

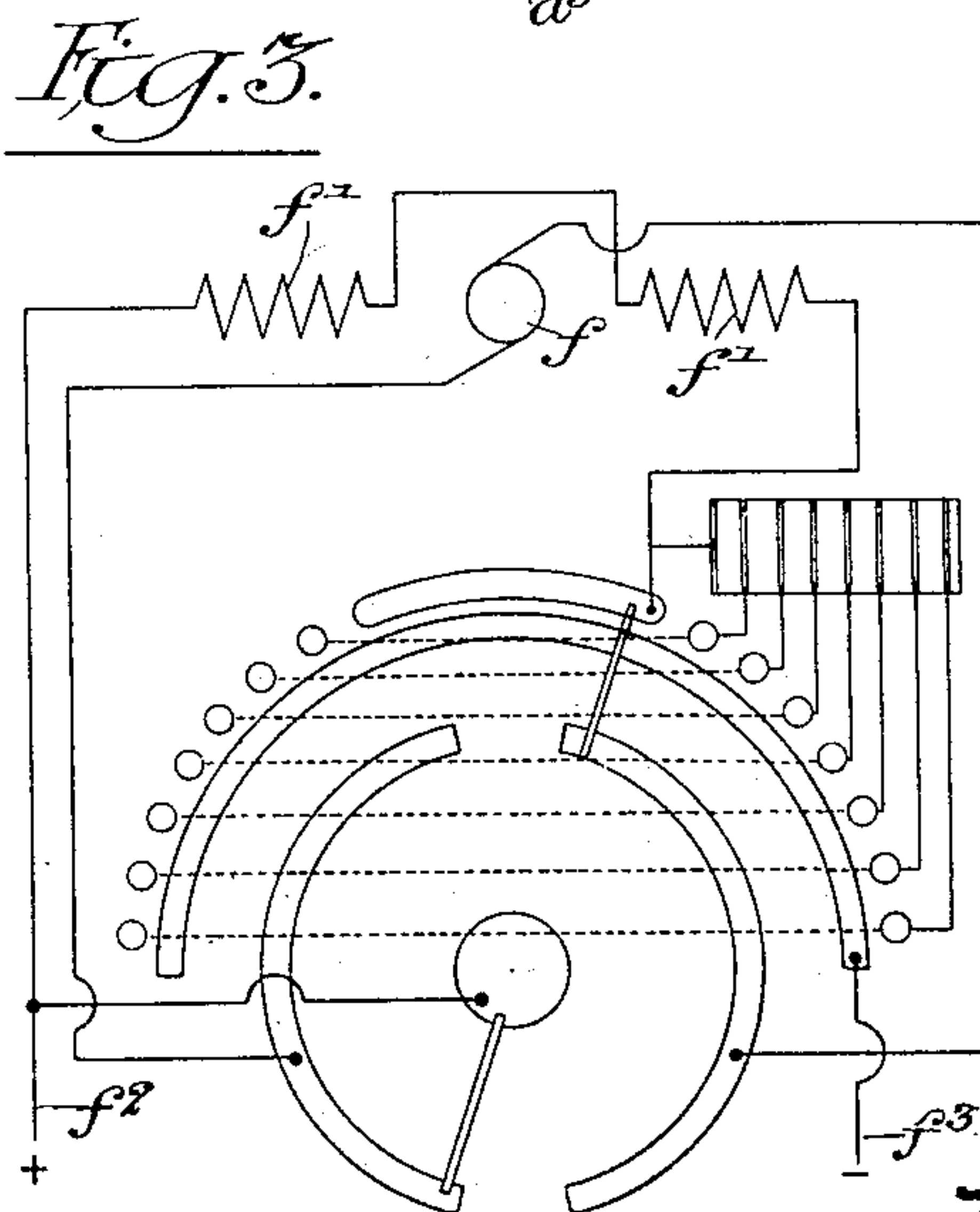
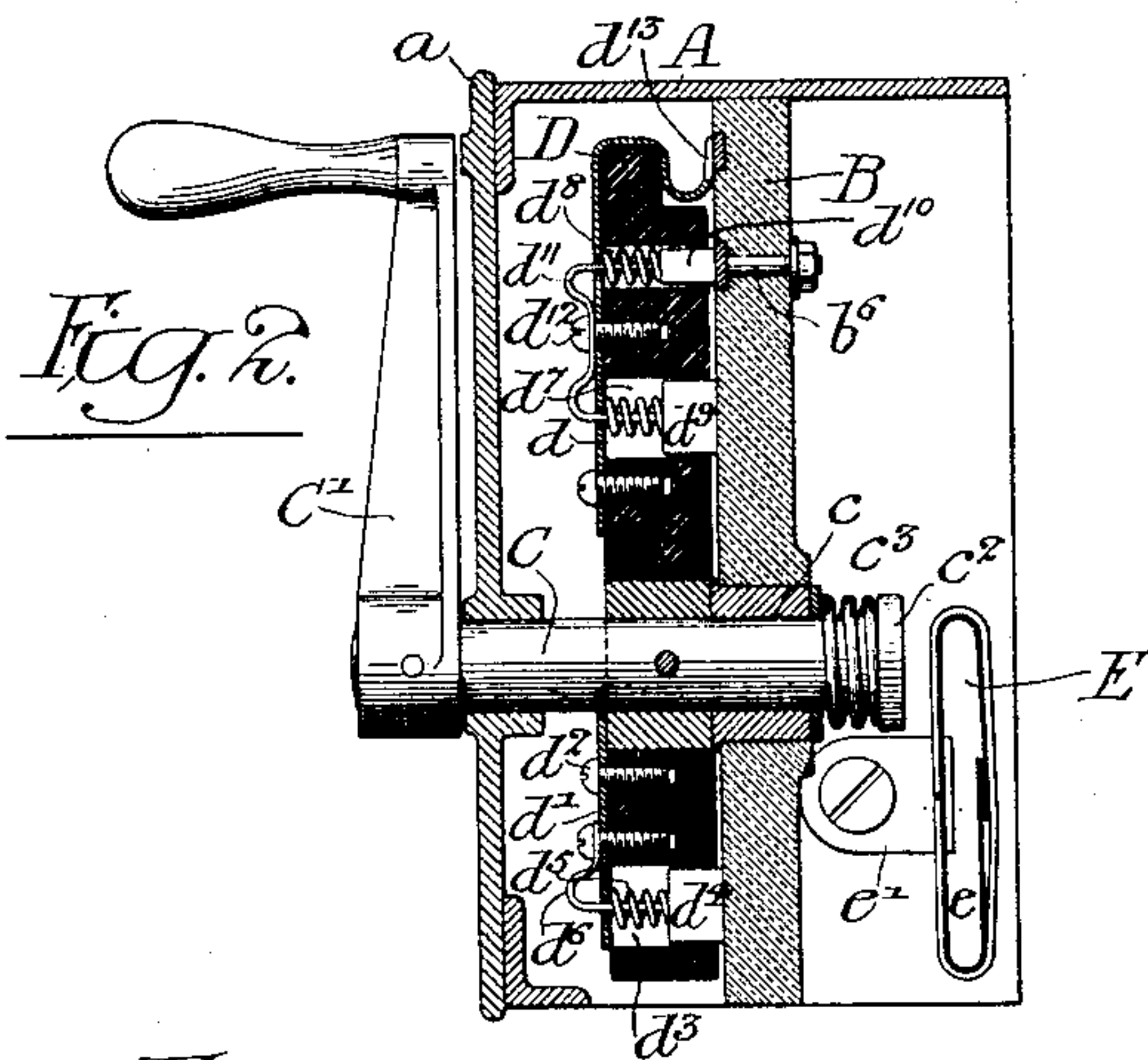
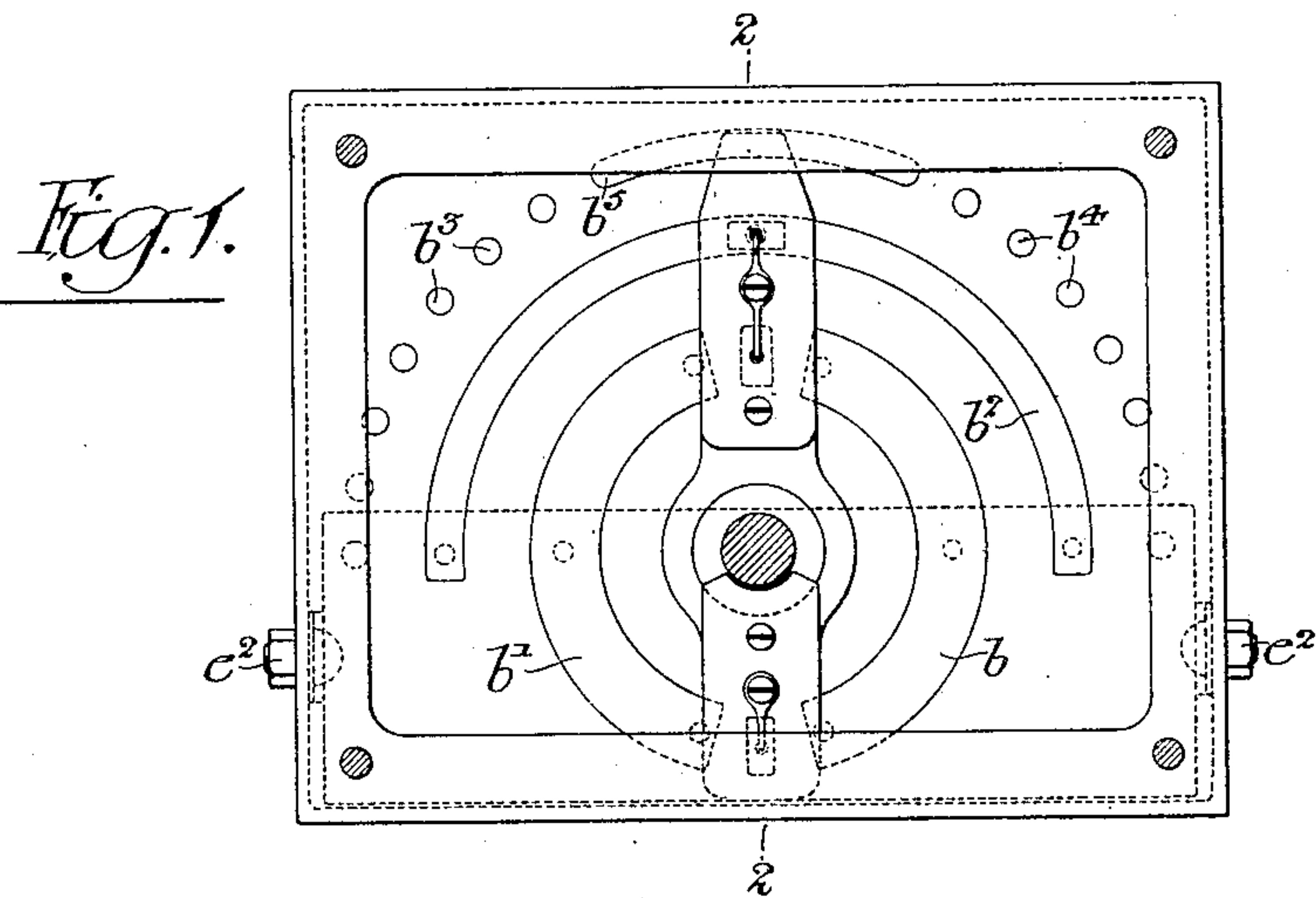
No. 703,234.

Patented June 24, 1902.

J. W. BROWN, JR.
ELECTRIC CONTROLLER.

(Application filed Mar. 7, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

JOHN WILSON BROWN, JR., OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 703,234, dated June 24, 1902.

Application filed March 7, 1902. Serial No. 97,125. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILSON BROWN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Electric Controllers, of which the following is a specification.

My invention relates to certain improvements in electric controllers, and more particularly to an improved form of controller for use in connection with shunt-motors.

The object of my invention is to provide a simple, compact, and substantial device of the class mentioned especially designed to insert varying amounts of resistance in the field-circuit of an electric motor for the purpose of varying its speed and to provide at the same time means for reversing the armature-current. This object I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of my improved controller, showing the cover-plate and operating-handle removed. Fig. 2 is a vertical sectional view of the controller, taken on the line 2 2, Fig. 1, the cover-plate and the operating-handle being shown in position; and Fig. 3 is a view showing diagrammatically the connections preferably made between my improved controller, the rheostat, and the motor which it is desired to control.

In the above drawings, A is a box-like casing, made in the present instance open at the back and on the lower side and provided with a cover-plate *a*. Supported within this casing in any desired manner is a slab or plate B, of some insulating material, as slate, marble, &c., this plate in the present instance being supported within the casing midway between the front and back thereof.

A spindle C passes through the plate B, being at this point provided with a metallic bushing *c*, it also having a bearing in and passing through the cover-plate *a*. Upon its outer end, which projects beyond the face of said plate, is pinned an operating-handle *c'*, while between the cover-plate and the insulating-slab B is similarly fixed a contact-arm D, the spindle being provided with a second metallic bushing *c²* between it and the said arm.

The spindle C projects from the rear face of the slab B, being provided at its end with a flange *c²*, between which and said slab there

is a spring *c³* always tending to draw the contact-carrying arm D toward the front surface of the slab B.

Upon the slab B and placed concentrically with the spindle C are mounted segmental plates *b* and *b'*, there being also a second segmental contact-plate *b²*, similarly mounted upon the arc of a circle, but upon a radius greater than that of the plates *b* and *b'*. Concentric with the spindle C and on a radius greater than that of the curved plate *b²* is a third series of contact plates or buttons in two sets *b³* and *b⁴*, respectively, between which is a single curved segment *b⁵*. All of these plates are in the present instance set flush with the front surface of the slab B, being held in place by means of a bolt or screw passing through said slab, as shown at *b⁶* in Fig. 2.

The arm D is composed of insulating material, fiber, hard rubber, &c., and has upon its upper surface two metallic plates *d* and *d'*, the latter of these having a screw *d²* for the attachment of the main-line conducting-wires. There is an opening *d³* passing through this arm at a distance from the axis of the spindle equal to the radius to which the segments *b* and *b'* are curved. This cavity contains a brush *d⁴*, having a spring *d⁵*, whereby it is kept pressed against the plates *b* or *b'* and connected by means of a wire *d⁶* with the plate *d'*. The other end of the arm has through it two openings *d⁷* and *d⁸*, in which are brushes *d⁹* and *d¹⁰*, pressed against the plates *b* and *b'* and *b²*, respectively. There is a wire *d¹¹*, electrically connecting the two brushes *d⁹* and *d¹⁰*, also electrically connected to the plate *d* by means of a screw *d¹²*. The outer end of the plate *d* is bent downwardly and curved upon itself, as shown in Fig. 2, so as to form a contact-finger *d¹³*, so placed as to bear upon the contact-plates *b³* and *b⁴* when the arm is turned with the spindle.

The field-rheostat used in connection with the mechanism above described is shown at E and consists of a flat hollow core of fiber or other insulating material *e*, provided with supporting-lugs *e'* and having wound upon it wire of the appropriate resistance. This rheostat is retained in position within the casing A by means of bolts *e²*, passing through the lugs *e'* and having nuts whereby they hold the whole within said casing.

In the diagram shown in Fig. 3, *f* repre-

sents the armature of a motor, and f' the field-magnets thereof, the positive and negative feed-line wires being shown at f^2 and f^3 , respectively. By reference to this diagram it will be seen that the fields of the motor are always energized as long as current is applied to the mains f^2 and f^3 , the armature-circuit being completed as soon as the operating-handle is moved from its mid-position and the armature being revolved under the action of the current in a direction depending upon the direction of flow of current through it as determined by the direction the operating-handle is moved from its mid-position.

It will be seen that the armature is operated at all times without resistance in circuit, the speed of the motor being controlled by the cutting in of more or less of the resistance of the rheostat into series with the field-magnets. It will also be seen that the controller is so arranged that a continuous motion of the handle will vary the armature speed from its highest value in a negative direction through all its lower values in descending order to zero and then through its positive values in ascending order to the highest, and vice versa. The connections to the contact-plates b^4 are the same as those to the plates b^3 , these connections being such that when the contact-arm D is in a position ninety degrees from that shown in Fig. 1 all of the resistance upon the rheostat is then in series with the field-magnets f' of the motor, which is then running at its highest speed.

I claim as my invention—

1. In an electric controller, the combination of a slab or plate of insulating material, concentric series of contact-plates thereon, an operating-spindle carrying a contact-arm provided with openings and also constructed of insulating material, metallic plates carried on the upper surface of said arm, one of said plates being bent over the end of the arm and extended to engage directly with one series of the contact-plates and spring-controlled brushes carried by the insulating-frame in said openings thereof, said brushes being placed to engage others of the contact-plates when the controller is operated, substantially as described.

2. An electric controller consisting of a plate of insulating material, an operating-spindle and a handle for moving the same, an arm of insulating material fixed to said handle, concentric series of contact-plates upon the insulating-plate, spring-controlled brushes within the openings in the insulating-arm, two metallic plates insulated from one another carried by the arm, one of the same being connected to two others of the brushes, the second plate being formed so as to engage with one of the series of contact-plates, substantially as described.

3. In an electric controller for varying the

speed of a motor by varying its field, the combination of a pair of contacts connected respectively to the armature-terminals of the motor, a series of contacts having resistances between them connected to one terminal of the field of the motor, the other terminal of said field being connected to one of the supply-mains, a contact-piece connected to the other main, and movable brushes respectively connecting one of the pair of contacts in the armature-circuit with one of the supply-mains, and the other of said contacts with the second supply-main and with the contacts in circuit with the field, substantially as described.

4. In an electric controller, the combination of brushes with means for connecting the same to the positive and negative supply-mains respectively, a pair of contact-pieces connected to the armature-terminals of a motor to be operated, a number of contacts having resistances between them and in connection with one terminal of the field of the motor, the other terminal of said field being in connection with one of the supply-mains, one of said brushes normally forming connection between one of the supply-mains and the contact of one armature-terminal when the other is connecting the contact of the other armature-terminal and the contacts of the field with the second supply-main, substantially as described.

5. In an electric controller, the combination of brushes, means for connecting the same to supply-mains, a pair of armature contact-pieces, a number of field contact-pieces, resistances between the said field contact-pieces, one of said brushes being constructed to be in contact with one of the armature contact-pieces when the second brush is in contact with the other armature contact-piece and the field contact-pieces, substantially as described.

6. The combination in an electric controller, of a central contact, a pair of armature-contacts on the arc of a circle adjacent to the central contact, a contact-piece on the arc of a second circle, and a series of contacts on a third circle having resistances connected between them, a brush forming connection between the central contacts and one of the armature-contacts when the controller is operated and a second brush placed to simultaneously form contact between the second of the armature-contacts and the contacts of the second and third circle, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN WILSON BROWN, JR.

Witnesses:

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