

(No Model.)

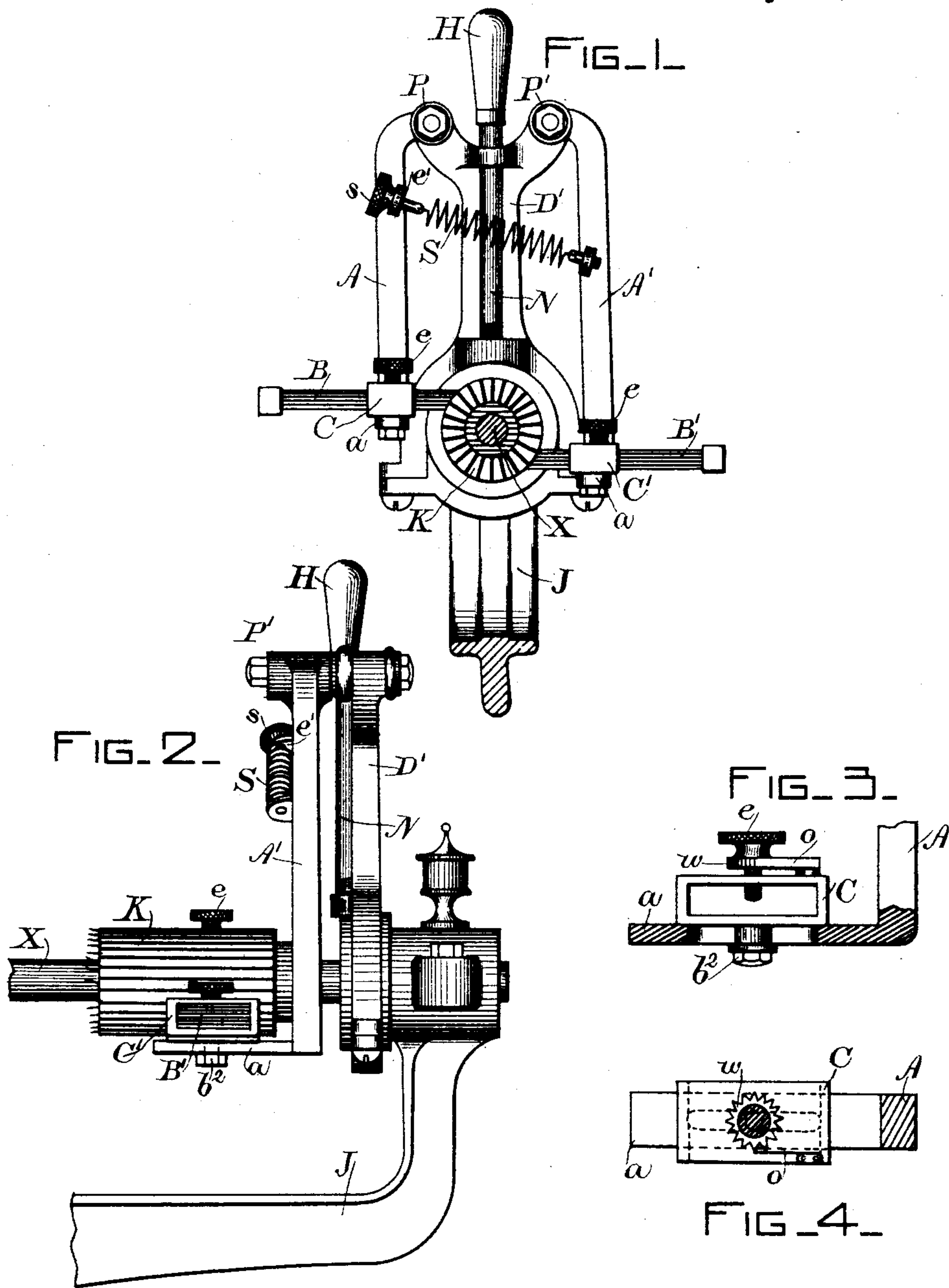
2 Sheets—Sheet 1.

E. THOMSON.

BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES.

No. 540,035.

Patented May 28, 1895.



WITNESSES

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INVENTOR

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By Bentley — Bentley
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FIG. 5.

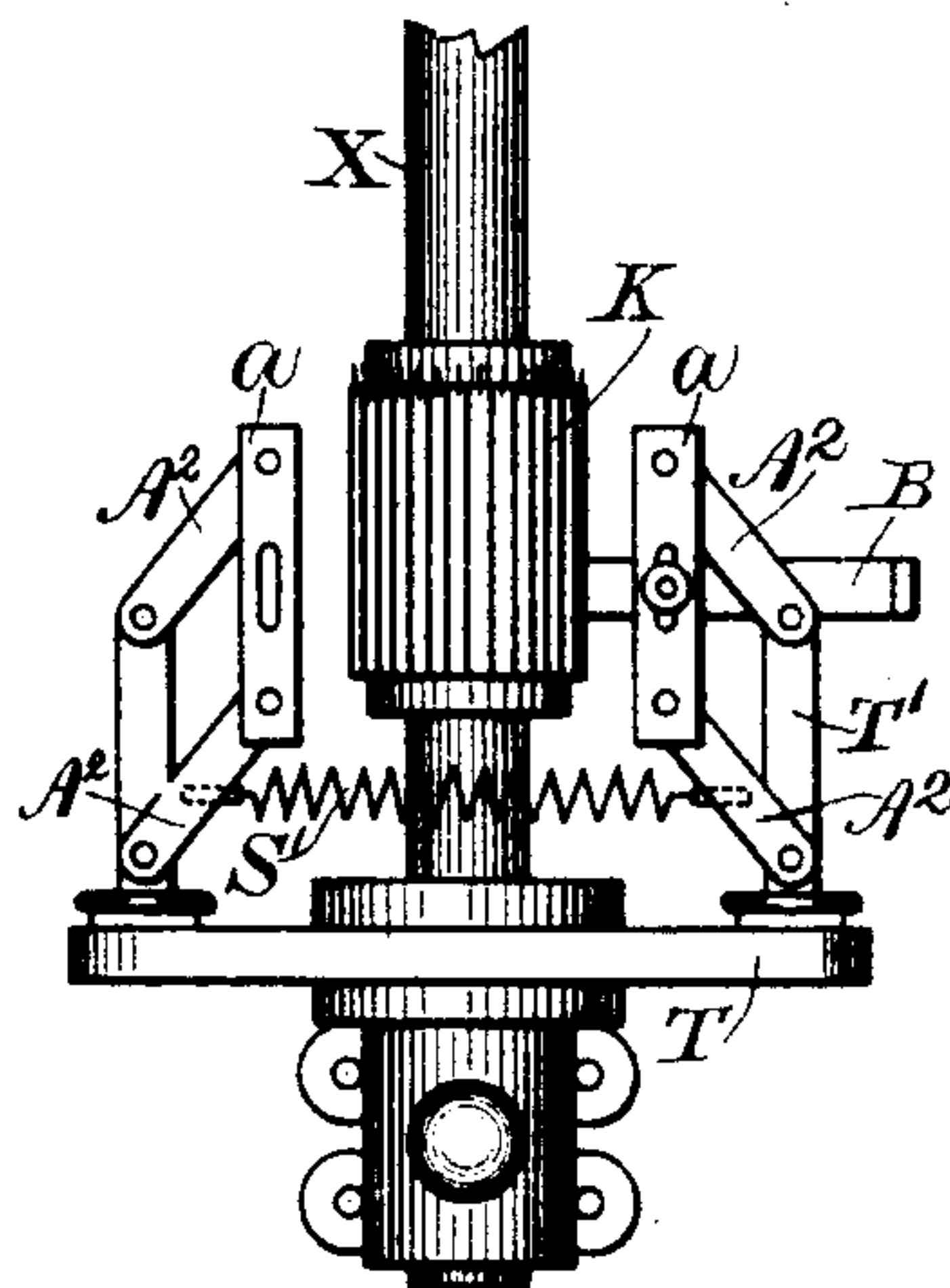
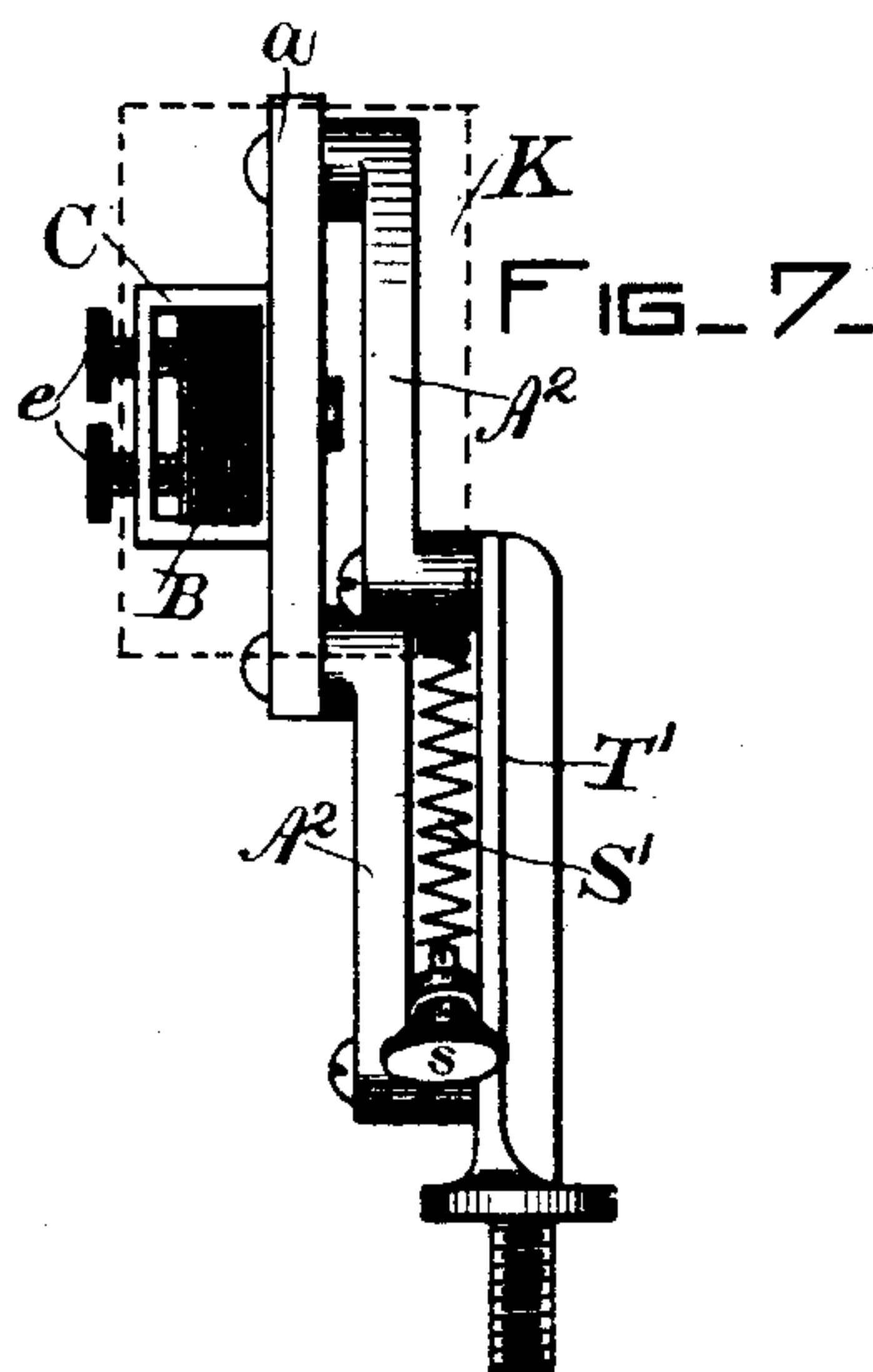
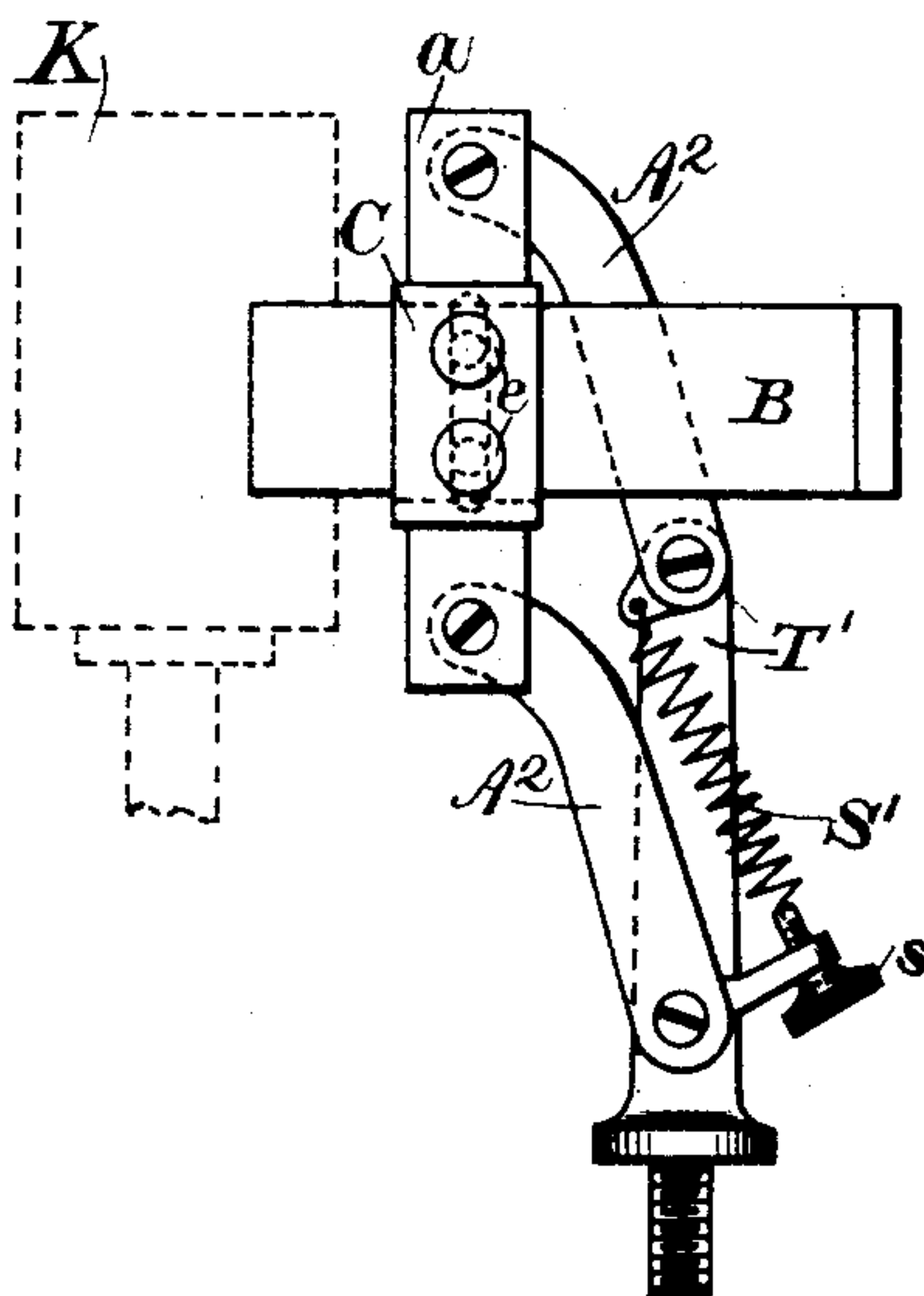


FIG. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

BRUSH-HOLDER FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 540,035, dated May 28, 1895.

Application filed February 20, 1893. Serial No. 462,984. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented a new and useful Improvement in Brush-Holders for Dynamo-Electric Machines or Motors, of which the following is a specification.

My present invention relates especially to means employed for applying and holding the brushes in engagement with the commutator of a dynamo electric machine. It is applicable either to generators or motors, and its object is to locate the brushes at the most desirable points, and in the best position for obtaining a proper and uniform feed and the equalization of the pressure of the two sets of brushes on the commutator cylinder. The brushes are given an end bearing on the commutator, and are applied in such positions that the range of movement permitted them lies, not in a plane cutting through the center of the shaft, as has been the case in some instances heretofore, but in parallel planes intersecting the commutator above and below respectively, a similar parallel plane drawn through the axis. The brushes are carried in clamps mounted on swinging supports in such manner that as the brushes, or the commutator cylinder, wear down so that the brush clamps stand nearer or farther away from the center of the shaft, the same good contact will be effected.

An important feature of the invention consists in a special device for maintaining an exact parallelism of the brush and brush clamp to the surface of the cylinder at all times, such device consisting of parallel links connecting the brush clamp with its support so that the brushes will always stand parallel to a given plane.

Some of the constructions employing my invention will be described in connection with the accompanying drawings, and the novel features of the invention will then be pointed out in the claims.

In the drawings, Figure 1 is a front elevation of my improved brush-holder and commutator. Fig. 2 is a side elevation thereof. Figs. 3 and 4 are detail views illustrating the

clamp mechanism. Figs. 5, 6, and 7 are views in different planes of a parallel-link construction for maintaining exact parallelism of the brush-clamps, Figs. 6 and 7 showing a slightly modified arrangement from that shown in Fig. 5.

In the drawings K is the commutator cylinder secured upon the armature shaft X of a dynamo or motor in the usual manner.

In Figs. 1 and 2 a standard J is shown which is a part of the frame of the machine forming one of the bearings for the armature shaft. The brushes are seen at B, B'. They are given an end bearing upon the commutator at diametrically opposite points thereof, but are so mounted that the planes in which they are free to move are substantially parallel planes intersecting the cylinder on opposite sides of the shaft. The brushes are carried by clamps C, C' and are held therein by set screws *e*. The clamps are supported upon swinging arms which in Figs. 1 and 2 are of some little length, and are pivoted at their farther ends at such a distance from the clamps and from each other that the tips of the brushes may move in substantially parallel planes as they are fed by the force of spring S, which joins the two arms and maintains the pressure of the brushes against the cylinder. The pivots P, P' for the arms A, A' are insulated and are carried upon a supporting yoke D', which is adjustable around the armature shaft, and may be locked in any desired position by means of a screw-threaded rod N provided with a handle H. The tension of the spring S is adjustable by means of a set screw *s* passing through a screw-threaded lug *e'*, and to the inner end of which a spring is connected. By joining the arms directly by the spring D the brushes bear with equal force against the commutator and the degree of pressure is easily regulated.

The brush clamps C, C' are carried on short arms *a* which project out at right angles from the main portions of the arms A, A', the attachment being made by a bolt *b*², which works in a slot in the arm *a* so that the position of the clamp may be adjusted laterally along the commutator. In order to prevent the working loose of the brush clamp screws

e, I provide a ratchet *w* on the stem of the screws, and a spring pawl *o* arranged as is illustrated in Figs. 3 and 4.

The arms A, A' are pivoted at a distance
5 apart substantially the same as the distance between the wearing tips of the brushes, and with this arrangement, the arms themselves being of some considerable length, the movement of the brushes through the limited range
10 which must be provided for is practically a parallel one, that is, the brushes always stand practically parallel to that portion of the surface of the cylinder at which they make contact. I have devised, however, special means
15 for securing this parallelism of movement, which is deemed a better construction. These means are shown in Figs. 5, 6, and 7, where the commutator shaft, adjustable yoke, and brush clamps are constructed and arranged in the manner already described.
20 Here the arms *a* to which the brush clamps are secured are pivoted at their opposite ends to swinging arms A², which play the part of the parallel links present in a parallel link ruler. The arms A² are at their other ends pivoted to
25 standards T' which are carried upon a yoke T, and the two sets of arms are in Fig. 5 connected by a spring S' pressing the brushes against the cylinder. In Figs. 6 and 7 the same construction is shown except that each
30 brush is separately spring controlled, the spring in each instance joining the two parallel arms carrying a single brush clamp, and being arranged in such a manner that it tends
35 to lengthen out the arms and move them forward toward the commutator cylinder.

I am of course aware that the parallel link construction, as a mechanical movement simply, is old long prior to my invention, but I
40 believe that no such movement has ever been used in the art to which this invention relates for maintaining the brushes always in their proper position notwithstanding wear

of the parts. Hence it is intended to be within the scope of my invention to substitute other parallel movements for giving a like effect instead of the arms or links precisely as shown. The construction I have found a desirable one inasmuch as small variations in the points at which the brushes
50 engage the commutator, such as ordinarily will take place owing to wear of the parts, as also the variations in the resistance of the contact if the brushes wear unevenly, play important parts in the resulting operation of
55 the machine.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a brush clamp and support for the same, one swinging upon the
60 other, and means for maintaining the clamp always parallel to a given plane.

2. The combination of a commutator brush and a parallel motion device connecting the brush with its support, and maintaining the
65 brush always parallel to that point of the surface of the commutator which it is intended to engage.

3. The combination of a brush clamp and brush, parallel links joining the clamp to its
70 support and so adapted to maintain the brush parallel to a given plane, and a spring for maintaining the pressure of the brush against the commutator.

4. The combination of brush clamps, 75 brushes, and pivoted supports therefor arranged to give the brushes respectively movements in practically parallel planes on opposite sides of the commutator, as set forth.

In testimony whereof I have hereto set my
80 hand this 18th day of February, 1893.

ELIHU THOMSON.

Witnesses:

JOHN W. GIBBONEY,
BENJAMIN B. HULL.