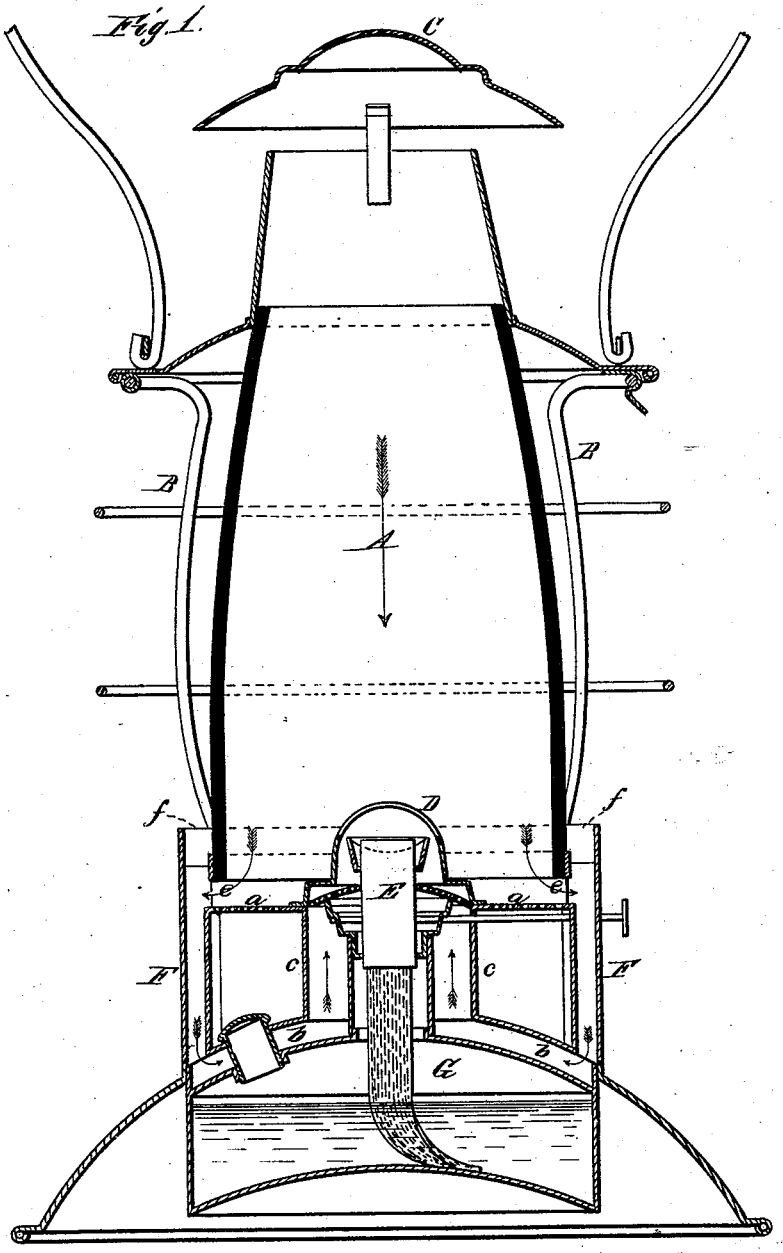
2 Sheets—Sheet .1

A. W. PAULL.
Lantern.

No. 206,478. **Patented July 30, 1878.**

Fig. 1.



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Inventor:
By Worth Osgood,
Attorney.

2 Sheets—Sheet 2.

A. W. PAULL.
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Fig. 2.

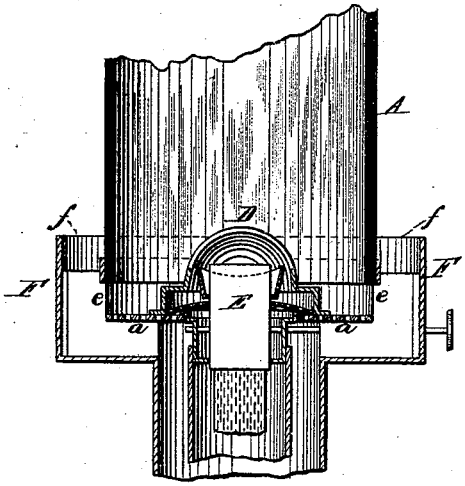


Fig. 3.

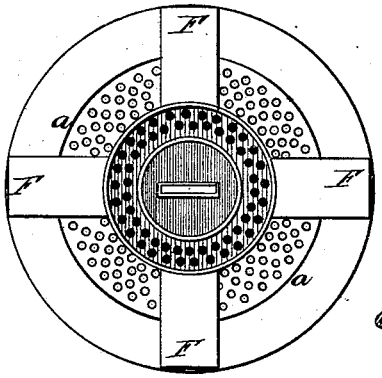


Fig. 4.

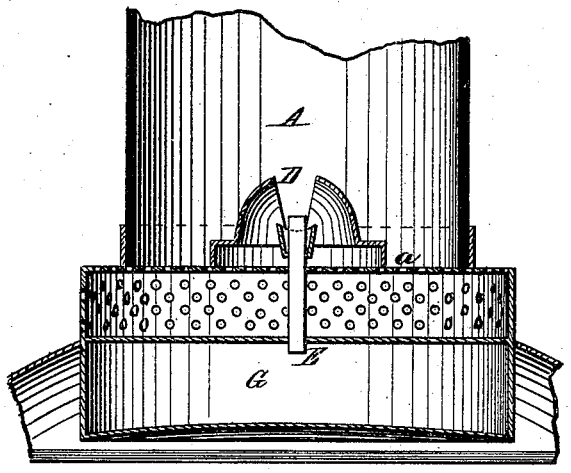
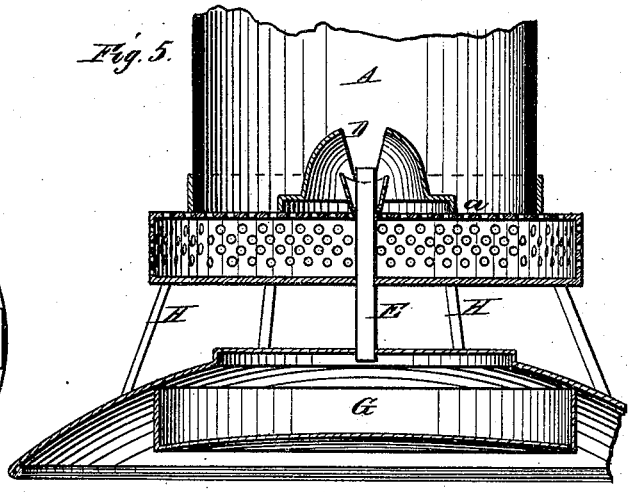


Fig. 5.



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UNITED STATES PATENT OFFICE

ARCHIBALD W. PAULL, OF WHEELING, WEST VIRGINIA.

IMPROVEMENT IN LANTERNS.

Specification forming part of Letters Patent No. **206,478**, dated July 30, 1878; application filed July 1, 1878.

To all whom it may concern:

Be it known that I, ARCHIBALD W. PAULL, of Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Lanterns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is an axial section of a hand-lantern embodying the several features of my invention, and adapted to operate in accordance with the principles thereof. Fig. 2 is an axial section of so much of a lantern as is necessary, showing a modified arrangement of the tubes illustrated in Fig. 1; and Fig. 3 is a plan view of the lower side of the chimney-base shown in Fig. 2. Fig. 4 is an axial section of so much of a lantern as is necessary, showing a further modified arrangement of the several air-channels, wherein the openings are made directly into a chamber beneath the cone; and Fig. 5 illustrates a device similar to that of Fig. 4, except in the relative distance between the air-chamber and the reservoir for the oil.

The principles of operation of the several devices shown are precisely similar, and like letters in all the figures indicate corresponding parts.

The construction, operation, and utility of the "tubular lanterns" are well known, and for the purposes of this description need not be herein particularly pointed out. It will be sufficient to mention that they, by a counterbalance of the several air-currents created by swinging, jarring, and otherwise using the lantern, effect a steady and uniform flame not heretofore attainable without the use of the tubes. These tubes have heretofore been made to receive air at a point in the region of the top of the globe, and from this point to conduct air down to an air-chamber beneath the burner. In this position the tubes must intercept some of the light from the flame, and they add materially to the expense of manufacture, as well as detract from the symmetrical appearance of the lamps.

The object of my invention is therefore to dispense with these tubes, and to produce a lantern without them which will stand all the tests and answer all the purposes of the aforementioned class of devices.

To accomplish this the invention consists in certain peculiarities of construction and arrangements of parts, as will be hereinafter first fully described, and then pointed out in the claims.

A is the globe or chimney of the lantern, having the guard-wires B, if necessary, and the dome C. D is the cone, extending up above the wick-tube E, and intended to protect the flame in a manner well understood. The space within the globe and around this dome or cone is denominated the "flame-chamber," to which there should always be an admission of fresh air to support the flame. In Fig. 1, fresh air is supplied to the flame-chamber through the foraminated plate *a*, the tubes F, of which there may be any desired number, being separated, so as to admit the air.

The air-chamber *b*, located above oil-reservoir G, is surrounded by a cylinder, *c*, which joins the said air-chamber with the cone D. This air-chamber receives fresh air through the tubes F, and these latter are open, as at *f*, a point, as will be observed, very near the base of the chimney. The tubes F also have an opening at *e*, leading into the flame-chamber, and, under certain circumstances, admitting an increased volume of air to said chamber, or affording a more free egress for air therefrom, as will hereinafter appear.

Under ordinary circumstances, when the lantern is burning and stationary, and the draft uniformly quiet and steady, the requisite amount of air will be supplied through the foraminated plate *a*, supplemented, if necessary, by an additional supply through the openings *e f*, according to the state of the flame. This foraminated plate *a* (located at and closing the mouth of the globe) operates to prevent the too sudden flow of air-currents either from or into the globe, and, in the event of an extreme pressure in either direction, becomes, for all practical purposes, a barrier to the passage of said currents, forcing them to take the directions as indicated through the various channels, intended to cause them to flow in such manner as will produce the counterbalancing effects.

Whenever the lamp is suddenly elevated, a portion of the air within the flame-chamber tends to descend through the open slot in the cone, and unless this current be counterbalanced a flickering of the flame or its complete extinguishment results. The air which is admitted through tubes F to chamber *b* passes up under the cone, and meets and counteracts or counterbalances the aforementioned descending current, thus rendering the flame steady. A surplus of air will find its way out of the flame-chamber through the openings *e f;* and in order that the operation of the lamp may be perfect under all circumstances, these openings should be so proportioned, with respect to each other and to the several air-passages, as to admit the passage in either direction of a quantity of air sufficient to balance the current in the reverse direction.

Probably the severest test which can be applied to the lantern is to allow it to drop suddenly and then instantly arrest its motion. This affords an instantaneous reversal of the several air-currents which can in any way affect the flame. Under this test the currents take the direction indicated by the arrows in Fig. 1, a portion of the volume of the air finding its way out through openings *e f*, as well as through plate *a*, and that portion, tending downwardly through the flame-slot, is counterbalanced by the upward tendency of the current from the air-chamber *b*.

In order to prevent heating of the oil in the reservoir G it is preferred to elevate the burner somewhat, as in Fig. 1; but the same objects and purposes, so far as the flame is concerned, may be attained by turning the tubes F directly under plate *a*, or directly under the globe, as indicated in Figs. 2 and 3.

Instead of employing a number of separate tubes, as F, the invention also contemplates the union of them into one chamber, as in Fig. 4, extending this beneath the entire globe, and perforating it, so as to afford a like free movement for the several air-currents, as in the other figures.

In Fig. 5 this extended air-chamber is shown as supported a distance above the oil-cup upon the standards H H.

Experience and practical tests demonstrate that when the lantern is constructed in accordance with the foregoing description it answers all the purposes of the tubular lantern, or of such lanterns as require the use of two globes or chimneys, and affords a more steady flame than either, as well as one practically more difficult to extinguish. The location of the conduits for the counterbalancing currents of air entirely below the line of the flame makes the construction of the lantern much more simple and less expensive, and in many other respects preferable to the ordinary tubular form or to the double-globe form.

The cone D is closed at its sides, or its walls are imperforate, so that the flame-chamber is divided from the space beneath the cone except through the passage afforded by the flame-slot, and the arrangement of the parts of the base of the lantern is such as to deflect the vertical currents of air descending in close proximity to the exterior of the chimney into the air-chamber beneath the cone, and thence up through said cone, whereby the desired counterbalancing effects are produced.

As before intimated, I am fully aware of many forms of lanterns receiving either heated or cold air at points above the top of the chimney, and conducting it downwardly through tubes exterior to the flame-guard, and into a chamber or channel beneath the burner.

I am also aware of the fact that in the older styles of lanterns these tubes have been omitted, but no provision made for counterbalancing the different currents of air within the flame-guard—as, for instance, in the patent of Haynes, of March 18, 1873, wherein the cone is open at the sides, and wherein the exterior air is deflected by a ring or flange applied beneath the chimney. Under such construction, air leaving the flame-chamber at the base would draw with it in the same direction the air from beneath the cone, whereas under my improvements any current of air leaving the flame-chamber at the base must be counteracted in its effects upon the flame by a current up through the cone in precisely the reverse direction, and thus the flame is not exposed to the action of a single current in any one direction.

The construction shown in the reissued patent to Sargent, of January 23, 1866, involves the use of the double globes hereinbefore alluded to, wherein the interception of light by the objectionable tubes is obviated, but an equivalent expense in manufacture incurred.

I desire, further, to acknowledge that the interception of light by the air-tubes has been obviated and the cost of construction reduced by making these tubes of glass and as a part of the globe.

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

1. In a lantern having a single globe wherein the descending and ascending currents are counterbalanced by reverse currents from or toward the exterior, the combination, with said globe and its foraminated bottom, of air ducts or channels receiving fresh air from a point at or near the base of the globe and conducting the same to the under side of the close-walled burner-cone, and having also a communication with the space exterior to said cone and within the globe, for the purposes and objects named.

2. In a lantern having a single globe provided with a foraminated bottom, the combination, with such globe, of an air-chamber provided with ducts or channels arranged, substantially as shown, so as to receive or arrest air from the exterior of the globe and at a point at or near the base thereof, directing this air beneath the base of the burner-cone,

said ducts or channels communicating also with the flame-chamber exterior to the cone, the whole being arranged so that air may be admitted to this flame-chamber either from the air-chamber or from without the lantern, and so that the currents within the globe must be counterbalanced by reverse currents passing through the burner-cone, in the manner and for the purposes set forth.

3. In a lantern having a single globe provided with a foraminated bottom, the combination, with said globe, of an air-chamber receiving air from the exterior of such globe at or near the base thereof, which air is directed beneath the base of the burner-cone, said air-chamber also having a communication with the interior of the globe or flame-chamber beneath the base thereof and exterior to the cone, the inlets to the flame-chamber and to the air-chamber being relatively located and proportioned, substantially as explained, so that the currents which pass down through the cone must be crossed and intercepted or otherwise counterbalanced by those which pass down outside the cone and by others forced in from the lantern, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

ARCHIBALD W. PAULL.

Witnesses:

WORTH OSGOOD,

SAML. C. MILLS.