

No. 768,262.

PATENTED AUG. 23, 1904.

H. L. BACHMAN.
CONTROLLER.

APPLICATION FILED MAY 31, 1904.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 4.

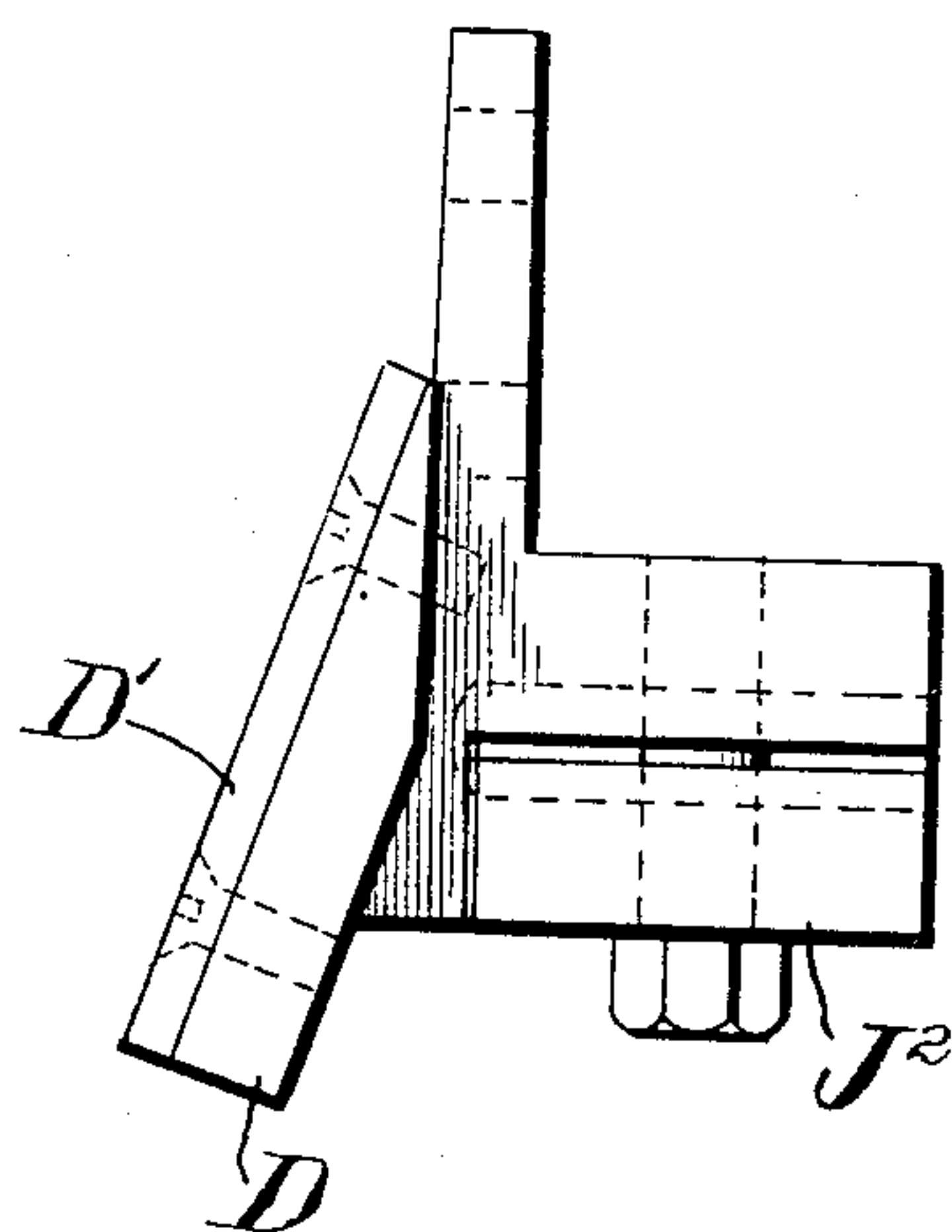


Fig. 2.

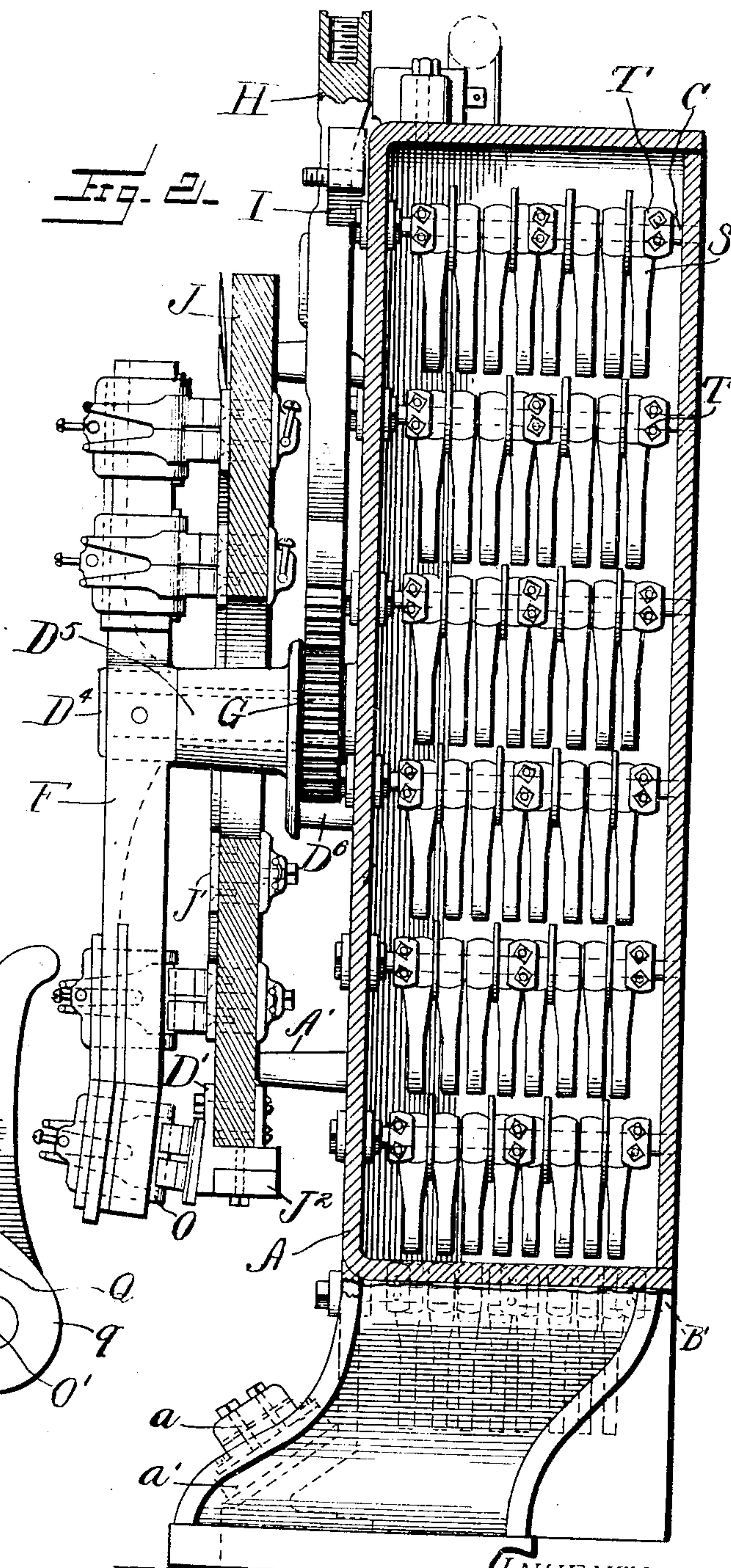
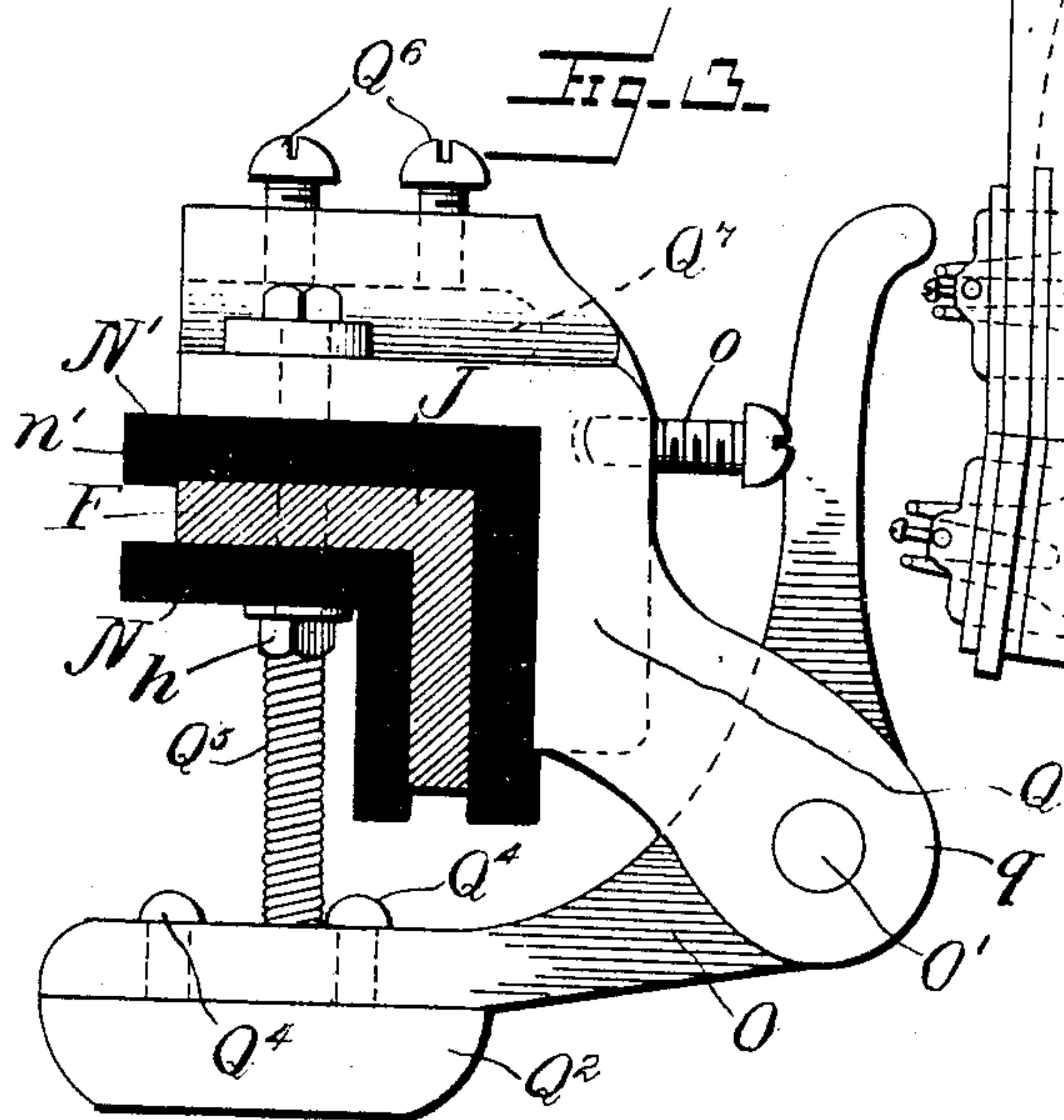


Fig. 3.



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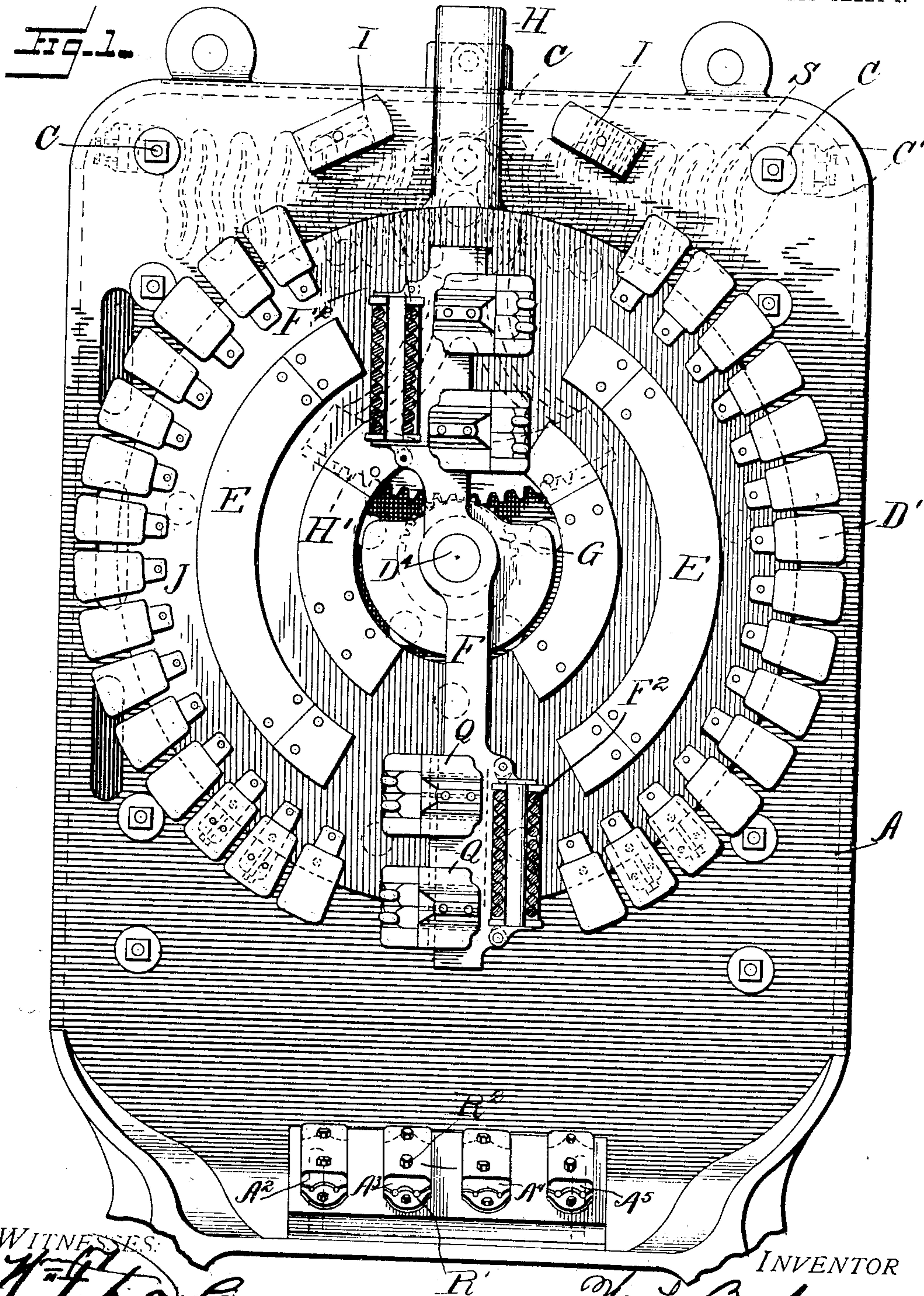
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2 SHEETS—SHEET 1.



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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 768,262, dated August 23, 1904.

Application filed May 31, 1904. Serial No. 210,536. (No model.)

To all whom it may concern:

Be it known that I, HARVEY L. BACHMAN, a citizen of the United States, residing at South Bethlehem, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Controllers; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in rheostats or controllers for electric motors; and the object of the invention is to produce a simple and efficient device which will be of substantial construction and adapted for rough handling incident to steel-mill working and combining economy in cost of construction and in maintaining and provided with a single lever for forward and reverse motion of the motor without the utilization of a reversing-switch and providing an apparatus which will occupy a small space and used with either series or shunt motors and employed in connection with shunt magnetic brakes on hoisting-gear, &c.

The invention consists, further, in various details of construction and combinations and arrangements of parts, which will be hereinafter fully described and then specifically defined in the appended claims.

My invention is illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this application, and in which drawings similar letters of reference indicate like parts in the views, in which—

Figure 1 is a front elevation of my controller. Fig. 2 is a central sectional view, parts being shown in elevation. Fig. 3 is an enlarged detail view showing one of the brushes and adjusting means therefor, and Fig. 4 is an enlarged detail view of one of the contact-plates upon the dial.

Reference now being had to the details of the drawings by letter, A designates a casing

inclosing a grid resistance and is provided with a suitable base so arranged as to keep the center of gravity well within the latter and at the same time reducing the space of occupancy to a minimum. The dial J is made, preferably, of heavy slate free from traces of magnetic materials and is supported in a vertical position upon the bosses A', which project from the face of the casing. Upon the base of the casing are placed contact-segments A² for the field, A³ representing the line-wire, A⁴ representing the field-terminal, and A⁵ designating the armature-terminal. Said contact-segments are preferably stamped from pure copper and are screwed to brass lugs a, Fig. 2 of the drawings, which are solid with the blocks a' on the rear of the front casing. Said blocks are made for both single and double wiring and may have either four or only two lugs, depending upon the segment to which it is attached. The double connection block is preferably split in halves and fastened by means of bolts, and by means of this construction a perfect and easily-accessible electrical connection is provided.

Positioned along the marginal edge of the dial is a series of resistance contact-segments, (designated in the drawings by letter D,) and, as shown in Fig. 4, these resistance-plates are secured to the contact resistance-steps D' by means of screws, and said segments D are fastened to the dial by means of screws passing through the latter in the manner disclosed in the drawings. The elevation and inclination of the contact-segments extending out from the dial prevent short circuits between the steps, due to lodging of dirt. This reduces considerably the cost of maintenance of the controller, since I have by experience found that one of the greatest expenses incident to the operation of controllers is due to the renewal of the copper contact-segments which are burned out by serious sparking and short circuits of heavy currents. The inclination of said plates also increases the bearing-contact of the brushes, and contact is not decreased with wear, since the brushes are inclined to settle toward the plate. The wiring connections between the various segments are made

by means of the blocks J^2 , fastened to the contact-plates, as shown clearly in Fig. 2 of the drawings.

Secured to the face of the dial are two arc-shaped plates E, which are fastened by means of contact-plates J^3 for the attachment of electrical connections, and projecting from the casing is a shaft D^4 , passing through a central aperture in the dial, and keyed to said shaft is a controller-arm F, having a double radius and preferably of cast-steel, and said controller-arm has mounted thereon brush-carriages Q, a detail of one of said carriages being illustrated in Fig. 3 of the drawings, in which arms q of said carriage support a rod O' , upon which is journaled side by side two shoe-carrying arms O, one of which is shown in elevation in Fig. 3 of the drawings, and a screw o is mounted in a threaded hole in the carriage Q and is adapted to limit the throw of one end of the arm O. A spring Q^5 is fastened to the other end of the arm O and bears between the same and a head n of a bolt n' , which passes through insulating-strips N and N' , which clamp the controller-arm J. A suitable pad Q^2 is fastened, by means of screws Q^4 , to the shoe, and Q^6 designates screws fitted in threaded apertures in the carriage and are adapted to engage wires which are designed to connect the carriage with an arc-arrester F^2 . Between each of said carriages is positioned one of said arc-arresters F^2 , which effectually disrupts any sparking. Said shaft D^4 is journaled in the bushing D^5 , which latter is flanged at its inner end and is supported upon bosses D^6 , projecting from the face of the casing.

Motion is transmitted to the controller-arm through a vertical operating-lever H, which carries a sectoral gear H' , meshing with a pinion G, keyed to the shaft D^4 . Said lever may be arranged to operate directly or indirectly by hand with any suitable connections. This operating mechanism, unlike other controllers, is positioned between the dial and frame of the casing instead of being inclosed in the latter in order to permit of the easy removal of the operating pinion and shaft without disturbing the casing and resistance. The screws fastening the flange of the bearing to the bosses may be conveniently removed, whereby the entire controller-arm, bearing-shaft, and pinion may be withdrawn through the central aperture in the dial. Mounted upon the face of the casing are the two adjustable blocks I, against which the lever is adapted to contact to limit the throw of the same in one direction or the other.

The grid resistance which is inclosed within the casing is arranged in tiers of grids of different cross-section, thus varying the resistance. Each tier S is composed of several rows, every alternate end of which is insulated from each other, leaving the others in connection, thus forming a continuous resistance. Each row is made up of two grids,

and each grid is shaped into coils, which may be of undulating shape, as shown, or straight, if preferred. Each tier is supported by three rods C, which pass through and are bolted to the front of the casing, and terminal blocks T are inserted at intervals, to which blocks connections are adapted to be made with the resistance-step terminal blocks of the dial. Said grids are insulated from the rods by any suitable insulation.

By the provision of a controller made in accordance with my invention it will be observed that the same may be constructed and operated at less expense than the ordinary controllers commonly in use and that by the utilization of a grid resistance a large radiating surface is afforded which is more satisfactory than wire or compressed forms of resistances, which are likely to burn out continually and require excessive repairing.

While I have shown a particular construction of apparatus illustrating my controller, it will be understood that I may vary the details of construction, if desired, without in any way departing from the spirit of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A controller comprising a dial, a casing, series of grid resistance-coils suitably insulated, and stepped terminal contact-plates upon said dial, a shaft, a reversing-arm, bracket members clamped to said arm and insulated therefrom, brushes pivotally mounted upon said bracket members, adjusting-screws carried by the latter and adapted to regulate the throw of said brushes, springs bearing between said brushes and reversing-arm, a pinion moving with said shaft, a rack having teeth in engagement with said pinion, and stops in the path of said rack-lever, whereby the movement of the same may be limited in opposite directions, as set forth.

2. A controller comprising a dial, a casing, series of grid resistance-coils suitably insulated, stepped terminal contact-plates mounted upon said dial, a hollow stud projecting through a central aperture in said dial, a shaft journaled in said stud, a reversing-arm fixed to said shaft, bracket members clamped to said arm and insulated therefrom, brushes pivotally mounted upon said bracket members, adjusting-screws carried by the latter and adapted to regulate the throw of said brushes, a pinion fixed to said shaft, a movable rack having teeth in engagement with said pinion, and means for limiting the throw of said rack and for limiting the movement of the said reversing-arm, as set forth.

3. A controller comprising a dial, a casing, series of grid resistance-coils suitably insulated, stepped terminal contact-plates mounted upon said dial, a hollow boss projecting through said dial and having its inner end

flanged, a shaft journaled in said boss, a reversing-arm fixed to said shaft, a pinion-wheel rotating upon said shaft, a rack pivotally mounted upon said casing and having the 5 teeth in mesh with the teeth of said pinion and held from a lateral movement by said flange, and means for limiting the throw of said rack, as set forth.

4. A controller comprising a dial, a casing, 10 series of grid resistance-coils suitably insulated, stepped terminal contact-plates mounted upon said dial, a hollow stud projecting through a central aperture in said dial, a shaft turning in said stud, a pinion-wheel rotating the said shaft, a segment-rack having 15 the teeth in engagement with said pinion-

wheel, and means for limiting the throw of said rack, a reversing-arm fixed to said shaft, bracket members clamped to said arm and insulated therefrom, brushes having angled 20 portions which are pivotally mounted on said bracket members, adjusting-screws carried by said bracket-arms, a spring yieldingly mounted between the back of each brush and said reversing-arm, substantially as shown and de- 25 scribed.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

HARVEY L. BACHMAN.

Witnesses:

L. D. RITTER,

WILLIAM A. BARTSCH.