

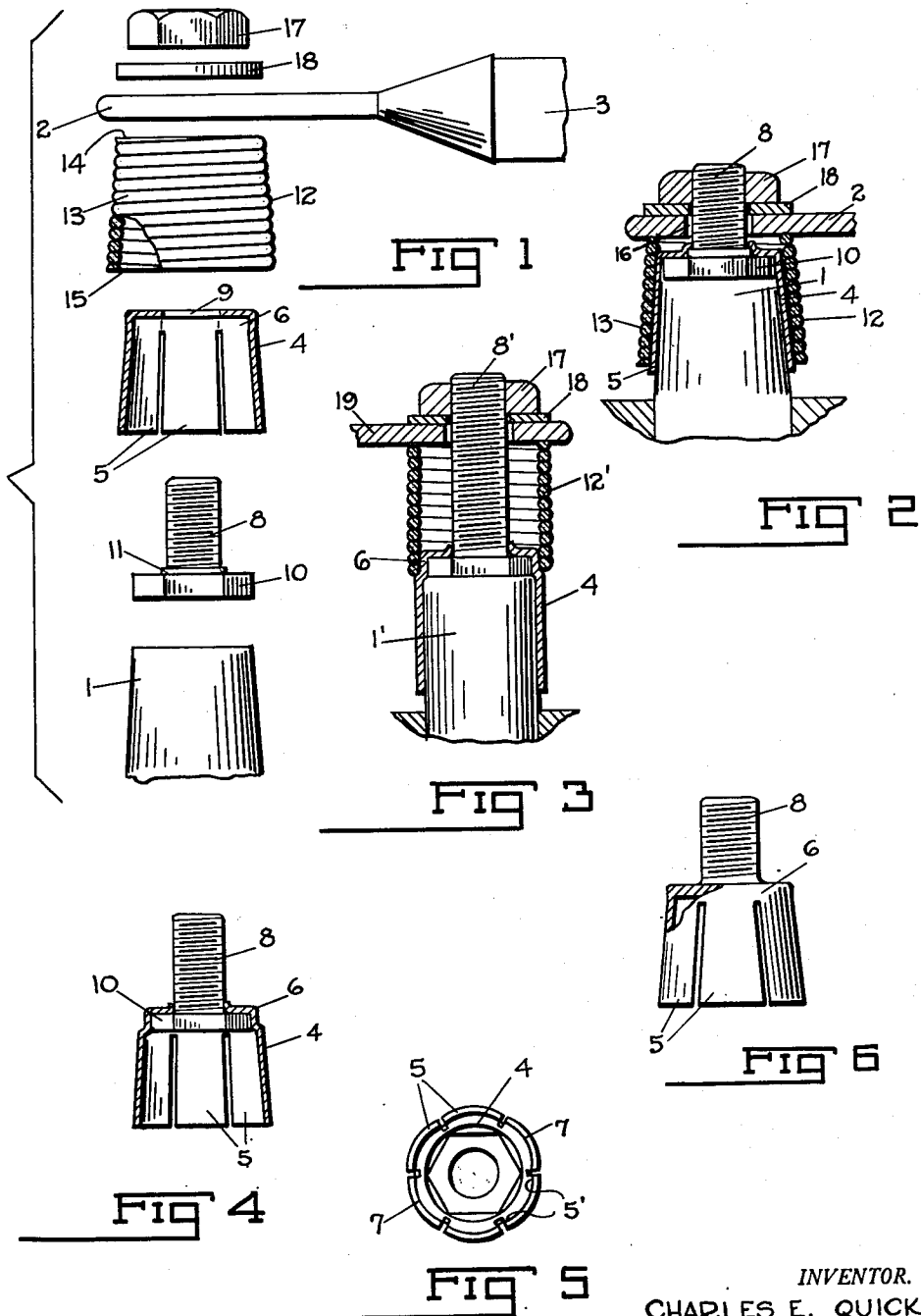
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TERMINAL CONNECTOR

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TERMINAL CONNECTOR

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This invention relates in general to terminal connectors and in particular to a battery cable terminal connector adapted for rapid installation and removal, and positive physical and electrical connection to the battery post.

Present day cable terminals have many detrimental features which I have overcome with my invention. The standard cable terminal now in use is difficult to apply and to remove. The threads on the mounting screw are often stripped or the bolt is bent by the force applied to the nut. The battery post is often defaced and bent and the battery case and cell plates are damaged by excess forces imparted to the terminal lug in its application and removal.

When a battery terminal is once applied it is difficult to spread the split member to effect removal thereof. Corrosion renders the terminal unfit for further use, and replacement of same must be made. This usually necessitates replacement of the entire cable and results in expense and loss of time. It has been found, in certain emergency situations, particularly in military use, that the terminal must be quickly removed to prevent fire, short-circuits and the like. The standard type terminal cannot be removed quickly.

To overcome these deficiencies and to provide an improved type terminal connector, it is one object of my invention to provide a battery cable terminal with a thimble or post gripping member, a ferrule or sleeve surrounding the post gripping member, and means for urging the ferrule down on the thimble to force said thimble into post gripping position.

It is another object of the invention to provide in a battery cable terminal of the class described, a multi-fingered thimble, each finger of the thimble being formed, in cross-section, on an arc smaller than the radius of the battery post, whereby application of a ferrule or sleeve about the thimble will urge the fingers of the thimble into post conforming position and will provide for a secure mechanical and electrical contact with the battery post.

One more object of the invention is to provide a battery cable terminal of the class described employing a thimble and a ferrule, a portion of the thimble having an inside configuration conforming to the periphery of the terminal bolt head to firmly grip and prevent said head from turning.

And one more object of the invention is to provide in a terminal connector of the class described, a thimble having a plurality of fingers, 55

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a reduced crown portion where the fingers are joined, a ferrule adapted to slip over the crown portion and be forced into finger surrounding position to urge the fingers against and into gripping contact with a central post or terminal.

And it is another object of the invention to provide in a terminal connector of the class described, a thimble having a plurality of fingers extending from a crown portion, the cross-sectional arc of each finger being less in radius than the radius of the terminal surface which it contacts, the crown portion being reduced and polygonal in cross section, the cross sectional configuration of the thimble at the juncture of the reduced portion and the fingers being substantially circular, a threaded stem extending from the crown, a ferrule receivable on the crown and the threaded stem, the conductor cable terminal or tang as it is called in the trade or other flat member received on the stem and bearing against the ferrule, a nut on the stem for forcing the ferrule down against the fingers to urge them against the terminal post and change the cross sectional configuration of the fingers into conformity with the surface of the post.

Still another object of the invention is to provide in a terminal connector of the class described, a ferrule formed of a helically wound wire, bonded into an integrated structure by coating with lead or a similar material, lead being preferred because of its anti-corrosive qualities, the helical wire ferrule possessing sufficient rigidity to serve its function in the terminal gripping process and sufficient flexibility to permit shaping to the configuration of the terminal on which it is used.

Another object of the invention is to provide in a terminal connector of the class described, a collapsible ferrule formed of a helically wound wire, bonded into an integrated structure by coating with lead or a similar material, a helical or spiral groove being formed, whereby emergency removal of the ferrule and the terminal may be effected by unwrapping the helically wound wire, breaking the bond in the groove between the adjacent wires by pulling on the end of said wire.

And another object of the invention is to provide a cable terminal which can be firmly secured to a battery post and retained permanently thereon, the cable connector being easily and quickly applied to or removed from the cable terminal without damage to the cable, the terminal or tang, the battery post or the battery box.

Further objects and advantages, as well as the

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construction, installation and use of my invention will be better understood by reference to the following description in connection with the accompanying drawing in which:

Fig. 1 is a disassociated view of my invention used on a battery terminal post, some of the parts being shown in section and some in elevational view.

Fig. 2 is a cross-sectional view of the assembled battery terminal connector applied on a tapered post.

Fig. 3 is a cross-sectional, partly disassociated view of a modified form of my invention for use on a straight post or shaft, parts being shown in elevation.

Fig. 4 is an elevational view of one form of thimble used in my invention.

Fig. 5 is a bottom plan view of the thimble showing the various configurations of the parts thereof.

Fig. 6 is a cross-sectional view of a modified form of thimble.

Referring now to the drawings by numerals of reference, 1 indicates a post on a battery or a similar extension to which it is desired to affix a terminal or tang 2, on a cable 3 or any other similar member. The battery post is normally tapered as shown and my device is designed for use on these tapered posts.

A thimble or cup-shaped member 4 has a plurality of spaced fingers 5 terminating in a reduced crown 6. The fingers are readily flexed when pressure of ferrule is applied to form a thimble, adaptable to either tapered or straight posts, circular or polygonal in cross-section.

In cross-sectional configuration each of the fingers is arcuate in shape as shown at 7, the radius of the arc being preferably less than the radius of the post 1 for the purpose hereinafter specified.

The reduced crown 6 carries a bolt 8 which passes through opening 9 in the thimble, head 10 of the bolt being held from turning by reduced crown 6 have the same configuration and closely fitting the head of the bolt. The bolt and thimble can be leaded and sweated together if desired, forming a unitary structure. A shoulder 11 adjacent the head 10 of the bolt may be employed to tightly fit the opening 9 in the thimble and be staked thereto.

Adapted to surround the thimble and urge same against the post 1 for suitable mechanical and electrical contact therewith, is ferrule 12 preferably formed of wire 13 of suitable cross-sectional shape, round wire being found most suitable because of easy availability and cost. Copper wire is preferred as it is easily bonded and/or coated with lead and is more resistant to corrosion than many other materials. Copper is also an excellent electrical conductor and possesses flexibility characteristics useful in this invention.

The structure forming the ferrule 12 may be an integrated one having a helically reduced wall thickness, and in one form of my invention the ferrule is circular and tapered to conform to the round taper of the battery post 1. The top and bottom of the ferrule is flattened as shown at 14 and 15.

After forming, the leaded ferrule may be subjected to heat to fuse the leaded wire together and form an integrated structure. Additional coats of lead may be given the entire ferrule after it has been formed.

In assembly and use of my cable terminal, the

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thimble 4 is placed on the battery post 1 and the ferrule 12 is dropped over it, the top of the ferrule normally being above the reduced crown. The terminal or tang 2 with suitable opening 16 therein is placed on the bolt 8 and a nut 17 fitted to the bolt. In actual practice it is preferable to employ a washer 18 between the nut and the terminal.

As the nut is turned, the ferrule 12 is forced down on the thimble urging the thimble into intimate engagement with the post 1, the edges 5' of the fingers cutting slightly into the post as the fingers 5 are flattened against said post, making a positive mechanical and electrical contact with the post, without objectionable tightening of the smallest inside diameter of the ferrule about the reduced crown.

In the modification shown in Fig. 3, the post or shaft 1' is shown with straight sides, with the thimble 4 the same as used in the form previously described. The ferrule 12', however, although formed of helically wound wire, is cylindrical in shape with substantially straight sides, the inside diameter being fractionally less than the outside diameter of the thimble on the post and freely fitting the reduced crown.

The bolt 8' may be of sufficient length to extend through and beyond the ferrule for reception of a connector or a flat member 19, and the nut 17. The end of the ferrule will freely fit the reduced portion or crown 6 of the thimble and rotation of the nut 17 will force the ferrule onto the thimble urging the fingers against and into intimate engagement with the post or shaft 1'. The fingers 5 assuming substantially the circular configuration of the post.

The flat member 19 may be the hub of a pulley or any similar member. Removal of said member 19 is easily and quickly effected by removing nut 17, the thimble and ferrule remaining on the post or shaft. If removal of the ferrule is desired, the end of the helically formed ferrule can be grasped with a pair of pliers and pulled, uncoiling the ferrule until it no longer exists as such.

The cost of manufacturing a ferrule of this type, as well as the other parts of my device is almost negligible compared to the cost of damage done when replacing present day battery cable terminals. Consequently, to replace the ferrule or other parts of my invention is less expensive than replacing a cable terminal used at present, particularly in view of the fact, that, as a rule, the entire cable together with the terminal must be replaced, it being far too costly to remove the old terminal and replace it by soldering on a new one. It is obvious that the terminal or connector comprising my invention will require little or no replacement or attention, and should replacement be required, the replacement cost would be very low.

In Fig. 6 I have shown a modified form of thimble, the bolt 8, crown 6 and fingers 5 being formed as an integral unit of one piece of material. The crown 6 in this instance must be reduced as previously specified but it may be of any shape; circular, polygonal or the like, the ferrule corresponding to the shape of the crown and both the crown and the ferrule being shaped to correspond with the configuration of the post on which they are employed.

From the foregoing it will be apparent that I have provided a connector for battery cable terminals which is simple and inexpensive in construction, quickly and easily applied to and re-

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moved from the battery post and which provides a positive mechanical and electrical contact with the post. It is also apparent that my device provides a positive means for connecting a pulley or other member to a shaft, employing exactly the same structure used for the battery cable terminal.

Obviously, changes in form, proportion and details of construction may be resorted to without departing from the spirit of my invention and I reserve all rights to such changes as come within the scope of these specifications and the claims which follow.

What I claim as new and desire to secure by Letters Patent is:

1. In a cable connector of the class described, a ferrule having spiral convolutions, said ferrule being spirally rupturable for facilitating the disconnecting of the cable connector, a rupturable material bonding adjacent convolutions of the ferrule.

2. In a cable connector of the class described, a ferrule having a wall thinned down spirally by grooves providing a rupturable ferrule for facilitating the disconnecting of the cable connector.

3. A cable connector of the class described for mounting on a terminal post and including the cable tang, a flexible thimble, a ferrule receivable on the thimble, a threaded member on the thimble, and a nut bearing against the cable tang forcing the ferrule, thimble and terminal into intimate contact with each other in the order named, spiral grooves in the ferrule rendering the ferrule spirally rupturable and removable by drawing on one end thereof.

4. A cable connector of the class described for mounting on a terminal and including the cable tang, a thimble having a polygonally shaped reduced crown, a ferrule receivable on the thimble, the smallest inside diameter of the ferrule being slightly larger than the largest outside di-

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mension across the reduced crown, a fastening member on the thimble, said fastening member including a bolt having a polygonally shaped bolt head receivable in the reduced crown, a nut on the bolt, said fastening member, nut and cable tang cooperatively forming means for forcing the ferrule down on the thimble and urging said thimble into intimate contact with the terminal.

5. In a cable connector of the class described, a ferrule formed of a spirally wound material, a rupturable bonding material between the convolutions of the spirally wound ferrule rendering said ferrule manually and spirally rupturable facilitating the disconnecting of the cable connector.

6. In a cable connector of the class described, a ferrule formed of a spirally wound material, a rupturable bonding material between the convolutions of the spirally wound ferrule, said bonding material being of good electrical conductivity and of a characteristic whereby said ferrule will be manually rupturable facilitating the disconnecting of the cable connector.

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