

Nov. 25, 1947.

L. W. BUELL

2,431,366

ELECTRICAL TERMINAL CLIP

Filed July 14, 1944

2 Sheets-Sheet 1

FIG. 1.

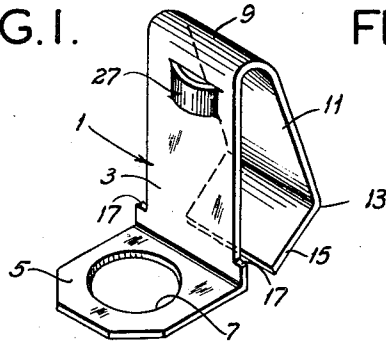


FIG. 6.

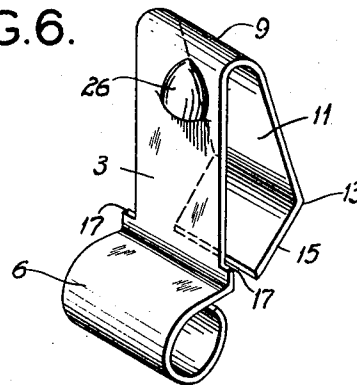


FIG. 2.

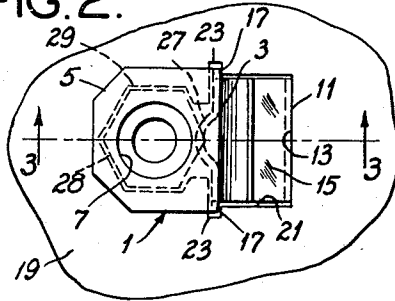


FIG. 7.

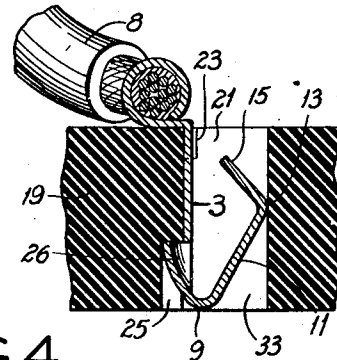


FIG. 3.

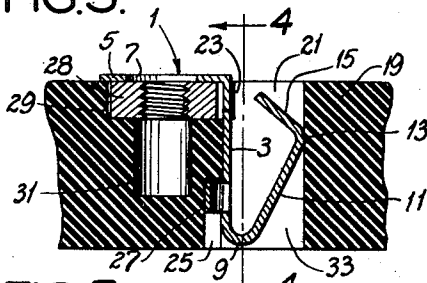


FIG. 4.

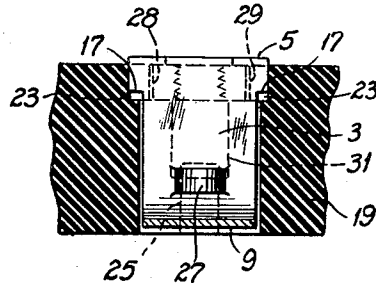
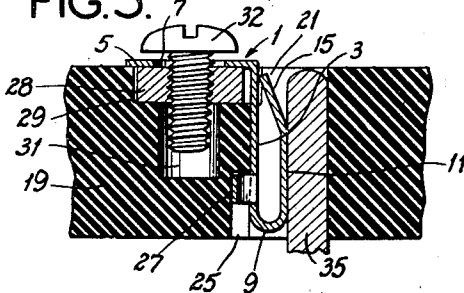


FIG. 5.



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FIG. 8.

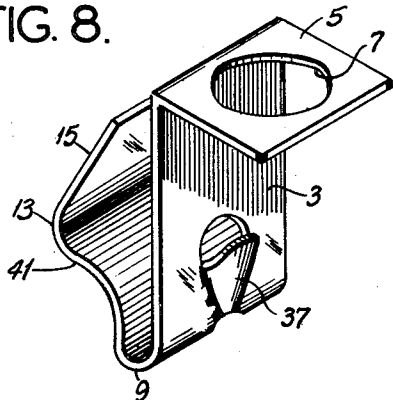


FIG. 12.

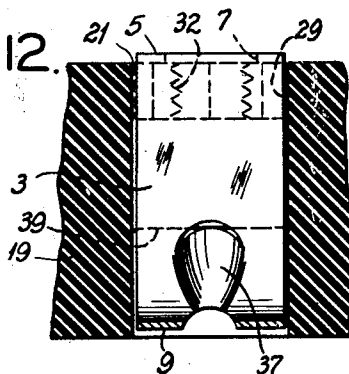


FIG. 9.

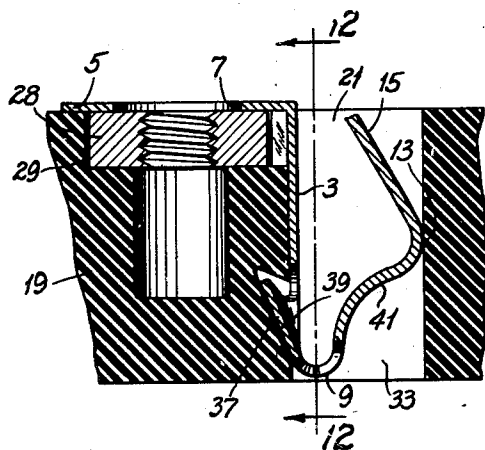


FIG. 10.

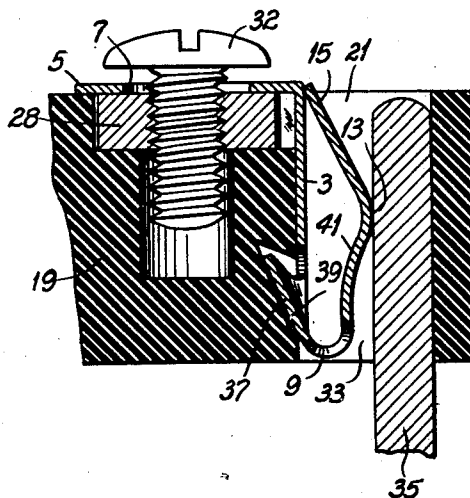
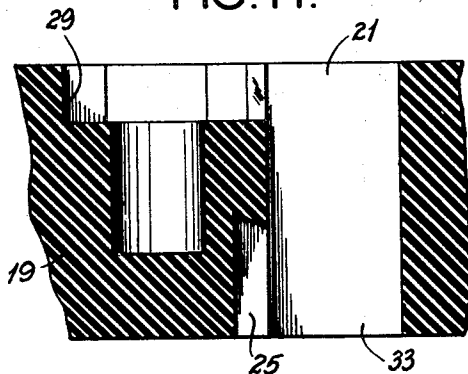


FIG. 11.



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ELECTRICAL TERMINAL CLIP

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Application July 14, 1944, Serial No. 544,866

2 Claims. (Cl. 173-363)

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This invention relates to electrical spring terminal clips, and more particularly to those for plug-in attachments.

This application is a continuation-in-part of my copending application, Serial No. 501,214, filed September 4, 1943.

Among the several objects of the invention may be noted the provision of an easily attachable and detachable terminal clip which at the same time provides for holding a wire and which also provides the springy engagement required for cooperation with engaging tines of electrical plugs and the like; the provision of a device of the class described in which the conducting element is constituted by a single spring member, the assembly of which to its base parts requires only a single very simple manual movement; and the provision of a device of the class described which while being reliably held in position during normal plugging in operations may in the absence of a plug be removed from its base with great ease. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangement of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which are illustrated several of various possible embodiments of the invention,

Fig. 1 is a perspective view of one form of the invention;

Fig. 2 is a plan view of the clip of Fig. 1, the clip being turned over and applied in its base;

Fig. 3 is a vertical section taken on line 3-3 of Fig. 2;

Fig. 4 is a vertical section taken on line 4-4 of Fig. 3;

Fig. 5 is a view similar to Fig. 4 but showing the application of a line wire holding bolt and showing the insertion of a tine of a cooperating plug;

Fig. 6 is a view similar to Fig. 1, showing another form of the invention;

Fig. 7 is a view similar to Fig. 3 but showing said other form of the invention;

Fig. 8 is a view similar to Figs. 1 and 6, but showing another form of the invention;

Fig. 9 is a view similar to Figs. 3 and 7, but showing the Fig. 8 form of the invention;

Fig. 10 is a view similar to Fig. 5, but showing the Fig. 8 embodiment;

Fig. 11 is a section of the base taken on line

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3-3 in Fig. 2, but with the clip and nut removed; and,

Fig. 12 is a section taken on line 12-12 of Fig. 9.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

In the copending patent application of myself and John D. Bolesky, Serial Number 515,012, filed December 20, 1943, for Motor starting and protective apparatus, there is shown a base construction requiring certain spring clips for cooperation with the tines of a removable plug. The present invention is shown as applied to that construction, but it is to be understood that it is also applicable to any construction wherein an electrical engagement is desired between plug tines and spring terminal clips. The invention is also applicable where there are dummy holes which are to act as hold-down means for clips on harnesses and the like, but wherein subsequent electrical engagement with the held-down clips is not necessary.

Referring now more particularly to Fig. 1, numeral 1 in general shows one form of my new clip which comprises preferably a phosphor bronze strip formed into a generally V-shaped spring contact clip having a straight arm 3 from the free end of which a tab 5 having an opening 7 extends laterally outward. The other arm 11 of the clip diverges from the apex 9 to provide a sloping face. This arm 11 is in turn bent back at the knee 13 to form the extension 15 toward arm 3. A projection or tongue 27 is struck up from the arm 3 adjacent to the apex 9. The widths of the parts 3, 9, 11, 13 and 15 are slightly less than the width of the tab 5. Offsets 17 provide the steps between the two widths. From the above it is clear that the clip is basically of V-shape in which the large end is partially closed and the other end constitutes a leading angle.

Referring to Figs. 2, 3 and 4, an insulating base is indicated at 19 through which passes an opening 21. Lateral endwise pockets 23 are provided as part of this opening to accommodate the steps 17 and an opposite endwise pocket 25 accommodates the tongue 27. A hexagonal recess 29 loosely accommodates a nut 28 which may be applied simply by dropping it into position. The recess prevents rotation of the inserted nut. A depression 31 below the pocket accommodates the threaded extending portion of any screw 32 which may be threaded through the nut (see Fig. 5). The width of the opening 21 is substantially

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less than the sprung distance between the bend 13 and the arm 3. Thus, simply by inverting the clip from the position shown in Fig. 1 and inserting and wedging the V-shape with corner 9 first into the opening 21, a springing action is obtained between the arm 3 and the knee 13 with the opposite walls of the opening 21. Finally, when the tongue 27 springs into the pocket 25, the clip is held in place.

As the clip is brought into final position shown in Figs. 3 and 4, the tab 5 comes into position to hold the nut 28 in place. As seen in Fig. 2 the opening 29 is of about the same hexagonal shape as the nut, so that the latter may not turn. The thread of the nut may be entered by the thread of screw 32 through the opening 7. In the absence of an accurate stop by the nut 28 or top of body 19, the downward movement of the clip is limited by engagement between offsets 17 and the bottoms of the pockets 23. Lateral engagement of offsets 17 with pockets 23 also prevents undue lateral rocking of the clip 1 as a whole in opening 21.

Thus all that is required to assemble the holding nut 28 and the clip 1 is to insert the nut and simply push the clip down into the opening 21, whereupon the tongue 27 springs into the pocket 25 to hold in the assembly.

The holding screw 32 for holding the conductor is shown threaded through the nut 28 in Fig. 5. This Fig. 5 also shows the application into the opening 21 of a tine 35 of an electrical plug. This tine engages the then sloping surface of arm 11 and pushes it back so that the part 15 engages the opposite arm 3 positively to hold the assembly in place despite roughest usage. It is here to be understood that the device does not depend upon screw 32 for holding it in position, either in the absence or presence of tine 35.

In order to remove the clip from its opening 21, assuming the tine 35 removed as in Fig. 3, it is only necessary to insert a pry into the pocket 25 and pry the tongue 27 out of the pocket 25, whereupon the clip may be pushed out from the side of the opening through which it was originally introduced. It is assumed that at this time the screw 33 has been removed. The result of prying out 1 will also be a release of the nut 27 which can easily be picked out, since it is not molded into base 19, but simply nested therein.

In Figs. 6 and 7 is shown another form of the invention in which like numerals designate like parts. There is a change in the character of the tongue in Fig. 6 and it has therefore been numbered 26. In the Fig. 6 form the tongue 26 is made by striking out from arm 3 a cup-like form instead of a bridge-like form as in Fig. 1.

A more important differentiation in the case of the Fig. 6 form is the substitution, for the flat tab 5 of Fig. 1, of the cylindric tab 6. This is for receiving a section of wire 8. By skinning the insulation from local sections of wire, a plurality of the clips may be applied by soldering to form what is sometimes referred to as an assembly harness. Then the wire with the applied clips may be brought into juxtaposition with a base having a plurality of the openings 21, and the clips simply pushed into their proper positions whereupon they become automatically fastened with the greatest of ease. In this case a recess such as shown at 29 of Fig. 3 is not necessary, but it is to be understood that if desired a clip of the form of Fig. 7 may be applied to a properly sized opening 21 having an adjacent recess such as 29 (Fig. 3), the latter simply being

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left useless. Of course the form of the invention shown in Fig. 1 may also be used on a harness.

Although the purpose of engaging the offset portion 17 with the pockets 23 is to provide for limiting motions of the clip in the opening 21 without relying upon the upper surface of the base 19, as above described, these and the offsets 17 are not always necessary.

In Figs. 8-12 is shown still another form of the invention, in which like numerals designate like parts. This new embodiment illustrates, among other things, how the offsets 17 and pockets 23 may be omitted (see Fig. 12).

The Figs. 8-12 clip also has a different type of tongue which has been numbered 37. In this embodiment the tongue 37 has been made by striking out a hook-shaped ledge instead of the cup-like form 26. A change has also been made in the base and a pocket having a sloping ledge 39 has been molded therein to conform to the shape of the tongue 37.

The arm 11 has likewise been changed in form and has been numbered 41. It will be noted that arm 41 has been curved inwardly so that a tine 35 upon entering does not immediately force this surface backwardly toward wall 3.

The Fig. 8 clip need not, however, be used with a base molded with a ledge 39, but may be utilized with a base having an opening 25, as shown in the Figs. 1-7 embodiments (see Fig. 11).

The hook-like shape of the tongue 37, particularly when used with a base having a ledge 39 molded therein, causes the entrance of a tine 35 to force the tongue more securely against the base. In this way, the terminal is more firmly anchored by the entrance of the tine 35 than before the tine has entered.

The formation of arm 41 in the manner shown causes the tine 35 upon entering to strike the arm farther in and as a result at a lesser angle of incidence. In this way the tine 35 tends to slide into the terminal clip more easily, yet is held as firmly as in the other embodiments of the invention.

The clips of the present invention are extremely economical to make, to disassemble and to assemble, and at the same time are very reliable.

It will be noted that in each of the forms of the invention, the knee 13, transversely considered, lies in a plane located between the tab 5 and the protrusion 27 (Fig. 1), between the tab 6 and protrusion 26 (Fig. 6) or between the tab 5 and protrusion 37 (Fig. 8). This means that the reaction at the knee 13 on one side of the opening 21 is such as to maintain the arm 3 flat against the opposite side of the opening 21. Thus, the arm 11 lies angularly across the opening 21. This provides a wide opening 33 for the easy reception of the tine, as Figures 3, 5 and 7 clearly show.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions and processes without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. An electrical connector comprising an insulation member having a tine-receiving open-

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ing therethrough, one side wall of the opening having a pocket adjacent one end thereof shaped to provide a ledge which slopes away from said side wall in the direction away from said one end of the opening, a generally V-shaped spring contact clip wedged into the opening with one of its arms engaging said one side wall and its other arm angled across the opening and engaging the opposite side wall, the apex of said clip being adjacent said one end of the opening and said one side wall, said one arm having a hook-shaped tongue extending into the pocket, said tongue having a sloping portion engaging said ledge, said one arm also having a tab extending laterally outward from its free end in engagement with said insulation member adjacent the other end of the opening, said other arm being bent so that the portion thereof adjacent the apex of the clip is substantially parallel to said opposite side wall of the opening, whereby a line inserted in the opening does not engage and bend back said other arm until it has been inserted a substantial distance into the opening.

2. A contact clip comprising a one-piece generally V-shaped spring member, one of the arms of

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said member being substantially straight and having a tab extending laterally outward from its free end, said one arm also having a hook-shaped tongue struck out therefrom adjacent the apex of the V, the other arm being bent to have a portion adjacent the apex of the clip substantially parallel to the straight arm and a portion angled away from said straight arm, and having its free end bent back toward said straight arm thereby forming a knee.

LEWIS W. BUELL.

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