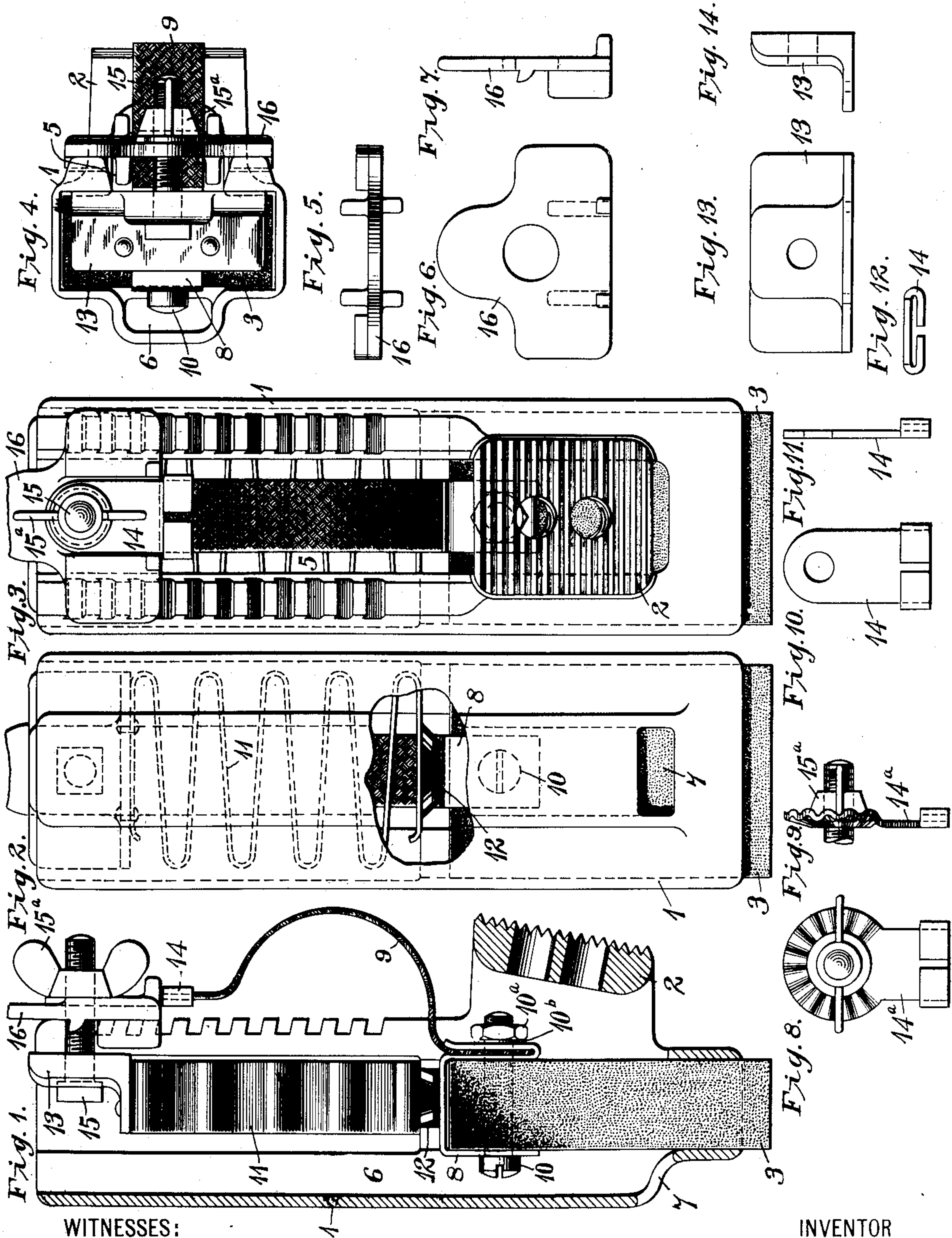


E. M. TINGLEY.
BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES.
APPLICATION FILED APR. 4, 1906.

956,548.

Patented May 3, 1910.



WITNESSES:

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BRUSH-HOLDER FOR DYNAMO-ELECTRIC MACHINES.

956,548.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EGBERT M. TINGLEY, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Brush-Holders for Dynamo-Electric Machines, of which the following is a specification.

My invention relates to brush holders for dynamo-electric machines and it has for one of its objects to provide an improved brush holder that shall be simple, durable and inexpensive in construction; that shall avoid detrimental heating of the tension spring, and that shall effectually ventilate both the brush and the brush holder.

A further object of my invention is to provide an essentially radial brush holder of such character that a minimum amount of the commutator surface is covered by the brush holder, and to arrange the movable parts so that they may be readily detached from the stationary carbon-holder.

Brush holders, as heretofore constructed, which were adapted for use with carbon brushes, have usually been so arranged that the spring and the other carbon-adjusting parts were attached to the stationary brush holder proper and extended laterally for a considerable distance over the commutator segments. Accordingly, a material area of commutator surface, not actively engaged by the carbon was rendered inaccessible and the relatively delicate parts were usually located on the outer or the exposed side of the holder where they were most liable to be injured. In the aforesaid arrangement, the movable parts cannot readily be replaced without removing the entire holder.

According to my present invention, I provide a brush holder comprising a rigid carbon-holder box which may be of cast or punched brass or other suitable conducting material and a tension spring and other movable parts which are attached to each other, and which may readily be removed from the holder box. In order to prevent electric currents from traversing the tension spring and overheating the same, an insulating block may preferably be interposed between the spring and the carbon brush on which it acts and the entire mechanism may be ventilated by means of a side pocket or enlargement which is connected with the main opening in the carbon-holder box to

permit the free movement of the carbon brush and is provided with an opening near the lower end of the holder through which dust and dirt may escape. This arrangement is specially advantageous in that a relatively light, direct-acting spring of simple design and construction may be employed and lateral binding of the carbon brush in the box, due to spring action, is entirely avoided.

Although I have shown a supporting projection which is adapted for a specific mounting, any suitable method or device may be employed for this purpose.

For a commutator cylinder of a given size, the distance between brush holders of opposite polarity may be materially increased over the prior art by the use of my improved brush holder construction because of its compact, radial design, and such burning action as may be incident to flashing over or bucking is obviated or materially reduced.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of a brush holder constructed in accordance therewith, the carbon-holder box being shown in section to disclose the movable parts. Figs. 2 and 3 are, respectively, a front and a rear elevation and Fig. 4 is a plan view of the carbon-holder box of Fig. 1, and Figs. 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 are detail views of the movable parts.

Referring to the drawings, the brush holder illustrated, comprises a stationary carbon-holder box 1 which is supported by a projecting arm 2 and is adapted to receive a suitable carbon brush 3. The projecting arm 2 may be attached to a brush holder bracket arm of a dynamo-electric machine, the engaging surfaces between the two being toothed in order to allow both a radial and a longitudinal adjustment between the two parts and in order to prevent the carbon-holder box from rotating out of its proper alinement when it is attached to the stationary bracket arm by a single bolt. The carbon-holder box 1 is relatively long and the projection 2 is located near its inner end. The wall of the box beyond the projection 2, toward the outer end, and on the same side is provided with a longitudinal slot 5 and the outside surface of the box on each side of the slot is notched. On the opposite side of the box from the slot 5 is a ventilating

pocket 6 which is provided with an opening 7 near its inner end through which dirt may escape and air may circulate and is connected throughout its entire length with the interior of the box without interfering with the free movement of the carbon brush 3. A plate 8 of thin conducting material and one end of a flexible shunt 9 are attached to the outer end of the carbon brush 3 by a bolt 10. One end of this bolt protrudes into the slot 5 and may serve to prevent the brush from dropping out of the holder box by engaging the wall of the box at the inner end of the slot. The bolt 10 preferably passes through a hole in the carbon brush and through the plate 8 and is held in position by a nut 10^a and a spring washer 10^b. Suitable tension may be applied to the carbon brush by means of a spring 11 which is constructed of resilient strap in zigzag form and is adapted to move freely within the box and bear against the brush. The size and type of the spring may, of course, be varied to suit various conditions of service. An insulating block 12, of porcelain or other suitable material, is preferably attached, by any convenient means, to the inner end of the spring 11 to insulate the spring from the brush. The outer end of the spring is riveted or otherwise fixed to a support 13, the projected plan of which is substantially commensurate with the cross-section of the carbon brush so that it may readily move within the carbon-holder box. The free end of the flexible shunt 9 is brought out through the slot 5 and is provided with a clip 14 by which the shunt is electrically connected to the carbon-holder box 1. This electrical connection, together with suitable adjustment of the spring 11, is effected by a bolt 15 which projects freely through holes in the support 13, in a rack bracket 16 and in the clip 14, and the parts are bound together by a thumb nut 15^a. The flexible shunt 9 may be connected to the box by any suitable means, the form shown being preferred, however, because it insures a good electrical but not permanent connection.

A modified form of clip 14^a is illustrated in Figs. 8 and 9 which comprises a spring washer having corrugated edges combined with a projection similar to that shown in Figs. 10, 11 and 12, to which the shunt may be fixed. The corrugations are adapted to engage the ears of the thumb nut 15^a and thus prevent the nut from working loose.

Electrical connections might, of course, be effected between the rack bracket 16 and the support 13 by means of a brush device or sliding contact which would engage the interior of the carbon box and which would not interfere with the longitudinal movement of the support. The rack bracket 16 is provided with suitable projections which

engage the notches in the outer surface of the box adjacent to the slot 5 and the arrangement of the parts 13 and 14 is such that the tightening of the thumb nut 15^a may hold the support 13 in any position along the slot 5 and thereby cause the spring 11 to exert any desired pressure upon the carbon brush 4.

The general structure of the brush holder is such that the movable parts are well protected from mechanical injury and also from injury due to arcs that are liable to form at the brush during operation.

If it is desirable to vary the maximum spring tension, this result may be readily accomplished by replacing the spring by another of any suitable strength or material.

Although I have shown a specific structure, I desire that variations in size and arrangement of details which effect similar results shall be included within the scope of my invention.

I claim as my invention:

1. In a brush holder, the combination with a box having a supporting arm and a longitudinal ventilating passage, and a carbon brush, of a direct-acting spring which operates within said box and is insulated from the carbon brush.

2. In a brush holder, the combination with a box having a longitudinal ventilating passage at one side, a carbon brush and a direct-acting spring which slide readily therethrough, and an insulating block interposed between the brush and the spring, of means for regulating the pressure exerted by the spring.

3. In a brush holder, the combination with a box having a side ventilating passage open at both ends, a carbon brush and a direct-acting zig-zag spring which slide therethrough, and an insulating block interposed between the brush and the spring, of a support attached to the outer end of the spring, and means for adjustably fastening the support to the box.

4. In a brush holder, the combination with a box having a slot in one of its side walls, and notches along the sides of the slot, a carbon brush adapted to slide in the box, a direct-acting zig-zag spring located in said box, an insulating block attached to the inner end of the spring to engage the brush, and a support attached to the outer end of said spring, of a rack bracket and clamping device cooperating with said side notches to adjust the position of the support.

5. In a brush holder, the combination with a box having a longitudinal side slot and cross notches, a carbon brush adapted to slide in the box, a direct-acting spring in said box, an insulating block attached to the inner end of the spring to engage the brush, and a support attached to the outer end of said spring, of a rack bracket adapted to

engage the cross notches of the box, and a binding screw for clamping the support and the rack bracket together.

5 6. In a brush holder, the combination with a box having a longitudinal slot in one side and notches at the sides of the slot, a brush and a direct-acting spring which slide readily therethrough, and an insulating block interposed between the brush and the
10 spring, of a rack bracket and clamp to cooperate with said notches for adjustably fastening the outer end of the spring to the box.

15 7. In a brush holder, the combination with a box having notches along one side, a brush and a direct-acting spring which slide readily therethrough, and an insulating block interposed between the brush and the spring, of a rack bracket and clamp to co-
20 operate with said notches for adjustably

fastening the outer end of the spring to the box.

8. In a brush holder, the combination with a box having a slot and cross notches in one of its side walls, a carbon brush adapted 25 to slide in the box, a direct-acting spring operating in said box, and a support attached to the outer end of said spring, of a rack bracket adapted to engage the cross notches of the box, and a binding screw for 30 clamping the support and the rack bracket together.

In testimony whereof, I have hereunto subscribed my name this 31st day of March, 1906.

EGBERT M. TINGLEY.

Witnesses:

F. D. NEWBURY,
BIRNEY HINES.