Dec. 20, 1938. W. McGINNIS ET AL 2,140,843

ELECTRICAL CONNECTION

Filed May 29, 1935

Fig. 1

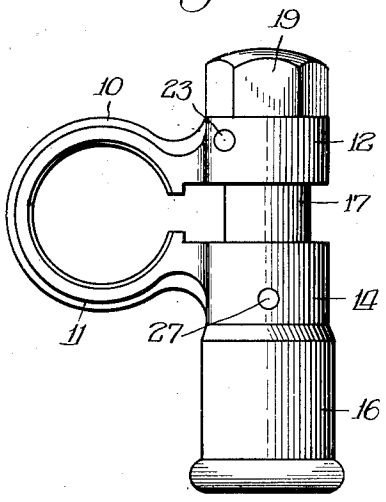


Fig. 2

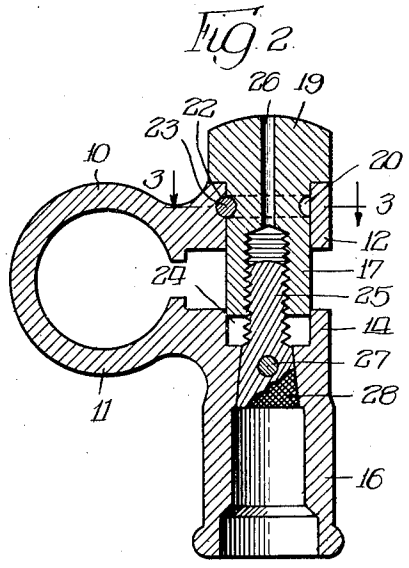


Fig. 3

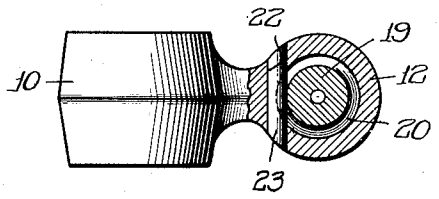
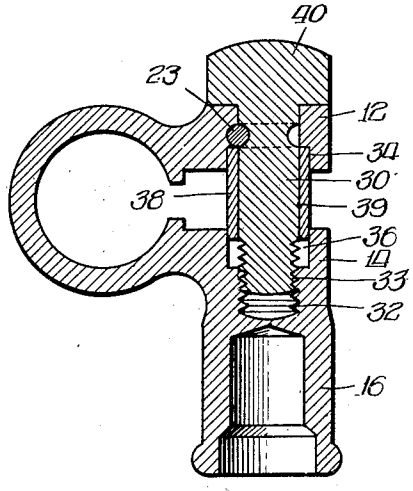


Fig. 4



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ELECTRICAL CONNECTION

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Los Angeles, Calif.

Application May 29, 1935, Serial No. 23,996

5 Claims. (Cl. 173—259)

The present invention relates to electrical connections and has particular reference to electrical connections for use as battery terminals in clamping a cable to a battery binding post.

Connections of this type are ordinarily provided with a cable insert or housing and with clamping members which may be placed about a battery binding post or other electrical contact and secured thereto. For ease of manipulation these connections are usually made from a soft metal alloy so that the clamping members may be easily spread apart and readily removed from the binding post. In order to hold the clamping members contracted about a binding post a bolt is usually thrust through the clamping members and the desired contraction secured by screwing a nut upon the threaded end of the bolt.

The threads of the bolt become corroded and worn making the replacement of it necessary when it can no longer be used for engagement with its nut. In some forms the bolt is rotatably mounted within one arm of the clamping member for prevention of loss and also to afford a positive separating movement between clamping members. In these instances the entire connection must be thrown away when the bolt threads are gone. Moreover, the mounting means for this type of connection have all been exposed to the action of the battery acid hastening the destruction of the connection.

The present application is a continuation in part of our earlier application, Serial No. 623,734, filed July 21, 1932, issued June 4, 1935, as Patent No. 2,003,788.

One object of the present invention is to provide a corrosive resistant electrical connection having clamping means that may be not only positively received around a binding post but may also be positively spread away from said binding post without injury to the post or connection.

Another object of this invention is to provide an electrical connection that will stand up and wear well in the presence of corrosive acids and oxidation.

A further object of this invention is to provide an electrical connection the moving parts or bearing surfaces of which are protected from corrosive acids that may be present.

Still other and further objects of my invention will be pointed out or indicated hereinafter or will be apparent to one skilled in the art upon an understanding of the invention or its employment in practice.

For aiding in the disclosure of the invention there is shown in the accompanying drawing, forming a part of this specification, certain arrangements of parts by reference to which the invention is described. It is to be understood that this description and drawing are presented for purposes of illustration only and are not to be construed so as to limit the scope of the appended claims unnecessarily.

In the drawing,

Fig. 1 is a view in elevation of one form of the electrical connection;

Fig. 2 is a vertical sectional view taken through Fig. 1 showing one embodiment of the invention;

Fig. 3 is a view taken on line 3—3 of Fig. 2; and

Fig. 4 is a further sectional view through Fig. 1 showing a structural modification of the invention.

As shown, the electrical connection of the present invention consists of a battery binding post terminal having the usual clamping members, a cable insert or recess portion and oppositely disposed apertured lugs on the clamping member for the reception of clamping bolts. Cooperating with these clamping members are certain securing means which are normally moving parts usually exposed to the corrosive action of battery action. By the arrangement shown the vulnerable portions of the connection are removed from this destructive action by the use of protective means or coverings which delay the deterioration of the connection from this source.

The connections shown embrace that type of clamping member wherein the rotation of the clamping bolt in one direction forces the clamping members together whereas an opposite rotation of the clamping bolt forces the clamping members apart. For this purpose the clamping bolt may be rotatably mounted at one end in one of the lugs and held therein while the other end advances towards or away from the oppositely disposed lug by a threaded turning or screwing action. Various pin and disc arrangements have been used heretofore in these terminals for rotatably mounting the bolt in one of the lugs. These mountings have been in direct contact with or subject to the corrosive action of the acids, and, as they are relatively thin or small members, are destroyed before the remainder of the connection is worn out. When the mounting is gone, the connection is of no further value in positively opening the clamping members. In the drawing is shown means whereby this mounting may be made simply, and may be inexpensively mounted within the interior of a lug to protect it from this corrosion.

Moreover, a sleeve or protecting cylinder overlies the threaded portions of the bolt between or within the lugs keeping them from or delaying this corrosive media.

With reference to Figs. 1 and 2 of the drawing there is shown an electrical connection having outwardly bowed split clamping members 10 and 11 preferably integrally formed. The split ends of these clamping members carry oppositely disposed lugs 12 and 14, and extending outwardly from the lug 14 is the cable housing or insert member 16.

Lug 12 is apertured for the reception of clamping bolt 17, having the enlarged head 19, and this clamping bolt is rotatably mounted within said lug. Adjacent the head 19, the clamping bolt is provided with the annular pin groove 20. Extending through lug 12 tangentially to groove 20 is a pin hole which cooperates with said groove to form a clamp bolt securing opening 22. Through this pin hole is inserted a pin member 23 which rides in the securing opening 22 formed by the cooperation of the bolt groove and lug pin hole holding the clamping bolt securely in position. The bolt rotates freely within the lug by means of the pin riding in the annular groove and yet the pin and its cooperating groove are enclosed by the lug and bolt and kept from the harmful effects of any corrosive acids present.

Lug 14 contains a shouldered recess 24 for the slidable reception of the bolt 17 therein. Lug 14 is further apertured for the reception of an anchored bolt 25 which may have its head 26 formed in a frusto-conical shape for the purpose of wedging it into position within its lug aperture. The head 26 may be knurled as at 28 and pressed into place to be held against rotation within the lug aperture or the bolt may be welded or held in position by the pin 27 extending through the lug 14 and the head 26.

The body portion of anchored bolt 25 is threaded and extends outwardly from the lug 14 aperture or recess 24 toward lug 12. Clamping bolt 17 is preferably cylindrical in shape and is hollow, having threads upon its interior portion for cooperation with the threaded body portion of bolt 25. The smooth cylindrical body of bolt 17 acts as a protective covering or sleeve for the threaded portions of the bolts and resists corrosive attacks upon those portions.

This sleeve or cylindrical portion of bolt 17 is slidably received within the recess 24 and may have a frictional engagement or piston-like action therewith for further protective purposes. The recess 24 is deep enough to accommodate enough of bolt 17 to insure a tight closing action of the clamping members. Likewise, the hollow threaded portion of bolt 17 should be able to accommodate enough of bolt 25 to insure full clamping action of the members 10 and 11. If sufficient depth is provided in both instances, the cylindrical sleeve portion of bolt 17 need not be withdrawn from its recess 24 in loosening the clamping members from a binding post.

In assembling this embodiment bolt 25 is inserted within lug 14 and properly secured therein against rotation as above set forth. The protective clamping bolt is then inserted through lug 12 and screwed down over bolt 25 until its groove or channel 20 is opposite the lug securing opening 22 and pin member 23 is inserted therein and secured in place.

A vent hole 26 may be provided through the head of bolt 17 extending into the threaded hollow interior so that the threads and moving parts may be entirely and constantly covered with a packing of grease for further resisting corrosion upon these parts.

Another form of the invention is disclosed in Fig. 4 wherein the connection is shown with the clamping members 10 and 11, the lugs 12 and 13 and the cable housing 16. The corrosion resistant assemblage includes a bolt 30 extending through lug 12 and rotatably mounted therein. The mounting means shown is similar to that disclosed in Fig. 2 and includes the groove 20 upon the bolt 30 adjacent the head of the bolt and within the lug 12, and its cooperating pin 23 extending through lug 12 tangentially to and riding in said groove. Bolt 30 extends through the space between the lugs 12 and 14. Lug 14 is hollowed out and threaded upon the interior as at 32 to receive the threaded end 33 of the bolt 30. Both lugs 12 and 14 are preferably provided with shouldered recesses 34 and 36, respectively, and a cylindrical corrosion-resistant sleeve 38 is inserted between the lugs and received in these shouldered recesses for protecting the threaded portions of the bolt and lug from deterioration. Bolt 30 extends through this sleeve 38 and is screwed backwardly and forwardly in threaded lug 14 expanding and contacting the clamping members 10 and 11.

As shown the shank 39 of the bolt 30 adjacent the head 40 of the bolt is smooth or unthreaded for that portion extending between the recesses 34 and 36 in the lugs. This formation of the bolt is preferable in further resisting corrosion that normally attacks the threaded portions of the bolt at this point. With the use of the protective sleeve 38 the possibility of corrosive attack on this portion of the bolt is lessened and consequently the usual threaded bolt may be used although the form shown is preferred. By forming the bolt 30 with the smooth shank 39 between the recessed portions of the lug as shown, this smooth portion in itself will form a protective shield delaying corrosion upon the threaded end portion 33 of the bolt and the lug threads 32. With adequate clearance provided in lug 12, the sleeve 38 may be made integrally with the bolt 30 for this purpose, or the recesses 34 and 36 may be drawn into engagement with the smooth portion 39 of the bolt 30.

The various constructions described present to the corrosive action of the acid and acid fumes a smooth area which is of smaller surface area than the usual threaded portion of the bolt thus exposed, and, at the same time, protects the threaded areas from corrosion by closing them off from direct corrosive action by means of the shouldered recesses closely engaging the smooth exposed surface areas. This structure also provides adequate space for housing and protecting lubricants used in connection therewith.

Furthermore, the usual mechanic will attack these connections with hammer or pliers in removing the connection from the battery post. By protecting the threads in the manner herein described they are removed from these blows and the threads do not become stripped or bent but remain in good condition for threading action.

Various modifications of this structure are, of course, possible without departing from the spirit of the invention. All such modifications are intended to be included in the scope of the appended claims.

We claim:

1. In an electrical connection having oppositely disposed clamping members and a cable hous-

ing, a corrosive resistant operating mechanism including a clamping bolt rotatively secured in one of said clamping members, said bolt being hollowed interiorly and having its hollowed surface threaded, the outer surface of said bolt being smooth to form a corrosive resistant surface, a recess formed within the oppositely disposed clamping member for receiving the outer surface of said clamping bolt in slidable engagement, and a second bolt secured within the recessed portion of the oppositely disposed clamping member, said bolt being threaded exteriorly for cooperation with the interiorly threaded portion of the first named bolt to contract and expand said clamping members.

2. In an electrical connection having oppositely disposed clamping members and a cable housing, a clamping bolt rotatively secured within one of said clamping members and extending over to be received within the other of said clamping members, said bolt having a hollow portion formed with screw threads therein and having a smooth outer surface forming a protective sleeve for said threaded surface, a recess within said other clamping member for receiving the outer surface of said bolt in slidable engagement, and threaded means within said other clamping member for cooperation with the interiorly threaded surface of said clamping bolt for expanding and contracting said clamping members.

3. In an electrical connection having oppositely disposed clamping members and a cable housing, a clamping bolt rotatively secured within one of said clamping members, said bolt having a smooth shank portion and a threaded portion of less cross sectional area than said shank portion, a recess in the oppositely disposed clamping member engaging the smooth portion of said bolt and threaded means within said oppositely disposed clamping member for cooperation with the threaded end of said bolt to expand and contract said clamping members.

4. In an electrical connection having oppositely disposed clamping members and a cable housing, a corrosive resistant operating mechanism including a clamping bolt mounted in one of said clamping members, said bolt being hollowed interiorly and having a threaded portion upon its hollowed surface, the outer surface of said bolt being smooth to form a corrosive resistant surface, a recess formed within the oppositely disposed clamping members for receiving the outer surface of said clamping bolt in slidable engagement, and a second bolt attached to the recessed portion of the oppositely disposed clamping member and held against rotation, said second bolt being threaded exteriorly for cooperation with the interiorly threaded portion of the first named bolt.

5. In an electrical connection having oppositely-disposed recessed clamping members and a cable housing, a corrosion resistant sleeve extending between said clamping members and in engagement with the recessed walls of the same, threaded means rotatively secured within one of said recessed members protected by said sleeve and cooperating threaded means in the other of said recessed members protected by said sleeve to expand and contract said clamping members positively upon rotation of said first-mentioned threaded means.

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CERTIFICATE OF CORRECTION.

Patent No. 2,140,843. December 20, 1938.

WALTER McGINNIS, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 27-28, for the word "contacting" read contracting; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of March, A. D. 1939.

Henry Van Arsdale.

(Seal) Acting Commissioner of Patents.