

(No Model.)

2 Sheets—Sheet 1.

LE ROY S. WHITE.
AUTOMATIC ELECTRIC GAS LIGHTER.

No. 441,458.

Patented Nov. 25, 1890.

Fig. 1.

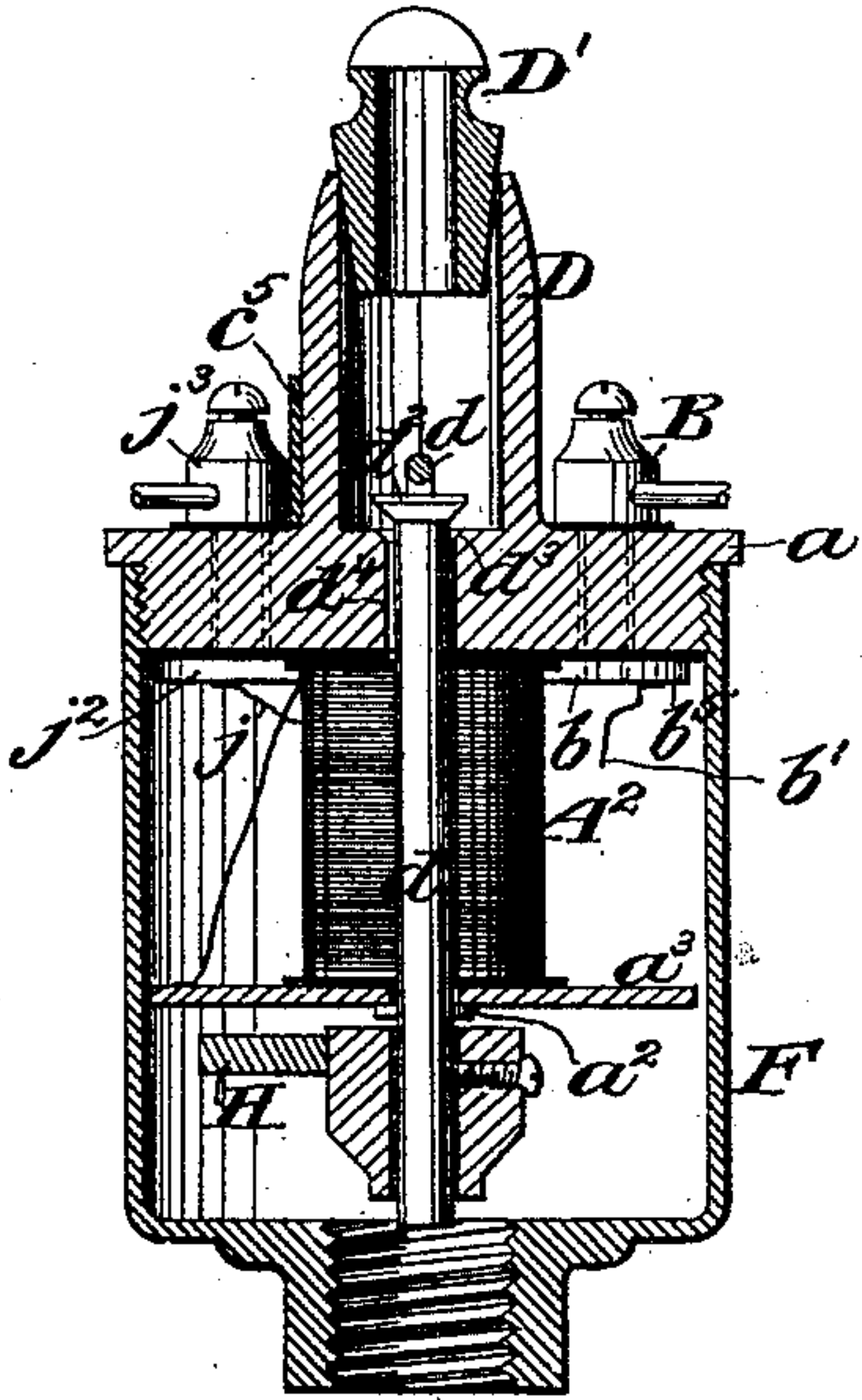


Fig. 2.

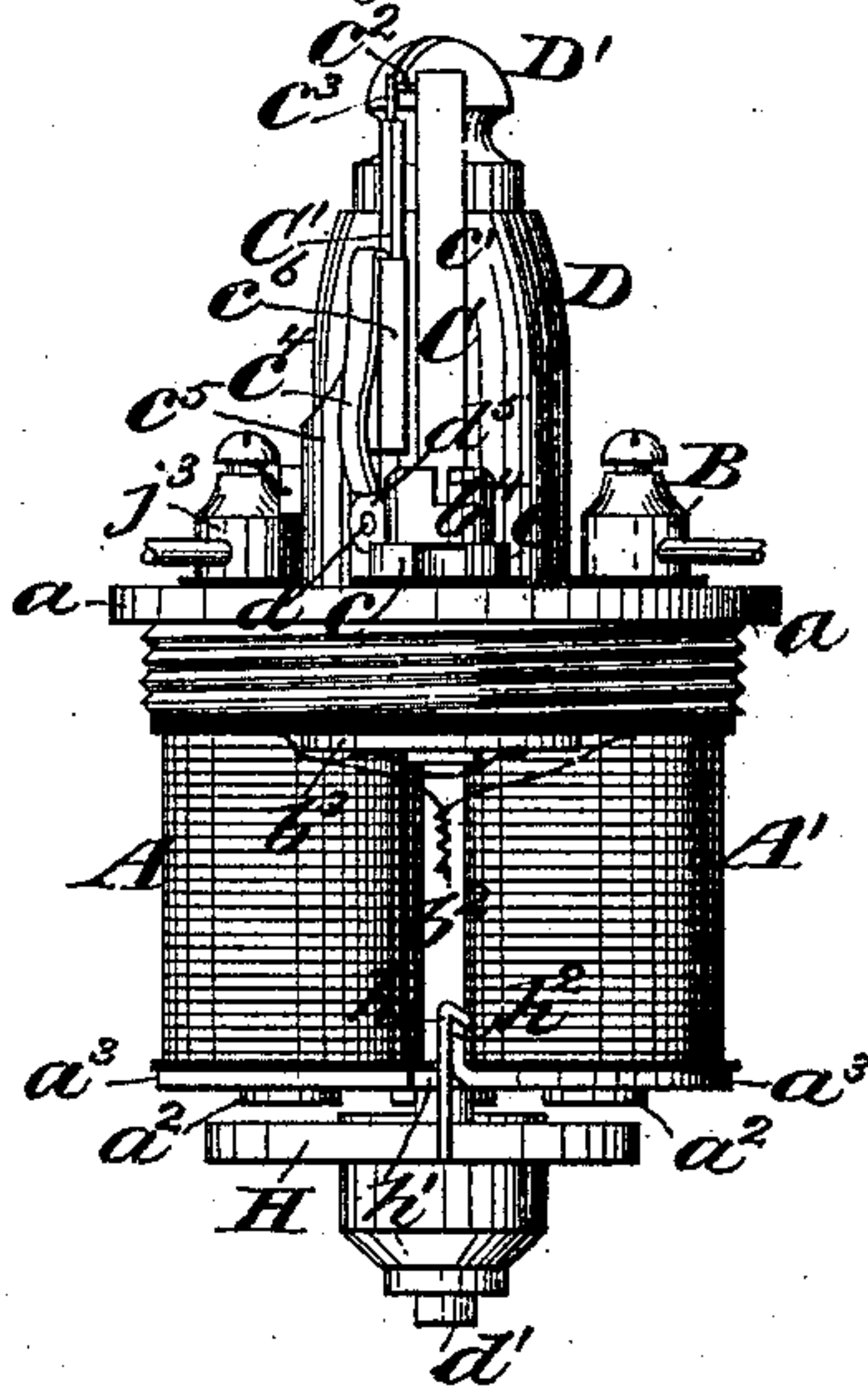


Fig. 4.

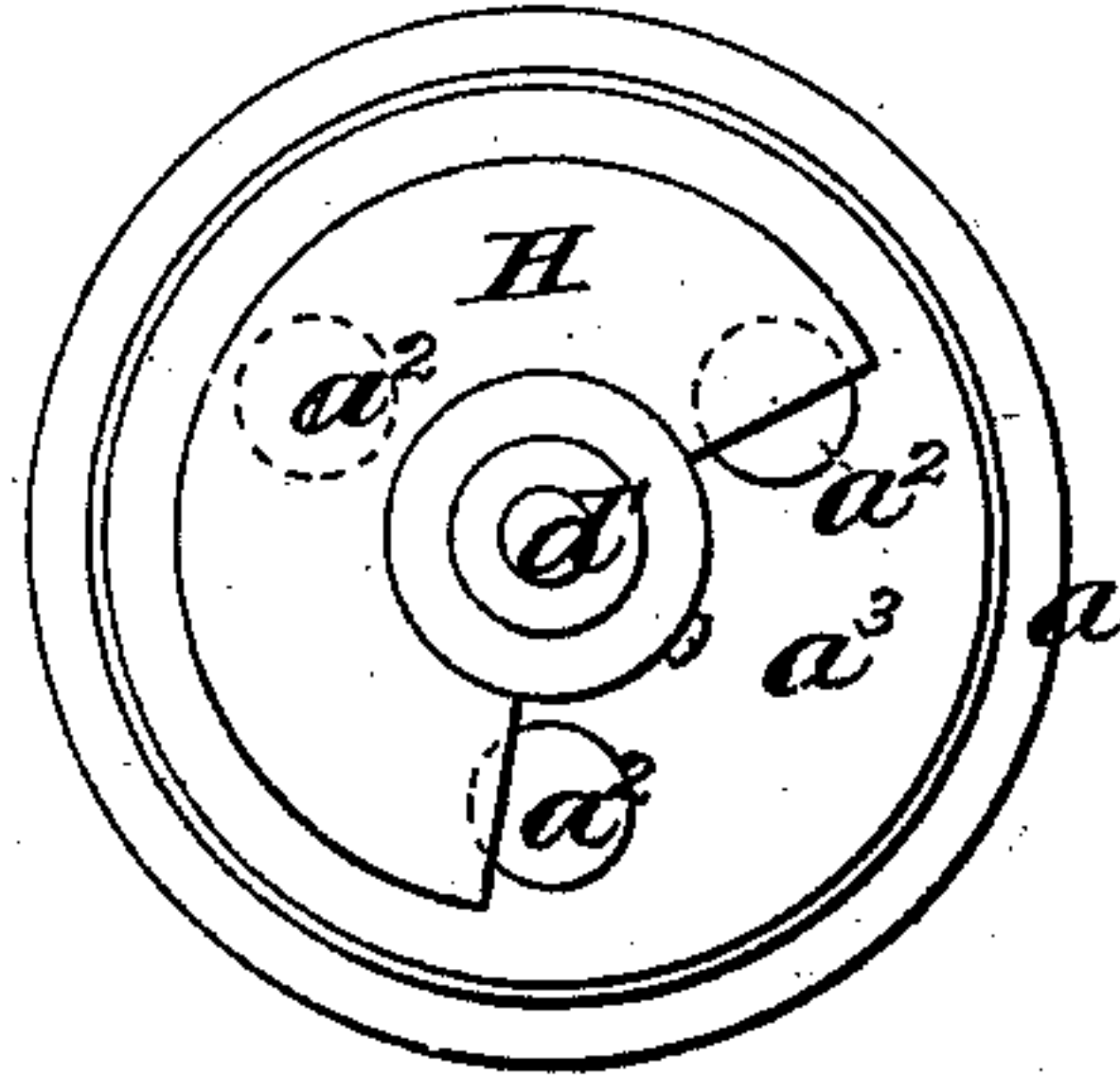


Fig. 3.

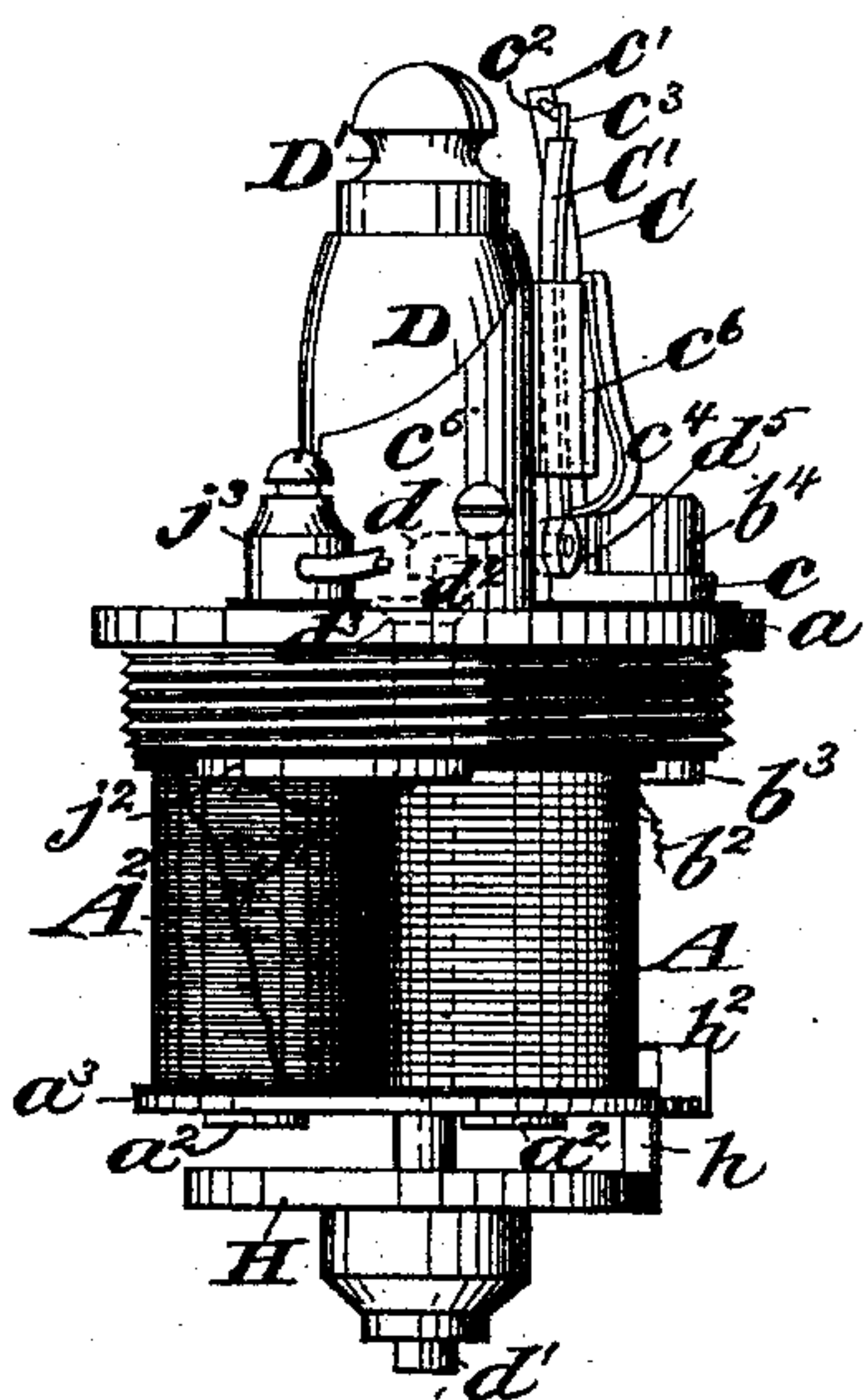
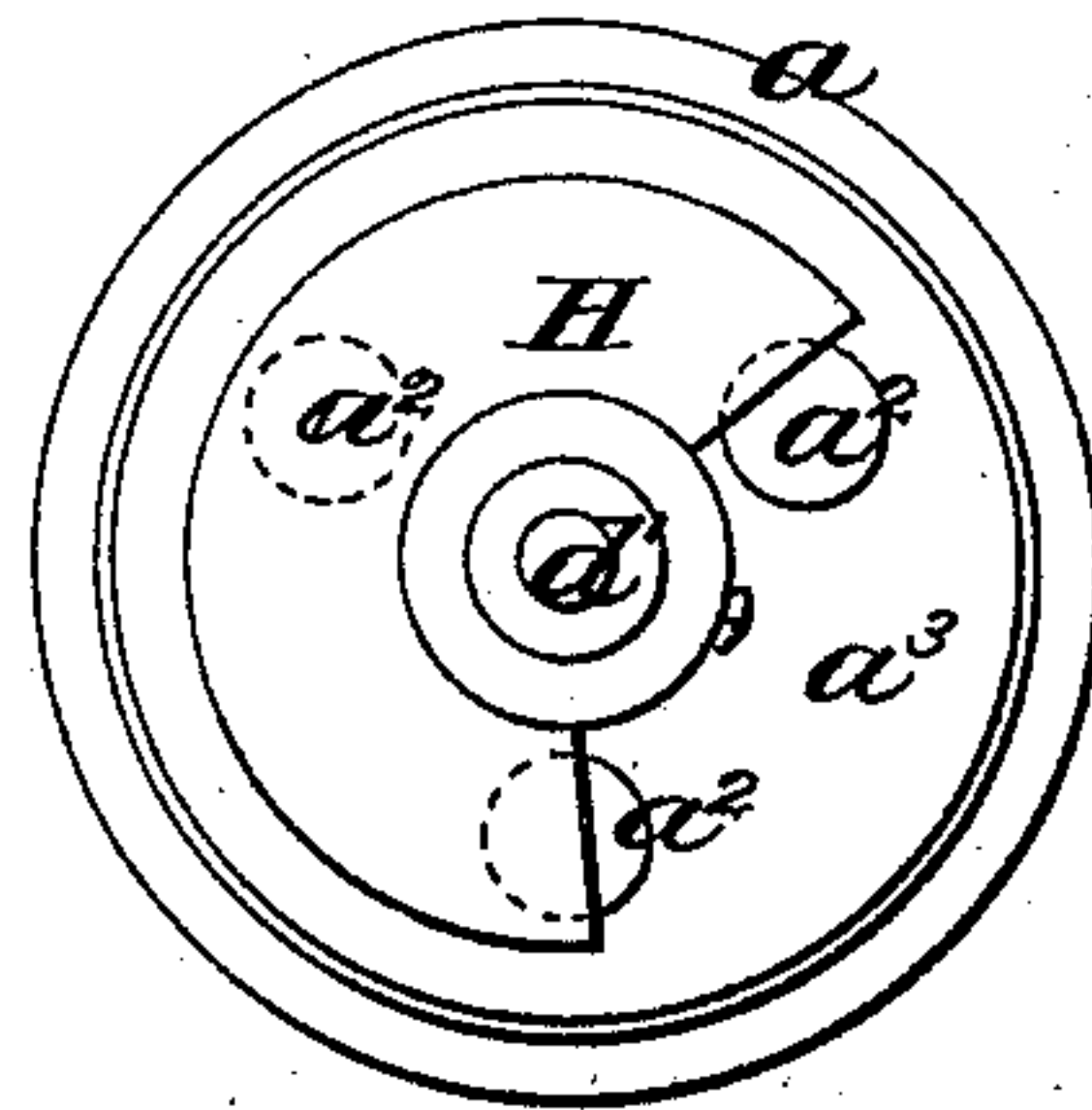


Fig. 5.



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(No Model.)

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Fig. 6.

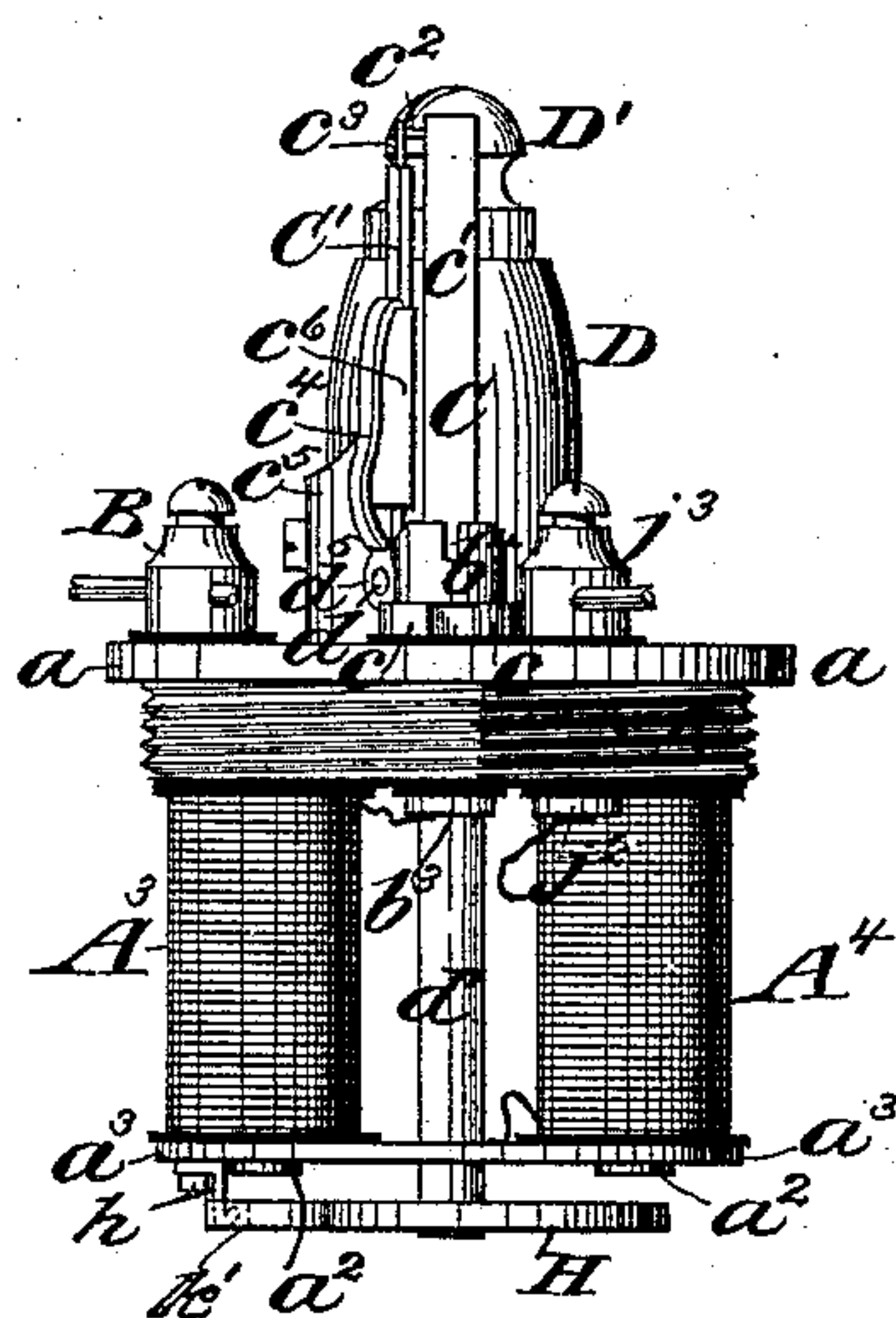
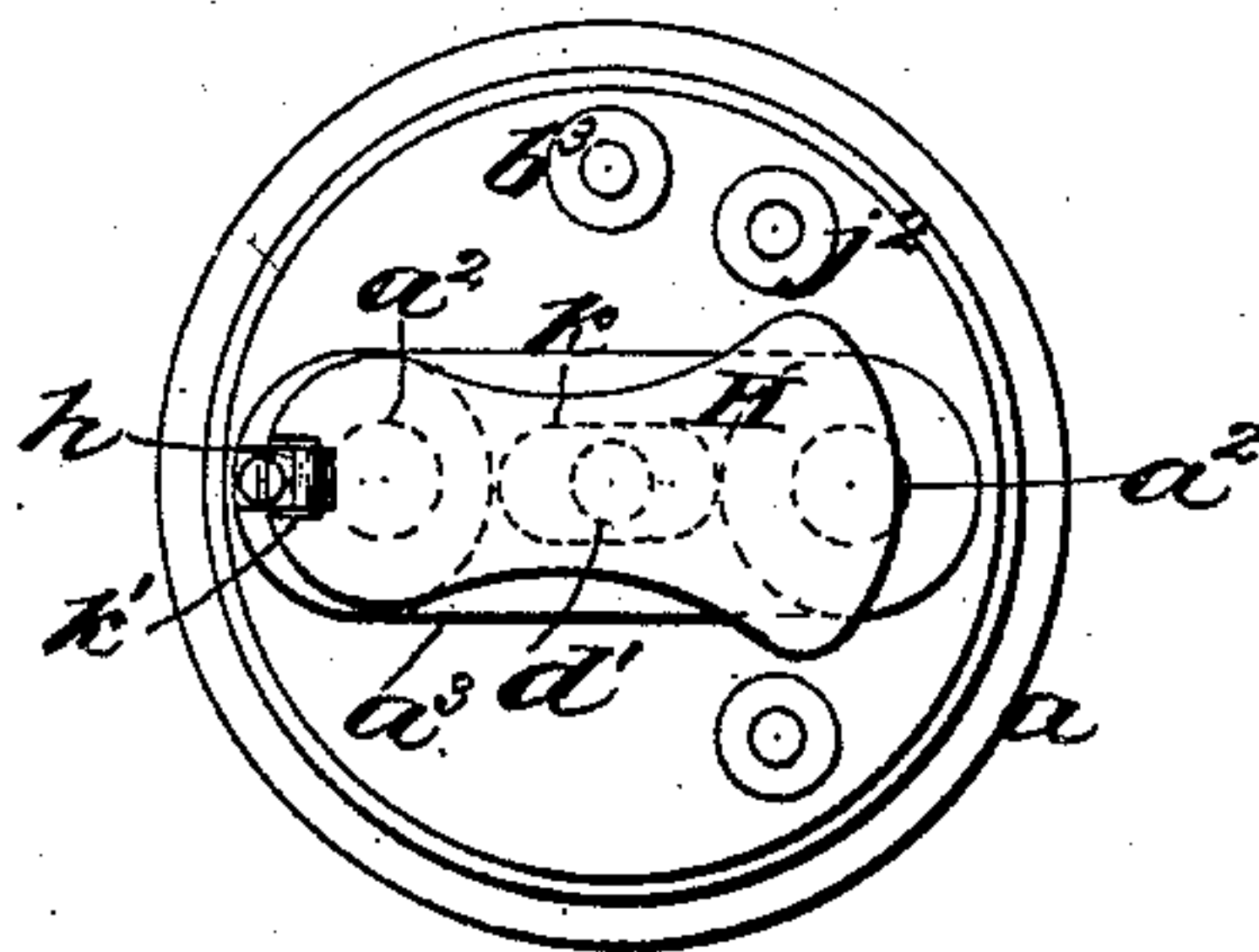


Fig. 7.



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UNITED STATES PATENT OFFICE.

LE ROY S. WHITE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE ELECTRICAL APPLIANCE MANUFACTURING COMPANY, OF SAME PLACE.

AUTOMATIC ELECTRIC GAS-LIGHTER.

SPECIFICATION forming part of Letters Patent No. 441,458, dated November 25, 1890.

Application filed May 23, 1890. Serial No. 352,829. (No model.)

To all whom it may concern:

Be it known that I, LE ROY S. WHITE, of Waterbury, in the county of New Haven, in the State of Connecticut, have invented a certain new and useful Improvement in Electric Gas Lighting and Extinguishing Devices, of which the following is a specification.

My improvement relates to that class of devices which are employed for turning on and off the gas and when turning it on to light the gas.

I will describe my improvement in detail, and then point out the novel features in the claim.

In the accompanying drawings, Figure 1 is a vertical section of a device embodying my improvement. Fig. 2 is a side elevation of the same, a certain shell within which a portion of the device is contained being removed. Fig. 3 is also a side elevation, looking at the device in a direction at right angles to Fig. 2. Fig. 4 is a bottom plan. Fig. 5 is a similar view, but showing the parts in a different position from that in which they are shown in Fig. 4. Fig. 6 is a side elevation illustrating a modification. Fig. 7 is a bottom plan of the same.

In reference to my improvement, illustrated in Figs. 1, 2, 3, 4, and 5, A A' A² designate coils of wire wound in the usual manner for forming electro-magnets. I prefer that the coils A A' be of coarser wire than that of the coil A², in order that the resistance offered by the coil A² may be substantially the same as that offered by the coils A A' combined. The coils A A' are connected together electrically, so as to be in circuit with each other. These two coils when energized cause the gas to be turned on and to be ignited. The coil A² is alone employed for causing the gas to be turned off and the consequent extinguishment thereof. All of the coils are provided with cores A², secured to a metallic head *a*, the said metallic head forming a magnetic metallic connection between the cores of the coils A A', said cores and metallic head, together with the coils, forming in effect an electro-magnet of the horseshoe type. The lower ends of the cores *a*² extend, as shown, through a circular plate *a*³ of some non-magnetic metal, and are secured therein.

Upon the upper side of the head *a* and insulated therefrom is a binding-post B. This binding-post extends through the head *a* and is connected to a metallic piece *b*, which is also insulated from the head *a*. The metallic piece *b* is preferably a nut screwed onto the end of the post B and provided with projected wings *b*⁵ to afford an extended surface for the attachment of the wire and at the same time economizing space. To the metallic piece *b* is electrically connected one end of a wire *b*¹, forming part of the coil A. The other end of the coil A is connected with the coil A'. As shown, such ends are twisted together at *b*². The other end of the coil A' is connected electrically to a metallic piece *b*³, preferably a nut similar to the piece *b*, above referred to, to which metallic piece is secured a binding-post *b*⁴, which binding-post is insulated from the head *a*. The binding-post *b*⁴ at its upper end is, as shown, provided with a screw-head.

C designates a metallic contact-piece, the lower end of which is bifurcated or provided with jaws *c*. These jaws are adapted to be passed about the binding-post *b*⁴, between the screw-head thereon and the insulating material beneath the latter. When the binding-post is screwed down tightly, there will then be a firm electrical contact between the binding-post *b*⁴ and the contact-piece C. A portion *c*¹ of the contact-piece C extends upwardly from the jaws *c*. Near its upper end said contact-piece bears a horizontally-extending pin or projection *c*².

C' designates a second contact-piece. This contact-piece is adapted to be rocked into and out of contact with the contact-piece C. Its upper end is, as shown, provided with a pin or projection *c*³, which pin or projection is normally in contact with the pin or projection *c*² upon the contact-piece C. It is thus held in contact by means of a spring *c*⁴, (shown as a flat spring,) rigidly secured near its upper end to a housing *c*⁵. Its lower end bears against the contact-piece C' near the lower extremity of the latter. The housing *c*⁵ is shown as a metallic plate secured to a tubular burner D. The housing is so constructed that the contact-piece C' may be rocked to and fro in a direction to move the

pin c^3 toward and away from the pin c^2 in a bent-round portion c^6 thereof. The latter acts as a guide for the contact-piece C' in its to-and-fro rocking movement. The lower end portion of the contact-piece C' is fixed to the outer end of a pin d , which extends from within to a point over the valve within the pillar and may be made of wire bent into the form shown more clearly in Fig. 3. At the point where it passes through the wall of the pillar it is formed with an enlarged rounded portion d^5 , which rests in a corresponding socket in the wall in a manner similar to that shown in my former patent, No. 377,305, thereby admitting the slight rocking motion required without liability of leakage at the joint. When an upward lift is exerted upon the inner end of the pin d , the contact-piece C' will be rocked a short distance out of contact with the contact-piece C , so as to break circuit between the two contact-pieces when circuit has been closed upon the coils $A A'$. A valve rod or stem d' is provided at one end (here shown as its upper end) with a valve d^2 , which normally closes upon a valve-seat d^3 , formed at the upper end of a passage d^4 , extending about centrally through the head d and opening at its upper end into the burner D . The passage d^4 constitutes a gasway, through which when the valve d^2 has been raised from its seat gas may pass to the burner D , and thence to the burner-tip D' . The lower or opposite end of the valve-rod d' is attached to the armature of the electro-magnet hereinbefore referred to.

It will be readily seen that when the rod d' is moved upwardly it will cause a rocking movement of the pin d , which movement may be communicated to the contact-piece C' and cause the latter to be rocked out of contact with the contact-piece C against the resistance offered by the spring c^4 , thus causing a "break" between the contact-pieces $C C'$. This operation takes place when the coils $A A'$ are energized. Said coils are energized by means of a battery placed in a circuit, one pole of which comprises a wire extending from a suitable switch or circuit-closer (not shown) to the binding-post B . The other pole of the circuit comprises the head a , a shell F , which has a screw-threaded connection with the head a , and the gas-pipe of a gas-fixture, (not shown,) the current passing then to ground. When circuit is closed on the coils $A A'$, the first effect is to raise the valve d^2 from its seat. The raising of the valve d^2 permits the passage of gas from the interior of the shell F into the burner D , and from thence to the burner-tip D' . The raising of the said valve from its seat is occasioned by longitudinal movement of the rod d' , which is occasioned by the movement of an armature H , fixed upon the rod and attracted by the magnet energized by the coils $A A'$. As will be readily seen, the movement of such armature will cause the elevation of the valve d^2 , and hence the inner end of the pin d , thereby rocking

the contact-piece C' out of contact with the contact-piece C , and consequently breaking circuit and producing a spark. As the gas has at the same time been turned on through the opening of the valve d^2 , the gas which has thus issued from the burner-tip D' will be ignited by the spark. Secured to the armature H is a hook h . This hook when the spindle d' is moved upwardly will pass through a suitably-formed slot or aperture h' in the plate a^3 .

In the example of my improvement shown in the figures under discussion the metal which is cut from the slot h' is bent upwardly to form a second hook h^2 . As the hook h is moved upwardly the armature H makes a partial rotation and the hook h will be swung over the top of the hook h^2 in position to engage the latter and cause the rod d' , and consequently the valve d^2 , to be maintained in an elevated position, or, in other words, so that the gas may pass freely to the burner-tip.

In order to accomplish the partial rotation of the armature H , I so shape the armature and so dispose it with relation to the cores of the coils that the line or centers of attraction will be located to one side of the centers of the cores, in order that when the coils $A A'$ are energized there will be a tendency on the part of the armature to turn on its axial support to adjust itself in its natural position over the cores. When the contact is broken, by releasing the pressure from the button or other circuit-closer the armature H falls slightly, bringing the hook h in contact with the hook h^2 and leaving the gas turned on. During this operation, comprising the turning on of the gas, the lighting of the same, and the maintaining of the valve in an open position, so that gas may be constantly admitted to the burner-tip, the coil A^2 has not been energized. As previously stated, the function of said coil is to turn off the gas, and consequently to extinguish the light. When, therefore, it is desired to turn off the gas and to extinguish the same, the coil A^2 is energized. From the latter coil extends one wire j , which wire is electrically connected to a metallic piece j^2 , preferably a nut, similar to the pieces $b b^3$, before referred to. To this metallic piece is secured a binding-post j^3 , which latter passes through the head a , but is insulated therefrom. Another wire from the coil A^2 extends to and is electrically connected to the plate a^3 . The plate a^3 is in contact with the shell F . When, therefore, circuit is closed upon the coil A^2 , either by turning a switch common to this and the former circuit herein referred to, or by means of any other well-known circuit-closer, the rotation of the armature H in a reverse direction to that previously described occurs because of the location of the center of attraction of the armature to one side of the center of the core of coil A^2 , whereby the hook h becomes released from the hook h^2 , and the rod d' , when the circuit is broken, is permitted to

drop downwardly. This of course closes the valve d^2 upon its seat and results in extinguishing the gas. It is to be borne in mind that in this operation the circuit is through
 5 the binding-post j^3 , the metallic piece j^2 , the coil A^2 , the plate a^3 , the shell F , and from thence through the gas-pipe to ground. In both instances, however, in which I have referred to the ground-circuit being made by
 10 the gas-pipe and gas-fixture, it could of course be made as well through a separate wire.

In the example of my improvement shown in Figs. 6 and 7 I employ but two coils—one
 15 for turning on the gas and igniting and the other for turning off the gas and causing its consequent extinguishment. The operation of alternately energizing the coils in this example, which I will designate by the letters
 20 A^3 A^4 , is the same as that previously described—namely, by a switch and a suitable electric circuit. The coil A^3 , when energized, causes the operation of the circuit-breaker comprising the contact-pieces C C' , and also
 25 the opening of the valve d^2 . When such coil is energized, the armature H upon the spindle is elevated and at the same time it is swung sidewise, being attracted by the core of the coil A^3 . The plate a^3 is provided with
 30 a slot k , which admits of the swinging move-

ment of the valve-rod. In this instance the hook h is upon the plate a^3 , and engages one of the side edges of a notch k' , formed in the armature H , the hook h^2 being omitted. It
 35 will be readily seen that this operation not only causes the turning on of the gas, but breaks circuit at the contact-pieces C C' , so that a spark ensues, whereby the gas is ignited. When, on the contrary, the coil A^4 is energized by the operation of the switch or
 40 other well-known circuit-closer, the armature is moved sidewise in the opposite direction to that described, and is released from the hook h . This admits of the dropping of the rod d and the consequent closing of the valve
 45 d^2 upon its seat.

What I claim as my invention is—

The combination, with the electro-magnet, including the coils A A' , of the circuit-breaker, comprising the contact-pieces C C' , the hous-
 50 ing c^5 , acting as a guide for the contact-piece C' , the spring c^4 , acting against the contact-piece C' , the vibrating part d , the rod d' , provided with the valve d^2 , the armature H , and the hooks h h^2 , substantially as set forth.

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Witnesses:

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