

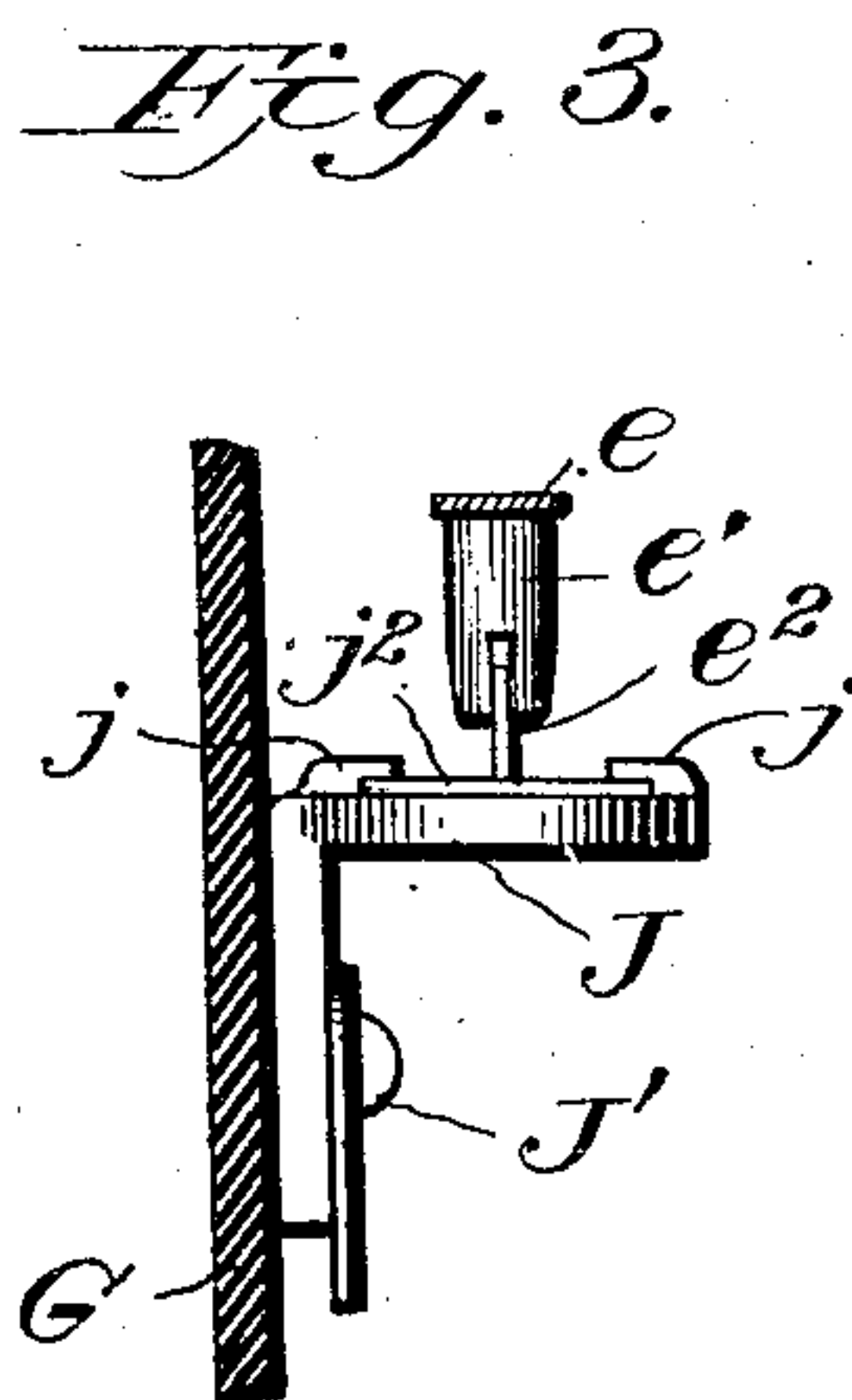
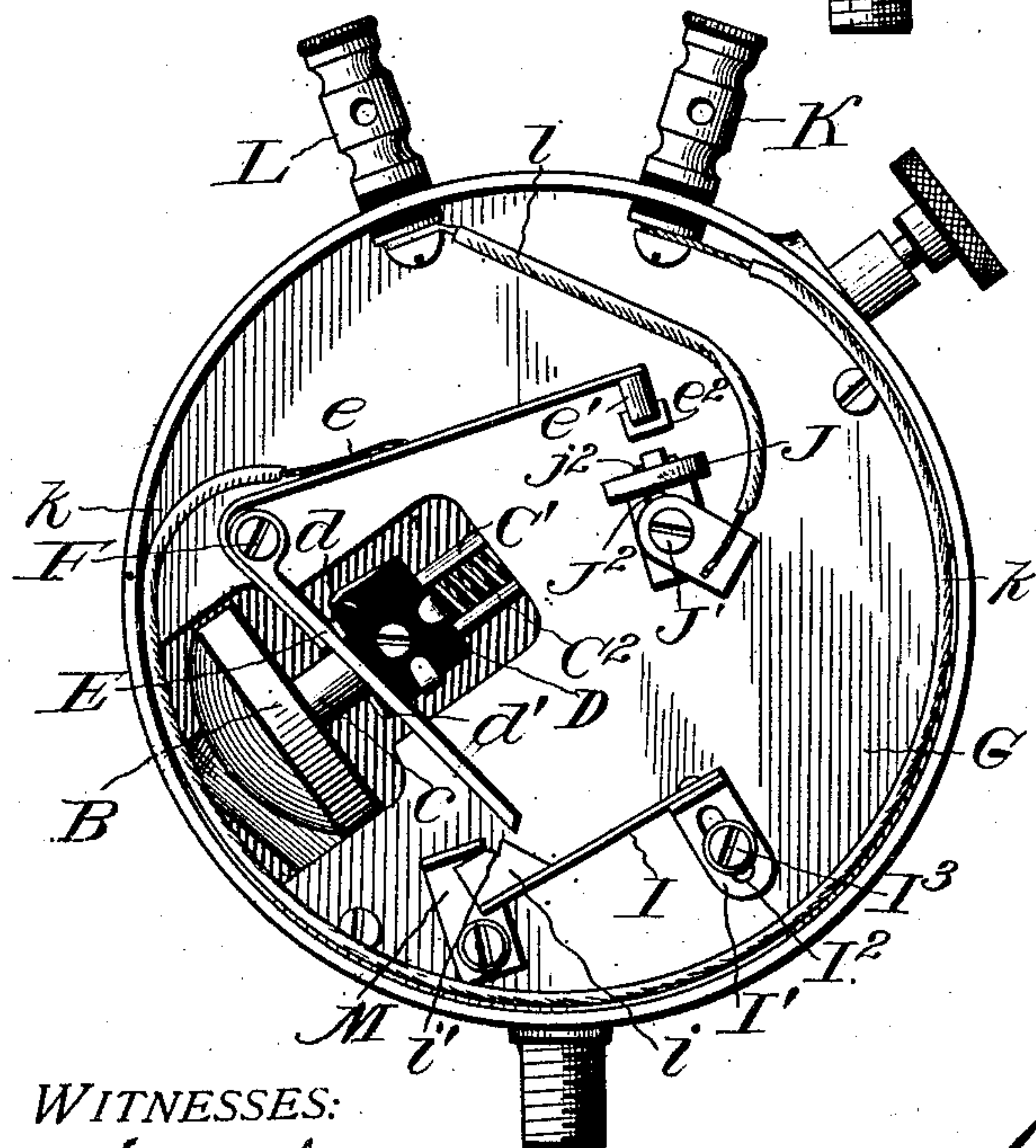
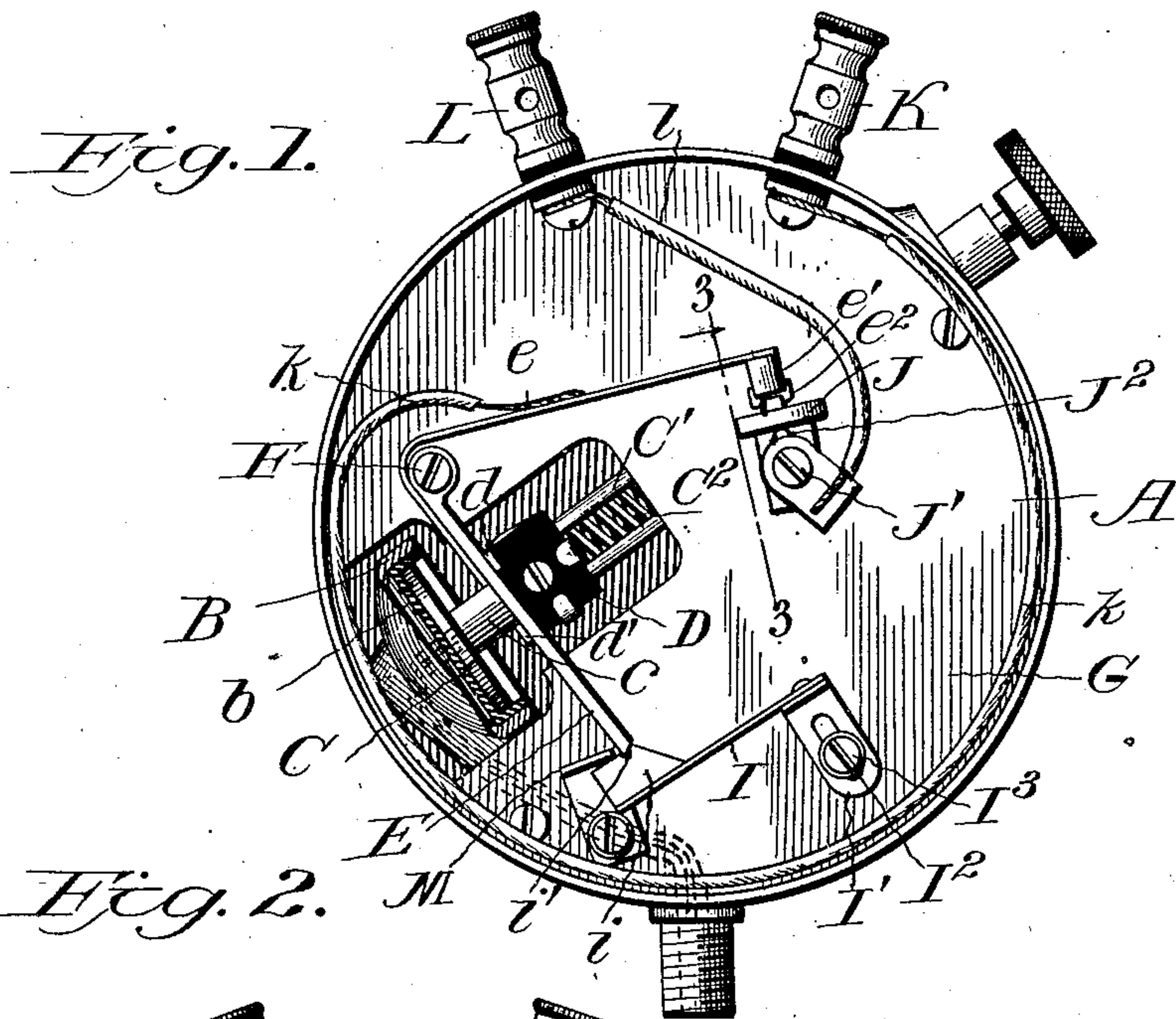
No. 849,762.

PATENTED APR. 9, 1907.

L. H. WESTPHAL.

AUTOMATIC PRESSURE CONTROLLED ELECTRIC SWITCH AND AIR GAGE.

APPLICATION FILED APR. 24, 1905.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC PRESSURE-CONTROLLED ELECTRIC SWITCH AND AIR-GAGE.

No. 849,762.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed April 24, 1905. Serial No. 257,110.

To all whom it may concern:

Be it known that I, LOUIS H. WESTPHAL, of Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Automatic Pressure-Controlled Electric Switches and Air-Gages; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in automatic pressure-controlled electric switches and air-gages of the type shown in the patent to Pugh, No. 765,040, of July 12, 1904.

The device is particularly adapted for use in connection with electrical pumps for compressing air or other fluids under pressure and is designed to throw the pumps into or out of action, according as the pressure falls below or rises above the desired point, thus maintaining a practically uniform or constant pressure at all times and economizing power by only operating the pumps when the supply of compressed fluid falls below the desired minimum.

The objects of the present invention are to make the switch certain in action, to render it less liable to arc and to have it close or open the circuit with a snap motion, so that when the pressure rises above the desired point the circuit will be broken instantaneously and if the pressure falls below the desired point the circuit will be closed instantaneously, thus preventing erratic and uncertain actions of the electrical apparatus which controls the air-pressure.

The invention will be thoroughly understood from the following description of the apparatus illustrated in the drawings, and the novel features are summarized in the claims.

In said drawings, Figure 1 is a rear view of the gage, showing the operative parts controlling the electrical switch and showing said switch closed. Fig. 2 is a similar view showing the switch open. Fig. 3 is a sectional view on line 3-3, Fig. 1, enlarged, showing the construction of the contacts.

In the drawings, A designates a pneumatic or fluid-pressure indicator of the ordinary type, provided with a chamber B, communicating in the usual manner with the air-reservoir (not shown) through suitable connec-

tions so as to be subject to the pressure in the reservoir. In this chamber B is a diaphragm *b*, of usual construction, which is pressed upon by a plunger C, attached to a stem *c*, working in a slotted cylinder C' and pressed inward by a spring C². As these parts are substantially like those described in the aforesaid patent to Pugh and operated as described in said patent, a detailed description and illustration thereof is not required herein.

To the stem *c* of the plunger is attached an insulated block D, carrying two upstanding fingers *d* and *d'*, which embrace between them an arm E, pivoted at one end on a screw F, which is attached to an insulated plate G, secured in the casing of the gage. The arm E at its free end is adapted to engage a bevel-notch *i'*, preferably formed in an enlargement of block *i*, attached to a spring I, fixed to a bracket I', which is adjustably attached to the plate G by means of a slot I² and screw I³, as shown. The rearward swing of the arm E is limited by a bracket M, attached to the plate G, as shown. To the pivoted end of the arm E is attached a brass spring *e*, which swings with the arm and has on its outer end a slotted head *e'*, in the slot of which is attached a platinum contact-strip *e*², which is secured by placing it in the slot and then squeezing the sides of the head, so as to close the slot on the strip, thus fastening the strip to the head without necessarily using solder. The opposite contact-strip *j*² is also preferably made of platinum and is attached to a bracket J, adjustably secured to plate G by means of a bolt J', passing through a slot J² in the bracket. This bracket J is preferably of brass and is provided with lugs *j* on its upper surface, between which the contact *j*² is placed and secured by bending down or closing over the lugs *j'* thereon, as shown more clearly in Fig. 3 of the drawings.

One of the binding-posts K is connected by a wire *k* to the spring *e*, which is preferably soldered on top of the spring and above the pivot F, so that the current will not pass to or through said pivot. The other binding-post L is connected by a wire *l* to the bracket J', as shown. The circuit therefore would be from post K through wire *k* to spring *e* and contacts *e*² *j*², brackets J, and wire *l* to

post L, provided the contacts are closed; but if they be separated of course the circuit is broken, and no current would pass.

When the pressure in the reservoir (not shown) falls below the desired point, the spring C² will force the plunger C inward, and in so doing finger *d* will engage arm E and press the latter toward bracket M. The beveled edge of block *i* at this time, however, stands in the path of the arm E and will obstruct the free swing of the latter, so that not until spring C², through finger *d*, exerts sufficient pressure on arm E to cause it to overcome the resistance of spring I and force arm E downward into notch *i'* will the contacts be brought together; but when spring C² does exert sufficient force to move arm E into notch *i'* the movement occurs with a snap action, as is evident, and this movement causes spring-arm *e* to move contact *e*² quickly against contact *j*² and hold these contacts together, closing the circuit and keeping it closed until the pressure in the reservoir and cylinder B rises sufficiently to overcome the resistance of spring *e* and move the plunger outward until finger *d'* engages arm E and tries to move the latter outward. The outward movement of the arm E, however, is opposed by spring I through the notch *i*, which is engaged by arm E, and therefore pressure will accumulate against arm E through finger *d'* until it is sufficient to snap arm E out of notch *i'*, and upon so doing the contact *e*² is instantly thrown away from contact *j*² and kept away from the latter, instantaneously breaking the circuit and holding it open until the pressure in the reservoir falls so much that spring *e* swings arm E back into engagement with notch *i'*, as above described.

From the foregoing it will be seen that the switch is opened and closed instantly with a snap action, thus avoiding the possibility of arcing and causing the motors to operate positively, if at all, and only throwing them into action when there is a sensible decrease in the pressure.

The spring I can be regulated by adjusting bracket I' so that the amount of pressure necessary to snap arm E into or out of notch *i'* can be regulated. The bracket M prevents too great downward movement of the arm E, and also serves as a stop to limit the movement of block *i* toward the arm.

The connection and operation of the parts with the motor-pumps and compressors are explained in said patent to Pugh, and as these have nothing to do with the present invention I deem it unnecessary to disclose the same herein.

It will of course be understood that the invention is not limited to use in connection with air-compressors, but may be employed wherein it is desired to control an electric circuit by a fluid-pressure gage.

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

1. In a pressure-controlled electric switch, the combination of a fixed contact, a movable contact mounted on a spring, a pivoted arm to which said spring is attached; a notched block adapted to engage the free end of said arm; an adjustable spring carrying said block; a reciprocating rod, a pneumatically-controlled plunger, adapted to move said rod in one direction, a spring for moving the rod in the opposite direction; an insulated block attached to said rod; and fingers attached to said insulated block and projecting on opposite sides of said arm, substantially as and for the purpose described.

2. In combination, a swinging arm, a spring engaging said arm having a notch for locking said arm in closed position, a movable contact carried by said arm; a contact fixed relatively to the arm, a rod adapted to be moved in one direction by fluid-pressure and in the opposite direction by a spring; and fingers attached to but insulated from said rod and projecting on opposite sides of said arm, for the purpose and substantially as described.

3. In a fluid-pressure electric switch, a pivoted arm, a movable contact connected therewith; a fixed contact opposite said movable contact; a spring having a notched block thereon engaging the free end of said arm to hold it in closed position; a fluid-pressure chamber, a plunger adapted to be operated in one direction by the fluid-pressure, a spring for retracting said plunger, a stop for limiting the spring-actuated movement of the plunger and arm, and devices attached to said plunger adapted to engage said arm on opposite sides, whereby the switch is snapped open when the pressure forces the arms out of the notch and is snapped closed when the spring forces the arm into the notch.

4. In a pressure-controlled electric switch, the combination of a fixed contact, a movable contact mounted on a spring, a swinging arm to which said spring is attached; a notched block adapted to engage the free end of said arm; a spring carrying said block, an adjustable support for said spring; a reciprocating rod, insulated fingers on said rod adapted to actuate said arm, a pneumatically-controlled plunger adapted to move said rod in one direction, and a spring for moving the rod in the opposite direction.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

LOUIS H. WESTPHAL.

In presence of—

W. GRUENWALD,
FRANK. J. PETO.