

M. W. ROBERTSON.
ELECTRICAL CONNECTOR.
APPLICATION FILED JUNE 24, 1920.

1,438,554.

Patented Dec. 12, 1922.

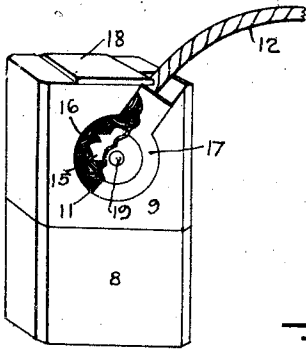


Fig. 1

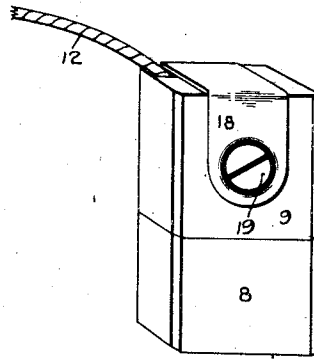


Fig. 2

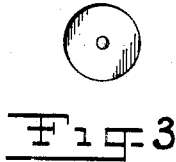


Fig. 3

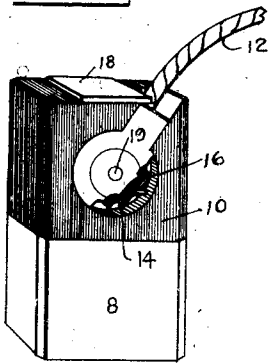


Fig. 4

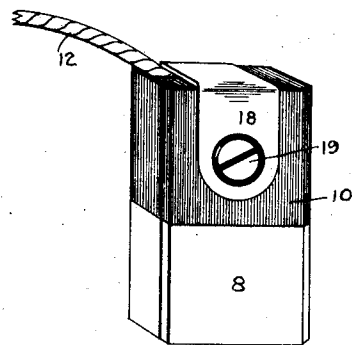


Fig. 5

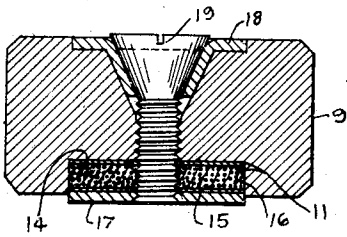


Fig. 6

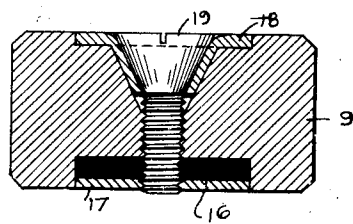


Fig. 7

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ELECTRICAL CONNECTOR.

Application filed June 24, 1920. Serial No. 391,337.

To all whom it may concern:

Be it known that I, MAXWELL W. ROBERTSON, a citizen of the United States, residing at Belle Harbor, L. I., in the county of Queens and State of New York, have invented certain new and useful Improvements in Electrical Connectors, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in electrical connectors and in the method of forming the same, and more particularly has reference to and is illustrated in the accompanying drawings in its application to a connector adapted for use upon the brush of an electrical machine such as a dynamo or motor. In order to establish good electrical connection I have found it desirable to not only bind the end of the flexible connector upon the brush, but to bind it within a recess preferably under heat with suitable solder in such a manner that the solder permeates or percolates and is forced between the strands of the end of the connector filling the entire recesses, thereby forming a solid integral mass with a maximum surface contact insuring the best possible electrical connection.

In the accompanying drawings I have illustrated in Fig. 1 in perspective a suitable carbon brush with the end of the electrical connector attached, parts being broken away. Fig. 2 is a view of the other side of the same. Fig. 3 is a perspective view of one of the soldering washers which may be employed. Fig. 4 is a similar view to Fig. 1 showing the brush partly tinned upon the outside. Fig. 5 is a view of the other side of the brush shown in Fig. 4. Fig. 6 is an enlarged cross-section of one of the brushes before the same has been heated and the binding screw turned down, and Fig. 7 is a similar view to Fig. 6 showing the result after the binding screw has been turned down while the solder is in molten condition.

8 indicates the carbon brush which may be first electrocopper plated upon the upper part as indicated at 9 and in addition to the copper plating the upper part may also be tinned as indicated at 10 in Figs. 4 and 5, although of course it will be readily understood that the tin may be limited to the recess or hole 11 within which the loop of the connecting tail 12 is seated as shown. Suitable washers of soldering material such

as half tin and half lead as shown in Fig. 3 are preferably first placed in the bottom of the recess 11 as indicated at 14 after which the loop 16 of the flexible connection or tail 12 may be introduced and then another washer of soldering material such as 15 may be applied, and lastly, the threaded locking member 17 may be applied. 18 indicates a suitable L-shaped clip adapted to pass over the top of the brush as shown and adapted to receive the screw 19 which also penetrates the brush and engages the threaded locking member 17. The combination is now loosely connected, in other words, the screw 19 has not been turned down tightly, leaving the strands of the loop 16 without any pressure thereon. The top of the brush is now preferably heated by any suitable means and as the temperature fuses the alloy or solder washers, the screw 19 is gradually turned down compressing the strands of the loop 16 and at the same time forcing the molten solder therein, and into all of the crevices of the recess 11 until finally the entire contents are formed in a compact integral mass making the fullest possible and most perfect electrical contact, thereby insuring a maximum conductivity as indicated in Fig. 7.

The foregoing method is quite different from the old method of forming the loop in a die and then inserting in the recess of the brush and squeezing it down tight, by a screw such as 19. By this old method there is only an imperfect connection established, First, because the loop as formed in the die is necessarily slightly smaller than the recess in which it is to be compressed, otherwise it would be difficult to force it therein, and secondly, because once it is squeezed therein there are air spaces around it and the individual strands, and between the strands and the entire surface of the recess, whereas according to my preferred method, these air spaces are entirely filled with solder material and increase the contact and electrical conductivity of the connection practically excluding every particle of air while at the same time the connection can be made without the necessity of especially forming the loop by forced compression in any particular form of die. The loop used in my method may be merely given the approximate form or shape that it is to assume in the brush and when pressure is applied by the screw 19, the loop takes its final form

and at the same time the molten solder fills all other space within the recess.

Of course it will be understood that various modifications may be made in the construction and arrangement of parts and in the method of uniting the same without departing from the spirit of the same.

I claim:

1. The method of connecting the brush of a dynamic electrical machine and the end of a connector therefor comprising the introduction of that part of said connector within a recess in said brush together with material of good electrical conductivity having a fusing point lower than said connector, heating the combination beyond said fusing point and applying pressure thereto forcing the fused material between said connector and said recess.

2. In combination with the carbon brush of an electrical machine, a recess in one side and a clamp adapted to engage said recess, a screw adapted to penetrate said brush for drawing said clamp within said recess, a lining in said recess and fusible washers therein adapted to be penetrated by said screw and secured at each side of the loop end of the connector to be retained therein, said washers being adapted to fuse upon the

application of heat as said clamp is drawn within said recess.

3. The method of attaching a flexible conductor to a carbon brush consisting in first coating a portion of the brush with metal, then assembling the conductor and solid solder with the brush adjacent the metal coated portion thereof, then assembling a securing element to hold the assembled parts together, and finally applying heat to the assembled parts in order to melt the solder and cause it to integrally unite the parts together.

4. The method of securing an electrical conductor between and in electrical contact with a washer plate and a metal-plate carbon brush, consisting in positioning a pre-formed eye on the conductor between the plate and brush with sheets of fusible material between said eye and said plate and brush, passing a fastener through said brush, plate, eye and sheets to initially bind them together, and applying heat to melt said sheets of fusible material and thereby solder the eye to the brush, plate and fastener.

In testimony whereof I hereunto affix my signature.

MAXWELL W. ROBERTSON.