

(No Model.)

W. H. ELKINS.
REGULATOR FOR DYNAMOS.

No. 506,482.

Patented Oct. 10, 1893.

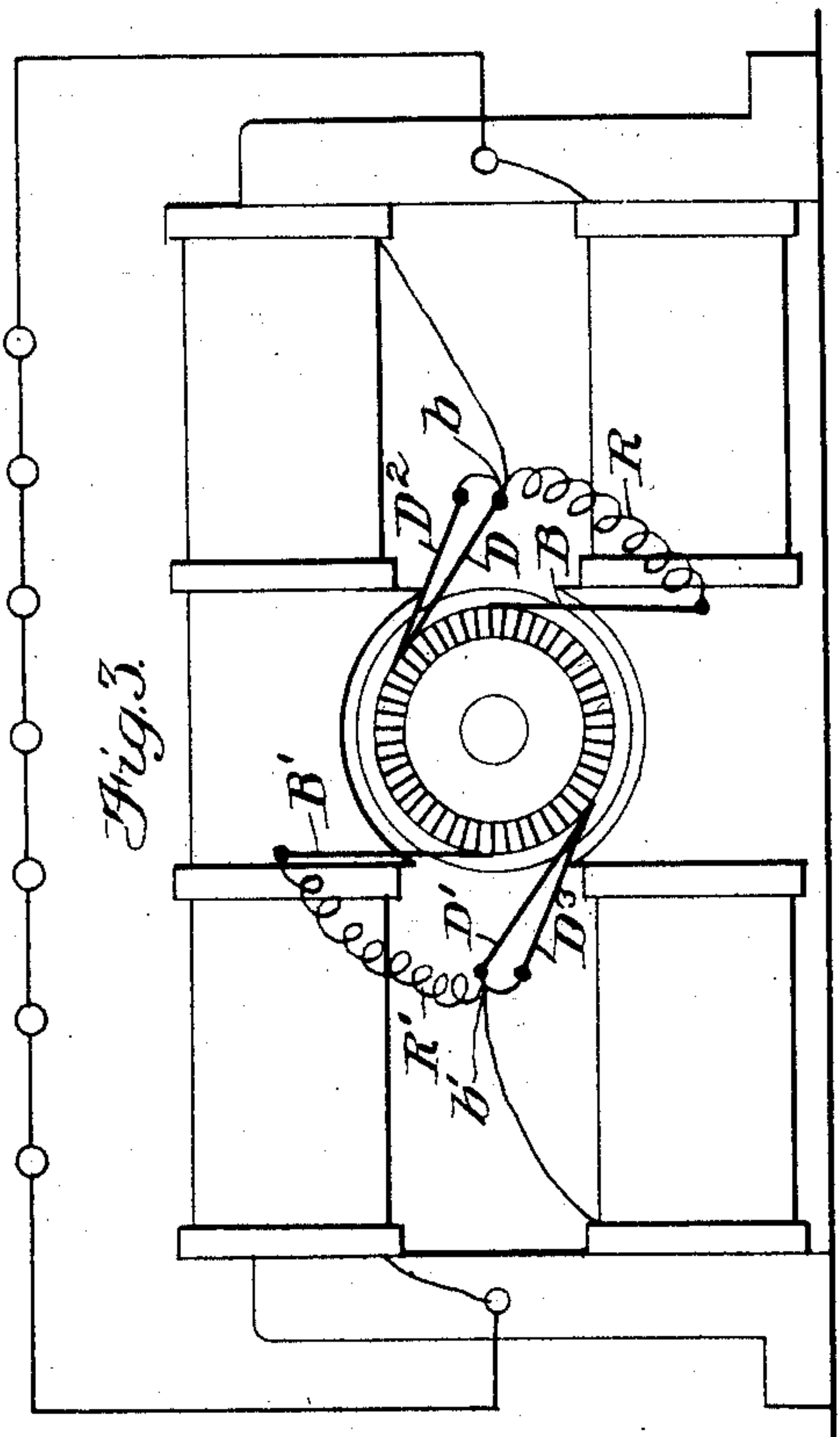


Fig. 3.

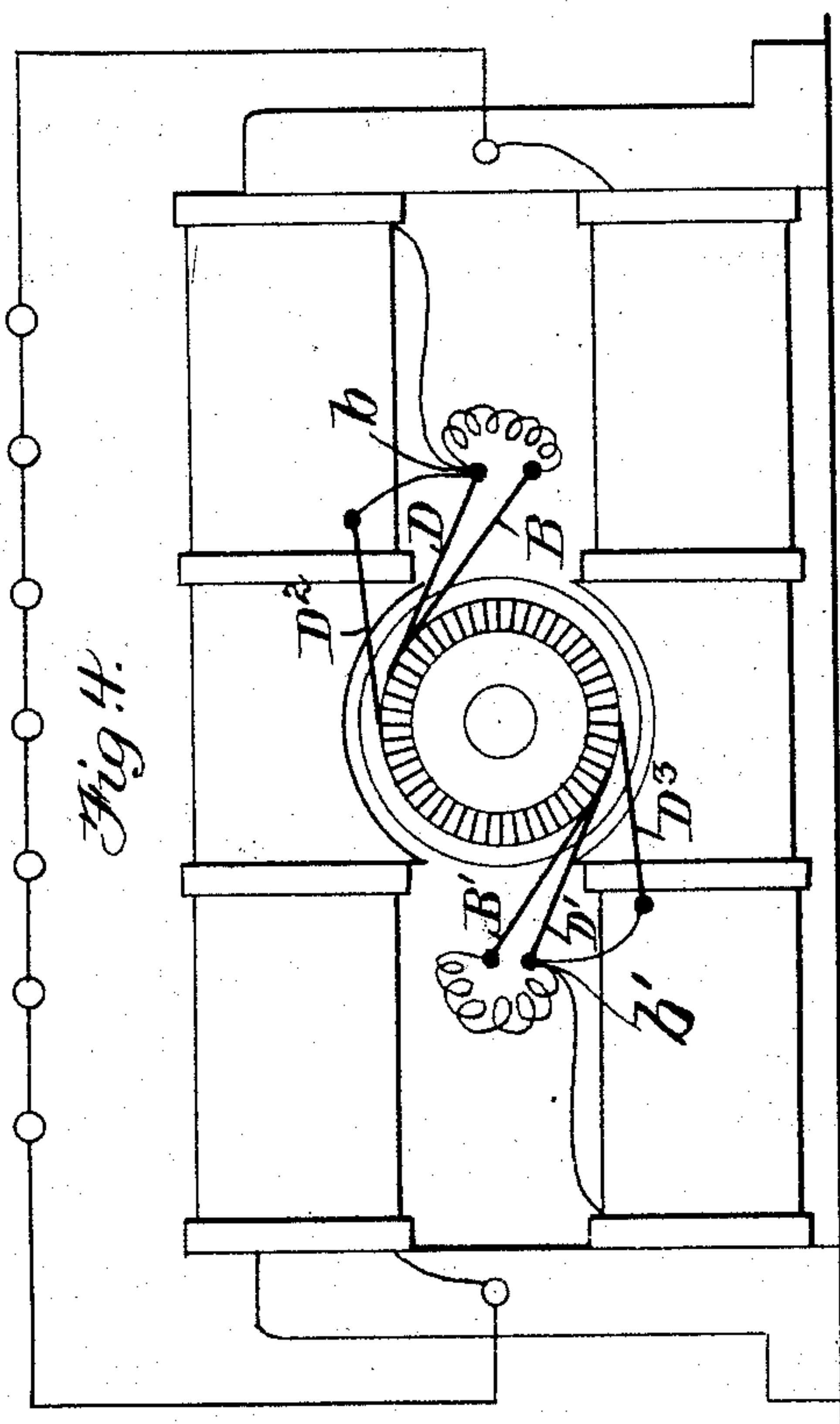


Fig. 4.

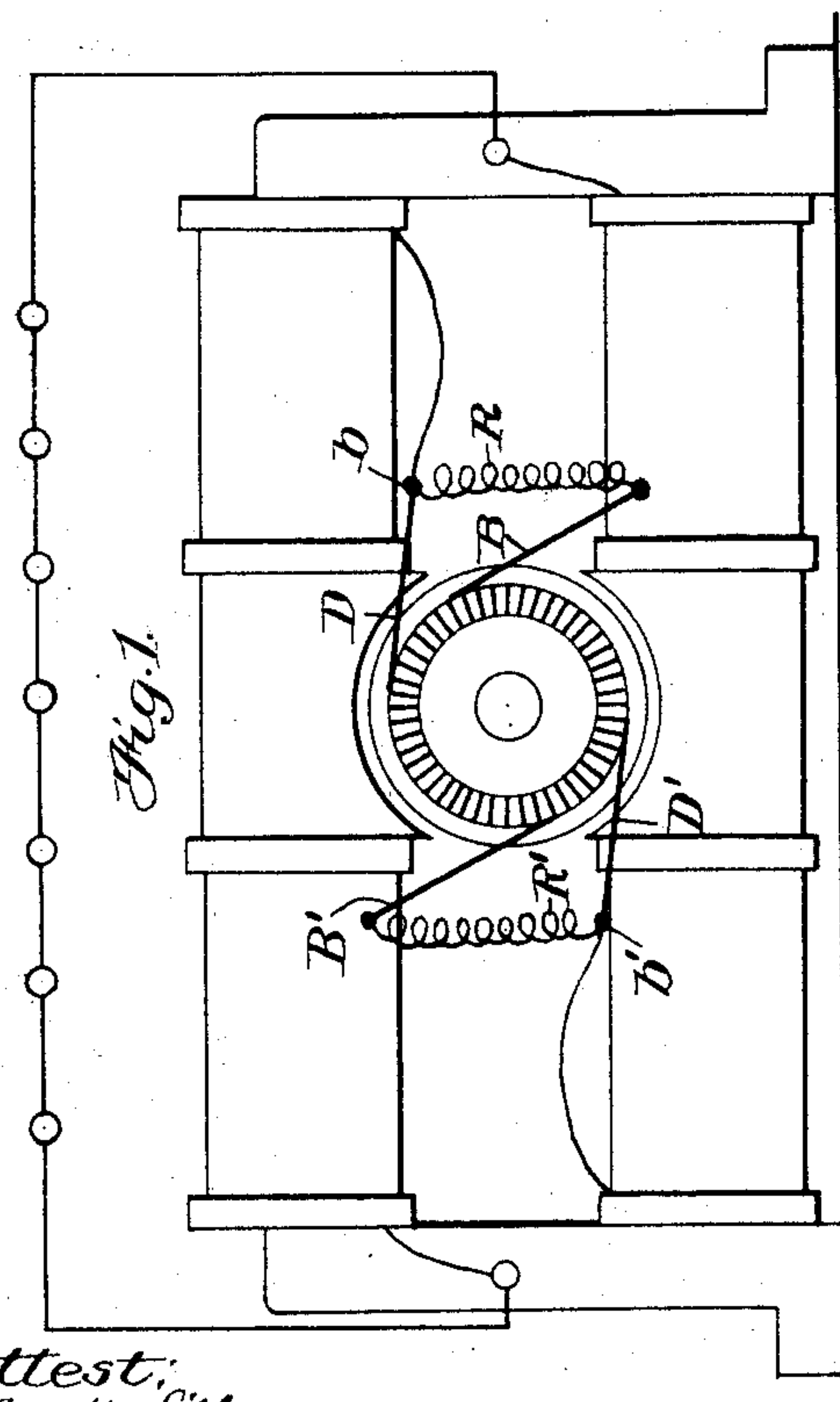


Fig. 1.

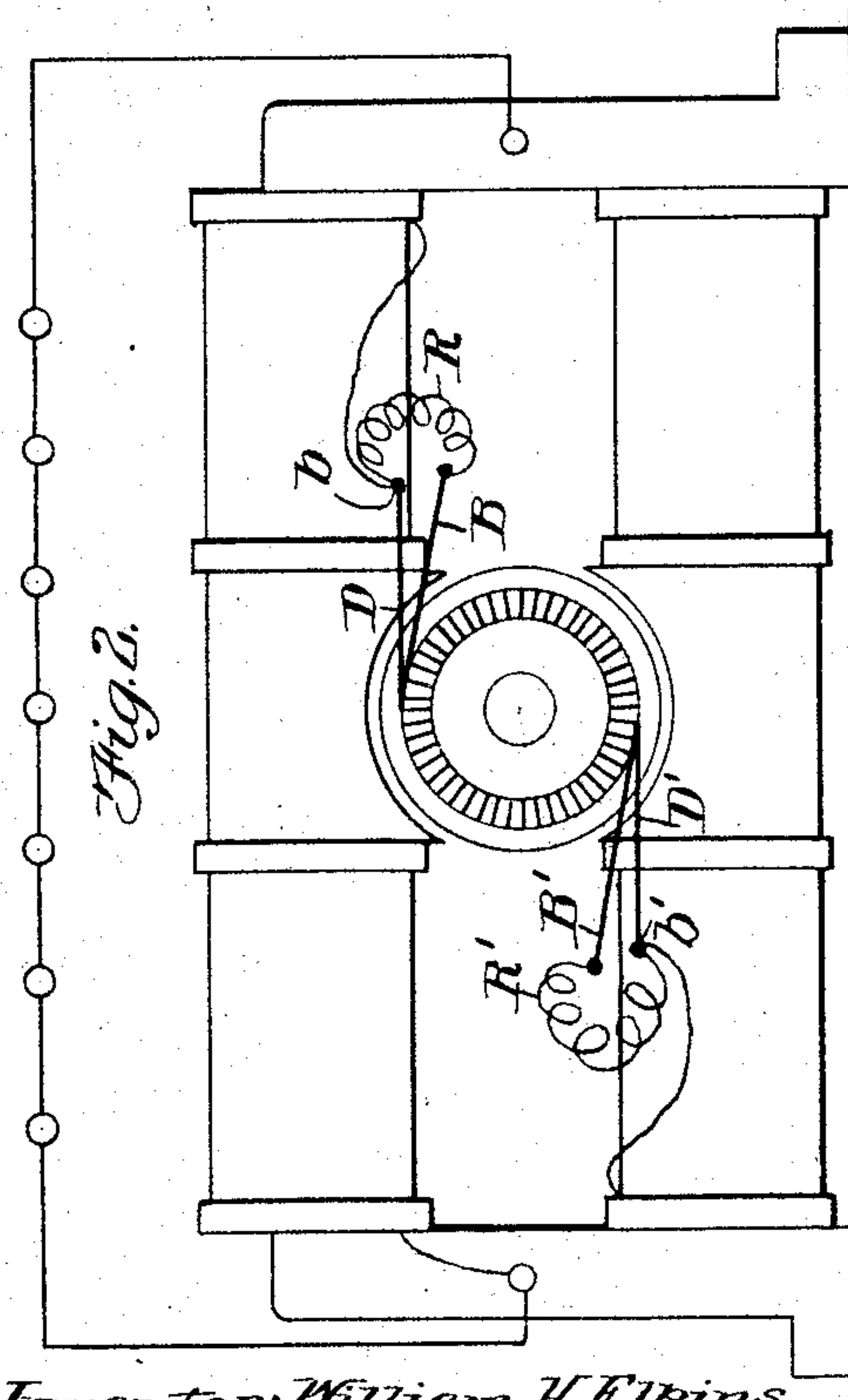


Fig. 2.

Attest:
J. A. Remick
H. A. Remick

Inventor; William H. Elkins,
By J. L. Maynard his atty.

UNITED STATES PATENT OFFICE.

WILLIAM H. ELKINS, OF CAMBRIDGE, MASSACHUSETTS.

REGULATOR FOR DYNAMOS.

SPECIFICATION forming part of Letters Patent No. 506,482, dated October 10, 1893.

Application filed February 27, 1893. Serial No. 463,782. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY ELKINS, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improved Regulator for Dynamos, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic elevation of a dynamo illustrating my invention, and Fig. 2 is the same, except that Fig. 1 is at full load, and Fig. 2 at minimum load. Figs. 3 and 4 are like Figs. 1 and 2, but with a sparking brush added.

My invention is a current regulator, which consists of two brushes of like sign the forward brush being connected directly with one terminal of the main circuit and the rear brush connected to that terminal through a resistance coil; that is to say the forward brush is connected to the terminal of the main circuit, in the usual way, while the rear brush is connected through a constant resistance as a coil or its equivalent, so that the current which would otherwise flow through the rear brush to the terminal, is greatly reduced; and the rear brush is moved toward the forward brush to prevent the current from rising as the load is decreased, and away from the forward brush to prevent the current from falling as the load is increased.

Another feature of my invention is the combination of third brush with the two above referred to, this third brush at full load being on the same segment of the commutator as the forward brush, but being adjustable as the rear brush is adjusted, the extra brush being moved forward as the rear brush is moved forward, and back as the rear brush is moved back; but the extent of motion necessary in practice in the extra brush is only about half of that of the regulating or rear brush.

The rear brushes B B' are connected to the terminals *b b'*, through the coils R R' and are adjustable forward and back, either by hand or automatically as will be fully understood. The forward brushes D D' are adjusted for full load, preferably so that half the current will flow through them and half through B B', (that is to say, regarding the extra brushes D² D³ of Figs. 3 and 4 as parts of the brushes D

D', for at full load the brushes D and D² are on the same segment at one side of the commutator, and the brushes D' and D³ on the same segment at the other side; and for the purposes of the main feature of my invention the brushes D² and D³ may be disregarded.) The part of the full current supplied to terminal *b* through rear brush B and the part supplied through forward brush D would depend wholly upon the number of segments of the commutator between B and D if the resistance R were not present, as is fully explained in my application, Serial No. 452,685, filed November 21, 1892, upon which my present invention is an improvement; but with a resistance coil R interposed between rear brush B and terminal *b*, the part of the current supplied through B can be cut down by making resistance R sufficiently great, without regard to the number of segments between B and D; and I have found it practically important, especially on large machines, to regulate the proportion of the current through B and D mainly by resistance R, instead of wholly by the number of segments between B and D as in my application above referred to; for in practice it is desirable at full load to have say five amperes through each brush B and D, that is half the full current through each, in order that the regulation may be effective clear down to minimum load in large machines, and usually it will require only about ten or eleven segments (out of one hundred and twenty in a sixty-light machine), between B and D to give five amperes through each; and with this small number of segments between B and D, the regulation by moving B forward will be limited to that number of segments; and in practice B will be moved up to D when the load has been reduced about three quarters, that is to one-quarter of full load. I overcome this objection, which is a practical one, by setting D farther forward than it should be, and cutting down the current through B by resistance R; and this is the main feature of my present invention; and it is owing to this that I am enabled to move the rear brush B sufficiently far forward to regulate clear down to minimum load or short circuit.

In regulating by moving the rear brush B toward the forward brush D the sparking will

become greater and greater as the rear brush gets nearer and nearer to the forward brush, and it is practically essential that this sparking be obviated, and the second feature of my present invention consists in the combination with the brushes B and D, whether with or without the resistance R, of an extra brush D^2 , which is on the same segment as is brush D, at full load, but is moved forward as brush B is moved forward, as the load decreases; and a proper movement of this extra brush D^2 will stop the sparking which would otherwise be caused by the forward motion of brush B.

It will be obvious that what has been said of brush D^2 with relation to brushes B and D, is also true of brush D^3 with relation to brushes B' and D'. In practice the motion of brushes D^2 D^3 is only about half that of B and B', as the load varies; and I have indicated this in the diagrams.

What I claim as my invention is—

1. In a dynamo in combination a stationary forward brush and a movable rear brush of like sign; a main circuit; a direct connection between the forward brush and the main circuit; and a resistance between the rear brush

and the main circuit; all combined and arranged to reduce the electro-motive force of the dynamo by moving the rear brush toward the forward brush, and to increase that electro-motive force by moving the rear brush away from the forward brush, substantially as set forth.

2. In a dynamo in combination a stationary forward brush; a movable forward brush; a movable rear brush; a main circuit; a direct connection between the forward brushes and the main circuit; and a resistance between the rear brush and the main circuit; all combined and arranged to reduce the electro-motive force of the dynamo and prevent sparking by moving the rear brush toward, and the movable forward brush away from the stationary forward brush; and to increase the electro-motive force and prevent sparking by moving the rear brush away from, and the movable forward brush toward the stationary forward brush, substantially as set forth.

WILLIAM H. ELKINS.

Witnesses:

J. E. MAYNADIER,
JOHN R. SNOW.