April 2, 1935. M. FERNANDEZ Y FERNANDEZ 1,996,413

FUEL BURNER

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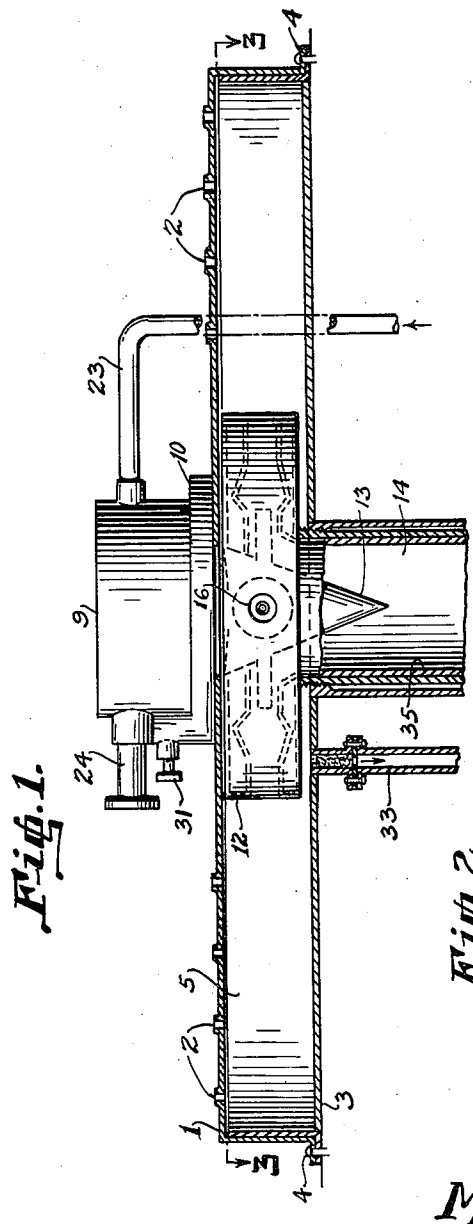


Fig. 1.

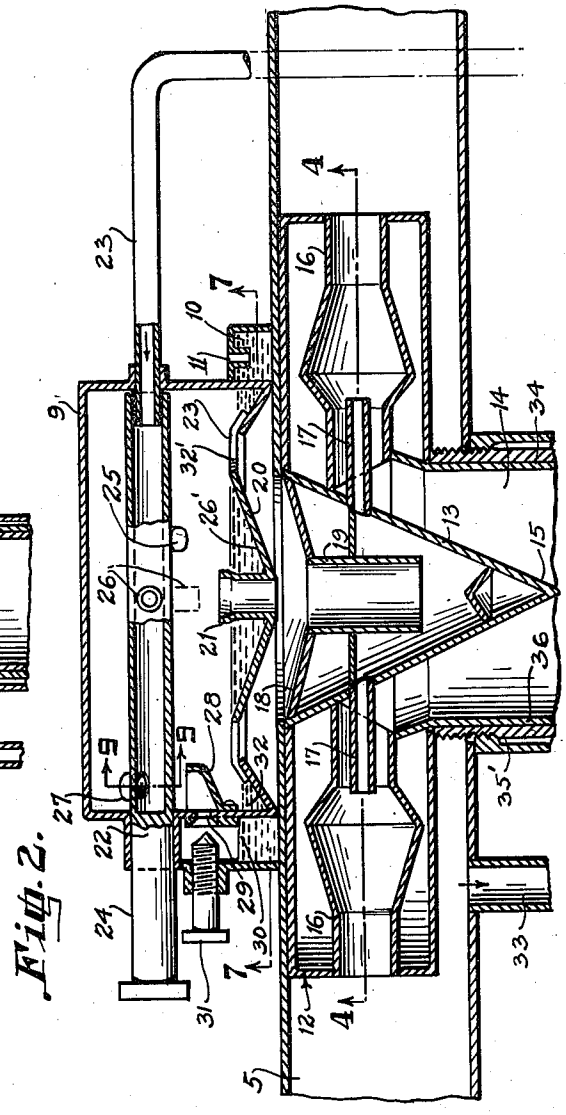


Fig. 2.

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Fig. 3.

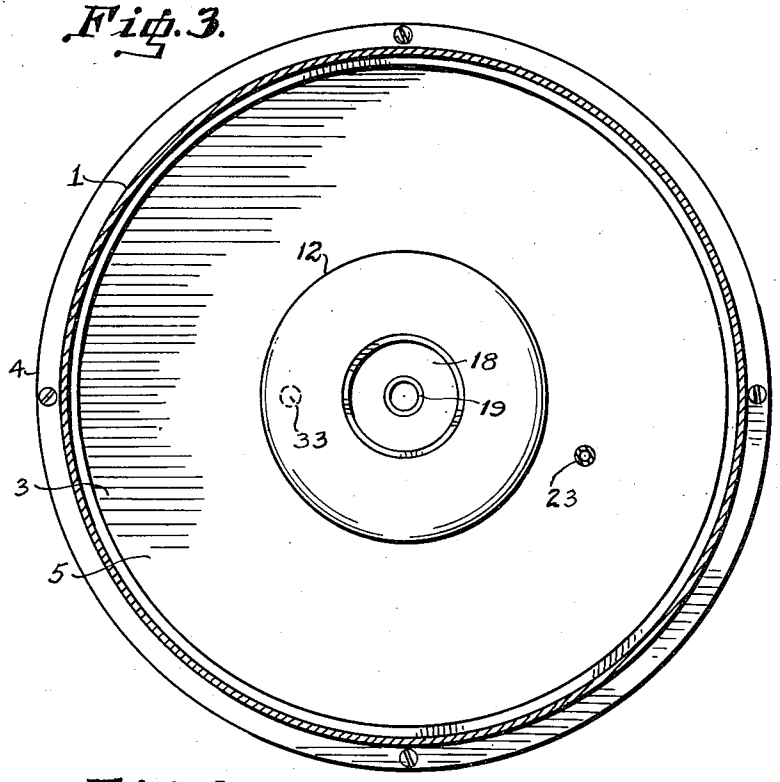


Fig. 4.

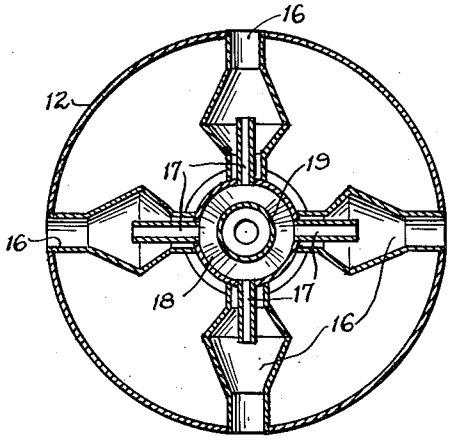


Fig. 5.

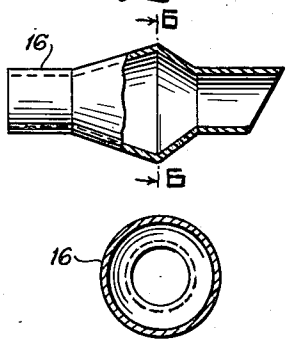


Fig. 6.

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Fig. 7.

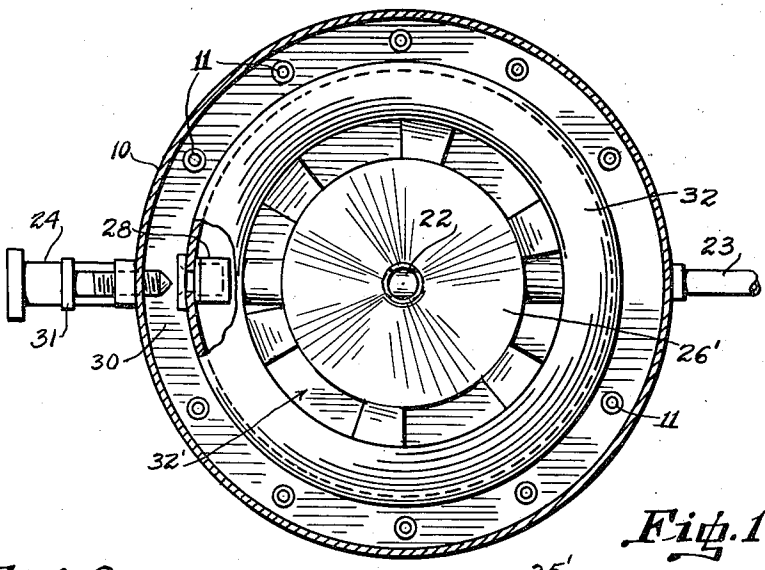


Fig. 8.

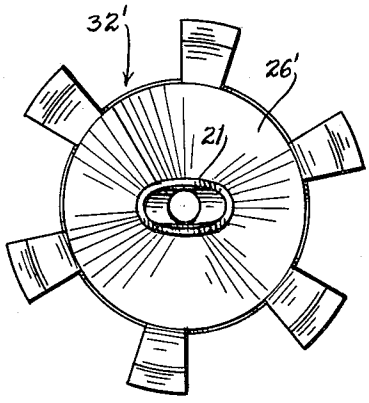


Fig. 9.

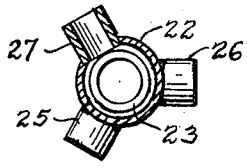
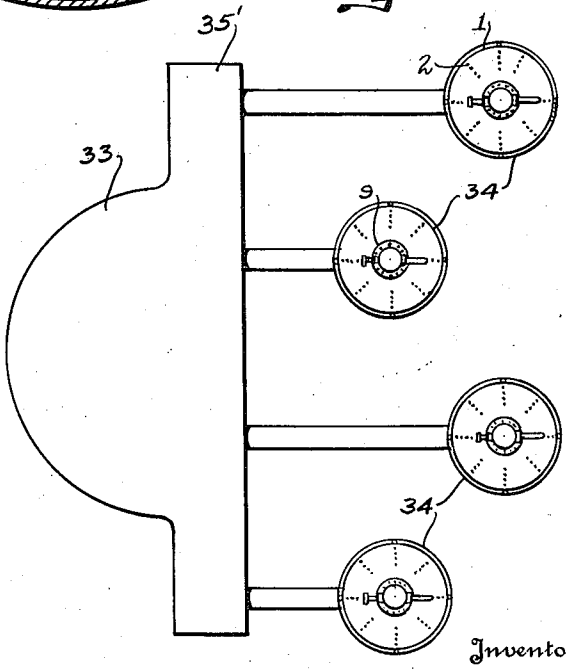


Fig. 10.



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UNITED STATES PATENT OFFICE

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FUEL BURNER

Manuel Fernandez y Fernandez, New Orleans, La.

Application August 27, 1930, Serial No. 478,204

4 Claims. (Cl. 158—63)

This invention relates to oil burners and has for one of its objects the provision of a combustible mixture generator distinguished by flexibility in its adaptation as an oil atomizer, vaporizer, or a combination of these two functions.

The invention is designed particularly for installations in which intense heat with economy of consumption is desired, such as in oil burner furnaces, cooking appliances, etc.

Another object of the invention is the provision of a plurality of burners supplied by a single selectively operable atomizing or vaporizing mixer, and therefore, each burner operating according to the alternative or combined functions of said mixer.

Other objects of the invention will appear as the following description of an illustrative embodiment thereof proceeds.

Referring now to the drawings which form a part of the specification, and in which the same element is referred to throughout the several figures, by the same characters of reference,

Figure 1 is a vertical elevation partly in section of an oil burning device embodying the principles of the invention;

Figure 2 is a vertical section on an enlarged scale;

Figure 3 is a section taken along the line 3—3 of Figure 1;

Figure 4 is a section taken along the line 4—4 of Figure 2;

Figure 5 is a vertical section taken through one of the expansion chambers;

Figure 6 is a section taken along the line 6—6 of Figure 5;

Figure 7 is a section taken along the line 7—7 of Figure 2;

Figure 8 is a plan view of the oil receiving pan of the vaporizing chamber;

Figure 9 is a cross section taken along the line 9—9 of Figure 2; and

Figure 10 is a plan view showing a plurality of burners connected to a single generating and mixing chamber.

Referring now in detail to the several figures, the numeral 1 represents a burner casing having outlets 2 for the combustible mixture, at which outlets the mixture is ignited. A base plate 3 closes the lower part of the burner casing, being shown as riveted thereto as at 4, through cooperating flanges formed on the member 3. The space 5 within the casing forms a secondary mixing chamber for rich mixture received from the atomizer or the vaporizing chamber. Above the central part of the burner casing is a drum 9 forming a vaporizing chamber. This drum is surrounded by a starting burner 10 by means of which the walls of the drum are heated, the priming burner having flame nozzles 11. Within the central part of the chamber 5 is a shell 12 having adjacent its center an atomizing device in the form of a conical reservoir 13 having radially disposed fuel nozzles (17) extending into the expansion chambers and terminating adjacent the anterior ends of the enlarged portions thereof. The upper part of the reservoir (13) is covered by a funnel-shaped member (18) having a central supply pipe (19) extending into said reservoir. Said reservoir projects into a main air pipe 14 preferably fed by a blower not shown, and the wall of said reservoir is preferably conical with its apex 15 coaxial with the air pipe 14, whereby an even annular distribution of air is secured. The shell 12 has a neck 35' fitting with a bushing 36 secured to the base plate 3 and it supports radial expansion chambers 16 communicating at one end with the air pipe 14 and at the other end discharging into the chamber 5 of the burner casing, the intermediate portions of said expansion chambers being enlarged and preferably of opposed frusto-conical form.

The vaporizing drum 9 has a similar funnel-shaped bottom member 20 having an open ended pipe 21 out of communication with the well of said funnel-shaped member 20, but arranged coaxial with the pipe 19.

A selective supply valve 22 extends through the vaporizing drum 9, being in communication at one end with a source of liquid fuel supply 23. The valve 22 is rotatable by means of a handle 24 and at different zones longitudinally of said valve it is provided with discharge nozzles 25, 26 and 27. When it is desired to supply oil to the vaporizer, the valve is turned so that the nozzle 25 extends downwardly so as to discharge the oil into the well 26' of the vaporizing chamber. When it is desired to supply fuel direct to the atomizer, the valve is turned so that the nozzle 26 is directed axially of the pipes 21 and 19. When it is desired to supply fuel to the priming burner 10, the valve is turned so that the nozzle 27 positions itself so as to spill into the spout 28, which by way of the port 29 communicates with the chamber 30 of the starting burner.

The burner is provided with a drain pipe 33 for disposing of any oil which through condensation or in any other manner may get into the burner chamber in liquid state.

In the operation of the burner, the valve 22 is

first turned to supply the starting burner. The latter is then lighted, the liquid fuel burning directly and beginning to heat the walls of the vaporizer 9. The supply of fuel by the starting burner is adjusted by means of the valve 31. As soon as the walls of the vaporizing drum 9 have become heated, the liquid fuel in the well 26' and in the annular groove 32 of the vaporizing drum, becomes vaporized, the vapor passing in two ways, that is to say, through the pipe 21, the pipe 19, into the reservoir 13, and through the fuel nozzles 17 where it entrains air from the air pipe 14 and carries the same into the expansion chamber where the air and fuel vapor are intimately mixed, the mixture then passing out into the chamber 5 where it is diluted as set forth in an earlier part of the description. At the same time a certain portion of the vaporized fuel passes into the starting burner direct from the vaporizing drum, and sustains combustion after the initial charge of liquid fuel in the starting burner has been consumed.

When it is desired to use the atomizer alone, the valve 22 is turned so that the nozzle 26 aligns itself with the pipes 19 and 21, the mouth of the latter being elongated in transverse direction to prevent the fuel being spilled into the well 26'. Liquid fuel then flows direct to the reservoir 13, filling the reservoir up to the level of the fuel nozzles, the air which passes forcibly through the pipe 14 and through the annular passages surrounding the fuel pipes 17, entraining the liquid fuel at the mouths of the pipe blowing it into atomized particles which are carried with the air into the expansion chambers and in this way intimately mixed. The mixture of air and atomized fuel discharges into the burner chamber where it is further diluted with air drawn in through the apertures 7 in the conduits 8.

By turning the valve to an intermediate position, both the nozzles 25 and 26 can discharge, the one into the vaporizer and the other into the reservoir 13. The funnel-shaped plate 20 forming part of the vaporizing drum is provided with apertures 32' affording free communication of the vaporizing fuel, with the upper unoccupied portion of the reservoir 13.

It is apparent from the above description that my burner affords the greatest range of flexibility in its generating function, since by a simple partial turn of the valve 22 its operation acting upon the principle of vaporization is changed to that of atomization, and which by a turn of the valve of less amplitude operates according to the combined principles of vaporization and atomization. It is obvious that a burner having this decided range of flexibility can operate successfully upon fuels of all grades of volatility, including crude, and that perfect combustion can therefore be secured by slight adjustment and requiring no complication of parts.

It is to be understood that in the present drawings, I have shown only such details of construction as are necessary to illustrate the principle of the burner operation and it therefore may be regarded as largely diagrammatic, the details of construction by which the various parts are cooperatively assembled, being in general, within the skill of the ordinary mechanic.

Figure 10 shows that a single mixing chamber, that is to say, a single device 33 embracing both the atomizing and vaporizing features may be used to feed a battery of burners 34 through the intermediary of a manifold 35, and the invention is by no means limited to a single burner or a particular number of burners but it may be so constructed as to distribute the mixed atomized and/or vaporized fuel mixture in any manner, and to any type of burner desired.

What I claim is:

1. In an oil burner: a vaporizing chamber; an atomizing device; a mixing chamber in communication with said vaporizing chamber through said atomizing device; a starting burner for heating the walls of the vaporizing chamber; and means connected to a source of liquid fuel supply for selectively supplying liquid fuel to said vaporizing chamber, said atomizing device and said starting burner.

2. The device of claim 1 in which the selective means for supplying fuel comprises a rotatable conduit member having a plurality of angularly disposed discharge jets.

3. The device of claim 1 in which the starting burner and vaporizing chamber are both superposed above the atomizing device; and in which the selective fuel supply means comprises a conduit rotatable in said vaporizing chamber and having a plurality of discharge jets extending radially therefrom to supply fuel to said vaporizing chamber, burner or atomizing device, selectively.

4. The device of claim 1 in which the vaporizing chamber has an inverted conical bottom member with a central stand pipe forming an annular well with said member, the starting burner is positioned around the lower end of the wall of said chamber and the atomizing device includes a reservoir positioned centrally and under said standpipe; and in which the selective fluid supply comprises a rotatable conduit member extending through the vaporizing chamber and having discharge jets extending radially therefrom to supply liquid fuel to said starting burner, to said well, and to said atomizing device through said standpipe, selectively.

MANUEL FERNANDEZ Y FERNANDEZ.