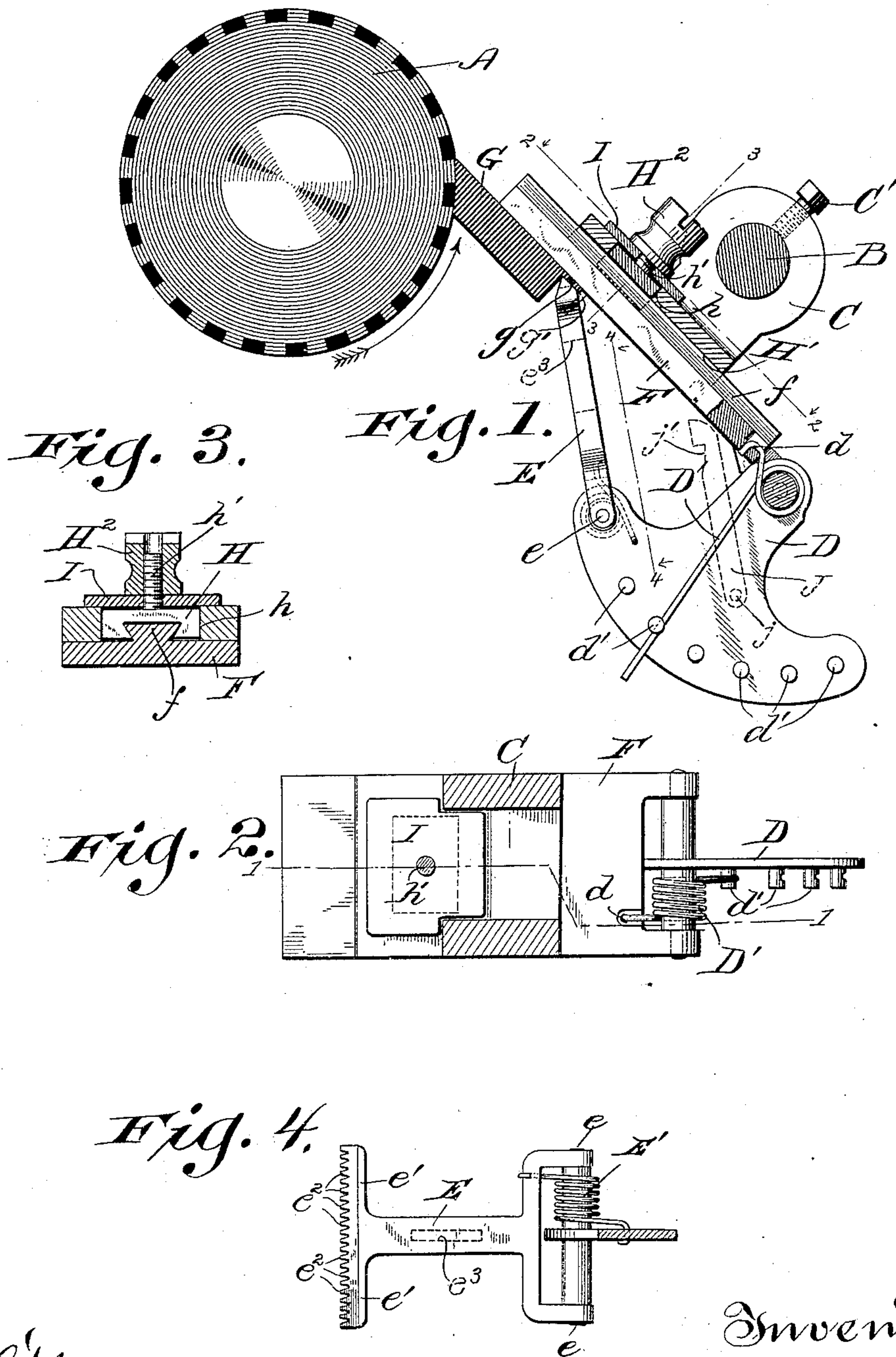


(No Model.)

R. HIRSCH.  
COMMUTATOR BRUSH HOLDER.

No. 557,678.

Patented Apr. 7, 1896.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## COMMUTATOR-BRUSH HOLDER.

SPECIFICATION forming part of Letters Patent No. 557,678, dated April 7, 1896.

Application filed July 1, 1895. Serial No. 554,612. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT HIRSCH, a citizen of the United States, residing at Milwaukee, county of Milwaukee, State of Wisconsin, have  
5 invented a certain new and useful Improvement in Commutator-Brush Holders; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to new and useful improvements in the construction of brush-holders for dynamo-electric machines and motors; and it consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a view, partly in elevation and partly in section, on line 1 1 of Fig. 2. Fig. 2 is a transverse sectional view of the same, taken on line 2 2 of Fig. 1. Fig. 3 is a cross-sectional view taken on line 3 3 of Fig. 1. Fig. 4 is a detail view, partly in elevation and partly in section, on line 4 4 of Fig. 1.

Referring by letter to the drawings, A designates the commutator of a dynamo-electric machine or motor, and B one of the usual supports which project from the frame of the machine and are arranged to support the brushes or collectors in operative position adjacent to the commutator. In the accompanying drawings only one of these supports is shown  
35 and one holder and brush for engagement with the commutator; but it will of course be understood that two or more supports, with a corresponding number of holders and brushes, will be employed, as the case may require. A block C is adjustably secured to the support B in any desired manner, conveniently by means of the set-screw C', and to this block is secured a suitable device for pressing the brush against the surface of the commutator  
45 and also suitable means for regulating the pressure of the brush against the commutator.

In practice I find it convenient to employ substantially the form of construction shown in the drawings, in which an arm or plate D is suitably pivoted to the block C or a con-

nected part and is acted upon by a spring D' in the manner shown. A suitable arm or push-bar E is pivoted at one end, as at e, to the arm or plate D and is arranged to engage in any convenient manner at its free end with  
55 the rear end of the brush, so as to press said brush longitudinally toward the surface of the commutator.

As shown in the drawings, an extension F is provided upon the block C, and one face  
60 of this extension is arranged in line with the desired position of the commutator-brush G, and said brush is arranged to rest at one side against said face of the extension F. A rearwardly-projecting lip g is provided upon the  
65 rear end of the brush G for engagement with the forward end of the arm or bar E, and a suitable spring E' is engaged in any convenient manner with said arm or bar E and with the arm or plate D, to which the arm E is  
70 pivoted, and serves to normally press the free end of said arm E toward the face of the extension F of the block C, so as to cause said arm E to hold the rear end of the brush G in firm contact with the surface of said extension.  
75

As shown more particularly in Figs. 1 and 2 of the drawings, the spring D' has an engagement at one end, as at d, with the extension F and at its free end has an adjustable  
80 engagement with the arm or plate D by means of a number of pins d' d', projecting from the face of said arm or plate D, and against which the free end of said spring is arranged to bear. By this arrangement the pressure or tension  
85 of the spring D' may be readily adjusted, so as to regulate the forward pressure of the arm or plate D and produce any desired pressure or tension of the brush against the surface of the commutator.  
90

In the particular form of construction shown in the drawings the extension F upon the block C is formed by a separate plate, which has upon one side a suitable dovetail tongue f, which is movably engaged with  
95 a correspondingly-shaped recess in a block H, which is located within a recess h in the lower part of the block C. A channel H' is formed in the block C at the front and rear of the recess h for the reception of the tongue or rib f.  
100



From the upper side of the block H extends a screw-threaded stud  $h'$ , with the outside of which is engaged a nut  $H^2$ , and a washer or plate I located beneath said nut serves as a support or bearing for the same. This separate plate forms the means for connecting the arm or plate D with the support, and said plate F, together with the arm or plate D, and the push-bar E being thus connected together are of course adjustable together upon the support. By this means the plate F is rendered adjustable longitudinally toward or from the commutator, and when adjusted may be securely retained in position by the nut  $H^2$  in an obvious manner.

As shown more particularly in Fig. 4, I prefer to construct the arm E with laterally-extending projections  $e' e'$  at its free end, together forming a transverse bar, and this bar is preferably beveled upon both sides, as shown in Fig. 1, and provided with teeth  $e^2 e^2$  in the manner shown in Fig. 4. By this means a secure engagement is afforded between the end of the arm E and the rear end of the brush G, and the liability of the brush shifting or slipping laterally is prevented.

It follows from the foregoing construction that by means of the pivoted arm or plate D and the connected arm E the brush G, when in operative position, will be automatically pressed forward into electrical contact with the surface of the commutator, and that as fast as said brush becomes worn said arms will be automatically adjusted by the spring  $D'$  so as to compensate for the wear upon the front end of the brush.

By the described construction the plate F may be readily adjusted toward or away from the commutator so as to rest at a desired distance from the surface thereof, and in case said commutator becomes worn said plate may be adjusted forward to compensate for said wear. By this construction the holder may be adjusted so as to adapt it for use upon different machines without the necessity of fitting or filing the holder.

Furthermore, by the described construction the upper surface of the brush is maintained in constant electrical contact with the under side of the plate F, while being at the same time entirely free to move longitudinally in order to preserve its electrical contact with the surface of the commutator.

Heretofore in the construction of commutator-brush holders it has been common to provide means for automatically advancing the brush as it becomes worn; but in such constructions the brushes have usually been fitted within sockets, and this results in a considerable amount of waste of the brushes, from the fact that when they have become worn down to a certain length or size they must be taken out and thrown away, because they can no longer be held in proper position and maintained in proper electrical contact with the commutator. By my improved con-

struction, however, the brush is held only at one end by the holder, and the commutator, rotating in the direction indicated by the arrow in Fig. 1, assists in holding the brush in electrical contact with the face of the plate F.

By means of my improved holder the brush will be held in firm electrical contact with the surface of the commutator until it has become almost entirely used up, and thereby any appreciable waste of the brush material is obviated.

If desired, my improved brush-holder may be provided with a suitable latch or detent J, as indicated in Fig. 1 by the dotted lines, which latch or detent is pivoted to the plate D, as at  $j$ , and is provided at its free end with a notch  $j'$ , adapted for engagement with a slot  $e^3$  in the arm E, whereby the plate D and the arm E may be held in their retracted positions when desired.

As also indicated by the dotted lines in Fig. 1, suitable upturned lips or flanges  $g'$  may be provided upon the rear end of the brush and arranged to engage behind the projections  $e$  of the arm E, so that when the plate D and arm E are retracted the brush will be simultaneously retracted and held out of contact with the commutator by said arm E.

By my improvement I am enabled to provide a very satisfactory form of brush-holder, which while admitting of a very wide range of adjustment is very sensitive, and at the same time serves to preserve a perfect electrical contact of the brush both with the holder and with the commutator.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The herein-described brush-holder, comprising a suitable support having a plane surface in line with the desired position of the brush, a spring-controlled arm or plate pivoted at one end to said support, and a second spring-controlled arm pivotally connected at one end with the free end of the first-mentioned arm or plate and adapted to bear at its free end against the rear end of the brush so as to press the latter into electrical contact with the surface of said support, and to press its forward end into electrical contact with an adjacent commutator, substantially as described.

2. The herein-described brush-holder comprising a suitable support having one surface in line with the desired position of the brush, an arm or plate pivoted at one end to said support and provided with a plurality of lateral projections, a spring engaged at one end with said support, and adapted for engagement at its other end with a desired one of said projections, and a second spring-controlled arm pivotally engaged at one end with the first-mentioned arm or plate, and adapted to bear at its free end against the rear end of a commutator-brush, to hold said brush in electrical contact with the face of said sup-



port, and to press the forward end of said brush into electrical contact with an adjacent commutator, substantially as described.

3. The herein-described brush-holder comprising a suitable support, a plate adjustably engaged therewith, and having one face arranged in line with the desired position of the brush, a spring-controlled arm or plate pivotally connected at one end with said adjustable plate, and a second spring-controlled arm pivoted at one end to the free end of the first-mentioned arm or plate, and adapted to bear at its free end against the rear end of a commutator-brush, substantially as and for the purpose described.

4. The herein-described brush-holder comprising the support C, the adjustable plate F, the arm or plate D, pivoted to said plate F, and provided with the studs or projections  $d'$

$d'$ , the spring D', and the spring-controlled arm E, all constructed and arranged and adapted to operate substantially in the manner and for the purpose described.

5. The combination with a brush-holder comprising a support having a plane surface in line with the desired position of the brush, and a spring-actuated follower for engagement with the brush of the commutator-brush provided upon its rear end with one or more angular projections or flanges for engagement with the follower to retract the brush, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

ROBERT HIRSCH.

Witnesses:

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CHARLES A. KLAVITER.