(No Model.) 3 Sheets—Sheet 1.

R. REID, R. HANNA, T. HOLROYD & H. A. WHEAT.

LAMP.

No. 490,415. Patented Jan. 24, 1893.

Fig. 1.

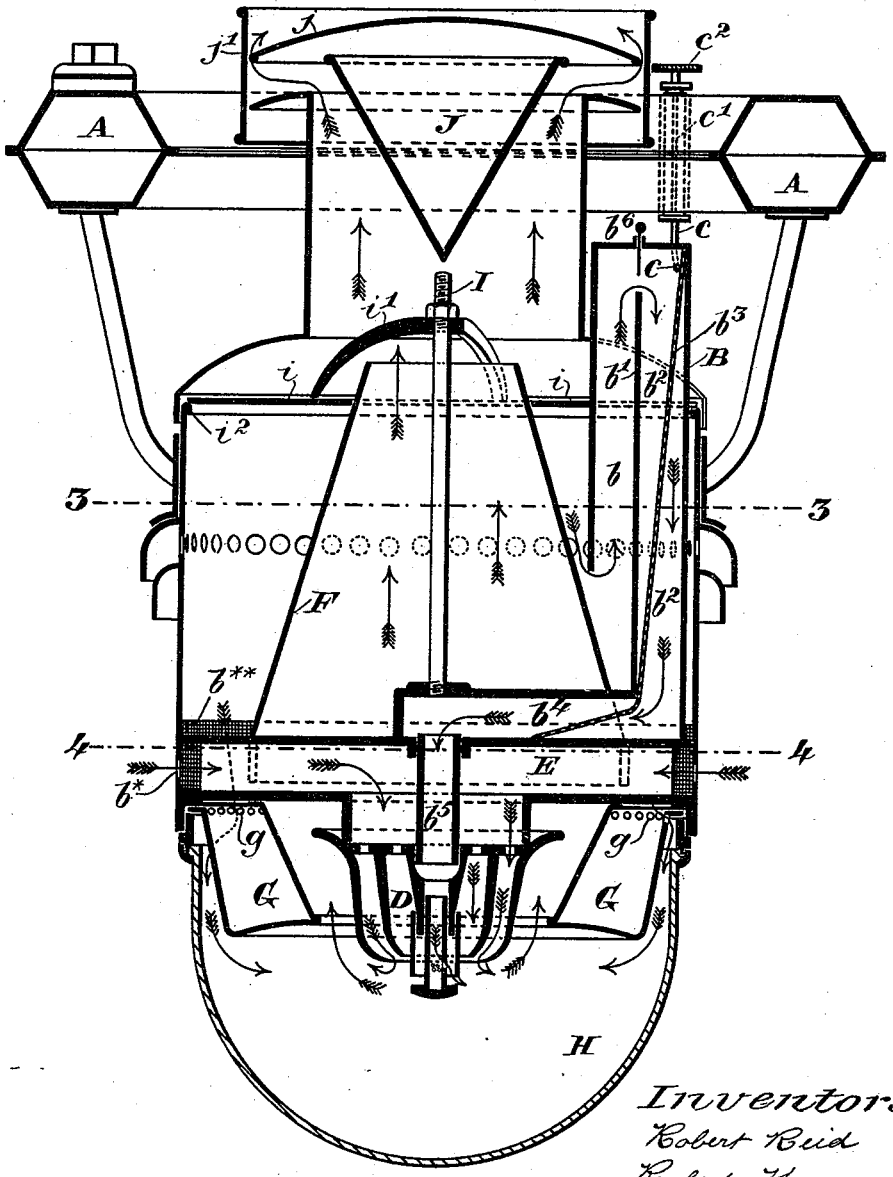

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Fig. 2.

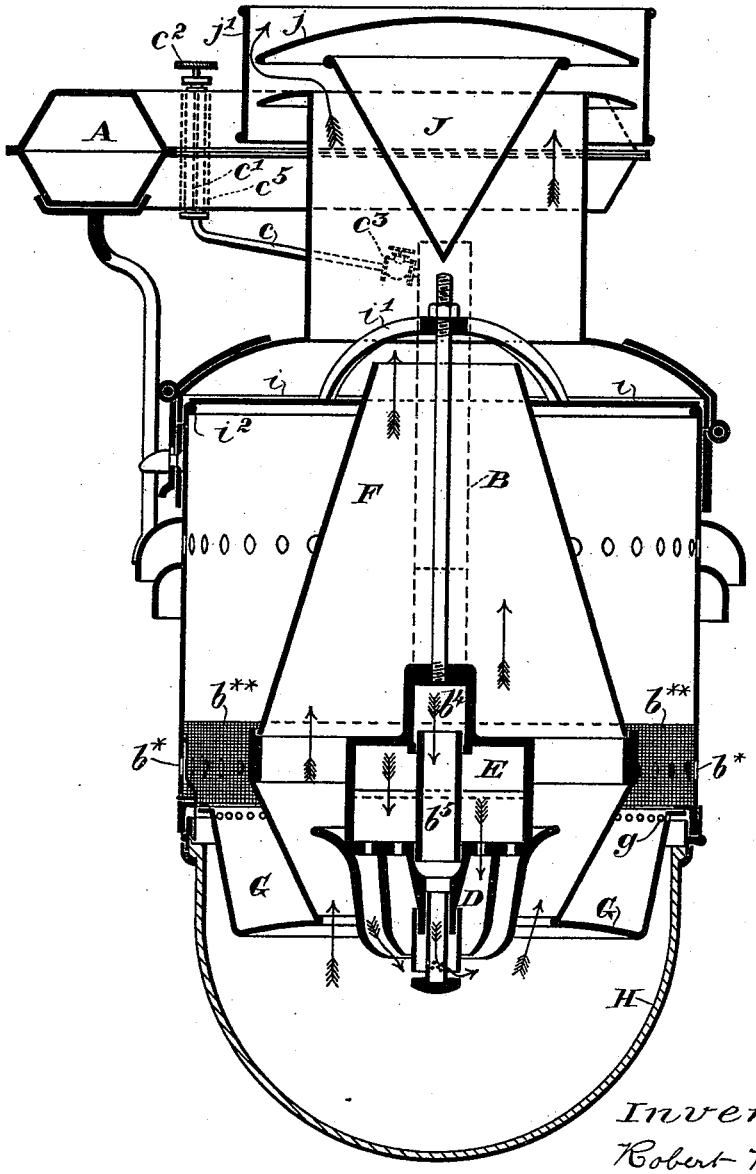

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Fig. 3.

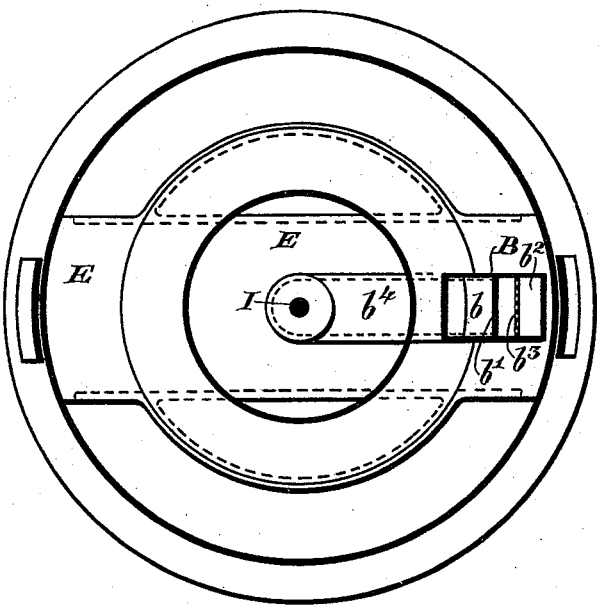

Fig. 4.

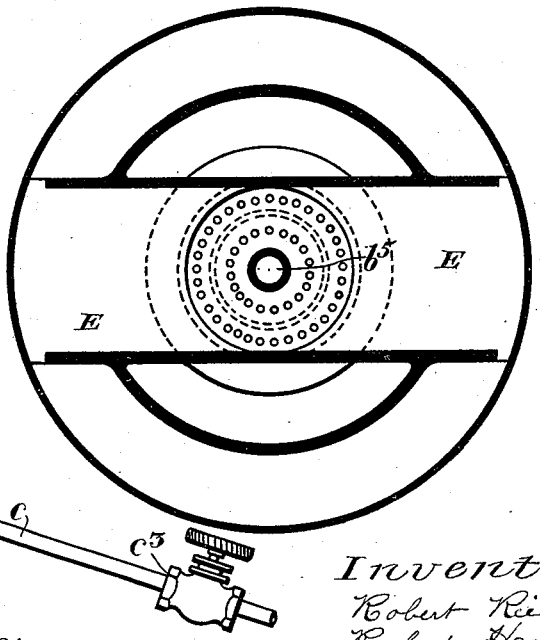

Fig. 5.

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UNITED STATES PATENT OFFICE.

ROBERT REID, ROBERT HANNA, THOMAS HOLROYD, AND HENRY ARTHUR WHEAT, OF MELBOURNE, VICTORIA.

LAMP.

SPECIFICATION forming part of Letters Patent No. 490,415, dated January 24, 1893.

Application filed June 25, 1891. Serial No. 397,478. (No model.)

To all whom it may concern:

Be it known that we, ROBERT REID, engineer, residing at Union Lane, Little Collins Street, Melbourne, in the British Colony of Victoria; ROBERT HANNA, importer, residing at 18 Market Street, Melbourne aforesaid; THOMAS HOLROYD, draftsman, residing at Barkley Street, Brunswick, near Melbourne aforesaid, and HENRY ARTHUR WHEAT, engineer, residing at Union Lane, Little Collins Street, Melbourne aforesaid, subjects of the Queen of Great Britain, have invented an Improved Lamp for Burning Gasoline and other Light Liquid Hydrocarbons, of which the following is a specification.

This invention relates to that class of lamps which are used for burning gasoline and other light liquid hydro-carbons. Its object is to provide a lamp wherein these comparatively volatile and inflammable materials can be more satisfactorily burned than with the lamps heretofore constructed; and, moreover, without necessitating the heating of such lamp either by lighting a small quantity of gasoline placed in a cup for the purpose, or by any other equivalent means, prior to the lamp being lighted.

Our invention consists in a lamp wherein the natural draft caused by it is utilized (when once the lamp is alight) to cause a current of air to pass through or over the surface of a small quantity of the gasoline or other light liquid hydro-carbons in such a manner as to carry off and mix with the vapor given off by such gasoline, thereby forming a gaseous mixture which, when ignited on issuing from a suitable burner, will give a steady and a brilliant light.

We will describe our invention as it would be embodied in a railway carriage lamp but would wish it understood that we do not intend to limit its use to any particular class or classes of lamps, because, as will be obvious from a perusal of this specification, it can be embodied in practically all classes, whether stationary or portable, whether for use indoors or out, and quite irrespective of the amount of light required.

In constructing a lamp according to our invention, we provide a reservoir for the gasoline or other light liquid hydro-carbon, and support it in such a position as that the fuel contained therein can readily be conveyed, to a chamber, which we call a "converter" wherein such liquid gasoline or other hydrocarbon is converted into vapor and is mixed with the current of air induced by the natural draft of the lamp, and is then conveyed, together with such air, to the burner, which latter must, of course, be so constructed and arranged as to insure a supply of sufficient air to support combustion. Although this burner may be of any construction found suitable for the purpose, we prefer to employ a circular burner constructed as herein described, because we have found that such a burner gives a bright and steady light, and does not necessitate any supports which would be liable to cast shadows. A valve is provided in the pipe connecting the gasoline reservoir with the converter in order that the supply of oil to the latter may be regulated to just the amount required, and said converter is made comparatively long, and is divided into two compartments or passages by means of a partition which is cut away so as to leave a free passage from one compartment to the other. The end of one of these compartments is left open to allow air to enter freely, while the end of the other one is in open communication with a passage leading to the center of the burner. Inside this second compartment is arranged a sheet, piece, or pieces of some material which will spread the liquid over a large surface and will allow the air to pass through freely. By preference we employ a sheet of wire gauze for this purpose because the gasoline spreads over that material in the form of a fine film, through which the air freely passes, the effect, of course, being to carry off any vapor evolved. The gaseous mixture thus formed passes down to the burner, where, on being ignited, it burns with a steady luminous flame. The air employed for mixing with the gasoline vapor is by preference drawn from a chamber formed within the body of the lamp and around the chimney, thus insuring that such air will be sufficiently hot to facilitate the vaporization of such gasoline and thereby expedite the operation. The air fed to the lamp, or some of it, is preferably passed

through a chamber situated above the burner and extending from side to side of the lamp, while the products of combustion from said burner pass up through openings or passages on either side of said chamber, and are carried away by a centrally arranged flue or chimney, fitted or provided with the ordinary or some other efficient means for preventing down draft, as will be well understood from the following description, reference being had to the accompanying drawings, wherein

Figure 1 is a central vertical section of a railway carriage lamp for burning gasoline and other light liquid hydro-carborns, constructed according to our invention. Fig. 2 is a similar view of the same lamp, but taken at right angles to Fig. 1. Fig. 3 is a horizontal section on line 3—3, Fig. 1. Fig. 4 is a horizontal section on line 4—4, Fig. 1. Fig. 5 is a vertical central section (shown approximately full size) of the value we prefer to employ for regulating the supply of gasoline or other light liquid hydro-carbons to the converter.

Similar letters of reference indicate the same or corresponding parts in all the figures.

A represents the reservoir in which the gasoline or other light liquid hydro-carbon to be burned in our lamp is stored, while B represents what we term the "converter"—that is, the chamber wherein the gasoline is subjected to the action of, and mixed with, a current of air passing up the passage or compartment b, over the upper end of the central partition b', and down the second passage or compartment b^2. Inside this latter is arranged a small sheet, preferably of wire gauze b^3, on to which the gasoline or other liquid hydro-carbon is fed by the small supply pipe c, whose upper end is fitted with a needle regulating valve C, constructed, as illustrated in Fig. 5, with a screw-threaded spindle c', and a milled head or thumb piece c^2, so that the amount of gasoline passing into the converter B can be regulated to a nicety. We prefer to provide a small stop valve c^3, in the pipe c between the needle regulating valve C and the converter, because we can then leave said regulating valve in its fixed position when once it is adjusted to feed the required amount of gasoline.

We have found in practice that it is advisable to reduce the size of this pipe c to the smallest possible diameter consistent with the supply of enough gasoline to provide sufficient vapor for maintaining the flame.

Instead of using a sheet of wire gauze, b^3, some other material which will distribute the gasoline over a large area and so allow the air to act upon it readily might be employed, though we have found that wire gauze gives very satisfactory results, because the gasoline spreads over its entire surface in the form of a film, through which the air is free to pass.

The supply of air for the converter B is preferably drawn as illustrated from inside the body of the lamp and above the burner, so that after the burner is lighted the air is heated, and thereby accelerates the vaporization of the gasoline, and moreover facilitates the combustion of the gaseous mixture. This air is admitted into the lamp body through holes b^*, which we prefer to cover with a strip of wire gauze b^{**}, arranged around the inside of the said lamp body as shown, in order to, as it were, split up the air supply and at the same time regulate it.

The lower end of the compartment b^2 is in communication with the center of the burner D through the passage b^4, and downwardly extending tube b^5, as shown, while an air chamber E, situated in the body of the lamp, is in open communication with the outside of the burner D, so that the latter is constantly supplied with sufficient air to insure the perfect combustion of the gasoline vapor, as will be well understood.

If preferred, a slide b^6 might be fitted inside the compartment b to enable the air passing up same to be regulated according to requirements.

The products of combustion from the burner D pass on each side of the air chamber E up through the chimney F, inside the body of the lamp, to the top, where they escape into the atmosphere without coming into contact with the gasoline reservoir A, and thus said reservoir is kept comparatively cool, a piece of non-conducting material being, if found necessary, fitted between said reservoir and each of its supports, in order to prevent any heat being conducted to said reservoir from the body of the lamp.

An annular reflector G is arranged around the burner as illustrated in Figs. 1 and 2, while an ordinary glass lamp bottom H may be fitted over the burner D in the usual manner. This annular reflector G is provided with a series of holes g through which a certain quantity of air is free to pass from the body of the lamp above into the glass bottom H below, thus assisting in supporting the combustion, and moreover serving to keep the reflector cool.

A flat circular plate i is fitted inside the lamp around the chimney F, and is pressed down tightly by a three-legged bridge piece or tripod i', through which passes a screw-threaded rod I, provided with a nut, whereby the pressure of said plate i on said chimney F, and on a bearing or bead i^2 provided for it around the top of the lamp body, as well as the pressure of said chimney on its support, can be regulated at will so as to form a comparatively air-tight chamber inside the body of the lamp. Above the chimney F are the usual arrangements for preventing down draft, comprising a cone J, a baffle plate j, and a ring j', all constructed as shown after the manner of an ordinary railway carriage lamp.

In order to prevent the entrance of any small particles of dust or other foreign substance into the needle valve C, we prefer to inclose it in a small perforated tube c^4, and to inclose the latter in a sheet or sheets c^5 of wire gauze or other material, which will serve as a filter to separate any of such particles from the liquid, or if preferred the valve might be fitted so that it projects slightly above a depression in the bottom of the reservoir A, said depression serving to receive or collect the impurities, which would naturally settle to the bottom and leave a comparatively clear body of liquid above. In either case we arrange the valve C so that it is surrounded by gasoline, because by that means we are enabled to keep said valve perfectly cool, which we find is a decided advantage.

The operation of our invention is as follows:—In order to light our improved lamp the valve C is opened sufficiently far to allow a small quantity of gasoline or other light hydro-carbon to pass on to the sheet of wire gauze b^3, and a lighted match or other flame is held under the burner D until the mixture of air and gasoline vapor passes into the burner, when the operation will go on continuously, the gaseous mixture being consumed as it issues from the burner D, and the draft set up being used for drawing a fresh supply of air through the converter B, and so on until either the whole of the gasoline in the reservoir A has been consumed, or the supply to the converter has been stopped by closing the valve C.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is—

1. In a carbureting lamp, the burner, the chimney above the same, the air chamber extending immediately about the said chimney, the walls of said air chamber constituting the outer body walls of the lamp, the said air chamber communicating with the outside air through openings in its walls, a converter arranged within the air chamber adjacent to the chimney and communicating with the said air chamber and being free from communication with the chimney, the reservoir for the oil, the conduit leading from the reservoir to the converter and the conduit leading from the converter to the burner, substantially as described.

2. In combination in a carbureting lamp, the lamp body the burner below the same, the chimney extending through the lamp body, forming with said body an air chamber around the chimney, communicating with the outside air, the converter within the lamp body and at one side thereof, the spreader plate, extending through the said converter, the conduit from the converter to the air chamber, the conduit from the converter to the burner, the oil reservoir and the conduit therefrom to the converter, substantially as described.

3. In combination in a carbureting lamp, the lamp body, the burner below the same, the chimney extending therefrom up through the lamp body and forming therewith an air chamber, the converter within the lamp body, and projecting up outside the same, the uptake conduit b, from the air chamber to the converter, and the down take conduit from the converter to the burner, the said flues extending up into the projecting part of the converter, the valve the oil reservoir and the conduit therefrom to the converter, substantially as described.

4. In combination in a carbureting lamp the lamp body, the burner below the same, the chimney above the burner, extending through the lamp body and forming therewith an air chamber about the chimney, the converter within the lamp body, extending vertically at one side thereof, the conduit from the air chamber to the converter, the oil supply pipe, the conduit from the converter to the burner, and the spreader plate B, extending diagonally through the said converter, substantially as described.

5. In a carbureting lamp, the burner having a central vertical opening, the chimney above the same, the air chamber immediately about the chimney, the walls of said air chamber constituting the outer body walls of the lamp, the said air chamber communicating with the outside air through openings in its walls, a converter arranged within the air chamber adjacent to the chimney and communicating with the air chamber, the reservoir for the oil, the conduit from the reservoir to the converter and the conduit leading from the converter to the burner including the passage b^4 extending laterally at the base of the chimney and above the burner, and the central tube b^5 at the inner end of the lateral passage, said tube extending into the central vertical opening of the burner, substantially as described.

6. In combination in a carbureting lamp, the lamp body, the burner below the same, the chimney above the burner and extending through the lamp body, and forming an air chamber, the converter connected with the burner and with the air chamber, the means for closing the air chamber and holding the chimney in place consisting of the plate i, resting on the upper edge of the lamp body, and engaging the chimney, the rod I extending through the chimney and the tripod adjustable thereon and bearing upon the plate i substantially as described.

7. In a carbureting lamp, the combination of the lamp body, the burner within the lower part of the same, the chimney extending centrally of the lamp body above the burner, the annular reservoir A above the lamp body and arranged concentric thereto and to the chimney, the said reservoir being supported from

the lamp body, the converter arranged below the reservoir and between it and the burner, and the connection from the reservoir to the converter and from the converter to the burner, substantially as described.

8. In combination in a carbureting lamp, the lamp body, the burner below the same, the chimney extending from the burner up through the lamp body and forming therewith an air chamber about the said chimney, the converter connected with said air chamber, the central tube b^5 of the burner, the lateral conduit b^4 from the converter to the central tube b^5, the transverse air passage E above the burner, and through which the pipe b^5 extends, the said passage E communicating with the burner, at its central part, and the said passage b^4 extending above and parallel with the air passage E substantially as described.

9. In combination, the burner D, transverse air passages E above the burner and opening thereto at its center, the annular air chamber G around and at a distance from the burner, the chimney F, the air chamber around said chimney, a converter into which said chamber discharges, and a vapor supply pipe from the converter to the burner, substantially as set forth.

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