R. N. EAGLE.

Lamp.

No. 87,480. Patented March 2, 1869.

Fig. 2.

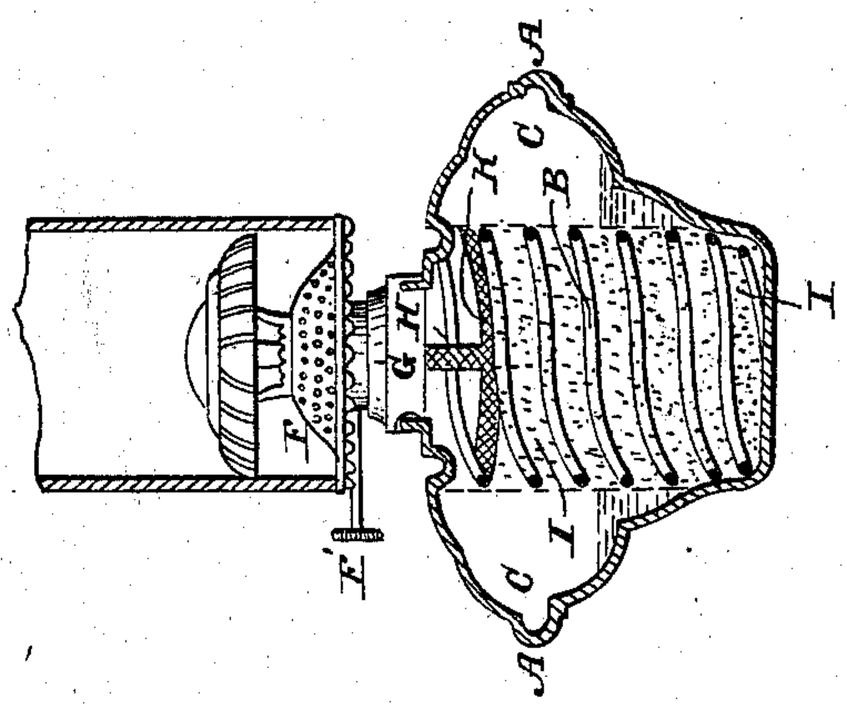

Fig. 3.

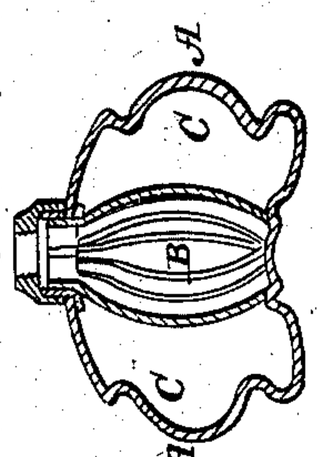

Fig. 4.

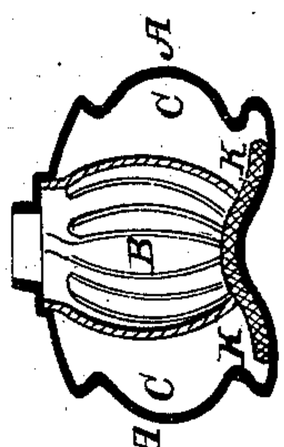

Fig. 4a.

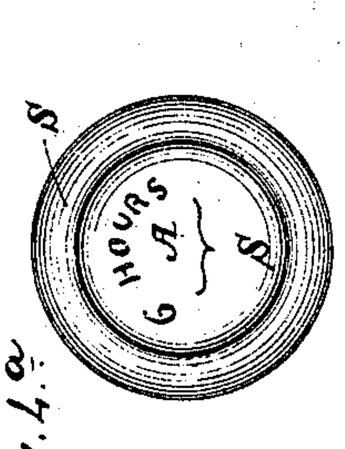

Fig. 1.

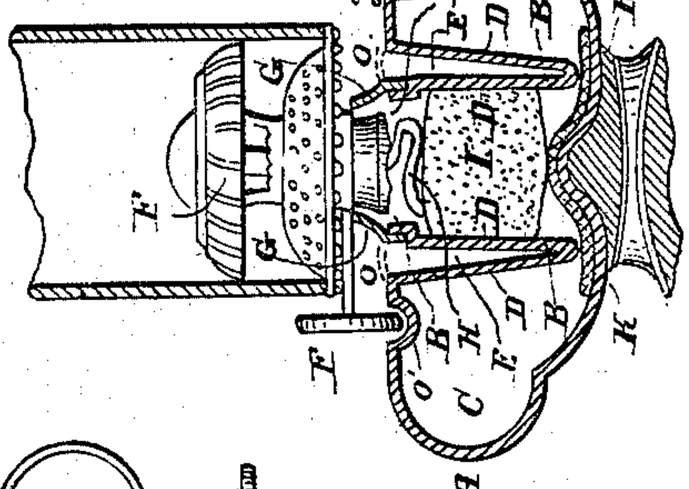

Fig. 1a.

Fig. 1d.

Fig. 5.

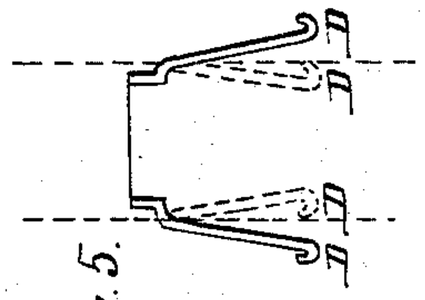

Fig. 1b.

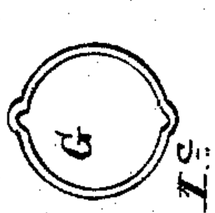

Fig. 1c.

Witnesses.

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Jos. R. Edson

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R. N. Eagle

United States Patent Office.

ROBERT N. EAGLE, OF WASHINGTON, DISTRICT OF COLUMBIA.

Letters Patent No. 87,480, *dated March* 2, 1869.

IMPROVEMENT IN LAMP-BURNERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ROBERT N. EAGLE, of the city and county of Washington, District of Columbia, have invented a new and useful Improvement in Lamps; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section.

Figure 1[a] is an elevation of the collar for attaching the burner to the lamp.

Figure 1[b] is a horizontal section of the same.

Figure 1[c] is an elevation of the feeding-tap or stopper.

Figure 1[d] is a horizontal section of the same.

Figure 2 is a vertical section of an ordinary lamp with certain of my improvements applied.

Figure 3 is a vertical section of an ordinary lamp with another application of certain of my improvements.

Figure 4 is a vertical section of an ordinary lamp with another modification of construction of the same improvements.

Figure 4[a] is a view of the bottom of a lamp.

Figure 5 is a section of part of my lamp, showing variations of form.

The same letters indicate corresponding parts in the several figures.

My improvements are especially designed for use in kerosene-lamps; and

My invention consists in constructing the body of the lamp with a reservoir surrounding the wick-tube or chamber, and so arranged in relation thereto, that, when filled, the oil will stand in the reservoir a little below the height of the base of the burner, having a free communication with the wick, through a space between the base or termination of the wick-tube or chamber and the bottom of the lamp;

Also, in arranging within the body of the lamp a wick-tube or chamber, which is filled with sponge, or other equivalent porous substance, to carry up the oil from the bottom of the lamp to the wick.

Also, in combining with the sponge and wick a porous mat, for feeding the oil to the sponge, or from the sponge to the wick;

Also, in so constructing the tap or stopper, which fills the hole that is used for pouring oil into the lamp, that it may also be used for admitting air to the reservoir above the oil, to prevent the formation of a vacuum;

Also, in attaching the burner to the lamp by a collar and catch, instead of screwing or springing it on to the neck or body of the lamp;

Also, in marking or moulding upon lamps such letters and figures as will indicate the length of time that the lamp may be burned with a designated size of wick;

Also, in constructing lamps with a chamber filled with air, or other non-conductor of heat, between the portion of the lamp which encloses the wick and that which contains the supply of oil furnished to the wick-chamber, such air-chamber being open only above, and not, as in other lamps, being a continuous opening entirely through the lamp, and surrounding the wick-chamber, the said wick-chamber being, in such cases, only connected with the body of the lamp or oil-chamber; and

Also, in providing an annular bridge, N, for covering or closing over the air-space E, when desired.

In the annexed drawings—

A represents the body of the lamp, which may be made of glass, porcelain, metal, or any other suitable material, with or without a stand to support it.

The central portion B, forming what I will call a wick-chamber, is separated from the reservoir C, which is intended to contain the oil, by bending a portion of the shell D D so as to bring its lower edge nearly to the bottom of the body of the lamp, and yet to leave a space between it and the said bottom sufficient for the free flow of oil from the reservoir to the wick-chamber, as well as for the admission of the feeding-mat, hereinafter described.

The precise form into which the portion D D shall be bent is immaterial; it may be as shown in fig. 1, or as shown in either the blue or red lines in fig. 5, or by a longer curve, according to fancy, the only essential feature being that it shall subdivide the body of the lamp into two compartments, which I term, respectively, the reservoir and wick-chamber, the latter being of a size sufficient to supply the demands of the wick, and the former to contain oil enough to correspond with the graduation of the lamp to a burner of any given size, as will be hereinafter more fully described, said compartments being connected by a space between the bottom of the lamp and the bottom of the depressed portion of the shell.

The top of the wick-chamber is about on the same horizontal plane as the top of the reservoir, or it may be a little elevated above it, the object being to prevent the oil from flowing over the top of the wick-chamber, and at the same time to bring down the burner to a height as little as possible elevated above the oil, and also to remove the bulk of the oil from the burner, so that it shall not be unduly heated by the latter.

As the oil can only pass from the reservoir to the wick-chamber through the space allotted to the feeding-mat, viz, between the bends D D and the bottom of the lamp, and as the sides of the wick-chamber are separated from the main body of the reservoir by an air-space, E, or by this space, filled with any other non-conductor, it follows that the heat of the burner only applies directly to the comparatively small portion of oil in the wick-chamber, and will not sensibly affect the temperature of the body of the oil in the reservoir, except by the slow process of circulation, and not to a degree sufficient to produce explosion.

By this arrangement, I am enabled to bring the burner close to the lamp, and yet avoid the disadvantage ordi-

narily experienced, where the burner is elevated enough to avoid the imparting undue heat to the oil, resulting from the difficulty of carrying up the oil necessary to supply combustion through so great a length of wick by capillary attraction, the result of which difficulty is that the lamps in ordinary use, when the oil has been but half burned out, are found to give a very imperfect and rapidly-diminishing light.

In my improved lamp, however, the oil, being contained in the reservoir, will continue to supply a sufficient amount for combustion until the oil is exhausted, because the whole height of the wick-chamber need not be more than that required for the elevation of the burner above the surface of the oil, as with lamps commonly constructed.

A' is the tap or stopper, for closing an opening in the top of the reservoir C, through which the oil may be introduced to feed the lamp.

In order that the oil may be drawn from the reservoir into the wick-chamber, to supply combustion, it is necessary that air shall be admitted to the reservoir above the surface of the oil. This may be done by means of a groove, *a*, left in the side of the stopper, extending part of the way to the head.

When the stopper is screwed down the oil cannot escape through the hole, nor can the gas that may be generated escape.

When it is found that the flame is becoming red, it indicates that air must be admitted to the reservoir; this may be accomplished by turning the stopper, so that the air may enter the reservoir through the groove *a*.

Instead of this device, a valve may be employed, so sustained that it will yield to the pressure of the external air when a partial vacuum has been caused, while it will be closed by pressure from within, so that neither the oil nor generated gases can escape.

F is the burner, which forms no part of this invention. The one represented is the well-known Collins or "sun-burner," but any form of burner in common use may be attached.

In lamps, as ordinarily constructed, the burner screws down into a collar, permanently secured to the neck of the lamp, or by means of springs formed upon the bottom of the burner, which likewise engage within the said permanent collar.

In order to enable an ordinary lamp-burner to be attached to a neck, intended to secure the burner by a catch, I propose to use an intermediate collar, G, constructed with a female screw on its upper edge, to receive the male screw of the burner, and fitted on its lower edge to be attached to the neck of the lamp by a catch.

This catch may consists of a groove and slot, one or more being used, formed in the outer collar G, which, on being passed over corresponding projections on the sides of the permanent collar, and turned either way, at right angles, on the principle of the bayonet-catch, firmly secures the collar G, and through it the burner, to the lamp, without fear of displacement, or of becoming inoperative after much use, as with springs engaging with and confined within the said permanent collar, which are liable to soften and become deranged by overheating.

In ordinary lamps, where the burner has to be screwed down into the neck of the lamp, the wick is twisted, and liable to be drawn to one side of the wick-tube, and thus becoming engaged or entangled with the elevating-wheel on that side of the tube, causes disarrangement of the fibres or threads, and subsequent ascent of the wick more to one side of the tube than the other.

By my improved mode of attaching the burner, the wick may be loosely coiled in the chamber formed within the collar G, and the collar then shoved down upon the neck of the lamp, without altering the position of the wick in the tube.

H is the wick. It is the ordinary flat wick in common use in kerosene-lamps. This wick, as is well known, by capillary action draws up the oil to supply combustion.

Wicks are ordinarily made of cotton, and their capillary power, especially with oils of the class of "kerosene," is limited to a few inches, and is at best imperfect. To supply a more powerful capillary action, I fill the chamber B with sponge, or other equivalent porous substance, such as cotton, wool loosely woven, felt, or other material affording capillary action.

Where sponge is used in entire pieces, they should be placed in the chamber in the position in which they grow, viz, with that part which is attached to or is nearest the rock in the native growth of the sponge, at the bottom of the chamber.

This sponge will absorb the oil, and its capillary action is sufficiently powerful, with the assistance of air supplied from time to time, or automatically, through the feeder, as already described, to carry up the oil much further than a cotton wick will raise it; and if the end or flat of the wick is allowed to rest upon the upper surface of the sponge, it will absorb the oil carried up by the sponge, and continue to supply a sufficient amount for combustion as long as the sponge is saturated; and this saturation will continue while the sponge remains in contact with a body of oil at the bottom of the lamp.

For some purposes, as where longer and more bulky wicks than those in present use shall be employed, I so arrange the sponge, or other porous conductor, within the wick-chamber B, as to leave a bed or hollow, of depth and capacity, within its circle or fold, sufficient to contain the wick, as well as to afford increased surface for attraction of the oil, by which arrangement it will be understood that the upper part of the chamber B would then be lined with the sponge, or other porous conductor, instead of being evenly filled up, as in the case where a shorter or less bulky wick might be used, and less space in the chamber B required.

Where the bottom of the lamp is not level, but elevated in the centre, as is commonly the case in oil-reservoirs, a mat, K, as shown in figs. 1, 2, and 4, of felt, or other substance easily saturated, may be used, to spread over the bottom of the lamp, and to come in contact with the base of the sponge. This mat will supply oil to the sponge as long as any remains in the lamp.

In reference to the space or air-chamber E, which has already been described, and is represented in fig. 1 as being open at top, or forming an annular space between the top of the wick-chamber B and the main body of the lamp or reservoir C, this form of construction is especially adapted to house-lamps, where the draught is uniform, and not liable to agitation.

The effect of the said space or air-chamber, on becoming filled with motionless air, being to assist the draught of ascending currents through the burner and chimney, a modification will be essential in the construction of lamps adapted for use in more exposed situations, such as in cars, door-ways, stores, &c., but which will consist mainly of a simple covering, *o*, for the said space or air-chamber E, either temporarily or permanently applied, of metal, or other proper material, so constructed as to allow of the escape of heated air, while precluding the possibility of undue draughts or currents of air being induced by the said air-space, to cause "flurries," or irregular supplies of air to the burner.

o, figs. 1 and 1ª, represents the annular bridge just referred to, for covering the said air-space or chamber E. It may be made of metal, or other suitable material, and of any desired form or design which will adapt it to the purpose intended. The drawings represent it as being a circular disk, loosely attached, or fitting over and around the collar G, of sufficient diameter to span and cover the air-space E.

A down-turned flange, *o'*, at the outer edge or pe-

riphery of the disk, formed into scallops or curtain-points, admits the air to the said space or chamber.

Simple perforations through the disk will answer the same purpose, viz, of allowing the heated air to escape, and a sufficient quantity to enter for a fresh supply, without allowing of undue currents to disturb the uniform draught of the lamp. I prefer, however, the former mode of construction.

I have shown, in figs. 2, 3, and 4, forms of chambers, which may be used in common lamps, to contain the sponge or other porous conductor used. These chambers may be made elastic, so as, on being compressed and introduced, they will bear against the bottom and top of the lamp, and by their tension hold themselves in place, with or without the aid of projections or recesses in the shell of the lamp.

In fig. 2 the chamber or cage is formed of a spiral spring.

In figs. 3 and 4, it is formed of elastic bars attached to a collar.

I do not claim, however, in this application, to cover such cages by my Letters Patent.

It is not essential that the sponge should be in a single piece. It will be cheaper to fill the chamber, on the contrary, with small refuse pieces, and in that case a porous mat, as shown in fig. 2, K, may advantageously be used, to cover the sponge, to retain the pieces in position, and prevent their attaching to the wick when it was being elevated in the tube, or when the wick was being altogether withdrawn from the lamp.

Having provided a mode by which the oil may be entirely consumed from the body of the lamp, I am enabled to gauge my lamps, as I can readily determine how long a lamp will burn under full flame, using any given size of wick, and the lamps may be marked accordingly, when made, as indicated at S, fig. 4ª, which shows that the lamp will burn six hours with an "A" wick.

The same lamp may also indicate, in letters and figures, how long it will burn with wicks of various sizes, so that the purchaser may be enabled to determine the size or capacity of the lamp and wick he should select for the object he may have in view.

The depression *a'*, fig. 1, is formed in the top of the lamp, to receive the thumb-screw F', so that the burner may be brought nearer to the top of the lamp.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The body A of a lamp, when so constructed as to form a wick-chamber, B, and surrounding reservoir C, separated by a depression of the shell of the lamp, substantially as set forth.

2. The combination of the reservoir and wick-chamber, when both are formed from the continuous shell of the lamp, and so arranged that the top of the reservoir and the point of connection between the burner and wick-chamber shall be on the same, or nearly the same, level, substantially as described.

3. A lamp, constructed with an air-chamber, E, formed by a depression, D D, of the shell of the lamp, substantially as and for the purpose set forth.

4. The depression *a'*, formed in the top of the body of the lamp, to receive the head of the thumb-screw F', substantially as and for the purpose set forth.

5. The combination of a lamp-body, having an annular air-chamber, E, and the annular bridge *o* and *o'*, substantially as and for the purpose set forth.

6. The combination of the wick, the porous capillary substance, and the mat; but this I claim only when the capillary substance is enclosed in a cage surrounded by the oil, and under and in contact with the wick, and when said mat is used to draw the oil from points outside of the cage to the capillary substance enclosed therein.

7. In combination with a lamp-burner, having a male screw on its lower end, and the neck of a lamp formed to receive and attach a burner by a catch, instead of a screw, an intermediate collar, G, which may be screwed to the burner, and also attached by a catch to the neck of the lamp, substantially as and for the purpose set forth.

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

R. N. EAGLE.

Witnesses:

C. A. RODNEY,

C. F. CLAUSEN.