March 24, 1925. 1,531,049

H. G. THOMPSON

ELECTRICAL CONNECTION CLIP

Filed June 13, 1923

Fig. 1.

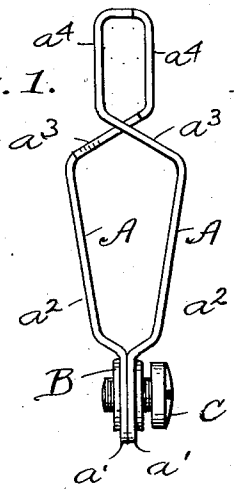


Fig. 2.

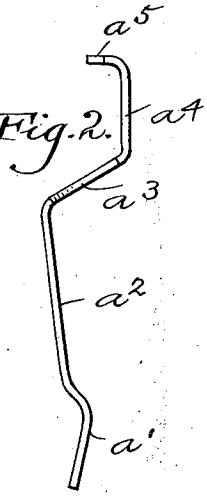


Fig. 3.

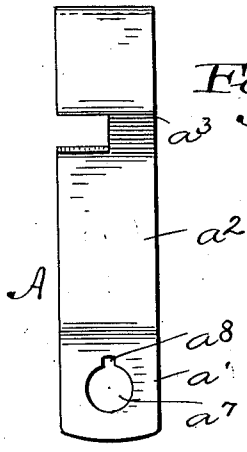


Fig. 4.

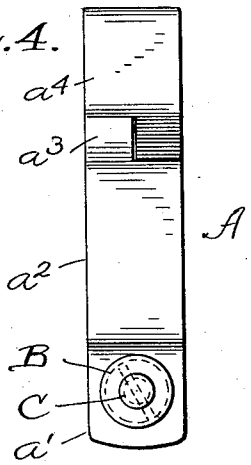


Fig. 5.

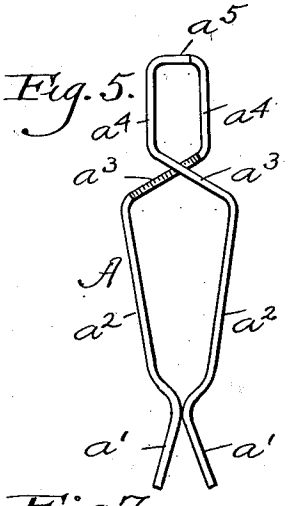


Fig. 9.

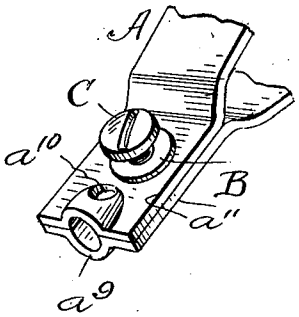


Fig. 7.

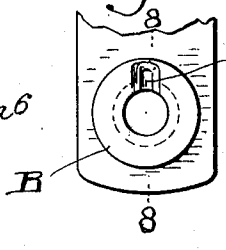


Fig. 8.

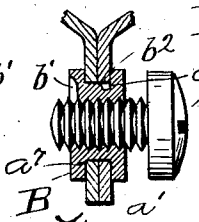


Fig. 6.



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Attorneys

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UNITED STATES PATENT OFFICE.

HENRY G. THOMPSON, OF CLEVELAND, OHIO, ASSIGNOR TO MUELLER ELECTRIC COMPANY, OF CLEVELAND, OHIO, A PARTNERSHIP CONSISTING OF RALPH S. MUELLER AND MAUDE K. MUELLER.

ELECTRICAL CONNECTION CLIP.

Application filed June 13, 1923. Serial No. 645,041.

To all whom it may concern:

Be it known that I, HENRY G. THOMPSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Electrical Connection Clips, of which the following is a full, clear, and exact description.

This invention relates to electrical connection clips, and has for its chief object to provide a clip which can be produced inexpensively, and which is at the same time efficient. In other words, it is the aim of the invention to provide a clip which can be utilized to form a good electrical connection between a pair of conductors, and which can be produced in quantities at low cost.

The construction which I have provided, is admirably adapted for small clips which have a very extensive field of use in radio apparatus, although, of course, the clip can be used for other purposes and can be made in large sizes as well as small.

The invention may be briefly summarized as consisting in certain novel details of construction which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawings wherein I have shown the preferred form of the invention, and also a slight modification which may be used, if desired, Fig. 1 is an edge view of a clip formed in accordance with my invention; Fig. 2 is a similar view of one of the two counterpart stampings used in forming the clip; Fig. 3 is a face or side view of the same; Fig. 4 is a face or side view of the clip looking toward the right of Fig. 1; Fig. 5 is an edge view of two clip forming stampings, before they are united or secured together at their rear ends; Fig. 6 shows the jaw end of the clip; Fig 7 is an enlarged fragmentary face view showing the hollow rivet or eyelet by which the rear ends of the stampings or body portions of the clip are fastened together and showing an indentation which is formed in one end of the eyelet for a purpose to be described; Fig. 8 is a sectional view on the same scale as in Fig. 7, the section being taken substantially along the line 8—8 of Fig. 7; and Fig. 9 is a perspective view of the rear end of the clip showing a slight modification.

The clip is preferably formed of two similar or counterpart stampings A, A, of steel or other suitable resilient material, this clip being of the type wherein the jaws are normally held together or closed by the inherent resiliency of the material.

The two stampings A, are provided at their rear ends with flat engaging portions a' which are held together in the manner hereinafter described. Forwardly of these portions a' the stampings have diverging arms a^2, and at the forward ends of these arms are crossed portions a^3, the crossed portions being in the form of relatively narrow necks which are reduced in width to substantially one-half the width of the stamping by notching out the stamping as clearly shown in Fig. 3. Forwardly of the crossed portions or necks a^3, are the jaws or jaw portions a^4, which at their free ends are bent inwardly toward each other, and are preferably serrated as shown at a^5 in Fig. 6. As previously stated, it is a feature of the clip that the two stampings are exact counterparts, and in order that the teeth of one part may fit into the notches between the teeth of the other as shown at Fig. 6, it is necessary that the teeth of one be laterally offset from the V-shaped notches of the other a distance equal to one-half the width of a tooth when one stamping is placed over the other for assembling, and this is accomplished by providing at one end of the jaw or series of serrations, a half tooth, or preferably a space a^6, of a width equal to one-half the width of a tooth at its base. This is clearly illustrated in Fig. 6.

The two stampings are held in alignment or in proper relationship by fastening together the rear portions a', and in order that the portions of the stampings forwardly of the rear portions a' may be under tension so that the free ends of the jaws will have a normal tendency to close and to be held closed or in engagement under a certain degree of pressure, the rear portions a' of the two assembled stampings are not initially parallel but are formed so as to diverge, or the stampings are otherwise initially shaped so that when the rear portions a' are drawn together and caused to lie flat against each

other for their full length, a considerable spring or tension is placed in the portions of the stampings forwardly of the rear portions.

The rear portions a' of the stampings are preferably fastened together and held flat against each other by a hollow rivet or eyelet B, the shank of which is extended through openings a^7 formed in the portions a'. A hollow rivet is preferably utilized for the reason that by threading the inner bore or opening of the rivet it will accommodate the terminal screw C by which the end of a conductor may be electrically connected to the rear end of the clip by clamping it between the head of the screw and the adjacent end of the rivet.

As far as I am aware, I am the first to use a hollow rivet for the double purpose of clamping together two parts such as the two clip stampings, and to form one element of a binding post by threading the wall of the opening in the rivet to accommodate a terminal or binding post screw. However, in addition to this feature, which I believe to be new with me in this art, I have provided certain additional improvements which enable me to utilize the hollow rivet for the two purposes stated, in the most effective manner. For example, it is desirable that the rivet be automatically held from turning when it is threaded. It is desirable also that the rivet effectively hold the two stampings in alignment and prevent their getting out of alignment by one swinging or turning relative to the other about the center of the rivet as an axis. Both these advantages are attained by interlocking the rivet to the stampings during the upsetting or riveting process when the end of the shank of the rivet is upset after extending the shank through the openings a^7. To accomplish this, the openings a^7 in the end portions a' of the stampings are provided with short lateral extensions or notches a^8, best shown in Fig. 3, and during the riveting or upsetting process the rivet is indented as shown at b' so as to drive part of the metal of the rivet, which is generally formed of copper, into the extensions a^8, as shown at b^2 in the enlarged sectional view of Fig. 8. This forms the equivalent of a key, which not only prevents the rivet turning when it is being tapped, but prevents the stampings turning relatively to each other.

I find that very effective results are obtained by indenting the rivet at one end only, but if desired, the metal can be indented in both ends so as to drive the metal in from both ends of the rivet. Furthermore, while I prefer to drive the metal into the notches a^8 of both stampings, I do not wish to be so limited, for obviously the rivet is held from turning if the metal is driven into one of the notches only, and this may be found sufficient also to prevent, or at least minimize liability of the stampings moving out of alignment.

The clips formed as above described, have proven by use to be very efficient and to possess great utility in quickly making electrical connections. I have, however, in Fig. 9, shown a slight modification. In this instance the portions of the stampings which are fastened together by the hollow rivet B, and here designated a'', are made somewhat longer than the corresponding portions a' of the construction first described, and in this instance, these portions a'' are at their rear ends bowed outwardly as shown at a^9 so that the two portions a^9 will when placed together form a substantially cylindrical passageway for the end of the conductor, and the inner end of one bowed portion a^9 is provided with an opening a^{10}, so that the uninsulated portion of the conductor can be extended out from this passageway and clamped between the screw C and rivet B. If the two stampings are to be counterpart as in the first instance, the opening a^{10} will be formed in both stampings, though, of course, only one opening will be utilized by the passage of the conductor therethrough. I do not consider it essential to provide the feature just described, and consisting of the bowed portions a^9 with the opening or openings a^{10}, but it may be used if desired.

Having described my invention, what I claim as new, and desire to secure by Letters Patent is:

1. An electrical connection clip composed of two stampings having crossed portions with jaws at the forward ends thereof and having rear portions held face to face under stress so as to impose initial tension in the jaws, a short hollow rivet passing through and fastening together said rear portions of the stampings and having its shouldered ends engaging the faces of the rear portions so as to effectively hold them together and electrically connect them, and a terminal screw engaging the inner passageway or bore of said rivet.

2. An electrical connection clip composed of two members connected together at their rear ends and having jaws at their forward ends, a fastening member extending through the rear ends of said members and interlocked therewith to prevent the turning thereof and a terminal screw engaging said fastening member.

3. An electrical connection clip composed of two members having rear portions fastened together and jaws at their forward portions, a hollow rivet extending through the rear portions of said members to fasten them together and interlocked with one of said members and a terminal having threaded engagement with said rivet.

4. In an electrical connection clip, a pair

of clip members having forward portions in the form of jaws, and rear portions with openings, one of which has a lateral extension, a fastening member passing through the openings and engaging in said extension and a terminal screw having threaded engagement with said fastening member.

5. An electrical connection clip composed of two members having rear portions fastened together and jaws at the forward portions thereof, a rivet passing through said rear portions to fasten the members together and a terminal screw having threaded engagement with said rivet, the opening formed in one of said members to receive the rivet having an extension, and a portion at one end of the rivet being driven into the same to prevent relative rotation between the rivet and the clip members.

6. An electrical connection clip composed of a pair of stampings having crossed portions and having rear portions fastened together, a hollow rivet for fastening said members together, the bore or central passageway of the rivet being threaded to receive a terminal screw, a portion of the rivet and one of said stampings being interlocked to prevent relative rotation thereof.

7. An electrical connection clip composed of a pair of stampings having jaws at their forward portions and having rear portions fastened together, a terminal screw carried by the clip, said rear portions being shaped to form between them a passageway for a conductor, which passageway extends from the rear end of the clip toward the screw.

8. An electrical connection clip composed of a pair of stampings having jaws at the forward portions thereof and having rear portions fastened together, and a binding screw, the rear portions being oppositely bowed to form a passageway for a conductor, one of said stampings having an opening through which the conductor may be extended to the binding screw.

In testimony whereof, I hereunto affix my signature.

HENRY G. THOMPSON.