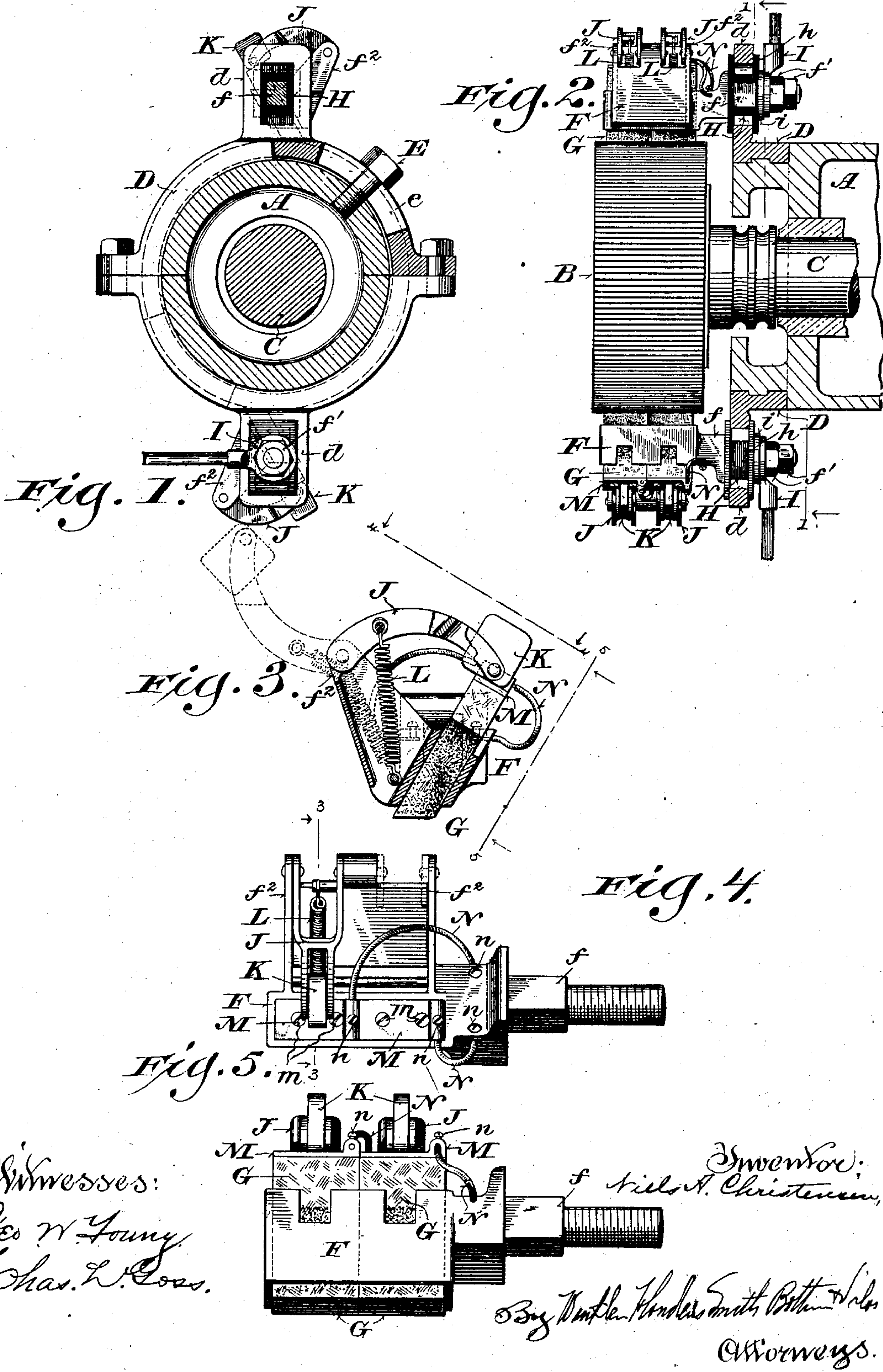


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ELECTRIC BRUSH HOLDER.  
APPLICATION FILED MAY 16, 1900.

NO MODEL.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## ELECTRIC-BRUSH HOLDER.

SPECIFICATION forming part of Letters Patent No. 724,544, dated April 7, 1903.

Application filed May 16, 1900. Serial No. 16,877. (No model.)

*To all whom it may concern,*

Be it known that I, NIELS A. CHRISTENSEN, a subject of the King of Denmark, residing at Milwaukee, in the county of Milwaukee

5 and State of Wisconsin, have invented certain new and useful Improvements in Electric-Brush Holders, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 My improvements relate particularly to carbon-brush holders for electric motors.

The main objects of the invention are to provide for readily increasing or adjusting the force with which the brushes are held

15 against the commutator when the brushes are renewed or changed and as they are worn, to facilitate the removal of the brushes from the holder for cleaning, inspecting, or renewing them, to insure good electrical contacts

20 with the brushes, and generally to improve the construction and operation of devices of this class.

It consists in the novel construction and arrangement of component parts of the device hereinafter particularly described, and

25 pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

30 Figure 1 is an inside elevation and partial vertical section on the line 1 1, Fig. 2, of a brush-holder embodying my improvements. Fig. 2 is an elevation of the brush-holder including the commutator and a portion of the

35 armature-shaft and a vertical section of the adjacent armature-bearing as viewed from the left with reference to Fig. 1. Fig. 3 is a vertical section on the line 3 3, Fig. 4, through one of the brushes and brush-housings. Fig.

40 4 is a view taken in a plane indicated by the line 4 4, Fig. 3, of one of the brush-housings from which one of the tension-arms and its adjuncts are omitted; and Fig. 5 is a view taken in a plane indicated by the line 5 5, Fig.

45 3, of the brush-housing with brushes and tension devices complete.

Referring to Figs. 1 and 2, A designates a portion of the armature-bearing next to the commutator, B the commutator, and C a por-

50 tion of the armature-shaft.

D is a yoke formed with radially-slotted arms *d d* and mounted and angularly adjust-

able on the armature-bearing A, on which it is secured in place by a bolt or screw E, passing through a slot *e* in said yoke and thread-

55 ed in said bearing. This yoke may be made, as shown, of annular form in two parts fitted and bolted together upon the armature-bearing, which is turned concentric with the ar-

60 mature-shaft and formed with a circumferential tongue fitting into an internal recess in said yoke, or under certain conditions and for some machines the yoke may be made

65 in one piece of segmental or semicircular form and fitted on one side only of said bearing and the arms *d* brought nearer together according to the arrangement of the arma-

ture-windings and the number of poles employed.

F F are metal housings in which standard

70 carbon brushes G G are loosely fitted and freely movable endwise. These housings are formed on their inner sides at right angles to the brushes with square-shouldered shanks *f*,

75 having reduced threaded ends on which nuts *f'* are fitted. They are secured in the slotted arms *d* of the yoke D by means of the nuts *f'* and are insulated from said arms by squared

80 flanged sleeves H and washers *h*, made of suitable insulating material.

I I are metal socket connections for the main electric conductors, formed with rings which are clamped on the threaded extensions of the shanks *f* between metal washers

85 *i* and the nuts *f'*.

J represents forked arms pivoted at one end to and between arms *f*<sup>2</sup> of the housings F in planes at right angles to their shanks *f*.

K represents polygonal blocks (in the present case four-sided) pivoted eccentrically in

90 the opposite ends of the arms J.

L represents tension-springs attached at one end to the housings F and at the other to the arms J between their sides, so as to hold the blocks K in engagement with the outer ends

95 of the brushes G and to force said brushes against the commutator B when said arms are in the position shown by full lines in Fig. 3 and to hold said arms out of the way when

100 they are thrown back into the position indicated by dotted lines in Fig. 3 for removing the brushes. To insure good and sufficient contacts and electrical connections between the brushes and the main conductors attached



to the brush-housings F, metal plates M M are mounted on the outer ends of said brushes and held in place thereon by screws or pins *m*, loosely engaged with holes in the brushes.

5 These plates are connected by flexible conductors N with said housings, the ends of said conductors being held by binding-screws *n* in sockets formed in said plates and in the housings.

10 By loosening the bolt or screw E the yoke D may be turned on the bearing A, so as to change the lead of the brushes, and by loosening the nuts *f'* the housings F may be adjusted by moving their shanks *f* in the radial slots of arms *d* toward and from the commu-

15 tator.  
As the brushes are worn shorter by the commutator or when new and longer brushes are inserted in the housings the force with which  
20 they are pressed against the commutator is increased or diminished by turning the blocks K so as to increase or diminish the distance between the free ends of the arms J and the bearing-plates M on the outer ends of the  
25 brushes, and thereby increase or diminish the tension of the springs L, as may be necessary or desirable.

By simply swinging the tension-arms J back into the position indicated by dotted lines in  
30 Fig. 3 and withdrawing the screws or pins *m*, with the plates M, from the ends of the brushes and carrying them to one side the brushes G may be easily removed from the housings, inspected or cleaned, and returned to place without disconnecting the conductors N from said  
35 plates or housings or otherwise disturbing the connections and adjustments of the brush-holder. The points of connection between the arms J and the springs L are carried past  
40 the pivot connections between said arms and the arms *f'* on the housings F in turning said arms J back out of operative or forward into operative position, so that said springs are thus caused to hold said arms J in either of  
45 their extreme positions.

The arms J and the blocks K, being made of metal and being in metallic connection with the housings F, to which current is supplied through the main-conductor connections I, afford paths for current to the brushes  
50 in addition to those afforded by the flexible conductors N.

Various changes in the minor details of construction may be made within the spirit  
55 and intended scope of my invention.

I claim—

1. In an electric-brush holder the combina-

tion of a metal housing in which the brush loosely fits and is movable endwise, an arm pivoted to said housing and connected there- 60 with by a tension-spring, and a polygonal block eccentrically pivoted to said arm and adapted to bear against the outer end of the brush, substantially as and for the purposes set forth. 65

2. In an electric-brush holder the combination of a metal housing in which the brush is held and is movable endwise, a forked arm pivoted at one end between arms on said housing, a polygonal block pivoted eccentrically 70 in the opposite end of said arm, and a spring attached at one end to said housing and at the other end to said arm between its sides, so as to pass by its pivot connection with the housing when it is turned forward and back- 75 ward, substantially as and for the purposes set forth.

3. In a brush-holder the combination of a metal housing in which carbon brushes are loosely fitted and movable endwise, inde- 80 pendently of each other, forked arms pivoted at one end to said housing, polygonal blocks eccentrically pivoted in the other ends of said arms and adapted to bear against the outer ends of said brushes, and springs con- 85 necting said housings and arms and tending to force and hold the brushes against the commutator, substantially as and for the purposes set forth.

4. In a brush-holder the combination of a 90 metal housing in which carbon brushes are loosely fitted and movable endwise, independently of each other, metal bearing-plates mounted on the outer ends of the brushes and electrically connected with the housing 95 by flexible conductors, arms pivoted at one end to said housings, polygonal blocks pivoted eccentrically to said arms at the other end and adapted to engage with said bearing-plates when said arms are swung into opera- 100 tive position, and springs connecting said arms with said housing so as to force the brushes against the commutator when the arms are turned into operative position and to hold them out of the way when they are 105 turned back for removing the brushes, substantially as and for the purposes set forth.

In witness whereof I hereto affix my signature in presence of two witnesses.

NIELS A. CHRISTENSEN.

Witnesses:

FREDERICK H. REMINGTON,  
CHAS. L. GOSS.