

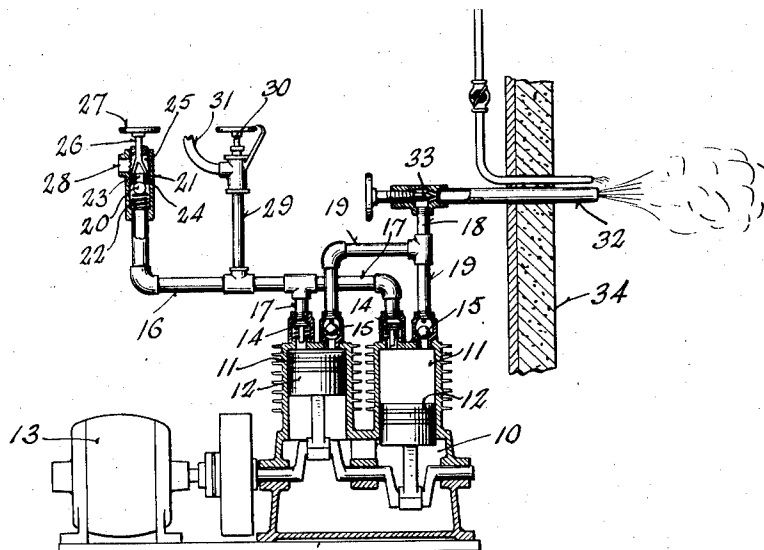
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G. A. DILLER ET AL.

OIL BURNER

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INVENTOR.

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OIL BURNER.

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To all whom it may concern:

Be it known that we, GEORGE A. DILLER, a subject of the King of Greece, having taken out first papers for citizenship of the United States, and PETER F. PETERSON, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Oil Burners, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to oil burners for domestic and commercial furnaces and, more particularly, to the method and means for producing combustible mixtures in burners of this type.

Methods heretofore adopted and carried out in this type of burners result in a mixture of air and oil in which the oil, in a more or less atomized condition, is merely suspended in the air. This is due to the fact that a strictly mechanical atomization of the oil is relied upon in producing the mixture. Mixtures so formed result in imperfect combustion, and only in those instances where the atomization is exceptionally good is it possible to use anything but the lighter grades of oil, such as kerosene, with any degree of success.

One object of the present invention is the provision of a novel method and means for preparing and treating the fuel mixture so as to obtain a more perfect combustion. This we have accomplished by heating the mixture after it has been formed and before it has been delivered to the burner nozzle. In carrying out this novel method we have been able to obtain an exceeding efficient and clean combustion of the heavier oils, such as crude oils.

Another object is the provision of means for carrying out the above method.

Another object is to simplify and otherwise improve the construction and operation of oil burners of the type referred to.

These and other advantages will appear from the following description of an illustrative embodiment of the present invention.

The single figure of the drawing is a view,

partly in section, of an oil burning apparatus constructed in accordance with the present invention.

In carrying out the method of the present invention the oil, in a more or less atomized condition, is mixed with air, the resulting mixture is then heated to at least partially vaporize the contained atomized fuel, and finally the mixture, so treated, is delivered to and through the burner nozzle to effect the desired combustion in the fire box of the furnace. The heating of the formed mixture is preferably effected by compressing the same to a pressure sufficient to produce the desired vaporizing temperature.

Although apparatus of various forms may be employed for performing this method, that shown in the accompanying drawings, and which will now be described, has been operated satisfactorily with heavy crude oil as fuel. The apparatus shown comprises a compressor 10 of standard construction having in this instance two cylinders 11 in which the pistons 12 reciprocate. The compressor is driven by any appropriate means, such as an electric motor 13. Each cylinder is provided with a check valve 14 adapted to open inwardly during the downward or suction stroke of the piston and with a check valve 15 adapted to open outwardly during the upward or compression stroke. A conduit 16 communicates through branch conduits 17 with the valves 14 and a conduit 18 communicates through branch conduits 19 with the valves 15.

A spring pressed valve 20 controls the admission of air to the conduit 16. This valve is mounted in a casing 21 and is yieldably retained by a coil spring 22 in closed position against a port 23 formed in a plug 24. Plug 24 is adjustable toward and from the spring 22 so as to vary the tension therein. In this instance, the plug is screwed into the internally threaded bore 25 of the casing and is controlled by a stem 26 projecting from the casing and provided with an appropriate handle 27. Air is admitted to the casing above the plug 24 through an inlet opening 28. Oil in a more or less atomized condition is admitted into the conduit 16 through a branch conduit 29 communicating therewith. A needle valve

30 of a well known type controls the admission of oil from a supply pipe 31 to the conduit 29.

Conduit 18 communicates with a fuel discharge pipe 32 through an appropriate control valve 33, herein shown as a needle valve of standard form. The pipe 32 is projected through the furnace door or wall 34 into the fire box of the furnace.

The pistons 12 work alternately so that during the suction stroke of one the other is producing a compression stroke. During the suction stroke of each piston, air, entering the opening 28, flows through port 23, into and through conduit 16 at a relatively high velocity past the communicating end of conduit 29. The suction in conduit 16, sufficient to open valve 20 against the pressure of spring 22 and to induce this flow of air is also sufficient to induce the admission of oil from the supply pipe 31, past the valve 30 and through the conduit 29 into the conduit 16 where it is thoroughly mixed with the high velocity air therein. The mixture thus formed passes on through one or the other of the branch conduits 17 into the cylinder of the compressor. During the compression stroke of each piston the mixture therein is compressed and delivered under pressure into the branch conduits 19 and communicating conduit 18. The compression pressures are such as to raise the temperature of the mixture and to thereby effect at least a partial vaporization of the liquid fuel particles suspended therein. The valve 33 not only controls the delivery of fuel mixture to and through the discharge pipe 32, but by restricting the escape of the fuel mixture from conduit 18, it also maintains sufficient back pressure to establish the desired compression pressures. It will thus be noted that in the apparatus shown the pipe 16 constitutes a chamber in which the air and oil are mixed and that the conduit 18 together with the communicating branch conduits 19 constitute a compression chamber in which the fuel mixture is compressed to obtain vaporizing temperatures.

The pressure of the spring 22 upon the air control valve 20 tends to smooth out the

pulsations in suction within the conduit 16, and by adjusting the tension in this spring the degree of suction in the conduit 16 may be controlled.

It will be noted that in the apparatus shown the compressor performs two separate and distinct functions. It not only compresses the mixture so as to increase the pressure and temperature thereof but also serves to induce the flow of oil into the air, so that a gravity feed or other forced feed of the oil is unnecessary.

Various changes may be made in the invention hereinabove specifically described, without departing from or sacrificing any of the advantages of the invention as defined in the appended claims.

We claim:

1. The method of preparing and treating fuel mixtures for oil burners of the character mentioned which comprises mixing oil and air, compressing the mixture to increase the temperature thereof, utilizing the heat of compression to vaporize the oil in the mixture, and delivering the mixture through a discharge passage to be burned.

2. In a liquid fuel burner of the character described the combination of a chamber for mixing air and liquid fuel, a compression chamber for receiving the fuel mixture, means for compressing the mixture in said compression chamber sufficiently to obtain vaporizing temperatures, and a burner connected with said compression chamber.

3. In a liquid fuel burner of the character described the combination of a chamber for mixing air and liquid fuel, a compression chamber for receiving the fuel mixture, said compression chamber having an outlet, a compressor for delivering the mixture under pressure to said compression chamber, the capacities of said compressor and outlet being so proportioned as to obtain pressures in said compression chamber sufficient to vaporize the fuel therein.

In witness whereof, we hereunto subscribe our names this 5th day of April, 1924.

GEORGE A. DILLER.
PETER F. PETERSON