3 Sheets--Sheet 1.

L. J. MARCY.

Lime-Light Apparatus for Magic-Lanterns.

No. 163,087. Patented May 11, 1875.

Fig. 1

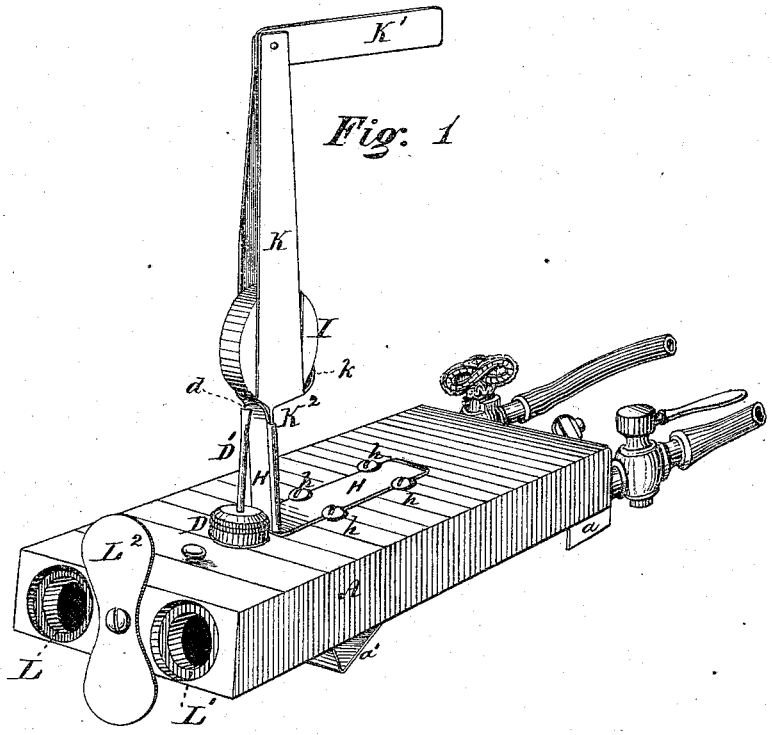


Fig. 3

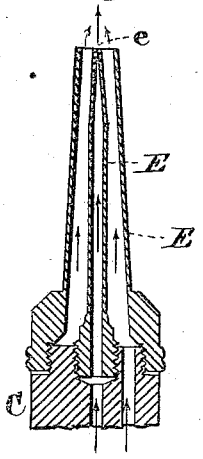


Fig. 2

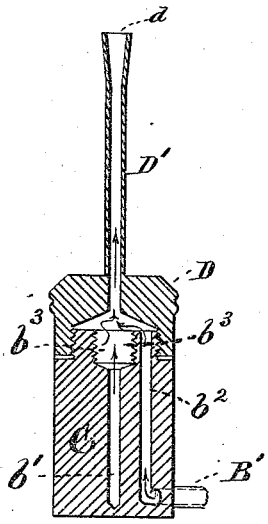


Fig. 4

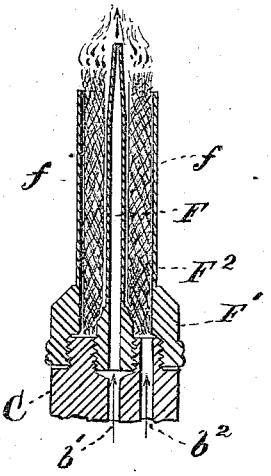
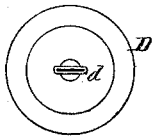


Fig. 5



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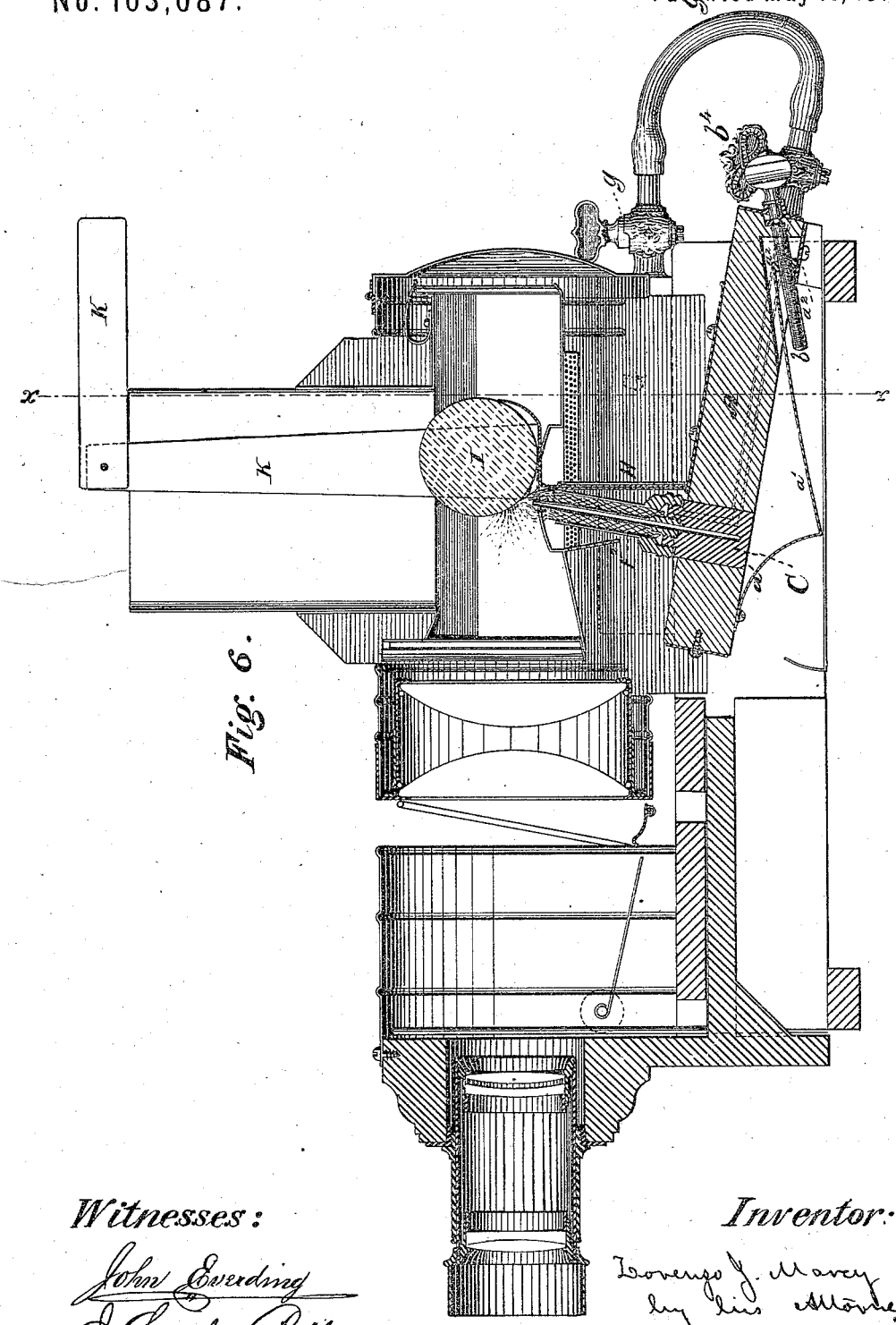

Fig. 6.

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3 Sheets--Sheet 3.

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Fig. 7.

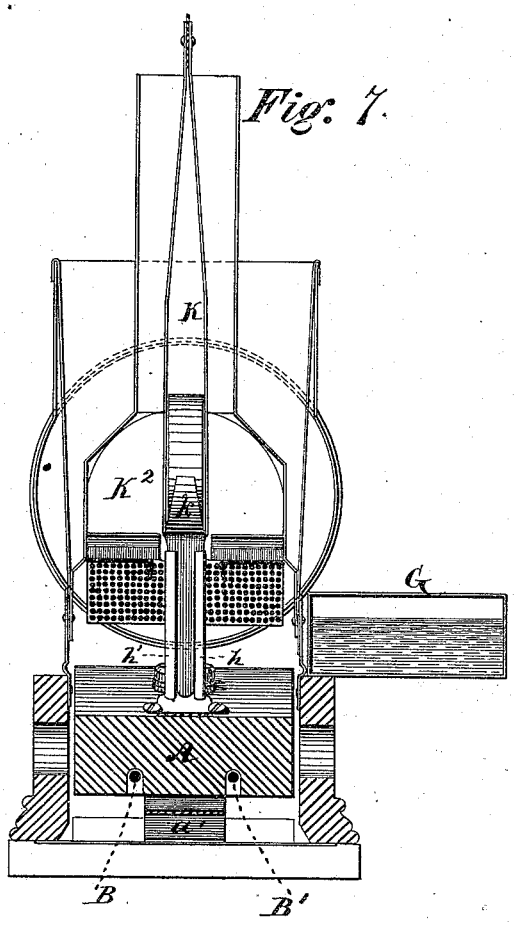
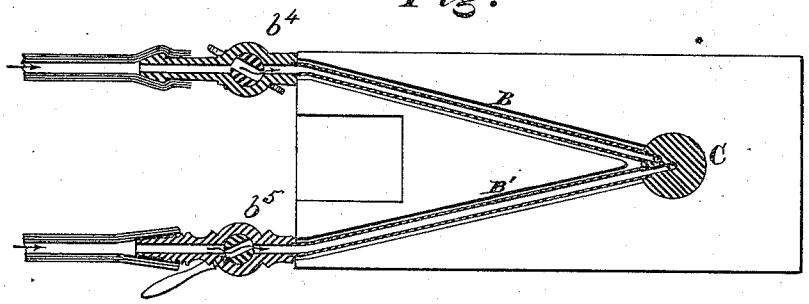


Fig. 8.



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UNITED STATES PATENT OFFICE

LORENZO J. MARCY, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN LIME-LIGHT APPARATUS FOR MAGIC LANTERNS.

Specification forming part of Letters Patent No. **163,087**, dated May 11, 1875; application filed June 6, 1874.

To all whom it may concern:

Be it known that I, LORENZO JAMES MARCY, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Lime-Light Apparatus for Magic Lanterns, &c., of which the following is a specification:

The object of my invention is to provide cheap, simple, safe, and efficient means for the production of the lime or "Drummond" light, my improvements being especially designed for application to magic lanterns or "sciopticons," but adaptable likewise to other uses.

My invention relates more especially to devices for removing, replacing, and adjusting the burners and lime apparatus, whereby I am enabled to adapt my improvements to an oil-burning magic lantern without altering the construction of the lantern proper, or of any of its parts.

The subject-matter claimed is hereinafter specified.

In the accompanying drawings, Figure 1 is a view in perspective of so much of a lime-light apparatus embodying my improvements as is necessary to illustrate the subject-matter claimed; Fig. 2, a vertical central section through the jet or burner employed for combining oxygen and free hydrogen; Fig. 3, a similar section of a burner for combining oxygen and the common illuminating or house gas; Fig. 4, a similar section of a burner for combining oxygen with hydrogen derived from the combustion of alcohol; Fig. 5, a plan view of the burner shown in Fig. 2; Fig. 6, a vertical longitudinal section through a magic lantern having my improvements applied thereto; Fig. 7, a vertical transverse section of the same on the line *x x* of Fig. 6; and Fig. 8, a horizontal section through the base-plate of the lime-light apparatus at the center line of the conducting-tubes.

I have shown my improvements in connection with a magic lantern of my own invention, well known to the trade, (portions of which are secured to me by Letters Patent, and on other portions of which an application for Letters Patent is now pending,) the better to explain their construction and operation, but will not describe the lantern aforesaid, inasmuch as it constitutes no part of the subject-matter herein claimed.

To carry out the object of my invention, I provide a base-plate, A, which I construct preferably of wood. This base-plate is supported at the end at which the connecting-tubes enter (and which in the description I will designate as the receiving end) upon feet *a a*. A metallic plate, a^1, is secured to the opposite or burner end of the base-plate, the plate a^1 being bent into the form shown most clearly in Fig. 6, and extending toward the receiving end, near which it terminates, and is provided with a nut, a^2, in which a screw, *b*, journaled in the base-plate engages. By means of the screw *b*, the free end of the plate a^1 can be drawn toward or from the receiving end of the plate at pleasure, so as to raise or lower the burner end of the base-plate, and thus vary the angle at which it stands when in use, so as to adjust its height relatively to the lenses of the lantern. Connecting-tubes B B′ enter the base-plate A at its receiving end, and gradually converge until they terminate in a burner-nozzle, C, near the opposite end of the base-plate; one, B′, of the tubes being central therewith, and the other, B, contiguous to it. Vertical passages b^1 b^2 are formed in the nozzle C, in continuation, respectively, of the tubes B and B′. The central passage b^1 opens into a cup or recess, b^3, at the top of the nozzle, in which recess a female screw is cut, and the other passage b^2 is open at the top of the nozzle, as close as practicable to the recess b^3. An external screw-thread is cut upon the top of the nozzle, concentric with the thread of the recess b^3. The connecting-tubes B B′ are, respectively, provided with cocks b^4 b^5.

The apparatus is designed to be used with any one of the three following combinations of gases, to wit: First, oxygen and free hydrogen; second, oxygen and ordinary illuminating-gas; and, third, oxygen and hydrogen derived from the combustion of alcohol.

For each of these compounds a special jet or burner (to be presently described) is re-

quired, and my improved nozzle provides a ready and convenient attachment for either jet, enabling the same to be removed and replaced by a different jet with ease and dispatch.

The jet, shown in Figs. 1, 2, and 5, is employed when a compound of oxygen and free hydrogen is used. It consists of a cap, D, provided with an internal thread, by which it can be screwed upon the outer thread of the nozzle C, and having a central tube, D′, terminating in a flattened mouth, *d*. In the use of this jet the oxygen enters through the tube B′ and its continuation b^2, the two gases being commingled immediately above the recess b^3, and burned at the mouth *d* of the jet.

Fig. 3 shows the jet employed for a compound of oxygen and ordinary illuminating or coal gas. In this instance a central tube, E, having a flattened mouth, *e*, similar to that of the tube D′, is screwed into the thread of the recess b^3, and a conical tube, E′, concentric with the tube E, is screwed upon the external thread of the nozzle, the upper extremities of the tubes E and E′ being in the same horizontal plane, or substantially so. The oxygen passes into the central tube E, and the illuminating-gas into the outer tube E′, the gases being mixed and burned at the mouths of the tubes.

Fig. 4 shows a jet suitable for use when the hydrogen employed is derived from the combustion of alcohol. A central tube, F, similar in all respects to the tube E, hereinbefore described, supplies oxygen from the passage b^1, and a concentric cylindrical tube, F^2, secured upon a cap, F^1, which is screwed upon the external thread of the nozzle C, serves to contain a wick, *f*, to which alcohol is supplied through the tube B′ and passage b^2. The wick-tube F^2 is made shorter than the oxygen-tube F—say, about one-half inch less in height—and the gases are mingled and burned at the mouth of the tube F.

I do not, however, claim herein the compound jets hereinbefore described, as compound jets of various constructions are old.

The fountain G, which contains the alcohol, rests upon a ledge or projection on the side of the lantern, and may be held in place by a catch, button, or slide piece, as desired. It is provided with a cock, *g*, for regulating the supply, which cock is connected by a flexible tube, *g′*, with the cock b^4 of the connecting-tube B′.

The fountain G is constructed so that its greatest dimensions shall be its length and width, being made as shallow as is admissible, and is placed in such position upon the lantern that its base shall be about on a line with the base of the wick tube F^2. By this combination of the fountain with the lantern and base-plate, the level of the alcohol in the fountain with relation to the wick remains practically the same whichever way the lantern may be tilted, and there is no risk either of an overflow or of an insufficient supply.

In the production of the lime-light the flame from the jets is caused to impinge upon a block of lime, to the support and proper adjustment of which one branch of my improvements relates. To this end I provide an adjustable standard, H, which is, by preference, formed of a metallic plate, bent nearly at right angles, its lower portion resting under the heads of screws *h*, which hold it down upon the base-plate A, while allowing it to be moved longitudinally thereon, so as to be brought toward or withdrawn from the jet at pleasure.

The lime-block is, by preference, constructed in the form of a wheel or short cylinder, I, and lies edgewise in a cradle, *k*, formed in the lower end of a lime-holder, K. The cradle *k* extends entirely across the lime-wheel at the side of the holder farthest from the jet, but is cut away contiguous to the jet, so that the flame may impinge freely upon the lime-wheel. The lime-holder is, in this instance, composed of two light metallic strips, separated at bottom sufficiently to admit of the introduction of the lime-wheel I between them, and converging toward their upper ends, where they are united by a pin, to which is pivoted a handle, K^1, for the manipulation of the holder. A plate, K^2, extends downward from the cradle, and is inserted under flanges or guide-pieces *h′*, formed upon the upper arm of the standard H, and serves to support the holder and lime-wheel.

I thus provide both a vertical and a horizontal adjustment for the lime-wheel, and by its position and connection with the improved holder, I am enabled to present its periphery to the action of the flame in the most desirable manner, and at the same time, to protect it from risk of breakage, and present a fresh surface to the jet from time to time, as required.

The standard H and burner-cap D are so proportioned that the burner-cap acts as a stop to hold the standard in the proper position to bring the jet in the proper relation to the lime-wheel to insure the most efficient action, all that is necessary being to slide the standard until it abuts against the cap D.

The lime-wheel is maintained securely, but without undue pressure in the holder, and, moreover, will retain its position therein even if broken.

The base-block and jet can be introduced into a lantern, the rear end of which is partially closed, by suitably inclining the block, and its position in the lantern can be properly adjusted by means of the plate *a′*. The lime wheel and holder are then introduced and fitted into the standard H, through the chimney of the lantern. By thus inserting the lime-holder through the chimney, I am

enabled readily to apply the lime-light to my "sciopticon," a magic lantern heretofore patented by me, and without removing or cutting the perforated diaphram employed by me to form the bottom of my flame-chamber.

Chambers L L^1 are formed in the burner end of the base-plate, and are covered by a pivoted cover or lid, L^2. These chambers serve as convenient receptacles for the storage of the two jets which are not in use. (See Figs. 6 and 7.)

These chambers, it will be observed, are formed in the end of the base-plate opposite to that at which the supply-pipes B B^1 enter, and the convergence of the latter affords room for said chambers.

I claim as my invention—

1. In a lime-light magic lantern, the flat-mouthed jet, constructed as described, in combination with the lime-wheel, whereby the flame impinges against the lime-wheel in a thin sheet, and acts upon a larger portion of its surface than was practicable with the round jet heretofore employed in this class of instruments.

2. The combination, substantially as set fort, of a base-plate, the jet mounted thereon, and the lime-holder, adjustable on the base-plate, whereby the cap of the jet operates as a stop to insure the correct relative adjustment of the lime-wheel and jet.

3. The combination, substantially as hereinbefore set forth, of the base-plate, its conducting-tube and burner-nozzle, and its adjustable plate which supports them, whereby the burner may be adjusted vertically relatively to the lime-light, as set forth.

4. The combination, substantially as set forth, of the lime-wheel and its holder, in which the lime is loosely held, and by which it is presented vertically and edgewise to the light, for the purposes set forth.

5. The combination, substantially as set forth, in a magic lantern, of a lime-wheel, a cradle in which it is held adjustable vertically in a laterally-adjustable standard on the base which supports the burner, whereby the lime-wheel is rendered adjustable both vertically and horizontally.

6. The combination, substantially as set forth, in a magic lantern, of a base-plate, adapted to be inserted through the body of the lantern, and a lime-holder adapted to be inserted through the chimney, whereby the two may be applied without interfering with the diaphragm or base of the flame-chamber.

In testimony whereof I have hereunto subscribed my name.

L. J. MARCY.

Witnesses:

JNO. H. HOGAN,

JNO. EVERDING,