W. J. CAMERON.

LIQUID FUEL BURNER.

APPLICATION FILED OCT. 3, 1911.

1,034,417.

Patented Aug. 6, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

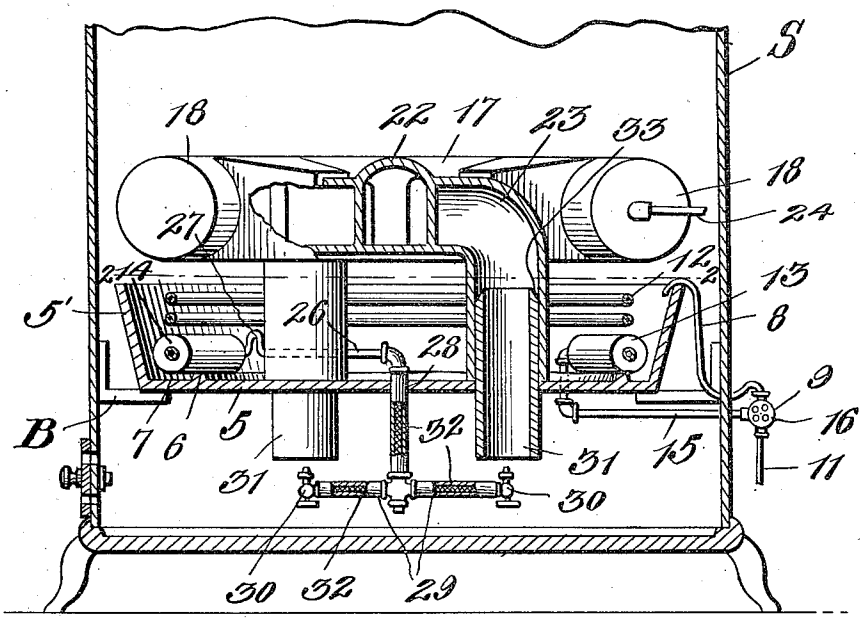
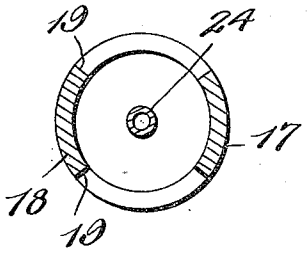


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 3.

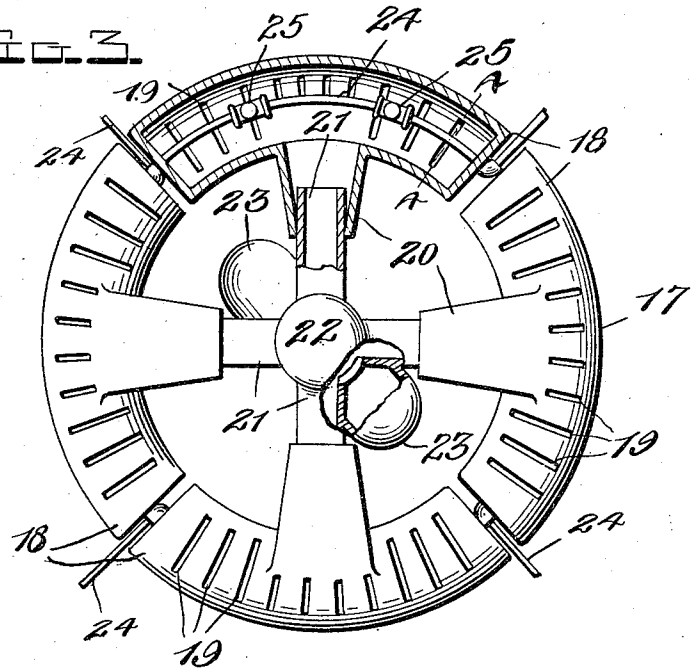
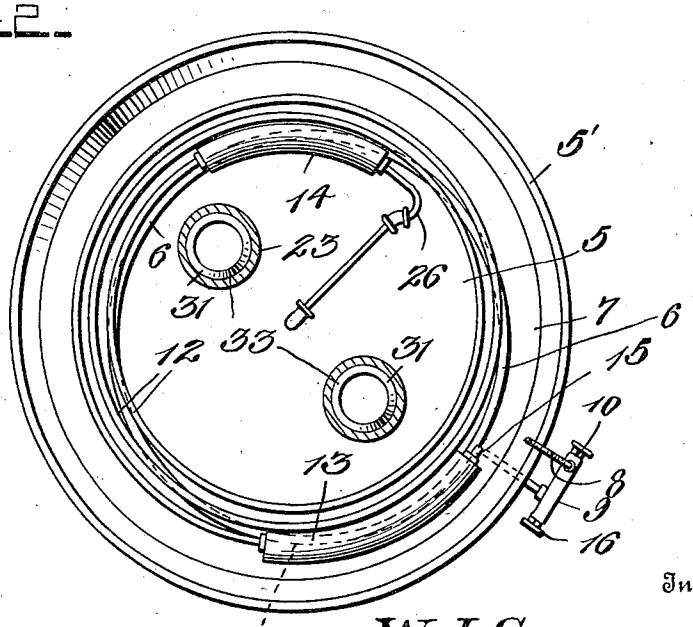


Fig. 2.



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WILLIAM J. CAMERON, OF ENID, OKLAHOMA.

LIQUID-FUEL BURNER.

1,034,417. Specification of Letters Patent. Patented Aug. 6, 1912.

Application filed October 3, 1911. Serial No. 652,481.

To all whom it may concern:

Be it known that I, WILLIAM J. CAMERON, a citizen of the United States, residing at Enid, in the county of Garfield and State of Oklahoma, have invented certain new and useful Improvements in Liquid-Fuel Burners, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to liquid fuel burners and has for its object to provide a device of this character which is applicable to stoves or furnaces and to any form of fire box and which is capable of producing an intense heat from a minimum consumption of fuel.

Another object of the invention is to provide means for generating liquid fuel into hydrocarbon gas for insuring the complete vaporization of the fuel.

A further object of the invention resides in the provision of a compound mixing chamber of novel form which may be easily and quickly assembled within the fire box of the stove or furnace and provides means for the proper admixture of the hydrocarbon gas with oxygen so that perfect combustion may be obtained.

Still another object of the invention is to provide novel means for insuring a continuous, uninterrupted and uniform flow of the vaporized fuel to the mixing chamber.

Still another object of the invention is to provide means for cleaning the vaporized fuel before it is admitted to the mixing chamber and relieving the same of particles of foreign matter.

With the above and other objects in view, the invention consists of the novel features of construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a liquid fuel burner certain parts being broken away embodying my improvements showing the same arranged within the fire box of a stove; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is a top plan view of the compound mixing chamber and the conducting tubes, certain parts thereof being shown in section; and Fig. 4 is a section taken on the line 4—4 of Fig. 3.

Referring in detail to the drawing S indicates the annular wall or shell of the stove or furnace which is mounted upon a suitable supporting base. Within this furnace and secured to the shell thereof the usual grate supporting brackets B are arranged. As the present invention is applicable to furnaces or stoves which may greatly vary in form and construction, a detailed description of the same will not be given, the above general statement sufficing for a clear understanding of the invention.

Upon the brackets B the generating pan 5 is supported, and upon the upper surface of the base of this pan an annular rib 6 is formed which provides a circular gutter or raceway 7 which is bounded by the circumscribing wall 5′ of the pan. To the annular gutter or raceway 7, the hydrocarbon oil is supplied through a pipe 8 which is connected to a controlling valve generally designated at 9, said supply being controlled by means of the needle valve 10. The valve 9 is supplied with the liquid fuel through the medium of a pipe 11 which is connected to the source of supply.

Within the generating pan 5 a vaporizing coil 12 is arranged, and to the ends of this coil the vaporizing chambers 13 and 14 respectively are connected. A pipe 15 connects one end of the chamber 13 to the valve 9 and the supply of hydrocarbon to said vaporizing chamber is regulated by means of the needle valve 16. The stems of the valves 10 and 16 are threaded in the opposite ends of the valve case 9 and are adapted to be adjusted to regulate the flow of oil from said case into the pipes 8 and 15 respectively. It will thus be seen that the supply of fuel to the vaporizing chamber 13 and to the annular gutter 7 of the generating pan may be separately regulated through the medium of the valves 16 and 10.

A compound mixing chamber 17 is arranged within the stove or furnace and above the generating pan 5. This mixing chamber consists of a plurality of similar sections 18, which in the present instance are shown of circular form in cross section. Each of these sections is of arcuate form in plan and is provided in its wall and on opposite sides with the spaced circumferentially extending slits 19 through which the vaporized fuel escapes into the generating pan and upon the coil 12 arranged therein. Each of the sections of the mixing chamber is further provided with an inwardly extending central neck 20 which tapers longitudinally and is of rectangular form in

cross section. These tapered necks of the mixing chamber sections are telescopically engaged upon the rectangular tubular arms 21 which are formed upon a central receiving head 22 and extend therefrom at diametrically opposite points. By such construction it will be readily observed that the sections of the mixing chamber can be moved inwardly or outwardly in accordance with the diameter of the stove or furnace within which they are arranged. The central head 22 is also provided with the depending tubes 23 which rest upon the base of the generating pan 5 said tubes connecting adjacent arms 21. In Fig. 3 of the drawing I have shown a pipe 24 extending centrally through one of the sections 18 of the mixing chamber, and this pipe is provided with a plurality of inlets 25 to receive a part of the gas contained in the chamber. Pipes 24 extend through one end of the chamber sections and may be connected to other pipes or flexible conductors to convey the gas to a distant point to be utilized for illuminating purposes. These pipes 24 also serve as a cooling appliance for the mixing chamber to prevent the overheating of the chamber and premature ignition of the gases.

As before stated, the vaporizing chamber 14 is connected to one end of the coil pipe 12 and to the other end of this chamber one end of the pipe 26 is connected. In this pipe adjacent its point of connection to the vaporizing chamber, a goose neck 27 is formed. This goose neck is provided for the purpose of insuring a uniform flow of the vaporized fuel from the chamber 14 to the pipe 26. This goose neck portion of the pipe also retains the hydrocarbon fuel in the vaporizing chamber until it is completely vaporized and effectually prevents any fluctuation in its flow. A vertical pipe 28 extends centrally through the base of the generating pan 5 and is connected to the pipe 26. To the lower end of this vertical pipe a horizontal pipe 29 is connected by means of a suitable joint and upon the ends of this pipe the valves 30 are arranged. Immediately above the valves 30 are positioned the vertical mixing tubes 31 which extend upwardly into the lower ends of the tubes 23 and frictionally engage the walls thereof. As the vaporized fuel is injected through the valves 30 into the lower ends of the tubes 31, it is mixed with oxygen and passes upwardly and through the tubes 21 into the compound mixing chamber 17. As the mixture of hydrocarbon and air travels a considerable distance and by a somewhat circuitous passage from the valves 30 to the sectional mixing chamber, the thorough admixture of the hydrocarbon and oxygen is secured so that perfect combustion of the gas is effected. In the pipe 28 and the pipes 29, a roll of gauze wire 32 is arranged and through this gauze, the hydrocarbon gas percolates so that any hard substance contained therein will be removed. The pipes 28 and 29 may be disconnected so that these screens can be removed and cleansed. The wire gauze in the pipe 29 is of somewhat finer mesh than that in the pipe 28 so as to prevent any small particles of matter from accumulating in the valves 30 from which point the hydrocarbon gas is passed into the compound mixing chamber. The valves 30 are preferably provided with removable caps or discharge nozzles and ground joint plugs which may also be removed so that the parts of the valve can be cleaned and the various foreign substances which may accumulate therein removed. The connecting member between the pipes 28 and 29 is also provided with a ground plug so that the gauze wire in the pipe 28 can be readily removed and cleaned.

From reference to Fig. 1 it will be noted that the walls of the tubes 31 at their upper ends are beveled or tapered as indicated at 33 so that any particles of hydrocarbon which have not become thoroughly vaporized will not fall below the mixing tubes 31 into the pan 5 but will be caught upon said beveled or tapered end of the tube. In this manner the formation of smoke and gas fumes in the fire box of the stove or furnace is eliminated.

In practical use, the operation of the device is substantially as follows. A small quantity of liquid fuel is first allowed to collect in the trough or gutter 7 of the generating pan 5. This hydrocarbon oil is ignited and the fuel is then turned into the vaporizing chamber 13 by adjusting the valve 16. The heat of the burning oil starts the generation of gas in the chamber 13 and throughout the coil pipe 12. The vaporized fuel flows through the coil pipe and into the chamber 14 where it is collected and is discharged at a uniform pressure through the pipe 26 and pipe 28 into the pipes 29, the goose neck 27 preventing the flow of the fluid from the chamber 14 until it is thoroughly vaporized. The gas thus formed is discharged through the valves 30 upwardly into the mixing tubes 31 and finally passes into the sections 18 of the mixing chamber. When the combustible gas has accumulated in these chamber sections to a sufficient extent, it finds its way through the slits 19 in the walls of said chambers, and at this point the gas is ignited. The flames from the slits in the top of the chamber walls are directed upwardly and outwardly against the wall or shell of the furnace while the flames from the slits in the lower portion of the chamber walls are directed downwardly into contact with the coil pipe 12 and the vaporizing chambers

13 and 14. It is of course understood that after the apparatus has once been started, the supply of oil to the pipe 8 may be cut off as it is no longer desired to supply the fuel to the trough 7, the flames from the chamber sections 18 being sufficient to continue the generation of the gases within the pipe coil and the chambers 13 and 14.

By means of the device constructed and assembled in the foregoing manner, I aim to secure the perfect vaporization of the liquid fuel which is essential to the formation of the proper gas when mixed with the oxygen to insure perfect combustion. The device also entirely eliminates the many deficiencies present in devices of this character as heretofore constructed.

Having thus described the invention what is claimed is:—

1. A liquid fuel burner comprising a generating pan, a mixing chamber arranged above the pan and in spaced relation thereto, depending tubes communicating with the chamber and resting at their lower ends upon the bottom of the pan, a generating coil arranged within said pan between the mixing chamber and the bottom of the pan, tubes extending into the lower ends of said depending tubes and below said generating pan, a pipe connected to the generating coil, and additional pipes connected to said latter pipe opening beneath and discharging into the tubes which extend below the generating pan.

2. A liquid fuel burner comprising a generating pan having an annular trough in its bottom, an annular mixing chamber arranged above said pan, a generating coil arranged beneath said mixing chamber and disposed over the trough of the pan, means for supplying liquid hydrocarbon to said trough and to the generating coil, a plurality of tubes connected to the annular mixing chamber, and pipes supplied from the generating coil and disposed beneath said tubes to discharge the vaporized fuel into the same.

3. A liquid fuel burner comprising a generating pan, a generating coil arranged within said pan, a vaporizing chamber on each end of the coil, a fuel supply pipe connected to one of said chambers, a mixing chamber, an outlet pipe connected to the other of the vaporizing chambers and having a goose neck formed therein adjacent its point of connection to the chamber, and means for conducting the vaporized fuel from said pipe to the mixing chamber.

4. In a liquid fuel burner, a central chambered head having a plurality of radially extending tubular arms formed thereon, supply tubes connecting adjacent arms, and independently adjustable mixing chamber sections telescopically engaged upon said radial arms.

5. In a liquid fuel burner, a central chambered head having depending tubes, said head also having radially extending tubular arms formed thereon, and an arcuate chamber section upon each of said arms adjustable longitudinally thereof.

6. In a liquid fuel burner, a central chambered head, tubular arms radiating from said head, depending tubes connecting adjacent arms, and relatively adjustable mixing chamber sections movable on the arms.

7. In a liquid fuel burner, an annular mixing chamber comprising a plurality of arcuate chamber sections each having an inwardly extending tubular neck, and a chambered supply head having tubular arms formed thereon with which the necks of the chamber sections are telescopically engaged whereby said sections may be adjusted with respect to the supply head and with relation to each other.

8. In a liquid fuel burner, a central chambered head having a plurality of radial tubular arms and vertical depending tubes connecting the adjacent arms, and a mixing chamber consisting of a plurality of arcuate sections each having an inwardly extending tapered neck telescopically engaged upon one of said arms whereby said sections may be adjusted relative to each other.

9. In a liquid fuel burner, an annular mixing chamber, a central supply head for said chamber having depending tubes and tubular arms connected to said chamber, and mixing tubes telescopically engaged in the lower ends of said depending tubes and having the upper ends of their walls beveled.

10. In a liquid fuel burner, a generating coil, a vaporizing chamber connected to each of the terminals of said coil, and a discharge pipe for the vaporized fuel connected to one of said chambers and having a goose neck formed therein, substantially as and for the purpose specified.

11. In a liquid fuel burner, a generating coil, a vaporizing chamber connected to one end of said coil, means for supplying liquid fuel to the coil, a vertical discharge pipe for the vaporized fuel connected to said chamber, horizontal pipes connected to the vertical pipe each provided with a discharge valve, and wire gauze rolls arranged in said horizontal pipes to clean the vaporized fuel and prevent clogging of the valves.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

WILLIAM J. CAMERON.

Witnesses:
ORA SOWERSBY,
S. J. WALTER.