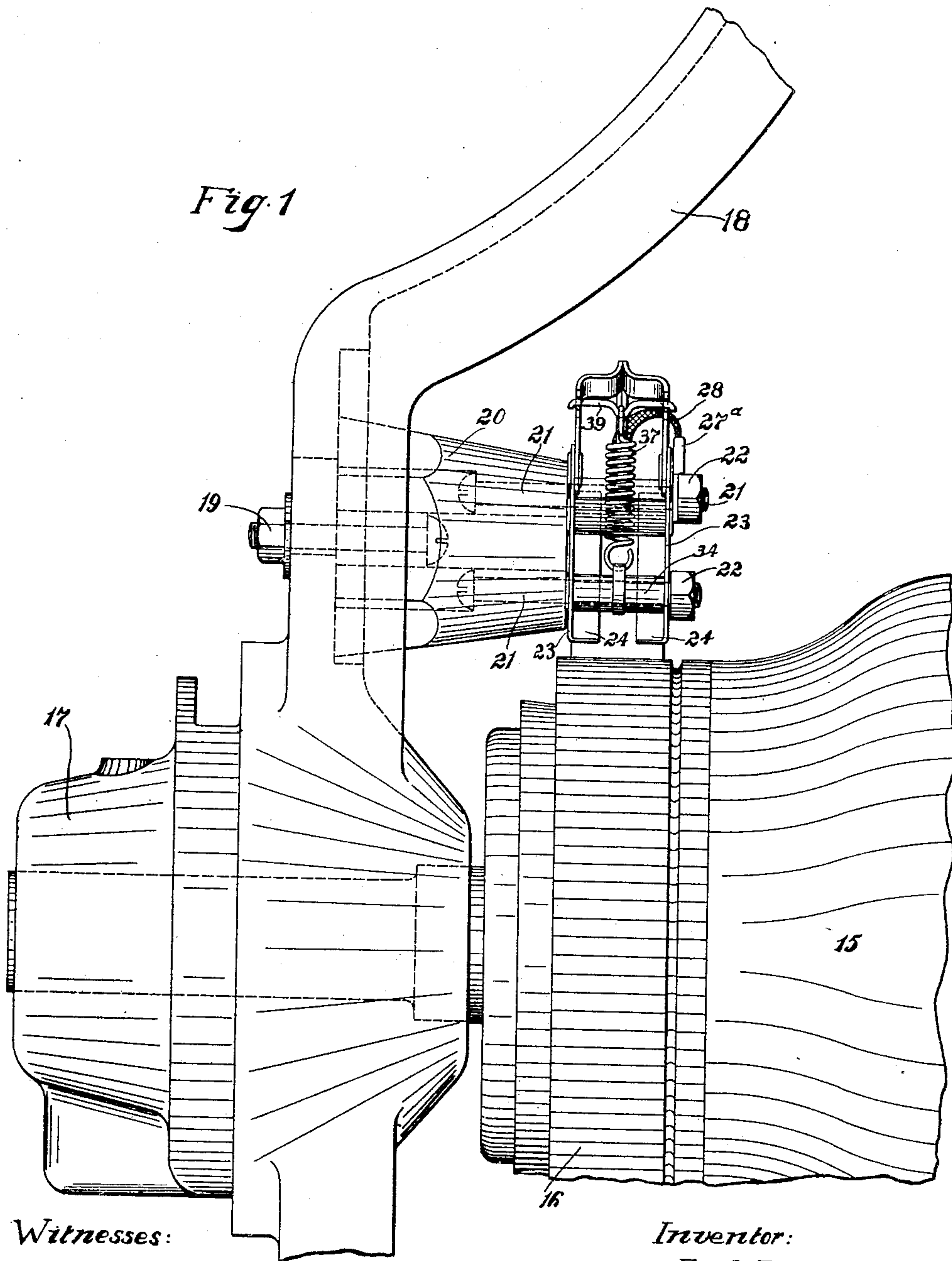


967,527.

E. R. KNIGHT.
BRUSH HOLDER.
APPLICATION FILED FEB. 4, 1905.

Patented Aug. 16, 1910.

3 SHEETS—SHEET 1.



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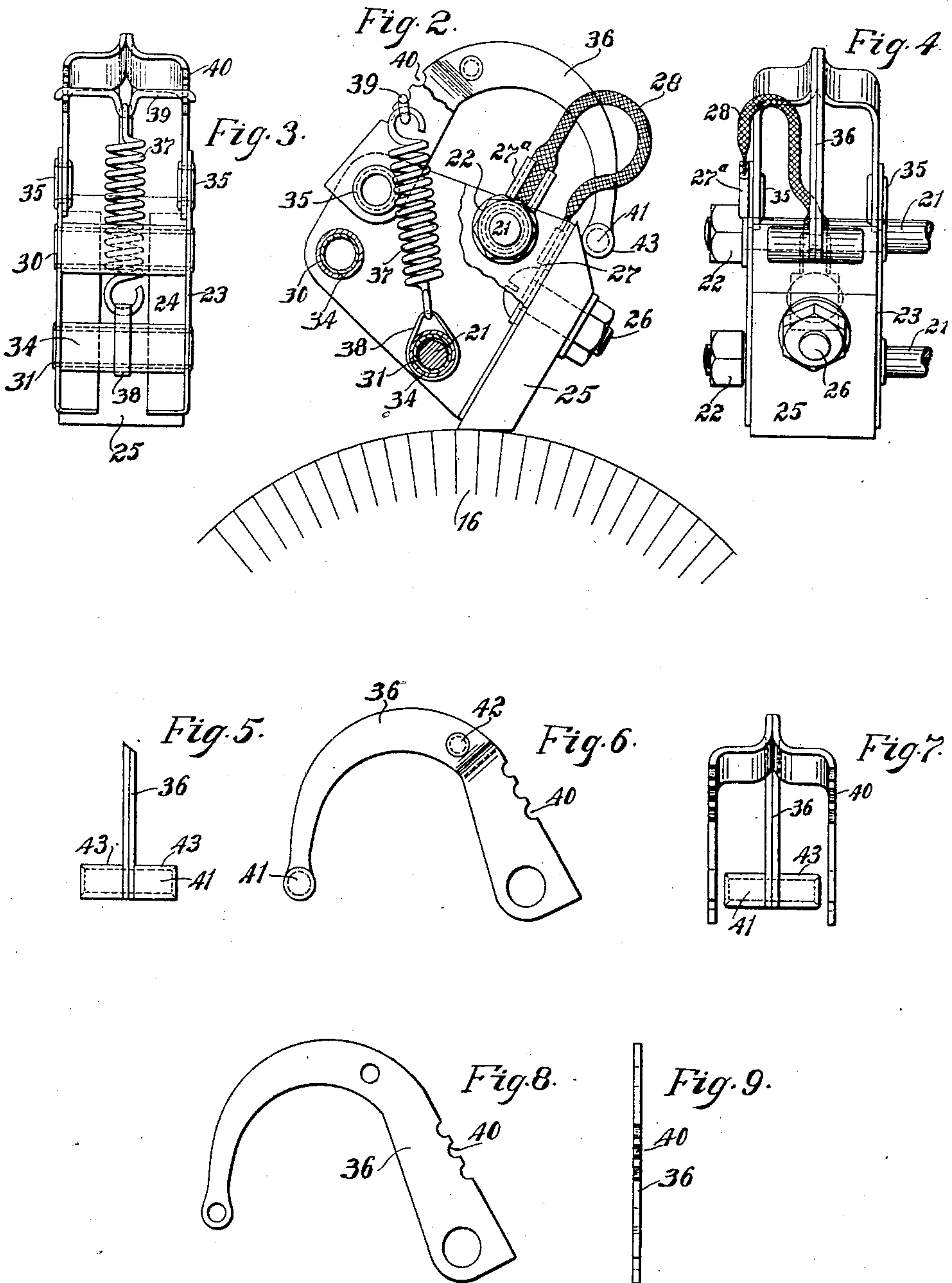
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 10.

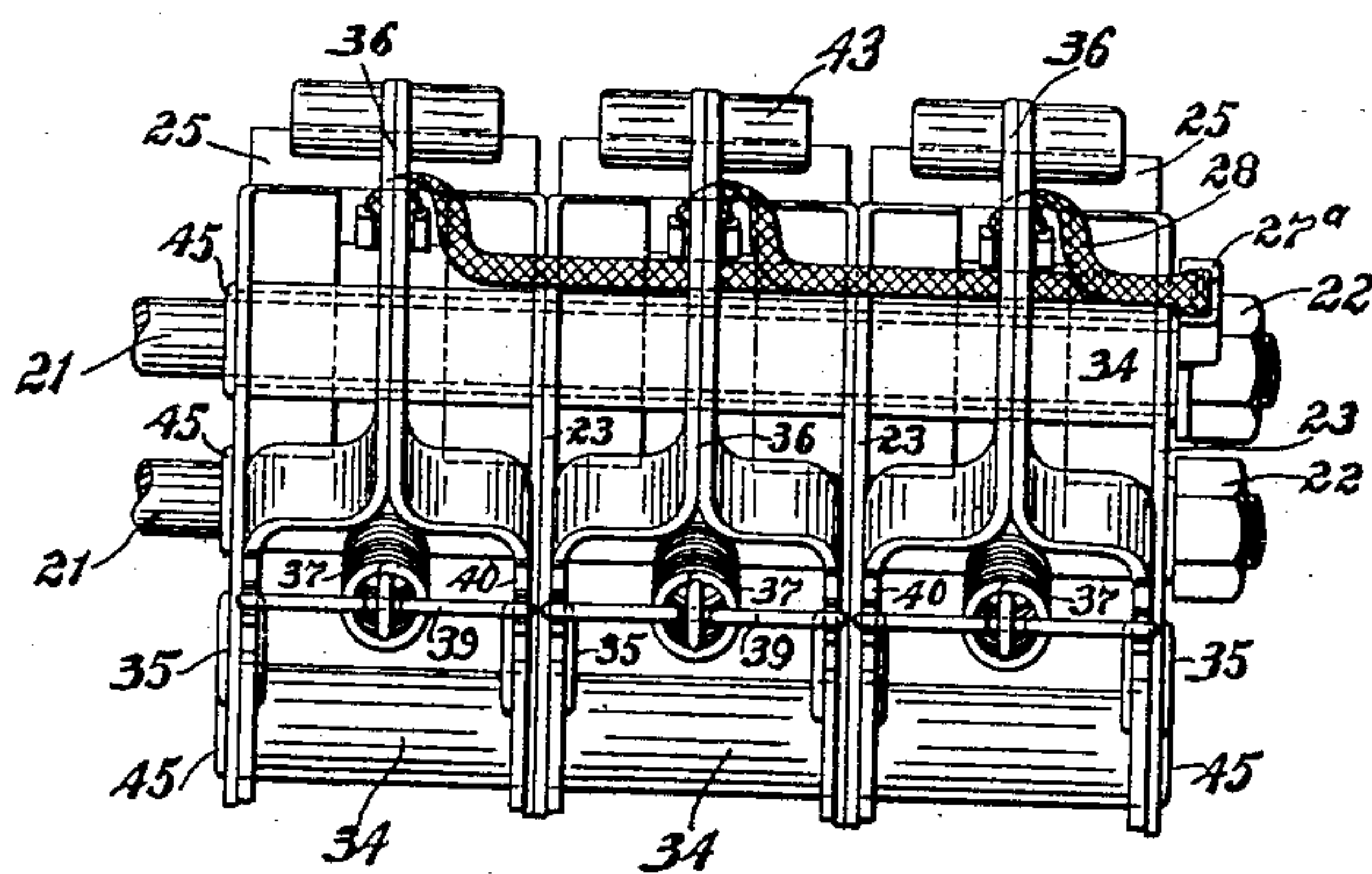


Fig. 11.

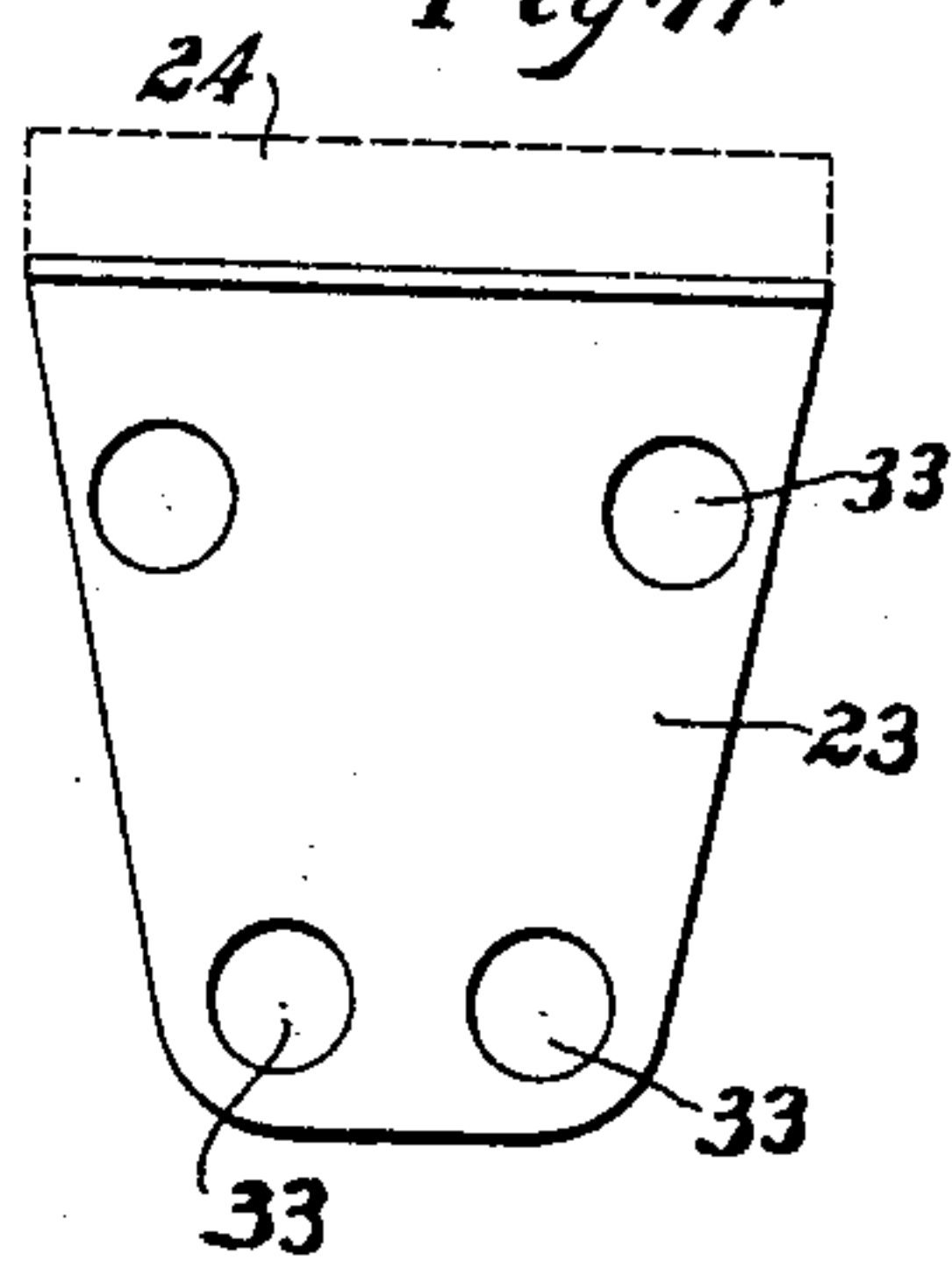


Fig. 12.

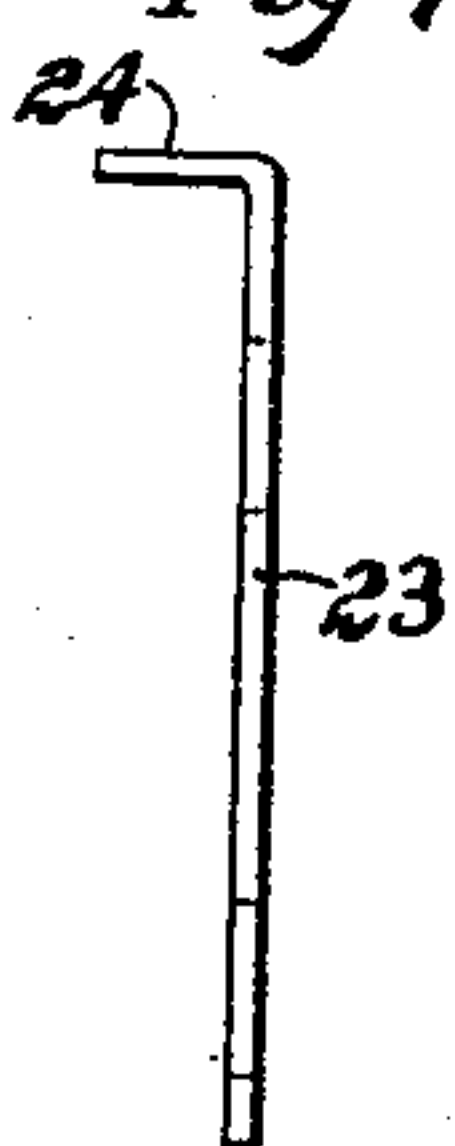


Fig. 13.

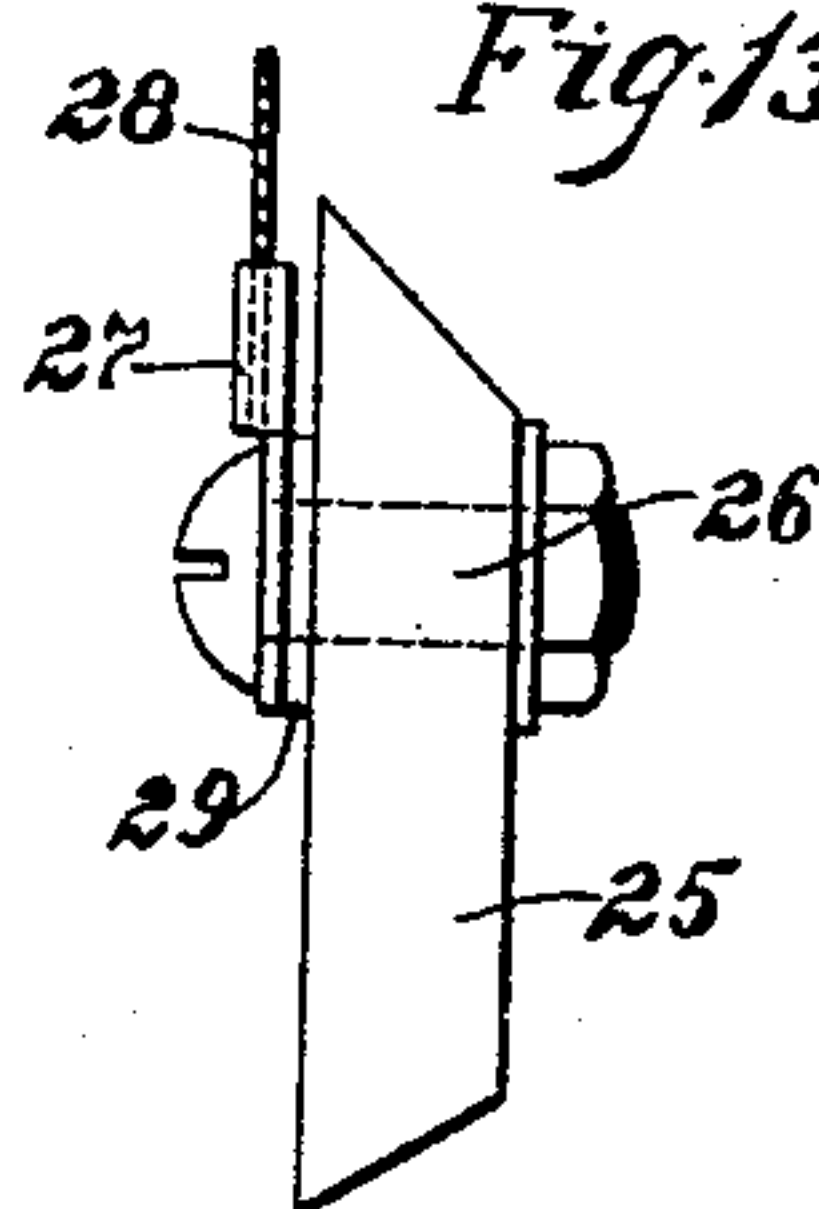
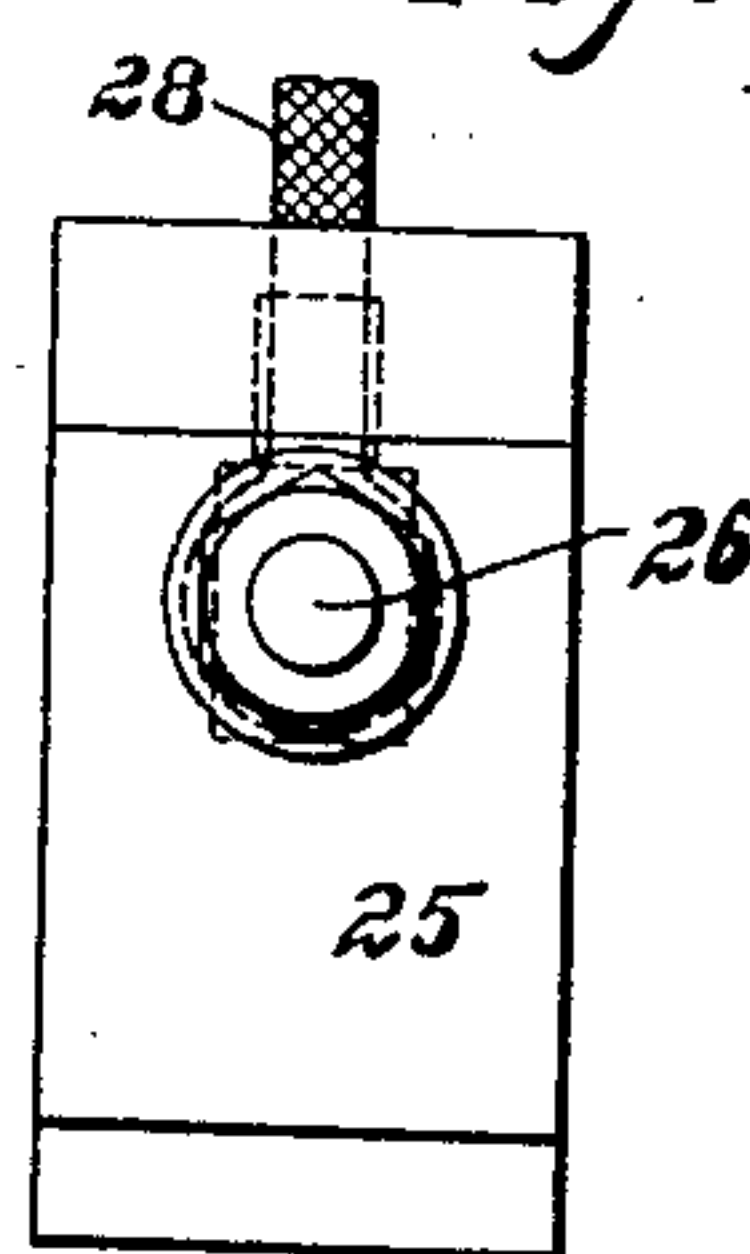


Fig. 14.



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UNITED STATES PATENT OFFICE.

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BRUSH-HOLDER.

967,527.

Specification of Letters Patent.

Patented Aug. 16, 1910.

Application filed February 4, 1905. Serial No. 244,117.

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 the invention is to simplify and improve the construction and reduce the cost of manufacture of brush holders, especially adapted for use on machines of the commutator type, and with this end in view the invention comprises certain novel features of construction and arrangement of parts which will be hereinafter described and more specifically stated in the appended claims.

It has been the custom heretofore, in order to obtain the proper strength and rigidity, to manufacture brush holders for dynamo electric machines with the parts made of metal cast into the desired shape. This method of manufacture makes the brush holder very heavy and cumbersome, while at the same time expensive to construct.

In overcoming the objections just noted I employ a brush holder made almost entirely of punchings from sheet metal, and thereby am able to construct an inexpensive brush holder which is very satisfactory in operation and is light and rigid.

In the accompanying drawings which illustrate the preferred embodiment of my invention, Figure 1 is a side view of a part of a dynamo electric machine equipped with one of my improved brush holders; Fig. 2 is a side view, partly in section, of a brush holder showing the brush in position on the commutator of the machine; Figs. 3 and 4 are end views of the brush holder looking from the left and right respectively of Fig. 2; Figs. 5, 6, and 7 are views of the pressure finger removed from the holder; Figs. 8 and 9 are side and edge views respectively of one of the punchings of sheet metal used to form the pressure finger; Fig. 10 is a plan view of a plurality of my improved brush holders mounted on the same supporting studs; Figs. 11 and 12 are side and

edge views respectively of one of the punchings which form the side plate of the brush holder body; and Figs. 13 and 14 are side and face views respectively of the brush and the flexible electrical connection therefor.

Referring now to Fig. 1, the end housing or bracket 18 supports the bearing 17 in which the shaft of armature 15 rotates. Fastened to the bracket 18 by means of the bolt 19 is an insulated block 20 carrying studs 21. The brush holder is mounted on said studs 21 and is held thereon against the end of the insulated block 20 by means of the nuts 22. Said brush holder carries the brush 25 which bears against the commutator 16. The brush holder body is made up of the side plates 23, which are held at a predetermined distance apart by means of the rods or tubes 30 and 31 and the spacing sleeves 34. The side plates are punched from sheet metal such as brass or copper in the shape outlined in Fig. 11, the part 24 indicated by dotted lines, being bent at right angles as shown in Fig. 12, before the brush holder is assembled. These parts 24 of the assembled holder form the bearing surfaces or slotted guide-way for the brush 25, said brush being guided in its movements toward and away from the commutator surface by the edges of these inwardly turned parts 24. The terminal 27 of the flexible electrical conductor 28 is fastened to the brush 25 by means of the bolt 26 carrying the rectangular shaped piece 29. This rectangular shaped piece 29 fits loosely in the opening between the inner edges of the parts 24 and serves to prevent the brush from rotating on the face of the brush holder 23. The terminal 27, as shown, has laterally extending portions or wings parallel to the face of the carbon brush and engaging the inner surface or face of the slotted guide-way 24 when in position on the holder. The other terminal 27^a of this flexible conductor 28 is fastened to the brush holder body by means of nut 22 on stud 21. The side plates 23 of the brush holder are held together by means of the rods or tubes 30 and 31 which are beaded, riveted, or expanded at their outer ends, after the said ends have been passed through the openings 33 in the side plates. Mounted on said tubes or rods 30 and 31 are the spacing sleeves 34, which serve to maintain the

side plates of the brush holder at a predetermined distance from each other; that is to say, the length of said sleeves determines the width of the brush holder. Pivoted on the
 5 eyelets 35 in the upper part of the brush holder is the pressure finger 36, the outer end of which is held against the upper surface of the brush 25 by means of the pressure spring 37. The lower end of spring 37 is fastened
 10 to the sleeve 34 on tube or rod 31 by means of the strap 38, and its upper end is attached to the rod 39 adjustable in the notches 40 formed in finger 36. The said finger 36 is made up of two pieces of sheet metal punched
 15 in the form shown in Figs. 8 and 9. These two pieces of sheet metal are then bent into the forms shown in Figs. 6 and 7 and are riveted together at 41 and 42, the outer end of the finger being provided with side extensions made up of the sleeves 43, which are
 20 held together on the end of said finger by rivet 41. These side extensions give a large bearing surface on the upper end of the carbon brush and serve as additional means for preventing the twisting and turning of the
 25 brush in the holder. The inner or pivoted end of the pressure finger 36 has a rearwardly extending rectangular projection 45 adapted to engage or to strike the sleeve 34 on a tube or rod 30 when the finger is swung
 30 backward or rearward, so as to limit its movement in that direction.

In Fig. 10 I have illustrated three of my improved brush holders mounted on the same
 35 supporting studs 21. The construction of each of the individual brush holders is substantially the same as has just been described, but the flexible electric conductors attached to the brushes in each holder are all fastened
 40 to the same stud 21 by means of a single nut 22. The eyelets 35 form the pivots for fingers in adjacent holders, and I prefer to employ tubes or rods 45 equal in length to the combined width of the holders in lieu of short lengths equal to the width of a single holder.
 45 These tubes or rods are expanded in openings in, or are otherwise attached, to the extreme outside side plates of the assembled holders. Spacing sleeves 34 of the proper
 50 length hold the side plates 23 of each holder at a predetermined distance apart on the tubes.

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

1. In combination, a brush holder comprising a sheet metal body portion, the sides of which have inturned ends which are spaced apart forming a guide slot or a slot-
 60 ted guideway with parallel brush guiding edges, a brush exterior to the guideway and engaging the slotted face thereof, brush guiding means carried by the brush and having a rectangular shaped portion which enters said slot and has substantially parallel

edges forming shoulders adapted to engage said parallel edges of the guideway, and said guiding means having portions which are parallel to the face of the brush and engage the inner face of the guideway.

2. In combination, a brush holder comprising a sheet metal body portion, the sides of which have inturned ends which are spaced apart forming a guide slot with parallel edges, a brush exterior to the holder and bearing against said inturned ends, and brush guiding means carried by the brush and cooperating with said guide slot, said guiding means comprising a member secured to the face of the brush and slidable in said
 75 guide slot, said member having parallel edges adapted to engage the edges of said inturned ends of the holder, and said guiding means including a second member spaced from the brush and having portions which are parallel to the face of the brush and overlap and engage the inner faces of said
 80 inturned ends of the holder.

3. A brush holder comprising a pair of separate side plates, spacing members extending between the side plates and holding the latter a predetermined distance apart, a pressure finger pivoted to said side plates, and a spring having one end connected to the pressure finger and its other end connected to one of said spacing members, and another of said spacing members being in the path of rearward movement of said pressure finger and serving as a stop to limit said rearward movement.

4. In combination, a brush holder comprising side plates formed of separate sheet metal punchings, means for holding said side plates at a predetermined distance apart, said means comprising tubes having their ends expanded in openings in said side plates and spacing sleeves mounted on said tubes, a support for said brush holder, and bolts passing through said tubes for fastening the holder to said support.

5. A brush holder structure comprising a plurality of pairs of side plates formed from separate sheet metal punchings, means for clamping all the side plates rigidly together and holding the plates of each pair a predetermined distance apart comprising clamping members extending through openings in all of said plates and secured to the two outer or end plates, and spacing sleeves mounted on said clamping members between the plates of each pair.

6. In combination, a plurality of brush holders, each having side plates formed from separate sheet metal punchings, tubes passing through openings in all said side plates, spacing sleeves mounted on said tubes for holding the side plates of each holder a predetermined distance apart, the ends of said tubes being expanded to hold the brush holders rigidly together, a support for said

brush holders, and bolts or studs passing through said tubes for fastening the holders to said support.

5 7. A brush holder structure comprising a plurality of pairs of side plates formed from separate sheet metal punchings, the plates of each pair having portions bent inwardly toward each other forming guid-
10 ing surfaces for a brush, clamping members passing through openings in all of said plates and secured to the two outer or end plates so as to hold said plates rigidly to-
15 gether and spacing sleeves mounted on said clamping members between the plates of each pair.

8. A brush holder comprising side plates formed from two separate sheet metal punch-
ings, means for supporting and holding said plates a predetermined distance apart com-
20 prising a plurality of tubular members extending through the plates, spacing sleeves surrounding said tubular members, and sup-
porting bolts or studs passing through said tubular members and projecting beyond the
25 same.

9. In combination, a brush holder com-
prising two separate side plates, means for
securing said plates together comprising tu-
bular members extending through the plates,
30 and means for supporting said holder com-
prising bolts or studs passing through said tubular members and projecting beyond the
same.

10. In combination, a plurality of brush holders, each holder comprising a pair of 35
sheet metal side plates, and means for sup-
porting said plates and for spacing the
same apart comprising tubular members
passing through all of the plates, and sleeves
40 mounted on said tubular members between the plates of each brush holder.

11. In combination, a plurality of brush holders each comprising a pair of sheet-
metal side plates, means for holding said
plates firmly in position and for spacing the 45
same apart comprising long tubes extending
through all said plates and shorter sleeves
on said tubes between the plates of each
brush holder, and supports for said brushes
comprising bolts or rods passing through 50
said tubes.

12. In a device of the class described, a
slotted guideway formed of sheet metal, a
carbon exterior to the guideway, said carbon
engaging the slotted face of the guideway, a 55
shoe attached to the carbon and having lat-
erally-extending wings parallel to the face
of the carbon and engaging the inner face
of the slotted side of the guideway.

In testimony whereof I affix my signature, 60
in the presence of two witnesses.

EARLE R. KNIGHT.

Witnesses:

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FRED J. KINSEY.