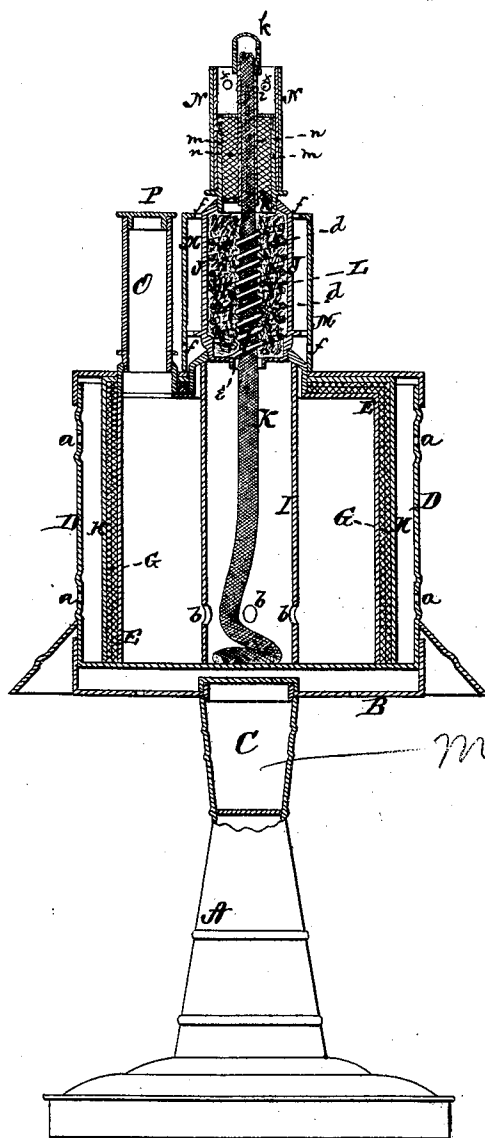


Improvement in Lamps.

Patented Oct. 15, 1872.



match Safe

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN LAMPS.

Specification forming part of Letters Patent No. 132,283, dated October 15, 1872.

To all whom it may concern:

Be it known that I, M. P. HADLEY, of Bluffton, in the county of Green Lake and in the State of Wisconsin, have invented certain new and useful Improvements in Lamps; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

It is well known that the following conditions must be fulfilled to produce a lamp-explosion—namely, first, a vacuum must be produced in the lamp; second, atmospheric air must be introduced in some way into this vacuum; and third, external heat must be applied to such a degree as to evolve and bring out the gas contained in a latent form within the fluid in the oil-chamber to mix with the air, and thus fill the vacuum that has been created. Unless these conditions are fulfilled an explosion of a lamp cannot be produced.

To prevent these conditions from being brought about is the object of my invention, and this is accomplished by the construction and combination of the various parts of which my lamp is composed, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, which is a longitudinal vertical section of my lamp.

A represents the base and pedestal of my lamp. On the top of this pedestal is a platform, B, upon which the lamp rests, and under the lamp, in the top of the pedestal, is placed or formed a match-safe, C. This match-safe is covered by the lamp, and the pedestal being made separate from the lamp, the lamp can be lifted off at will to get at the matches. The matches are thus kept always at hand in case the lamp should by any means be extinguished, and they are also kept safe. The lamp consists of an outside shell, D, provided with ventilating openings *a a* near the top and bottom. Attached to the bottom of, and within, this outside shell D, is the oil-chamber E, over and around which is placed a movable cap, G, of rubber or paper, or both combined. Over this is again placed a metal cap, H. The

paper and rubber can be used in the shape of a band encircling the oil-chamber, and confined in its place by the metal cap covering the same. The covering around the oil-chamber and the metallic cap operate to keep the oil within the chamber at its natural temperature by preventing the action of cold upon the outside of the oil-chamber, and thus reducing the natural temperature of the fluid, which must be preserved in using hydrocarbon oils. A strong active non-conductor would reduce the temperature that we wish to avoid. The metallic cap confines the underlying covering firmly in its place, making the same as near air-tight as possible. Thus, while the covering and cap keep out the external cold, they keep in the natural heat and prevent it from passing off. The shell D, with its ventilators, furnish a current of air, preventing the metallic cap from being heated from outside influences. By this arrangement there is a perfect protection given to the fluid within the oil-chamber. Without it the fluid would be subject to the ever changing influence of the elements around it. In the center of the oil-chamber E is placed a hollow tube, I, made of lead one inch, more or less, in diameter. This tube may be attached to the bottom of the oil-chamber and run up to the top of the same; or it may be attached to the lower end of the generator above and run down to the bottom of the oil-chamber, which latter mode would perhaps be more preferable, as then it could be removed with the generator when desired. The tube I has four, more or less, holes or slots, *b b*, near its lower end, for the passage of oil from the oil-chamber into the condenser; and the object or design of this tube is to keep the fluid in the oil-chamber more perfectly in its normal condition. Above the tube I, and attached to the top of the same, is placed a hollow metallic tube, J, about one inch in diameter and one inch high. The bottom of this tube is to be made of lead, or heavily lined with lead. The screw-joint that connects this tube with the tube below is to be made of some non-conducting metal; or it may be made of brass. The inside of the tube J is lined with a coil, *d*, of copper wire, within which and connected with it is another smaller coil, *e*, to form a passage for the wick K through the tube, and to protect the same

from the pressure of the packing within the tube, the extreme point of the smaller coil *e* extending straight up to near the top of the burner for the purpose of conducting heat into the packing-chamber below. The space between the coil *d* lining the tube and the coil *e* surrounding the wick is packed with sponge or cotton, marked L; the combination thus formed I call the gas-generator. Over the gas-generator thus formed is placed a metallic cap, M, with ventilating openings *ff*, to protect the generator and the connecting-joint between it and the lead tube below. The tube J with its interior packing is designed to act as an absorbent, and to equalize the heat produced by the copper wire within the generator, and at the same time prevent air or heat from passing down from the burner into the oil-chamber, by which arrangement I secure safety to my lamp and to those who use it, producing at the same time a more steady light. The wire-coil *e* surrounding the wick, and having one end extending up into the burner, is to protect the wick from the pressure of the packing, and thereby impede the circulation of the fluid through the wick from the oil-chamber below by capillary attraction. The wick thus protected is a free conveyor of the gas that is generated by heat in the tube through which it passes. By the action of the pointed wire at the base of the burner heat is conveyed into the gas-generator above the oil-chamber, and thus supplying a greater quantity of gas to the burner above, thereby giving a more steady light. The outer coil *d* lining the inside of the tube above the oil-chamber, and connected with the coil *e* surrounding the wick, is designed to communicate heat to the fluid held by the sponge within the tube. Gas is thus generated which flows through the wick to the burner above. The cap M with its ventilators keeps the base of the gas-generator cool at its junction with the oil-chamber. The packing L I prefer to make of sponge, as this material will expand and swell when saturated with fluid, and thus prevent a vacuum from being formed in the generator, and thereby prevent that condition which is absolutely necessary to cause an explosion. At the same time this material is porous, and the amount of fluid drawn up from the oil-chamber is not sufficient to form a fluid-joint, and hence the free flow of gas to the burner is in nowise impeded. Attached to the top of the generator is the burner, which consists of a screw-joint, *h*, made of brass, and to the base of which is attached a small upward-projecting tube, *i*, about three inches long, for the passage of the wick that conveys the fluid to the point of combustion at the top of the burner. *k* is a cap, to be placed on the top of the tube *i* after the lamp is extinguished, to prevent evaporation. Around the base of the burner is a hollow tube, *m*, about one inch high, packed with plaster of Paris or other similar material, marked *n*, and covered with a cap, *p*, through which the tube

i passes. The tube *m*, with its packing, is designed to keep the lower section of the burner from the action of cold air. Anything cold applied to the lower section of the burner when the lamp is burning will greatly retard the burning of the same. This is of great importance, as in using vapor-lamps it is absolutely necessary to sustain and keep up as even a temperature as possible in order to produce a steady and strong light. Around the packed tube *m* is placed a hollow tube, N, of galvanized iron or copper, which may be moved up and down at will, and may be made single or double. It is provided with four holes, *ff*, passing through the same about half an inch below the top of the tube, and is designed to regulate the heat at the top of the burner. The vacuum produced by this tube above the lower section of the burner and the top of the movable tube serves to increase the heat at the top of the burner, and thereby favors rapid combustion. The lamp can be used without this tube, the only use of which is to produce a more steady and brilliant light by increasing the heat at the top of the burner. By moving the tube N up or down the light may be readily regulated. At one side of the gas-generator and over the oil-chamber E is inserted a tube, O, with screw-cap P, for convenience in filling the lamp. This tube should be as high as the gas-generator, which would bring it up to the base of the burner.

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

1. The arrangement of the detachable base or pedestal A with match-safe C formed in its upper end, so that when the lamp is placed on said pedestal the match-safe will be covered, substantially as herein set forth.

2. A cap or covering, G, of rubber or paper or both combined, to cover and inclose the oil-chamber of a lamp, substantially as and for the purposes herein set forth.

3. In combination with a cap or covering, G, of rubber or paper or both, inclosing the oil-chamber of a lamp, I claim a metallic cap, H, fitting tightly around and inclosing said covering, substantially as and for the purposes herein set forth.

4. The combination of the oil-chamber E, covering G, cap H, and the perforated shell D, all substantially as and for the purposes herein set forth.

5. The combination of the tube J, outer wire-coil *d* around the interior of the tube, the inner wire-coil *e* surrounding the wick and having its point extending up into the burner, and the packing L between the two coils, all constructed and arranged as described to form the gas-generator of the lamp, substantially as and for the purposes herein set forth.

6. In combination with the gas-generator the exterior perforated cap M, substantially as and for the purposes herein set forth.

7. The burner, consisting of the screw-joint *h*, tubes *i* *m*, cap *p*, and filling *n*, all construct-

ed and arranged substantially as and for the purposes herein set forth.

8. In combination with the burner the exterior perforated movable tube N, substantially as and for the purposes herein set forth.

9. The combination to form a lamp for burning hydrocarbon oils, of the pedestal A with match-receptacle C, platform B, exterior shell, oil-chamber with covering and cap, interior lead tube, generator, burner, and filling-tube,

all constructed and arranged substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of June, 1872.

MOSES P. HADLEY.

Witnesses:

JULIUS A. McDOWELL,

JOHN H. BROOKS.