

S. W. MORROW, JR.
PILOT BURNER.
APPLICATION FILED JAN. 24, 1910.

977,531.

Patented Dec. 6, 1910.

2 SHEETS—SHEET 1.

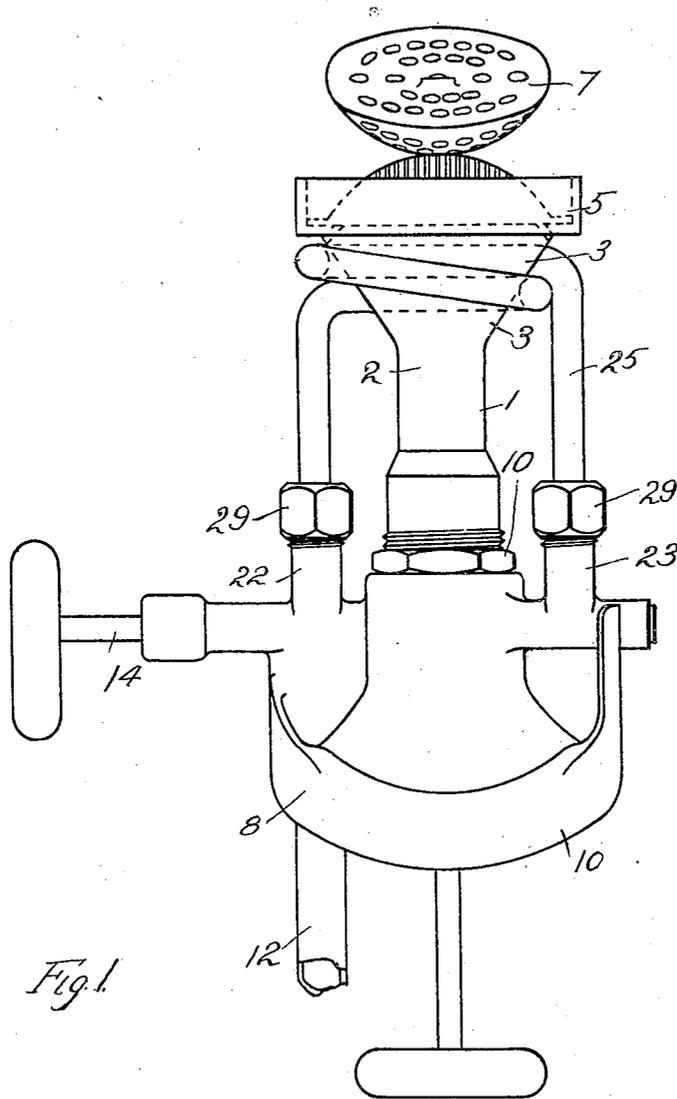


Fig. 1.

Witnesses

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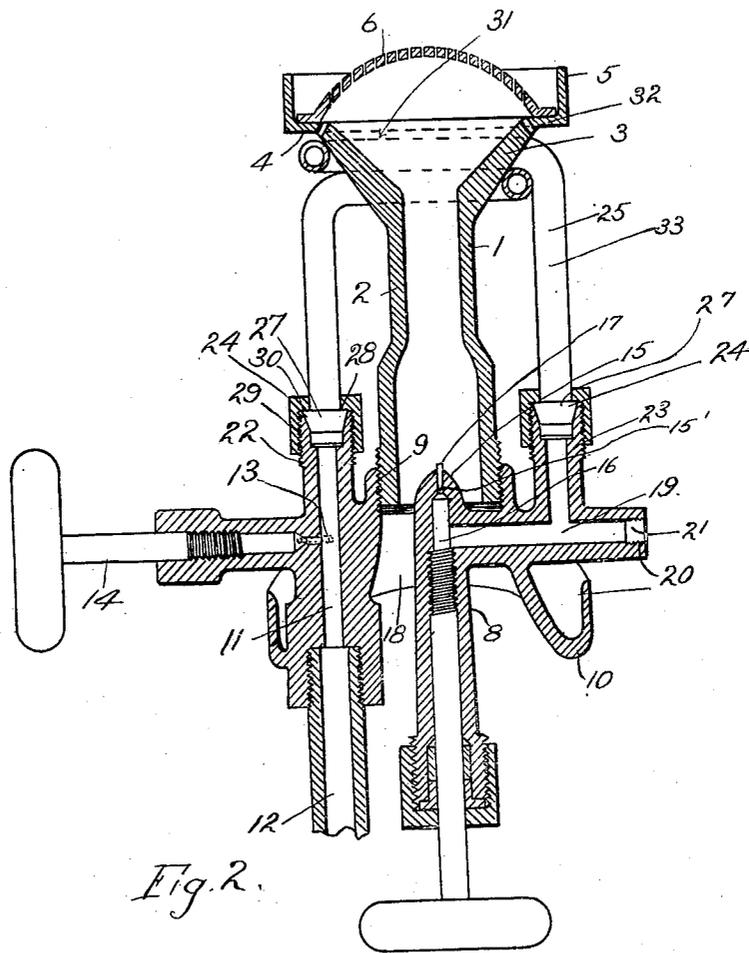


Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

SAMUEL WILSON MORROW, JR., OF BALTIMORE, MARYLAND.

PILOT-BURNER.

977,531.

Specification of Letters Patent.

Patented Dec. 6, 1910.

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To all whom it may concern:

Be it known that I, SAMUEL W. MORROW, Jr., a citizen of the United States of America, residing at the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Pilot-Burners, of which the following is a specification.

This invention relates to liquid hydrocarbon burners of the type which operate by vaporizing the liquid fuel and mixing it with air to form the combustible mixture which is burned.

Though my burner may be variously applied with but slight variations, it is particularly adapted to use as an auxiliary or pilot burner to heat the vaporizer of a larger liquid fuel burner. The burners in connection with which such pilots occur are most frequently used for the generation of steam for propelling steam automobiles, launches, etc., and my burner may be used either as an initial heater for the vaporizer of the larger burner to be extinguished when the main burner is in operation or it may furnish all the heat required for vaporizing fuel for the main burner during the entire period of operation of the latter.

The object of my invention is to produce a pilot burner of improved and simplified construction which shall be cheaper, simpler, more efficient and more durable than those now in use and to so apply to the vaporizer a portion of the heat generated that complete vaporization will result and the vaporizer will not become clogged with deposited carbon. The quantity of heat to which the vaporizer is subjected is so limited that the latter may be made of thin tube and still be of reasonably long life.

A preferred embodiment of my invention consists of a burner having three integral members, a head, a base and a vaporizing tube. The head has a combustion nozzle and a tubular stem. The base forms an annular flush cup which is apertured centrally to receive the lower end of the stem. There is also an upright injector nozzle integral with the base placed in the aperture so that there is an air inlet about the nozzle from below. The base is apertured to form passages—

one for liquid fuel having an opening into the flush cup, the latter controlled by a suitable valve, another for gas *i. e.* mixed air and vapor leading to the nozzle. The vaporizing tube is coiled about the head beneath the combustion nozzle and joined at one extremity to the oil passage in the base and at the other to the gas passage. The nozzle is provided with a main opening and auxiliary openings. The main opening is upwardly disposed and cooperating with this opening there is a cap and a spreader of any suitable type. The auxiliary openings are disposed downward and serve to direct against the coil of the vaporizing tube a portion of the flame which is small relatively to the main flame.

The drawings illustrate the preferred embodiment of my invention.

Figure 1 is an elevation of the pilot burner. Fig. 2 is a vertical axial cross section the spreader block and lock nut being removed.

Referring to Fig. 2 the head 1 is shown as formed with a tubular stem 2 which leads to a flaring nozzle 3 at its upper extremity. This nozzle which will hereinafter be known as the combustion nozzle, is in the form of an inverted cone. Surrounding the base of the cone which is uppermost is a horizontal annular shoulder 4 and at the outer edge of this shoulder is an upright rim or cylindrical flange 5. The shoulder 4 forms a seat for a convex slotted head or cap 6 to the center of which is secured a hemispherical perforated block or spreader 7, see Fig. 1. The base 8 is centrally apertured at 9 to receive the lower extremity of the tubular stem 2. Both the aperture and the lower extremity of the stem are threaded and these threads cooperate to form a rigid engagement. A lock nut 10 serves to make this engagement permanent and prevent displacement. The portion of the base 8 surrounding the aperture 9 is formed into an annular flush cup 10 the function of which is to hold fuel to be burned in heating the burner preliminary to starting. The base is also apertured at 11 to form a supply passage for liquid fuel which is connected by a pipe 12

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with any suitable receptacle. The supply passage is connected by an outlet 13 to the flush cup and this outlet is closed by a valve 14. Also formed integral with the base 8, placed centrally of the aperture 9 and upwardly disposed is an injector 15 having an opening 15' controlled by a needle valve 16 having one face of the needle flattened at 17 as shown to provide a passage for the gas. The opening 9 extends through the base 8 forming a passage 18 leading upward from below and extending substantially around the injector. Leading into the injector opening 15' is the vapor passage 19 which, as shown, is bored from the outside of the casting at 20 the opening being closed by a suitable screw plug 21. This opening serves to give access for cleaning the passage if necessary. Both the passages 11 and 19 lead upward from the base through uprights 22 and 23 and the extremities of these uprights are chambered at 24 to form conical seats. The vaporizing tube 25 is coiled about the base of the combustion nozzle 3 and its extremities are provided with conical shoulders 27 which enter the chambers 24 and cooperate with the conical seats therein. The conical shoulders 27 are flattened horizontally above at 28 and the tube is held in position by internally shouldered nuts 29, which inclose the shouldered ends of the uprights 22 and 23. The shoulders 30 of the nuts engage the flat surfaces 28 above the cones on the tubes and the screw threads of the nuts engage corresponding screw threads on the uprights 22 and 23.

In addition to the main opening 31 which is partially closed by burner cap 6, the combustion nozzle is provided with supplementary openings 32 which are disposed substantially opposite to the main opening and directed downward toward the vaporizer 25 where it incloses the head beneath the combustion nozzle and forms a coil.

When the pilot burner is in operation the pipe 12 is connected to a supply of suitable liquid fuel under pressure. To start the burner, the valve 14 is opened and a small quantity of liquid is allowed to flow into the flush cup 10, valve 14 is closed and the liquid in the cup is lighted. The flames heat the vaporizing tube 25. The heat evaporates the liquid in the tube, the pin valve 16 is opened and a jet of vapor which at first is mixed with the atomized liquid is injected into the stem 2 by way of the nozzle 15. The vapor injected through the nozzle, 17, mingles with the air in the tube, and the velocity of the vapor from the jet carries the mixture upward into the burner. More air is drawn in through the opening, 18, by the vacuum thus created, and a continuous supply of mixture is fed to the burner. The opening of the valve 16 is so

regulated that the mixture thus formed is highly combustible and it takes fire from the initial flame in the flush cup. The resistance to the passage of the gas formed by the burner cap 6 maintains a considerable pressure in the main aperture 31 of the nozzle whereby a small portion of the burning mixture is caused to pass out through the downwardly disposed supplementary apertures 32. The flames thus formed are directed toward the vaporizing coil and the size and number of the openings 32 are so regulated as to heat the tube to exactly the desired temperature to vaporize the fuel without injury to the tube.

It will be noted that a flame from the supplementary openings 32 passes downward along the upright portions of the tube enveloping them and maintaining the temperature of the leg 33 which carries the gas at such a high degree that no deposit of carbon takes place. It is also an important feature of the invention that the base 8 is so formed that it is conveniently made of a single casting. The head is also formed of a single casting and the two are connected rigidly by a screw threaded engagement with a lock nut forming a simple, durable, cheap and convenient structure.

Having described my invention I desire it to be understood that the specific terms herein are used in a descriptive rather than in a limiting sense.

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

1. A pilot burner for liquid fuel comprising three integral members—a head, a base and a vaporizing tube the head consisting of a combustion nozzle and a tubular stem, the base being apertured centrally to receive the lower end of the stem, an injector nozzle forming part of the base and placed in the aperture thereof to provide an air inlet about the nozzle from below, the base also being apertured to form passages—one for carrying liquid fuel and another for gas, the latter leading to the nozzle, the vaporizing tube being coiled about the combustion nozzle and joined at one extremity to the liquid fuel passage in the base and at the other to the gas passage.

2. A pilot burner comprising three integral members—a head, a base and a vaporizing tube, the head consisting of a combustion nozzle and a tubular stem the base forming an annular flush cup and being apertured centrally such opening extending through the base to receive the lower end of the stem, an upright injector nozzle forming part of the base and placed in the aperture thereof so that there is an air inlet about the nozzle from below, the base also being apertured to form passages—one for carrying liquid fuel, another for gas leading to the

injector nozzle, a needle valve for the in-
jector nozzle, the vaporizing tube being
coiled near the combustion nozzle and out
of range of the main flame therefrom, the
5 tube being joined at one end to the liquid
fuel passage at the base and at the other to
the gas passage, the head being provided
with supplementary openings disposed

toward the coil to direct relatively small
flames against the vaporizing tube. 10

Signed by me at Baltimore, Maryland,
this 21st day of January 1910.

SAMUEL WILSON MORROW, JR.

Witnesses:

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