

O. F. SHEARMAN & C. F. ERDMANN.
HYDROCARBON BURNER.
APPLICATION FILED JAN. 14, 1911.

1,017,180.

Patented Feb. 13, 1912.

2 SHEETS—SHEET 1.

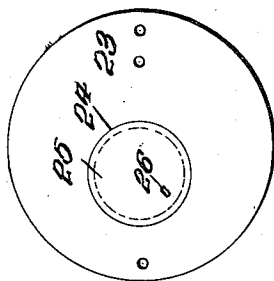
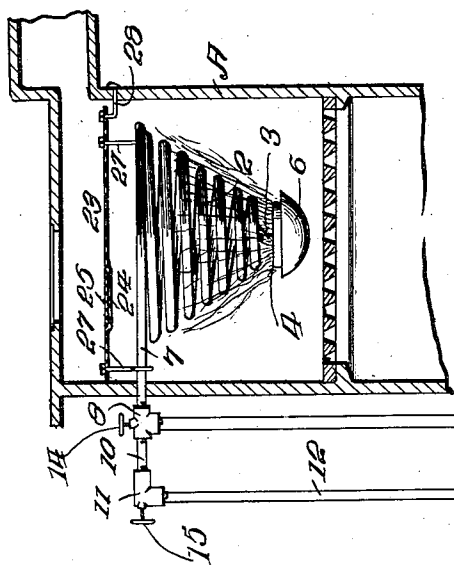


Fig. 5.

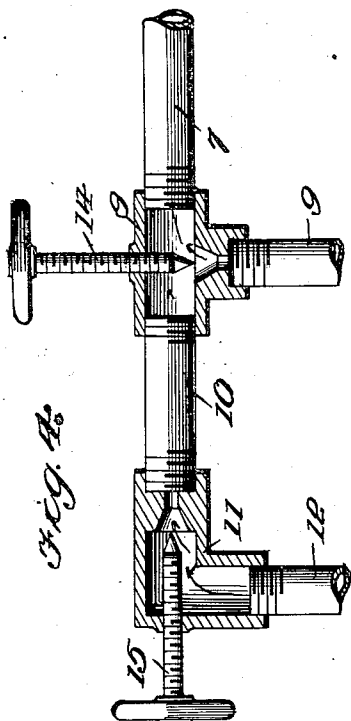


Fig. 4.

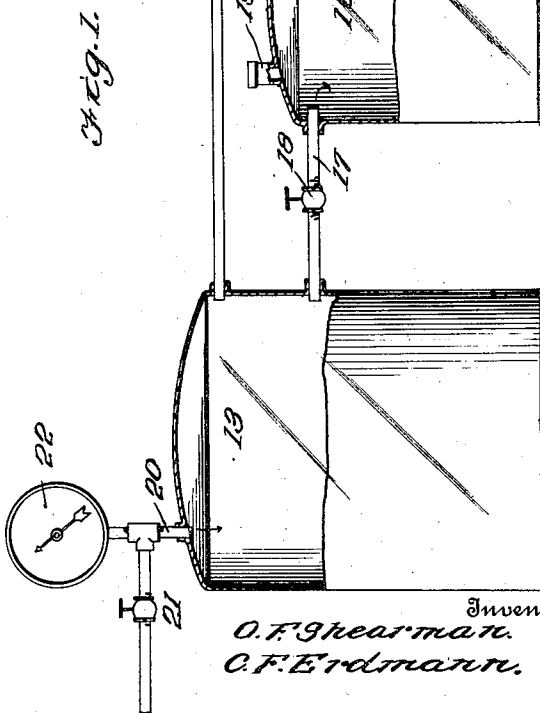


Fig. 1.

Witnesses
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ORLO F. SHEARMAN AND CHARLES F. ERDMANN, OF OTTO, NEW YORK.

HYDROCARBON-BURNER.

1,017,180.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ORLO F. SHEARMAN and CHARLES F. ERDMANN, citizens of the United States, residing at Otto, in the county of Cattaraugus and State of New York, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

Our invention relates to hydrocarbon burners and particularly to devices for vaporizing and burning heavy hydrocarbon oils such as kerosene.

The object of the invention is to provide a hydrocarbon burner of this character in which the liquid fuel is mixed with air prior to its passage into the vaporizer.

A further object is the provision of means whereby air under pressure may be used for feeding the proper quantity of air to be mixed with the oil and also be used as a means for forcing the oil into the vaporizer.

A further object is to provide a vaporizer and burner of this character which may be readily cleaned by forcing the compressed air through the tubes of the vaporizer and out through the openings of the burner, thereby clearing the pipes and passages of the burner from soot or other accumulations of foreign particles.

A further object is to provide the combination with a vaporizing burner of a flame-deflecting plate supported immediately over the vaporizer and burner, so arranged that it will deflect the flame from the burner outward and around the circumference of the plate, the deflecting plate being so formed that a section of it may be removed in order to permit the primary ignition of the gas.

A still further object is the provision of a combined priming cup and burner located below the vaporizer and so arranged that the jets arising from the burner will play around the coils forming the vaporizer so as to obtain a maximum application of heat to the vaporizer.

Our invention is illustrated in the accompanying drawings wherein:

Figure 1 is a side elevation partly in section of our improved oil burner and the supply tanks connected therewith, the stove or furnace in which the burner is applied being shown in section. Fig. 2 is a transverse section on the line 2—2 of Fig. 3. Fig. 3 is a plan view of the conical volute va-

porizing coil. Fig. 4 is a detail section of the valves for admitting compressed air and oil to the burner. Fig. 5 is a plan view of the deflecting plate removed.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to these figures, it will be seen that the vaporizer 2 comprises a conical volute formed of a metal pipe or tube, the apex of the volute being downward. The extremity of the coil forming the vaporizer is carried downward as at 3 and terminates in a burner 4, this burner preferably having the form of a cylindrical chamber provided upon its upper face and surrounding the pipe 3 with a plurality of jet openings 5. Preferably formed integral with the burner or chamber 4 is the priming cup 6 which is, of course, larger in diameter than the burner 4 and is of sufficient depth to contain a proper amount of fuel for priming. The upper end of the coil 2 forming the vaporizer extends outward at a tangent as at 7 and passes through the walls of the stove or furnace A. The pipe 7 is connected to a T 8, one branch of which is connected to a fuel supply pipe 9, while the other arm of the T directly opposite to the pipe 7 is connected to a pipe 10 which passes to an elbow 11 from which a pipe 12 extends to a compressed air tank 13. The T 8 is provided with a valve 14 whereby the admission of fuel from the pipe 9 to the pipe 7 may be regulated. The elbow 11 is also provided with a needle valve 15 whereby the passage of air from the pipe 12 to the pipe 7 may be controlled. The supply pipe 9 extends into an oil tank or other suitable fuel reservoir 16. Preferably, the pipe 9 extends to the bottom of the tank 16 as illustrated in Fig. 1. The tank 16 is connected to the compressed air tank 13 by means of a pipe 17 which extends from the upper end of the tank 16 and is provided with a valve 18 whereby communication between the tanks 13 and 16 may be established or cut off. The tank 16 is further provided with a filling opening 19. The compressed air tank 13 is connected, preferably at its upper end, by means of a pipe 20 to any suitable air compressor, as for instance an air pump not shown, and the pipe 20 is provided with a valve 21 whereby communication may be established between or cut off between the

air pump and the compressed air tank 13. The tank 13 is further provided with a gage 22 whereon pressure of air within the tank may be indicated.

5 Mounted above the upper end of the vaporizing tube 2 is a deflecting plate 23 which is of larger diameter than the upper end of the conical volute formed by the pipe 2. The plate 23, however, is less in diameter than the diameter of the heater A in which the burner is to be applied. Preferably about an inch space is left between the periphery of the deflecting plate 23 and the walls of the stove or furnace. Eccentrically disposed in the plate 23 is an opening 24 normally closed by a lid or removable section 25, the margin of the plate 23 immediately around the opening 24 being deflected to form an annular flange upon which the lid 25 is supported. The lid 25 is provided with a recess 26 whereby an implement may be applied to raise the lid. The deflecting plate 23 is supported in any suitable manner but preferably by means of supporting bolts or studs 27 extending upward from the uppermost coil of the vaporizer 2. Nuts on these bolts hold the deflecting plate in position but permit the deflecting plate to be easily removed when desired. In order to hold the deflecting plate, the vaporizer and the burner in proper relative position within the stove or furnace, we preferably provide one or more hook-shaped bolts 28 which pass through the walls of the furnace or heater and have upwardly extending terminal portions which pass up through openings formed in the margin of the deflecting plate. These bolts 28 hold the deflecting plate in proper position so as to leave a space between the periphery of the deflecting plate and the wall of the stove or heater.

In practice, when it is desired to start our improved burner, the valves 14 and 15 are closed and the valves 18 and 21 opened and the air in the compressed air tank 13 and supply tank 16 compressed to any desired degree. After the desired pressure has been secured in the tanks, the valve 21 is closed. It will now be seen that there is pressure of air upon the upper surface of the oil contained within the tank 16. The valve 14 is now opened and oil passes from the tank 16 through the pipe 9, the T 8 to the coils of pipe forming the vaporizer. The liquid fuel passes down these coils of pipe and is forced out through the openings 5 in the chamber or burner 4. This oil so forced out accumulates in the priming cup 6. When the priming cup is nearly full of oil, the valve 14 is closed and the oil in the cup 6 is lighted. When the oil is nearly burned out of the priming cup, the valve 14 is opened a slight amount and when the oil ignites from the flames in the priming

cup then the valve 15 is opened a slight amount. Gas is then formed in the vaporizer 2 and escaping through the opening 6 is ignited and burns with a blue flame which is entirely smokeless and odorless. The flame is regulated by manipulating valves 14 and 15 until the desired heat is produced. By regulating these valves, any desired amount of heat can be secured, or the flame may be turned down extremely low.

The burner as described will work to excellent advantage in any kind of wood or coal stove and may be used either for heating or cooking purposes. The burner can also be used in any kind of furnace.

When it is desired to ignite the oil in the priming cup, it is only necessary to remove the section 25 of the deflecting plate. A match may then be easily applied to the oil in the priming cup. The deflecting plate causes the flames to pass up adjacent to the wall of the stove, furnace or other heater and thus provides for a better distribution of heat and for an increase in the heating power of the stove or furnace. It will be seen that the flames proceeding from the orifices 6 will play over, around and between the pipe forming the vaporizing coil 2 so that a particularly effective application of heat occurs for the proper vaporization of the fuel before it passes to the burning orifices. It is further to be noted that air is admixed with the fuel prior to its passage to the vaporizer. We have found in practice that this causes a more perfect mixture of air with the fuel and a better formation of gas than where the air mixes with the fuel after the latter is vaporized. Further, it is to be noted that the air is forced into the T 8 under pressure and tends to nebulize the oil as it passes into the vaporizer.

It will be observed that the vaporizer being in the form of an inverted conical volute, tends to deflect the flames arising from the burner 5 upward and outward to the circumference of the deflecting plate 23 and between the periphery of the deflecting plate and the walls of the heater A. At the same time some of the flames will play upward within the space inclosed by the tubular vaporizer and between the coils of the vaporizer so that the vaporizer will be thoroughly heated. It is further to be noted that when the air pressure has been entirely exhausted within the tank 13 the oil will no longer be forced into the burner and hence that the fire will go out.

By connecting the compressed air tank 13, both with the oil tank 16 and with the T 8, we secure a positive feed of oil to the burner and also secure a positive feed of air thereto. The amount of compressed air within the tank 13 may be easily adjusted so as to cause the burner to operate for any desired length of time. By closing off the connec-

tion between the oil tank and the air tank and also closing the valve 14, it is possible to force compressed air under any degree of pressure through the pipe forming the vaporizer and through the openings 6 in the burner 4, thereby clearing out any accumulations of soot or scale which may have formed within the pipes or passages of the burner.

10 While we have shown what we believe to be the best form of our device, and a form which we have found to be extremely effective in practice, we do not wish to be limited thereto as it is obvious that many minor changes might be made therein without departing from the spirit of the invention.

What we claim is:

20 1. In apparatus of the character described, a vaporizing coil having the form of an inverted conical volute, a burner located below the apex of the coil and connected with the same, said burner having jet openings directed toward the coil, a priming cup surrounding the burner, a fuel inlet pipe con-

nected to the upper end of the coil, and a 25 deflecting plate supported above the upper end of the coil and slightly larger in diameter than the same, said deflecting plate formed in sections.

2. In apparatus of the character described, 30 a vaporizing coil having the form of an inverted conical volute, a burner connected to the lower end of the coil and disposed below the apex of the volute, a priming cup integral with the burner and surrounding the 35 same, a fuel pipe connected to the upper end of the coil, a deflecting plate supported upon the upper end of the coil and formed with an opening, and a lid normally closing said opening but removable therefrom. 40

In testimony whereof, we affix our signatures in presence of two witnesses.

ORLO F. SHEARMAN. [L. s.]
CHARLES F. ERDMANN. [L. s.]

Witnesses:

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