(No Model.)

4 Sheets—Sheet 1.

H. H. BLADES.

ELECTRIC MOTOR.

No. 454,024. Patented June 16, 1891.

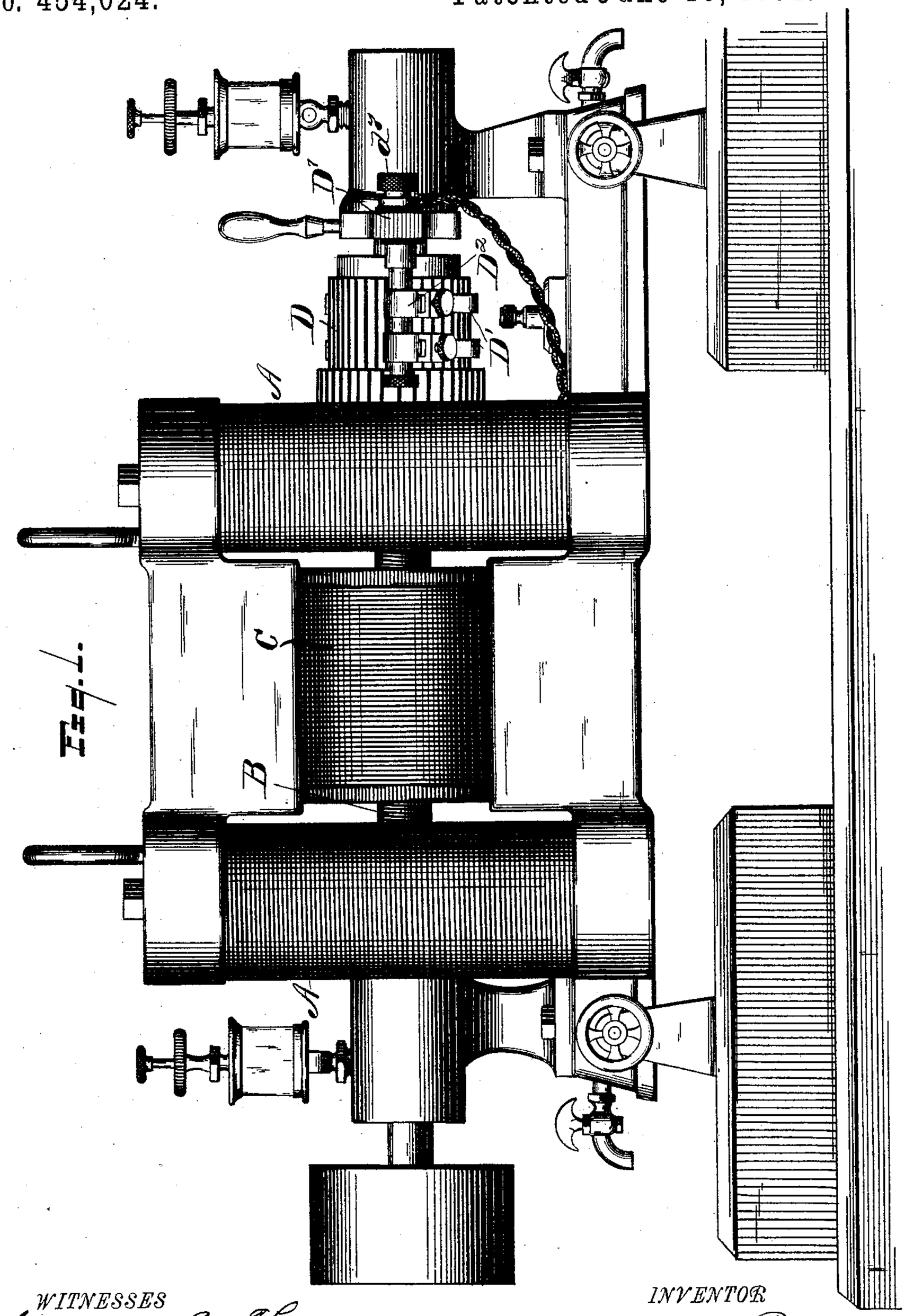

Fig. 1.

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Fig. 2.

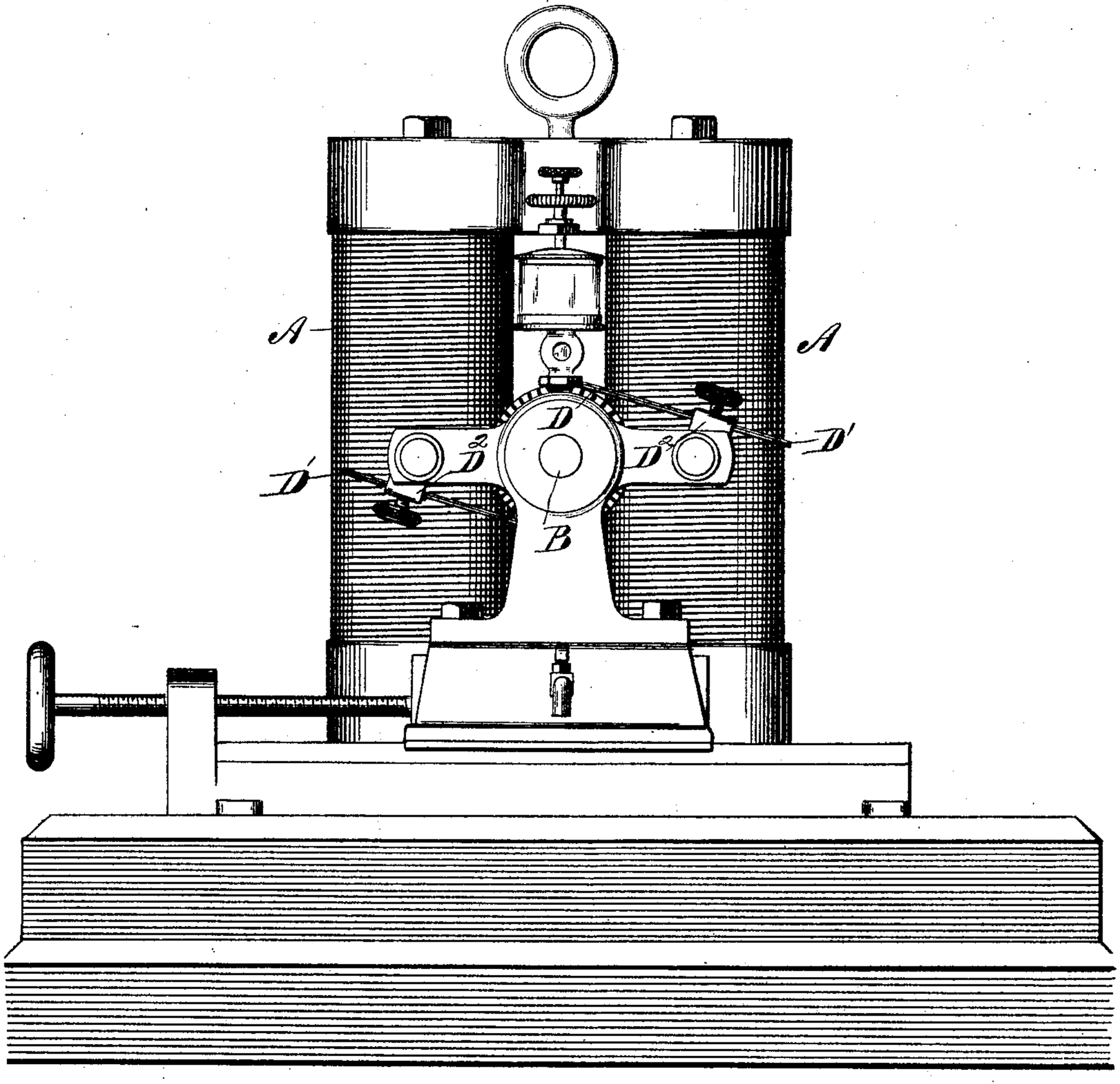

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Fig. 4.

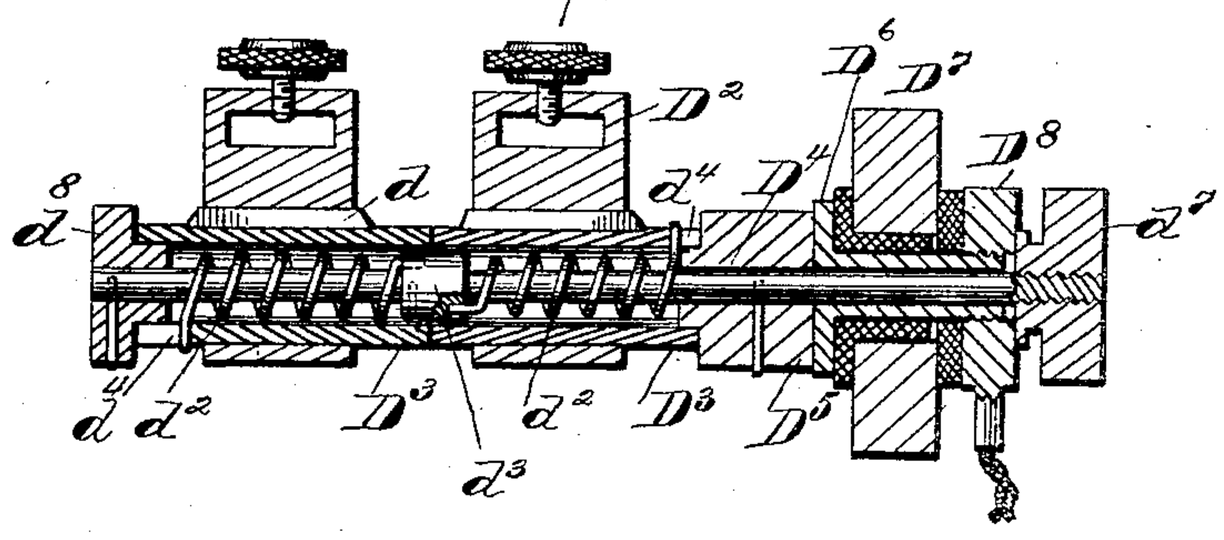


Fig. 5.

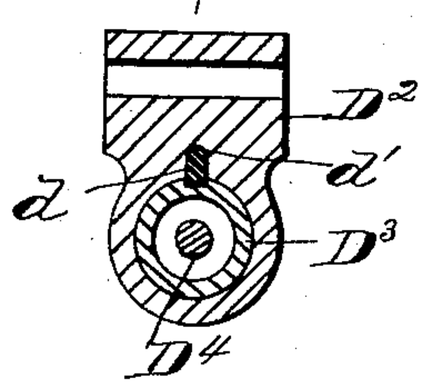


Fig. 6.

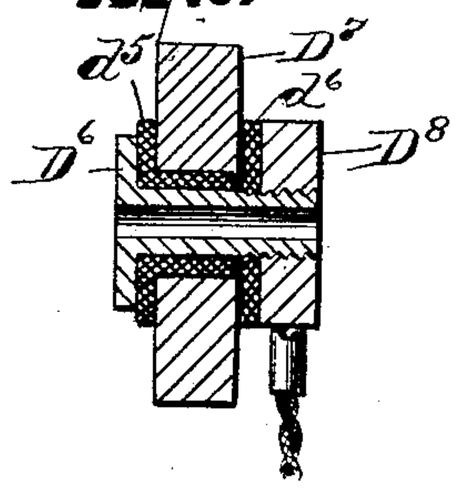
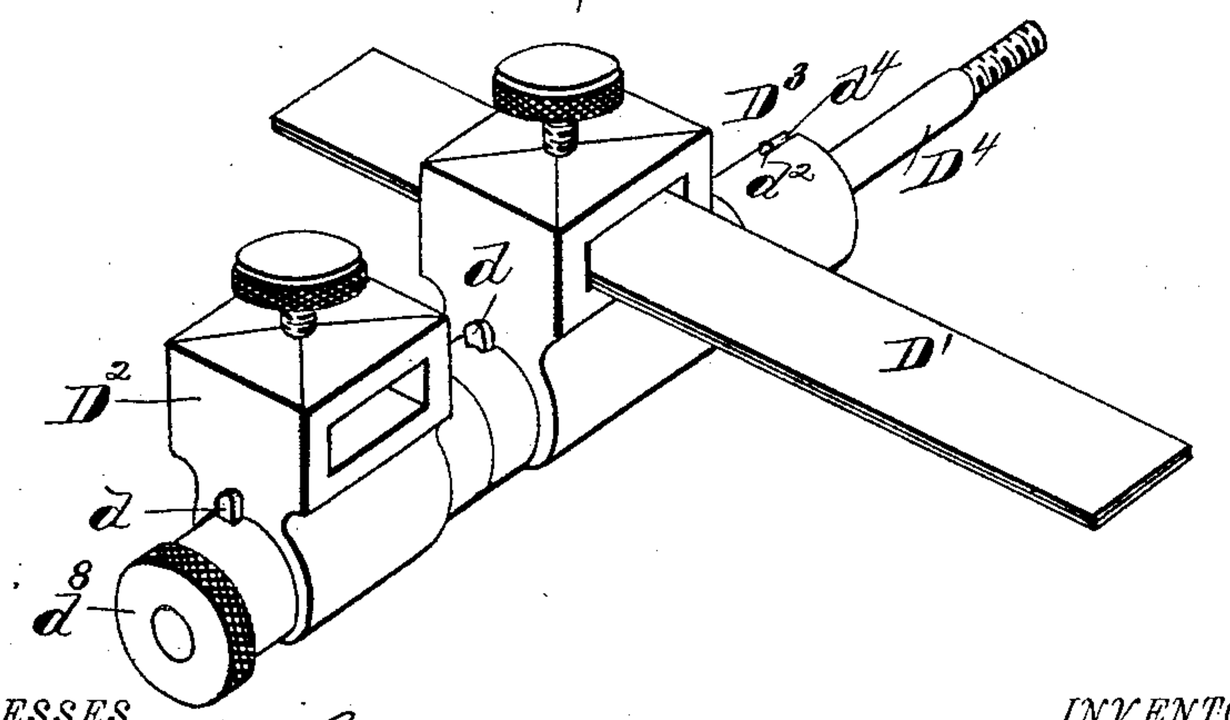


Fig. 3.



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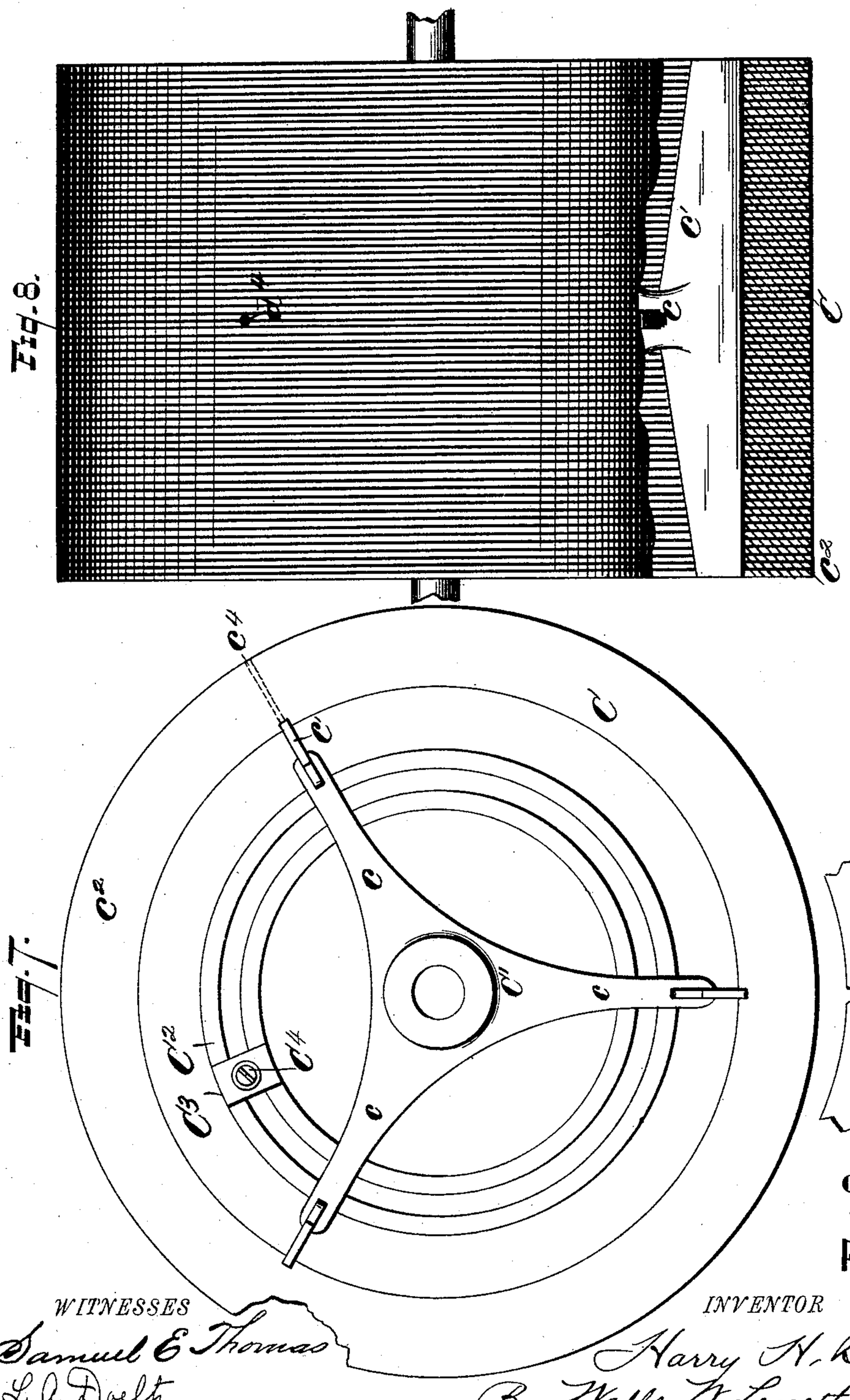

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UNITED STATES PATENT OFFICE.

HARRY H. BLADES, OF DETROIT, MICHIGAN.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 454,024, dated June 16, 1891.

Application filed May 11, 1889. Serial No. 310,403. (No model.)

To all whom it may concern:

Be it known that I, HARRY H. BLADES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Electric Motors; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

In the drawings, Figure 1 is a side elevation, and Fig. 2 is an end elevation, of my improved motor. Fig. 3 is a perspective view, and Fig. 4 is a longitudinal section, of the brush-holder mechanism. Fig. 5 is a cross-section of the brush-holder. Fig. 6 is a sectional view through the brush-supporter with the holder removed. Fig. 7 is an end elevation of the armature. Fig. 8 is an elevation of the same with parts broken away. Fig. 9 is a detail of a section of one of the armature-laminæ.

It is the purpose of my invention to produce a dynamo-electric machine or motor which shall be simple and compact in construction; in which the armature may possess means for easily and correctly balancing the same after it is complete and wound; in which simple and convenient means shall be employed for increasing or decreasing the pressure of the brushes in a novel construction, whereby the armature-ring may be wound and the spider or hub frame introduced after it is completed; also, in certain other novel features of construction hereinafter described and claimed.

In carrying out my invention, A represents the field-magnets; B, the armature-shaft; C, the armature-ring; C′, its spider or hub frame; D, the commutator, and D′ its brushes, supported in the holder D^2.

D^3 are sleeves embracing the rod D^4, and each provided with the projection d on its surface adapted to enter a corresponding groove d' in the holders, thus preventing the latter from revolving on the sleeve and yet permitting them to slide longitudinally on the sleeve.

d^2 are spiral springs on the interior of the sleeves and embracing the rod D^4. One end of each spring is engaged in the annular projection d^3 on the rod and the other end enters the slot d^4 of the sleeve, and thus becomes engaged to the latter.

D^5 is a shoulder keyed to the rod D^4.

D^6 is a bushing insulated from the brush-supporter D^7 by the spool d^5 and washer d^6 of insulating material.

D^8 is a washer adapted to screw onto the end of the bushing and bind the latter firmly in the supporter.

d^8 is another thumb-screw keyed to the opposite end of the rod. It will thus be seen that the brushes, by means of the springs d^2, are held in their contact with the commutator by a spring-tension, and this tension may be increased or decreased by loosening the lock-nut d^7 and revolving the rod D^4; also, when the brushes are held in contact with the commutator by the springs, the lock-nut d^7 being loosened and the tension on the springs released, the brushes will drop away from their contact by gravity. Of course, if desired, one spring might be used instead of two and the various parts be changed in their form and arrangement without departing from the spirit of my improvement.

The spider or hub frame C′ is preferably provided with three spokes c, upon the outer ends of which are rigidly engaged or formed integral the strips c'. Each lamina c^2 of the armature-ring C is provided on its inner periphery with the notches c^3, corresponding with the strips c' of the spider or hub frame. Thus when the armature-ring is all complete and wound the inner periphery is provided with grooves corresponding with the spokes, and into these grooves the spokes are forced and fastened by the pin c^4, which is driven through the ring and into the spoke, thus completing the armature and yet permitting the ring to be easily and readily wound before the spider or hub frame is inserted. This spider or hub frame C′ of the armature is provided with the rings C^2, preferably cast thereon, which form an annular support for the weights C^3, used to balance the armature. These may be secured by bolts C^4 or other suitable fastening to allow them to be removed or shifted from place to place on the

support. Thus weights of any desired size may be supported at any desired point on the armature for balancing it.

Heretofore in four-field dynamos and motors in which the field-magnets are parallel with each other and at right angles to the shaft it has been customary to support the armature-shaft by bearings which were located between the fields. This has necessitated placing the fields far enough apart to properly and securely locate the bearings between them. By extending one of the pole-pieces out parallel with the shaft, as shown, and securing the shaft-bearing thereto the field-magnets are brought closer together and closer to the center of the machine. The advantage of this is that with a given weight of iron in the magnetic circuit the resistance of the circuit is lessened and the efficiency of the machine thus increased. The extension of the pole-piece forms a bed of great stability, sufficient to prevent the motor or dynamo from easily changing its position. This construction admits of a very compact and symmetrical machine.

The shaft-bearings, which are placed at the extremities of the pole-piece, are preferably cast one of iron and the other of brass. By reason of this there is very little magnetism in the shaft, and the short-circuiting of the magnetism from one pole-piece to the other through the bearing is reduced to a minimum.

What I claim is—

1. In a dynamo-electric machine, the combination, with the armature-rings, of an internal spider or hub frame C′ engaging therewith, and the rings C^2, cast on the spider-arms and forming an annular support for balancing-weights for the armature, substantially as described.

2. In a dynamo-electric machine, the combination, with the commutator-brushes and the brush-holders, of the sleeves D^3, carrying said holders and engaged therewith by the feathers *d*, fixed rod D^4, springs d^2, lock-nut d^7, and thumb-screws d^8 for varying the tension of the springs, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

HARRY H. BLADES.

Witnesses:

W. H. CHAMBERLIN,

L. A. DOELTZ.