Nov. 13, 1945. T. B. TAYLOR 2,388,883

FUSE TERMINAL CLIP

Filed Nov. 15, 1943

Fig. 1

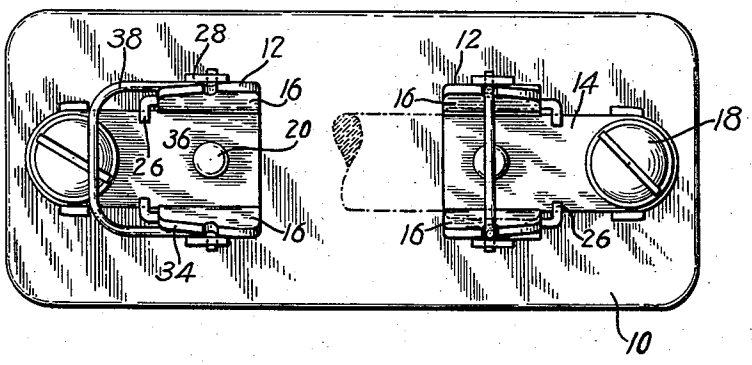


Fig. 2

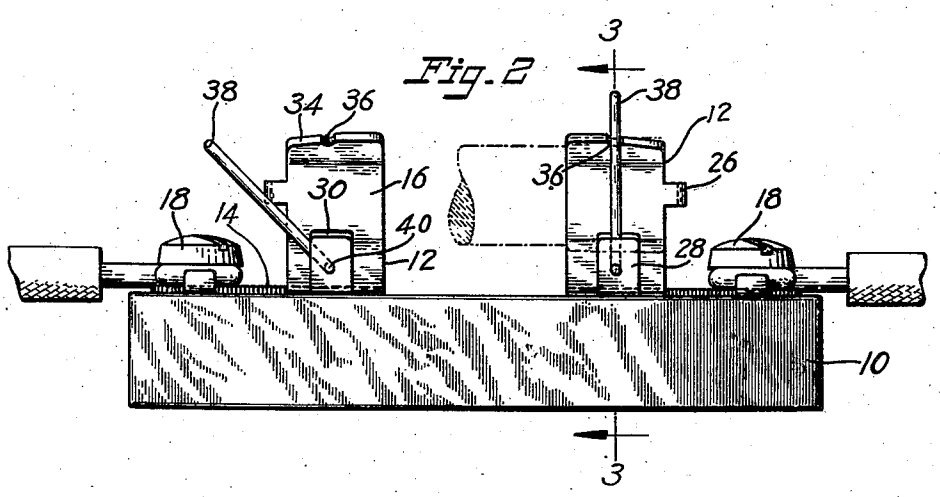


Fig. 3

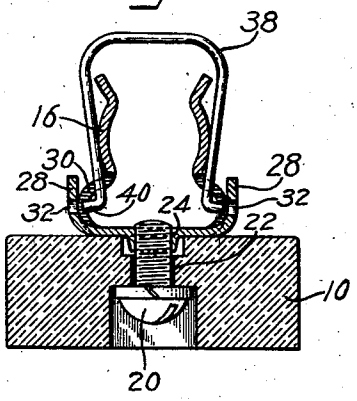
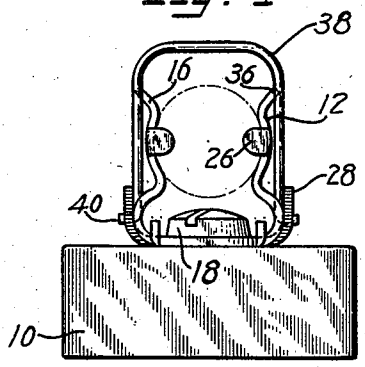


Fig. 4



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FUSE TERMINAL CLIP

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14 Claims. (Cl. 200—134)

This invention relates to improvements in clips for holding and clamping fuse terminals in electrical engagement therewith.

It is an object of the invention to provide a fuse terminal clip which may be formed of thinner material than conventionally used but provide means to nevertheless effect firm electrical engagement between each clip and the fuse terminal held thereby.

It is another object of the invention to provide means to effect said firm electrical engagement between each clip and fuse terminal while requiring only manual manipulation and involving the use of no tools to either insert or remove a fuse in or from said clips.

In addition to the last mentioned object, it is a still further object to provide clamping means to urge portions of the clips into firm electrical engagement with the fuse terminals while requiring only a very small amount of manual force to manipulate said clamping means.

It is a still further object of the invention to provide means for releasably locking the above-mentioned clamping means in position to firmly clamp said clips in electrical engagement with the respective fuse terminals mounted therein.

The details of the invention and said foregoing objects, as well as other objects of the invention, are described and illustrated in the following specification and said accompanying drawing forming a part thereof.

The accompanying drawing shows the embodiment of the invention which is deemed preferable, but it will be understood that the drawing is intended for illustrative purposes only and is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Fig. 1 is a top plan view of a complete fuse block showing a pair of fuse clips embodying the present invention, one of said clips being in fuse clamping position while the other clip is open and in position to receive a fuse terminal.

Fig. 2 is a side elevation of the fuse block shown in Fig. 1.

Fig. 3 is a sectional end view taken on the line 3—3 of Fig. 2 and showing the fuse clip in the position to which the arms of the clip are moved for purposes of assembling the locking bail with the clip.

Fig. 4 is a right end view of Fig. 2 and showing the fuse clip in clamping position with a fuse terminal mounted therein.

The instant invention pertains to fuse clips which are basically of the conventional U-shaped type and formed of resilient sheet metal. In the prepared embodiment of the invention illustrated in the drawing, the arms of the U-shaped clip member are respectively bowed outward to form a substantially cylindrical seat to receive a cylindrical type terminal of a fuse. It will be understood that the invention may also be applied to other types of fuse clips.

Conventional fuse clips are made of stock sufficiently heavy to provide firm electrical engagement between said aforementioned bowed arms and the fuse terminal received therebetween. However, in order to insure that there will be firm electrical engagement between said terminal and arms, the natural resiliency of the heavy stock is so great that considerable force is required to insert a fuse terminal in or remove the same from said clip, whereby said operations are only performed with great difficulty.

The instant invention was developed to provide a fuse clip which could be readily and easily operated without the use of tools but nevertheless provide at least equally as firm electrical engagement between the arms of the clip and a fuse terminal as the conventional heavy type clip referred to above. This is achieved by forming the clip comprising the present invention of considerably lighter and therefore weaker stock than that of the conventional clip and providing clamping means to hold the arms of said weaker clip in firm clamping and electrical engagement with opposite sides of a fuse terminal, the clamping means comprising a bail pivotally mounted on the clip and engageable with relatively diverging cams respectively provided on the upper end of each arm. Notches are also provided in the upper end of each arm to hold said locking bail in the locked position to which it is ultimately moved from open position.

Referring to the drawing, an insulating block 10 is provided to support a pair of spaced fuse clips 12 embodying the details comprising the present invention. The clips 12 are preferably but not restrictively of one piece construction and comprise a base 14 from which a pair of resilient outward bowed arms 16 extend upward. The upper ends of said arms are also flared outward relative to each other to provide means to facilitate the insertion of a fuse terminal between said arms.

Each base 14 is provided with a conventional terminal screw 18 preferably threaded into a threaded opening provided in said base. Each of the clips 12 are also preferably secured to

the block 10 by a screw 20 which passes through a suitable opening 22 formed in the block and provided in its interior with an annular shoulder, said screw cooperating with said shoulder and a threaded opening 24 provided in the base of each U-shaped clip 12. This construction is shown specifically in Fig. 3.

Each arm 16 of the clip is provided with an inward projecting positioning lug 26 to provide means to properly locate a fuse lengthwise with respect to the fuse block 10.

The construction thus far described is similar to that in a conventional fuse block except that, as stated above, the clips 12 are preferably made of considerably lighter or thinner material than the conventional fuse clips. The spaced legs of said clips are respectively held in firm electrical engagement with the terminals of a fuse by construction hereinafter described.

Each arm 16 is provided with an ear 28 which is preferably integral at one end with but struck out from said arm and results in an opening 30 being formed in each arm, said opening being for purposes to be described. Said ears 28 are each provided with a bearing aperture 32, said bearings in opposed ears being axially aligned. The ears 28 also extend upward in a substantially vertical direction and are spaced outward a substantially fixed distance from the outward bowed sides of the arm with which they are integral.

The upper end of each arm is provided with an angularly disposed cam surface 34, said surfaces on the opposed arms being relatively divergent from one edge of each arm toward the center thereof. Each cam surface 34 terminates in a concave notch 36 for purposes to be described.

A substantially U-shaped locking bail 38 is provided on its free ends with outward directed oppositely extending pintles 40 which are adapted to be respectively pivotally received in the axially aligned bearings 32 provided in ears 28 as shown in Figs. 1, 2 and 4. The pintles 40 are of such length that, when the arms 16 are moved toward each other as shown in Fig. 3, the space between the ears 28 and the outward bowed sides of the temporarily moved arms will permit passage of the pintled ends of clamping bail 38 whereby the pintles may be respectively moved through openings 30 and be disposed in alignment with the bearings 32. When the pintles and bearings are aligned thusly, the arms 16 are released for automatic movement to their normal positions and will thereby force the pintles respectively into the bearings 32. After the arms 16 assume their normal positions shown in Fig. 1, the space between ears 28 and the outward bowed sides of arms 16 is less than the length of the pintles 40, whereby accidental separation of the locking bail from the clip is not possible.

The locking bails 38 are pivotally movable in opposite directions between a substantially vertical or clamping position and a position inclined to the vertical approximately, but not restrictively, 45° as shown in the left hand clip of Fig. 2. When the bail is in the latter position, the clip is unobstructed to receive a terminal of a fuse. After the terminals of a fuse have been respectively inserted in the fuse clips, the bails 38 are moved from the position shown at the left in Fig. 2 to the position shown at the right in Fig. 2. While so moving, portions of the legs of the bail engage the opposite cam surfaces 34 on the upper ends of the arms 16 and continued movement of the bail urges or moves said arms 16 toward each other and into firm clamping and electrical engagement with a fuse terminal received therebetween. At the conclusion of said clamping movement of the bail, said portions of the legs thereof will respectively snap into the opposed notches 36 provided in said upper ends of the arms 16 and thereby releasably lock said clamping bail in its clamping position. The bails 38 are preferably but not restrictively formed of resilient spring-like material, whereby the reception of said portions of the bail within the notches 36 will be readily effected without materially decreasing the clamping function of the bail. The natural resiliency of the arms 16 will also contribute to this function. The dimensions and angularity of the upper ends of arms 16 and the surfaces 34, as well as the spacing between the legs of bail 38 and said arms 16, are such that the legs of the bail 38 will engage the cam surfaces 34 and move the arms 16 together sufficiently to effect firm clamping and electrical engagement with the fuse terminal received therein while the legs of the bail are moving from the outer ends of said cam surfaces 34 to the notches 36.

The concavity of the notches 36 is such that the moving of the opposite legs of the bail 38 thereinto, as well as the removal of said legs therefrom, requires only a very small amount of manual force. Thus, while the clips 12 may be made of considerably lighter or thinner material than the conventional clip of similar configuration, it will be seen that the clips 12 nevertheless will be urged into at least equally as firm and possibly even firmer clamping engagement with fuse terminals than is afforded by said conventional clips. Also, after a fuse has been firmly clamped within a pair of the clips 12, said clips are automatically held locked in clamping engagement by the reception of the legs of bail 38 within the notches 36.

The removal of a fuse from said fuse clips is readily effected, with the use of much smaller force than is usually required to remove a fuse from the conventional U-shaped fuse clip, by moving the clamping bails from the position shown at the right in Fig. 2 to that shown at the left in said figure. The manual removal of the fuse from between the arms of the lighter clips 12 also requires far less force than is required to remove a similar fuse from similar conventional fuse clips.

When the bails 38 are moved toward their open position shown at the left in Fig. 2, their movement in said direction will be limited upon engagement of the legs of the bail with the portions of the legs 16 disposed on one side of openings 30.

It will further be observed that the clamping action of the bails 38 with respect to the clips 12 is highly efficient since, while the moving together of the arms 16 by the bail 30 will tend to spread the legs of said bail, the simple expedient of only the apertured ears 28 will most effectively prevent said spreading of the legs and thus retain said legs in proper position to enable them to effect the desired clamping between the arms 16 and the fuse terminal received therebetween.

In the foregoing, terms used to describe direction and location such as inward, upward, upper, lower, and the like, are to be considered when the base of the fuse block is disposed horizontally and the fuse terminal clips extend upward therefrom. This position is that illustrated in Fig. 2 when the sheet is held vertically. Said terms are to be considered in the same relative sense regard-

less of the position in which the fuse block may be ultimately disposed.

It will thus be seen that the present fuse clip is of such construction that it is not only efficient in operation and requires considerably smaller force to operate than similar conventional clips, but the clip may also be quickly assembled or fabricated by the simple expedient of moving the arms 16 toward each other a short distance and inserting the pintled ends of the bail through the openings 30 and into alignment with the bearings 32, following which the arms 16 are released to automatically position the pintles within the bearings and otherwise properly position the bail 38 for operation.

While the invention has been illustrated and described in its preferred embodiment and has included certain details, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways, falling within the scope of the invention as claimed.

What I claim is:

1. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, apertured means respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of said clamping bail adjacent said pintles disposed in the spaces between said arms and apertured means, said bail being pivotally movable between two extreme positions with respect to said base and having means which in one of said positions of the bail respectively engage said arms to urge them toward each other into firm clamping engagement with a fuse terminal when disposed therebetween and in the other position of the bail release said arms for effecting removal of said fuse terminal from between said arms.

2. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, apertured means respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of said clamping bail adjacent said pintles disposed in the spaces between said arms and apertured means, said bail being pivotally movable between two extreme positions with respect to said base and having means which in one of said positions of the bail respectively engage said arms to urge them toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and in the other position of the bail release said arms for effecting removal of said fuse terminal from between said arms, and means to releasably lock said bail in said one position thereof.

3. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, upward extending apertured ears respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of the bail adjacent said pintles disposed between said arms and ears, said bail being movable between a substantially vertical position and another position inclined from the vertical and in one of said positions engage said arms to urge them toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and in the other position of the bail disengage said arms to permit removal of said fuse terminal from between said arms.

4. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, an upward extending apertured ear integral with and spaced outward of each arm to provide a pair of bearings at opposite sides of said clamp, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of the bail adjacent said pintles disposed between said arms and ears, said bail being movable between a substantially vertical position and another position inclined from the vertical and in one of said positions engage the upper ends of said arms respectively with its legs to urge them toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and in said other position of the bail disengage said arms to permit removal of said fuse terminal from between said arms.

5. In combination in a fuse terminal clamp, a U-shaped clip comprising a base and pair of opposed resilient arms projecting upward therefrom to form a socket adapted to receive therebetween one terminal of a fuse, an upward extending apertured ear struck out from but integral at one end with and spaced outward of the lower portion of each arm to provide a pair of bearings at opposite sides of said clip, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of the bail adjacent said pintles disposed between said arms and ears, said bail being movable between a substantially vertical position and another position inclined from the vertical and in one of said positions engage the upper ends of said arms respectively with its legs to urge them toward each other and in firm clamping engagement with a fuse terminal when disposed therebetween and in said other position of the bail disengage said arms to permit removal of said fuse terminal from between said arms.

6. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, a cam carried by each arm, the cam surfaces thereof being relatively divergent, apertured means respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of said clamping bail adjacent said pintles disposed in the spaces between said

arms and apertured means, said bail being pivotally movable between two extreme positions with respect to said base and slidably engageable with said cams in moving from one of said positions to the other to urge said arms toward each other into firm clamping engagement with a fuse terminal when disposed therebetween and said bail releasing said arms after being oppositely moved whereby removal of said fuse terminal from between said arms may be effected.

7. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, a cam carried by each arm, the cam surfaces thereof being relatively divergent, apertured means respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings with portions of said clamping bail adjacent said pintles disposed in the spaces between said arms and apertured means, said bail being pivotally movable between two extreme positions with respect to said base and slidably engageable with said cams in moving from one of said positions to the other to urge said arms toward each other into firm clamping engagement with a fuse terminal when disposed therebetween and said bail releasing said arms after being oppositely moved whereby removal of said fuse terminal from between said arms may be effected, and means to releasably lock said bail in said cam engaging position thereof.

8. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, a cam carried by each arm, the cam surfaces thereof being relatively divergent and each having a notch adjacent one end, apertured means respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings, portions of the bail arms inwardly of said pintles being disposed in the spaces between said resilient arms and said apertured means, said bail being pivotally movable between two extreme positions with respect to said base and slidably engageable with said cams in moving from one of said positions to the other in which the legs of the bail are respectively received in said notches to releasably lock said bail in said position wherein said legs urge said arms toward each other into firm clamping engagement with a fuse terminal when disposed therebetween and said legs releasing said arms when said bail is oppositely moved whereby removal of said fuse terminal from between said arms may be effected.

9. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, a cam carried by each arm, the cam surfaces thereof being relatively divergent, upward extending apertured ears respectively associated with each arm in outwardly spaced relation thereto and providing a pair of opposed bearings, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings, portions of the bail arms inwardly of said pintles being disposed in the spaces between said ears and said resilient arms, said bail being movable between a position inclined to the vertical and a substantially vertical position and engaging said cams when so moved to urge said arms toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and said bail releasing said arms after being oppositely moved whereby removal of said fuse terminal from between said arms may be effected.

10. In combination in a fuse terminal clamp, a base, a pair of opposed resilient arms projecting upward from said base and comprising a socket adapted to receive therebetween one terminal of a fuse, a cam carried by the upper end of each arm, the cam surfaces thereof being relatively divergent, an upward extending apertured ear integral with and spaced outward of each arm to provide a pair of bearings at opposite sides of said clamp, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings, portions of the bail arms inwardly of said pintles being disposed in the spaces between said ears and said resilient arms, said bail being movable between a position inclined to the vertical and a substantially vertical position to respectively engage with its legs the cams on the upper ends of said arms and urge said arms toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and said bail releasing said arms when oppositely moved whereby removal of said fuse terminal from between said arms may be effected.

11. In combination in a fuse terminal clamp, a U-shaped clip comprising a base and pair of opposed resilient arms projecting upward therefrom to form a socket adapted to receive therebetween one terminal of a fuse, a cam carried by the upper end of each arm, the cam surfaces thereof being relatively divergent, an upward extending apertured ear struck out from but integral with and spaced outward of the lower portion of each arm to provide a pair of bearings at opposite sides of said clip, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings, portions of the bail arms inwardly of said pintles being disposed in the spaces between said ears and said resilient arms, said bail being movable between a position inclined to the vertical and a substantially vertical position to respectively engage with its legs the cams on the upper ends of said arms and urge said arms toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and said bail releasing said arms after being oppositely moved whereby removal of said fuse terminal from between said arms may be effected.

12. In combination in a fuse terminal clamp, a U-shaped clip comprising a base and pair of opposed resilient arms projecting upward therefrom to form a socket adapted to receive therebetween one terminal of a fuse, the ends of said arms being relatively flared outward, a cam carried by the upper end of each arm, the cam surfaces thereof being relatively divergent and provided with a notch adjacent one end, an upward extending apertured ear struck out from but integral with and spaced outward of the lower

portion of each arm to provide a pair of bearings at opposite sides of said clip, portions of the bail arms inwardly of said pintles being disposed in the spaces between said ears and said resilient arms, and a clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and respectively pivotally received in said opposed bearings, said bail being movable between a position inclined to the vertical and a substantially vertical position, whereby its legs respectively engage the cams on the upper ends of said arms to urge said arms toward each other and said legs are also ultimately respectively received in said notches to releasably lock said bail in position to hold said arms in firm clamping engagement with a fuse terminal when disposed therebetween, and said bail also releasing said arms when oppositely moved whereby removal of said fuse terminal from between said arms may be effected.

13. In combination in a fuse terminal clamp, a U-shaped resilient clip comprising a base and a pair of opposed resilient arms respectively bowed outward and projecting upward from said base to form a socket adapted to receive one terminal of a fuse, an upward extending apertured ear integral with and spaced outward of each bowed arm a substantially fixed distance to provide a pair of bearings at opposite sides of said clip, and a U-shaped clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and adapted to be respectively pivotally disposed within said bearings after said legs of the clip have been first moved inward sufficiently to increase said fixed distance between each said ear and bowed arm to at least equal the length of each pintle, whereby said pintles may be respectively moved between said ears and bowed arms and be respectively pivotally received in said opposed bearings and following which said arms may resume their normal positions, and said bail being movable in opposite directions between a substantially vertical position and another position inclined from the vertical and in one of said positions engage the upper ends of said arms respectively with its legs to urge them toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and in said other position of the bail releasing said arms to permit removal of said fuse terminal from between said arms.

14. In combination in a fuse terminal clamp, a U-shaped resilient clip comprising a base and a pair of opposed resilient arms respectively bowed outward and projecting upward from said base to form a socket adapted to receive one terminal of a fuse, an upward extending apertured ear struck out from and integral at one end with each bowed arm, said ears being respectively spaced outward of said arms a substantially fixed distance to provide a pair of bearings at opposite sides of said clip, and a U-shaped clamping bail provided on its free ends with pintles respectively directed outward in opposite directions and adapted to be respectively pivotally disposed within said bearings after said legs of the clip have been first moved inward sufficiently to increase said fixed distance between each said ear and bowed arm to at least equal the length of each pintle, whereby said pintles may be respectively moved between said ears and bowed arms and be respectively pivotally received in said opposed bearings and following which said arms may resume their normal positions, and said bail being movable in opposite directions between a substantially vertical position and another position inclined from the vertical and in one of said positions engaging the upper ends of said arms respectively with its legs to urge them toward each other and into firm clamping engagement with a fuse terminal when disposed therebetween and in said other position of the bail releasing said arms to permit removal of said fuse terminal from between said arms.

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