No. 661,669. Patented Nov. 13, 1900.

A. L. ROHRER.

CONNECTING CONDUCTORS TO CARBON BRUSHES.

(Application filed July 22, 1898.)

(No Model.)

FIG. 1.

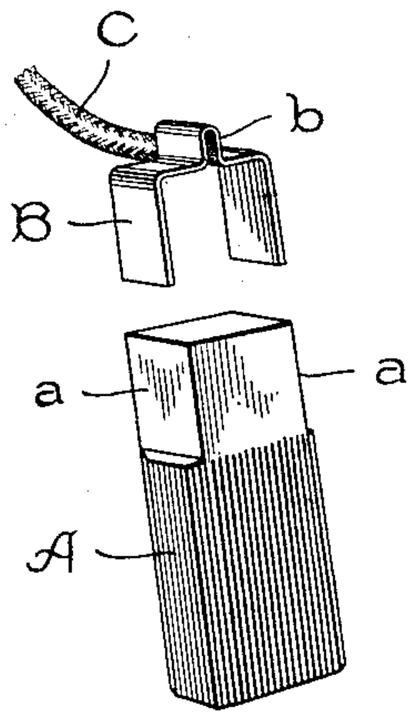
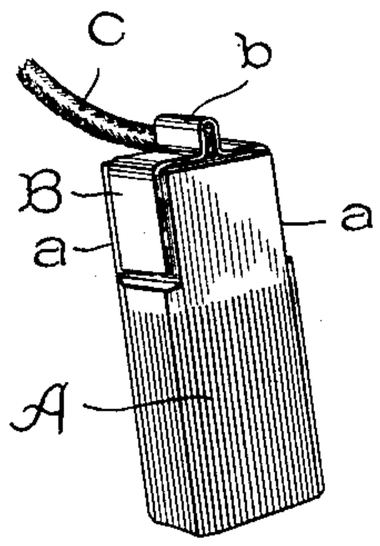


FIG. 2.



WITNESSES.

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ALBERT L. ROHRER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

CONNECTING CONDUCTORS TO CARBON BRUSHES.

SPECIFICATION forming part of Letters Patent No. 661,669, dated November 13, 1900.

Application filed July 22, 1898. Serial No. 686,579. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. ROHRER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Connecting Conductors to Carbon Brushes, (Case No. 823,) of which the following is a specification.

My present invention relates to connecting conductors to carbon brushes for dynamo-electric machines or motors, and has for its object to provide an efficient contact for the conductor which shall enable it to carry without undue heating the full current transmitted to the brush. The process of uniting the conductor and the brush is also embraced within the invention. It has been the common practice in the art to transmit the current from brushes by contact, a spring or plate being pressed against the brush. This has not been efficient, the contact not being sufficient, unless of very large area, to carry the current to the brush. When made of sufficient area, the device has been clumsy and uncommercial, and in either case the current passing through the spring causes it to lose its elasticity. Another method of making connection between the brush and the flexible conductor commonly used to carry the current has been to bore a hole in the brush and insert in that a plug of solid conducting metal to which the flexible conductor has previously been secured. This has not been, however, a good form of connection except for small brushes, the main difficulty being to drill the hole in the carbon brush in such shape that the plug can be made to fit it. It is difficult, on account of the softness of the carbon, to bore the hole without making it taper toward the bottom, and in many cases the plug will only make good contact at or near the bottom of the hole. Various other forms of connection have been devised, but none, so far as I am aware, have proved thoroughly efficient.

To overcome the difficulties pointed out, I have devised my present invention, one part of which consists in a clip designed to fit over the outside and top of the brush and to which the conductor has previously been secured. This clip is soldered firmly to the brush, and the joint is afterward electroplated with copper or other good conducting metal. Of course the brushes, as is the common practice, are previously electroplated with copper, at least at the portion at which the clip is connected. I preferably also cut away the sides of the brush over which the clip fits, so that the outer surface of the clip and the main body of the brush are in the same plane, and thus the latter may slide easily in the box commonly provided for it on the brush-holder.

Another part of the invention consists in the process of uniting the brush and clip, presently described more fully.

The accompanying drawings show my invention.

Figure 1 is a perspective view of the brush with the clip about to be applied thereto, Fig. 2 being a similar view of the completed article of manufacture.

In Fig. 1, A is the brush, and *a a* are the parts of the sides which are cut away to take the clip B. The latter is formed with a loop *b*, in which the flexible conductor C, formed, as is the common practice, of braided wires, is compressed and soldered. The form of the clip B is such as to just make a snug fit with the cut-away portion *a* of the brush. In practice in the manufacture of the brushes they are first coated with hard solder, as indicated in the unshaded portion of Fig. 1, over that part of the brush which will be covered by the clip B. The latter is then applied and held firmly while soldered in place, the whole end of the brush and clip being heated in any desired manner to effect this. The surplus solder is then brushed off and the brush cooled, so that the clip adheres to it firmly. Afterward, if necessary, the joint is electroplated with copper or other good conducting metal, copper of course being preferred. It will be noted that the end of the braided-wire conductor C is held against the end of the brush by the clip.

By the construction outlined I obtain a thoroughly good contact of ample area to carry any current which the brush itself is designed to transmit. The contact never becomes impaired during the life of the brush and, so far as I am aware, it has corrected

all the principal difficulties attending the use of carbon brushes for the transmission of current.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A carbon brush, a plating of good conducting metal thereon, a conductor united integrally with said metal plating, and a yielding non-resilient conductor connected in good conducting relation to said conductor.

2. A carbon brush, a plating of good conducting metal thereon, a conductor soldered to said plating, and a yielding non-resilient conductor connected in good conducting relation to said conductor.

3. The means described for carrying current from the brush to the stud in a brush-holder, consisting of a flexible non-resilient conductor provided with a clip making a close fit with the brush.

4. The conductor C having the strip B secured to the carbon brush A and provided with the loop *b*, in which the conductor is compressed and soldered.

5. A carbon brush provided with a metallic clip of large surface integrally united therewith and having no movement independent thereof, and a flexible non-resilient conductor secured in said clip.

6. A carbon brush having a metallic clip of large surface secured thereto in good conducting relation and having no movement independent thereof, and a flexible non-resilient conductor secured in good conducting relation in said clip.

7. The means for making connection between a carbon brush and a flexible non-resilient conductor, which consists of a conducting-strip making intimate and extensive contact with the surfaces of the brush and of the flexible conductor.

8. The combination with a carbon brush, of a clip making contact with said carbon brush, and a conductor making contact with said brush and clip.

9. The combination with a carbon brush, of a rigid conducting-plate intimately associated therewith, and a flexible non-resilient conductor secured to said plate.

10. The combination with a carbon brush, of a rigid conducting-plate united integrally therewith, and a flexible non-resilient conductor secured to said plate.

11. The combination with an electroplated carbon brush, of a rigid conducting-clip soldered thereto, and a flexible non-resilient conductor attached to said clip.

12. The combination with a carbon brush, of a conducting-clip secured thereto, and a flexible non-resilient conductor held compressed by said clip.

13. The combination with a carbon brush, of a conducting-clip secured thereto, and a flexible non-resilient conductor compressed and soldered to said clip.

14. A carbon brush having its surfaces engaged by the flat surfaces of a conducting-strip, said strip having secured to it a flexible non-resilient conductor.

15. A carbon brush, a plating of good conducting metal thereon, a conductor soldered to said plating, and a yielding non-resilient conductor soldered to said conductor.

16. A carbon brush, a plating of good conducting metal thereon, a conductor integrally united with said plating, and a yielding non-resilient conductor soldered to said conductor.

17. A carbon brush, a plating of good conducting metal thereon, a conductor soldered to said plating, a yielding non-resilient conductor connected in good conducting relation to said conductor, and a plating of good conducting metal on the joint between the conductor and the plating.

18. A carbon brush, a plating of good conducting metal thereon, a conductor soldered to said plating, and a flexible conductor connected in good conducting relation with said conductor.

19. In combination a carbon brush, a braided-wire cable and a contact-piece secured to the brush in such manner that full current may be transmitted from the brush to the cable.

20. The combination with a carbon brush, of a braided-wire cable in electrical communication therewith, and a contact-piece rigidly connected to said brush and conductor.

21. The combination with a carbon brush, of a metallic strip secured thereto, and a braided-wire cable secured to said strip.

22. The combination of a brush having a cut-away portion *a* with a strip of conducting material registering with the cut-away portion, so that the strip and sides of the main body of the brush are in the same plane, and a conductor attached to the strip.

23. As a new article of manufacture, a carbon brush having a cut-away portion *a* designed to register with a conducting-strip for collecting current.

24. A carbon brush having a cut-away portion, and a rectangular strip of good conducting metal soldered to the cut-away part of the brush, with a flexible conductor secured in a loop in the strip.

25. A carbon brush having a cut-away portion, a clip soldered to the cut-away part of the brush, the joint being electroplated with copper, and the clip having a loop in which a flexible conductor is compressed and soldered.

26. The method, which consists in plating a carbon brush with good conducting metal, and then uniting with said plating, a conductor to which a yielding non-resilient conductor is connected in good conducting relation.

27. The method, which consists in plating a carbon brush with good conducting metal, and then soldering thereto a conductor to which a yielding non-resilient conductor is connected in good conducting relation.

28. The method, which consists in integrally uniting with a carbon brush, a con-

ductor to which a yielding non-resilient conductor is connected in good conducting relation.

29. The method, which consists in uniting in good conducting relation with a carbon brush, a conductor which is integrally united with a yielding non-resilient conductor.

30. The method, which consists in integrally uniting a yielding non-resilient conductor with a second conductor, and then integrally uniting the latter with a carbon brush, whereby the yielding conductor is united integrally with the brush.

31. The method, which consists in soldering a yielding non-resilient conductor to a second conductor, and then integrally uniting the latter with a carbon brush.

32. The method, which consists in plating a carbon brush with good conducting metal, and soldering thereto a conductor to which a yielding non-resilient conductor is soldered.

33. The method, which consists in plating a carbon brush with good conducting metal, soldering thereto a conductor to which a yielding non-resilient conductor is connected in good conducting relation, and finally electroplating the joint between the plating and said conductor with good conducting metal.

34. The method, which consists in uniting with a carbon brush, a conductor to which a yielding non-resilient conductor is connected in good conducting relation, and then electroplating the joint between the brush and said conductor with good conducting metal.

35. The method, which consists in plating a carbon brush with good conducting metal, and integrally uniting therewith a conductor to which a yielding non-resilient conductor is soldered.

36. The method, which consists in plating a carbon brush with good conducting metal, soldering thereto a conductor to which a yielding non-resilient conductor is connected in good conducting relation, and then electroplating the joint between the plating and said conductor with good conducting metal.

37. In combination, a carbon brush, a metallic clip secured in good conducting relation therewith, and a flexible non-resilient conductor held mechanically by said clip in good conducting relation therewith.

38. A carbon brush having a metal plating on its exterior surface at one end, a metal clip soldered to the plating, the clip being formed with a loop, and a flexible cable held in the loop.

In witness whereof I have hereunto set my hand this 18th day of July, 1898.

ALBERT L. ROHRER.

Witnesses:

B. B. HULL,

TESSA L. MCMAHON.