

No. 753,866.

PATENTED MAR. 8, 1904.

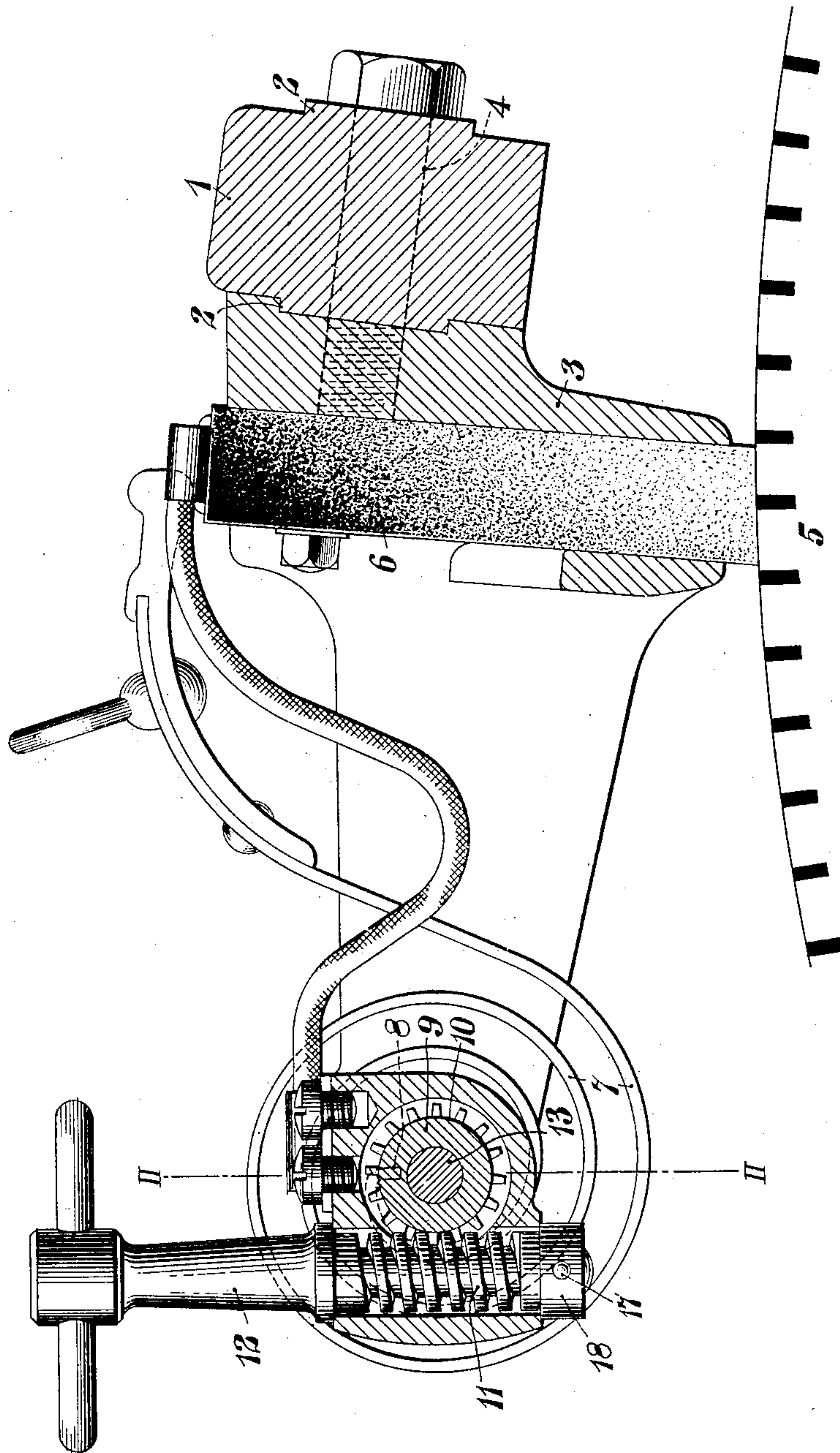
W. H. FOOT.
BRUSH HOLDER FOR ELECTRICAL MACHINES.

APPLICATION FILED JUNE 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

C. L. Belcher
J. B. Morse

INVENTOR

William H. Foot

BY

Wiley S. Carr
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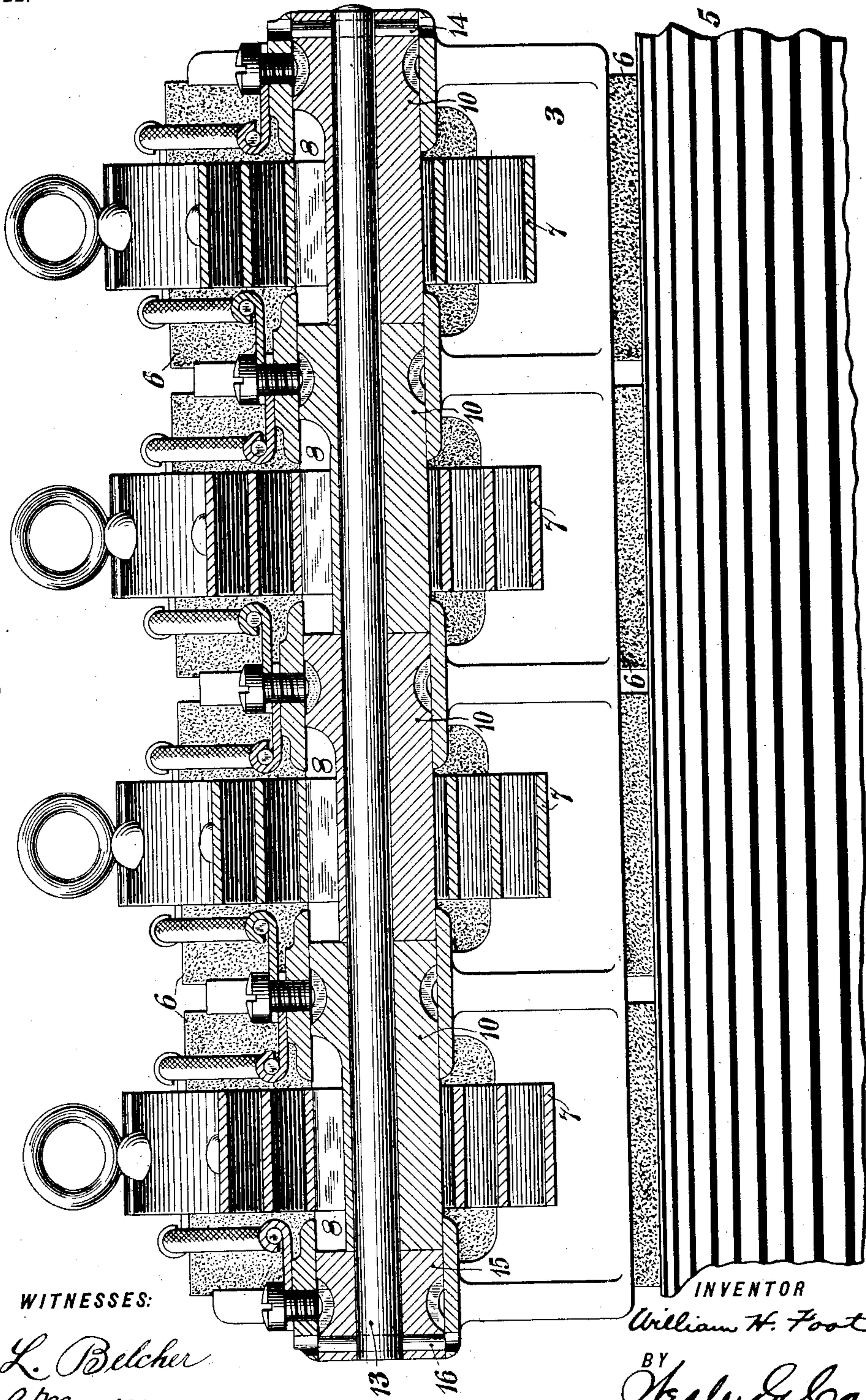
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NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM H. FOOT, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO
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PORATION OF PENNSYLVANIA.

BRUSH-HOLDER FOR ELECTRICAL MACHINES.

SPECIFICATION forming part of Letters Patent No. 753,866, dated March 8, 1904.

Application filed June 24, 1903. Serial No. 162,908. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. FOOT, a sub-
ject of the King of Great Britain, residing at
Wilkinsburg, in the county of Allegheny and
State of Pennsylvania, have invented a new
and useful Improvement in Brush-Holders for
Electrical Machines, of which the following is
a specification.

My invention relates to brush-holders for
electrical machines; and it has for its object to
provide a brush-holder comprising a plurality
of individually-actuated brushes of such con-
struction that its position on the rocker-arm
which carries it may be easily and quickly
reversed when it is desired to reverse the di-
rection of rotation of the armature.

It is often desirable in the operation of elec-
trical machines to reverse the direction of ro-
tation of the armature. This necessitates re-
versal of the positions of the brush-holders on
the rocker-arms which support them. On
large machines it is a common practice to em-
ploy a plurality of brushes instead of one
having the same aggregate area, because it is
difficult to keep the whole area of a single
carbon in contact with the commutator-cyl-
inder. The holders for the individual carbons
are often cast in one piece for the purpose of
reducing the number of parts and of obtaining
a simple rigid bracket, and good contact is
maintained between the carbons and the com-
mutator-cylinder by means of springs which
press against the outer ends of the said car-
bons. Since it is desirable to effect individual
adjustment of pressure upon each of the car-
bons, a separate spring and means for varying
its tension is provided for each of them.

My invention is illustrated in the accom-
panying drawings, in which—

Figure 1 is a transverse sectional view of a
brush-holder constructed in accordance there-
with. Fig. 2 is a longitudinal sectional view
taken on line II II of Fig. 1, a portion of the
commutator-cylinder being shown in side ele-
vation.

The rocker-arm 1 is provided with a longi-
tudinal projection 2 on each side thereof, the
one or the other of which fits into a corre-

sponding recess in the brush-holder bracket 3,
substantially as shown. The bracket 3 is se-
cured to the rocker-arm by means of tap-
bolts 4, which are easily removed and replaced
when reversing the brush-holder, such rever-
sal being effected by transferring the bracket
from one side to the other of the rocker-arm,
according to the direction of rotation of the
commutator-cylinder 5.

A suitable pressure is maintained upon the
brushes 6 by means of spiral springs 7, the
free ends of which rest upon the outer ends of
the corresponding brushes. The other end of
each of the springs 7 is secured in a slot 8 in
the hub 9 of a corresponding worm-wheel 10.
The worm-wheels 10 are severally actuated by
worms 11 on the ends of spindles 12 in order
to vary the pressure exerted by the corre-
sponding springs 7. All of the worm-wheels
10 except the one at the extreme right, as
shown in Fig. 2, are independently mounted
on a shaft 13, about which they are free to
rotate in order that they may be individually
adjusted.

The end worm-wheel 10 is secured to the
shaft 13 by means of a pin 14, and a wheel 15
of the same form and dimensions, except that
it has no laterally-extended hub, is secured to
the other end of the shaft by a similar pin 16.
This construction allows of the adjustment of
the spring 7, which is attached to the hub of
the end wheel 10 from either end of the brush-
holder bracket 3, and in order to facilitate such
adjustment the end spindle 12 is made inter-
changeably useful in connection with either
of worm-wheels 10 and 15. The removal of
a cotter-pin 17 and the head 18, which it holds
in position, permits of the ready removal of
the spindle 12 from its position at either end
of the brush-holder bracket.

The end spindle 12 is always placed in the
end of the bracket which is farthest from the
armature in order that the tension of the end
spring 7 may be adjusted without danger to
the attendant, and it is therefore evident that
said spindle must be changed from one end of
the bracket to the other whenever the brush-
holder is reversed in position on its rocker-

arm and that the construction herein described greatly facilitates such change.

It would of course be feasible to utilize a single detachable worm-spindle for actuating
5 all of the worm-wheels or to employ a worm-spindle for each of the worm-wheels, including wheel 15, and I therefore desire that my invention be construed broadly enough to cover such variations from what is hereinbefore specifically set forth.

The remaining parts of the brush-holder are well known in the art and need not here be described, my invention pertaining only to the adjustment of the springs when reversing the
15 direction of rotation of the machine and the consequent reversal of the brush-holder bracket on its rocker-arm.

It is evident that I have provided a means whereby this result may be accomplished
20 easily and expeditiously by disturbing a minimum number of parts, and I do not wish my invention limited to any particular number of individually-actuated brushes or to any specific means for applying pressure to said
25 brushes.

It will be further understood that my invention is not limited to the employment of brushes of any specific form or material, except as limitations may be imposed by the
30 particular service to be performed in any given case.

I claim as my invention—

1. In a brush-holder having a plurality of brushes, the combination with a plurality of
35 springs, of a rotatable shaft having adjusting means for one of the end springs fastened to its respective ends, and separate adjusting means for each of the other springs mounted upon the shaft to turn independently thereof.

40 2. In a brush-holder having a plurality of brushes, the combination with a plurality of springs acting independently upon the several brushes, of a rotatable shaft having adjusting means for one of the end springs fastened to
45 its respective ends and separate adjusting means for each of the other springs rotatably mounted upon the shaft.

3. In a brush-holder having a plurality of brushes, the combination with a plurality of
50 springs bearing severally upon the brushes, of a rotatable shaft, adjusting-gears for said springs each of which has one of its members mounted upon said shaft, means for fastening each of said gear members to its spring, means
55 for fastening one of said members to the shaft and a supplemental gear member that is attached only to the shaft.

4. In a brush-holder having a plurality of brushes, the combination with a plurality of

springs bearing severally upon the brushes, of
60 a rotatable shaft, a worm-wheel fastened to one end of the shaft and the corresponding spring, a worm-wheel fastened to the other end of the shaft, a detachable worm-spindle for engagement with either of said worm-
65 wheels, a plurality of worm-wheels rotatably mounted upon said shaft and severally attached to the intermediate springs, and worm-spindles engaging the respective worm-
70 wheels.

5. In a brush-holder having a plurality of brushes, the combination with a shaft having gear members fastened to its ends and intermediate gear members rotatably mounted thereon, of springs respectively attached to
75 the intermediate gear members and one of the end members and bearing upon the respective brushes, manually-operated gear members respectively meshing with said intermediate members and a detachable, manually-
80 operated gear member adapted to mesh with either of said end members.

6. The combination with a rocker-arm having a longitudinal projection on each side thereof, a brush-holder having a longitudinal
85 recess in one side and means for clamping the holder against either side of the rocker-arm with one of said projections in its recess, of a set of brushes seated side by side in said holder, a set of independent springs for said
90 brushes, means for adjusting one of the end springs from either end of the holder and independent means for adjusting each of the other springs.

7. The combination with a rocker-arm, a
95 brush-holder and means for detachably clamping said holder to either side of said arm, of a set of brushes supported side by side in said holder, a set of springs for said brushes, means for adjusting one of the end springs
100 from either end of the holder and independent means for adjusting each of the other springs.

8. The combination with a rocker-arm, a
105 brush-holder and means for removably clamping said holder to either side of said arm, of a set of brushes supported independently in said holder, a set of springs for said brushes, independent adjusting means for each of said springs, said means for one of the end springs
110 comprising a rotatable shaft and an actuating device at each end thereof.

In testimony whereof I have hereunto subscribed my name this 12th day of June, 1903.

WILLIAM H. FOOT.

Witnesses:

J. M. HIGGINBOTHAM,
BIRNEY HINES.