June 29, 1948. H. S. JOHNSON 2,444,229

ELECTRICAL CLIP

Filed Oct. 19, 1945

Fig. 2.

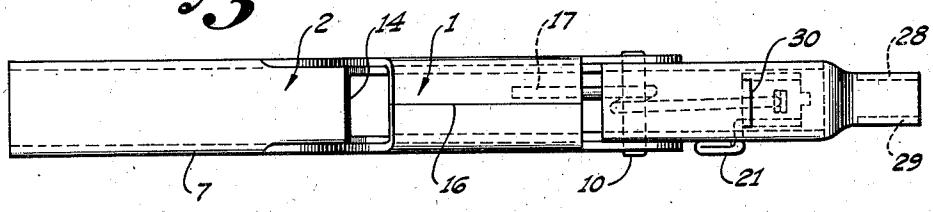


Fig. 1.

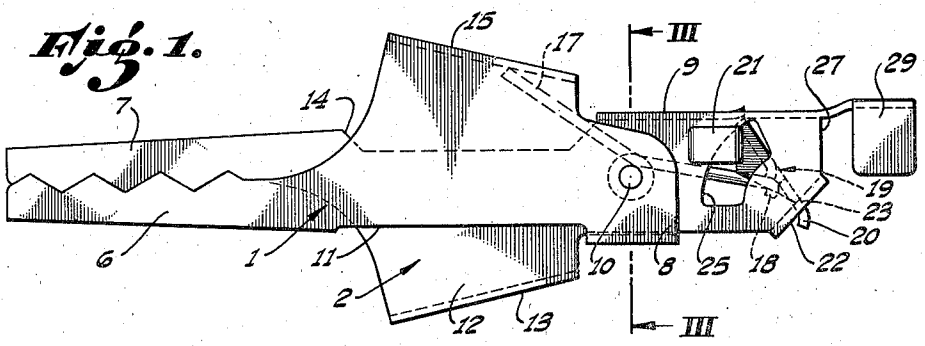


Fig. 5.

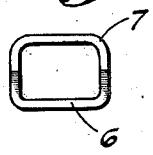
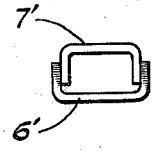


Fig. 6.



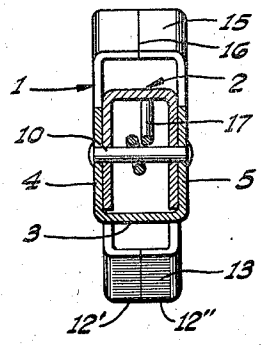


Fig. 3.

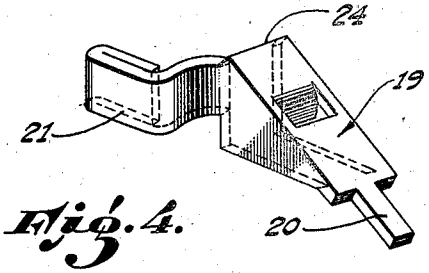


Fig. 4.

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ELECTRICAL CLIP

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4 Claims. (Cl. 173—273)

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This invention relates to an improved spring-actuated terminal clip by means of which electrical contact may be releasably made to terminals, wires, batteries, etc.

Various types of spring-actuated terminal clips have been devised heretofore but most of these clips have several disadvantages. For example, the method of attaching a cable to the clip is either complicated and time-consuming or of such an imperfect character that the clip becomes readily detached from the cable and causes annoyance. Moreover, prior clips did not conduct current from the jaws to the cable in a uniform manner and often introduced unnecessary resistance into the circuit. Other forms of clips were bulky and could not be attached to terminals located between closely adjacent pieces of equipment, such as radio tubes, etc.

The present invention distinguishes from prior clips in that the clip is simple, composed of a minimum number of parts, permits electrical currents to flow from the jaws to the terminal without introducing unnecessary resistance, and is provided with means for positively and simply locking and holding a cable or terminal in good electrical contact with the clip. Moreover, the clip is strong and the jaw elements may be of any desired length so that the clip may be readily attached to terminals located in normally inaccessible places.

Generally stated, the terminal clip of the present invention comprises an inner element and an outer element, each of channel section, the body portions of these two elements being nested and pivotally connected together. Suitable presser faces are carried by the two elements between the pivotal point of connection and the jaws so that the jaws may be readily and easily manipulated. A rearward extension of one of the elements, preferably the inner element, may be provided with a clamping lever cooperating with guiding means for guiding a terminal into the clip and into operative engagement with the clamp.

An object of the invention, therefore, is to disclose and provide a simple, inexpensive and strong terminal clip.

A further object of the invention is to provide a terminal clip including a pivotally mounted clamp bar for assuring positive connection between the clip and a cable terminal.

Another object of the invention is to provide a terminal clip including a clamp bar, the jaws of the clip and the clamp bar being simultaneously urged into normally closed position by a single spring.

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These and other objects of the invention will become apparent to those skilled in the art from the following description of one exemplary form illustrated in the appended drawings, in which:

Fig. 1 is a side elevation of a terminal clip embodying the present invention.

Fig. 2 is a plan view thereof.

Fig. 3 is a transverse section taken along the plane III—III of Fig. 1.

Fig. 4 is a perspective view of the clamp bar.

Figs. 5 and 6 are end views showing alternative jaw arrangements.

In the form of device illustrated in the drawings the terminal clip is composed of an outer element 1 and an inner element 2. Both these elements may be of channel section, as best shown in Fig. 3. The outer element 1, for example, may be composed of a web 3 and side walls 4 and 5. The inner element 2 may be similarly provided with a web and side walls but sufficiently narrower so as to slidably fit within the outer element 1 and slidably contact with the inner surfaces of the walls 4 and 5. The inner element 2 is preferably in an inverted position with respect to the outer element.

Each of these elements 1 and 2 may be said to consist of a body portion and a formed jaw portion. The jaw of the outer element is indicated at 6 and that of the inner element at 7. The edges of the side walls of the jaws may be serrated and they may either interlock, as shown in Fig. 6, or the side walls of the jaws of the inner element 2 may be bent outwardly so as to present cooperating and opposing edges to the marginal edges of the jaw 6, as best shown in Fig. 5.

The body portion 8 of the outer element may be pivotally connected to the body portion 9 of the inner element 2 as by means of a pivot pin or rivet 10 (see Fig. 3).

A port is preferably formed in the web of each element between its jaw and body portion. For example, a port 11 may be formed in the outer element 1 and the side walls of the inner element may be caused to extend through such port 11, the extended side walls being then provided with a lateral presser face. The presser face may be either attached to the side walls or the outer edge portions of the extended side walls 12 may be inwardly turned as at 12' and 12'' (see Fig. 3) to form a presser face, generally indicated at 13.

A portion of the web of the inner member 2 may be removed so as to form a port 14 and a lateral presser face 15 may be carried by the side walls of the outer element 1 above the port 14

in the web of the inner element 2. The presser face 15 may also be made by inturning the side walls of the outer element, such inturned side walls abutting along the longitudinal line 16, as shown in Fig. 3.

A single spring 17 may be wound around the pivot pin 10, the ends of such spring bearing against the inner surfaces of presser faces 13 and 15, thereby normally urging the jaws 6 and 7 into closed position.

In the illustrative form, one end of the spring 17 cooperates with the outer element 1 and bears against the presser face 15, whereas the other end of the spring is bent as indicated at 18 and bears against a clamp bar 19 pivotally carried by a rearward extension of the inner element 2. The clamp bar 19 is shown in detail in Fig. 4 and may include a downwardly extending pivot pin 20 and a lever handle 21. One of the side walls of the inner element 2 may be folded inwardly to form a transverse partition 22 at the rear of the device. A port or opening 23 is formed in such partition, such port being adapted to loosely receive the tip or pivot pin 20 of the clamp bar 19. The protruding tip may be bent, as shown in Fig. 1, so as to prevent the clamp bar from becoming loose and falling out accidentally. The clamp bar 19 is movable between the side walls of the inner element 2 but is normally urged upwardly by means of the rearwardly extending end portion 18 of the spring 17. The upper edge 24 of the clamp bar 19 is relatively sharp and bears against the inner surface of the web of the inner element 2. A port or slot 25 is formed in one of the side walls of the inner element 2 so that the handle 21 extends exteriorly of the inner element (see Fig. 2).

Means are provided for guiding a terminal into operative engagement with the clamp bar 19, such means comprising a rearwardly extending opening 27 in the inner element 2 and a U-shaped element having downwardly extending wings 28 and 29 between which a terminal or cable may be inserted. Means are provided for moving the clamp bar to open the same so as to receive (or liberate) a terminal, such means comprising the handle 21 operating through the port 25.

In order to make certain that the upper edge 24 of the clamp bar firmly holds the end of the cable in electrical contact with the inner element 2, the web of the inner element 2 may be slitted or deformed along a transverse cut 30 immediately above the point where the upper edge of the clamp bar 19 contacts the inner surface of such web. Pressure applied by spring 17 through the clamp bar against a terminal extending between the edge 24 and the inner surface of the web of the inner element 2 will deform the terminal or cable by reason of the slit and indentation formed and thereby firmly hold the cable in position. The wings 28 and 29 may also be clamped around the cable.

It will be noted that thorough electrical contact exists between outer element 1 and inner element 2 inasmuch as the side walls of these two elements are in sliding contact with each other. Electrical current passing through the clip is therefore not impeded and need not pass through the spring 17. By reason of the channel form of the elements 1 and 2, the device is extremely strong and rugged. It will be noted that the clamp bar 19 is inclined forwardly so that tension applied to any terminal held by the clamp bar is thoroughly resisted.

Although a specific form of device has been described in detail, those skilled in the art will readily appreciate that various changes and modifications may be made not only in proportions but also in details of construction, without departing from the inventive thought herein disclosed. All changes coming within the scope of the appended claims are embraced thereby.

I claim:

1. An electrical terminal clip comprising: an inner element and an outer element, each of channel section and including a web and virtually parallel side walls, each element having a jaw portion and a body portion, the body portion of the inner element extending between the side walls of the outer element in inverted position; means pivotally connecting the body portion; a port formed in the web of each element between the jaw and the body portion thereof; a lateral presser face carried by the outer element above the port in the web of the inner element, said presser face comprising inwardly extending and abutting extensions of side walls of the outer element; a lateral presser face carried by the inner element and extending through the port in the web of the outer element, said lateral presser face comprising inwardly extending and abutting extensions of side walls of the inner element; and spring means within the inner element extending through the port in the web of the inner element so as to bear against the inner surface of the presser face of the outer element to normally urge the jaws into engagement.

2. An electrical terminal clip comprising: an inner element and an outer element, each of channel section and including a web and virtually parallel side walls, each element having a body portion and a jaw portion; a port formed in the web of each element between the jaw and body portion thereof; extending side wall sections in each element, the body portion of the inner element extending between the side walls of the outer element in inverted position, with the extending side walls of the interior element passing through the port in the web of the outer element; means pivotally connecting the body portions; a lateral presser face carried by the extending side wall section of the outer element above the port of the inner element; a lateral presser face carried by the extending side wall section of the inner element; and spring means within the inner element extending through the port in the web of the inner element so as to bear against the inner surface of the presser face of the outer element to normally urge the jaws into engagement.

3. An electrical terminal clip comprising: an inner element and an outer element, each of channel section and including a web and virtually parallel side walls, each element having a jaw portion and a body portion, the body portion of the inner element extending between the side walls of the outer element in inverted position; means pivotally connecting the body portions; a port formed in the web of each element between the jaw and the body portion thereof; a presser face carried by the outer element above the port in the web of the inner element; a presser face carried by the inner element and extending through the port in the web of the outer element, the body portion of the inner element extending rearwardly and including a pivotally mounted clamp bar within said body of said inner element; an actuating handle carried by the clamp bar extending laterally through a port in one side wall of the body portion of said

inner element; and a spring within the body portion bearing against the clamp bar and extending through the port in the web in the inner element so as to bear against the inner surface of the presser face carried by the outer element, whereby to simultaneously urge the jaws of the elements into engagement and pivot the clamp bar into pressure contact with the inner surface of the body portion of the inner element.

4. An electrical terminal clip comprising: an inner element and an outer element, each of channel section and including a web and virtually parallel side walls, each element having a jaw portion and a body portion, the body portion of the inner element extending between the side walls of the outer element in inverted position; means pivotally connecting the body portions; a port formed in the web of each element between the jaw and the body portion thereof; a transverse pin pivotally connecting the body portions; a presser face carried by the outer element above the port in the web of the inner element; a presser face carried by the inner element and extending through the port in the web of the outer element, the body portion of the inner element extending rearwardly beyond the other element and including a pivotally mounted clamp bar

within the body portion of said inner element; an actuating handle carried by the clamp bar extending laterally through a port in one side wall of the body portion of said inner element; a spring within the body portion bearing against the clamp bar and extending through the port in the web in the inner element so as to bear against the inner surface of the presser face carried by the outer element, whereby to simultaneously urge the jaws of the elements into engagement and pivot the clamp bar into pressure contact with the inner surface of the body portion of the inner element; and means for guiding a terminal between the end of the clamp bar and the inner surface of the body portion of the inner element.

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