

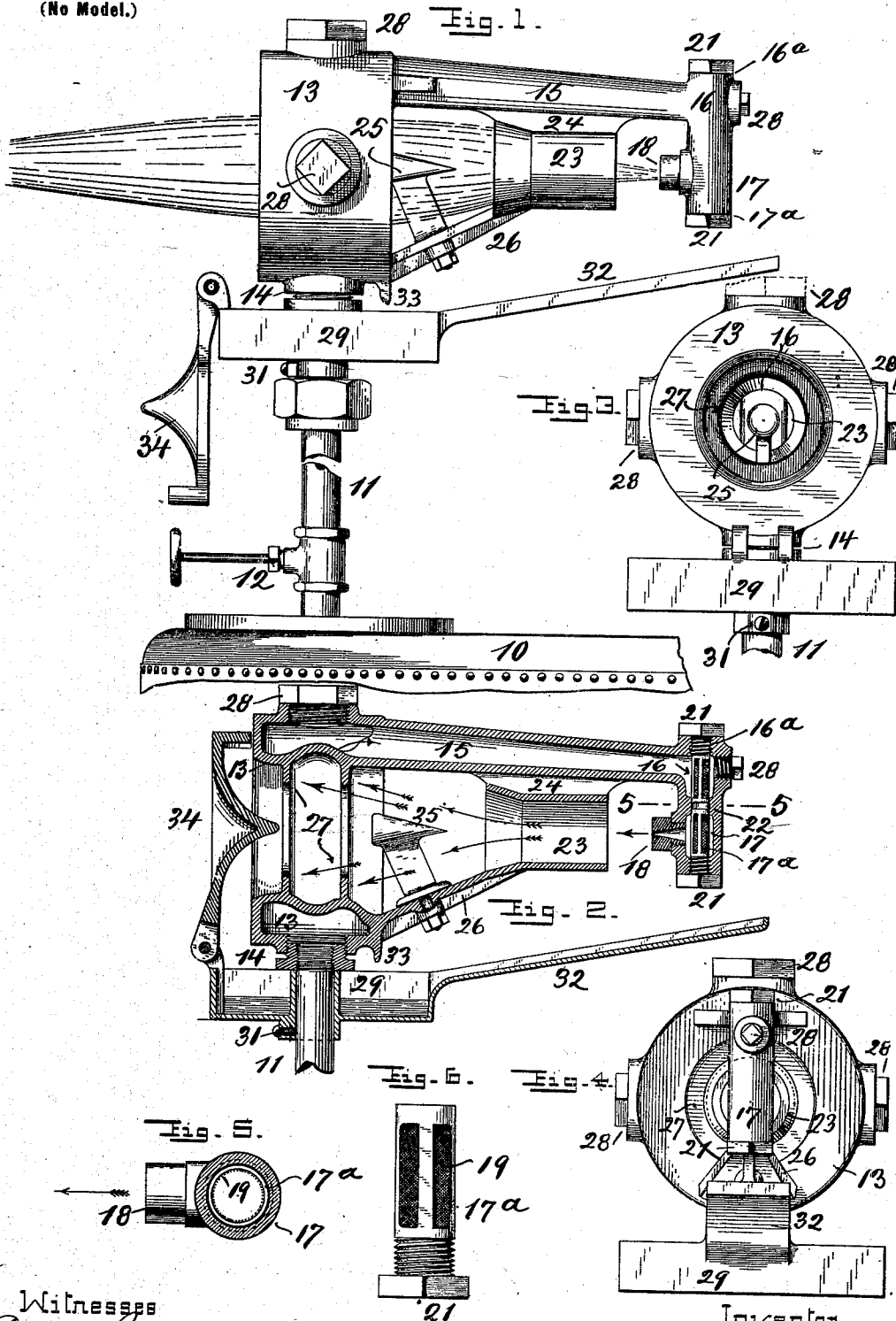
No. 714,722.

Patented Dec. 2, 1902.

W. MACLEOD.
HYDROCARBON BURNER.

(Application filed Mar. 8, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 714,722, dated December 2, 1902.

Application filed March 8, 1902. Serial No. 97,257. (No model.)

To all whom it may concern:

Be it known that I, WALTER MACLEOD, a citizen of the United States, and a resident of the city of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form also a part of this specification.

This invention relates to certain improvements in burners using a hydrocarbon as a fuel, which for combustion is vaporized, the gas generated from the converted fuel being immediately consumed.

The burner may be used for lighting as well as for heating purposes, according to the particular manner of its mounting and the position in which it is supported.

The invention consists of certain improvements in the construction in general and in detail, features of which are the provision of means accelerating the vaporization of the liquid fuel, of filtering the generated gas, and of directing the same toward the point of combustion.

In the following specification, and particularly pointed out in the claims at the end thereof, is found a full description of the invention, together with its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a side view of my improved hydrocarbon-burner as it appears when in operation. Fig. 2 is a longitudinal vertical section of the preceding figure, showing the burner before its operation is started. Fig. 3 is a front view, and Fig. 4 a rear view, of it. Fig. 5 is an enlarged horizontal section of certain parts of the burner as indicated by line 5 5 in Fig. 2. Fig. 6 is an enlarged view of one of the detached gas-filters.

The hydrocarbon, which may be crude petroleum or any of the products derived therefrom, is contained in a suitable tank 10 and supplied to the burner by means of a pipe 11, controlled by a valve 12. The burner is mounted or connected to the end of this supply-pipe, and the fuel is supplied to it either

by gravitation, if the arrangement and relative position of the parts permit such, or otherwise—as, for instance, by air-pressure, which is assumed in the case illustrated. The supplied fuel is first introduced into a hollow ring-shaped structure forming the vaporizing-chamber 13 of the burner and having on its outside an attaching-nipple 14, at which it is connected to and supported on the supply-pipe 11 and where the fuel enters. At another point, preferably diametrically opposite thereto, is the outlet for the generated gas, which latter passes through a laterally-extending tubular member, forming a duct 15, into the first of two filtering-chambers, (designated by 16,) from which it enters the second filtering-chamber 17, both being angular continuations of duct 15, after which it leaves through the perforated discharge plug or nozzle 18. The direction of this discharge is such as to be axially coincident or in line with the center or axis of the ring forming the vaporizing-chamber 13, for which purpose the parts are arranged as shown—that is, the tube forming duct 15 projects laterally from the ring forming chamber 13, and the filtering-chambers are arranged substantially at right angles thereto, projecting in a direction which brings the discharge-opening to the proper point. The filtering-chambers are in open communication with each other as well as open above and below to receive the filter-plugs 16^a and 17^a. They are each a hollow plug open at one end to receive the filtering medium 19, which is wire-gauze and of which a piece of sufficient size is placed all around within the hollow plug and against the inside thereof. The side of each plug is provided with a number of large openings to prevent interference with the passage of the gas through the gauze. The other end of each plug is closed and provided with a head 21, formed into a nut, and a portion of each plug is also screw-threaded, which thread engages a corresponding thread inside of the filtering-chambers, so that these plugs may be removed for cleaning or renewal of the filtering medium. The plugs are inserted with their inner open ends opposite each other, with said ends fitted into a contracted portion or throat 22 between the filtering-chambers, so that the gas during its passage is compelled to pass

through the plugs. This passage as to the plugs is in opposite direction—that is, in the upper chamber the gas passes from the outside through the side of the wall into the plug and in the lower chamber it passes from the inside of the plug through the side thereof to the outside. It will thus be seen that the gas is filtered twice, so that with the meshes or perforations of the filtering medium not larger than the opening in plug 18 any possibility of obstructing or closing the gas-outlet is avoided. The gas next enters the igniting-chamber 23, in which it becomes mixed with air and where the combustion begins. This chamber is a cylindrical structure supported on the under side of the wall of duct 15 by means of a web 24 and has open ends, one of which enlarges outwardly on a flare. The axis of this chamber is also in line with the discharge-opening of the gas and the center of the opening through the ring forming the generating-chamber 13, and, as will be seen, it is supported between these two in a manner to leave large open spaces at each end to admit free access of air and oxygen to the gas where the same enters it at one end and to the flame at the other.

Between the flaring end of the igniting-chamber 23 and chamber 13 there is placed the spreader 25, being a conical member so placed as to be with its axis centrally aligned with the parts mentioned and with its point turned toward the gas-outlet. It may be supported from above on the tube forming duct 15 or below on a brace 26, to either of which it is attached. The effect of this spreader is to separate the flame, causing parts of the same to be thrown against annular baffle-plates 27, projecting inwardly from the inner wall of the ring forming the generating-chamber. The effect of this contact is to heat these plates intensely, which heat is quickly and continuously communicated to the surrounding parts of the generating-chamber, which becomes also heated, so that the vaporization of the liquid fuel within when coming in contact with these hot surfaces is materially accelerated.

The parts and walls forming the generating-chamber 13, duct 15, filter-chambers 16 and 17, igniting-chamber 23, supporting-web 24, and brace 26 are preferably all made out of one casting.

There are openings left at various places to facilitate removal of the core—as, for instance, in the outer wall of the ring forming chamber 13 and at the end of duct 15 at the turn where it forms the filtering-chambers. These openings are closed by screw-plugs 28 and have no further function or significance, except, being removable, they permit access for cleaning the inside of these parts in case such should become necessary.

To start operation of the burner, a preliminary heating becomes necessary of the outside of chamber 13 in order to obtain gas. This may be done by fuel ignited in a pan 29,

placed immediately below the parts to be heated, where it may be permanently attached—as, for instance, by a set-screw 31—to supply-pipe 11. This fuel may also be oil supplied from the burner itself, for which purpose valve 12 is opened and a limited quantity permitted to escape at 18. This oil is caught by a gutter 32, and thereby conveyed into pan 29. To prevent any of this oil or condensed vapors from getting into the screw-joint at nipple 14, I provide a drip-nose 33, which prevents such and by intercepting such oil causes the same to drip into pan 29. In order to confine the heat as much as possible during this preliminary heating of the burner, a flap 34 is raised into a position, as shown in Fig. 2, where it closes the front part of the burner. After operation of this latter is fully started said flap is dropped, as shown in Fig. 1. It is hingedly connected to pan 29. The parts as shown, with the exception of where the flame issues, may be inclosed by an outer casing of sheet metal, due regard being had by provision of openings in this latter to admit the necessary air to the gas and flame.

The spreader may not always be needed, for which purpose it is detachably connected; but its use is desirable in extremely cold weather or strong wind.

The small gas-filtering openings might be directly provided in the sides of the filter-plug instead of the large openings shown there now and the wire-gauze omitted. This latter is preferable, however, by reason of the facility of its ready renewal.

When air-pressure is used to raise the fuel into the burner, air-pump, pressure-gages, and similar auxiliary means needed in such case are provided, but form no part of my invention.

Having described my invention, I claim as new—

1. In a hydrocarbon-burner, the combination of a hollow ring forming a vaporizing-chamber, a gas-discharging nozzle supported opposite the same, a tubular member connecting the two and forming a gas-conveying duct between them, another shorter tubular member open at both ends supported between the vaporizing-chamber and the gas-outlet forming a mixing and igniting chamber, and a conical spreader between the vaporizing-chamber and the mixing-chamber so formed and disposed with its pointed end toward the gas-outlet, all these parts axially aligned with each other and centrally in line with the gas-outlet.

2. In a hydrocarbon-burner, the combination of a hollow ring forming a vaporizing-chamber and having annular baffle-plates projecting from its inner side into the space surrounded thereby, a gas-discharging nozzle supported opposite the same, a tubular member connecting the two and forming a gas-conveying duct between them, another shorter tubular member open at both ends

supported between the vaporizing-chamber and the gas-outlet, forming a mixing and igniting chamber and a conical spreader between the vaporizing-chamber and the mixing-chamber so formed and disposed with its pointed end toward the gas-outlet, all these parts axially alined with each other and centrally in line with the gas-outlet so that the discharged gas and ignited flame pass through all these parts and part of the flame is directed by the spreader against the annular baffle-plates on its passage through the open ring.

3. In a hydrocarbon-burner, the combination of a hollow ring forming a vaporizing-chamber, a gas-discharging nozzle supported centrally opposite the same so that the flame of the ignited gas passes through the open ring, a tubular member connecting the two and forming a gas-conveying duct between them, part of this tubular member near the gas-discharging nozzle constituting a filtering-chamber communicating with the gas-outlet mentioned and being contracted between the ends of the chamber so formed and hollow filter-plugs with perforated sides fitted into this filtering-chamber, one at each open end thereof and with their inner open ends opposite each other and within the contracted part of the filtering-chamber, whereby the gas is filtered twice by passing first into one plug and then out of the other.

4. In a hydrocarbon-burner, the combination of a hollow ring forming a vaporizing-chamber, a gas-discharging nozzle supported centrally opposite the same, so that the flame of the ignited gas passes through the open ring, a tubular member connecting the two and forming a gas-conveying duct between them, part of it near the gas-discharging nozzle constituting a filtering-chamber communicating with the gas-outlet mentioned and being contracted between the ends of the chamber so formed and hollow filter-plugs

having openings in their sides fitted into this filtering-chamber, one at each of the open ends thereof and with their inner open ends opposite each other and within the contracted part of the filtering-chamber and wire-gauze fitted all around against the inside of these filter-plugs.

5. In a hydrocarbon-burner, the combination of a hollow ring forming a vaporizing-chamber, a gas-discharging nozzle supported centrally opposite the same so as to cause the flame of the ignited gas to pass through this ring, a tubular member connecting the two and forming a gas-conveying duct between them, an igniting-pan fitted under the ring forming the generating-chamber, a gutter extending therefrom to within a point below the gas-outlet and a drip-nose at the lowest part of the ring forming the generating-chamber and on the side nearest the gas-outlet.

6. In a hydrocarbon-burner, the combination of a hollow ring forming a vaporizing-chamber, a gas-discharging nozzle supported opposite the same, a tubular member connecting the two and forming a gas-conveying duct between them, another shorter tubular member open at both ends supported between the vaporizing-chamber and the gas-outlet and forming a mixing and igniting chamber, a brace extending from the lower part of the ring forming the mixing-chamber to the lower part of the tube forming the generating-chamber and a conical spreader detachably connected to this brace, said spreader together with the ring and tube forming respectively the generating-chamber and mixing-chamber being all axially alined and centrally in line with the gas-outlet.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

WALTER MACLEOD.

Witnesses:

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ARTHUR KLINE.