

No. 793,872.

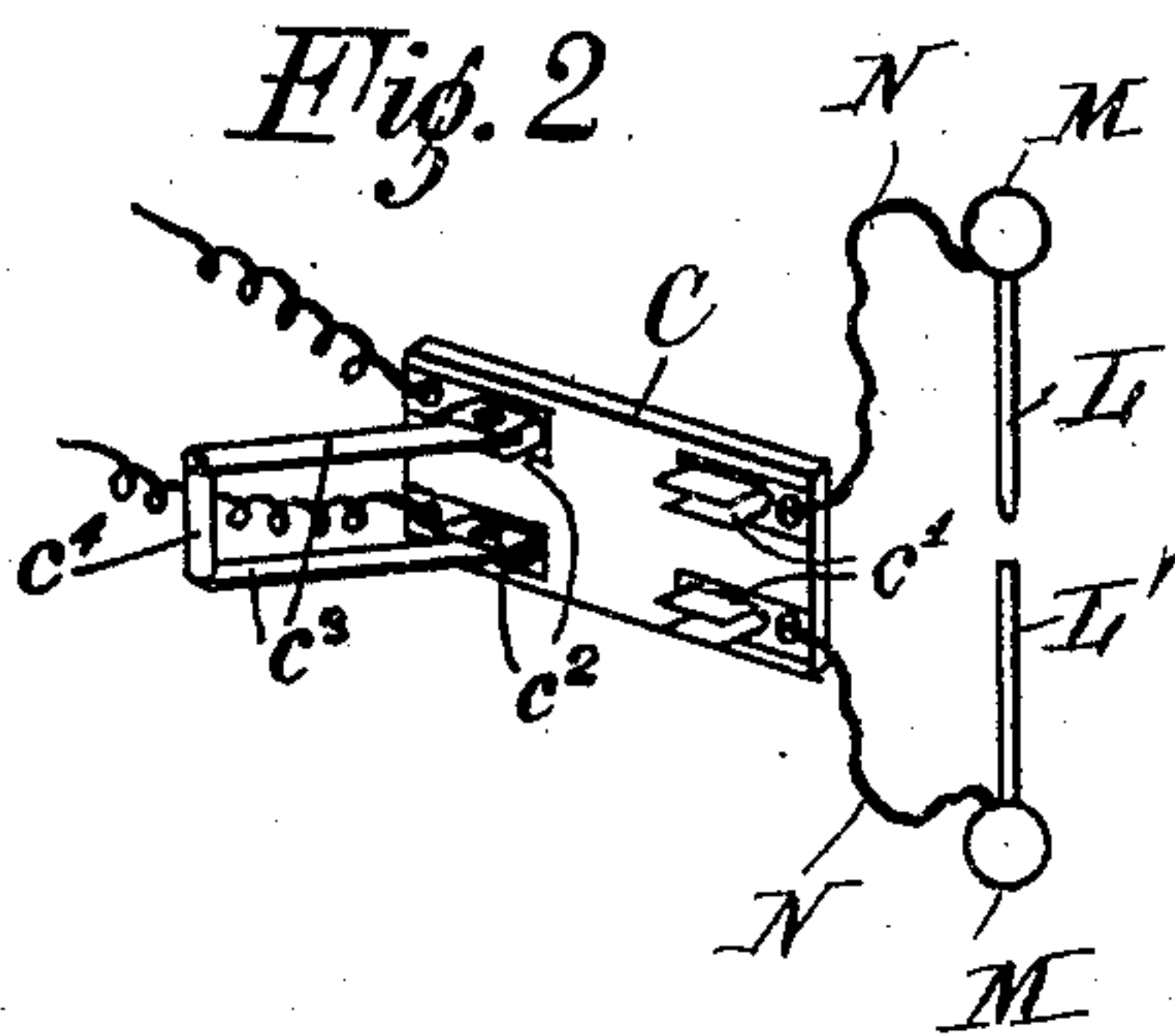
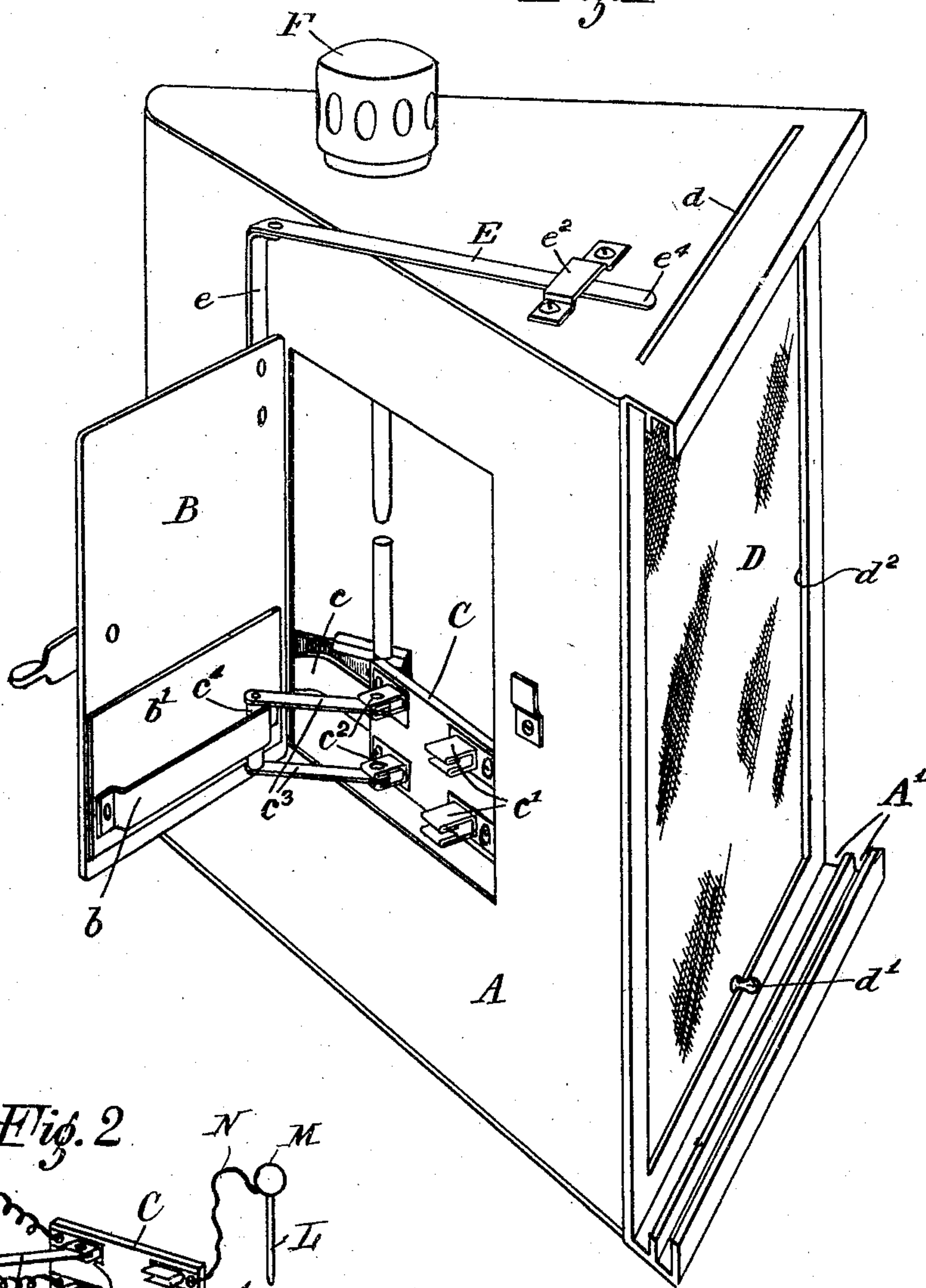
PATENTED JULY 4, 1905.

H. BISSING.
SPARK TIGHT BOX FOR ARC LAMPS.

APPLICATION FILED MAY 23, 1904.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses
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2 SHEETS—SHEET 2.

Fig. 4

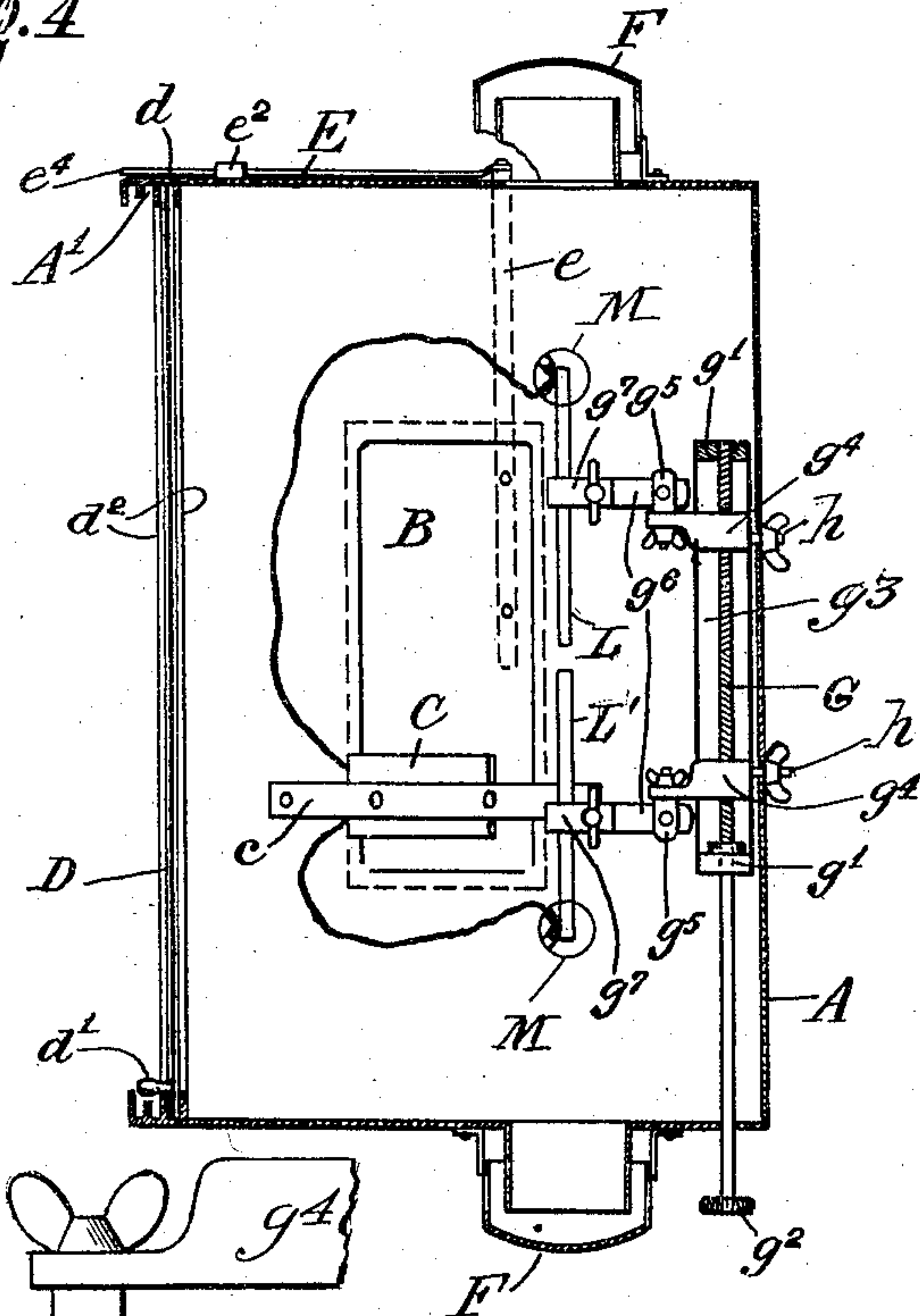


Fig. 5.

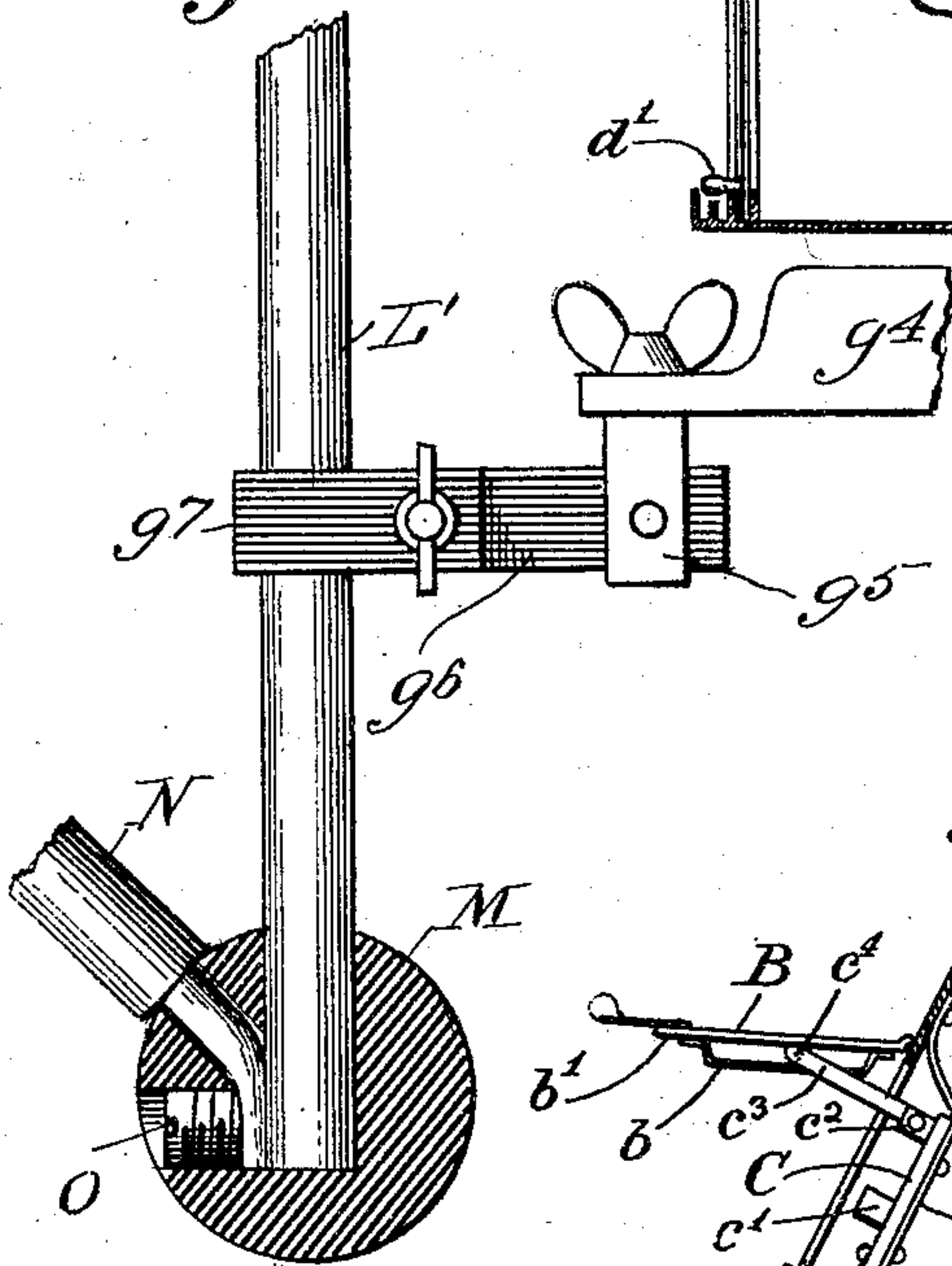
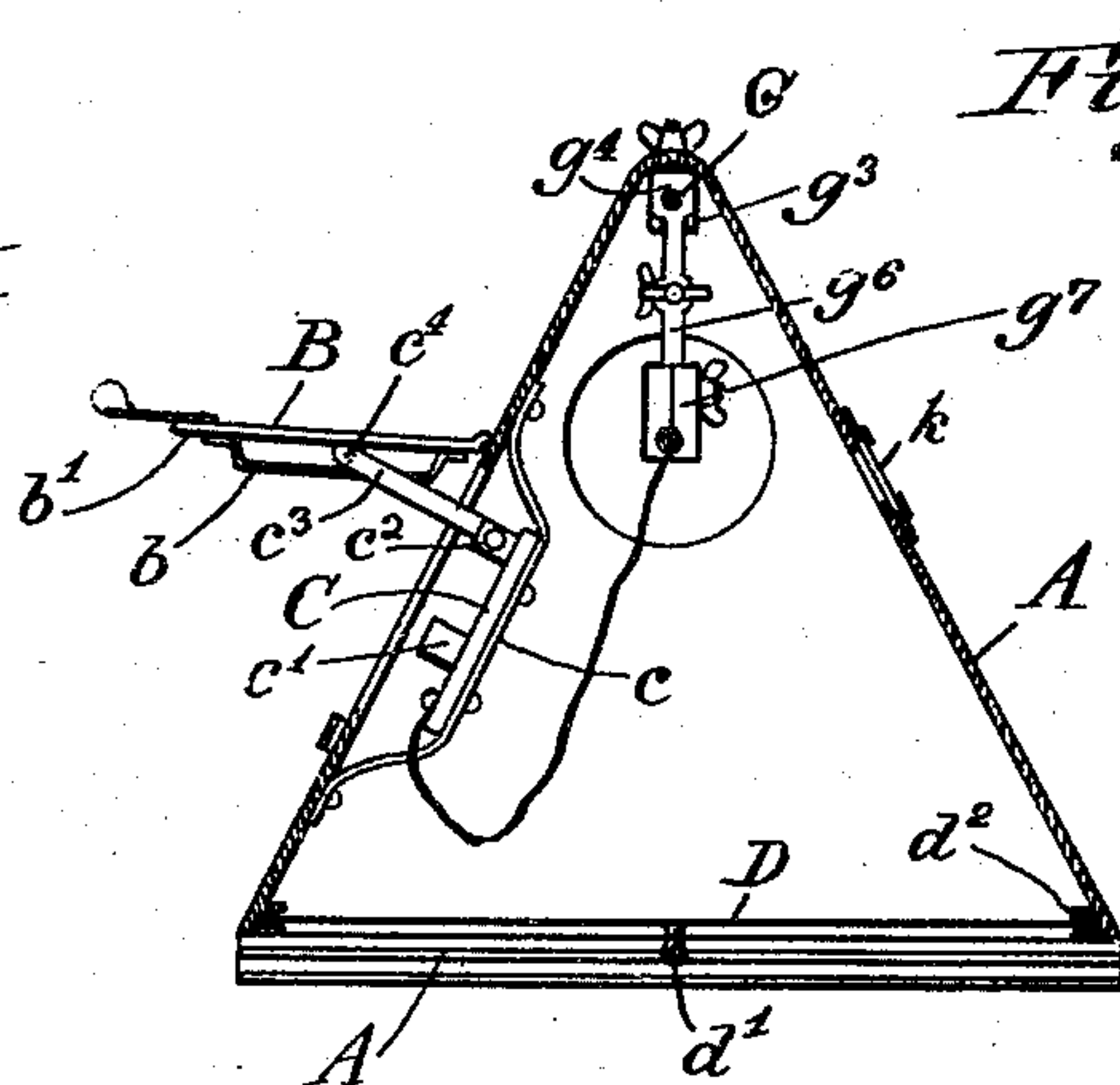


Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRY BISSING, OF NEW YORK, N. Y.

SPARK-TIGHT BOX FOR ARC-LAMPS.

SPECIFICATION forming part of Letters Patent No. 793,872, dated July 4, 1905.

Application filed May 23, 1904. Serial No. 209,234.

To all whom it may concern:

Be it known that I, HARRY BISSING, a citizen of the United States, residing in the city and State of New York, have invented a new and useful Spark-Tight Box for Arc-Lamps, of which the following is a specification.

Arc-lamps which are used in stages of theaters are required by insurance underwriters to be inclosed in a spark-tight fashion, so that no sparks may escape from the arc-lamp and onto the stage, where they are liable to set fire to the scenery and eventually the theater. To this end I inclose the arc-lamp within a metallic box having an open front normally closed by a removable screen of wire net or gauze of a mesh sufficiently fine to prevent the passage of sparks, or of other transparent or translucent material impervious to sparks. In addition I supply the side of the box with an aperture covered by a door. The purpose of the aperture is to render easy the access to the arc-lamp for the purpose of renewing or readjusting the carbons in their holders, and the purpose of the door when closed is to prevent the passage of sparks through the aperture. With this type of box it may happen that the operator forgets to put the wire screen in position before use, thus leaving the entire front of the box open for the passage of sparks onto the stage; nor would it be uncommon for the operator to forget to close the door in the side of the box before turning current onto his lamp. In either case there is left a large opening for the passage of sparks; but I so construct the box as to make it impossible for the operator to pass the electric current through the arc-lamp without having first rendered the box practically spark-tight at all points. I effect this object by having the door in the side of the box through which access is obtained to its interior operate an electric switch which breaks the electric circuit to the carbons when the door is opened and which may incidentally close this electric circuit when the door is closed. We see then that so long as the door is open and the box to this extent is not spark-tight the arc-lamp is without current and can

give off no sparks. Furthermore, I construct the movable or sliding wire screen in such a manner that it can never be entirely removed from the box. I then combine the door with a lock for the screen which prevents the screen from being raised, and thus uncovering any part of the front of the box so long as the door is closed and current on the lamp. I may also construct this lock so that the door cannot be closed so long as the screen happens to be raised and any portion of the front of the box to be thus uncovered.

It will thus be seen that my invention provides an arc-lamp lantern-box adapted for all purposes of the stage of such a character that it is impossible for the operator short of smashing the box to turn current on the arc-lamp without having first closed or thereby closing all apertures through which sparks might escape. When the arc is once in operation, it is impossible for the operator to uncover any apertures through which sparks may escape without first turning the current off the lamp.

My invention comprises certain other improvements which will be made clear later on.

In the drawings, Figure 1 is a perspective view of my box with the door open. Fig. 2 is a diagram of the circuit connections. Fig. 3 is a horizontal cross-section. Fig. 4 is a vertical cross-section, and Fig. 5 is a detail showing one of the carbons and its appurtenances.

The arc-lamp which I prefer to employ comprises a runway g , bent up from sheet metal and having guide-flanges g^3 for the carbon-holders. The top and bottom of this runway are closed by end pieces g' , in which is journaled a right and left hand screw G , operated by a knob g^2 on the outside of the box. The nuts g^4 , which are threaded on the screw G , carry uprights g^5 , which in turn are pivotally clamped to insulated brackets g^6 , to which are hinged insulated carbon-clamps g^7 . The carbons $L L'$ are clamped between the parts g^6 and g^7 in a manner which will be evident. The carbons may thus, if desired, be set at an angle by reason of the pivotal clamps. I

may add that the runway g is secured to the corner of the inclosing box opposite the screen by bolts and nuts h or in any other suitable way and that the operator adjusts the carbons with relation to each other by turning the knob g^2 on the outside of the box, a peep-hole closed by a piece of colored glass k being provided, so that the operator may see what adjustment is needed. From this it follows that the arc-lamp may be kept burning with the carbons in a proper relative position of adjustment without necessitating the use of any opening in the box through which sparks might escape; but it is from time to time necessary to renew the carbons or to change their adjustment in their holders, and a door B is provided to give access to the box for this and similar purposes. Upon this door I mount a plate of insulating material b' , to which is secured a strap constituting a runway b . On the inside of the box opposite the door-opening I secure a switch-plate C by means of straps c . Upon this switch-plate are mounted a pair of terminals c' and a second pair of terminals c^2 of a double pole-switch, the switch-blades c^3 being hinged to the terminals c^2 at one end and carrying at the other end a handle c^4 of insulating material, which moves inside the runway b , this runway and handle constituting one type of sliding connection which I may use between switch-blade and door.

The two terminals of the arc-lamp are connected, respectively, to the pair of switch-terminals c' , and the line-wires from which current is supplied have their terminals secured to the pair of switch-terminals c^2 . It will thus be seen that so long as the door B is open the pair of switch-terminals c' , which are in contact with the lamp-terminals, are out of contact with the line-terminals and the circuit of the lamp is broken. The only way in which the circuit to the lamp can be closed is by closing the door.

The screen D, of woven wire or other material which is pervious to light, but impervious to sparks, slides in grooves d^2 on each side of the box, a catch d' being provided at the lower end to prevent the entire removal of the screen from the box at any time or for any cause. The screen D in sliding upward passes through a longitudinal aperture d in the top of the box.

On the back of the door at some point distant from its hinge I fasten a standard e , to the top of which at the point e' is pivoted a sliding lock-bar E, which is guided by a strap e^2 . When the door is open, the lock-bar E is withdrawn from over the slot d , through which the screen D works; but when the door is closed and the lamp is in operation the lock-bar E covers the top of the slot, and the screen may not be raised to uncover any part

of the front of the box, however small, for the passage of sparks. On the other hand, if the screen is not all the way down, so as to entirely close the front of the box, any attempt to close the door will throw the front e^4 of the lock E against the inside surface of the screen, which prevents the door from being closed. Since the screen D may never be entirely removed from the box by reason of the catch d' , the function of the lock which I have just described prevents the arc-lamp from being put into operation without having the screen lowered and the front of the box closed in a spark-tight fashion. The arc-lamp once being in operation, the screen cannot be raised without first having opened the door and broken the circuit to the arc-lamp, nor can in any event the door B be opened, so as to permit sparks to fly from the arc-lamp to the outside of the lamp-box without having first broken the circuit of the lamp, and thus made the production of sparks impossible. It will thus be seen that my invention provides an inclosing lantern-box for arc-lamps which will prevent sparks from issuing therefrom despite any negligence, carelessness, or laziness on the part of the operator. I have called this lantern-box "spark-tight," and from a practical standpoint this is a correct designation. At the same time it will be understood that it may sometimes be desirable to provide ventilating-apertures; but in this case they should be properly protected by shields or caps F, so that the path of a spark in its attempt to get out of the box is so circuitous as to kill the spark. Other ventilating-apertures may be covered by wire-gauze. The two apertures through which the line-wires pass into the box and the apertures through which the screw-rod passes may be packed to make them absolutely spark-tight; but this is hardly necessary, since a sufficiently-close fit can be secured without this trouble. It is, in fact, again to be understood that I use the words "spark-tight" in a practically and not theoretically accurate sense.

In order to prevent the possibility of the upper end of the upper carbon L or of the lower end of the lower carbon L' from coming into contact with the top or bottom of the metallic inclosing box in case the operator should accidentally screw the carbons too far apart, I insert the non-burning ends of the carbons each in an insulated jacket or covering or a sphere M, of porcelain or other insulating material, having one aperture for the insertion of the carbon. In the form shown there is another aperture for the insertion of the insulated leading-in wire and a third aperture for the passage of a countersunk binding-screw O to secure the leading-in wire to the carbon. Since the line-wires

which pass through the box are insulated, the leading-wires to the carbons are insulated and the carbon-holders are of insulating material. The insulated ends of the carbons complete
 5 in the form shown the perfect insulation of every portion of the electric circuit which could possibly come into contact with the metallic top or bottom or sides of the box, and thus cause a short circuit. No unprotected
 10 part carries current except the carbons.

I have indicated at A' the guides for the colored slides which are used in connection with this general type of stage-lamp.

The screen of my spark-tight arc-light lantern-box is made of wire gauze or net. I have discovered that such wire net can be made of a mesh which is impervious to sparks from the arc without at the same time obstructing the passage of light to an appreciable extent. It follows that the light-emitting side of such arc-light lantern-box can be made of such wire-gauze without interfering with its spark-tight character. This has the great advantage over mica and the like
 25 that it does not blister or tarnish with the heat of the arc. It is far more durable, and it affords a free ventilation to keep the box cool.

I claim—

1. The combination of an arc-lamp, a spark-tight inclosing box provided with a screen pervious to light but impervious to sparks and with a door, and a switch controlled by the door for breaking the arc-lamp circuit when the door is open, substantially as described.

2. The combination of an arc-lamp, a spark-tight inclosing box provided with a screen pervious to light but impervious to sparks and with a door, and a switch controlled by the door for breaking the arc-lamp circuit when the door is open and for closing the circuit when the door is closed, substantially as described.

3. The combination of an arc-lamp, a spark-tight inclosing box therefor provided with a screen pervious to light but impervious to sparks and with a door, a switch mounted inside the box, having a hinged handle, and a sliding connection between the hinged handle and door to operate the switch on opening the door, substantially as described.

4. The combination of an arc-lamp, a spark-tight inclosing box provided with a screen pervious to light but impervious to sparks and a door having a runway, and a switch, mounted inside the box opposite the door, having a hinged handle operated by the runway, substantially as described.

5. The combination of an arc-lamp, a spark-tight inclosing box therefor, a movable screen, an electric switch in the arc-lamp circuit, and a lock for the screen controlled by the position of the switch, substantially as described.

6. The combination of an arc-lamp, a spark-

tight inclosing box therefor, a movable screen, an electric switch in the arc-lamp circuit, and a lock connected to the switch for preventing the withdrawal of the screen when the switch is closed, substantially as described.

7. The combination of an arc-lamp, a spark-tight inclosing box therefor, a movable but irremovable screen, an electric switch in the arc-lamp circuit, and a lock connected to the switch for preventing the closing of the switch when the screen is not in proper position, substantially as described.

8. The combination of an arc-lamp having the non-burning ends of its carbons provided with insulated jackets or coverings, and an inclosing box therefor having a metallic top or bottom, whereby accidental short-circuiting is avoided, substantially as described.

9. The combination of an arc-lamp, insulated clamps for the carbons, insulated coverings for the non-burning ends of the carbons, insulated leading-in wires, and an inclosing metallic box whereby accidental short-circuiting is avoided, substantially as described.

10. The combination of an arc-lamp, a right and left hand screw for manually operating its carbons, insulated jackets or coverings for the non-burning ends of the carbons, and an inclosing box having a metallic top or bottom, whereby accidental short circuits are avoided, substantially as described.

11. The combination of an arc-light carbon and a mass of insulating material for its non-burning end having an aperture for the insertion of the carbon, an aperture for the insertion of the insulated leading-in wire, and an aperture for the insertion of the binding-screw, substantially as described.

12. The combination of an arc-lamp, a spark-tight inclosing box therefor, a movable screen, an electric switch in the arc-lamp circuit, a lock for the screen, and a door for the box controlling the switch and lock, substantially as described.

13. The combination of an inclosing box provided with a door, a switch mounted inside the box having a pivoted arm and a sliding connection between the same and the door to positively operate the switch on opening the door, substantially as described.

14. The combination of a box provided with a door having a runway, and a switch mounted inside the box having a pivoted arm sliding in and positively operated by the runway, substantially as described.

15. The combination of an arc-lamp with a spark-tight inclosing lantern-box therefor, means for opening the lantern so as to afford access to the lamp, and a switch in the lamp-circuit actuated by said means to break the lamp-circuit before access to the lamp is afforded, substantially as described.

16. The combination of a switch comprising terminals and a hinged blade cooperating therewith, a box inclosing the switch having a door carrying a slide or runway, and a sliding connection between the door and hinged blade, whereby the opening of the door positively opens the switch, substantially as described.

17. The combination of an arc-lamp and a spark-tight lantern-box inclosing the same,

having the light-emitting side composed of wire-gauze, substantially as described.

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

HARRY BISSING.

Witnesses:

FRANK DETERING,
ELWOOD E. PRICE.