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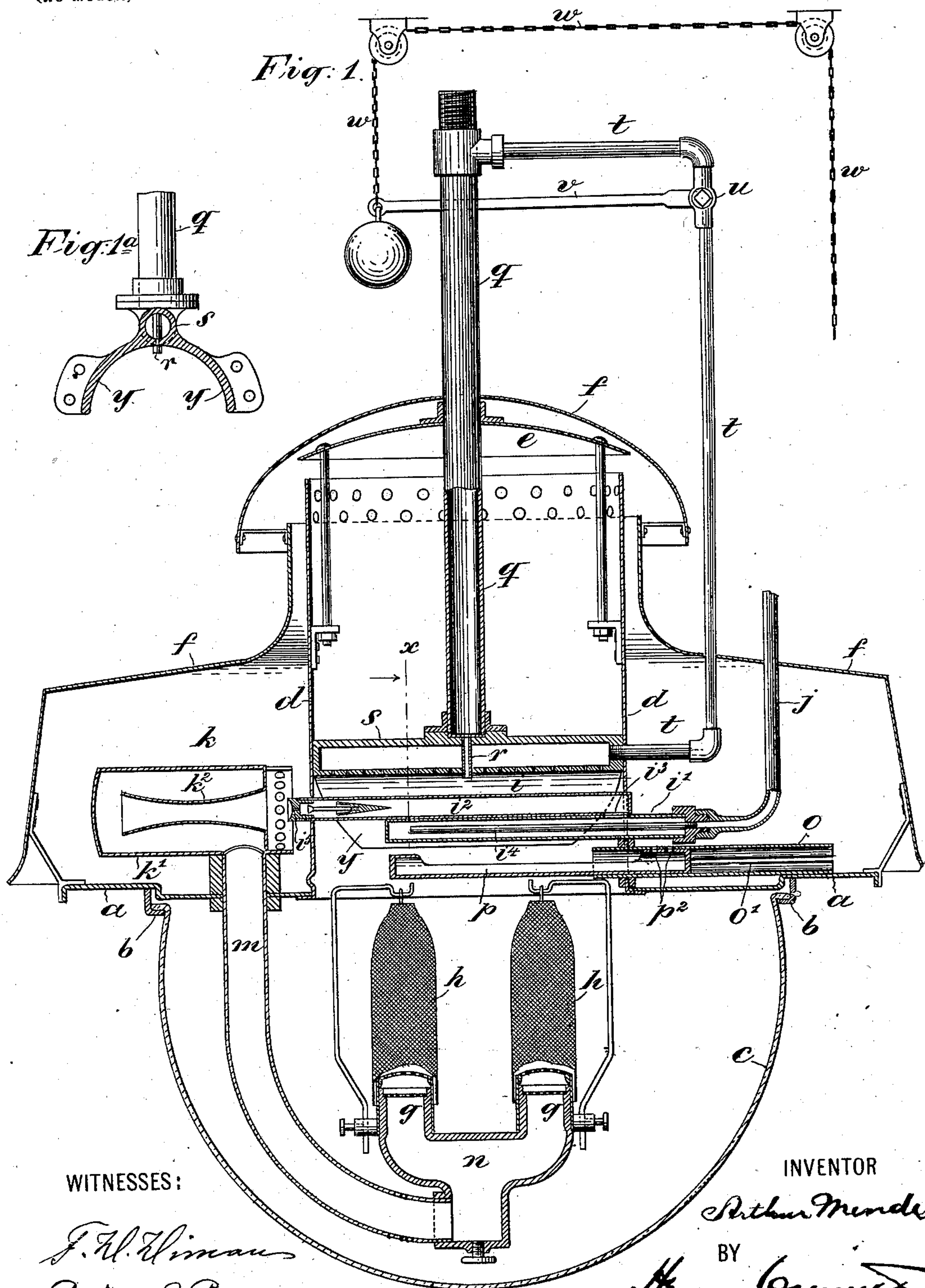
Patented June 17, 1902.

A. MENDE.
HYDROCARBON BURNER.

(Application filed Apr. 2, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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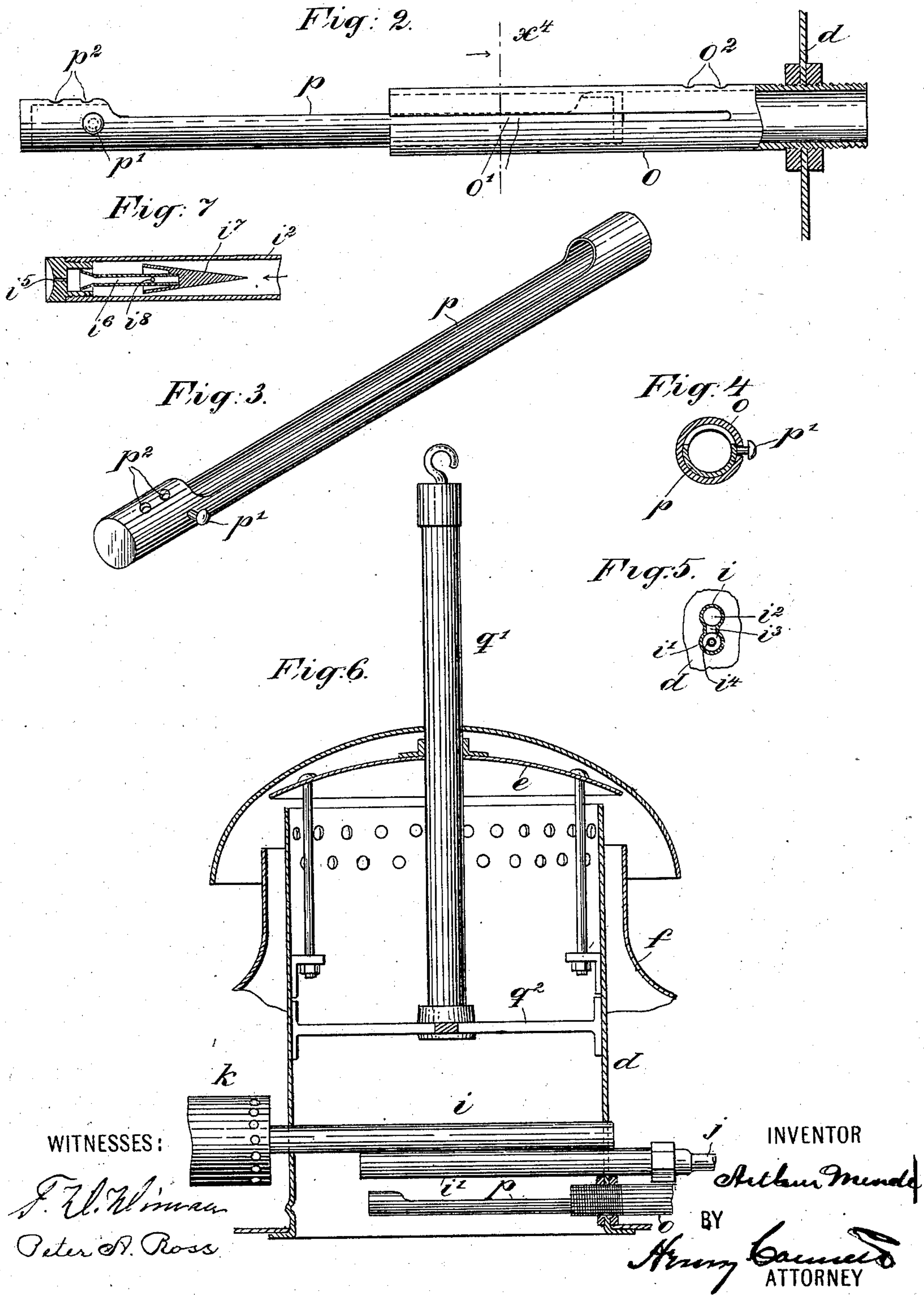
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UNITED STATES PATENT OFFICE.

ARTHUR MENDE, OF NEW YORK, N. Y., ASSIGNOR TO THE PAN AMERICAN LIGHT COMPANY, OF NEW JERSEY.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 702,449, dated June 17, 1902.

Application filed April 2, 1901. Serial No. 54,019. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR MENDE, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

This invention relates to the class of hydrocarbon-burners for illuminating purposes wherein kerosene or other liquid hydrocarbon is vaporized in a vaporizer over the illuminating burner or burners, the vapor mixed with air in a mixer, and the air thus carbureted is led to the burner and burned in an incandescent mantle.

The object of the present invention is in part to improve the vaporizer and mixer and in part to improve the means for primarily heating the vaporizer.

In the drawings which serve to illustrate the invention, Figure 1 is a vertical axial section of a hydrocarbon burner or lamp embodying the invention, and Fig. 1^a is a fragmentary section at $x-x$ in Fig. 1. Fig. 2 is a detail side elevation of the primary heater on a larger scale than Fig. 1. Fig. 3 is a perspective view of the trough for carrying the volatile liquid for the heater. Fig. 4 is a cross-section at x^4 in Fig. 2. Fig. 5 is a cross-section of the vaporizer. Fig. 6 is a view of the upper part of the lamp, illustrating a construction where the use of gas as a primary heater of the vaporizer is omitted or dispensed with. Fig. 7 is an enlarged view of the delivery end of the vaporizer.

In the following description the device as a whole will be called a "lamp," as that is the trade name, and the device for primarily heating and vaporizing the hydrocarbon, so as to set the lamp in operation, will be called the "starter."

In the general drawings, a is an annular platform, to which is hinged at the under side of the platform a supporting-ring b for the glass globe c . On the annular platform a is mounted a drum d , perforated at its upper part and surmounted by a crown-plate e . Supported on the platform a is a removable storm-hood f . Within the globe c are the burners g of the lamp, which have mantles h

of the kind usually called "Welsbach" mantles. All of these features are common in this class of lamps.

Extending transversely across the drum d , above the burner g , is the vaporizer i . This device consists of two tubes, which overlap and are brazed or otherwise secured together. The receiving-tube i' is below and the delivery-tube i^2 above, and the two are connected by an aperture i^3 . The oil-supply tube j , which brings oil to the vaporizer from any suitably-situated reservoir, connects with a tube i^4 , which extends into the lower or receiving tube i' nearly to its closed end. Thus the oil enters the device through the tube i^4 , which discharges it at the inner end of the tube i' . The oil flows thence back through the tube i' about the tube i^4 , keeping down the temperature of the latter and shielding the incoming oil therein from the intense heat. Eventually the oil passes through the aperture i^3 into the upper tube i^2 , in which the vaporization is completed, and the vapor under pressure from expansion is driven out as a forcible jet through a jet-aperture i^5 in the delivery end of the tube i^2 . Thus the vaporizer comprises a plurality of parallel tubes so connected as to form a zigzag passage for the oil, whereby the latter is gradually heated and vaporized without decomposition.

Situated opposite to the jet-aperture i^5 and exterior to the drum d is the mixer k , which consists of an outer drum or casing k' , closed at the rear or outer end and open at the other end to receive the jet from the vaporizer. Within the outer casing k' is an inner tubular receiver k^2 , which is contracted at its middle part and flared at its ends by preference. The mouth of this receiver is directly opposite to the jet-aperture of the vaporizer, and the axes of the upper tube of the latter and the receiver k^2 are alined. The jet of vaporized hydrocarbon carries air in with it by induction and mixes with the air in the mixer. From the mixer the carbureted air flows by a pipe m to a Y-shaped breeching n , on the respective branches of which are mounted the burners g . This pipe m is situated at one side of the globe c and out of the zone of greatest heat, whereby it is protected from deterioration, and at the same time by the construc-

tion shown each burner is supplied equally and impartially with gas or carbureted air. This is important in respect of durability. It may be noted here also that the delivery
 5 end of the vaporizer is exterior to the wall of the drum *d*, and therefore entirely outside of the zone of intense heat and protected from the latter, so that its jet-aperture does not readily become clogged or choked with the
 10 solid distillates, as is the case with most lamps of this general character. Should this aperture become clogged, however, the access to it for the insertion of a cleaning needle or pin is easy, as the vaporizer may be readily re-
 15 moved by unscrewing it from the end of the oil-supply pipe *j* and drawing it out, as it is not secured or need not be secured in the walls of the drum *d*, in which it is mounted, or if it be undesirable to unscrew the vaporizer
 20 from the oil-supply pipe the mixer *k* may be readily unscrewed from the pipe *m*, so as to afford convenient access to the aperture *i*⁵.

Preferably the lamp will be supplied with two starting devices, one operating with ordinary illuminating (or street) gas and the
 25 other with some volatile hydrocarbon, as alcohol, or both devices may be used conjointly. These will now be described.

Mounted in the wall of the drum *d*, below
 30 the level of the vaporizer *i* and extending out radially from the drum, is a tubular guide *o*, Figs. 1 and 2, and in this guide is adapted to slide a tubular trough *p*. This trough has on its side a stud-like thumb-piece *p*¹, the neck
 35 of which engages a slot *o*¹ in the guide, so that the trough is held against rotation. In its operation some alcohol or the like is put in the trough *p* and the latter inserted in and pushed into the tubular guide *o*. When
 40 pushed in as far as the stud and slot will permit, the trough will occupy a position directly under the vaporizer, as seen in Fig. 1. The alcohol may now be ignited at a hole or holes
 45 *o*² in the top of the guide *o*, which will then be in coincidence with corresponding holes *p*² in the top of the outer end of the trough *p*, which is covered at this point. This construction enables the alcohol or other volatile
 50 combustible to be ignited as a body within the drum *d*, so as to avoid the danger from fire which exists in the use of some forms of these lamps. The vaporizer may be heated by gas also in the construction shown in Fig. 1. The suspending-stem *q* of the lamp is a
 55 gas-pipe, which may be connected at its upper end to a gas-service pipe. This pipe extends down in the axis of the drum *d* and has at its end a small burner tip or tube *r*, which is at all times lighted. The burner *r* is situated
 60 under a transverse burner-tube *s* in the drum, which has jet-apertures along its under side directly over the vaporizer *i*. A branch gas-pipe *t* from the pipe *q* or from any source of gas leads gas to the burner-tube *s*, and in
 65 this pipe *t* is a cock *u*, closed by a weighted lever *v*. This lever may be operated from any point by a cord or wire *w* over suitable

guide-sheaves to turn on the gas and keep it on as long as may be needed. The small jet or burner *r* ignites the gas at the jets in the
 70 burner-tube, and these heat the vaporizer and produce carbureted air to supply the burners *g*, which will be ignited as soon as they are supplied. The burner-tube *s* (seen in cross-section in Fig. 1^a) will be of cast metal,
 75 as iron, by preference, and the tubular stem *q* of the lamp extends down into the drum *d* to the burner-tube, to which it is rigidly secured, thus serving the double purpose of a pendant for the lamp and a pipe to supply
 80 gas to the small permanent or "pilot" burner *r*. This burner may be a bit of slender tubing extended down through the tube *s*. The latter tube will have, by preference, deflecting-plates *y* to embrace the vaporizer, as seen
 85 in the cross-section, Fig. 1^a.

Fig. 7 shows, more enlarged than in Fig. 1, the device in the delivery end of the vaporizer *i* for compelling the reverberation of the
 90 vapor before it reaches the contracted outlet or jet-aperture *i*⁵. This device consists of a tube *i*⁶ in the axis of the upper tube *i*², with its flared end presented to the aperture *i*⁵ and having on its inner end a cone *i*⁷, the
 95 apex of which is directed inward. The current of vaporized hydrocarbon flowing toward the jet-aperture is spread by said cone, flows around the base of the cone and into the hollow thereof, and then enters the tube *i*⁶
 100 through an aperture or apertures *i*⁸ therein. Through the last-named tube it reaches the jet-aperture. The peculiar form of the tubular receiver *k*² of the mixer or carbureter
 105 *k* is found best adapted for effecting the induction of air by the jet of vapor.

The construction illustrated in Fig. 6 will require no extended description. The pendant *q*¹ of the lamp extends down into the
 110 drum *d* and is rigidly secured to a frame *q*² therein. The gas apparatus for starting is omitted in this construction.

Having thus described my invention, I claim—

1. In a hydrocarbon-lamp, the combination with the drum of the lamp, a vaporizer for
 115 the oil situated within said drum, a burner or burners below said vaporizer, and means for mixing air with said vapor and supplying it to the burner, of means for primarily heating the vaporizer, said means comprising a
 120 tubular guide fixed at one end radially in the wall of the drum below the level of the vaporizer, a trough to contain a volatile liquid mounted in the guide, said trough and tube having igniting apertures which register
 125 when the trough is pushed in under the vaporizer, and means for guiding said trough in its movements in the tube, substantially as set forth.

2. In a hydrocarbon-lamp, the combination
 130 with the drum of the lamp, a vaporizer in the drum, a burner below the vaporizer, a mixer in operative relation to the vaporizer, and a conduit connecting the mixer and burner, of

a tubular guide secured in the drum in a radial position and provided with a slot and a hole or holes, of the trough slidably mounted in the guide and provided with a thumb-piece
5 engaging the slot in the guide, and a hole or holes, adapted to register with the holes in the guide when the trough is pushed in, substantially as set forth.

3. In a hydrocarbon-lamp, the combination
10 with the drum of the lamp, the burner or burners thereunder, the vaporizer in the drum above the burner, said vaporizer having its outlet or discharge exterior to the drum, a mixer exterior to the drum and in operative
15 relation to the vaporizer, said mixer comprising an outer casing and an inner tubular receiver, said receiver being contracted at its middle and flared at its ends, and a pipe leading from the lower side of said outer casing
20 to the lower portions of the burners, substantially as set forth.

4. In a hydrocarbon-lamp, the combination with the drum, the burner or burners below the drum, a transverse vaporizer above and
25 over the burners, a mixer connected with the vaporizer, and a pipe to conduct the mixed vapor and air to the burners, of means for

primarily heating the vaporizer, said means consisting of a guide extending into the drum below the vaporizer, its receiving end being
30 exterior to the drum, and a trough to contain a combustible slidably mounted in said guide and extending out into the guide exterior to the drum, said guide and trough having coincident holes for igniting the combustible,
35 substantially as set forth.

5. In a hydrocarbon-lamp, the combination with the drum and the vaporizer extending across the same diametrically, of a burner-tube extending across said drum above the
40 vaporizer and fixed rigidly in the drum, an upright pipe in the axis of the drum and forming the suspending stem of the lamp, the small jet-tube at the lower end of the said pipe to provide a permanent jet, and means
45 for admitting gas to the burner-tube, substantially as set forth.

In witness whereof I have hereunto signed my name, this 6th day of March, 1901, in the presence of two subscribing witnesses.

ARTHUR MENDE.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.