Sept. 5, 1944. T. O. WILLIAMS 2,357,567

BATTERY TERMINAL CONNECTOR

Filed March 9, 1942

FIG. 1.

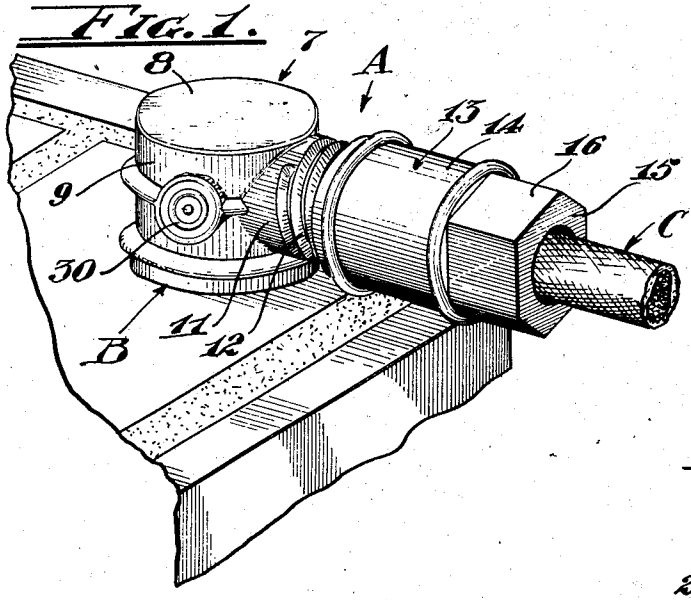


FIG. 4.

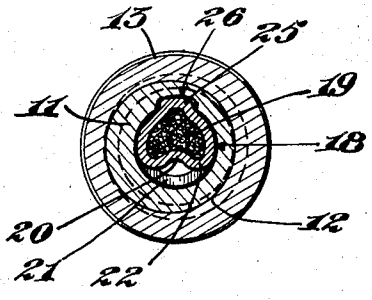


FIG. 2.

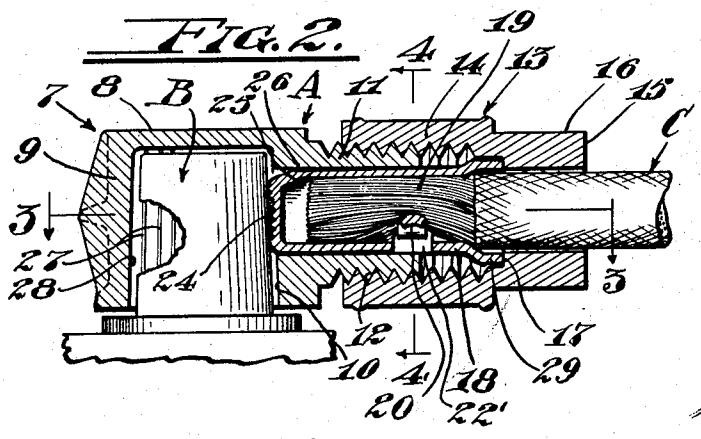


FIG. 5.

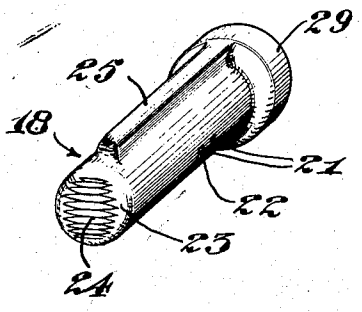
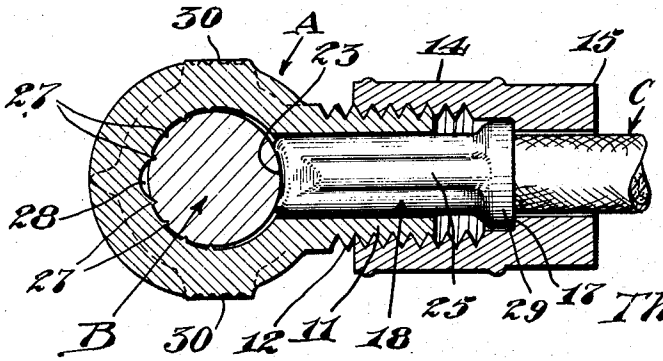


FIG. 3.



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Patented Sept. 5, 1944 2,357,567

UNITED STATES PATENT OFFICE

2,357,567

BATTERY TERMINAL CONNECTOR

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Application March 9, 1942, Serial No. 433,912

1 Claim. (Cl. 173—259)

This invention relates to connectors for battery terminals and particularly pertains to connectors employed in effecting connection between an end of an electrically conductive cable and a terminal of an electric battery such as is employed on motor vehicles.

An object of the invention is to provide a battery terminal connector which is so constructed as to afford a shroud for the battery terminal and to encompass the latter in a body of grease in such manner as to prevent or at least minimize corrosive action of battery acid on the connector and on the cable end attached thereto.

Another object is to provide a construction in the connector whereby an effective electrical connection will be made between a cable and the battery terminal through the grease body encompassing the latter.

Another object is to provide a construction in the connector whereby the use of clamping bolts and nuts as commonly employed in devices of this character is eliminated and in which clamping engagement between the connector and the battery terminal post and release thereof may be easily and rapidly effected.

Another object is to provide a construction in the connector whereby adequate electrical connection between the cable and the connector may be effected without the use of solder and whereby the connector may be readily attached to the end of the cable without the employment of special tools and in a fashion to afford a substantial and enduring connection between the cable and the connector.

A further object is to provide a construction in the connector whereby when the latter is applied to the battery terminal post it will be securely engaged therewith in such fashion as to securely hold the connector against either turning movement around the post or longitudinal movement relative thereto and whereby the connector will be retained against accidental displacement on the battery terminal post.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention is carried into effect as illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a perspective view of the connector showing it as applied;

Fig. 2 is a view in vertical longitudinal section of the connector showing it applied to a battery terminal post;

Fig. 3 is a detail in horizontal section taken on the line 3—3 of Fig. 2;

Fig. 4 is a detail in cross section as seen on the line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a contact member embodied in the connector and which is adapted to be applied to the end of a cable.

Referring to the drawing more specifically, A indicates generally the battery terminal connector, B designates the battery teminal post, and C designates an electrical cable to be connected to the terminal B by the connector A. The post B here shown is the conventional terminal post of electric batteries such as are used on motor vehicles, which post is circular in cross section and slightly tapered from its base to its tip, and is formed of soft metal.

The connector A embodies a cap 7 including a top wall 8 and an annular side wall 9, which cap is adapted to be positioned to extend over the terminal post B to shroud the latter as shown in Fig. 2; the wall 9 of the cap being formed slightly larger than the post B so that when the cap is positioned on the post a clearance space 10 will be afforded between the post and the interior surface of the side wall 9, whereby the cap may be readily positioned on and removed from the post and whereby a grease receiving space will be afforded between the cap and the post to afford a grease packing between the post and the connector as will be later described.

Formed on the cap 7 and extending laterally from the side wall 9 thereof and integral therewith is a tube 11 which is open at its outer end and has its inner end open to the interior of the cap through the side wall of the latter. The tube 11 is formed with external screw threads 12 to receive a sleeve 13 having an internally threaded end portion 14 for screw engagement with the tube 11. The sleeve 13 has an outer end portion 15 formed with external flat faces 16 constituting a wrench-hold; which end portion of the sleeve is of reduced internal diameter. A shoulder 17 is formed interiorly of the reduced end portion 15 of the tube for abutting engagement with the inner end of a contact ferrule 18 affixed on the end of the electrical cable C on which the sleeve 13 is carried. The contact ferrule 18 is formed of electrically conductive metal and is designed to receive a clump 19 of wire ends of the cable C and to be engaged therewith by an indent 20 formed on the ferrule 18 by providing a pair of circular circumferentially extending slits in the side wall of the ferrule intermediate the ends of the latter such as to provide a strip 22 of metal between the slits which is capable of being bent inwardly and forced into tight engagement with the clump 19

of wire ends extending into the ferrule as shown in Fig. 4. When the strip 22 is indented an opening 22' will be formed in the side of the ferrule.

The ferrule 18 is contoured and dimensioned to be freely slidable in the tube 11 and to afford a slight clearance between the side of the ferrule and the inner surface of the tube, and is formed of a length exceeding that of the tube 11 so that when positioned in the latter its inner end will protrude from the outer end of the tube. The opening 22' is arranged in this protruding portion of the ferrule so as to be exposed.

The outer end of the ferrule 18 is formed to conform to the side contour of the post B and is preferably provided with an end wall 23 having a transverse concave curvature conformable to the curvature of the post B and slightly inclined lengthwise to conform to the taper of the post. Formed on the end wall 23 is a series of transverse teeth 24 adapted to be pressed into the surface of the post B so as to effect intimate interlocking engagement with the latter. As a means for insuring proper positioning of the concave end wall 23 and the teeth 24 thereon with the post B the ferrule 18 is formed with a longitudinally extending rib 25 which is slidably engageable with a longitudinally extending channel 26 formed interiorly of the tube 11 which rib and channel are so positioned relative to the recessed end wall 23 and the teeth 24 on the ferrule that when the latter is inserted in the tube 11 the teeth 24 will extend lengthwise circumferentially of the post. As here shown the rib 25 and channel 26 are located on the upper portions of the contact member and tube and extend perpendicular to the length of the teeth 24 and parallel to the axes of the connected ferrule and tube.

As a means for effecting intimate interlocking engagement between the cap 7 and the post B the portion of the side wall of the cap opposing the tube 11 and ferrule 18 is formed with a series of longitudinally extending teeth 27 which when the ferrule 18 is clamped against the post B, as will presently be described, will penetrate the surface of the post B as shown in Fig. 3.

Formed on the inner face of the wall 9 longitudinally thereof and perpendicular to and in alignment with the axis of the tube 11 is a channel 28 which extends longitudinally between a pair of the teeth 27 and is flanked on its margins thereby, which recess is provided to afford a space for the reception of a body of grease between the binding post B and the interior portion of the wall 9 which ordinarily would extend in close relation to the post, and also enables three point contact between the connector and the post.

In the application and operation of the invention a suitable length of cable C is provided on which the sleeve 13 is slipped with the threaded end of the latter outermost. The ferrule 18 is then applied to an end of the cable by stripping a length of the insulating sheath of the cable from the end of the latter a distance less than the length of the interior of the ferrule 18, then introducing the clump 19 of exposed wires of the cable into the interior of the ferrule 18 a distance to bring the end portion of the insulating sheath of the cable within a flared end 29 formed on the ferrule. The strip 22 is then pressed inwardly by a punch or other suitable tool to form the indent 20 and in such manner as to effect clamping engagement with the clump 19 of cable wire as shown in Figs. 2 and 4, thus effecting electrical connection between the cable and the ferrule 18 and without the aid of solder. It will be understood however that if it is desired to amplify the connection between the ferrule and the cable end solder may be applied in the recess which is formed by indenting the strip 22. However, practice has shown that such application of solder is unnecessary and that it is desirable to leave an opening in the side of the ferrule as is formed by indenting the strip 22 so that a packing grease may be forced interiorly of the ferrule and into interstices between adjacent cables wires and the inner periphery of the ferrule as will presently be described.

In applying the connector, the interior of the cap 7 and the tube 11 is filled or substantially filled with a suitable hard grease whereupon the cap is slipped over the post B which latter on being advanced into the cap will displace a portion of the grease such that portions thereof will be squeezed both outwardly in the tube 11 and outwardly from the lower margin of a cap. The ferrule 18 is then inserted in the outer end of the tube with the rib 25 engaged in the channel 26; the ferrule being forced through the body of grease in the tube so as to further displace a portion of the grease and squeeze some of the grease through the clearance space between the tube and the ferrule and out onto the protruding inner end of the ferrule to which other grease is added if need be. The sleeve 13 is then advanced on the cable and over the grease covered end of the ferrule and then screwed into engagement with the tube 11 so that the shoulder 17 will abut the flared end of the ferrule and advance the ferrule in the tube so as to bring the end of the ferrule into engagement with the battery post. Continued advance of the sleeve 13 on the threads of the tube after the ferrule 18 abuts the post B will act to draw the cap 7 toward the ferrule and thus bring the teeth 27 on the cap into contact with the post.

The application of the connector to this point may ordinarily be effected by hand without the aid of tools, then to complete the connection the sleeve is tightened on the tube by manipulation of a wrench gripping the wrench-hold on the reduced end of the sleeve and whereby the ferrule and cap will be advanced relative to each other so as to cause the teeth 24 on the ferrule and the teeth 27 on the cap to bite into the surface of the post B and thus effect interlocking engagement of the ferrule and cap with the post such as to hold the cap against both turning and longitudinal movement on the post thereby securing the cap against accidental disengagement from the post. The bites afforded by the teeth 24 and 27 insure positive electrical connection between the ferrule, cap and post through the grease body encompassing the post.

In advancing the sleeve 13 on the tube 11 a body of grease will be entrapped at the outer end of the tube so that a portion of such grease will be forced into the ferrule through the opening 22' afforded by the indented strip 22, thus packing the interstices interiorly of the ferrule with the grease by pressure created in screwing the sleeve on the tube.

Portions of the grease acted on by advancing the sleeve 13 on the tube will be squeezed outwardly through the open end of the ferrule and along the portion of the cable encompassed by the end extension 15 of the sleeve 13 thus grease sealing the bore of the sleeve around the cable

and thereby protecting the cable from corrosion.

It will now be seen that by the construction set forth the interior surfaces of the connector including the cable connection may be effectively packed in grease and thus be protected against corrosive action of battery acids or fumes. It will also be noted that the point of application of a tool for tightening or loosening the connector, namely, the wrench-hold 16 at the outer end of the sleeve 13 is located remote from the post B. This arrangement is advantageous in that it permits positioning of the connector so as not to interfere with filler caps of the battery.

By provision of the rib 25 and channel 26 a key or splined connection is afforded between the cable end and the connector cap such as to hold the cable end against turning in event twisting of the cable becomes necessary after application of the connector, thus preventing loosening of the sleeve 13 by reason of such twisting of the cable.

By the provision of the three-point contact between the connector and the post afforded by the recess 28 and its marginal ribs 27 and the opposed end of the contact ferrule, rocking of the connector on the post is prevented and the connector is adapted for engagement with posts of various diameters.

In tightening or loosening the connector the post B and the battery grid plates connected thereto (not shown) may be relieved of strain by gripping the cap 7 with a wrench or pliers while manipulating the sleeve 13. To this end the side wall of the cap is formed with tool engaging faces 30 on opposed sides thereof.

While I have shown and described a specific embodiment of my invention I do not limit myself to the exact details of construction set forth, and the invention embraces such changes, modifications and equivalents of the parts and their formation and arrangement as come within the purview of the appended claim.

I claim:

A battery terminal connector comprising a cap having an annular side wall for initial loose encirclement of a battery terminal post, an externally threaded tube protruding from said side wall, a sleeve screwed on said tube, a ferrule loosely slidable through said tube adapted to receive an end of a cable and having a flared outer end projecting from the tube and spaced from contact with the outer end of the tube and arranged to be abutted by said sleeve whereby screwing said sleeve onto said tube will advance said ferrule and said wall into clamping engagement with the post, an end wall on said ferrule having a concave transverse curvature, a longitudinal rib on said ferrule and a channel interiorly of said tube slidably receiving said rib for positioning said end wall in registering relation to the post and for holding said ferrule against turning in said tube.

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