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F. H. LORING.

BRUSH AND BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES.

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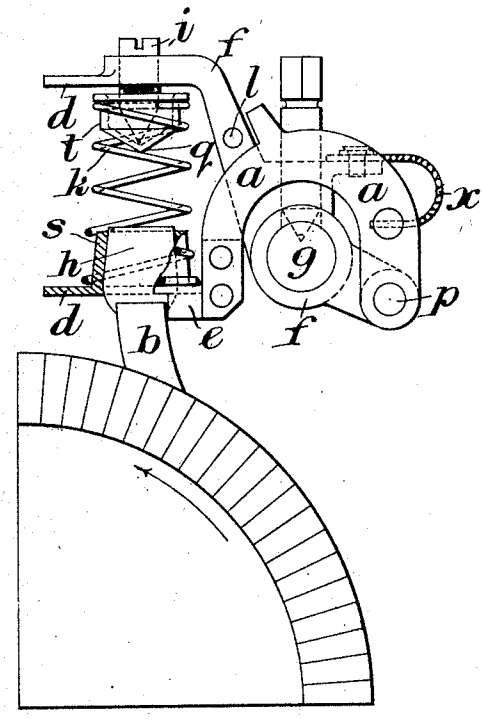

Witnesses:

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UNITED STATES PATENT OFFICE.

FREDERICK HENRY LORING, OF LONDON, ENGLAND.

BRUSH AND BRUSH-HOLDER FOR DYNAMO-ELECTRIC MACHINES.

No. 883,550. Specification of Letters Patent. Patented March 31, 1908.

Application filed November 4, 1907. Serial No. 400,570.

To all whom it may concern:

Be it known that I, FREDERICK HENRY LORING, a citizen of the United States of America, residing at 7 Doughty street, London, England, have invented new and useful Improvements in Brushes and Brush-Holders for Dynamo-Electric Machines, of which the following is a specification.

My invention is of the class known as brush-holders for dynamo-electric machines and comprises the brush-holder proper and the brush therefor, the latter being of carbon or like material.

The object of my invention is to provide a combined brush and holder which is cheap to manufacture; simple and compact in design; and more or less free from complicated and troublesome screw fixings, the brush being easily inserted in and ejected from its holder while its alinement in all directions is accurately and automatically accomplished. Freedom from rattle, good electrical contact with the brush, and a minimum of carbon waste are further features of my improved device. As the brush wears away, the position of the contact face remains unchanged, and the spring is applied at a most advantageous point. When several brushes are mounted on one stud, they may be set close to each other without their ends coming in contact and causing unnecessary friction.

The accompanying drawing shows how my invention may be carried out, according to one example thereof.

According to my invention, the lower or body portion *b* of the carbon brush takes in general a rectangular shape, or has a rectangular cross-section and is provided with an extension or head *h*, which is tapering and has a circular cross section. The taper head, practically an integral part of the brush proper, fits into a corresponding taper socket *s*. This taper both of the brush and the socket can be produced by a tool without hand labor and therefore the manufacture can be carried out at a minimum cost, and a good permanent fit is insured. The taper socket is fastened to a short arm *a* loosely carried on a pin *p* situated in a fixture *f* attached to the usual brush-holder-stud *g*. Situated over and pressing against the taper socket is a coiled or volute spring *k* having an abutment against the fixture *f* attached to the aforesaid stud. An intermediate screw *i* may be employed for adjusting the compression of the spring. Extending, preferably through the interior of the spring, a little way down, is a lug or point *q* against which the brush may be raised by hand when it is desired to eject it.

In order to keep the wearing face of the brush fixed in space, irrespective of the brush-depth, I give the part above described as the rectangular or body portion a curved shape, the curved sides of which, if developed into imaginary circles or concentric tubes would have a common axis coincident with that of the pin supporting the arm *a*, *a* carrying the socket. To insure the insertion of the brush so that its long side will be parallel with the commutator bars, I provide two ears *e* which extend from one or opposite sides of the socket and which act as shoulders against which one or both sides of the brush loosely rests. Other means may be provided for preventing the brush from turning round in its socket, as for example, the taper part may have a groove or slit or raised part to engage with a reverse part or indentation—the one fitting into the other.

The springs employed may be of the volute pattern made heavy enough to carry all the current, or flexible copper conductors *x* may be used for connecting the movable with the stationary part.

The application of the spring directly over the brush, while an advantage in some forms, may not necessarily be adhered to, since it would perform substantially the same function if situated at one side. Either a spiral or a clock-spring may be used.

For convenience in adjusting the spring pressure, I may provide an adjusting-screw in a boss formed on part of the holder, the screw being so placed as to bottom in a cup or thimble *t* fitted in the free end of the spring *k*. A stop *l*, secured in the main part and arranged in the path of the moving arm, may be provided. By this means the downward movement of the arm, as the brush wears away, is checked at any pre-determined point. Suitable finger-lips *d*, *d*, preferably in line with each other, may be provided to facilitate the lifting-up of the brush and also to afford a ready means of ejecting it.

What I claim is:—

1. A current collecting brush comprising a taper head of circular cross section shaped to fit a correspondingly tapered socket, and a contact portion of substantially rectangular cross section attached to said head.

2. A commutator brush comprising a taper

head of circular cross section adapted to fit a correspondingly formed socket, and a contact portion attached to said head and curved on an axis transverse to the axis of said head.

3. A brush holder of the class described, comprising a brush carrying arm provided with a taper socket, a brush having a correspondingly tapered head fitting said socket, and a device on said arm coöperating with a portion of the brush exteriorly of the socket to prevent rotation of the brush in said socket.

4. A brush holder comprising a fixture, a movable arm having a brush receiving socket therein, and an ejector arranged on said fixture in alinement with said socket.

5. A brush holder comprising a fixture adapted for attachment to a brush holder stud, an arm pivoted on the fixture and provided with a taper socket, a brush having a taper head fitting said socket, and an ejector arranged on the fixture and adapted to enter said socket and remove the brush therefrom.

6. A brush holder comprising a fixture, a brush carrying arm pivotally mounted thereon and provided with a brush receiving socket, an ejector arranged on the fixture in alinement with said socket and adapted to enter the latter to remove a brush therefrom, and coöperatively arranged finger pieces on the fixture and the brush carrying arm for proximating them to effect the ejecting operation.

7. A brush holder comprising a fixture, a brush carrying arm pivoted thereon, a brush mounted on said arm and having a contact portion curved concentrically with the axis of movement of said arm, and a helical spring interposed between said arm and the fixture and having its axis arranged in substantial alinement with the brush.

8. A brush holder of the class described, comprising a fixture, a brush carrying arm pivotally mounted thereon and provided with a brush receiving socket, a helical compression spring having its axis arranged in alinement with said socket and engaging the brush carrying arm, and a cap supported on the fixture and providing a seat for the opposite end of the spring, the cap being provided with an ejecting point arranged within the spring and in alinement with the brush receiving socket on said arm.

9. A brush holder of the class described, comprising a fixture adapted for attachment to a brush holder stud, a brush carrying arm pivotally mounted on the fixture and provided with a brush receiving socket, a helical compression spring having one end surrounding the socket on said arm, a cap engaging the opposite end of said spring, a screw connecting said cap to the fixture and serving to adjust the compression of said spring, an ejector arranged within the said spring and in alinement with the brush receiving socket, and coöperatively arranged finger pieces on the fixture and brush carrying arm respectively, for proximating the said parts to eject a brush from said socket.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FREDERICK HENRY LORING.

Witnesses:
R. D. LYUDE,
H. D. JAMESON