

E. R. KNIGHT.

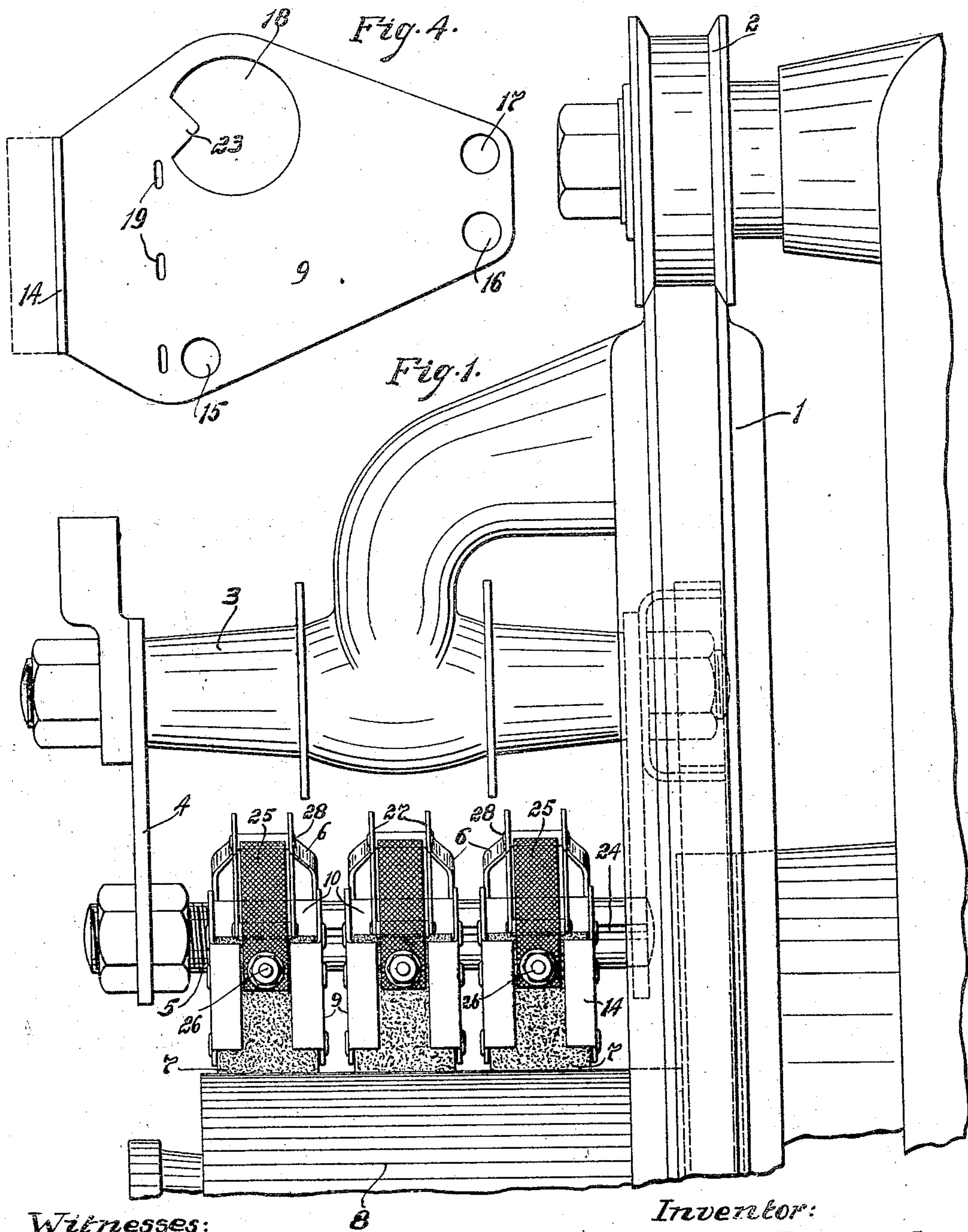
BRUSH HOLDER.

APPLICATION FILED AUG. 30, 1905.

940,393.

Patented Nov. 16, 1909.

2 SHEETS—SHEET 1.



Witnesses:

George J. Schwartz.  
Fred J. Kinsey

Inventor:

Earle R. Knight.

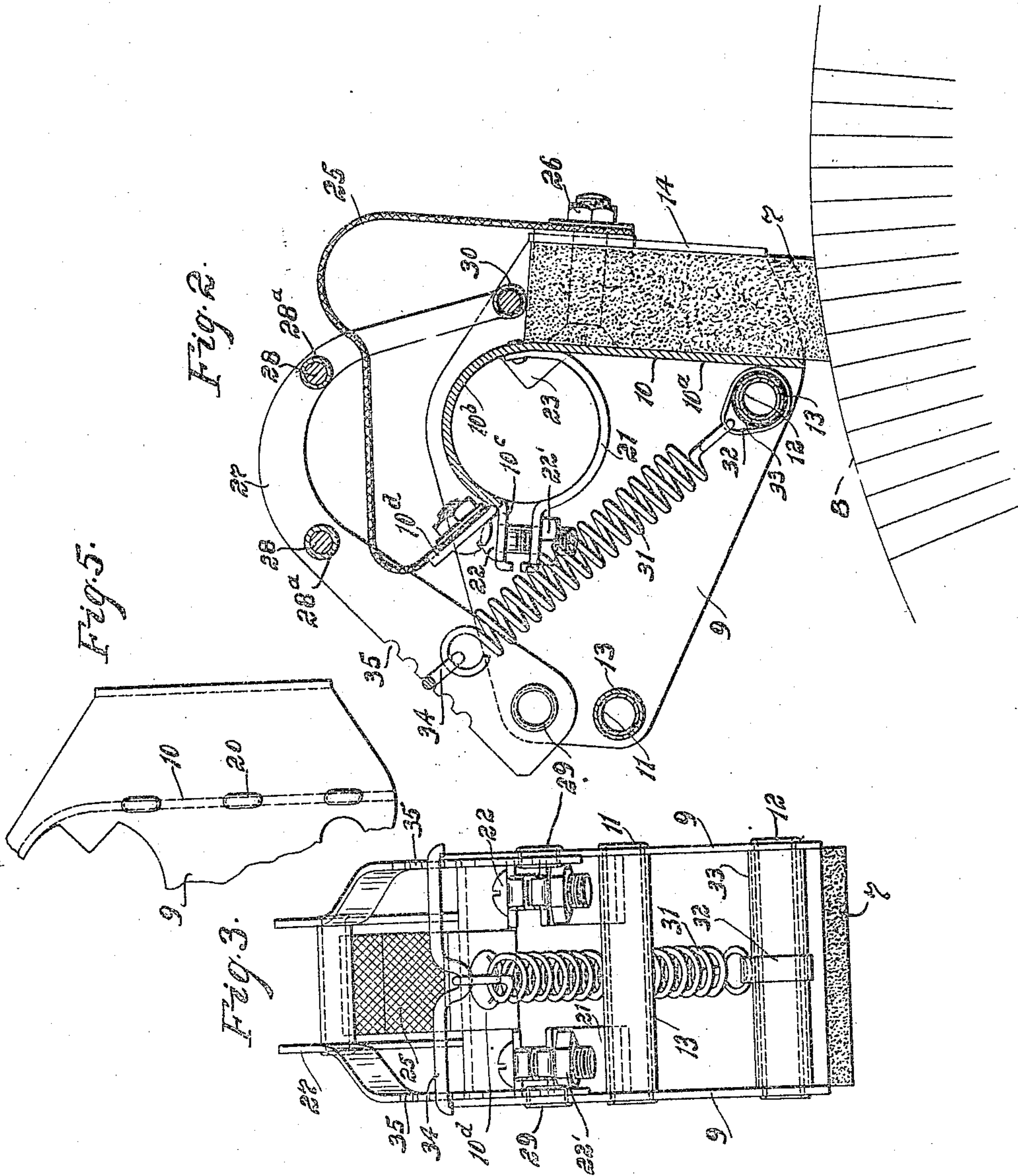
By

Chas. E. Lord  
Attorney.

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# UNITED STATES PATENT OFFICE.

EARLE R. KNIGHT, OF NORWOOD, OHIO, ASSIGNOR TO THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

## BRUSH-HOLDER.

940,393.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed August 30, 1905. Serial No. 276,375.

To all whom it may concern:

Be it known that I, EARLE R. KNIGHT, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Brush-Holders, of which the following is a full, clear, and exact specification.

This invention relates to brush-holders for dynamo-electric machines.

The object of my invention is to provide a brush-holder which is simple in construction, easy and inexpensive to manufacture, consists of few parts, and still is very durable, rigid, and highly efficient, and my invention consists in the details of construction, arrangement of parts, and combination of elements described in the specification and set forth in the appended claims.

Heretofore it has been customary to construct brush-holders of cast-metal parts which necessitates considerable cost and labor, and the brush-holders so constructed are cumbersome and not very durable. In overcoming these objections, I construct my brush-holder almost entirely of sheet metal punchings, of very few parts.

For a more complete understanding of my invention reference is had to the accompanying drawings in which I have shown one form of my invention.

Figure 1 is an elevation of a portion of a dynamo-electric machine, having mounted thereon three of my improved brush-holders; Fig. 2 is a sectional elevation through one of my brush-holders showing the brush in contact with a portion of a commutator; Fig. 3 is a rear elevation of my brush-holder; Fig. 4 is a detail view of one of my side plates; and Fig. 5 is an elevation of the forward portion of my holder showing especially the manner of securing to the side plates my spacing plate and brush guide.

In Fig. 1 I have shown a portion of a brush supporting yoke 1, mounted in bearings one of which is shown at 2. Extending from the yoke is a rigid arm 3, to which is adjustably held by arms 4 a brush-holder stud 5, on which may be mounted as many brush-holders as desired. I have in this instance shown on the stud three of my improved brush-holders 6, carrying brushes 7, which bear on the commutator 8. It is to be understood that there are a number of such

brush holder studs arranged at regular intervals about the yoke.

My brush-holder is composed of two side plates 9, held a predetermined distance apart by the spacing or connecting plate 10, arranged at right angles to the side plates, and by the tubes or rods 11 and 12 carrying spacing sleeves 13. The side plates are punched from sheet metal and are of the shape shown in Fig. 4, the part indicated by dotted lines in the figure being bent at right angles to the main portion, as shown at 14, to form a portion of the brush guide or socket. Each plate has openings 15 and 16 to receive the spacing tubes or rods, an opening 17 to receive a rivet or other support for the pressure finger hereinafter described, an opening 18 to receive the supporting stud, and a plurality of openings 19 arranged in a line parallel to the bent portion 14 to receive lugs 20 of the spacing plate 10. The plate 10, (as shown in Fig. 2) has a straight flat portion 10<sup>a</sup>, a curved or arched portion 10<sup>b</sup>, and a flat end piece 10<sup>c</sup> bent substantially at right angles to the curved portion. The end piece 10<sup>c</sup> is slotted and the middle portion 10<sup>d</sup> is bent upward as shown, for purposes to be explained later.

When assembled the side plates are held a predetermined distance apart by the plate 10, the lugs 20 of which fit into the openings 19, and by the tubes 11 and 12 carrying the sleeves 13. The lugs 20 which extend through the openings 19 are hammered or riveted, forming enlarged heads, and the ends of the tubes are beaded or expanded. Adjacent each side plate are two curved sheet metal straps 21, each being riveted at one end to the plate 10. The opposite end of each strap is perforated to receive a screw 22. By means of the screw and nut 22' each strap is held to the portion 10<sup>c</sup> of the plate 10, (as is shown in Figs. 2 and 3). It is seen that the curved strap 21 and the curved portion 10<sup>b</sup> are substantially cylindrical in outline and form good bearings for the supporting studs. By adjusting the screws the straps can be caused to grip the stud and hold the brush-holder in any position along the stud. Each side plate 9 has an integral lug 23 adapted to fit into a corresponding recess or slot 24 in the stud, to prevent the brush from rotating on the stud after it has been clamped in place.



The brush 7 is adapted to slide freely toward or away from the commutator in the brush socket formed by the side plates 9 and plate 10. A flexible terminal or shunt 5 25 is connected at one end to the upwardly extending portion 10<sup>a</sup> and held by a screw or rivet 26 to the brush, the head or nut of which is received in the slot or opening between the outer end portions 14 of the 10 holder.

The pressure finger or arm consists of two sheet metal curved or arched side pieces 27 held a predetermined distance apart by the tubes or rivets 28 on which are mounted 15 spacing sleeves 28<sup>a</sup>. The pressure finger is secured at one end to the rear of the brush-holder preferably by rivets or eyelets 29. The free end of the finger is provided with a loose sleeve or roller 30 which bears upon 20 the brush. The outer end of the pressure finger is held yieldingly against the brush by the spring 31. The lower end of the spring is fastened to the strap 32 mounted upon the lower tube 12 and its spacing sleeve 25 13, but insulated therefrom by the sleeve 33 of insulating material. This arrangement prevents the flow of current through the spring 31, saving the same from injury due to such current flow. The upper end of the 30 spring 31 is attached to the rod 34 which is adjustable in notches 35 formed in the finger 27.

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

1. In a brush holder, a pair of side plates, and a separate sheet metal spacing plate therefor, said spacing plate having a curved or arched portion and a portion forming a 40 guide for a brush.

2. A brush-holder comprising side plates and a separate curved or arched connecting-plate intermediate the ends of the side plates, said connecting-plate forming a bearing for 45 the brush-holder stud.

3. In a brush-holder, side plates and a connecting-plate, said side plates having openings, and said connecting-plate having a curved or arched portion adapted to re- 50 ceive the supporting stud.

4. In a brush-holder, parallel side plates having openings to receive a supporting stud, and a spacing plate, all said plates being formed of sheet metal punchings, said spac- 55 ing plate having an upper portion bent to form a bearing for the supporting stud.

5. In a brush-holder, parallel side plates, and a connecting-plate for holding said side plates a predetermined distance apart, said 60 connecting-plate having a flat portion forming a brush guide and an upper portion curved to receive a supporting stud.

6. In a brush-holder, side plates having openings to receive a supporting stud, and a 65 plate made from a sheet metal punching con-

nected to said side plates and holding the latter a predetermined distance apart, said connecting-plate having a flat brush guiding portion and an arched or curved portion conforming partially in shape to the open- 70 ings in the side plates and alined therewith to form a bearing surface for the supporting stud.

7. In a brush-holder, two side plates, a connecting-plate having a curved or arched 75 portion, and a strap secured thereto having an oppositely curved portion, the curved portions being adapted to receive and form a bearing surface for the supporting stud.

8. In a brush-holder, two side plates, a 80 connecting-plate having a portion curved or arched to receive a supporting stud, a curved or arched strap secured at one end to the connecting-plate, and means for adjustably holding the outer free ends of said strap and 85 connecting-plate.

9. In combination, a brush supporting stud, a brush-holder thereon having a pair of side plates and a connecting-plate having a portion bent partially around the support- 90 ing stud and having a free outer end, a pair of stud holding straps secured to the connecting-plate at their ends and having bent portions forming with the bent portion on the connecting-plate a substantially cylindrical 95 bearing surface, and means for adjustably holding the free outer ends of the connecting-plate and straps whereby the brush-holder will be adjustably clamped on the 100 supporting stud.

10. In combination, a brush supporting stud, a brush-holder having side plates, a connecting-plate having a brush guiding sur- face, a curved or arched portion and a free 105 outer end, a pair of straps each connected at one end to the connecting-plate and curved oppositely to the curved or arched portion thereof forming with the curved connecting-plate a bearing for the support- 110 ing stud, means for adjustably holding the straps and connecting-plate in engagement with the stud, and means for attaching a flexible brush lead to the free outer end of the connecting-plate.

11. In a brush-holder, side plates, and a 115 connecting-plate forming a brush guide, said connecting-plate having a flexible extension, and means cooperating with said flexible extension and forming clamping means for se- 120 curing the brush holder to a support.

12. In a brush-holder, side plates, a con- 125 necting-plate for holding the side plates a predetermined distance apart, said connect- ing plate having a flexible extension forming part of the clamping means for holding the brush-holder on a supporting stud, and one or more flexible straps fastened to said 130 connecting-plate and also forming part of said clamping means.

13. As a means for clamping a brush- 130



holder to a stud, a plate forming part of the brush holder structure and having a flexible curved extension, and one or more flexible curved straps secured thereto.

5 14. As a means for clamping a brush-holder to a stud, a plate forming part of the brush holder structure and having a portion bent to conform partially to the shape of the supporting stud, one or more straps secured thereto and being also bent to partially conform to the shape of the supporting stud, said plate and strap having free outer ends, and means for adjustably clamping together the said free outer ends.

10 15. In combination, a brush supporting stud having a longitudinal slot, a brush-holder thereon having side plates through which the stud extends, and a connecting-

plate having a portion bent partially around the stud and having a free outer end, a pair 20 of stud holding straps secured to the connecting-plate at their ends and having portions bent partially around the stud, forming with the bent connecting-plate a substantially cylindrical surface for the stud, 25 means for clamping the free ends of the plate and straps, and lugs or projections integral with the side plates extending into said longitudinal slot in the stud.

In testimony whereof I affix my signature, in the presence of two witnesses.

EARLE R. KNIGHT.

Witnesses:

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FRED J. KINSEY.