

(No Model.)

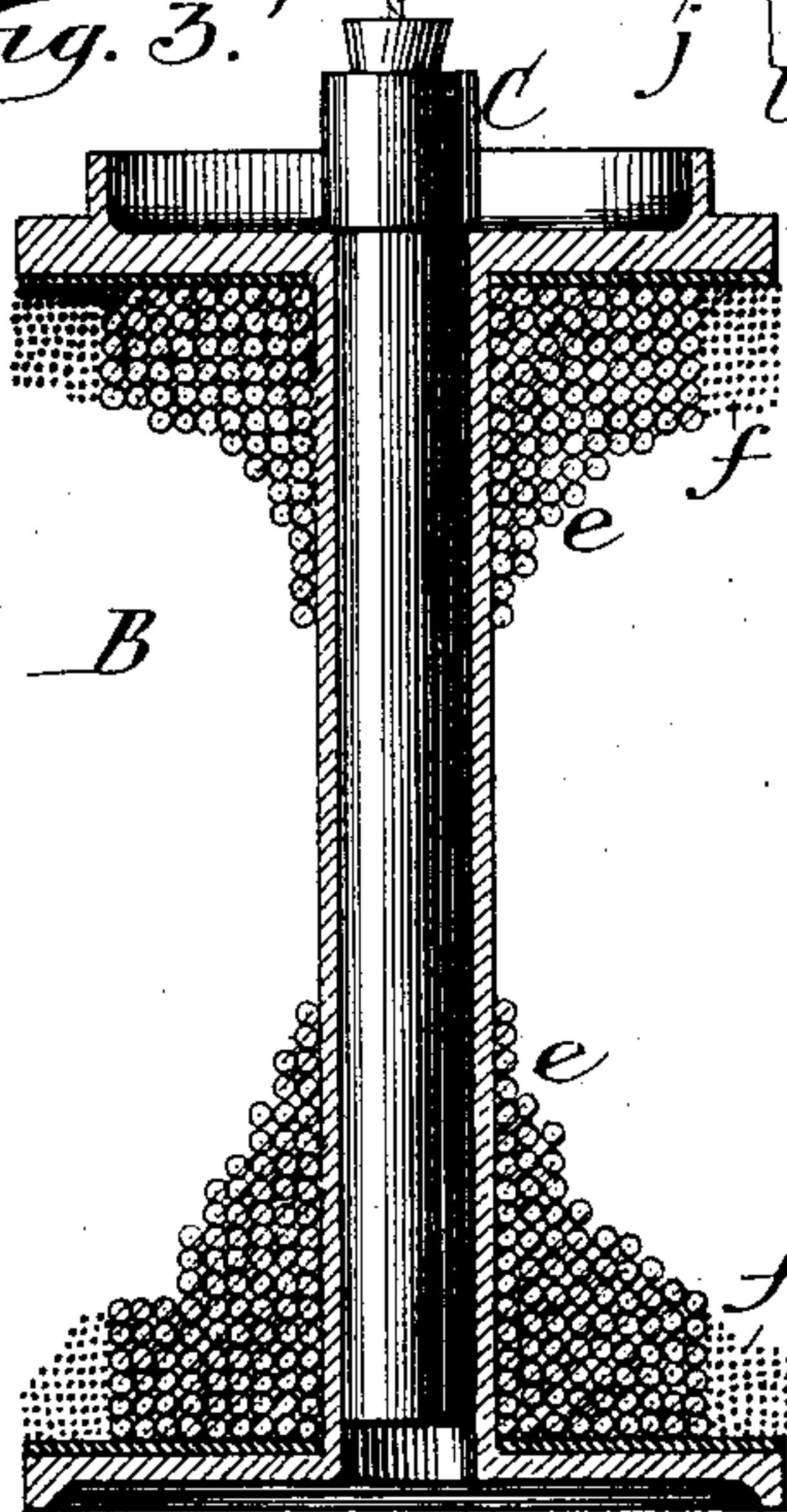
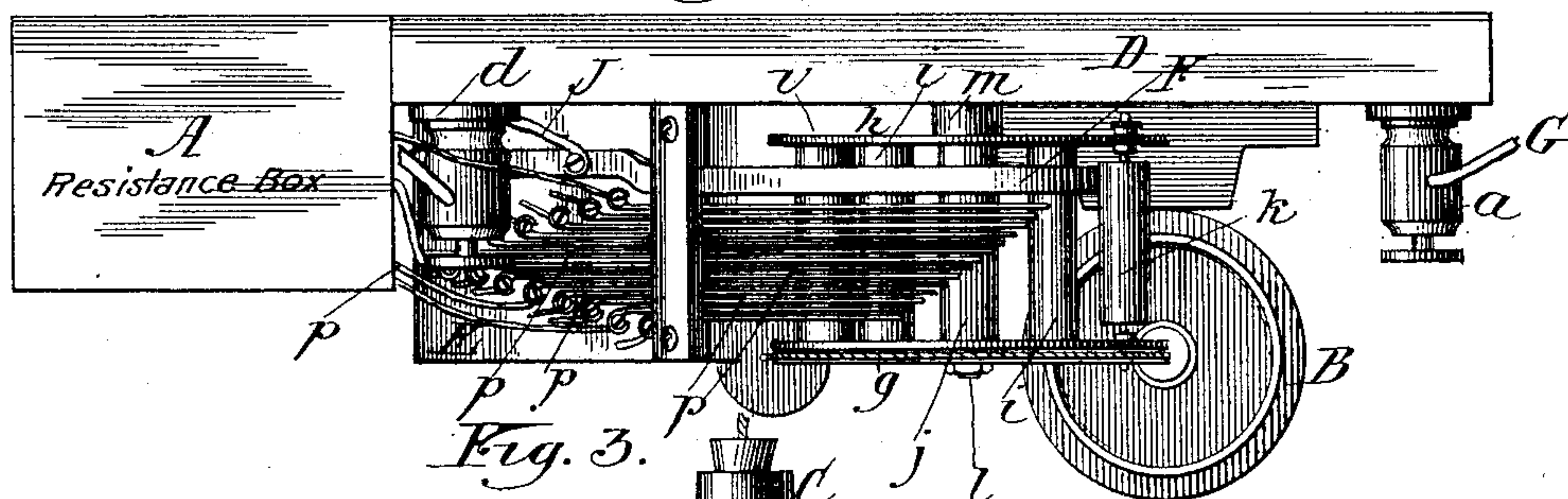
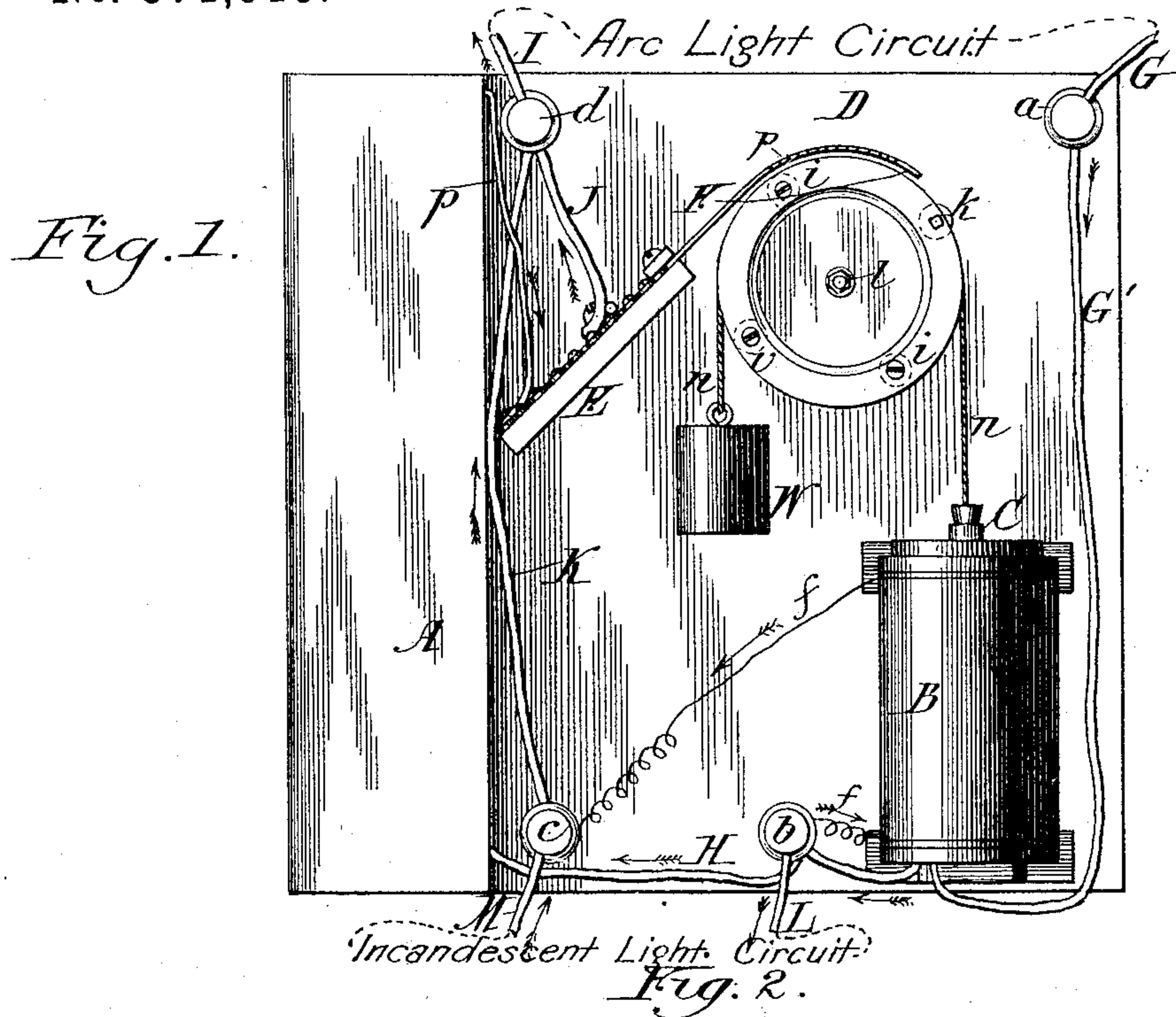
2 Sheets—Sheet 1.

C. D. BAKER.

GOVERNOR FOR INCANDESCENT LIGHTS ON ARC CIRCUITS.

No. 371,915.

Patented Oct. 25, 1887.



Witnesses:

E. A. West
Harry T. Jones.

Inventor:

Chamney D Baker

(No Model.)

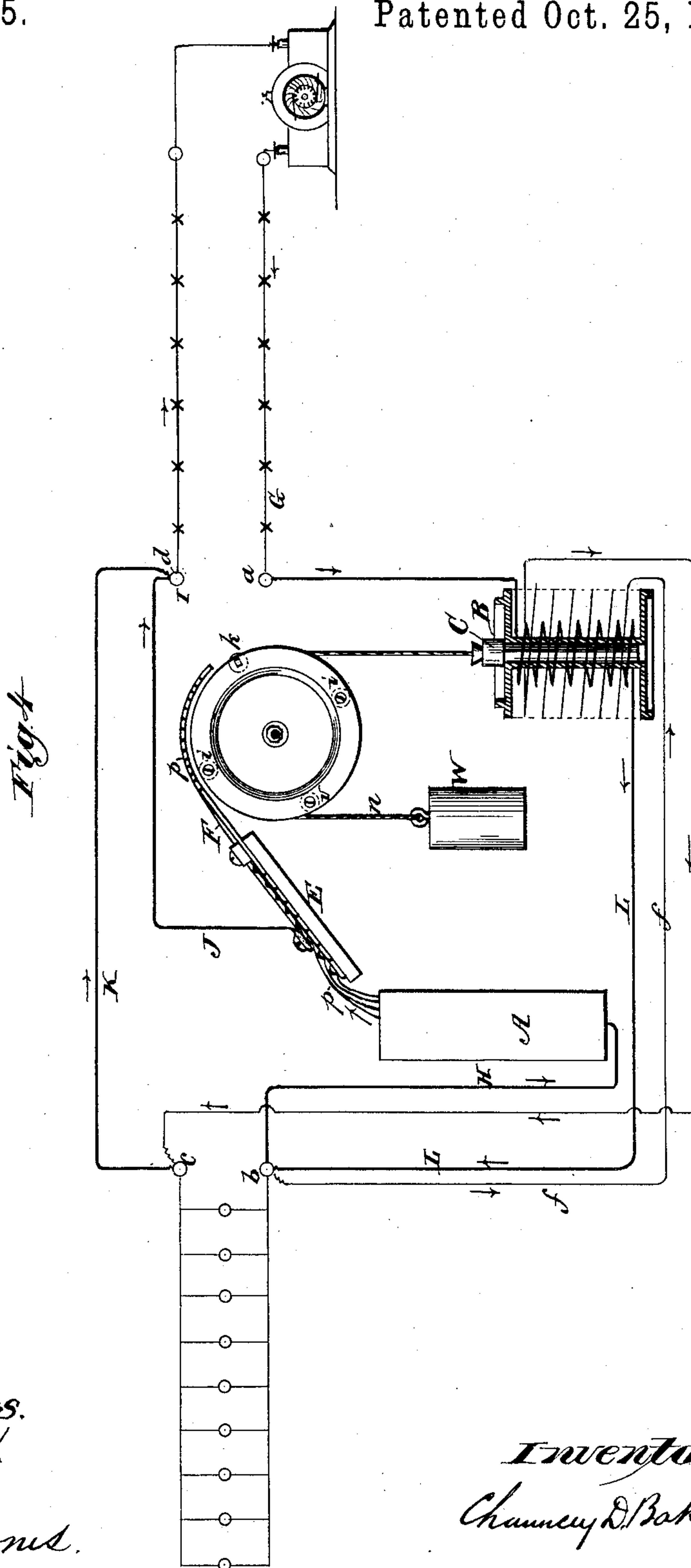
2 Sheets—Sheet 2.

C. D. BAKER.

GOVERNOR FOR INCANDESCENT LIGHTS ON ARC CIRCUITS.

No. 371.915.

Patented Oct. 25, 1887.



Witnesses.
E. A. West.
Harry T. Jones.

E. F. West.

Harry T. Jones.

Inventor:
Channey D. Baker.

Channey D. Baker

UNITED STATES PATENT OFFICE.

CHAUNCEY D. BAKER, OF CHICAGO, ILLINOIS.

GOVERNOR FOR INCANDESCENT LIGHTS ON ARC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 371,915, dated October 25, 1887.

Application filed November 11, 1886. Serial No. 218,610. (No model.)

To all whom it may concern:

Be it known that I, CHAUNCEY D. BAKER, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Governors for Incandescent Lights on Arc Circuits, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation. Fig. 2 is a top view. Fig. 3 is a detail showing the magnet or solenoid in section. Fig. 2 is enlarged as compared with Fig. 1, and Fig. 3 is still more enlarged. Fig. 4 is a diagram view of the arc and incandescent light circuits and the governor devices included therein.

The leading object of my invention is to make a governor for incandescent lights on an arc circuit which will be more simple in construction than those now in use and at least equally effective in operation, which I accomplish by means of a single compound solenoid, used in connection with a resistance-box and a commutator, all as illustrated in the drawings and hereinafter fully described.

Those things which I claim as my invention will be set forth in the claims.

In the drawings, A represents a resistance-box, which may be of any known suitable construction, and therefore its interior is not shown.

a b c d are binding-posts.

B is a compound magnet or solenoid. It is made by first winding a number of layers of coarse wire, *e*, upon the spool and then winding a number of layers of fine wire, *f*, upon the outside of such coarse wire, as illustrated in Fig. 3. The layers of coarse wire and the layers of fine wire are wound in the same direction, but the connections are so made that the current through these two wires travels in opposite directions.

C is the armature.

g h are two disks.

i are rods or bars located between and at their ends secured to the disks *g h*.

j is a short cylinder placed centrally between and secured to the two disks *g h*.

k is a roller pivoted between the two disks *g h* so that it rotates with very little friction. These disks are arranged to rotate upon a

stud or pin, *l*, suitably secured to a block, D, which may be made of wood or other suitable material.

m is a washer or shoulder upon the pin *l*, between the disk *h* and the block D.

n is a cord, one end of which is secured to the armature C. The cord passes over a groove in the disk *g*.

W is a weight.

v is a roller or weight for the purpose of counterbalancing the weight of the roller *k*. The disks *g h* and their connections *i*, in effect, form a pulley.

E is a bracket secured to the block D.

F is a bar or rod one end of which is secured to the bracket E, and the other end is curved over between the disks *g h*, as shown in Fig. 1.

p are a number of small wires, the free ends of which are bent over between the disks *g h*. These wires are not of uniform length, but the end of each successive wire projects a little beyond the preceding one, as shown in Fig. 2. These wires *p* are secured to the bracket E and are then carried to one end of the resistance-box A.

G is one of the wires of an arc circuit, which wire is carried to the binding-post *a*.

G' is a wire leading from the binding-post *a* to and around the magnet B, and thence to the binding-post *b*.

H is a wire leading from the binding-post *b* to the resistance-box A. I is the other wire of an arc circuit, which goes to the binding-post *d*.

J is a wire leading from the binding-post *d* to the bar or rod F.

K is a wire connecting the binding-posts *c* and *d*.

L is a wire leading from the binding-post *b* to the incandescent lamps, and M is a wire leading from the incandescent lamps to the binding-post *c*. One end of the fine wire *f*, which is coiled upon the magnet, is connected with the binding-post *b* and the other end with the binding-post *c*.

The operation is as follows: Suppose all the incandescent lights between the two wires L and M to be burning. The main portion of the current will then pass through G', around the magnet, thence to the binding-post *b*,

thence through the wire L to the lamps, and from the lamps through the wires M, K, and I, completing the circuit. At the same time a very small portion of the current will pass
 5 from the binding-post *b* through the small wire *f*, around the magnet, and thence to the binding-post *c*. The effect of this current which passes through this small wire *f* is to partially counteract the effect of the current
 10 which passes through the wire *G'*. The weight *W* is to be of such size that it will, when all of the lamps are in operation, counterbalance the armature *C* and the force exerted upon it by the current which passes through *G'*,
 15 which force will be equal to the entire force of the current minus such quantity of force as will be neutralized by the current which passes through the coil *f*. Now, if one of the lamps be cut out, that portion of the current
 20 which had been used by such lamp will be divided between the remaining lamps and the fine wire around the magnet, the division being in proportion to the resistance of the remaining lamps and that of the fine wire *f*.
 25 The increased current through the fine wire will counteract a portion of the remaining effect of the current through the coarse wire of the magnet, and then the action of the weight *W* will partially rotate the pulley, lifting the
 30 armature *C* until the roller *k* comes in contact with the free end of the bar *F* and with the free end of the longest of the wires *p*, thereby completing a circuit from the binding-post *b* through the wire *H* to the resistance-box *A*,
 35 thence through the box and the wire *p* with which the roller *k* is in contact, thence through the roller *k* to the bar or rod *F*, thence through the wire *J* to the binding-post *d*, thence through *I* to complete the circuit, and then that por-
 40 tion of the current which, when the lamp was cut out, was divided between the remaining lamps and the fine wire *f* will pass through the wire *H*, the resistance-box *A*, and the commutator to the post *d* and wire *I*. If, then,
 45 one or more of the remaining lamps be cut out, the current will be again divided and distributed, as last above described, and the weight *W* will again act upon the pulley, again lifting the armature and bringing the
 50 roller *k* into contact with one or more of the wires *p*, as before described, and this operation will be continued from time to time, as often as one or more of the lamps are cut out.

It is evident that by providing the wires *p*,
 55 which are of varying length and co-operate with the roller *k*, the rotation of the disk carrying the roller will complete the circuit through different portions of the coils in the resistance-box equivalent to the lamps thrown
 60 out of action in the circuit L M.

By means of the fine-wire coil, the resistance-box *A*, and the wires *p* a uniform difference of potential is maintained between the two posts *b c*, whether one or more or all of the
 65 lamps be burning.

It is not necessary that the coarse wire be

first wound upon the spool. The fine wire may be first wound upon the spool, and the coarse wire may then be wound outside of the fine-wire coil.

It is not essential that the commutator which I have shown and described be used, because the compound solenoid may be used in combination with a commutator of different construction with substantially the same results,
 70 a suitable resistance-box, of course, being interposed.

The governor will be equally effective if a portion of the lamps in the circuit are burning and others are afterward brought into con-
 80 nection, in which case, when one or more additional lamps are connected, the quantity of current passing through the wire *f* will be reduced, and then the action of the magnet on the armature will pull it down, and the roller
 85 *k* will be carried away from contact with one or more of the wires *p* until the difference of potential between the posts *b c* is restored to the adjusted point of the apparatus.

The compound solenoid operates as an elec-
 90 tromotor, and its action, in connection with the weight *W*, changes the position of the pulley and the roller *k*, which is a contact-piece, as the lamps are lighted or extinguished.

The two wires *G I* are in fact the two ends of
 95 a cut wire of an arc circuit. The bar *F*, the wires *p*, the roller or contact-piece *k*, and the devices for moving the contact-piece constitute a commutator for which I intend to make
 100 a separate application for a patent.

I am aware that it is not new to arrange a group of incandescent lamps in series with electric-arc lamps upon the same circuit, and to combine with a device whereby the flow of current to the incandescent lamps may be regulated a
 105 derived circuit to said lamps containing a solenoid-coil, by which the regulating devices may be operated, and a second solenoid-coil acting on the same devices and combined with means whereby its effects may be automatically va-
 110 ried, according to the set or adjustment effected by the operation of the derived-circuit coil. My invention differs essentially from the above, since I make use of a compound solenoid in which the main current flows con-
 115 stantly in opposite directions in order to obtain the neutralizing effect hereinbefore referred to. I am well aware that a compound solenoid has heretofore been employed in connection with an electric-light system, but not
 120 in the manner and for the purpose proposed by me.

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

1. In a governor for incandescent lamps on
 125 an arc circuit, a single compound solenoid having layers of coarse and fine wire circuit-connections for causing the main current to flow constantly through said solenoid in oppo-
 130 site directions in order to partly neutralize said main current before it reaches the incandescent lamps and increasing said neutraliz-

ing effect upon the main current as one incandescent lamp after another is thrown out of circuit, substantially as herein set forth.

2. A single compound solenoid having layers of coarse and fine wire arranged so that the current will travel through them in opposite directions, in combination with a resistance-box and a commutator, substantially as and for the purposes specified.

3. The combination, with a compound solenoid having layers of coarse and fine wire arranged so that the current will pass through the same in opposite directions, of a variable resistance-box, a commutator, and a connection between the armature of the solenoid and the commutator, substantially as and for the purpose set forth.

4. The combination, with an arc circuit, of an incandescent-lamp circuit, a shunt around the incandescent lamps, a single compound

solenoid through which the main current is constantly passing in opposite directions, a variable resistance-box, and a commutator, substantially as herein set forth.

5. A single compound solenoid having layers of coarse and fine wire arranged so that the current will travel through them in opposite directions, in combination with a resistance-box and a commutator consisting of a bar, F, wires *p*, a pulley carrying a metallic contact-surface arranged to be brought into contact with the bar F and wires *p*, and a weight connected with the armature of the solenoid by a cord which runs over the pulley, substantially as and for the purposes specified.

CHAUNCEY D. BAKER.

Witnesses:

E. A. WEST,

HARRY T. JONES.