Nov. 1, 1966 R. F. COBAUGH 3,283,289

TERMINAL CLIP

Original Filed Jan. 20, 1964

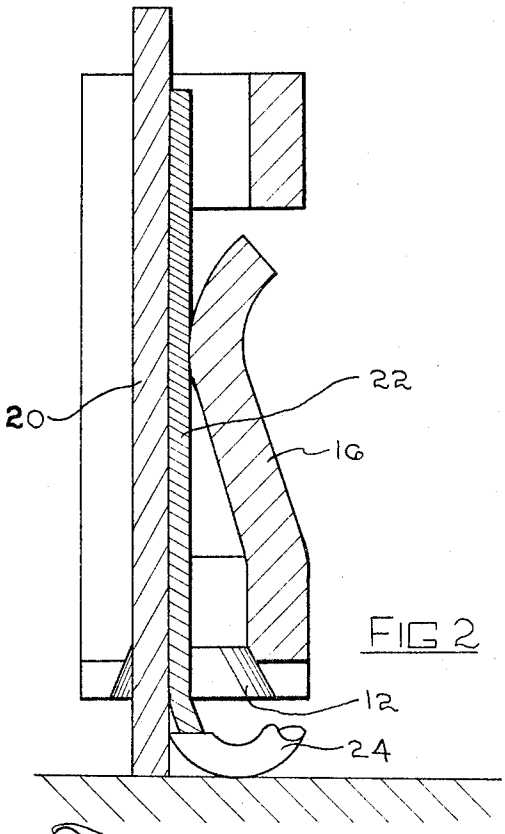

FIG 2

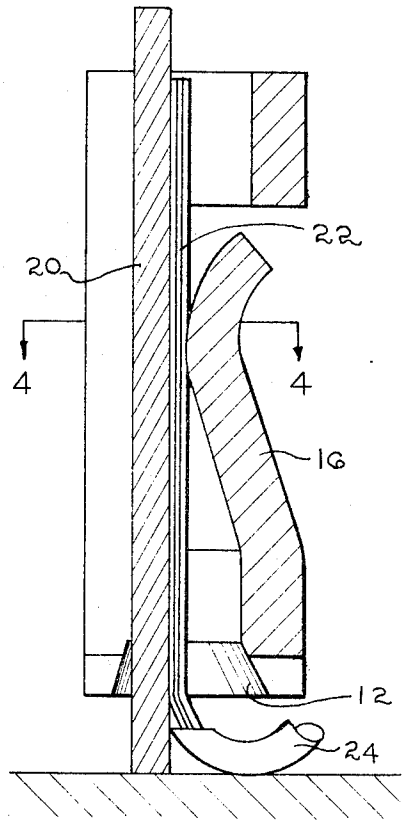

FIG 3

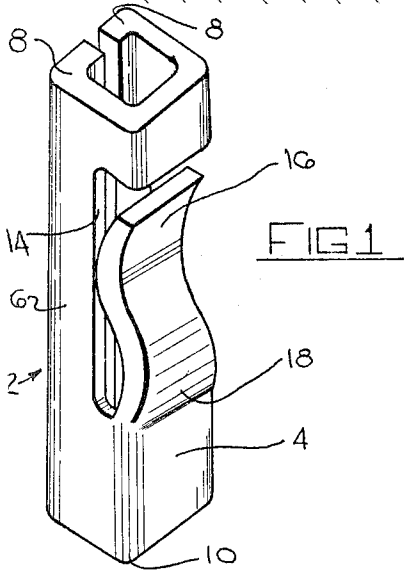

FIG 1

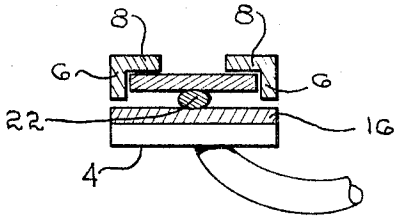

FIG 4

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TERMINAL CLIP

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Original application Jan. 20, 1964, Ser. No. 338,663, now Patent No. 3,243,757, dated Mar. 29, 1966. Divided and this application Sept. 22, 1965, Ser. No. 489,357

1 Claim. (Cl. 339—256)

This application is a division of application Serial No. 338,663, filed January 20, 1964, now U.S. Patent No. 3,243,757, for Electrical Connections and relates to clip-type electrical connections and to terminal clips for making such connections.

Clip-type electrical connections in accordance with the teachings of application Serial No. 338,663, are made by moving a terminal clip past a transversely extending conductor and onto a terminal post in a manner such that the clip drags the wire over a surface of the post and holds the wire against, and in electrical contact with, the post after coming to rest thereon. The present invention relates to a terminal clip having an improved spring means for holding the clip and the wire on the post.

It is an object of the invention to provide an improved clip for making clip-type electrical connections. A further object is to provide a terminal clip which is particularly adapted for use with relatively small terminal posts and wires. A further object is to provide a terminal clip which can be manufactured with relative ease and which does not involve extremely close manufacturing tolerances.

These and other objects of the invention are achieved in one embodiment in which the clip is of generally rectangular cross-section and comprises a web on one side and has an open seam extending axially along the side opposite to the web. A cantilever spring is struck from, and integral with, the web and extends axially with respect to the axis of the clip, the arrangement being such that when the clip is moved onto a terminal post with a wire disposed between the underside of the web and a surface of the post, the cantilever spring holds the clip on the post and holds the wire against, and in electrical contact with, the post. In a finished electrical connection in accordance with the invention, the wire thus extends axially along the post towards the fixed end thereof and emerges from confined relationship between the clip and the post at the end of the clip which is proximate to the base of the post.

In the drawing:

FIGURE 1 is a perspective view of a preferred form of terminal clip in accordance with the invention;

FIGURE 2 is a sectional side view of an electrical connection in accordance with the invention between a terminal post and a snigle-stranded wire;

FIGURE 3 is a view similar to FIGURE 2 but showing an electrical connection between a terminal post and a multi-stranded wire; and

FIGURE 4 is a view taken along the lines 4—4 of FIGURE 2.

A terminal clip **2** in accordance with the present invention is of substantially rectangular cross-section and comprises a web **4** and sidewalls **6** having inwardly turned edges **8**. The interior edges of the clip at the leading end **10** thereof are bevelled towards the longitudinal axis as shown at **12** to provide a strain relief and guide means for the conductor in the finished electrical connection as shown in FIGURES 2 and 3.

The sidewalls **6** are cut away adjacent to the web **4** as shown at **14** and a cantilever spring **16** is formed from the metal of the web. This spring is integral with the web **4**, as shown at **18**, at its end which is adjacent to the leading end **10** of the clip, and is curved inwardly so that its upper end extends into the gap formed by the cut-away sidewall portions **14**.

The clip **2** is intended to be used with a terminal post **20** having a width substantially equal to, and slightly less, than the distance between the opposite internal surfaces of the sidewalls **6** so that the clip can be telescopically moved onto the post as described more fully in application Serial No. 338,663 and in my co-pending application Serial No. 171,074, filed February 5, 1962 for Electrical Connection. The electrical connection is ordinarily made by moving the clip **2** over a mandrel or guide member and past a transversely extending wire in a manner such that the clip drags the wire over the surface of the mandrel and onto the post until its leading end **10** is disposed proximate to the fixed end of the post **20**. As shown in FIGURES 2 and 4, the stripped end **22** of the conductor will thus be confined between the underside of the cantilever spring **16** and the surface of the terminal post **20**. FIGURE 2 shows an electrical connection in accordance with the invention where the wire **22** comprises a single-strand with the insulated portion **24** of the wire emerging from the leading end of the clip and over the bevelled strain relief surface **12** of the clip. Clips in accordance with the invention can also be used with stranded wires or electrical connections between stranded wires and terminal posts as shown in FIGURE 3.

A comparative advantage of a terminal clip in accordance with the invention is that the spring means for maintaining the conductor in contact with the terminal post is formed from the web of the clip. The spring **16** can be accurately formed with comparative ease and the sidewalls **6** and inwardly turned sidewall ends **8** need not be formed with an extremely high degree of accuracy. This advantage is particularly important in the case of terminal clips intended for usage with relatively fine wires, for example, in the range of AWG 40–50. Wires in this size range would normally be used only with extremely small terminal posts and the terminal clip for usage with such posts and wires would, therefore, also be externally small. The provision of a separate spring means, such as the cantilever spring **16** of the disclosed embodiment, for terminal clips is thus advantageous since the spring **16** can be provided on the terminal notwithstanding the relatively small size of the terminal.

While the herein disclosed embodiment of the invention comprising a cantilever spring integral with the web of the terminal, it would also be feasible under some circumstances to provide a separate spring on the terminal end in partially surrounding relationship thereto, for example, it would be practical to mount a spring on a terminal intermediate its ends which would be sprung outwardly when the clip is moved onto the post.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claim when viewed in its proper perspective against the prior art.

I claim:

In an electrical connection of the type comprising a conductor and a terminal post, said post being straight and having a substantially uniform cross-section throughout its length, said post having a fixed end and a free end, a clip on said post, said clip having a web portion and having sidewalls extending from its longitudinal edges, said sidewalls extending partially around said post whereby said clip is in embracing relationship to said post, said conductor being contained between said web and one side of said post and extending axially along said post towards

said fixed end, said conductor emerging from confined relationship at the one end of said clip which is proximate to the base of said post, the improvement comprising: a cantilever spring formed in said web intermediate the ends thereof, said spring being integral with said web at said one end and extending towards the other end of said clip which is proximate to said free end of said post, said spring being resiliently biased towards said conductor and maintaining said wire in electrical contact with said post, internal edge portions of said clip at said one end being chamfered to provide a guide means and strain relief for said conductor.

References Cited by the Examiner

UNITED STATES PATENTS

2,134,775	11/1938	Bergan	339—258 X
2,705,788	4/1955	Soreng	339—258
2,759,165	8/1956	Batcheller	339—256
3,122,604	2/1964	Cook et al.	339—256 X

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