

April 10, 1928.

1,665,446

N. J. CONRAD

FUSE CLIP

Filed May 25, 1925

Fig. 1.

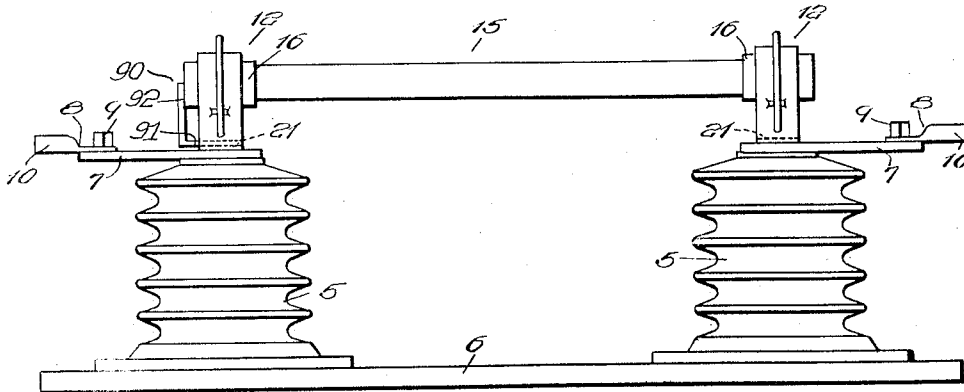


Fig. 2.

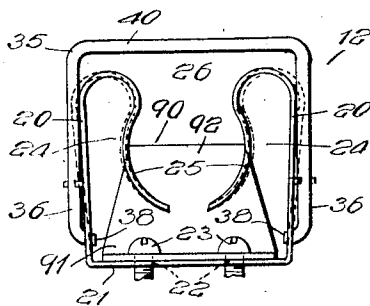


Fig. 3.

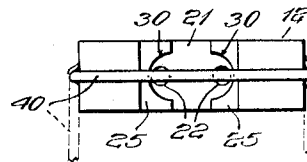


Fig. 5.

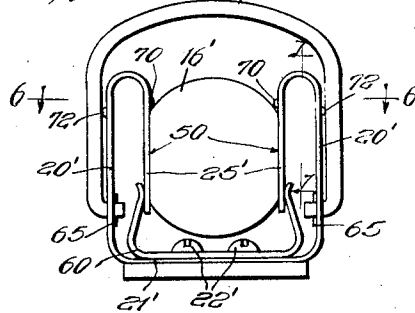


Fig. 4.

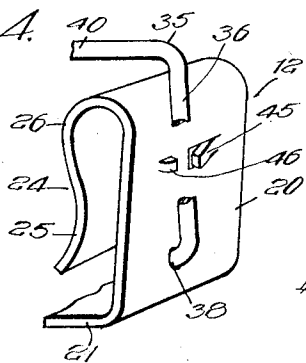


Fig. 7.

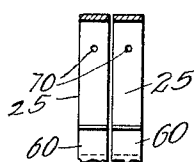
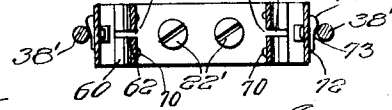


Fig. 6.



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UNITED STATES PATENT OFFICE.

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FUSE CLIP.

Application filed May 25, 1925. Serial No. 32,741.

My invention relates to improvements in fuse clips and is a continuation in part of my prior application, Serial No. 631,263, filed April 11, 1923.

To illustrate the invention I have shown and described the same in connection with a fuse clip. However, it is to be understood that the invention is not limited to such a use, but may be employed wherever found desirable.

The objects of the instant invention are to provide for holding the fuse, or other device, securely in place in the clip; also to provide for preventing accidental displacement of the fuse, or other device, from the clip; for tensioning the contact jaws of the clip, and for pressing them firmly against the terminals of the fuse, or other device, to increase the intimacy of the electrical contact and assure maximum, firm, and positive contact at all times. I further provide a clip which will permit tensioning the jaws and pressing them firmly against the terminals of the fuse, or other device, and a clip which will accommodate itself to slight variations and inaccuracies of the fuse terminal or ferrule, and still further a generally improved and simplified construction that may be economically produced, conveniently mounted, and into and from which the fuse, or other device, may be conveniently inserted and withdrawn.

To further acquaint those skilled in the art with the nature of my invention and the manner of practising and carrying out the same, I shall now describe in connection with the accompanying drawings certain embodiments of the invention.

In the drawings:

Figure 1 is a side elevational view of a fuse mounting embodying my invention;

Fig. 2 is an enlarged end view of one of the fuse clips;

Fig. 3 is a top plan view of the clip;

Fig. 4 is an enlarged fragmentary perspective view of the clip, taken from one side thereof;

Fig. 5 is an end view of another form of clip embodying my invention;

Fig. 6 is a horizontal section taken on the line 6—6 of Fig. 5; and

Fig. 7 is a vertical section taken on the line 7—7 of Fig. 5.

The mounting shown in the drawings comprises a pair of post or supporting insulators 5, suitably mounted at their lower ends upon a supporting base 6. Terminal bars 7, of suitable conducting material, are mounted upon the upper ends of the insulators 5, and terminal members 8 are secured, as by means of bolts 9, upon the extending ends of the bars 7 and in electrical contact therewith. The terminal members 8 may have sockets 10 in which the line conductors (not shown) may be mechanically secured and in proper electrical contact with the socketed terminals.

The fuse clips 12 are mounted upon the terminal bars 7 with their bases in proper contact with the bars 7 for electrical connection with the line conductors there-through.

The fuse shown and with which the present clips and mounting are especially adapted for use, although they may be employed wherever found desirable, is designated at 15. It is of the typical "Schweitzer & Conrad" type, such as is disclosed, for example, in Schweitzer and Conrad Patent No. 1,135,548, granted April 13, 1915, and comprises a tube or sleeve having terminal ferrules 16 at opposite ends with a normal electrical connection between the ferrules, means for opening the fuse, a fusible element normally restraining same, and a body of arc extinguishing liquid of high dielectric strength enclosing the mechanism within the tube or sleeve for quenching the arc.

Each of the fuse or spring contact clips 12 is formed of a metallic strip having a springiness of the desired order, and the opposite ends of this strip are turned up to form legs 20 substantially normal to the intermediate base 21 provided thereby. The base 21 has a pair of apertures 22 through which screws 23 may be inserted for fastening the base of the clip to the terminal bar 7 and in good electrical contact therewith.

The outer portions of the legs 20 are looped or folded back at 24 to provide contact jaws of proper configuration to receive the terminals 16 and to conform intimately to and make a good contact with said terminals. In the embodiment shown in Figs. 1 to 4, the terminals 16 are cylindrical in cross-section and the jaw portions 25

in which the terminals are held are given a somewhat similar curvature, but the spacing of said jaw portions 25, when the fuse is not in place and the bail is released, is preferably somewhat less than the diameter of the ferrule 16, so that they will be spread upon insertion of the fuse and will be tensioned by the inherent springiness of the clip, because of its material and formation, into firm contact with the ferrule. Above the ferrule receiving portion proper, as they are turned into or from the legs 20, the jaws 24 are preferably re-curved at 26 to give the jaws a restricted mouth or throat through which the ferrule is sprung in inserting the fuse into the clip. As the terminal of the fuse reaches the jaw portions 25 upon insertion, the re-curved portions or restricted mouth or throat 26 spring back or contract and provide a yieldable restriction against removal of the fuse from the clip.

The lower free ends of the jaw portions 25 may be notched or recessed at 30 to permit convenient insertion of a screw driver, or other suitable tool, between the jaws and into engagement with the screws 23 for the purpose of mounting and demounting the clip.

For the purpose of increasing the intimacy of the contact with the fuse terminal and increasing the tension in the looped spring jaws of the clip, as well as increasing the amount and firmness of contact, and preventing accidental or unintentional displacement of the fuse from the clip, I provide the same with a bail 35. The particular bail, illustrated in Figs. 1 to 4, comprises a relatively rigid wire of suitable gauge and of generally U-shaped formation. The free ends of the legs 36 of the bail 35 are turned in at 38 into apertures in the legs 20 of the clip, and preferably fit sufficiently loose in said apertures that the bail may be swung conveniently about the ends 38, which are thus pivoted to the clip. The bail 35 is adapted to be swung about its swingably mounted ends up into position embracing the clip, or out laterally, as shown in dotted lines in Fig. 3, to free the jaws of the clip. The sides of the clip or legs 20 are preferably flared outwardly and when freed normally assume the outward flared position shown in dotted lines in Fig. 2. Conversely, of course, the legs of the bail may be flared in the opposite direction, or the legs of the bail and the legs of the clip may both be flared reversely or in opposite directions. By flaring the legs of the clip, flaring of the bail is unnecessary. The swingable mounting of the bail is near the bottom of the legs 20 where the distance between said legs is in the normal freed condition thereof, less than at the upper looped ends. This permits swinging the bail up into clip embracing position and as the bail begins to take

upwardly about the legs 20 of the clip, it cams or presses, because of the flaring of the legs 20, the upper ends of said legs, and thereby the spring jaws inwardly contracting or clamping said jaws firmly upon the ferrule 16 to secure an increased intimacy and maximum, firm, and positive contact with the ferrule of the fuse.

The contraction of the jaws proper 25, being limited because of the ferrule 16 between them, any contraction imposed by the bail in excess of that permitted in the jaws proper 25 results in contracting each looped leg 20 to still further increase the pressure imposed by the springiness thereof.

When the bail is in clip embracing position the intermediate or base portion 40 thereof extends across the open end of the generally U-shaped clip and disposes a barrier in the path of removal of the fuse or other device from the clip, so that in addition to the firm clamping of the fuse in the clip, accidental displacement of the fuse is still further prevented. The bails thereby perform the double function of firmly clamping the spring jaws of the clip upon the ferrule of the fuse, and disposing a barrier in the path of removal of the fuse from the clip.

Lugs 45 struck up from the sides or legs 20 of the clip are adapted to limit the swing of the bail in one direction, lugs 46 being similarly struck up to a less degree, as shown in Fig. 4, and adapted for co-operation with the legs of the bails upon springing the same thereover to prevent accidental swinging of the bails in the opposite direction. The lugs 46 are formed to prevent accidental release of the bails from clip embracing position and, at the same time, they permit springing of the bails past them in one direction in setting the bails into clip embracing position, and in the opposite direction when it is desired to release the fuse. When it is desired to remove the fuse, the clips 16 are released by springing the bails 35 past the lugs 46 to the dotted line position shown fragmentarily in Fig. 3, whereupon the terminals of the fuse may be conveniently sprung from the jaws 25 through the restricted throats 26.

When the fuse is mounted vertically the lower clip, as for example shown at the lefthand side of Fig. 1, is preferably provided with an angle stop 90. This stop is preferably a conductor and its base 91 may be mounted under the heads of the screws 23, as shown in Fig. 2. Its free leg 92 extends out along or beneath the end of the adjacent terminal ferrule of the fuse and additionally prevents longitudinal slipping of the fuse from its mounting.

In the embodiment shown in Figs. 5, 6 and 7, the ferrule 16' is splayed on diametrically opposite sides to provide dia-

metrically opposite parallel contact faces 50. In this case the looped back jaw portions proper 25' are flat and substantially parallel for flat contact with the contact faces 50 of the fuse ferrule upon mounting the same therebetween. These flat jaws 25' preferably do, however, when freed, converge slightly towards their lower ends, so that when the upper portions of said jaw portions are clamped into engagement with the ferrule by the associated bail 35', parallel contact will be secured.

Although not limited to any particular use, the clip shown in Figs. 5, 6 and 7 is especially suitable for heavier service or duty. In such cases the parts are usually heavier and more rigid and to increase the springiness of the jaws 25', said jaws may be split lengthwise or vertically (Fig. 6) by cuts 56 extending between and parallel with the opposite edges of the jaws and up and at least partially through the upper looped portions where they turn into the legs 20'. A second generally U-shaped clip member 60 mounted upon the base 21' and in electrical contact therewith, as by means of the mounting screws 22', has its unstanding legs (Fig. 5) embracing the lower free ends of the jaws 25' and acting in opposition to any spreading thereof to firmly maintain the lower portions of said jaws in firm electrical contact with the ferrule 16'. The unstanding legs of the clip member 60 may be separated by cuts 62 extending between and parallel with the opposite edges of said legs. This provides in effect a laminated spring jaw for the fuse.

The bail 35' may be mounted as before, and its inturned ends 38' may be additionally held against displacement by means of cotter pins 65.

In the absence of the restricted throat of the previous embodiment, the jaws 25' of the present embodiment may have slight protuberances 70 punched therein and providing stops for preventing outward displacement of the ferrule of the fuse when it is clamped in place in the clip. The bail stops 72 may be pressed in the legs 20', as shown in Fig. 6, and have laterally extending surfaces 73 (Fig. 6) terminating in projecting shoulders 74, which limit the swing of the bail in one direction. As the bail is swung into clip embracing position, it engages the surfaces 73 and through said surfaces clamps the spring jaws of the clip firmly against the contact surfaces of the ferrule. The friction engagement of the legs of the bail with the surfaces 73 holds the bail against accidental swinging into released position, and as the bail reaches complete clip embracing position, it engages the stops 74, which limit its swing in that direction.

As the bail moves into clip embracing

position and rides upon the surfaces 73, it presses the looped jaws of the clip into firm and complete contact with the ferrule and, as before, any inward contraction over that allowed by the ferrule will result in contracting the loops of the clips themselves, placing them under tension to still further increase the binding action upon the flat contact faces of the fuse ferrule 16'.

I do not, of course, intend to be limited to the precise details shown and described.

I claim:—

1. In a clip of the class described, the combination of a pair of spring jaws adapted to receive a device for mounting therein, said jaws being held in close contact with the device by their inherent resiliency, and a swingably mounted bail adapted to be swung into position embracing said jaws to press same upon the device and having a portion lying in the path of removal of the device when in jaw embracing position.

2. In a clip of the class described, the combination of a pair of spring legs looped to form integral jaws to receive a device for mounting therein, and a bail swingably mounted upon said legs and adapted to be swung into position embracing same to tension the looped legs and press the jaws upon the device disposed therein.

3. In a clip of the class described, the combination of a pair of spring legs looped to form jaws to receive a device for mounting therein, a bail swingably mounted upon said legs and adapted to be swung into position embracing same to tension the looped legs and press the jaws upon the device disposed therein, and detent means on the looped legs for holding the bail in clip embracing position.

4. In a clip of the class described, the combination of a pair of spring legs looped to form integral jaws to receive a device for mounting therein, and a bail swingably mounted upon said legs and adapted to be swung into position embracing same to tension the looped legs and press the jaws upon the device disposed therein, said bail having a portion disposed in the path of removal of the device from the clip when the bail is in embracing position.

5. In combination, a clip having an intermediate mounting base, spring legs having sides generally normal to opposite ends of said base and integral internal contact jaws to receive a device for mounting in the clip and a generally U-shaped bail having its intermediate portion disposed opposite the base of the clip and its legs swingably mounted upon the clip sides, said bail being adapted to be swung into position embracing the spring legs of the clip to control said jaws.

6. In combination, a generally U-shaped clip having integral spring legs to receive a

device for mounting in the clip, and a generally U-shaped bail swingably mounted upon the legs of the clip and adapted to be swung into position embracing said legs to contract the same upon a device in the clip.

7. An electric terminal comprising a generally U-shaped strip of spring metal having the ends of the U bent inwardly to form yielding engaging members, and clamping means for pressing the legs of the U together, said means comprising a bail extending over the open end of the U when in clamping position.

8. A terminal clip comprising a strip bent to form a base portion, side portions, and jaws for the reception of a fuse device, a bail adapted to be swung up about said side portions to clamp the fuse in the clip and down from co-operation with said side portions to release the fuse, the opposite ends of said bail being turned into apertures in said side portions, and means on said side portions for holding the bail in position thereabout.

9. A terminal clip comprising a strip bent to form a base portion and spring jaws for the reception of a fuse device, and a bail adapted to be swung up about said jaws to clamp the fuse in the clip and down from co-operation with said jaws to release the fuse.

10. In a device of the class described, a clip having jaw forming legs secured at one end, the opposed faces of the jaws being flat and substantially parallel for receiving and contacting with a fuse device, and a bail for clamping the fuse device therein, the ends of the bail being turned into apertures in the clip legs and swingably mounted thereon, said bail resiliently pressing said jaws against the fuse device when moved to a position overlying the jaws.

11. In a device for holding an object, a first resilient element including a base, a plurality of yieldable jaws integral therewith and adapted to receive said object, and a plurality of resilient legs also integral with said base and said jaws between said base and said jaws for urging said jaws into firm contact with said object, and a bail pivoted in said resilient legs and adapted to be swung into the path of removal of said object from said jaws to prevent its removal and to engage and hold said resilient legs from spreading.

12. In a device for holding an object, a first resilient element including a base, a plurality of yieldable jaws integral therewith and adapted to receive said object, and a plurality of resilient legs also integral with said base and said jaws between said base and said jaws for urging said jaws into firm contact with said object, a bail carried by said resilient legs adapted to be swung into the path of removal of said object from

said jaws to prevent said removal and to augment the effect of said resilient legs when in the path of removal, and a second resilient element associated with said base and the free ends of said jaws for preventing said free ends from becoming spread by the insertion of said object.

13. In a device having yieldable jaws for holding an object in electrical and mechanical contact, resilient means for urging said jaws up said object, and an element pivoted upon said resilient means and adapted to be swung into position embracing the jaws to prevent the removal of the device therefrom and to tension the jaws upon the device without affecting the resiliency or yieldability of said jaws.

14. In a device of the character described, opposed jaws spaced to receive an object inserted between them, said jaws being yieldingly urged toward each other into contact with said object, the space between the jaws being open at one end for insertion and removal of the object, and means permanently associated with the jaws and movable relative thereto into and out of position to obstruct the path of movement of the object in removing the same from between said jaws, said means when in obstructing position pressing the jaws more firmly upon the object.

15. In a device of the character described, an approximately U-shaped member having its arms bent inwardly and downwardly forming resilient jaws, and a second U-shaped member mounted on the base portion of the first member and having its arms contacting with the jaws and resisting outward movement thereof.

16. In a device of the character described, an approximately U-shaped member having its arms bent inwardly and downwardly forming straight resilient jaws disposed in approximate parallelism with the arms, and a second U-shaped member mounted on the base portion of the first member and having its arms extending above the lower ends of the jaws and engaging the outer faces thereof to resist outward movement of said jaws.

17. In a device of the character described, an approximately U-shaped member having its arms bent inwardly and downwardly forming jaws disposed in spaced relation to each other and to the arms of said member, and a bail mounted on the arms for swinging movement about the same, said bail acting when in raised position to force the jaws toward each other and to release the jaws when in lowered position.

18. In a device of the character described, an approximately U-shaped resilient member having its arms bent inwardly and toward the right portion of said member forming resilient jaws disposed within and sub-

stantially parallel to the arms, and means contacting with said jaws and resisting outward movement thereof.

19. In a device of the character described, 5 an approximately U-shaped member formed of resilient material, and having its arms bent inwardly and toward the bight portion of said member forming resilient jaws disposed substantially parallel to said arms in spaced relation thereto to receive and contact 10 with an object inserted between said jaws.

20. In combination an open topped U shaped resilient frame having jaw portions 15 facing each other within the frame for engaging a terminal member between them, a wire bail pivoted adjacent the base of the U shaped frame and adapted to be swung over the open top of the U shaped frame to 20 prevent displacement of the terminal mem-

ber from said jaw portion said bail bearing against the sides of the U-shaped frame to press the sides toward each other.

21. In combination an open topped U shaped resilient frame having jaw portions 25 facing each other within the frame for engaging a terminal member between them, a bail pivoted adjacent the base of the U-shaped frame and adapted to be swung over the open top of the U shaped frame to prevent 30 displacement of the terminal member and said jaw portion and to press said jaws toward each other, said resilient frame having a pair of projections on each side for holding 35 between them the bail when it is in position over the top of said frame.

In witness whereof, I hereunto subscribe my name this 22nd day of May, 1925.

NICHOLAS J. CONRAD.