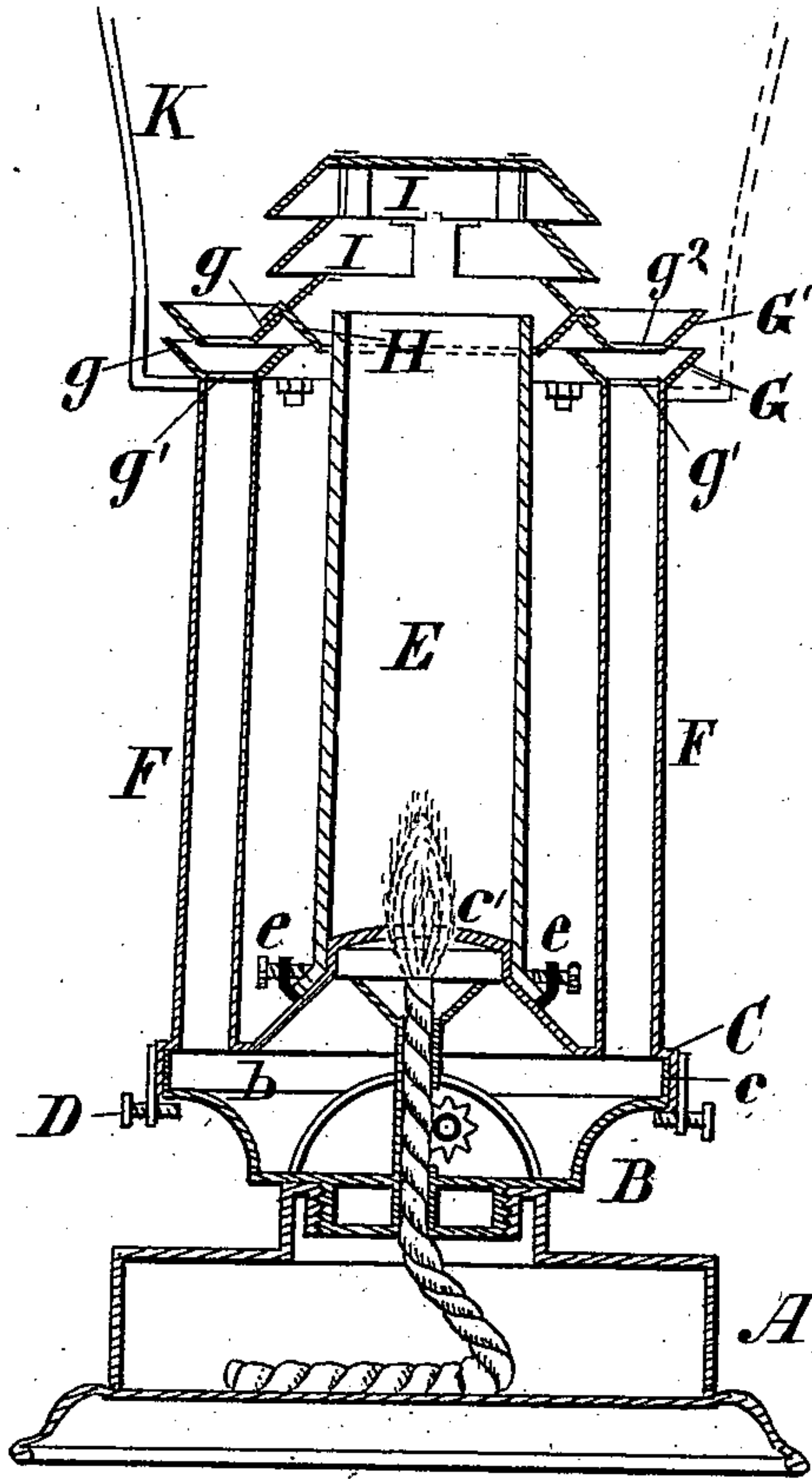


J. H. IRWIN.  
Lantern.

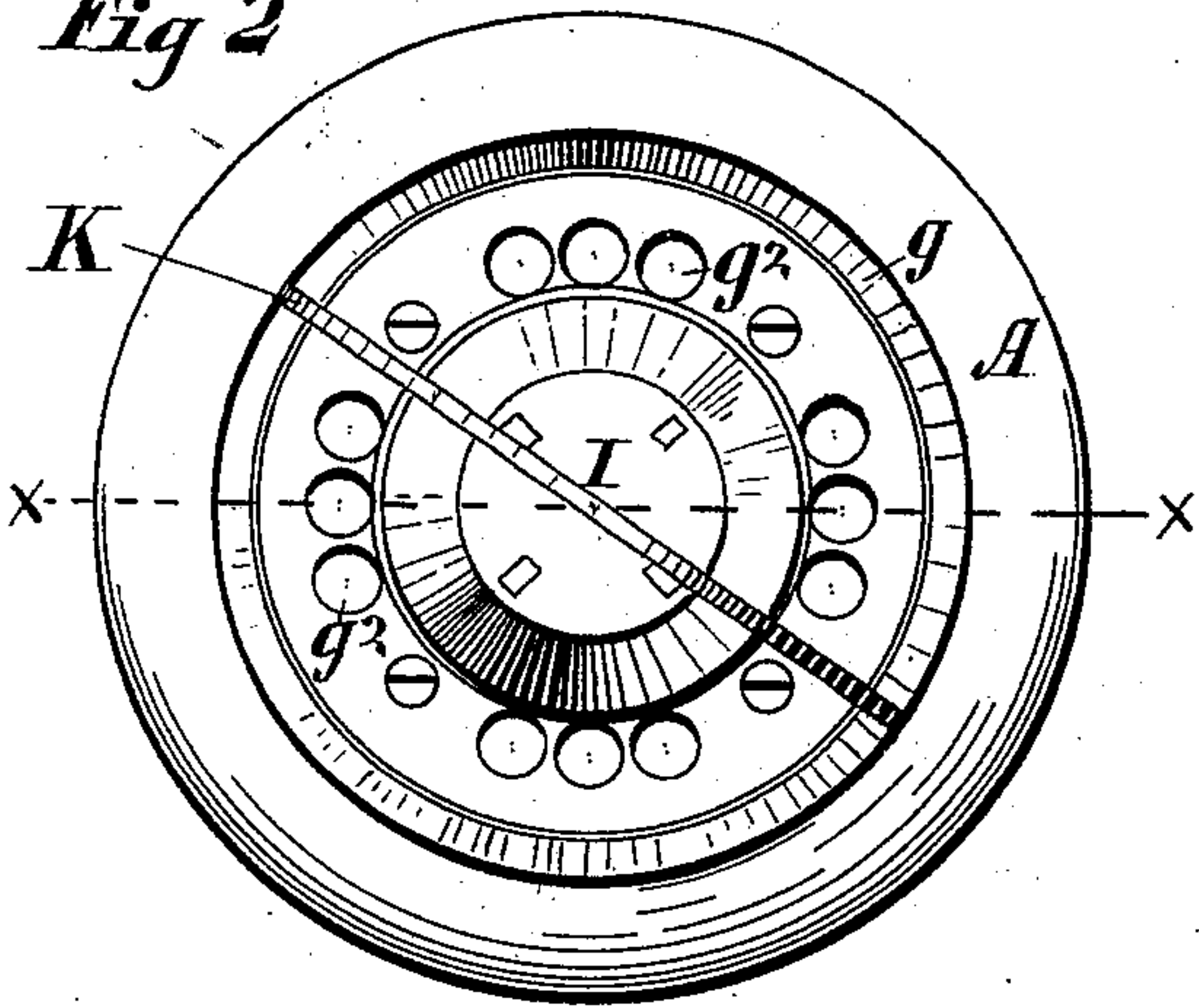
No. 209,051.

Patented Oct. 15, 1878.

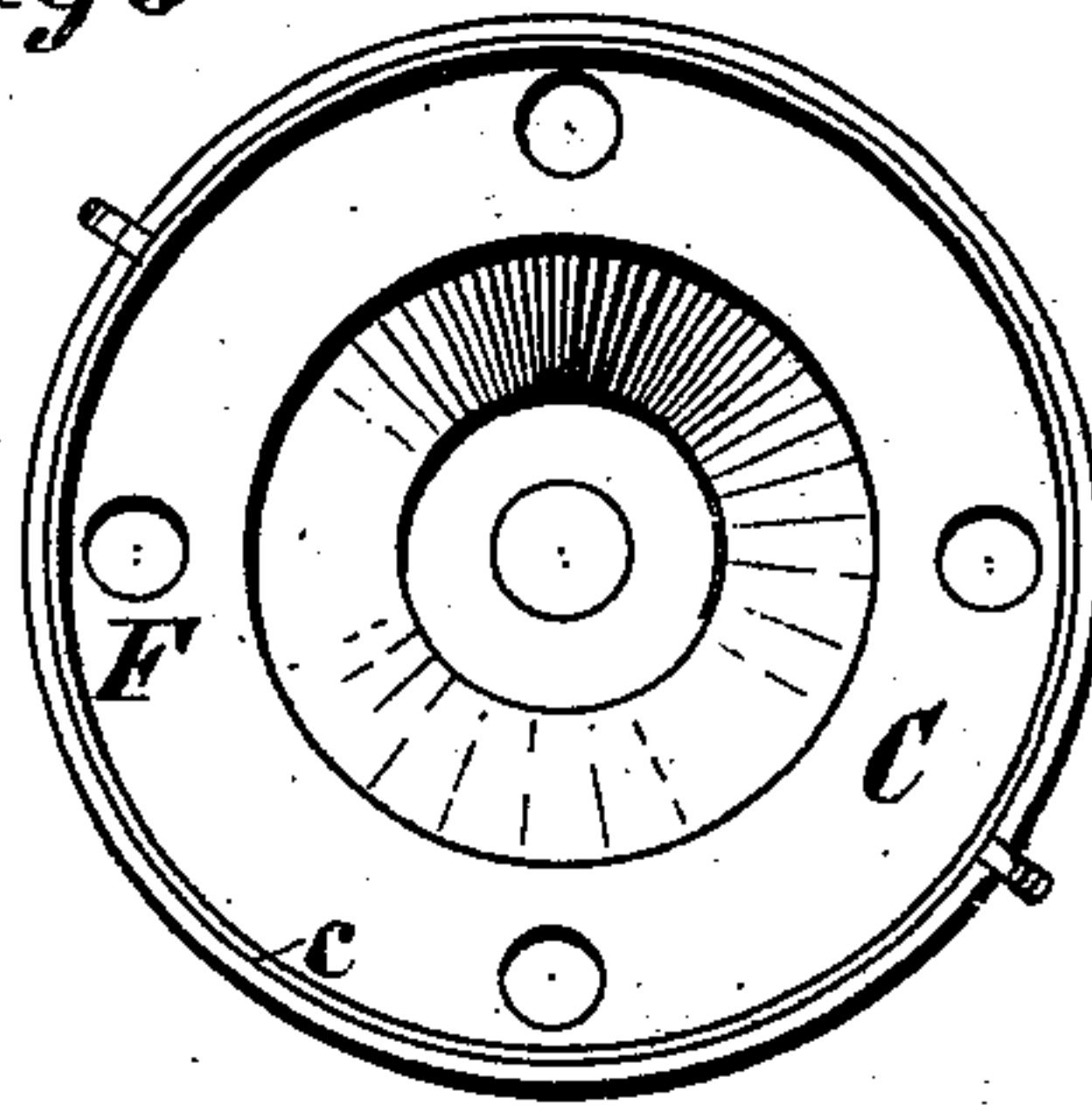


*Fig 1*

*Fig 2*



*Fig 3*



Witnesses

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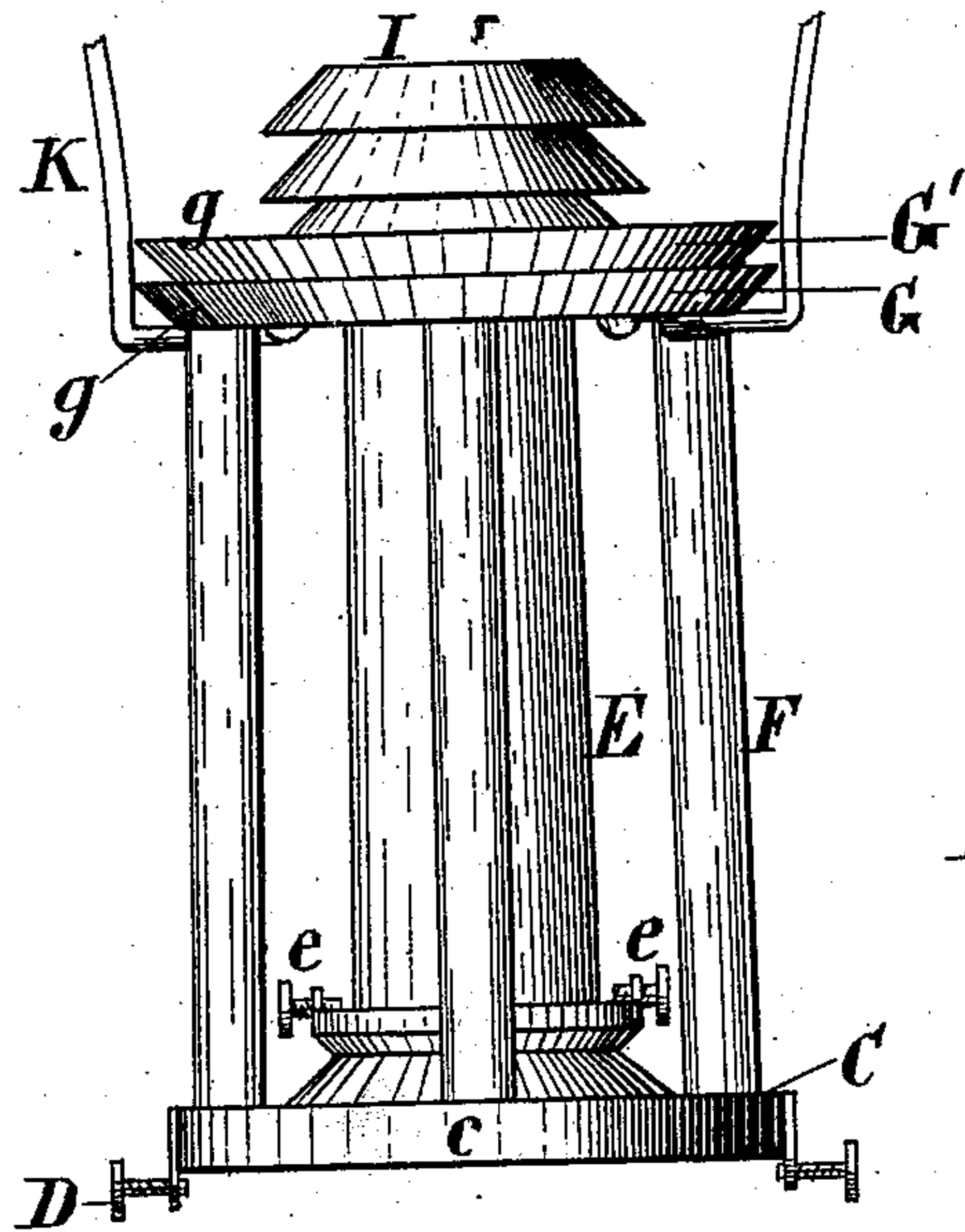
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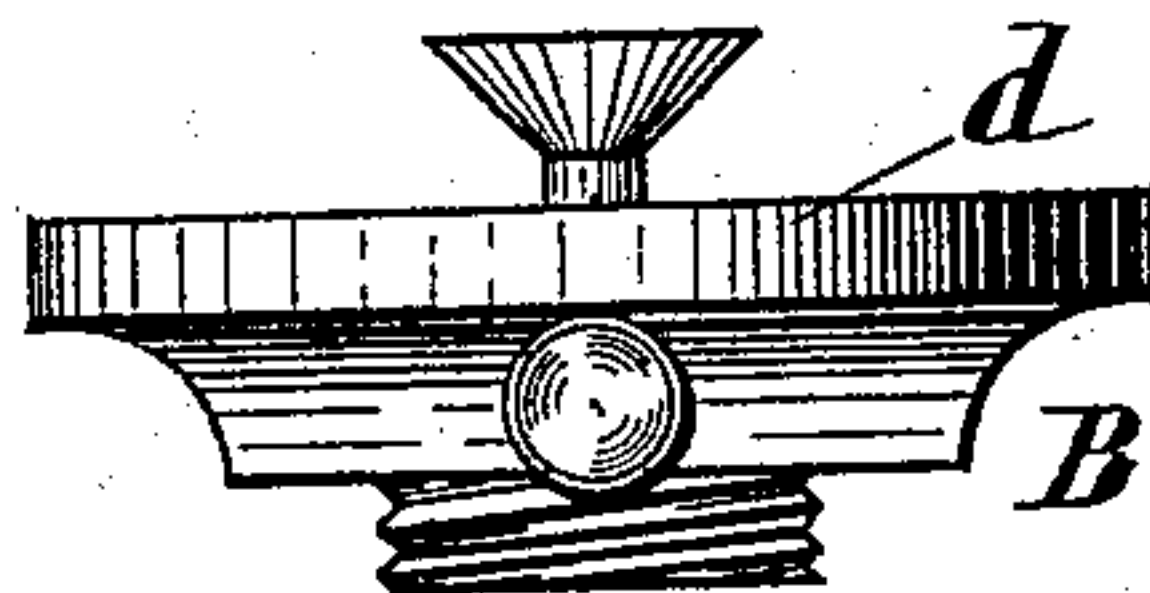
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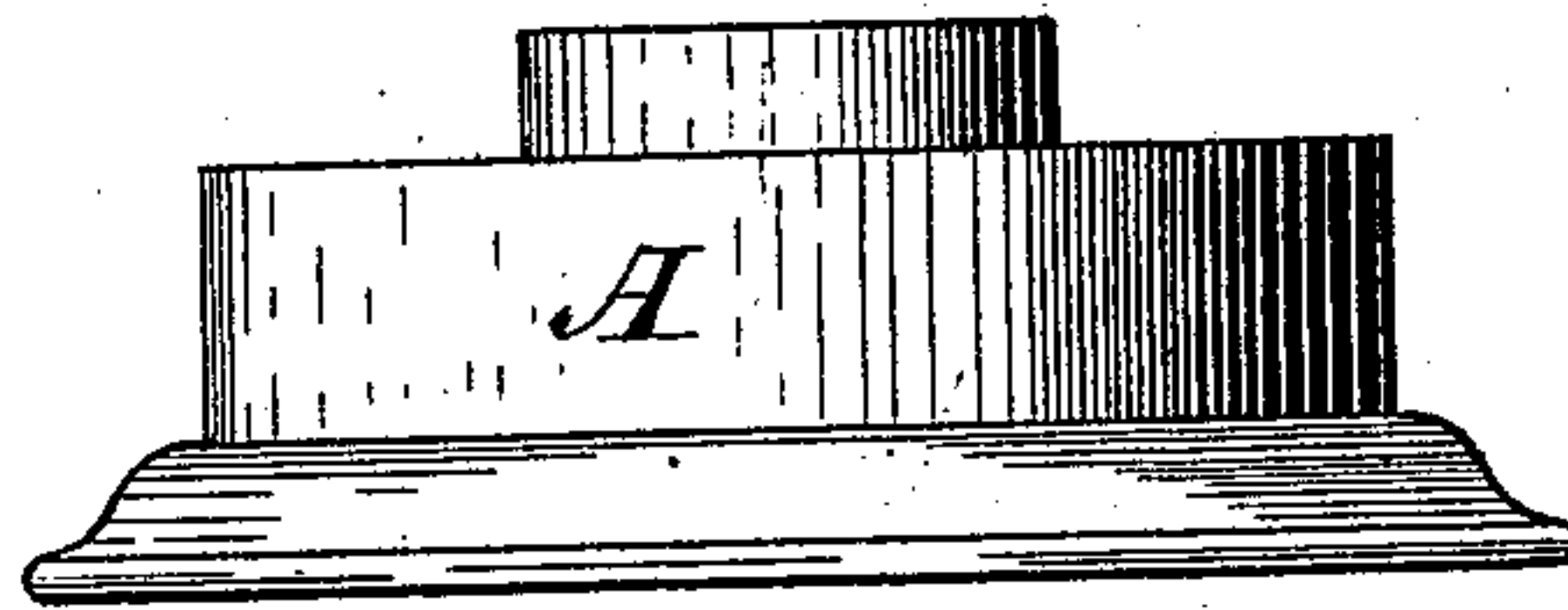
Patented Oct. 15, 1878.



*Fig 4*



*Fig 5*



*Fig 6*

Witnesses

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# UNITED STATES PATENT OFFICE.

JOHN H. IRWIN, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN LANTERNS.

Specification forming part of Letters Patent No. 209,051, dated October 15, 1878; application filed May 11, 1878.

*To all whom it may concern:*

Be it known that I, JOHN H. IRWIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Lanterns, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section of a lantern embodying my improvements, taken on the line *x x*, Fig. 2; Fig. 2, a plan view of the same; Fig. 3, a bottom view of the tubular section of the lantern; and Figs. 4, 5, and 6, elevations, respectively, of the tubular section, burner-section, and oil-pot or bottom composing the lantern, but disconnected from each other.

My invention relates to that class of lanterns known as "tubular," and has for its object the improvement of the lantern in various features of construction, more especially, however, in the method of combining with the tubular form my improved atmospheric injector and ejector.

The invention consists in the special construction of the injector, and the combination therewith of the conducting air-tubes.

It also consists in the special combination of the injector, conducting-tubes, and ejector.

It also consists in the construction of the lantern with an independent tubular section, burner, and bottom, all detachable from each other.

In the drawings, A represents the oil-pot or bottom of the lantern, and B the burner, which is attached to the bottom by a screw-connection in a well-known way. The burner is surrounded by a flaring cup or bent disk, *b*, the edge of which is perpendicular, as shown in Fig. 1 of the drawings. A cap or cover, C, is fitted to the upper portion of this cup, the straight turned-down edge *c* of which fits over the upturned edge of the cup, in which position it is fastened by set-screws D, or any other suitable device which will permit the cap to be detached from the burner whenever desired.

The central portion of the cap is raised to form a dome, *c'*, for the upper end of the wick-tube, and the dome is perforated at its center to provide a flame-aperture and for the es-

cape of heated gases. The dome is surmounted by a chimney, E, which is fastened thereto by screws *e*, or any other device which will render the chimney detachable.

It will be seen that the disk or cup around the burner and cap or cover C together make a chamber around the burner.

A series of air-tubes, F, are attached at their lower ends to the cap C, which is perforated, so that the tubes open into the chamber below the cap. These tubes extend upward outside of the chimney, and are surmounted by an atmospheric injector. As shown in the drawings, this injector consists of two annular plates, G G', with both the inner and outer edges *g* turned upward in a flaring position, as shown in Fig. 1 of the drawings, the plates being arranged one above the other. The upper ends of the air-tubes F are inserted in the bottom or horizontal portion of the lower plate, G, which is provided with apertures *g*<sup>1</sup> to receive them. The upper plate, G', is provided with a series of apertures, *g*<sup>2</sup>, arranged as shown in Fig. 2 of the drawings, three together, immediately above the tube-openings in the plate below. These openings *g*<sup>2</sup> are not necessarily three in number, but may be one or more, as is found necessary for the successful operation of the devices.

The tubes and injector-plates are arranged with reference to the chimney, so that the top of the latter extends up about even with the top of the injector, and is held within a plate, H, inclined outward or flaring, and attached to the inner upturned edge, *g*, of the injector-plate G'. This plate is not fitted closely to the chimney; but the aperture therein is somewhat larger than the latter, so as to permit the chimney to be removed by being slipped up off from the dome and then pulled outward at its lower end and withdrawn.

The inner turned edge, *g*, of the upper injector-plate G', is extended upward above the outer edge, as shown in Fig. 1 of the drawings, and is surmounted by ejector-plates I, constituting an ejector similar to that shown and described in Letters Patent No. 173,958, granted to me February 22, 1876.

The ejector is arranged immediately above the upper end of the chimney, and the plates composing it are of considerably less diameter



than the plates of the injector below—in fact, are not much larger than the chimney. These injector and ejector plates are all fastened firmly together, and the air-tubes F are rigidly secured respectively to the injector-plate G and the cap C. A bail, K, is attached to the injector, by means of which the lantern is carried.

By the action of the deflecting-plates of the injector the air will be driven down upon the bottom of the plate G, which it will follow around, entering the open ends of the tubes C, down which it will pass to the chamber around the burner to feed the flame, the circulation being thence upward through the chimney, from the upper end of which the hot gaseous products of combustion will be continuously discharged by the operation of the ejector I. If the bottom of the upper plate, G', were entire when exposed to strong currents of air, the flow past the upper openings of the tubes C would sometimes be so strong as to reverse the direction of the current and produce a discharge up through the tubes and extinguish the light. The apertures in the plate G' immediately above the tubes are for the purpose of preventing this action. The surplus air escapes upward through these apertures instead of passing around below the plate, and at the same time a constant supply is carried down the tubes into the burner-chamber.

I do not limit myself to the precise number of deflecting-plates here shown and described, though I have found this number sufficient to produce satisfactory practical results, and, of course, the number of injector-plates cannot be diminished.

The interior deflecting-plate, H, turns an upward current of air outward into the injector, and also prevents both the passage of air up outside of the chimney, so as to enter it at the top, which would extinguish the light, and the escape of the products of combustion outward directly from the top of the chimney, where it would become mixed with the fresh-air supply entering the tubes, this latter operation being also assisted by the upward extension of the inner edge of the plate G'.

This construction and arrangement of an atmospheric injector and ejector, applied as described to a lantern constructed upon the tubular principle, is very simple and cheap, and I have found the results to be very satisfactory in the way of producing a constant

supply of air to the burner and a circulation always in the same direction, so that there is no danger of extinguishing the light.

It is desirable to provide several conducting-tubes. I have shown four in the drawings arranged in a rectangular position; but this is a merely arbitrary selection, as the number may be increased, if desired, though I have found four sufficient for practical purposes.

It will be seen that the lantern really consists of three independent and detachable sections, the bottom or oil-pot, the burner, and the tubular section, including the chimney and injector and ejector, all of which may be disconnected from each other, as illustrated by Figs. 4, 5, and 6 of the drawings.

This construction is very advantageous, as it permits each part to be readily reached for repairs, and also enables one section to be replaced when worn by a new one without disturbing the others. The ready detachment of the chimney from the upper section is also an advantage in the same direction.

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

1. In a tubular lantern, the injector-plates G G', bent as described, and the upper one provided with apertures  $g^2$ , in combination with the tubes F and an air-chamber around the burner, substantially as described.

2. The injector composed of the plates G G', in combination with the tubes F, air-chamber around the burner, chimney E, and ejector I, all constructed and operating substantially as described.

3. The interior flaring-plate H, in combination with the feed-tubes and burner and injector-plate G', substantially as described.

4. The cap or disk b, surrounding the burner, in combination with a detachable cap or cover, C, and air-tubes F, attached to the cap, substantially as described.

5. In a tubular lantern, the bottom or oil-pot, in combination with a burner and air-supply tubes and globe, all independent of each other, and connected together by devices which permit them to be detached from each other, substantially as described.

JOHN H. IRWIN.

Witnesses:

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