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BRUSH FOR DYNAMO ELECTRIC MACHINES AND METHOD OF ATTACHING CONDUCTORS THERETO.

APPLICATION FILED SEPT. 28, 1912.

1,210,029.

Patented Dec. 26, 1916.

Fig. 1.

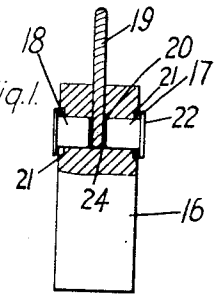


Fig. 3.

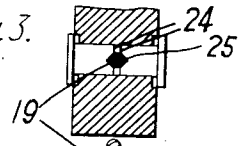


Fig. 2.

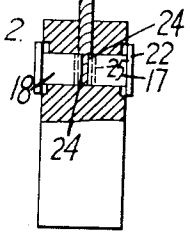


Fig. 4.

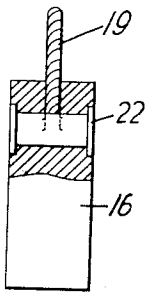


Fig. 5.

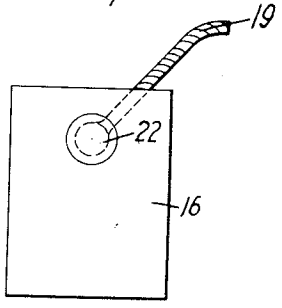


Fig. 6.

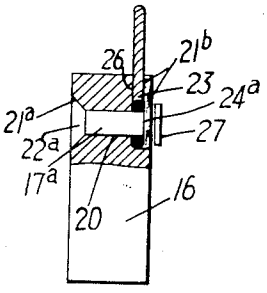


Fig. 7.

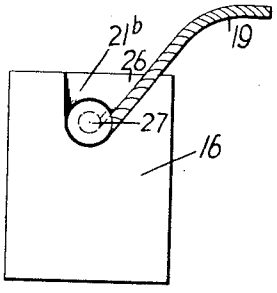
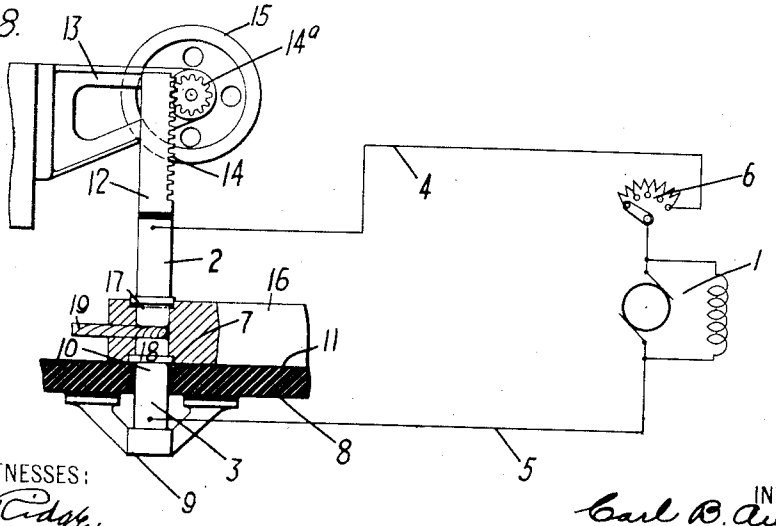


Fig. 8.



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BRUSH FOR DYNAMO-ELECTRIC MACHINES AND METHOD OF ATTACHING CONDUCTORS THERETO.

1,210,029. Specification of Letters Patent. Patented Dec. 26, 1916.

Application filed September 28, 1912. Serial No. 722,972.

To all whom it may concern:

Be it known that I, CARL B. AUEL, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Brushes for Dynamo-Electric Machines and Methods of Attaching Conductors Thereto, of which the following is a specification.

My invention relates to brushes for dynamo-electric machines and to methods of attaching conductors thereto.

One of the objects of my invention is to provide a device of the above-indicated character having a flexible conductor or pig-tail intimately secured to the brush member in such manner that a particularly efficient electrical contact is obtained between the conductor and the brush member, whereby losses of energy incident to high contact resistance are obviated and undue heating is prevented.

Another object of my invention is to provide a simple and effective method of securing flexible conductors to the brush members which may be readily practised with considerable economy and which produces results heretofore unattained.

Another object of my invention is to connect the flexible conductor to the brush member by means of a rivet or rivets of material like that of the conductor, said parts being fused or welded together to form a unitary member of homogeneous material of high electrical conductivity.

My invention may best be understood by reference to the accompanying drawing in which—

Figure 1 is a view, partially in section and partially in front elevation, of a device embodying my invention, the component parts thereof being shown in their initial positions, Fig. 2 is a view similar to Fig. 1 and embodying a modification of the device shown therein, and Fig. 3 is a plan view, partially in section, of the parts shown in Fig. 2. Fig. 4 is a view, similar to Figs. 1 and 2, of a completed device showing the positions of the various parts after the operation has been completed, and Fig. 5 is a view, in side elevation, of the device shown in Fig. 2. Figs. 6 and 7 are, respectively, views similar to Figs. 1 and 5, of a device embodying another modified form of my invention, and Fig. 8 is a partially diagrammatic view of apparatus and circuit connections which may be employed in practising my invention.

Referring particularly to Fig. 8, a generator 1 or other suitable source of energy is adapted to deliver energy to a plurality of electrodes 2 and 3 through conductors 4 and 5 and an adjustable resistor 6 or other well-known means for effecting changes in the circuit conditions. The electrode 3 is adapted to project through an opening 7 in a supporting bed-plate or table 8, preferably of insulating material, such as slate or the like, and the said electrode 3 is secured in position by means of a bracket member 9. The upper end 10 of the electrode 3 is disposed in the plane of the upper surface 11 of the supporting plate or table 8, for a purpose to be hereinafter set forth. The electrode 2 is secured to, and insulated from, an adjustable member 12 which is supported in position by means of a suitable bracket 13. The member 12 is provided with a plurality of teeth 14 which are adapted to coöperate with the teeth of a pinion 14^a that is mechanically associated with a hand-wheel 15 or other suitable device by means of which the electrode 2 may be raised or lowered in position.

Reference may now be had to Figs. 1, 4 and 5 in which a device is shown comprising a brush member 16 of carbon, graphite or other similar material, a pair of rivets 17 and 18, and a flexible conductor 19. The brush member 16 is provided with a lateral opening 20 which is preferably located near the upper end thereof and embodies enlarged end recesses 21. The rivets 17 and 18 are of like construction and are preferably made of copper or other material of high electrical conductivity, although I do not wish to be restricted in this respect. Each of the rivets 17 and 18 is provided with an enlarged head 22 which is adapted to be disposed in the recesses 21, hereinbefore mentioned. The flexible conductor 19 preferably constitutes twisted or braided copper threads or strands, such as are commonly employed as pig-tails for brushes of this character, although other forms of conductors may be employed.

In practising my invention, the rivets 17

and 18 are severally disposed in the opposite ends of the opening 20 after which one end of the conductor 19 is inserted longitudinally into the central portion of the opening 20 so that it is interposed between the adjacent flat ends 24 of the rivets 17 and 18, as shown clearly in Fig. 1. Having assembled the component parts of the device in the manner hereinbefore described, the device is placed upon the supporting bed plate 8 of the apparatus shown in Fig. 8 in such manner that the head 22 of one of the rivets 18 rests upon the upper end 10 of the electrode 3 after which the electrode 2 is brought into coöperative engagement with the head 22 of the upper rivet 17 by means of the hand wheel 15 and rack-and-pinion connection already set forth. Assuming the parts in the positions shown in Fig. 8, the desired amount of current is supplied thereto from the generator 1 through the adjustable resistor 6, and, at the same time, pressure is exerted upon the rivets 17 and 18 and the interposed flexible conductor 19 through the agency of the hand wheel 15. Thus, the rivets 17 and 18 and the conductor 19 are electrically welded together through the application of heat and pressure in a well-known manner. During this operation, the upper rivet 17 is forced downwardly into intimate engagement with the brush member 16 so that the head 22 thereof is pressed into the upper recess 21. It will also be understood that the rivets 17 and 18 and the conductor 19 are fused together to form a unitary member of homogeneous material having high electrical conductivity, whereby the conductor 19 is intimately secured or attached to the brush member 16 in such manner that comparatively no losses of energy result by reason of poor electrical conductivity or contact.

Although I consider the apparatus hereinbefore described as particularly applicable for the purposes intended, it is obvious that my invention is not limited specifically to electric welding, as any other means of securing the same result may be employed.

Referring to Figs. 2 and 3, the device shown is similar, in structure and arrangement of parts, to that already described and differs only in that the adjacent ends 24 are severally provided with notches or recesses 25 to receive the end of the flexible conductor 19, as is clearly shown in Fig. 3.

Referring now to Figs. 6 and 7, the brush member 16 is provided with an opening 20 having a countersunk recess 21^a at one end and an enlarged recessed portion 21^b at its opposite end. A suitable rivet 17^a, having a head 22^a adapted to conform to the countersunk recess 21^a, is inserted into the opening 20, the end 24^a thereof projecting slightly beyond the inner surface 26 of the recess 21^b. The lower end 23 of the conductor 19 is inserted in the recess 21^b and is wrapped around the projecting end 24^a of the rivet 17^a in intimate contact therewith. A disk 27 of suitable material, preferably like that of the rivet 17^a, is then disposed against the end 24^a of said rivet, and the brush 16 with its associated parts is then placed in position upon the welding apparatus already shown and described, and the disk 27, rivet 17^a and conductor 19 are electrically welded or fused together, as will be readily understood.

Although I have shown and described a structure embodying specific details and arrangement and location of parts, as well as having set forth a method embodying a specific series of operations, it is evident that many variations may be effected in the resulting product and in the mode of procedure without departing from the spirit and scope of my invention, and I desire that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. A method of attaching a conductor to a dynamo-electric machine brush having an opening therethrough which consists in inserting metallic members into the opposite ends of said opening, interposing a portion of said conductor between the adjacent ends of said metallic members, and uniting said parts by means of heat and pressure.

2. A method of attaching a conductor to a dynamo-electric machine brush having an opening therethrough which consists in inserting metallic members into the opposite ends of said opening, placing a portion of said conductor in contact with at least one of said metallic members, and fusing said parts together to form a homogeneous mass of high electrical conductivity.

3. A method of attaching a conductor to a dynamo-electric machine brush having an opening therethrough which consists in inserting metallic rivets into the opposite ends of said opening, placing a portion of said conductor in contact with said rivets, and welding said parts together to form a unitary homogeneous structure.

4. A method of attaching a flexible copper conductor to a carbon brush having an opening therethrough, which consists in inserting copper rivets into the opposite ends of said opening in abutting relation, interposing a portion of said flexible conductor between the adjacent ends of said rivets, and welding said parts together by the application of heat and pressure to form a homogeneous mass of high electrical conductivity.

5. A brush for dynamo-electric machines comprising a main body member having a lateral opening therethrough, metallic rivets of good conducting material respectively having an enlarged portion in engagement

with said body member and other portions thereof disposed in said opening, and a flexible conductor of similar material projecting longitudinally into said body member and united to said rivets at their adjacent ends to form a homogeneous body of high electrical conductivity.

6. A method of attaching a flexible conductor to a dynamo-electric machine brush having a plurality of communicating openings therein which consists in inserting metallic members having grooved ends into the opposite ends of one of said openings, inserting a portion of said conductor into the other opening and into engagement with the grooved ends of said metallic members, and intimately uniting said parts by the application of heat and pressure to form a homogeneous mass of high electrical conductivity.

In testimony whereof, I have hereunto subscribed my name this 21st day of Sept., 1912.

CARL B. AUEL.

Witnesses:
A. B. KAIGHIN,
B. B. HINES.