Sept. 3, 1940. R. A. MILLERMASTER 2,213,284

ELECTRIC FUSE CLAMP

Original Filed July 6, 1937

Fig. 1

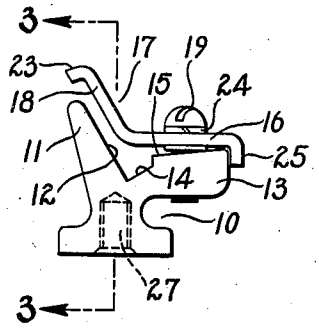


Fig. 2

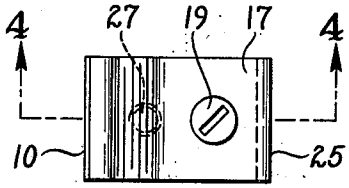


Fig. 3

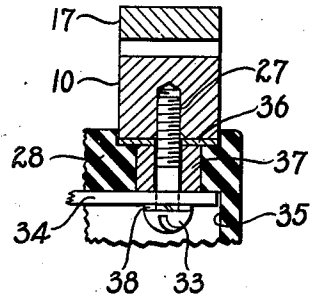


Fig. 4

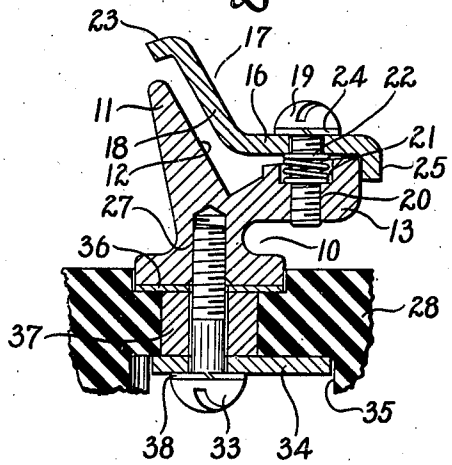
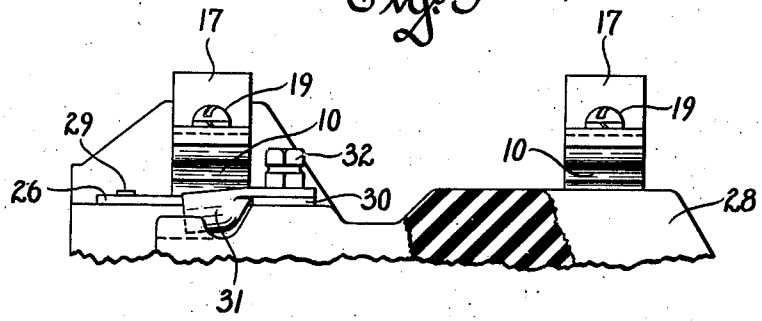


Fig. 5



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ELECTRIC FUSE CLAMP

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Original application July 6, 1937, Serial No. 152,029. Divided and this application August 4, 1939, Serial No. 288,357

7 Claims. (Cl. 200—134)

This invention relates to improvements in electric fuse clamps.

A primary object of the invention is to provide an improved fuse clamp of rugged and durable construction.

Another object is to provide a simplified form of clamp for electric fuses having blade type ends or terminals.

Another object is to provide novel means for effecting the desired degree of contact pressure of a blade type terminal against a contact surface, while avoiding a frictional wedging action of the clamping means against the blade whereby release of the clamping pressure at will is facilitated.

Another and more specific object is to provide such a device wherein the blade terminal support may be formed in a simple manner from copper or other good electrical conducting material while the means for applying clamping pressure may be formed of steel or other material of relatively great strength and resiliency.

Other objects and advantages of the invention will hereinafter appear.

This application is a division of my copending application Serial No. 152,029, filed July 6, 1937, now Patent No. 2,178,600 granted November 7, 1939 for improvements in Safety switches.

The accompanying drawing illustrates an embodiment of the invention which will now be described, it being understood that the embodiment illustrated is susceptible of modification in respect of certain structural details thereof without departing from the scope of the appended claims.

In the drawing,

Figure 1 is an end view of a blade type fuse clamp constructed in accordance with my invention.

Fig. 2 is a top plan view thereof.

Fig. 3 is a section, on the line 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 2, illustrating one manner of mounting the fuse clamp with respect to an insulating switch base or the like, and

Fig. 5 is a fragmentary view in elevation, showing a pair of the fuse clamps in assembled position upon the upper surface of one form of safety switch.

The fuse clamping device herein disclosed comprises a block 10 of copper or other metal of good electrical conductivity, which block consists of a length or section sawed or cut from an extruded rod or bar having the cross sectional form best illustrated in Fig. 4. Extending upwardly at the desired angle from the base portion of block 10 is a tapered arm or flange 11 providing the flat surface 12 to be engaged by the blade terminal (not shown) of a cartridge type fuse. Extending laterally from the base of block 10 is a second arm or flange 13 which provides a flat surface 14 against which the lower edge of the terminal blade is adapted to seat, and a flat surface 15 against which the flat portion 16 of a punched and stamped sheet metal clamping member 17 may seat. Member 17 is preferably formed of steel, and the same is provided with a flat portion 18 arranged substantially parallel to the aforementioned surface 12 and movable to and from the latter to clamp and release an interposed blade terminal.

The means for effecting such clamping movement of portion 18 preferably comprises a screw 19 formed of steel or other high strength metal. The shank of screw 19 freely penetrates an opening provided in portion 16 and takes into a tapped opening 20 (Fig. 4) provided in arm 13, and the flat lower surface of the head of said screw overlies and engages the upper surface of the flat portion 16 of clamping member 17.

Surrounding opening 20 at the upper end thereof is a recess 21 (Fig. 4) which is adapted to completely accommodate a coiled compression spring 22 upon full tightening of screw 19. The arrangement is such that upon loosening of screw 19 spring 22 acts to move or tilt member 17 upwardly whereby portion 18 is moved away from surface 12 to release or permit removal of the blade terminal.

Portion 18 is preferably provided at its upper end with a lug or flange 23 which overlies the upper edge of an inserted blade terminal after tightening of screw 19 to positively prevent upward displacement or removal of the blade terminal. The arrangement is such, however, that lug 23 offers substantially no interference to insertion or removal of the terminal blade when screw 19 is withdrawn or loosened to the desired degree.

A spring lock washer 24 is preferably interposed beneath the head of screw 19 to prevent accidental loosening of the latter. Portion 16 of member 17 is preferably provided with a downwardly extending flange 25 which cooperates with the outer edge of arm 13 to prevent rotary displacement of member 17 relatively to block 10 during tightening or loosening of screw 19.

The two fuse blade clamping devices 10 employed for use with the respective opposite terminal blades of a fuse are of like form and have been given like numerals of reference (see Fig. 5).

The left hand block 10 in Fig. 5 is shown attached to a metal plate 26, as by means of a screw (not shown) which takes into the tapped recess 27 in the lower flat face of said block. Plate 26 may be secured at one end to the upper surface of an insulating base 28 as by means of a screw 29; and said plate has an extension 30 to which a known form of solder-type wiring terminal element 31 may be attached, as by means of a second securing screw (not shown) having a cooperating nut 32.

The right hand block 10 in Fig. 5, as shown in section in Figs. 3 and 4, is attached to insulating base 28 as by means of a screw 33 the shank of which takes into tapped recess 27 provided in the lower surface of said block, and the head of which screw 33 is adapted for clamping engagement with a metal member 34 (forming part of a switch contactor or the like) which is located within a recess 35 in the lower surface of base 28. Positioned beneath said last mentioned block 10 is a conducting metal plate or washer 36, and interposed between member 34 and washer 36 is a tubular member 37, preferably formed of copper. A lock washer 38 is preferably interposed between member 34 and the head of screw 33 to prevent accidental loosening of the latter.

The bottom portion of each block 10 is preferably of rectangular contour, and the same fit into correspondingly shaped recesses in the upper surface of base 28, whereby turning of said blocks is prevented.

Safety switches having my improved fuse clamps applied thereto are shown in my aforementioned application Serial No. 152,029, now Patent No. 2,178,600, to which reference may be had for illustration of various alternative mounting arrangements thereof.

What I claim as new and desire to secure by Letters Patent is:

1. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a solid block of copper having a base portion of substantially rectangular contour, said base portion having a downwardly opening tapped recess formed therein to provide for rigid attachment thereof to a suitable support, said base portion having an integral arm of upwardly tapered form in transverse cross section, said arm having a contact surface angled outwardly with respect to a plane vertical to said base portion, said base portion having a second integral arm extending laterally therefrom in a direction away from said contact surface aforementioned, said last mentioned arm having a portion of its upper surface arranged in a substantially horizontal plane, said last mentioned arm having a tapped opening penetrating the same at substantially right angles to said upper surface thereof, a sheet steel member having a flat portion adapted to overlie the upper surface of said last mentioned arm and a second flat portion arranged in a plane substantially parallel to said contact surface aforementioned, and a screw the shank of which cooperatively engages said tapped opening and the head of which engages the first mentioned flat portion of said steel member to draw the second mentioned flat portion of the latter into clamping engagement with a knife blade fuse terminal when interposed between the same and said contact surface.

2. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a block consisting of a predetermined length of an extruded copper bar of somewhat anvil-form in transverse cross section, but with the beak or horn extending upwardly at an angle to the horizontal, whereby an upwardly angled contact surface is provided, a portion of said block providing a substantially horizontal surface, a sheet steel clamping member having a flat portion superimposed upon said horizontal surface and a second flat portion extending upwardly in a plane substantially parallel to said contact surface and normally spaced from the latter a distance less than the thickness of a fuse blade to be associated therewith, a screw the head of which overlies said first mentioned flat portion of the steel member and the shank of which freely penetrates said flat portion and takes into a tapped opening communicating with said horizontal surface, said tapped opening having an enlargement at its upper end to provide a shoulder, a coiled compression spring interposed between said shoulder and said first mentioned flat portion to provide for movement of said second mentioned flat portion away from said contact surface upon partial withdrawal of said screw, and said block being formed at its lower end to provide for rigid attachment thereof to a suitable support.

3. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a block consisting of a predetermined length of an extruded copper bar of somewhat anvil-form in transverse cross section, but with the beak or horn extending upwardly at an angle to the horizontal, whereby an upwardly angled contact surface is provided, a portion of said block providing a substantially horizontal surface, a sheet steel clamping member having a flat portion superimposed upon said horizontal surface and a second flat portion extending upwardly in a plane substantially parallel to said contact surface and normally spaced from the latter a distance less than the thickness of a fuse blade to be associated therewith, a screw the head of which overlies said first mentioned flat portion of the steel member and the shank of which freely penetrates said flat portion and takes into a tapped opening communicating with said horizontal surface, said tapped opening having an enlargement at its upper end to provide a shoulder, a coiled compression spring interposed between said shoulder and said first mentioned flat portion to provide for movement of said second mentioned flat portion away from said contact surface upon partial withdrawal of said screw, and said first mentioned flat portion having an integral downwardly extending flange engageable with an outer edge portion of said block, whereby rotary displacement of said steel member relatively to said block is prevented.

4. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a block consisting of a predetermined length of an extruded copper bar of somewhat anvil-form in transverse cross section, but with the beak or horn extending upwardly at an angle to the horizontal, whereby an upwardly angled contact surface is provided, a portion of said block providing an approximately horizontal surface, a resilient sheet metal clamping member having a flat portion superimposed upon said horizontal surface and a second flat portion extending upwardly in a plane substantially parallel to said contact surface and normally spaced from the latter a distance less than the thickness of a fuse blade to be associated therewith, a screw

the head of which overlies said first mentioned flat portion of the sheet metal member and the shank of which freely penetrates said flat portion and takes into a tapped opening communicating with said horizontal surface, said tapped opening having an enlargement at its upper end to provide a shoulder, a coiled compression spring interposed between said shoulder and said first mentioned flat portion to provide for movement of said second mentioned flat portion away from said contact surface upon partial withdrawal of said screw, said first mentioned flat portion having an integral downwardly extending flange engageable with an outer edge portion of said block, whereby rotary displacement of said sheet metal member relatively to said block is prevented, and said second mentioned flat portion having an integral flange normally overlying the space between said flat portion and said contact surface, to thereby positively prevent upward removal of a fuse blade pending a predetermined degree of withdrawal of said screw.

5. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a relatively heavy block of copper extruded to provide the desired shape thereof in transverse cross section and cut transversely to provide the desired length, said block having a tapped recess opening to the flat lower surface thereof to accommodate a threaded securing element of suitable form, said block having a portion providing a substantially horizontal upper surface and another portion providing an upwardly angled contact surface, with a flat-bottomed groove formed therebetween, the first mentioned portion of said block having a recess of predetermined depth formed therein and opening to said horizontal surface thereof, said portion also having a tapped opening alined with said recess, a sheet steel clamping member having a flat portion overlying said horizontal surface and having a downwardly extending flange engageable with the outer edge of said block to prevent rotary displacement of said clamping member, a coiled compression spring interposed between said flat portion and the bottom wall of said recess, said recess being adapted to completely accommodate said spring when compressed to a predetermined degree, a screw the shank of which freely penetrates said flat portion and said spring and takes into said tapped opening and the head of which overlies said flat portion to move the latter downwardly against the bias of said spring upon tightening of said screw, a lock washer interposed between said flat portion and the head of said screw to prevent accidental loosening of the latter, said clamping member having a second flat portion normally extending in a plane substantially parallel to said upwardly angled contact surface and movable toward and away from the latter to clamp and release a fuse terminal blade when positioned therebetween and said last mentioned flat portion having an integral flange to overlie the upper edge of a fuse terminal blade when inserted, to positively prevent upward removal of the latter pending a predetermined degree of withdrawal of said screw.

6. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a block consisting of a predetermined length of an extruded metal bar of good electrical conductivity of somewhat anvil-form in transverse cross section, but with the beak or horn extending upwardly at an angle to the horizontal whereby an upwardly angled contact surface is provided, a portion of said block providing an approximately horizontal surface, a resilient sheet metal clamping member having a flat portion superimposed upon said horizontal surface and a second flat portion extending upwardly in a plane substantially parallel to said contact surface, a screw the head of which overlies said first mentioned flat portion of the sheet metal member and the shank of which penetrates said flat portion and takes into a tapped opening communicating with said horizontal surface, a spring interposed between said horizontal surface and said first mentioned flat portion to provide for movement of said second mentioned flat portion away from said contact surface upon partial withdrawal of said screw, and said first mentioned flat portion having an integral downwardly extending flange engageable with an outer edge portion of said block, whereby rotary displacement of said sheet metal member relatively to said block is prevented.

7. In an adjustable clamp for cartridge fuses having blade type terminals, in combination, a block consisting of a predetermined length of an extruded metal bar of good electrical conductivity of somewhat anvil-form in transverse cross section, but with the beak or horn extending upwardly at an angle to the horizontal whereby an upwardly angled contact surface is provided, a portion of said block providing an approximately horizontal surface, a resilient sheet metal clamping member having a flat portion superimposed upon said horizontal surface and a second flat portion extending upwardly in a plane substantially parallel to said contact surface, a screw the head of which overlies said first mentioned flat portion of the sheet metal member and the shank of which penetrates said flat portion and takes into a tapped opening, communicating with said horizontal surface, a spring interposed between said horizontal surface and said first mentioned flat portion to provide for movement of said second mentioned flat portion away from said contact surface upon partial withdrawal of said screw, said first mentioned flat portion having an integral downwardly extending flange engageable with an outer edge portion of said block, whereby rotary displacement of said sheet metal member relatively to said block is prevented, and said second mentioned flat portion having an integral flange normally overlying the space between said flat portion and said contact surface, to thereby positively prevent upward displacement or removal of a fuse blade, pending a predetermined degree of withdrawal of said screw.

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