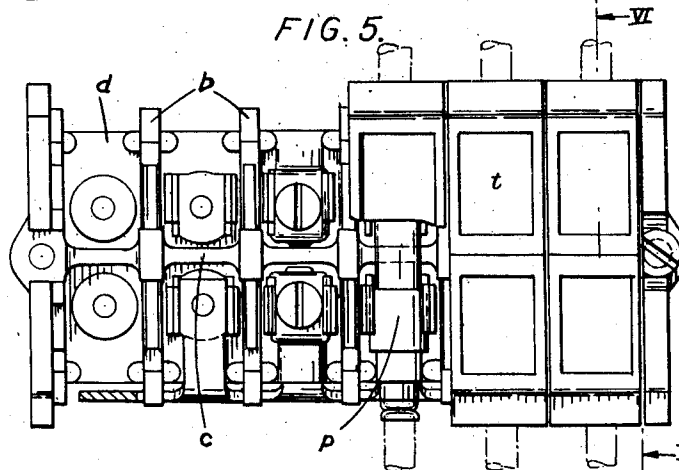
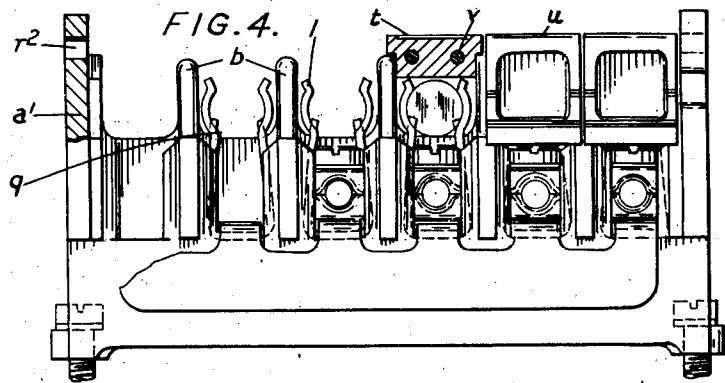
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ELECTRIC FUSE BOX

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ELECTRIC FUSE BOX

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Application January 24, 1945, Serial No. 574,410
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4 Claims. (Cl 200—133)

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This invention relates to improvements in and connected with electric fuse boxes, and has for its object to provide a compact construction of light weight in which the connections can be readily made, while ensuring a high degree of electrical efficiency.

According to this invention, a moulded insulating block is formed with compartments each adapted for the reception of a U-shaped fuse clip between the arms of which there is disposed a connector socket, for a removable plug or ferrule, and the curved upper ends of which fuse clips resiliently grip the end caps of a replaceable cartridge or tubular fuse. The sockets and clips are mounted in pairs within the block, one clip of each pair receiving the end cap of a fuse, the fuses being disposed in parallel relation in the upper part of the block, the open top of which block may be closed by a removable cover or by holders for the fuses.

The socket is preferably composed of two clamps, secured by a screw with which is associated a spring for maintaining resilient pressure engagement of the clamps with the ferrule, in the event of loosening of the screw, in accordance with U. S. Patent 2,360,304, dated October 10, 1944. Each socket assembly is introduced into, and is removable from, the block as a unit, thereby facilitating assembly and replacement. The compartments are provided by insulating partitions or barriers which afford advantageously long creepage paths for ensuring a high degree of electrical efficiency.

Each clip is mounted in the block by means of a bush, having a riveted attachment with the connecting limb of a clip and adapted to be driven or forced into a recess in the bottom of a compartment. The screw of a socket assembly engages a nut which is non-revoluble in this recess and the spring is disposed in the recess between the bush and the nut.

A fuse may be clamped by a holder composed of two parts which may be movable with respect to each other to permit release of the fuse. These parts may be of L-shape, the aligning portions being provided with connecting means, while the parallel portions are adapted for engagement with the end caps of the fuse and are shaped for manipulation in introducing the fuse into, or removing it from, the clips. The con-

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necting means between the component parts of the holder may permit the sliding of the parts relatively to each other when introducing or withdrawing a fuse, while being adapted to prevent detachment of one part of the holder from the other part thereof. Such means may consist of a blade of hair-pin shape and having sufficient resiliency to prevent inadvertent separation of the parts due to vibration. According to a modified construction, the L-shape holder parts may be engaged by a pin and socket coupling permitting the detachment of one part from the other.

In order to enable the invention to be readily understood, reference will now be made to the accompanying drawings illustrating, by way of example, two constructions for carrying the invention into effect, in which drawings:

Figure 1 is a side elevation with parts in section, of a block provided with a removable cover.

Figure 2 is a plan of Figure 1, portions being removed to illustrate the construction more clearly.

Figure 3 is a cross section on the line III—III of Figure 2.

Figure 4 is a side elevation, with parts in section, of a modified construction in which the cover of Figure 1 is dispensed with, and the fuses are carried in fuse holders.

Figure 5 is a plan view of Figure 4.

Figure 6 is a section on the line VI—VI of Figure 5.

Figure 7 is a perspective view of a fuse holder shown in Figures 4, 5 and 6.

Figure 8 is a perspective view of a modified construction of fuse holder.

Figure 9 is a section on the line IX—IX of Figure 8.

Figure 10 is a sectional view to an enlarged scale of a part of Figures 3 and 6.

Referring to Figures 1, 2 and 3 of the drawings, the moulded block *a* of insulating material is formed with a number of transverse partitions *b* and with a central longitudinal partition *c*. In each of the cells or chambers *d* thereby formed is mounted a single-ended socket, in accordance with U. S. Patent 2,360,304, dated October 10, 1944, and comprising a pair of clamps *e* through aligned openings *f* in which, there freely extends the plain portion *g*¹ of a screw *g*.

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The tapped end of this screw enters a nut *h* non-revolubly mounted in the square bottom *i* in the closed base *j* of the block.

A bush *k* having external annular ribs, is formed at one end with a circular boss or flange *k*¹ adapted for riveted connection to the connection to the connecting limb *l*¹ of a U-shaped fuse clip *l*. The bush *k*, with the clip *l* secured thereto, is driven or forced into the upper end of a recess *i*, the ribs on the bush serving for obtaining rigid mounting of said bush and clip in the block *a*.

The sockets and clips are arranged in spaced relation in two rows so that the end caps of a fuse may be engaged by a pair of opposite clips. The sockets of one row are connected with a bus bar or link, for which purpose each apertured lateral extension *n*¹ of the bar *n* is clamped in position between a clip *l* and the lower clamp of a socket, the screw *g* passing freely through the aperture in such extensions. The lower clamp of each socket of the other row is seated on the limb *l*¹ of a clip *l* and the head of the screw *g* bears on the upper clamp.

A helical spring *m*, disposed in the recess between the bush *k* and the nut *h*, acts for forcing the nut downwardly into the recess so that, in the position shown in Figure 3, a resilient pressure engagement of the socket clamps *e* with a plug or ferrule *n* is obtained. When the screw *g* is turned for further engaging with the nut, the clamps are positively locked with the ferrule, as described in the patent specification aforesaid.

Before introduction into the block, the socket clamps *e* are retained in position around the plain portion *g*¹ of the screw by the abutment of the lower clamp with the upper thread of the screw. Thus the assemblage can be introduced into, and removed from, the block as a unit. The closed end of each socket clamp is formed with a semicircular opening engaging an annular groove in a small locating disc *o*. Each socket clamp is introduced between the parallel arms of a clip *l*, the screw *g* passing freely through openings in the bush *k*, and bus bar *n*, into the nut *h*. The end caps of a fuse *p* are resiliently gripped by the upper ends of the clips *l* and the glass tubes thereof are positioned by lugs *q* of the clips. The compartments in Figures 1 and 2 show different stages in the mounting of the parts therein.

The end walls *q*¹ of the block are of extended height and between them is disposed a removable cover *r* for closing the open top of the block, each end of the cover having a pair of spring pressed projections *r*¹ engageable in small holes or recesses *r*² in the end walls. Downwardly sloping sides *r*³ of this cover serve as protective shrouds overhanging the conductor ferrules *m*¹ introduced into the sockets. The undersurfaces of these sloping sides are formed with locating ribs *r*⁴ which act as abutments for preventing undue endwise movement of the fuses in the clips. An identification label *r*⁵ is secured in the cover by a screw *r*⁶ and a transparent covering *r*⁷.

For high voltage currents, each fuse is mounted in an insulating holder *u* Figures 4 to 7, composed of two parts *t*, *t*² each of L-shape, the end caps of a fuse *p* being received in recesses *t*¹ of the downwardly-extending, substantially parallel legs of the holder, while the ends of the aligned parts of the holder are adapted for coupling such parts. Thus one part *t* may be provided with a pair of pins *v* for introduction into the socket openings *v*¹, in the other part *t*², thereby enabling the

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parts to be mated and secured together with the fuse trapped in position between them. Identification plates may be mounted in shallow rectangular recesses *w* on the upper surface of the holder parts. The holder may be manipulated by gripping its ends with finger and thumb, the exposed end caps of the fuse being engageable with the fuse clips *l*, it being understood that the requisite end pressure exerted on the holder ensures the detention of the fuse therein. The various holders serve for covering the open top of the block so that the cover, shown in Figures 1 to 3, may be dispensed with.

According to the modified construction of fuse holder shown in Figures 8 and 9, the L-shaped parts are engaged by a flat blade *x* of hair-pin shape adapted to permit the endwise sliding of the parts while preventing their complete separation. The blade possesses resiliency which frictionally holds the parts in the closed position so as to prevent vibration from causing inadvertent endwise movement of the parts. These parts are slidable on the parallel portions of the blade *x*, short outward extensions *x*¹ of which have abutting engagement with the holder parts for limiting their complete separation.

We claim:

1. An electric fuse box for replaceable cartridge fuses, comprising an insulating block formed with compartments; a pair of spaced, aligned U-shaped fuse clips in each compartment, each adapted to receive between its upstanding arms and to grip the end cap of a cartridge fuse inserted therebetween; a connector socket disposed between the upstanding arms of each clip and attached to the connecting limb of said clip and overlying said limb, each said connector socket comprising two superimposed clamping members; a headed screw the threaded shank of which passes freely through aligned openings in said two clamping members with the head of said screw overlying the uppermost of said members; and a nut in the insulating block for threaded engagement by the threaded shank of said screw, said nut being non-rotatably retained within a recess in said insulating block; said socket adapted to receive and retain therein the end of a conductor inserted in said socket.

2. An electric fuse box as defined in claim 1, which includes a spring disposed between the lowermost of said clamping members and said nut for maintaining resilient pressure engagement of the clamping members with the end of the conductor inserted in said socket in the event of loosening of the screw with respect to said nut.

3. An electric fuse box for replaceable cartridge fuses comprising an insulating block formed with compartments with spaced recesses in the base of each compartment, a pair of spaced, aligned U-shaped fuse clips in each compartment each adapted to receive between its upstanding arms and to grip the end cap of a cartridge fuse inserted therebetween, a connector socket disposed between the upstanding arms of each clip and attached to the connecting limb of said clip and overlying said limb, said socket adapted to receive and retain therein the end of a conductor inserted in said socket, a headed clamping screw associated with each of said sockets, a bush rigidly retained within each recess in the insulating block and having riveted connection with the connecting limb of one of the fuse clips and apertured to permit the passage therethrough of the said screw and a nut non-rotatably mounted in each recess in the insulat-

ing block below the bush secured therein for threaded engagement by the screw.

4. An electric fuse box for replaceable cartridge fuses as defined in claim 3 and including a spring positioned between the bush and the nut for maintaining resilient pressure engagement of the connector socket with the end of the conductor inserted in said socket in the event of loosening of the screw with respect to said nut.

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THOMAS DANIEL GUY WINTLE.

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