

No. 885,319.

PATENTED APR. 21, 1908.

W. H. CHIPPERFIELD.

APPARATUS FOR THE COMPRESSION OF GAS OR AIR FOR LAMPS.

APPLICATION FILED FEB. 16, 1907.

2 SHEETS—SHEET 1.

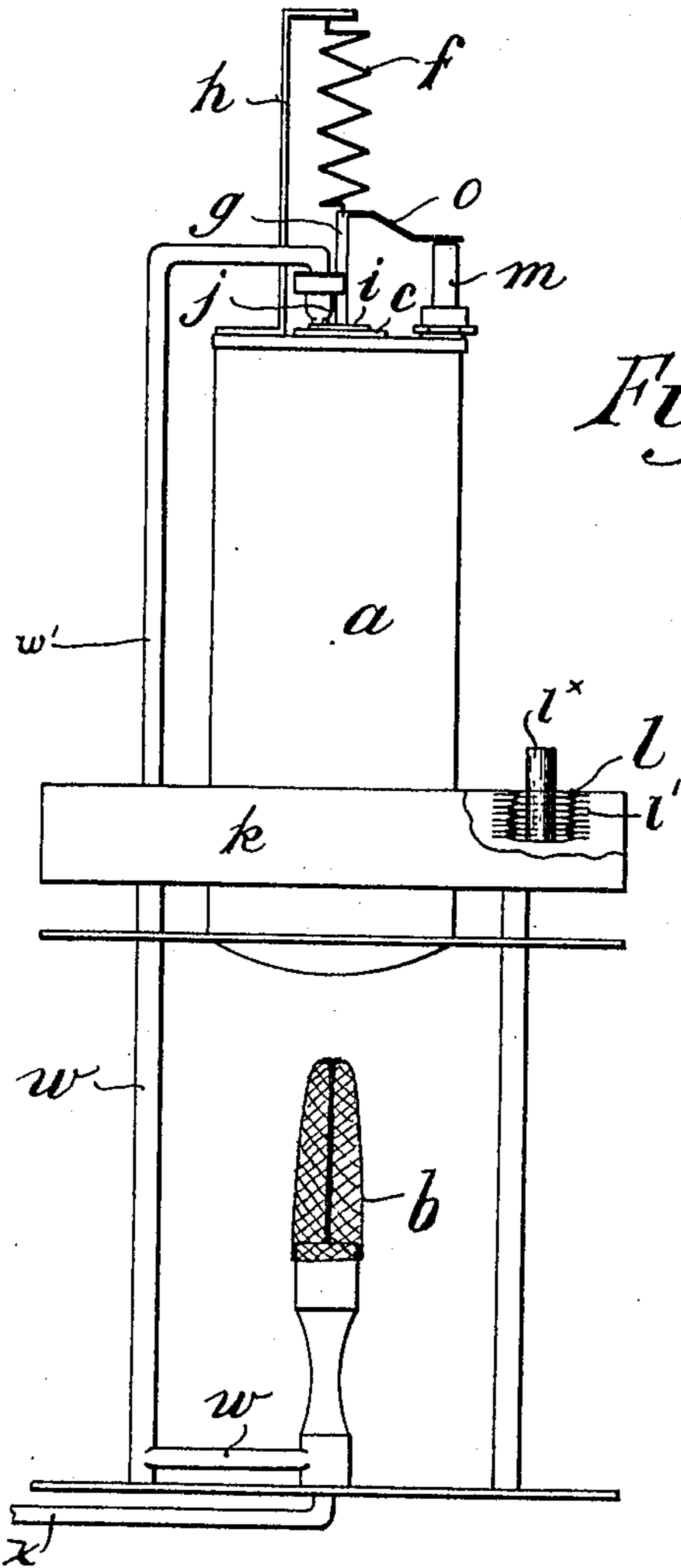


Fig. 1.

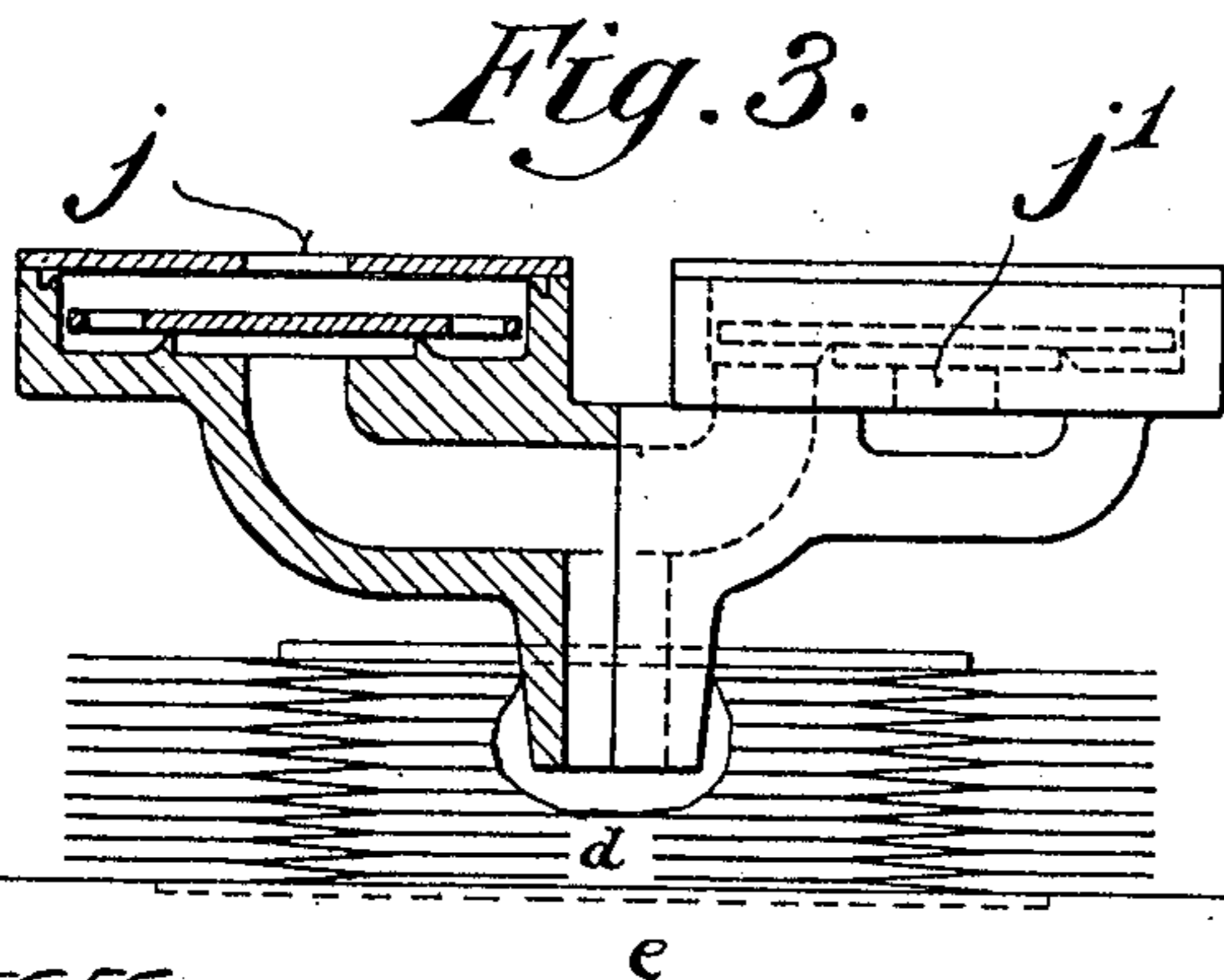
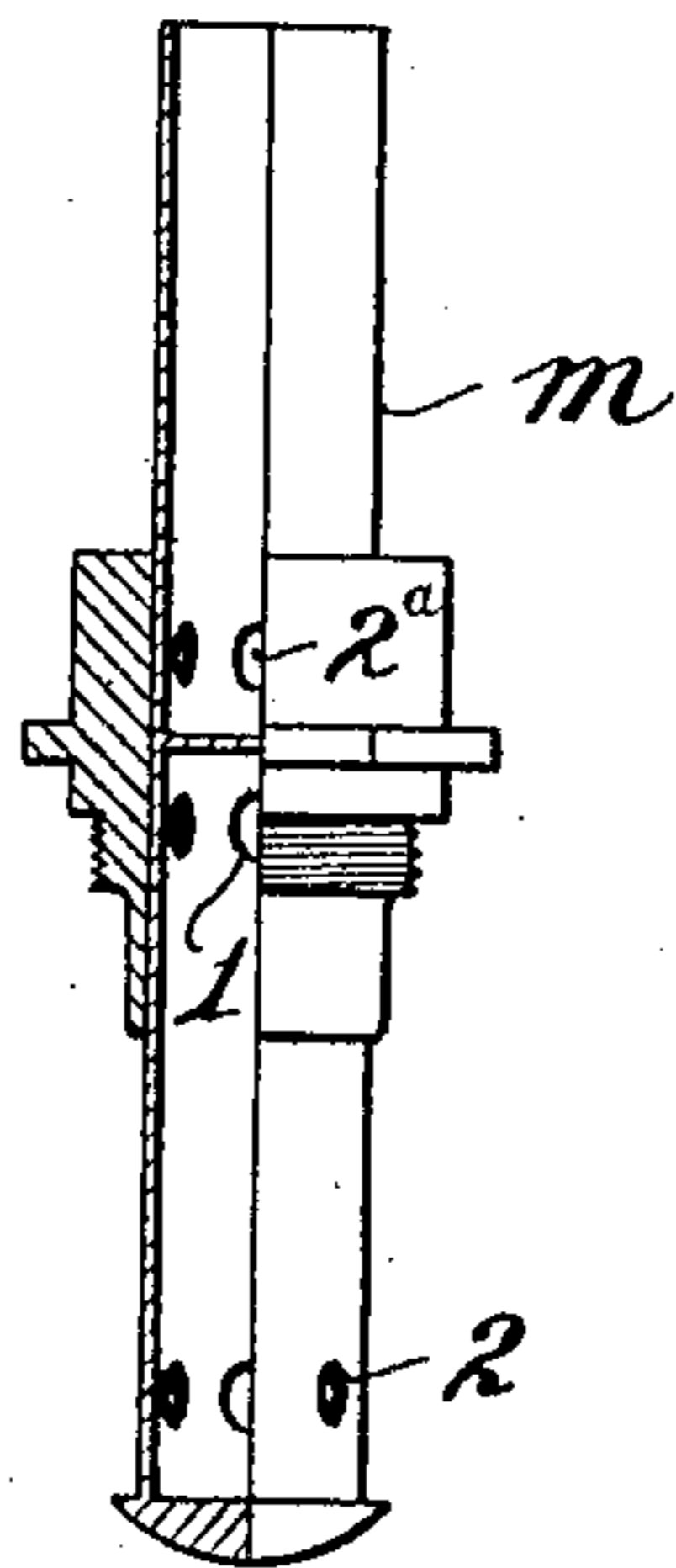


Fig. 3.

Fig. 4.



WITNESSES

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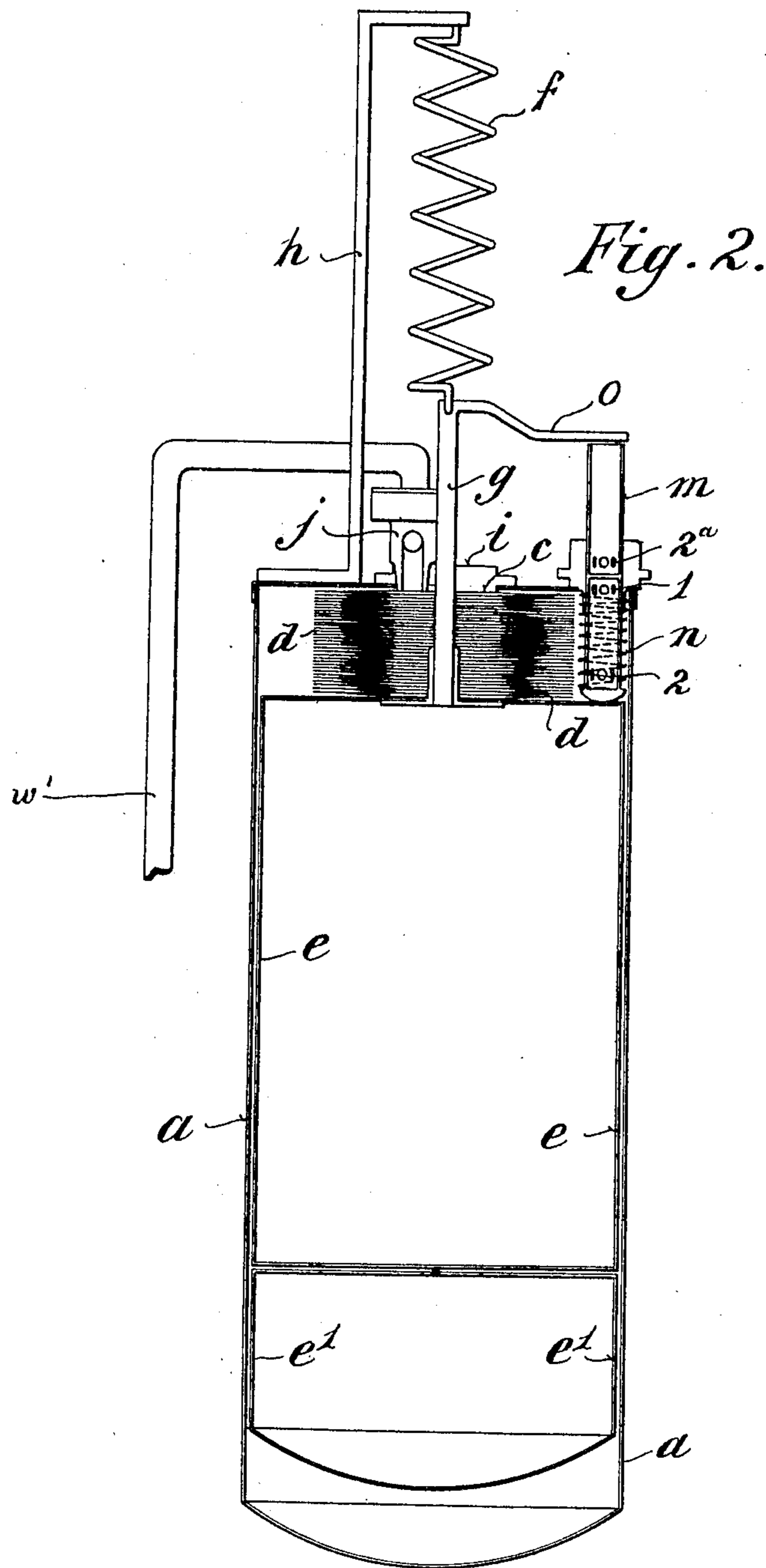
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2 SHEETS—SHEET 2.



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM HOWARD CHIPPERFIELD, OF LONDON, ENGLAND.

## APPARATUS FOR THE COMPRESSION OF GAS OR AIR FOR LAMPS.

No. 885,319.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed February 16, 1907. Serial No. 357,773.

*To all whom it may concern:*

Be it known that I, WILLIAM HOWARD CHIPPERFIELD, a subject of the King of Great Britain and Ireland, residing at London, England, have invented new and useful Improvements in Apparatus for the Compression of Gas or Air for Lamps, of which the following is a specification.

This invention relates to improved apparatus for the compression of gas, or air, for lamps, and it has for its objects to provide means whereby the compressing apparatus will be reliable in its operation; to reduce the cost of the manufacture thereof, and to increase its durability. These objects are attained by the apparatus illustrated in the accompanying drawings in which:—

Figure 1 is an elevation of a lamp with the improved compressing apparatus fitted thereto. Fig. 2 is a sectional elevation thereof, to an enlarged scale. Fig. 3 is an elevation, partly in section to an enlarged scale, of inlet and outlet valves to the compressor. Fig. 4 is an elevation, partly in section, to an enlarged scale of a cylindrical slide valve.

Similar letters refer to like parts throughout the several views.

According to this invention, the lamp is provided with a vessel, or hollow body *a*, of metal, which is placed in position above the mantle, or burner, *b*, so that the heat therefrom will impinge upon the lower portion thereof. *x* is the pipe leading from the fuel supply. This vessel *a* has an opening *c* formed centrally in its upper end, to the boundary of which is attached a hollow flexible, extensible and compressible metallic body *d*, preferably annular in form to which is attached a further hollow body *e* composed of any suitable material, but preferably of metal, and free to move within the outer vessel *a*. This inner hollow body *e* is constructed in two parts *e*, *e*<sup>1</sup>, as shown, or it may have a dividing diaphragm about its center, its weight being held in suspension by a spring *f*, through the medium of the rod *g*, the upper end of the spring being attached to a supporting rod *h*.

The central opening *c* in the upper end of the outer body *a* is closed by a cover *i* to which are connected inlet and outlet valves, the outlet valve *j* communicating by pipe *w*

with a receiver *k* placed in any convenient position and provided with suitable apparatus, such as *l* for equalizing the pressure of the gas, or air, within, which is then conducted through the pipe *w* to the burner *b* for use as required, the inlet valve *j*<sup>1</sup> communicating from the atmosphere into the flexible metallic body *d*.

The element *l* consists of a flexible metallic body *l*<sup>×</sup> having a weight *l*<sup>×</sup> resting thereon so that when the pressure of gas in the chamber *a* exceeds the predetermined pressure set by the weight *l*<sup>×</sup> the flexible body *l*<sup>×</sup> contracts and thus reduces the pressure.

The lower end of the rod *g* is attached to the top of the upper inner chamber *e*, the rod passing up through the cover *i* and capable of reciprocating movement. A cylindrical slide valve *m* is attached to the outer vessel or chamber *a* and is provided with ports which are open to the atmosphere at each end of the stroke. An arm *o* mounted on the connecting rod *g* and moving therewith extends above the slide valve *m* thereby insuring the downward movement of same. Of course when the apparatus is to be used for the compression of the gas to be consumed at the burner, the inlet valve *j*<sup>1</sup> will be coupled up to the source of supply in any suitable or convenient manner, instead of being simply open to the atmosphere.

The application of heat to the lower end of the apparatus will expand the air in the outer chamber *a*, thereby increasing its pressure, causing the inner flexible metal body *d* to contract, and carry with it the hollow body *e*, thereby raising the valve *m*. This movement will continue until the ports 1 in the valve *m* are open to the atmosphere, when the expanded air in the outer chamber *a* will be allowed to escape to the atmosphere through the ports 2. The pressure in the outer vessel *a* having thereby been reduced, the vessels *e* and *e*<sup>1</sup> will commence to fall by gravity, thereby causing the expanded air at the bottom and heated end of the chamber to pass upward between the inner and outer chambers to the cooler ends, where contraction takes place, creating a partial vacuum by which the further downward travel of the chamber is continued, until the ports 2<sup>a</sup> in the valve *m*, which has been caused to follow

the movement of the inner chamber by the action of the spring *n*, again opens communication between the outer chamber and the atmosphere through the open upper end, thereby admitting a fresh supply of air from the atmosphere to take the place of the air previously released, the movements and operations recurring in regular cyclical order.

The motion imparted to the inner flexible metal body *d*, causes it to act as a pump, by which gas from the gas supply, or air from the atmosphere, will be drawn into it through the valve *j*, and expelled through the outlet valve *j*<sup>1</sup>, at an increased pressure, to the receiver *k*.

I am aware that prior to this invention it was well known to compress air, or gas, for incandescent gas lighting by apparatus in which the attainment of the increased gas, or air, pressure is effected by the direct expansive action of heat upon the gas or air to be used, without intermediate compressing accessories, and I do not wish such apparatus to be understood as of this invention, but

What I do claim as of my invention and desire to secure by Letters Patent, is:—

1. In apparatus for the compression of gas, or air, for lamps the combination of a burner a vessel or chamber of metal arranged above the burner and having an opening formed in its upper end, an inner hollow body free to move within the outer vessel or chamber; and a hollow flexible, extensible, and compressible metallic body one end of which is attached to the boundary of said opening and the other to the inner hollow body.

2. In apparatus for the compression of gas, or air, for lamps the combination with a burner, a vessel or chamber of metal arranged above the burner and having an opening formed in its upper end, of an inner hollow body constructed in two parts free to move within the outer vessel.

3. In apparatus for the compression of gas, or air, for lamps the combination with a burner, a vessel or chamber of metal, arranged above the burner and having an opening formed in its upper end, an inner hollow body free to move within the outer vessel, and a hollow flexible, extensible, and compressible metallic body attached to the boundary of said opening and to the inner hollow movable body; of a cover for closing the said opening, a connection from the vessel to the burner, an outlet in said connection an inlet valve in the cover and a fluid supply connected with said inlet valve.

4. In apparatus for the compression of gas, or air, for lamps the combination with a burner, a vessel, or chamber, of metal arranged above the burner, and having an opening formed in its upper end, an inner hollow body free to move within the outer vessel,

and a hollow flexible extensible and compressible metallic body attached to the boundary of said opening and to the inner hollow movable body; of a cover for closing the opening a connection from the interior of the flexible metallic body to the burner, an outlet valve in said connection, an inlet valve in the cover and a fluid supply connected with the said inlet valve; substantially as and for the purpose specified.

5. In apparatus for the compression of gas or air for lamps, the combination with a burner, a vessel or chamber of metal, arranged above the burner and having an opening formed in its upper end, an inner hollow body free to move within the outer vessel, and a hollow flexible extensible and compressible metallic body attached to the boundary of said opening and to the inner hollow movable body, of a cover for closing the opening, inlet and outlet valves connected to said cover and to the burner, a rod attached to the top of the inner chamber capable of reciprocating movement through the cover, a spring having one end connected to said rod and a supporting rod connected to the other end thereof, substantially as and for the purposes specified.

6. In apparatus for the compression of gas, or air, for lamps the combination with a burner a vessel or chamber of metal, arranged above the burner and having an opening formed in its upper end, and a hollow flexible extensible and compressible metallic body attached to the boundary of said opening and to the inner hollow movable body; of a cover for closing the said opening, inlet and outlet valves on said cover, a connection from said outlet valve to the burner, a rod attached to the top of the inner chamber capable of reciprocating movement through the cover a supporting rod, a spring having one end connected to said supporting rod and its other end connected with the reciprocating rod; and a cylindrical slide valve attached to the outer vessel, or chamber, provided with ports which are open to the atmosphere at each end of its stroke; substantially as and for the purposes specified.

7. In apparatus for the compression of gas, or air, for lamps the combination with a burner, a vessel or chamber of metal, arranged above the burner and having an opening formed in its upper end, and a hollow flexible extensible and compressible metallic body attached to the boundary of said opening and to the inner hollow movable body; of a cover for closing the said inlet and outlet valves in said cover, a connection from the outlet valve to the burner, a rod attached to the top of the inner chamber capable of reciprocating movement through the cover a spring to which the rod is suspended, a sup-

port for the spring; a cylindrical slide valve  
attached to the outer vessel, or chamber pro-  
vided with ports which are open to the at-  
mosphere at each end of its stroke and an  
5 arm mounted upon the reciprocating rod  
and extending above the slide valve *m* sub-  
stantially as and for the purposes specified.

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

WILLIAM HOWARD CHIPPERFIELD.

Witnesses:

JAMES G. STOKES,  
H. D. JAMESON.