

(No Model.)

C. J. VAN DEPOELE.

DEVICE FOR ADJUSTING THE BRUSHES OF DYNAMO ELECTRIC MACHINES.

No. 285,527.

Patented Sept. 25, 1883.

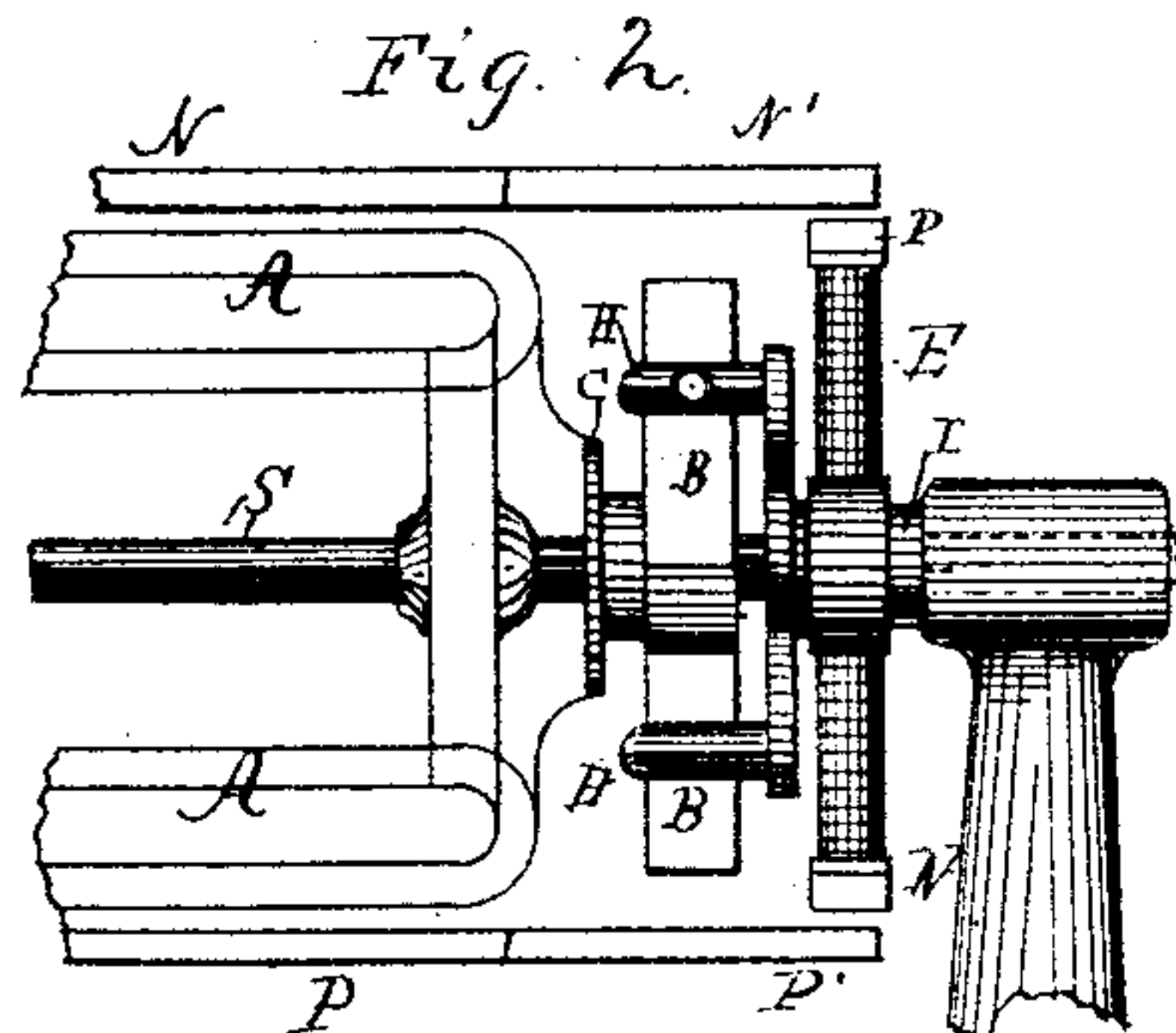
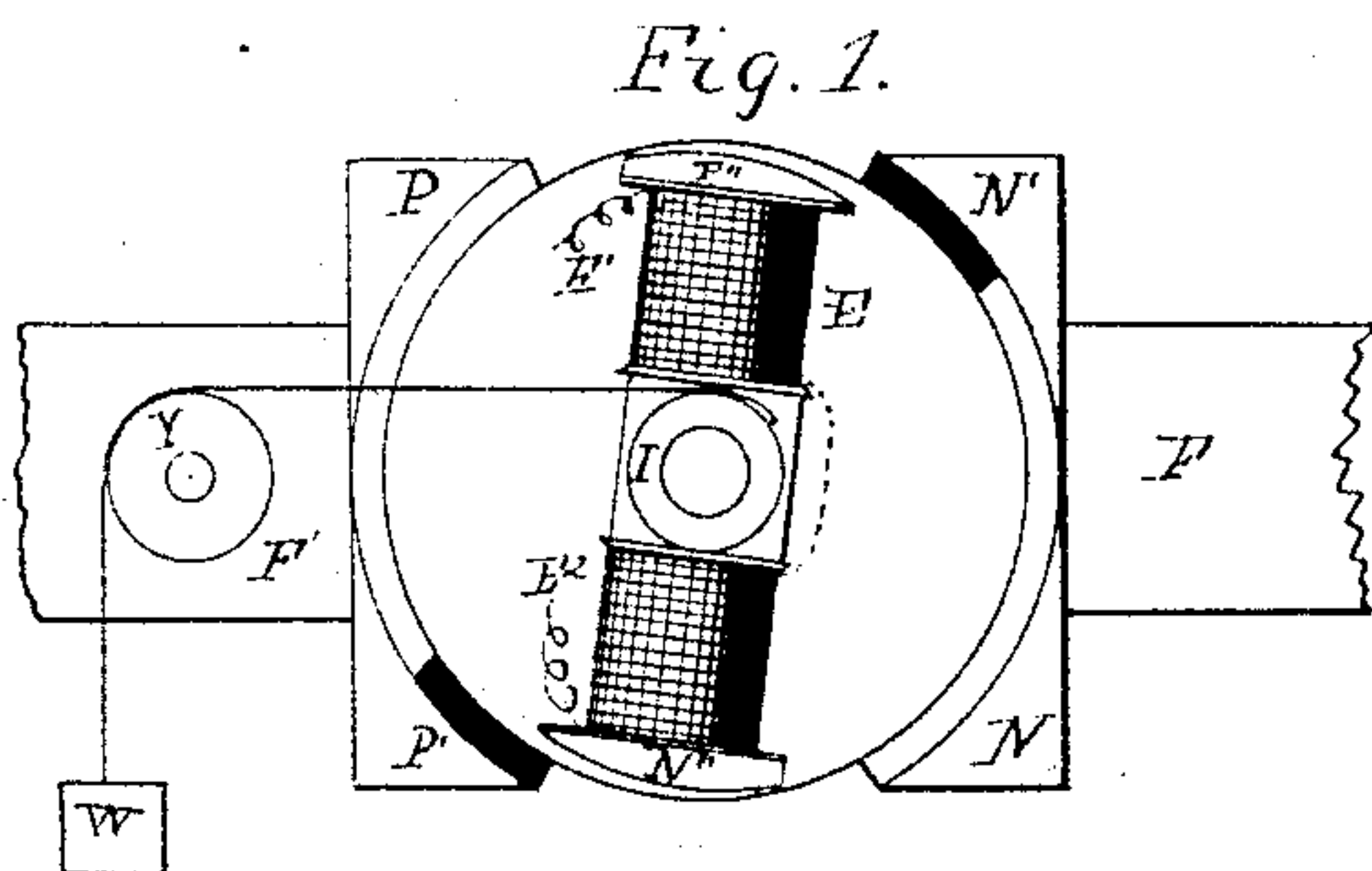


Fig. 3.

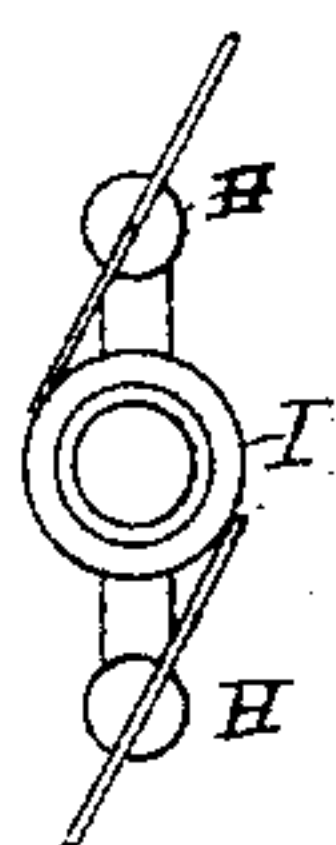


Fig. 4.

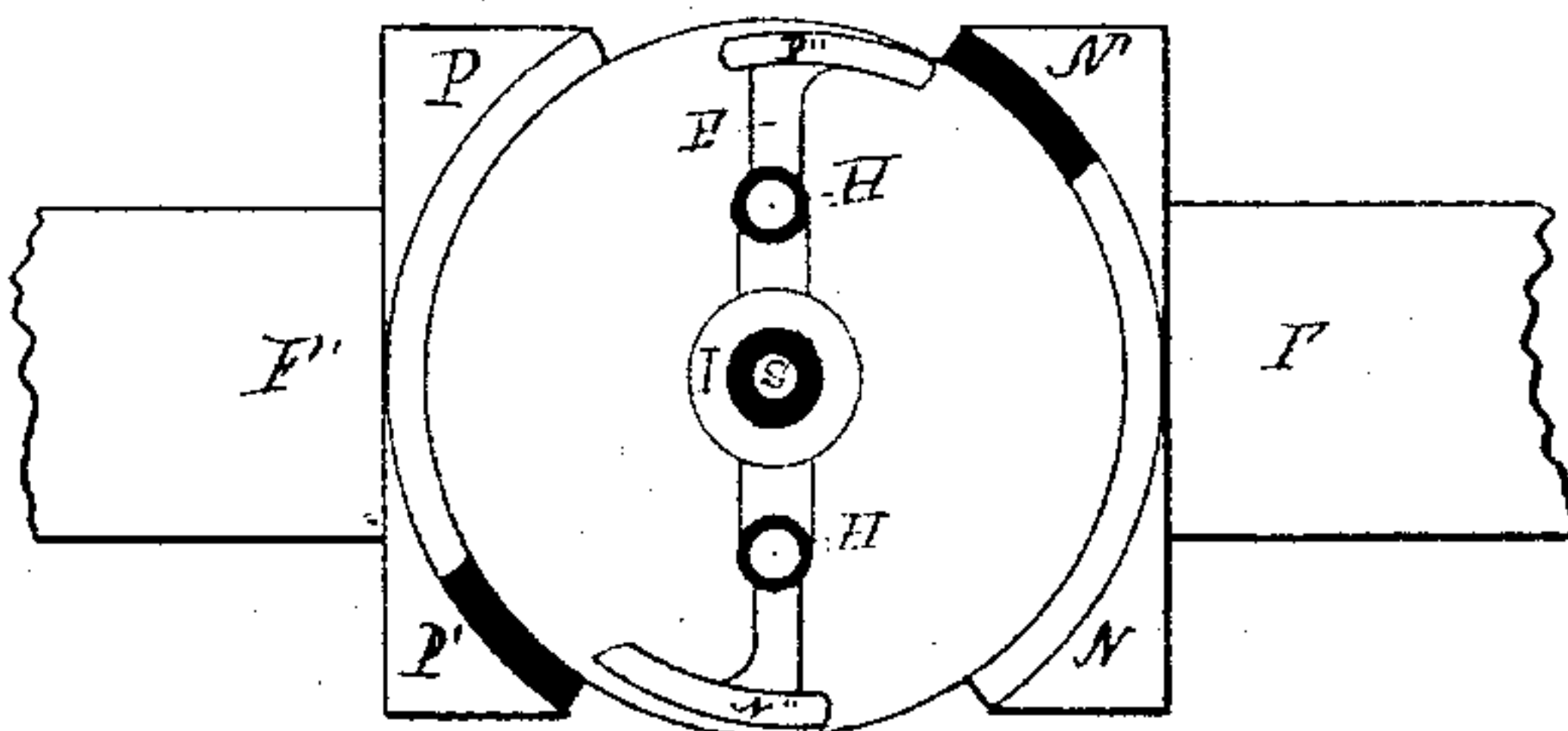


Fig. 5.

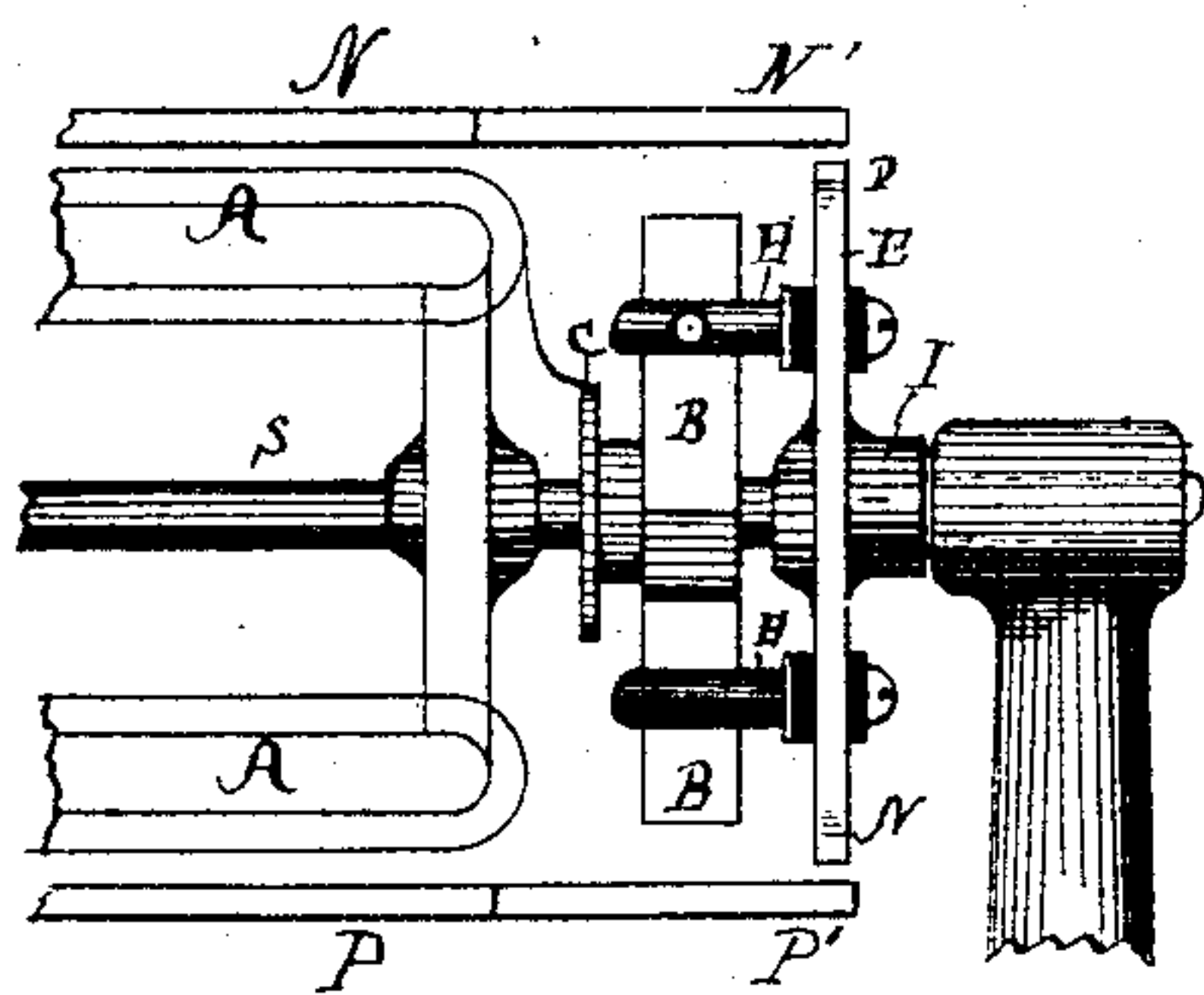


Fig. 6.



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DEVICE FOR ADJUSTING THE BRUSHES OF DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 285,527, dated September 25, 1883.

Application filed April 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, of Chicago, in the county of Cook and State of Illinois, have invented new and useful
5 Improvements in Devices for Adjusting the Brushes in Dynamo-Electric Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings,
10 which form a part of this specification.

This invention relates to a new and useful device to be employed in connection with dynamo-electric machines, by means of which, whenever the electro-motive force in said machines is varied, the collectors or brushes will automatically adjust themselves to their proper place on the commutator of the machine; and the invention consists in such automatic adjustment of the brushes or collectors and
20 the appliances by means of which this is done.

Figure 1 is a partial front view of the magnetic system of the dynamo. Fig. 2 is a side view of the same. Fig. 3 is an elevation of the brush-holders. Fig. 4 is a sectional elevation, showing the field-magnets, their pole-pieces and extensions, which are also shown in Fig. 1. Fig. 5 is a side elevation, partially in section, showing the arrangement of parts. Fig. 6 is an end elevation of the commutator and brush-holder and brushes.
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In the accompanying drawings, which form a part of this specification, F F' represent the magnet-cores of the field, provided with their poles P and N.

35 N' and P' are polar extensions, which are to act upon the electro-magnet E, P and N representing the poles of said electro-magnet.

I is a hollow sleeve, placed upon a proper bearing, and adapted to allow the electro-magnet E upon said sleeve to oscillate freely under the influence of the polar extensions N' P'.
40

E' and E" are the terminals of the coils of the electro-magnet.

45 V is a pulley secured in any suitable position, over which passes a cord, as shown in Fig. 1, one end of which is attached to the sleeve I, while the other is provided with a weight, W, intended to counteract the action of the electro-magnet E upon the polar extensions P' and N'.
50

A represents the armature upon the shaft

S, and C the commutator, connected with the armature in the usual way, and secured to the shaft S so as to revolve with the same.

55 B B represent the brushes bearing upon the commutator C, and H H are the brush-holders fastened to the electro-magnet E, with which they are intended to move around the commutator, by the combined action of said electro-magnet and the polar extensions P' N' of the field-magnets. The poles P'' and N'' of the magnet E are eccentric to the axis of the sleeve I, the highest point being farthest away from the extensions of the field-magnets, so as
60 to secure ample motion to the electro-magnet E.

Having described the different parts of my device, I will now proceed to explain the same when in operation. We will suppose Fig. 1 to be a dynamo having the armature in circuit with its field-magnet helices, or connected upon the principle called "in series." By the position as shown in Figs. 1, 2, and 3 it will be seen that the electro-magnet E is away from the poles P' and N' so far as to place the brushes on the spot of lowest efficiency of the machine. However, as soon as the current is established, the armature A will be attracted with its poles toward the extension of the fields. The highest points of E will tend to meet the highest point of P' and N', thus raising the brushes to the maximum of efficiency of the machine. As long as the machine has to do its normal duty the brushes will be kept in the proper spot upon the commutator; but in case of an increase of current, by changing the resistance in the working-circuit, the brushes would be kept up to the highest point with an increased force, and would endanger the machine, were it not for the action of the current in the electro-magnet E, which is in circuit with both the machine and the exterior circuit, and so wound and proportioned that on an abnormal increase of the current said electro-magnet will tend to demagnetize the polar-extensions P' and N', or to repel itself from them, thus carrying the brushes and itself to such position where a balance is obtained. This system will in a certain degree constitute a self-regulating dynamo, but is not sufficiently so for large machines, as the range of regulation is not large enough, which can be obtained by simply raising or lowering the brushes.
100

We will now consider the system as applied to a large generator having its field-magnets energized by a second or special armature independent from the main armature of said generator. We say the large dyamo is intended to run sixty lights in the circuit of its main armature, the field-magnet circuit being in no way connected to the latter armature. As soon as the machine is started and the circuit closed between the auxiliary armature and the field-magnet helices of the machine, the field-extensions P' and N' will attract the electro-magnet E, thus raising the brushes to a point where the attraction between P' and N' will be balanced with E. The electro-magnet E can in this case be in circuit with the field-magnet helices, and so wound and connected that the electro-magnet will concur with the action of the extension P' and N', so that by increasing the current in the field-magnet circuit the brushes will be raised higher by the motion of E, and the reverse will take place whenever the current in said field-magnet circuit is lowered. In this case a spring or other means is applied to E, so as to counteract the motion from E toward P' and N'. Let it be understood, however, that the motion of the brushes in this case is not intended to regulate the current in the outside circuit. This regulation is more dependent upon the strength of the field-circuit, which can be varied by any of the known means. The utility of the device is here to place the brushes in the spot where least sparking will occur without the attention of an assistant.

In Fig. 4 is an arrangement where the armature A replaces the electro-magnet E. This device can be used with a dynamo the fields of which are energized either by a derivation from the main circuit or by an exciter. Whenever the electro-motive force in the machine rises, the brushes will be brought up higher. The reverse will take place when the electro-motive force drops. In case of a generator wound upon the principle of derivation, the varying of resistance in the external circuit reacts upon the field-magnets of the machine, so that whenever the machine is doing its maximum work the brushes will be brought up to the height as adjusted, to have no spark on the commutator, which is also the point of highest efficiency. On diminishing the power of the field-magnets of the generator by diminishing the external resistance, the armature A will be turned lower by the diminished attraction of the poles P' and N', and by the action of a spring, weight, or other means tending to counteract the attraction of N' and P' upon E, as shown in Fig. 1.

A device embodying the principles herein described forms the subject-matter of another application for Letters Patent filed of even date herewith.

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

1. A dynamo-electric machine having field-magnets provided with polar extensions, in

combination with an electro-magnet or armature constructed and arranged to oscillate under the influence of said field-magnets, and connections between the oscillating magnet and the commutator-brushes, whereby the said brushes may be moved upon the commutator of such machine higher or lower in accordance with the varying attraction of the field-magnets, substantially as described.

2. A dynamo-electric machine having field-magnets provided with extensions on their opposite poles, in combination with an electro-magnet connected to the commutator-brushes and wound and connected to react upon said polar extensions, whereby an automatic adjustment of the brushes around the commutator of the said dynamo-electric machine is effected, substantially as described, and for the purpose specified.

3. In a dynamo-electric machine, an electro-magnet centrally pivoted around the shaft of the armature of a dynamo-electric machine, provided with brush-holders, and brushes bearing upon the revolving commutator of such machine, in combination with field-magnets having polar extensions acting upon said electro-magnet, the brushes are moved around the commutator by the varying power of the field-magnets and electro-magnet combined, substantially as above specified, and for the purpose set forth.

4. In a dynamo-electric machine, and in combination with its commutator, a centrally-pivoted electro-magnet or an armature carrying brush-holders, and brushes bearing upon said commutator, arranged so as to move said brushes around and concentric with the commutator, said motion to be determined by the combined action of the field-magnets and the above armature or electro-magnet, substantially as above described, and for the purpose set forth.

5. In a dynamo-electric machine, and in combination with its field-magnets or extensions of the same, an electro-magnet centrally pivoted upon the shaft of said machine, the coils or helices of said electro-magnet being in circuit with the field-magnet helices, or with the armature of such machine, and commutator-brushes connected thereto, and adapted to be moved around the commutator by the variation of the attractive forces of said magnets, substantially as described.

6. The combination, in a dynamo-electric machine, of the field-magnets having polar extensions, an electro-magnet having an oscillating motion in proximity to said polar extensions, and adapted, when suitably connected to the commutator-brushes, to change the position of the said brushes upon the commutator in accordance with the varying force of the current, substantially as and for the purpose described.

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