A. H. AIKMAN & G. K. OSBORN.

Lamp.

No. 221,263. **Patented Nov. 4, 1879.**

Fig. 2

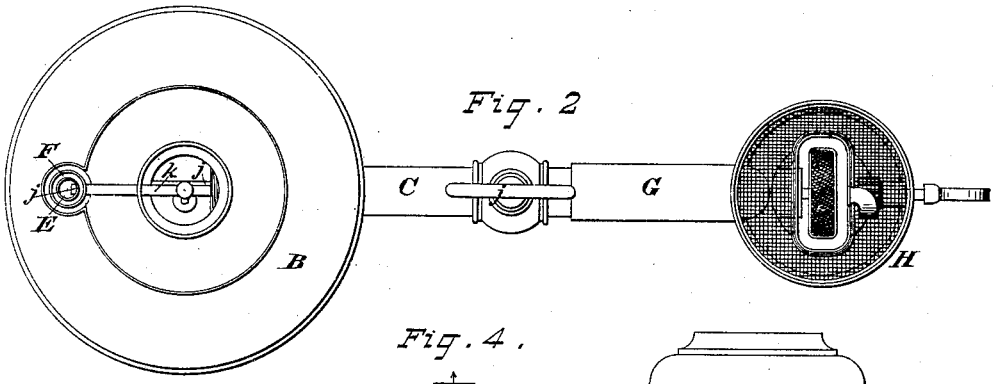


Fig. 4.

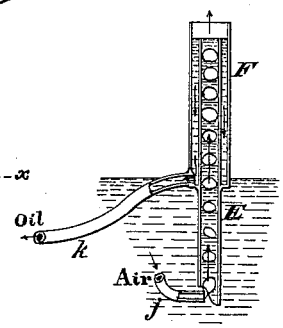


Fig. 3.

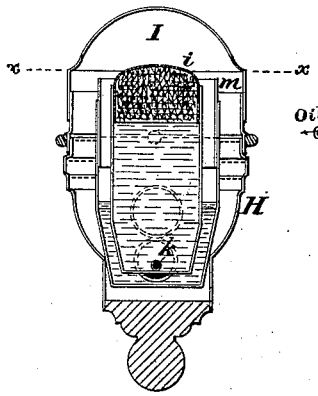
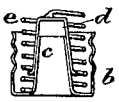


Fig. 5.



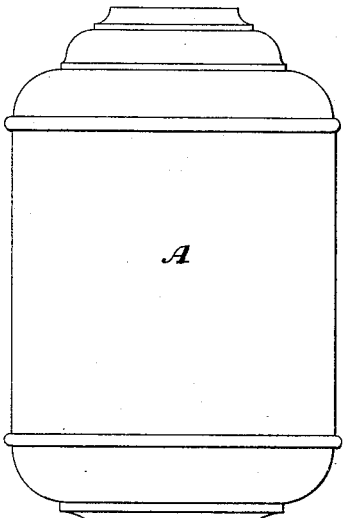
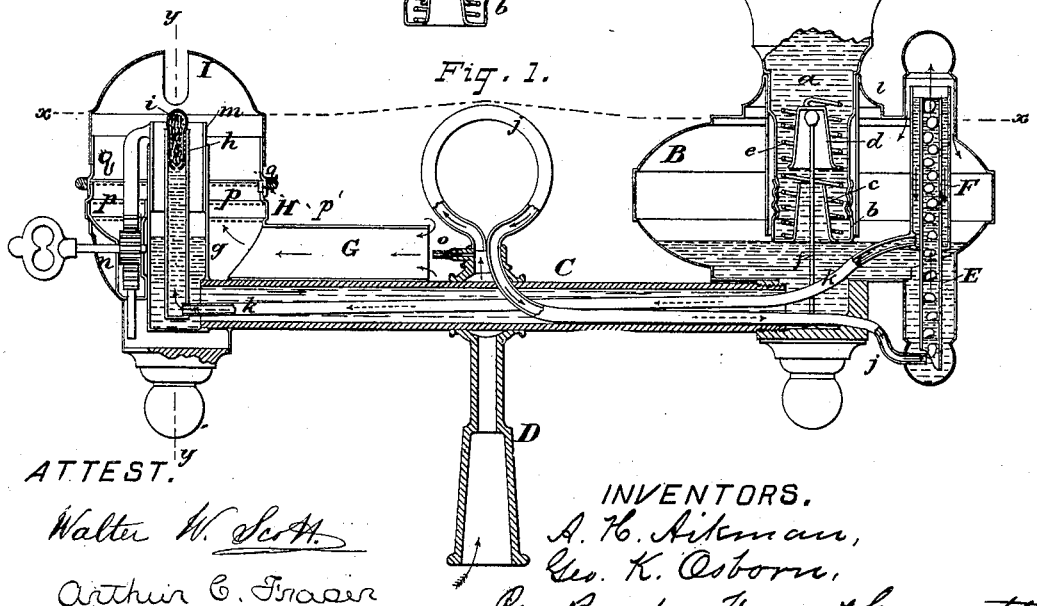


Fig. 1.



ATTEST.

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AUGUSTUS H. AIKMAN AND GEORGE K. OSBORN, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN LAMPS.

Specification forming part of Letters Patent No. **221,263**, dated November 4, 1879; application filed December 6, 1878.

To all whom it may concern:

Be it known that we, AUGUSTUS H. AIKMAN and GEORGE K. OSBORN, both of Brooklyn, in the county of Kings and State of New York, have jointly invented certain Improvements in Hydrocarbon-Lamps, of which the following is a specification.

This invention relates to a lamp for burning liquid hydrocarbons, in which an impelled current of air is used to lift the liquid from its normal level in the holder to, or nearly to, the burning-point, and another impelled current is used to supply the flame with oxygen, whereby a chimney is avoided.

The novel features of the invention will be more definitely set forth in the following description and claims.

In the drawings, Figure 1 is a vertical mid-section of a lamp provided with our improvements. Fig. 2 is a horizontal section of the same, taken on line *x x*, Fig. 1. Fig. 3 is a vertical mid-section of the burner, taken in a plane at right angles to the plane of Fig. 1. Fig. 4 is an illustrative sectional view, showing the oil-raising mechanism detached. Fig. 5 is a detached sectional view of the fount-valve.

The form of lamp chosen to illustrate our invention is that in which a horizontal oil-tube connects the reservoir or fount and fount-holder with the burner, and the point of support is between the two.

The invention is, however, equally well adapted to chandeliers with two or more lights, and indeed to almost any style of burner or lamp.

A is the fount or oil-reservoir, arranged in an inverted position, with its neck *a* inserted in the fount-holder or supply-chamber B. The neck of the reservoir is screw-threaded at its extremity to receive a removable cap, *b*, which bears the valve or closing device. This valve consists, primarily, of a tube, *c*, attached to or forming a part of the cap *b*, and on or over this rests a thimble-cap, *d*, which is held down by a spring, *e*. The tube and cap *c d* may be slightly conical, although this is not absolutely essential, nor is it essential that the two fit closely, one on the other, as the thimble will, in any case, form a seal and prevent the escape of oil from the fount, except when lifted entirely above the tube, as in Fig. 1. When the fount is in place in the holder B the thimble *d* is lifted by a stem, *f*, fixed rigidly upright in the latter, as shown.

The cap *b* is made readily removable by some means, a screw attachment, as shown, being, perhaps, preferable; but it might be provided with a catch or a "bayonet-fastening," so called; or it might simply be held on by frictional contact. The lower face of the cap *b* governs the level of the oil in the chamber B.

C is a tube which connects the fount-holder with the burner-shell, or a tube, *g*, fixed into the same to receive the burner-tube *h*.

It will be seen that the oil finds the same level in *g* that it has in B.

In or on the upper extremity of the burner-tube *h* is fixed a porous burner-tip, *i*. We prefer to make this tip by shaping a piece of wire-gauze over a former, so that it will have the proper contour for a tip or wick, and then stuffing the receptacle thus formed with fibrous glass of very fine texture. This forms a very refractory porous tip, through which the liquid to be burned may be forced. Other forms of porous refractory tips may be used with this lamp; but this one is especially adapted to it.

It will be seen that it is necessary to lift the liquid to be burned from the normal oil-level to or above the tip. To do this we prefer to employ a mechanism which will now be described.

D is an air-inlet, which is shown here as a socket to fit any kind of air-pipe. Through this inlet a current of air is received from some suitable air-forcing apparatus or apparatuses connected with the lamp by a pipe or hose.

Any form of air forcing or compressing apparatus may be employed. Therefore none is shown. We generally employ, however, an air-pump driven from the water in the mains or pipes; but in many cases power from such a source will not be attainable.

As two distinct currents of air are employed, one to lift the oil and one to supply oxygen to the flame, two air-forcing apparatuses may be employed, one for each current; or one apparatus may supply the two currents, provided

it has sufficient capacity, and these may spring separately from the apparatus; or one larger current may be divided into two smaller ones at some point between the apparatus and the lamp, as desired.

To some part of the inlet D is attached an air-duct, *j*, which is shown as rising in a loop, so as to be above the oil-level. From thence it extends, preferably inside the pipe C, to the oil-elevating apparatus. This latter, stripped of its surroundings, which are merely ornamental, is clearly shown in Fig. 4, where E is a vertical open-ended pipe or tube, having one end immersed in the oil and the other projecting above the same. The proportion of this pipe that should be submerged is not material; but we prefer that the submerged portion should not be less than the part that projects above.

The mouth of the duct *j* opens just below and opposite the end of the tube E, as shown in the figures, and the wall of the tube may project downward, so as to be opposite the end of the duct, if found desirable or necessary. As this tube E is open to the oil in the fount-holder B, it is obvious that the oil will stand at the same level in both; but if a current of air be forced through the tube *j* it will rise in the form of bubbles in the tube E, mixing, so to speak, with the oil, and lessening by this admixture the specific gravity of the mass. The column of this lighter compound necessary to balance the column of the heavier oil in the vessel B must of necessity be higher than the latter, and in consequence the mixture of oil and air in the tube rises and overflows its top.

Around the upper part of the tube E is arranged a jacket or overflow-vessel, F. The top of this vessel may rise a little above the top of the tube E.

An oil-duct, *k*, taps the jacket F, and carries oil therefrom to the burner-tube *h*. This entire oil-elevating device may, in some cases, be inclosed entirely within the fount-holder B, as shown. In other cases it may be arranged outside, if more convenient.

Should the vessel F be overflowed, the excess of oil will fall back into the main reservoir to be raised again.

The air from the duct *j* separates from the oil as it overflows the tube E, and eventually escapes from the fount-holder B.

The operation, so far as described, is as follows: The current of air through the inlet D and duct *j* causes the oil to rise in the tube E until it overflows into the vessel F. This head is maintained by the constantly-inflowing current of air, and it causes the oil to rise in the burner-tube *h* and percolate through the pores or interstices of the tip *i*, where it is ignited and burned, the excess, if any exists, passing over into the annular space between the tubes *g h*.

Where a wick or tip is employed which possesses no capillary power, the head in the vessel F should be a little above the burning-point; but should the tip possess some capillary power, as it may, the head may be a little lower down.

When the air-blast is cut off the oil in the burner-tube immediately falls to the normal oil-level, leaving the wick dry.

In addition to the air-current for lifting the oil from the normal oil-level to the burning-point, and in connection therewith, we employ another current to supply the flame with air, whereby a chimney is dispensed with.

To supply an induced current, we provide a jet, *o*, from the inlet D, which opens opposite to a larger tube, G, which taps the burner-shell H beneath gauze diaphragms *p*, arranged across the burner-shell one above another, substantially as indicated. These diaphragms are separated slightly, and serve to divide up as well as break the force of the incoming current of air. The air is thus diffused and prevented from acting injuriously by concentration at one point.

We are aware that a single sheet of perforated metal has been employed to disperse the air in a lamp where the flame is fed by an impelled current; but we find by experiment that the perforations cannot, practically, be made fine enough to properly accomplish the end sought, nor is one diaphragm sufficient. We employ not less than two diaphragms of fine wire-gauze, placed at some distance apart, as shown in Figs. 1 and 3.

To lessen the size of the flame, we employ a slide, *m*, arranged to be raised and lowered by means of a rack and pinion, *n*. This slide possesses some novel features of arrangement over those in use in this, that it stands off from the burner-tube all around, being guided in its play by the inner face of the tube *g*. This construction permits the overflow to pass down inside of the slide, and insures the conduction of such gases or vapors as may arise from the overflow-chamber to the flame, where they are burned.

I is the cone, which possesses some novel features.

As ordinarily constructed, these cones are simply made to lift off or turn back on a hinge, having no means of adjusting them vertically with respect to the burner-tip. Their position with respect to the flame is fixed once for all.

In our improvement the cone is made to slip closely over the rim of the burner-shell in the manner of telescope-tubes, so that its height may be adjusted with respect to the burner-tip. It may also be adjusted by turning round horizontally, so as to arrange the slit with reference to the flat tip in any manner most desirable.

As the cone fits snugly on the rim of the shell, either inside or outside, the friction of contact will be sufficient to hold it in place under all ordinary circumstances; but as it is sometimes desirable to get at the interior of the burner-shell under the cone to prevent the

disarrangement of the latter, we make a segment of the rim of the burner-shell, so that it lifts off with the cone. This section, *q*, fits rather loosely on the shell, and is or may be guided to its proper position and held there by a projection, *p'*, adapted to engage a corresponding notch or recess in the wall of the shell. It is immaterial whether the section *q* be considered as a part of the cone or the burner-shell. In either case it provides for an extensible and adjustable cone which may be readily removed. The section or segment *q* might be hinged to the shell, if desired.

With respect to the device for elevating the oil to the burning-point, as before stated, it need not be situated inside the chamber B. Indeed the tube E might be arranged within the burner-shell; but we prefer to place it at some point away from the flame, so that the escaping air may not interfere with the flame.

One important advantage of raising the oil to a burning-point above the normal level of the oil in the reservoir is, that it avoids the necessity of drip-cups below the reservoir to catch the overflow.

In our construction the overflow simply returns to and mingles with the oil in the reservoir through the pipe or tube C, or other equivalent connection between the burner-shell and the reservoir.

We claim—

1. A lamp or chandelier for burning liquid hydrocarbons in which two impelled currents of air are employed, one to raise the oil from its normal level in the reservoir to, or nearly to, the level of the point of combustion, and one to supply the flame with oxygen to support combustion, substantially as specified.

2. A lamp or chandelier for burning liquid hydrocarbons in which one impelled current or blast of air from an air-forcing apparatus is divided at any desired point between the air-pump and the burner, one current being employed to raise the oil from the normal oil-level in the reservoir to, or nearly to, the level of the point of combustion, and the other being employed to supply the flame with the oxygen necessary to support combustion without a chimney, substantially as shown.

3. In a lamp for burning liquid hydrocarbons, the mechanism or means for supplying oil to the burner, which consists of a tube, E, having its lower extremity immersed in the liquid below its normal level, and arranged to receive air from an impelled jet of the same at its lower end, in combination with an elevated reservoir to receive the overflow from the top of the tube E, substantially as set forth.

4. In a lamp, the tube E, with open ends, its lower extremity immersed in the liquid hydrocarbon below the normal level of same, the air-duct *j*, arranged to emit a jet of compressed air or impelled air beneath or in the end of the tube E, a vessel, F, to receive the overflow of oil from E raised by the air-jet, a pipe or duct, *k*, to convey it to the burner, and a burner-tube, *h*, provided with a wick or tip, *i*, all arranged substantially as set forth.

5. In combination with the lifting mechanism for the oil, substantially as represented, the chamber B, the tube C, the overflow chamber or tube *g*, the burner-tube *h*, arranged within the tube *g*, and the tube or duct *k*, substantially as set forth.

6. The slide *m*, arranged with respect to the burner-tube so as to leave an annular space entirely around the same between the slide and the tip of the burner, substantially as and for the purposes set forth.

7. A lamp or chandelier for burning liquid hydrocarbons, provided with a suitable air-pump or other air-forcing apparatus, and a suitable air pipe or duct leading therefrom to the oil in a reservoir connected with the burner of the lamp, the whole being so arranged that a current of air forced through the said pipe or duct will force or lift the liquid from the normal oil-level in the reservoir to, or nearly to, the level of the burning-point, substantially as set forth.

8. A burner-tip for lamps or chandeliers, consisting of a cup formed from one piece of wire-gauze pressed into the form of a deep concave receptacle and stuffed with glass fiber or other refractory fibrous material, as set forth.

9. The seal for the fount or reservoir A, consisting of the re-entering tube *c* and the cap or thimble *d*, arranged to be held down to its seat or on the tube by a suitable spring, *e*, substantially as set forth.

10. The seal for the fount A, consisting of a removable cap, *b*, to fit the neck of the fount, bearing a cap or thimble, *d*, arranged to close over a tube, *c*, and held down normally by means of a spring, substantially as set forth.

11. A lamp or chandelier for burning liquid hydrocarbons, provided with a reservoir or receptacle for the overflow or drip from the same, an air-pump or other suitable air-forcing apparatus, and suitable air pipes or ducts connecting said apparatus with the drip-reservoir, the whole being arranged in such a manner that an impelled current of air from the said air-forcing apparatus will elevate or lift the said overflow back to, or nearly to, the level of the point of combustion, substantially as set forth.

12. A lamp or chandelier for burning liquid hydrocarbons, provided with a reservoir or receptacle below the burner-tip to receive the overflow or drip from the same, an air-pump or other suitable air-forcing apparatus, and suitable air pipes or ducts connecting said apparatus with the drip-reservoir, the whole being arranged in such a manner that an impelled current of air from the said forcing apparatus will lift the said overflow to a point above the level of the burning-point, substantially as herein set forth.

13. In a lamp or chandelier, a cone, I, made capable of adjustment vertically with respect

to the burner tip or point, and also capable of removal from the burner-shell without disarrangement of the vertical adjustment, substantially as herein set forth.

14. The combination of the cone I, the section *q*, and the burner-shell M, arranged to operate substantially as set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

AUGUSTUS H. AIKMAN.
GEORGE K. OSBORN.

Witnesses:
HENRY CONNETT,
ARTHUR C. FRASER.