No. 647,692. Patented Apr. 17, 1900.

F. M. BLACKMAN.

INCANDESCENT VAPOR-BURNER.

(Application filed July 20, 1899.)

(No Model.)

Fig. 1.

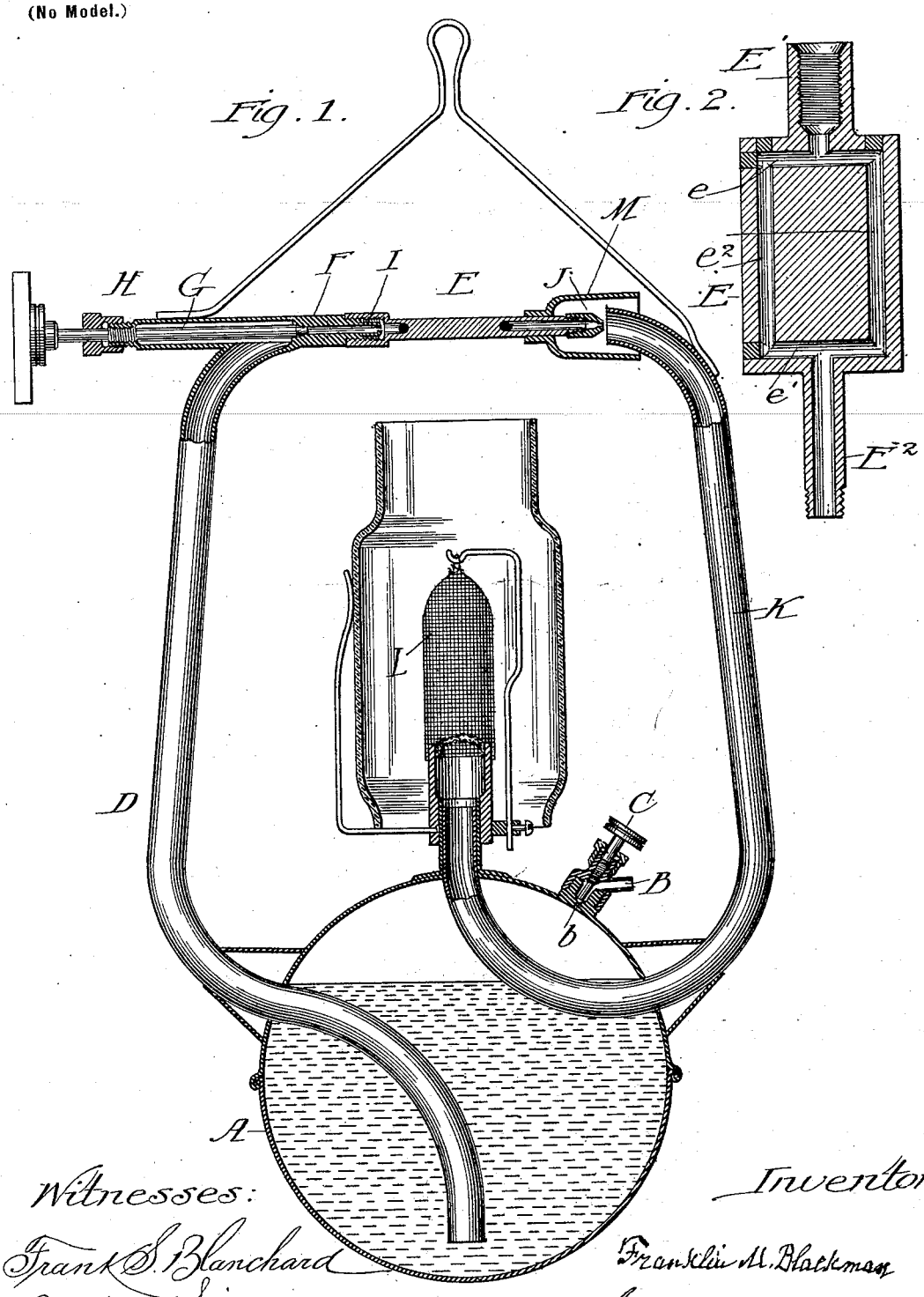

Fig. 2.

Witnesses:

Frank S. Blanchard

Bertha C. Sims

Inventor:

Franklin M. Blackman

By Gridley & Hopkins

Attorneys.

UNITED STATES PATENT OFFICE.

FRANKLIN M. BLACKMAN, OF AURORA, ILLINOIS, ASSIGNOR OF ONE-THIRD TO ALFRED COLE, OF SAME PLACE.

INCANDESCENT VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 647,692, dated April 17, 1900.

Application filed July 20, 1899. Serial No. 724,482. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN M. BLACKMAN, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Lamps, of which the following is a specification.

The present invention relates to that class of lamps in which gasolene or other light hydrocarbon oil is vaporized by the heat of the flame of the lamp and the vapor thus produced mixed with a suitable proportion of air and conveyed to the burner.

The object of the invention is to provide a lamp of this class of such construction that the pressure developed in the generator or vaporizer will remain constant, whereby pulsations in the flame are prevented. This object is attained by providing the vaporizing-chamber of the generator with a minute inlet-orifice adapted to discharge a minute jet of liquid hydrocarbon directly into it, and a second minute outlet-orifice for the escape of the vapor, said orifices being very small in cross-sectional area as compared with the cross-sectional area of the vaporizing chamber or passage, the proportions being such, regard being had for the capacity of the lamp, that the entire volume of liquid hydrocarbon discharged into the vaporizing-chamber is vaporized almost instantly upon entering and the flooding or partial flooding of the chamber prevented. I am aware that it is not new, broadly, to provide a lamp of this class with a generator or vaporizer which is heated by the flame of the lamp and which has a minute vapor-outlet; but I am not aware that it has ever been proposed to provide the vaporizing-chamber with a similarly-minute inlet for the liquid hydrocarbon. In fact, it seems that heretofore very little attention has been paid to the quantity of liquid hydrocarbon introduced into the vaporizing-chamber, and in those instances where a minute outlet-orifice has been employed the size of the inlet-orifice seems to have been regarded as of no importance, the inlet-orifice being made of such size that an excessive quantity of liquid hydrocarbon is discharged into the vaporizing-chamber and of such size that the pressure developed within the vaporizing-chamber might pass back into the reservoir. The objection to this is that it causes in the flame pulsations, due to the fact that the pressure within the vaporizing-chamber and the pressure in the reservoir do not remain in equilibrium. This objection is wholly obviated by continuously and uninterruptedly delivering to the vaporizing-chamber the exact quantity of liquid hydrocarbon necessary to produce the quantity of vapor needed for the lamp, and in an ordinary stand-lamp for household use this quantity is very small, only such as might be admitted through a minute orifice—such, for example, as would scarcely admit a very fine needle. It is upon the term "minute" as thus defined (regard being had always for the capacity of the lamp) that I rely in this specification for distinguishing the character of the inlet-orifice contemplated by my invention from the inlet-orifices of devices as heretofore constructed.

The invention consists in the features of novelty that are herein fully described with reference to the accompanying drawings, which are made a part hereof, and in which—

Figure 1 is a vertical section of a lamp embodying the invention. Fig. 2 is a section, on a somewhat-larger scale, of the generator or vaporizer with its inlet and outlet nozzles or tips omitted.

A represents the reservoir, which in the form of the invention shown in the drawings is located at a level lower than the generator. When so located, it is necessary to provide means for charging the reservoir with air under pressure for the purpose of forcing the liquid hydrocarbon up to the generator. To this end the reservoir is provided with a nipple B, adapted to receive the connection from a pump, by which air may be forced into the reservoir through the orifice *b*, and with a valve C, by which the orifice may be opened while the air is being pumped in and closed after the reservoir is charged. The same nipple and orifice may be used for introducing the liquid hydrocarbon.

D is a pipe the lower end of which is in communication with the reservoir A near the bottom thereof, whence the pipe extends upward to the level of the generator or vaporizer E. As shown more clearly in Fig. 2, this

generator or vaporizer preferably consists of a thin block or plate having at its opposite ends tubular extensions E′ and E², the former of which screws onto a fitting F, with which the tube or passage D communicates. The fitting F is provided with an internal bore and with a seat for a valve or cut-off G, the stem of which passes through a stuffing-box H. The end of the fitting is reduced and provided on its exterior with threads for receiving corresponding threads on the interior of the tubular extension E′, and it is further reduced to receive a discharge nozzle or nipple I, having a minute discharge-orifice. The block or plate is bored or cored to form a generating or vaporizing chamber comprising two transverse branches *e e′* and two longitudinal branches *e²*, connecting their ends. The branches *e* and *e′* communicate, respectively, with the tubular extensions E′ and E², the arrangement being such that the jet of liquid hydrocarbon discharged from the nipple or nozzle I strikes against the wall of the branch *e*. The generator is disposed with its broad flat sides in horizontal planes directly over the burner of the lamp, whereby it is kept at a sufficiently-high temperature to vaporize the liquid hydrocarbon which is discharged into it. By reason of the described construction of the generating or vaporizing chamber or passage the entering volume of liquid hydrocarbon discharged into the generator or vaporizer is completely vaporized and superheated in its passage through the generator, and the superheated vapor thus produced is discharged from the generator through a minute orifice in a nipple or nozzle J. The cross-sectional area of the orifice in this nozzle is very much less than that of the generating or vaporizing passage or chamber of the vaporizer and is disposed opposite the intake end of a comparatively-large tube or passage K, which leads to the burner L. The burner is of the Welsbach type and offers but little resistance to the escape of the combustible mixture from the end of the tube K, so that there is comparatively no back pressure within said tube, and consequently no tendency to the escape of gas at the air-inlet of the tube. It will be understood that the vapor is under considerable pressure in the vaporizing-chamber; but owing to the minuteness of the inlet-orifice of the generator this pressure does not to any appreciable extent extend into the tube or passage D or the reservoir A. Under this pressure the vapor is discharged from the nozzle K with considerable force, and in entering the intake end of the tube or passage K it induces or draws into said tube or passage a volume of air sufficient to form, with the vapor, a combustible mixture.

In order to positively prevent the escape of any vapor at the breach or interspace between the nozzle J and the tube or passage K, this breach or interspace is surrounded by an imperforate hood or sleeve M, which is preferably closed at one end and has its open end presented in the direction of the vapor-discharge, so that the air in order to enter the tube or passage K must enter the hood or sleeve in a direction opposite that in which the jet of vapor is passing.

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

1. A lamp having an oil-reservoir, means for admitting thereto and confining therein air under pressure, a tube for conveying oil therefrom, a generator to which the oil is conveyed by said tube, said generator having a vaporizing-chamber formed in a thin and comparatively-wide body of metal, a minute orifice for the inlet of oil to said vaporizing-chamber and a minute orifice for the outlet of vapor therefrom, said orifices being of substantially the same size and of much less cross-sectional area than the vaporizing-chamber, whereby a minute jet of oil is discharged into the vaporizing-chamber under pressure where it is immediately and completely vaporized and the vapor thus formed is discharged through the outlet-orifice in a minute jet under the pressure at which it is generated, a tube into which said jet of vapor is discharged, said tube being open for the induction of air under the influence of said jet of vapor and being of comparatively-large cross-sectional area, whereby the vapor and air are thoroughly mixed in passing through it, and a burner at the discharge end of said tube, said burner being of the Welsbach type, whereby back pressure within the tube is prevented, the burner being located immediately below the generator and the generator being arranged with one of its broad faces presented toward the burner, substantially as set forth.

2. A generator for lamps consisting of a thin and comparatively-broad body of metal having within it a passage, tubular extensions communicating with said passage, and nozzles carried by said tubular extensions, one of said nozzles being arranged to discharge a jet of liquid hydrocarbon into said passage and the other being arranged to discharge a jet of vapor from said passage, the orifices of said nozzles being minute, of substantially the same size and of less cross-sectional area than the cross-sectional area of the passage and the passage being indirect or deflected from a straight line connecting the nozzles, whereby the jet of liquid hydrocarbon discharged into it strikes against one of its walls, substantially as set forth.

3. A lamp having a generator consisting of an integral plate of metal having a vaporizing-chamber comprising connected transverse and longitudinal branches, a minute orifice for the inlet of oil arranged to discharge a minute jet of oil against the wall of one of said branches, a minute orifice for the outlet of vapor, a burner, and a tube or passage leading from the vapor-outlet orifice to the burner, substantially as set forth.

4. A lamp having a generator consisting of

an integral plate of metal having a vaporizing-chamber comprising two transverse branches and two longitudinal branches connecting the ends of said transverse branches, a minute orifice for the inlet of oil arranged to discharge a minute jet of oil against the wall of one of said transverse branches at a point intermediate said longitudinal branches, a minute outlet-orifice arranged opposite the other of said transverse branches at a point intermediate said longitudinal branches, a burner, and a tube or passage leading from the vapor-outlet orifice to the burner, substantially as set forth.

FRANKLIN M. BLACKMAN.

Witnesses:
N. C. GRIDLEY,
ALFRED COLE.