J. S. DEAN.

CURRENT COLLECTING DEVICE.

APPLICATION FILED JUNE 4, 1915.

1,277,394. Patented Sept. 3, 1918.

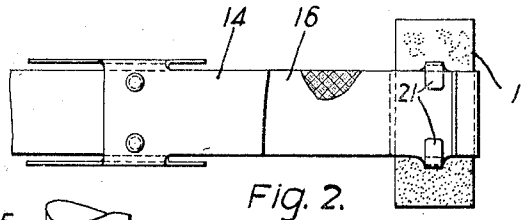


Fig. 2.

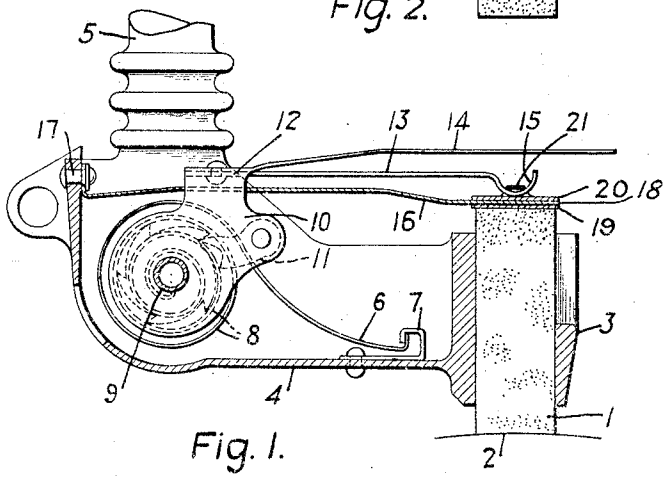


Fig. 1.

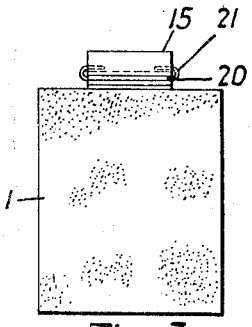


Fig. 3.

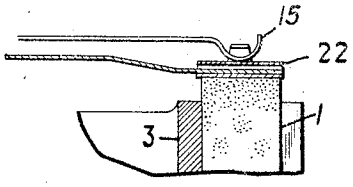


Fig. 4.

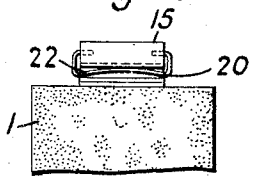


Fig. 5.

WITNESSES:

R. J. Ridge.

O. W. Kennedy

INVENTOR

John S. Dean.

BY

Wesley G. Carr

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN S. DEAN, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CURRENT-COLLECTING DEVICE.

1,277,394. Specification of Letters Patent. Patented Sept. 3, 1918.

Application filed June 4, 1915. Serial No. 32,210.

To all whom it may concern:

Be it known that I, JOHN S. DEAN, 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 Current-Collecting Devices, of which the following is a specification.

My invention relates to current-collecting devices for dynamo-electric machines, and it has for its object to provide an improved structure for use in connection with devices of the above-indicated character whereby certain operating difficulties which have been experienced in the prior art shall be obviated.

Current-collecting devices, as heretofore constructed, have usually consisted of a current-collecting member or brush adapted to be in engagement with a rotatable commutator cylinder or other current-delivering surface and supported by means of a suitable body member or brush holder. The brush is usually held in operative relation with respect to the coacting rotatable member by means of a pressure-exerting member carried by the brush holder and engaging the brush.

It is well known that the current-carrying capacity of a brush holder is determined by the amount of current that the brush-holder body can transmit from the brush without excessive heating. For this reason, it has been customary to employ a current-carrying member of high conductivity connected in parallel circuit relation with respect to the brush-holder body and the brush. Such a conductor or shunt serves to divide the current taken to or from the brush and thereby materially reduces the heating of the brush-holder body. Heretofore, considerable difficulty has been encountered in securing a satisfactory electrical connection between the shunt and the brush by reason of the inherent mechanical properties of the usual brush material and the movements of the brush within the brush box. The shunts have been usually secured to the brush by rivets or by suitable metallic connecting members but such devices have proved unsatisfactory, as they are liable to become loosened and cause the brush holder to carry the total current, with resultant over-heating.

According to the present invention, I provide a conducting member that is particularly adapted for use as a shunt in connection with carbon or metal-carbon brushes. A shunt constructed in accordance with my invention is adapted to be interposed between the brush and the pressure-exerting means which arrangement insures that the shunt will retain its electrical connection with the brush as long as the brush holder remains in operative condition.

In the accompanying drawings, Figure 1 is a view, partially in side elevation and partially in section, of a current-collecting device embodying my invention; Fig. 2 is a plan view of a portion of the structure shown in Fig. 1; Fig. 3 is a view, in front elevation, of a portion of the parts shown in Fig. 1, and Figs. 4 and 5 are fragmentary views showing a modification of my invention.

The brush holder shown in the drawings is similar to the brush holder described in a copending application, Serial No. 848,848, filed July 3, 1914, now Patent 1,244,476, issued Oct. 30, 1917, by me and assigned to the Westinghouse Electric & Manufacturing Company.

The current-collecting device comprises a suitable current-collecting member or brush 1 that is in engagement with a commutator cylinder 2 of a dynamo-electric machine and is adapted to slide within a guiding aperture or brush box 3. The brush box 3 is disposed at one end of a brush-holder frame 4 and the latter is provided with an upwardly extending member 5 that is adapted to be secured to the frame of the dynamo-electric machine, (not shown) by a suitable clamping device. The brush holder 4 is further provided with a spring means 6 that is secured to the frame by suitable retaining means 7 and comprises a plurality of convolutions 8 of resilient material, the end of the innermost turn being secured to a centrally located sleeve member 9. The sleeve 9 extends through the coil 8 and is connected to a yoke member 10 through a suitable ratchet-and-pawl mechanism 11, shown in dotted lines, the yoke member 10 thus being movable with the coil 8. The bridge portion 12 of the yoke member 10 is provided with a projecting arm or finger 13 and a protecting shield member 14. The finger 13, preferably formed of flat spring material, extends outwardly and adjacent to the brush

holder box 3 and terminates in a substantially semi-cylindrical portion 15. A shunt 16, composed of suitable flexible conducting material, is secured, at one end, to the brush holder 4 by soldering or any other suitable means, such as a rivet 17, and terminates in a contact tip 18. The contact tip 18 comprises a flat plate 19, preferably composed of pure copper or other similar material having a high electrical conductivity, and a pressure plate 20, preferably composed of steel or other similar material having a relatively low electrical conductivity. The end portion of the shunt 16 is disposed between the plates 19 and 20 and the several members are secured together to form a substantially unitary structure by welding, brazing or otherwise. The pressure plate 20 is formed with a pair of oppositely disposed bent-over ears 21 that are adapted to embrace the cylindrical portion 15 of the spring member 13, as best shown in Fig. 3. There is sufficient clearance between the ears 21 and spring 13 to prevent wedging between the members. In Figs. 4 and 5 is shown a modification of the construction of the contact tip 18 of the shunt 16, wherein the pressure plate 20 is formed with a substantially cylindrically curved portion 22. The cylindrically curved portion 22 is disposed with the axis thereof at right angles to the axis of the semi-cylindrical portion 15 of the spring 13, as best shown in Fig. 5. This arrangement allows a substantially universal movement between the coacting cylindrically curved surfaces 15 and 22 so that the full pressure of the spring means 6 will always be applied to the plate 21 at a single point on the surface thereof for any position of the brush 1 within the brush box 3.

From the foregoing, it is apparent that a shunt provided with a contact tip constructed in accordance with my invention will always secure good electrical contact between the brush and the shunt, so long as the pressure-exerting means maintains its operative relation to the brush. The steel pressure plate provides a good wearing surface for the cylindrically curved portion of the spring, and the relatively high resistance of this plate, in comparison with the copper contact plate, insures that only a negligible amount of current will pass through the spring. Overheating of the spring is thereby effectively prevented and it will therefore retain its temper and resiliency, even though the brush holder be subjected to heavy overloads.

While I have shown my invention in a simple and preferred form and as applied to a certain type of brush holder, it is apparent that it may be applied to any other type of current-collecting device and is subject to only such limitations as may come within the scope of the appended claims.

I claim as my invention:

1. The combination with a brush holder, a brush carried thereby, and a spring for applying pressure to the said brush, of current-carrying means connected, at one end, to the said brush holder and provided, at the other end, with a plate in contact with the said brush, and a pressure plate having portions embracing the said spring.

2. The combination with a brush holder, a brush carried thereby, and a spring for applying pressure to the said brush, of an independently removable current-carrying means interposed between the said brush and the said spring and comprising a plate in contact with the said brush, a flexible conductor connected to the said brush holder and a pressure plate provided with projections embracing the end portion of said spring.

3. The combination with a brush holder, a brush carried thereby, and a spring for applying pressure to the said brush, the said spring terminating in a semi-cylindrical portion, of a current-carrying means interposed between the said brush and the said spring and provided with a pressure plate having a cylindrically curved portion the axis of which is at right angles to the axis of the semi-cylindrical portion of the said spring.

4. The combination with a current-collecting member, a holding member therefor, and means for applying pressure to the said current-collecting member, of a current-carrying means interposed between the said current-collecting member and the said pressure applying means, the said current-carrying means and the said pressure-applying means being provided with coacting cylindrically curved surfaces, the axes of which are disposed at right angles to each other.

5. The combination with a brush holder, a brush carried thereby, a current-carrying means connected at one end to said brush holder and at the other end to said brush, and a spring adapted to exert pressure on said brush, of a plate of relatively low resistivity interposed between said current-carrying means and said brush and a plate of relatively higher resistivity interposed between said current-carrying means and said spring.

6. The combination with a brush holder, a brush carried thereby and a spring adapted to exert pressure on said brush, of a flexible conductor having one end connected to said brush holder and the other end inserted between said spring and said brush, a contact plate composed of a metal of relatively high conductance interposed between said brush and said flexible conductor, and a pressure plate composed of a material of relatively low conductance, said contact plate, said pressure plate and said flexible

conductor being united to form a unitary structure.

7. The combination with a brush holder, a brush carried thereby and a spring adapted to exert pressure on said brush, of a flexible conductor having one end connected to said brush holder and having the other end inserted between said brush and said spring, a copper contact plate interposed between said flexible conductor and said brush, and a steel plate interposed between said spring and said flexible conductor, said copper plate, said flexible conductor and said steel plate being united to form a unitary structure.

In testimony whereof I have hereunto subscribed my name this 26th day of May, 1915.

JOHN S. DEAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."