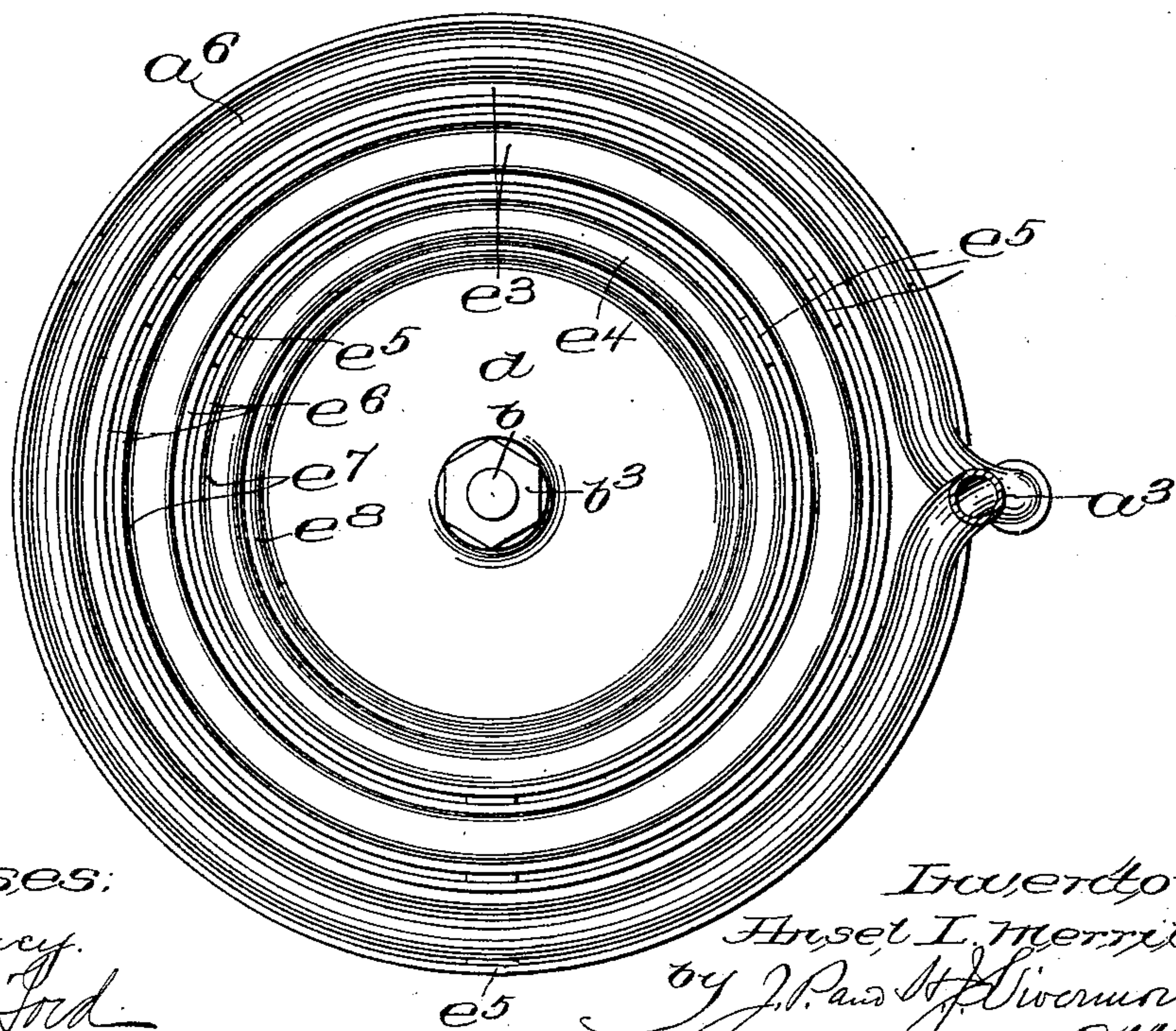
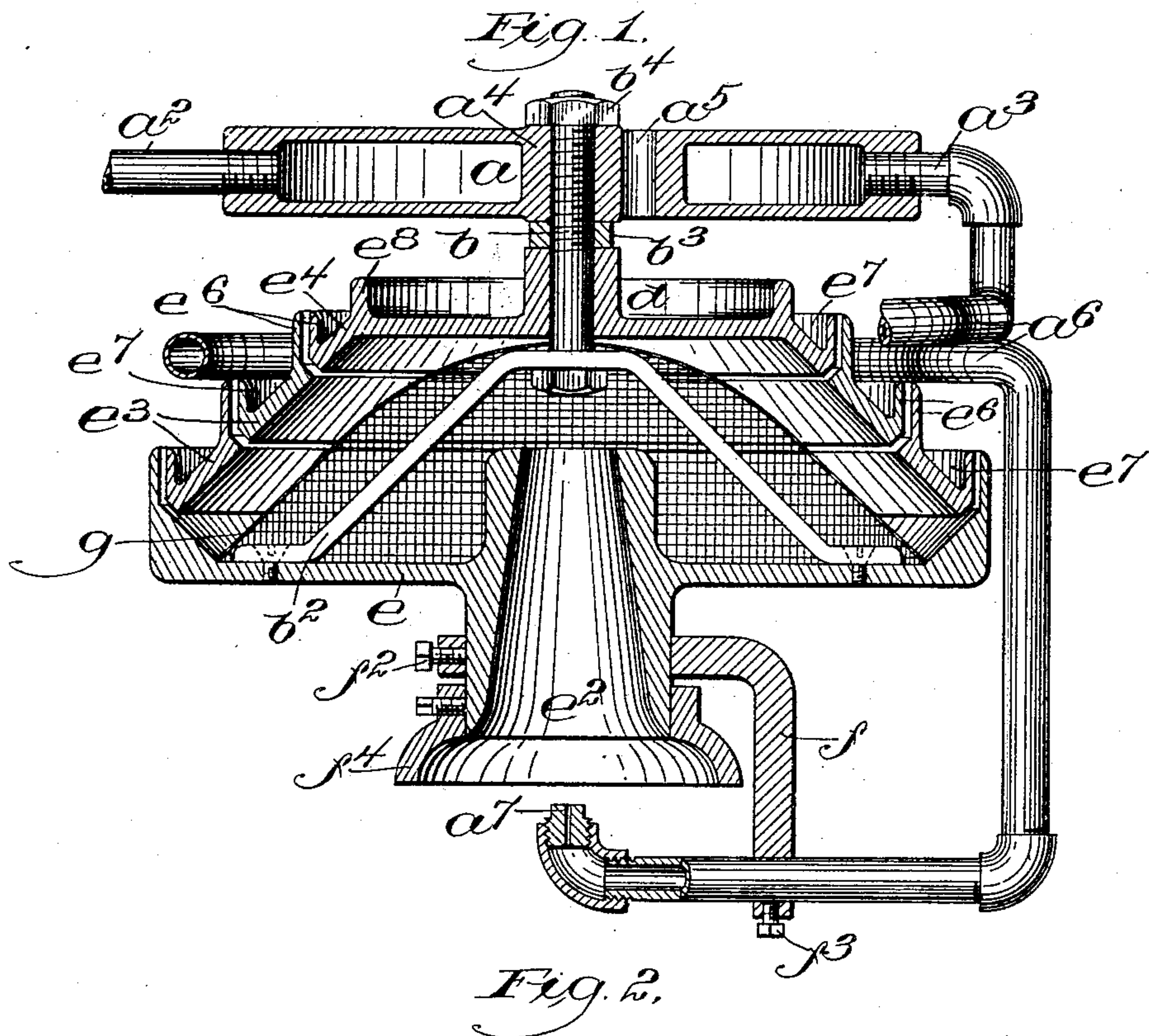


No. 745,880.

PATENTED DEC. 1, 1903.

A. L. MERRILL.
HYDROCARBON BURNER.
APPLICATION FILED OCT. 18, 1902.

NO MODEL.



Witnesses:
Jas. J. Maloney.
Nancy P. Ford.

Inventor,
A. L. Merrill.
by J. P. and H. J. Livermore,
Attys.

UNITED STATES PATENT OFFICE.

ANSEL L. MERRILL, OF HYDEPARK, MASSACHUSETTS.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 745,880, dated December 1, 1903.

Application filed October 18, 1902. Serial No. 127,863. (No model.)

To all whom it may concern:

Be it known that I, ANSEL L. MERRILL, of Hydepark, county of Norfolk, and State of Massachusetts, have invented an Improvement in Hydrocarbon-Burners, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a hydrocarbon-burner of that type in which oil is vaporized, superheated, and then injected, together with entrained air, into a burner-chamber provided with orifices through which the combustible mixture of hydrocarbon gas and air escapes and burns.

The invention is embodied in a burner of novel construction and arrangement, the purpose being to obtain a burner which is compact, simple, and inexpensive to construct and at the same time efficient.

A further advantage of the construction embodying the invention is that the inlet-jet for the superheated oil-vapor is thoroughly protected from the flames at the burner-orifice, thus obviating the tendency of the superheated oil-vapor to light and burn at the jet.

A further feature of the invention consists in providing the burner with a vaporizing-chamber which has a large area of surface exposed to the heat which is used to start the apparatus, so that the oil is rapidly vaporized and the tendency to carbonize and clog the apparatus obviated.

In accordance with the invention the vaporizing-chamber, which is mounted directly above the burner-chamber, is of a shape to substantially conform to that of the burner, being preferably substantially cylindrical, and formed, if desired, in a single casting with a sand core to form a chamber. The burner, which is directly below the vaporizing-chamber, is substantially conical in shape, the burner-outlets being arranged in a series, one above the other, and preferably in the form of annular slots. The inlet for the vaporized oil is through the bottom of the burner, and the jet, which is in alinement with the inlet, is at the end of a tube or duct which leads from the vaporizing-chamber and which has formed in it between the vaporizing-

chamber and the jet a superheating-coil which is subjected to the direct flame from the burner-chamber.

The invention further relates to certain novel features of construction and arrangement, which will be hereinafter more fully described.

Figure 1 is a vertical section through the middle of a burner embodying the invention, and Fig. 2 is a top plan view of the burner without the vaporizing-chamber.

The vaporizing-chamber *a*, which is at the top of the burner, is shown as formed in a single casting substantially circular or cylindrical in shape, the oil being admitted to said chamber through a supply-pipe *a*² and passing out of the chamber through an outlet-pipe *a*³, the said pipes being shown as screwed into openings formed in the side walls of the chamber.

To afford a support for the chamber *a*, the middle thereof is left solid, as indicated at *a*⁴, and the solid portion is bored through to receive a bolt *b*, which is utilized, as will be hereinafter described, to connect together all the parts of the apparatus. The said part *a*⁴ is also shown as provided with a hole *a*⁵, bored through the solid part *a*⁴ from the top to the bottom of the chamber-casting, the purpose of which is merely to facilitate feeding oil to a receiver *d* at the top of the burner for the purpose of starting the apparatus.

The outlet-pipe *a*³, which leads from the vaporizing-chamber *a*, is provided with a superheating-coil *a*⁶, which extends, as shown, around the burner-chamber, so as to be subjected to the heat of the flame when the burner is in operation, and from said coil the pipe extends below the base of the burner, terminating in a jet *a*⁷, which points upward toward a conical tubular orifice *e*², formed in the base-plate *e* of the burner-chamber. The said tubular orifice is preferably in the middle of the base-plate *e*, which is shown as substantially circular in shape, so that the gas and the air entrained thereby enter the middle of the chamber, so as to be equally and thoroughly distributed therein.

The chamber is shown as conical in shape and is preferably built up of annular sections *e*³, the lower section, which is of the largest

diameter, being adapted to support the section above it, which in turn supports the next, the top section e^4 being in the form of a disk or cover to close the top of the chamber.

5 The burner-orifices through which the gas escapes from the chamber are shown as in the form of annular slots between adjacent sections, the said sections being separated from each other to form the slots by means of lugs
10 e^5 , which afford the immediate support for the section above and are of sufficient width to separate the sections, as best shown in Fig. 1. The uppermost section e^4 being closed, as shown, the gas which enters through the
15 conical inlet-orifice e^2 strikes the closed top and is deflected throughout the chamber, escaping at the sides, the construction being such that it is practically impossible for the gas inside the chamber to ignite and cause
20 the burner to light back or burn directly at the jet.

In order to further prevent the gas within the chamber from igniting before it escapes, each section is shown as provided with a flange
25 e^6 , the said flanges standing parallel to each other when the parts are assembled, the space between the flange which affords the annular burner-orifice thus being of considerable length—i. e., from the inside to the outside
30 of the chamber. The several flanges, furthermore, afford channels e^7 around the burner, which will hold oil to be lighted for the purpose of starting the burner, the heat thus developed serving to act upon the superheating-coil and convert the oil into gas before it
35 reaches the jet.

The oil-receiver d is shown as formed in the upper section e^4 , which is provided with a flange e^8 , which forms a shallow cup to hold
40 oil, the heat of which when burning impinges directly against the vaporizing-chamber a .

As previously stated, the bolt b serves to hold all the parts together, the said bolt extending through a strap b^2 , which is secured
45 to the base-plate e , and being provided with a nut b^3 , which is screwed onto the middle of the bolt at the outside of the disk or cover e^4 , so that by tightening the said nut the base-plate e and the cover e^4 are brought together
50 and clamped, the intermediate sections e^3 thus being held in place. The vaporizing-chamber a is also supported by said bolt, and rests upon the nut b^3 , and is held in place by means of a nut b^4 , the tube or outlet-pipe a^3
55 being supported in turn by the chamber a .

To afford an additional support for the pipe a^3 and also to insure the proper location of the jet a^7 with relation to the orifice e^2 , the apparatus is provided with a bracket member f ,
60 secured, as by a set-screw f^2 , to the base-plate around the orifice, a portion of said bracket also being secured by means of a set-screw f^3 to the pipe a^3 , which can be moved or adjusted until the jet is in the right position and then
65 held by tightening the set-screw.

The gas issuing from the jet is shown as protected by means of a bell-shaped member f^4 ,

which is secured to the part of the base-plate in which the tubular orifice is formed, it being obvious that the bell-shaped member 70 might be cast integral with the base-plate, if desired.

Within the chamber between the inlet-orifice and the burner-outlets I prefer to place a screen or netting g , which renders it practi- 75 cally impossible for the flame to ignite the gas at the jet.

In starting the burner the receptacle d and the channels e^7 are supplied with oil, which is ignited so as to burn freely, thus heating the 80 vaporizing-chamber a and the superheating-coil a^6 in the pipe a^3 . When these parts have been heated sufficiently to vaporize the oil as it flows through, the supply of oil is turned on, and passing through the vaporizing-cham- 85 ber and the superheating-coil becomes converted into gas before reaching the jet, from which jet it issues with considerable force, entraining air and mixing therewith, so as to fill the chamber with the proper combustible 90 gaseous mixture. The flow of gas is directed against the top of the chamber and deflected downward, so that it becomes thoroughly mixed before reaching the annular burner-slots. As soon as the action is started, the 95 heat developed by the gas burning at the slots keeps the vaporizing-chamber and superheating-coil hot, so that the operation will continue so long as the burner is supplied with oil. 100

I claim—

1. In a hydrocarbon-burner, the combination with a vaporizing-chamber; of a burner-chamber below said vaporizing-chamber provided with annular burner-orifices and an 105 air-inlet at the bottom; and a superheating-coil surrounding said burner-chamber and interposed between the said burner-chamber and the vaporizing-chamber, and terminating in a jet-orifice in alinement with the air- 110 inlet at the bottom of the burner-chamber.

2. The combination with a conical burner-chamber provided with burner-orifices one above the other along the conical wall of said chamber and also with a tubular inlet at the 115 bottom; and a duct having a superheating-coil surrounding the conical wall of the burner-chamber over the burner-orifices, and terminating in a jet in line with the tubular inlet at the bottom of the burner-cham- 120 ber, said burner-chamber being provided with a channel formed on the outside of the conical wall thereof below the said superheating-coils.

3. The combination with a burner-cham- 125 ber closed at the top and having conical walls and being provided with annular burner-orifices in said walls provided with parallel flanges to increase the length of the orifices from the inside to the outside of the cham- 130 ber, said chamber being also provided with a tubular inlet at the bottom; a vaporizing-chamber supported above the burner-chamber; and a duct leading from said vaporizing-

chamber to the bottom of the burner and terminating in a jet pointing into said tubular inlet.

4. In a hydrocarbon-burner, the combination with a vaporizing-chamber and superheating-coil terminating in a jet; of a burner-chamber provided with a tubular inlet-orifice at the bottom in line with said jet and having upper and lower members and intermediate annular sections resting one upon another; and a fastening device connecting said upper and lower members and clamping together the annular sections.

5. In a hydrocarbon - burner, a burner-chamber made in sections and provided with tapering or conical walls; means for separating the sections to afford burner-orifices be-

tween adjacent sections, said chamber being provided with a tubular tapered inlet through the bottom; a vaporizing-chamber supported above the burner-chamber; and a tube leading from said vaporizing-chamber and provided with a superheating-coil surrounding the burner adjacent to the burner-orifices, said tube terminating in a jet in alinement with the inlet to the burner-chamber, as set forth.

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

ANSEL L. MERRILL.

Witnesses:

HENRY J. LIVERMORE,
NANCY P. FORD.