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ELECTRICAL CONNECTING CLIP

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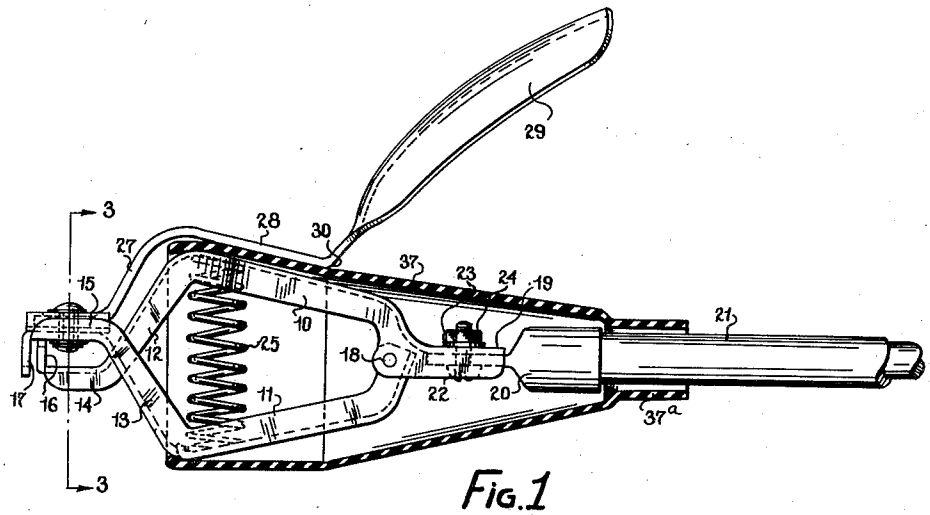


FIG. 1

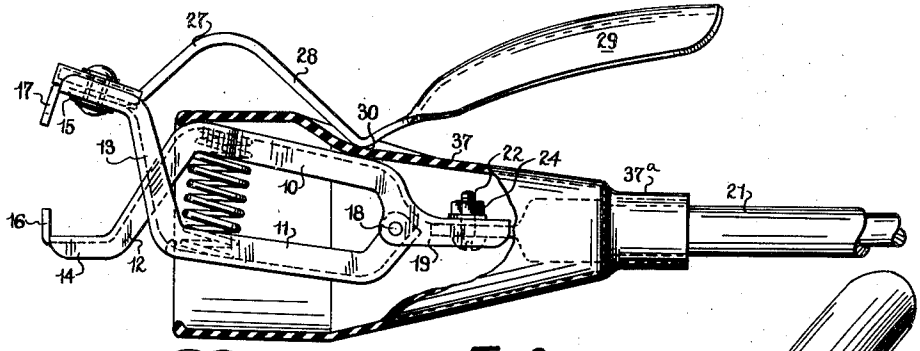


FIG. 2

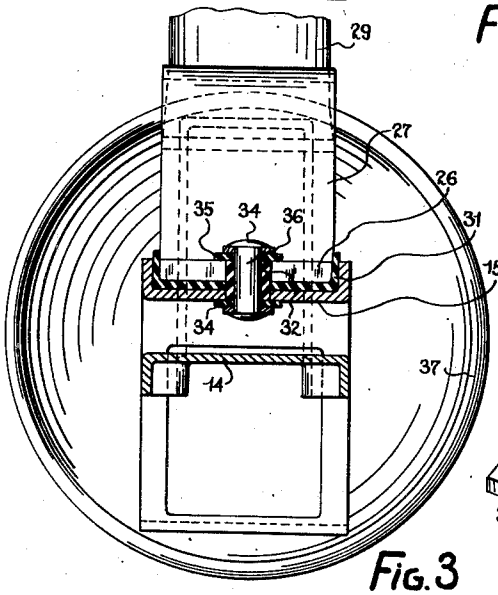


FIG. 3

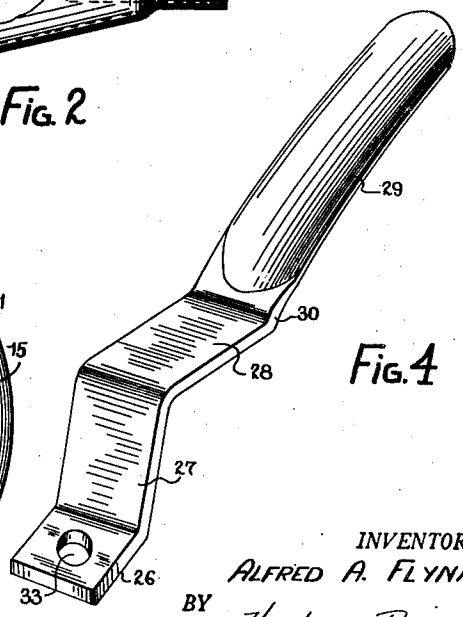


FIG. 4

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ELECTRICAL CONNECTING CLIP

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4 Claims. (Cl. 173—273)

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This invention relates to electrical connection clips of the type composed of two clip members having jaws at one end pressed yieldingly together by a spring with one of said members having at its opposite end an extension to which an electrical conductor is adapted to be attached.

Electrical connection clips of the type referred to, particularly if of large size, require considerable force to overcome the spring and open the jaws of the clip. Consequently, it is frequently difficult to apply the clip to a battery or other terminal, especially when the terminal is located in an inaccessible position requiring the user of the clip to exert a relatively long reach in order to apply the clip. In such situations it is almost impossible to apply the clip by one hand.

An object of the invention is to provide an electrical connection clip of the type referred to which may be applied to a battery or other terminal quickly and easily even though the terminal is not in a readily accessible location and may require a relatively long reach on the part of the user in the application of the clip.

Another object of the invention is to provide a connection clip of the type referred to which may be opened by the user without requiring an inordinate force to effect the opening operation and which force frequently may be beyond the strength capacity of the user.

A further object is to provide an electrical connection clip of the type specified and which is so constructed that the force exerted by the user in opening the clip acts on the clip jaws through a multiplying leverage arrangement, wherefore the user may readily open the clip without the exertion of great strength and thus will be able to apply the clip to a terminal either vertically or horizontally by means of one hand even though the terminal is not readily accessible and may require a long reach on the part of the user to apply the clip thereto.

A more specific object is to provide, in combination with a clip of the type specified, a handle arrangement for opening the clip and which arrangement provides the proper leverage so that the user may quickly and easily apply the clip to a terminal, merely using one hand to effect the operation.

A further object is to provide an electrical connection clip as referred to in the last named object and wherein the handle arrangement where it is connected to the clip is effectively electrically insulated from the clip.

Further and additional objects and advantages not hereinbefore referred to will become apparent hereinafter during the detailed description of an embodiment of the invention which is to follow.

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Referring to the accompanying drawing illustrating such embodiment,

Fig. 1 is a side elevational view of the electrical connection clip with the jaws thereof in closed position and with an electrical conducting cable attached to the clip, an insulating sleeve being mounted on the clip and shown in section.

Fig. 2 is a view similar to Fig. 1 but showing the clip with the jaws thereof opened as during the application of the clip to a terminal.

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 1 looking in the direction of the arrows, and

Fig. 4 is a perspective view of the handle that is combined with the clip.

The clip comprises two clip members 10 and 11 which, respectively, have crossed portions 12 and 13. The crossed portion 12 of the member 10 extends through an elongated opening in the portion 13 of the member 11. The portions 12 and 13 at their outer ends are provided, respectively, with jaw carrying portions 14 and 15, with the portion 14 having at its free end an upwardly extending jaw 16 while the portion 15 is provided at its free end with a downwardly extending jaw 17. The members 10 and 11 are pivotally connected together by a pivot pin 18 which extends through the strengthening side flanges of the members, it being understood that said members are generally channel-shaped in cross section for purposes of strength.

The member 10 to the right of the pivot pin 18, as viewed in the drawing, is provided with an extension 19 which is channel-shaped in cross section. The extension 19 receives the flat portion of a copper connecting lug 20 which is electrically secured to the cable 21 as will be well understood in the art. The flat portion of the lug 20 is clamped in tight electrical contact with the extension 19 by means of a bolt 22, washer 23 and nut 24. A coil spring 25 extends between the members 10 and 11 and has its opposite ends anchored within the channels of said members while said spring functions to normally maintain the jaws 16 and 17 in closed relationship, all as will be well understood in the art.

The members 10 and 11 preferably are formed of copper and in the case of large clips the material of the members is of relatively heavy gauge. Preferably a pure copper shunt element around the spring 25 is provided for the purpose

of protecting the spring, distributing current flow and reducing current loss if only one jaw is making contact.

The electrical connecting clip as thus far described is well known in the art and further details of its construction need not be set forth.

An electrical connecting clip of the type described, particularly if it is a heavy duty clip, requires considerable strength on the part of the user to open the jaws against the load of the spring 25. In many cases the user to open the clip must employ both hands in the operation. However, many times the clip must be applied to a terminal which is not readily accessible and the use of both hands to open the clip in the application of it to the terminal is impractical if not impossible. An example of an instance of this kind may be found in the battery terminal of an automobile wherein the battery is so located as not to be readily accessible and to require an extended reach by the user to apply the clip. Of course there are other instances where this situation would prevail also in addition to the one given by way of illustration. Clips of this type frequently must be applied to inaccessible terminals in an automobile in the operation or fast chargers for the battery, the use of booster batteries for starting the car and other heavy duty battery work.

The present invention contemplates providing the clip with a handle arrangement affording sufficient leverage to enable the user of the clip to easily and readily open the clip jaws with one hand to apply the clip to a terminal, either in the vertical position or the horizontal position, and in those cases requiring the user to exert a long reach to apply the clip to the terminal.

In carrying out the invention an actuating handle is employed which has an attaching portion 26 that is adapted to be located in and secured to the jaw carrying portion 15 of the member 11 in a manner later to be described. Extending from the attaching portion 26 are angularly disposed portions 27 and 28 which, when the handle is secured to the clip and the jaws of the latter are closed, follow substantially the longitudinal contour of the member 10 and its portion 12 and lie in spaced relation thereto as shown in Fig. 1.

The handle further includes a hand grip portion 29 which extends angularly and laterally from the right hand end of the portion 28, it being noted that the portion 28 and the hand grip portion 29 are interconnected with a rounded surface or fulcrum portion 30 on the side adjacent to the clip member 10 for a purpose which will become apparent. The hand grip portion 29 of the handle is curved in cross section to be easily engaged by the hand of the user.

In securing the attaching portion 26 of the handle to the portion 15 of the member 11 it is desirable that said portion 26 be fully insulated from the member 11. Therefore the channel-shaped portion 15 of the member 11 is provided with a channel-shaped insulator 31 which interfits the portion 15 and in turn has interfitted in it the attaching portion 26 of the handle. The insulator 31 may be formed of any suitable insulating material as, for example, hard fiber. An insulating bushing 32 extends through registering openings in the portion 15 of the member 11, in the insulator 31 and an opening 33 in the attaching portion 26 of the handle. A rivet 34 extends through the bushing 32 and intermediate the heads of the rivet 34 and the upper side of the attaching portion 26 of the handle and the lower side of the portion 15 of the member 11 are insulating washers 35 and metal washers 36. It will thus be seen that the attaching portion 26 of the handle is completely insulated from the clip.

When the jaws of the clip are closed, as shown in Fig. 1, or when the jaws of the clip are clamped upon a terminal the handle portions 27, 28, 30 and 29 are completely spaced from the member 10. However, during the opening of the clip to move the jaws from the position indicated in Fig. 1 to the position indicated in Fig. 2 to apply the clip to a terminal, the rounded fulcrum portion or surface 30 of the handle will, if an insulating sleeve for the clip is not provided, contact the outer side of the member 10 and have rolling movement thereon. The operator in opening the clip to apply the same to a terminal grasps with one hand the hand grip 29 of the handle and the extension 19 of the member 10 together with the lug 20 and cable 21 and merely by a squeezing action of his hand readily and easily with a minimum amount of strength opens the clip jaws. It will be noted that this squeezing action of the user's hand causes the handle to move relative to the member 10 with the curved fulcrum surface 30 of the handle having a rolling action on the outer side of the member 10 adjacent to the right hand end of the latter and substantially spaced longitudinally of the clip from the attaching portion 26 of the handle. Consequently the force exerted on the hand grip 29 is transmitted through the handle with a high leverage to the portion 15 of the clip member 11 and thus the latter member is moved on the pivot 18 in a jaw opening direction and against the load of the spring 25. It will be apparent that the handle enables the clip to be opened readily with the exertion of a minimum force on the part of the user and that the latter can quickly and easily apply the clip either horizontally or vertically to a terminal that is difficult to reach.

Preferably an insulating sleeve 37 will be employed with the clip and said insulating sleeve will surround the clip members 10 and 11 and extend over the extension 19 of the member 10 and over the lug 20 with the cylindrical end 37a of the insulator sleeve embracing the clip 21 as is well understood in the art. The insulating sleeve 37, due to the spacing of the handle from the member 10, extends therebetween and when the clip jaws are opened by the squeezing action of the user's hand, as already explained, the rounded fulcrum surface 30 of the handle will have rolling movement on the insulator sleeve rather than directly on the outer surface of the member 10.

Although a preferred embodiment of the invention has been illustrated and described herein it will be understood that the invention is susceptible of various modifications and adaptations within the scope of the appended claims.

Having thus described my invention, I claim:

1. In an electrical connection clip of the type including two cooperating members, means adjacent one end of said members pivotally interconnecting the same, said members having divergent portions extending from said one end and crossed portions adjacent the opposite end of said members and integral with said divergent portions, said crossed portions being provided at their outer ends with integral jaws, and spring means interposed between said divergent portions and acting to maintain said jaws normally closed; the improvement which comprises a

handle having an attaching portion secured to a jaw of one of said members and a fulcrum portion spaced from said attaching portion and located adjacent the divergent portion of the other of said members and which fulcrum portion is brought into temporary contacting engagement with the divergent portion of said other of said members when the operator grasps the handle and clip and moves the same relatively toward each other to open said jaws.

2. The improvement defined in claim 1 and wherein said fulcrum portion of said handle extends substantially parallel to said divergent portion of said other of said members and has a curved surface normally spaced from but which is brought into temporary rolling contacting engagement with said divergent portion of said other of said members when the operator grasps the handle and clip and moves the same relatively toward each other to open said jaws, and insulating means interposed between said attaching portion and said jaw of said one member.

3. The improvement defined in claim 1 and wherein the attaching portion of said handle is integral with an intermediate portion which in turn is integral with the fulcrum portion, said intermediate portion and fulcrum portion of said handle being respectively substantially parallel to the crossed portion and the divergent portion of the other of said members.

4. An electrical connection clip of the type including two members, means adjacent one end of said members pivotally interconnecting the same, one of said members at said one end being provided with an extension beyond said means to which a conducting cable can be attached, said members having divergent portions extending from said means and crossed portions adjacent the opposite ends of said members and integral with said divergent portions, said crossed portions being provided at their outer ends with integral jaws, and spring means interposed between said divergent portions and acting to maintain said jaws normally closed; the improvement which comprises a handle having an attaching portion secured to the jaw of one of said members, insulating means between said attaching portion and said jaw, said handle being further provided with an intermediate portion integral with said attaching portion and a fulcrum portion integral with said intermediate portion, said intermediate portion and said fulcrum portion extending respectively substantially parallel to the crossed portion and divergent portion of the other of said members and normally in spaced relation thereto whereby an insulating sleeve can be positioned over said clip and intermediate said fulcrum portion of said handle and said divergent portion of said other member, said handle having a hand grip portion integral with and extending angularly from said fulcrum portion whereby said fulcrum portion can be caused to exert pressure upon the divergent portion of said other of said members when the operator grasps the hand grip portion and clip and moves the same relatively toward each other to open said jaws.

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