Aug. 20, 1935. O. E. BARTHEL ET AL 2,011,606

OIL BURNER

Filed Sept. 11, 1931

Fig. 1.

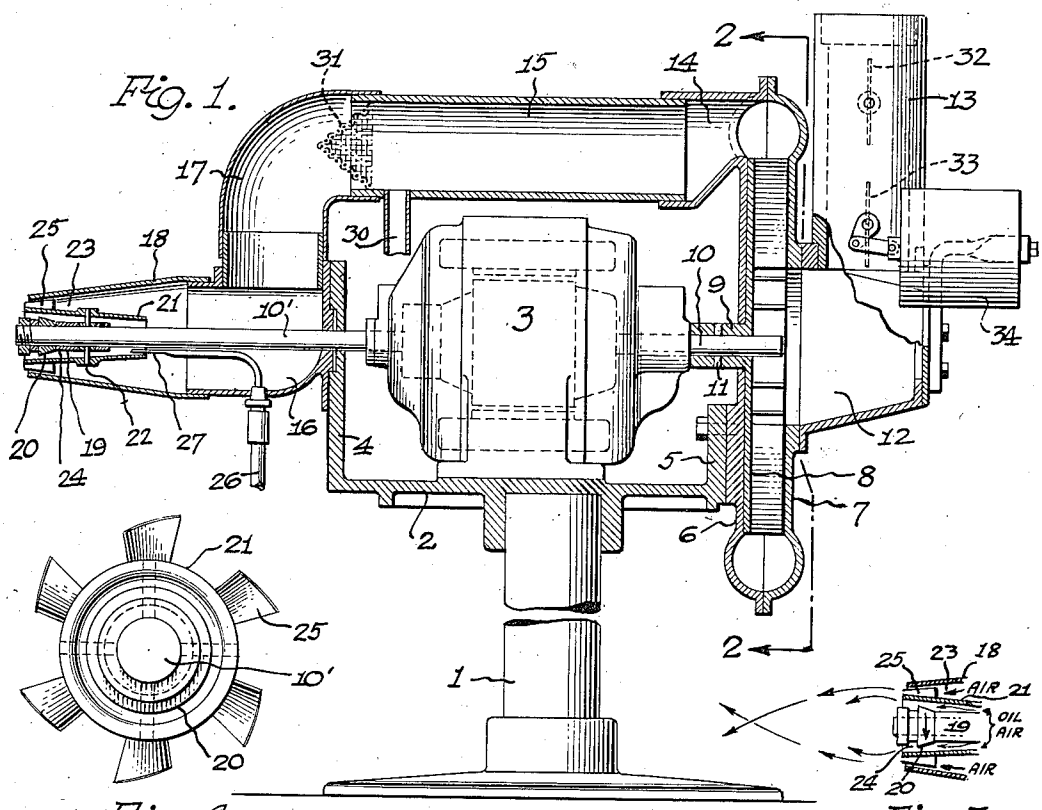

Fig. 4.

Fig. 5.

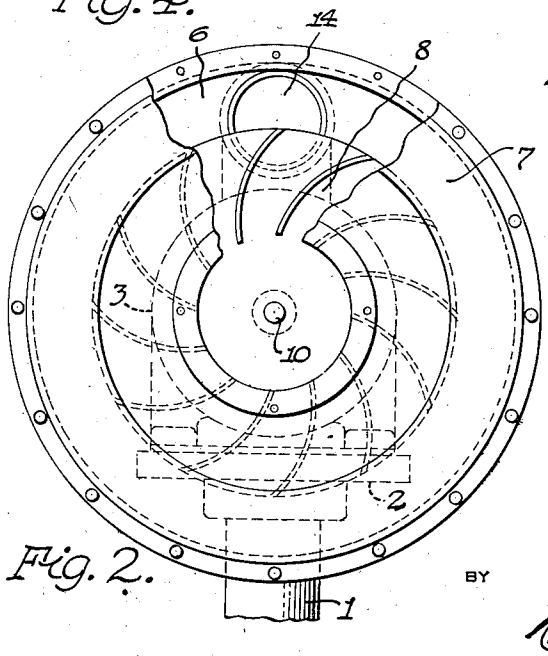

Fig. 2.

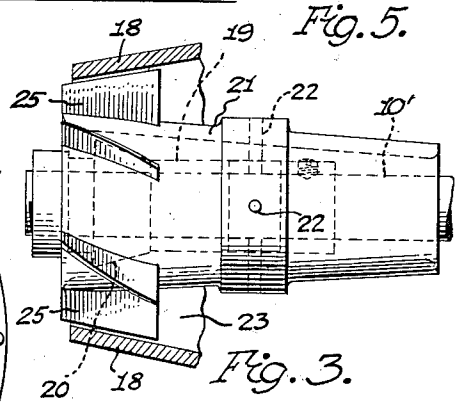

Fig. 3.

INVENTORS

Oliver E. Barthel,

John J. Power,

BY Burhoff & Burhoff

ATTORNEYS

Patented Aug. 20, 1935 2,011,606

UNITED STATES PATENT OFFICE

2,011,606

OIL BURNER

Oliver E. Barthel and John J. Power, Detroit, Mich., assignors of one-third to said Barthel, one-third to said Power, and one-third to Harlow B. Loveland, all of Detroit, Mich.

Application September 11, 1931, Serial No. 562,270

1 Claim. (Cl. 158—77)

The present invention pertains to a novel oil burner designed particularly for domestic use although adapted also for industrial purposes. The principal object of the invention is to provide a burner which forms an intimate mixture of oil and air in the ignition zone and thus promotes efficient combustion.

The burner is constructed in such a manner as to form a stream of oil and air and an enclosing stream or envelope of air. One of these streams, preferably the outer stream, is rotated, and the relative movement of the two streams while in contact with each other results in thorough mixing and efficient combustion.

The device is also suitable for the burning of a prepared gas which however is also mixed with air taken in at the burner. In this case the device is operated in the same manner to provide two coaxial and relatively rotatable streams which result in thorough mixing of the air and gas and efficient combustion in the manner already outlined.

The invention is fully disclosed by way of example in the following description and in the accompanying drawing, in which—

Figure 1 is a longitudinal section, partly in elevation, of an oil burning apparatus constructed according to the invention;

Fig. 2 is a section on the line 2—2 of Figure 1;

Fig. 3 is a detail elevation, partly in section, of the nozzle;

Fig. 4 is an end view of the nozzle; and

Fig. 5 is a detail section, partly in elevation, of the nozzle.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

The apparatus is built upon a pedestal 1 having a table top 2 which supports a suitable electric motor 3. The member 2 has forward and rear vertical flanges or walls 4 and 5 respectively for the attachment of other parts which complete the apparatus and also enclose the motor as will presently appear.

To the wall 5 is secured a half section 6 of an air pump housing which is completed by a similar section 7. Within the housing is a conventional air pump rotor 8 having a hub 9 extending through the section 6 and secured to the shaft 10 of the motor by a pin 11. The central part of the member 7 is cut away to form an air intake passage 12, and to this portion is secured an air intake pipe 13 leading from any suitable source.

The section 6 is formed with an outlet duct 14 to which is connected one end of a pipe 15 extending across the motor in a direction parallel to the shaft thereof. The shaft 10 is extended as at 10' through the wall 4 and is surrounded by an elbow 16 supported on the outer side of the wall and connected to the remaining end of the pipe 15 by another elbow 17. To the elbow 16 is also connected a tubular member 18 substantially coaxial with the shaft 10' and tapering slightly away from the elbow 16.

The tube 18 constitutes the outer shell of a nozzle adapted to mix oil and air in an efficient manner or to eject a prepared gas for combustion. The shaft 10' carries a core 19 formed with a collar 20 which flares outwardly towards the outlet of the tube 18. The shaft also carries another tube 21 held by pins 22 between the core and the tube 18 in such a manner as to form an annular space 23 with the tube and another annular space 24 with the core. Finally, the inner tube 21 carries a series of spiral vanes 25 extending into close proximity to the inner wall of the tube 18 and also projecting slightly beyond the tip of the tube as shown more clearly in Figure 3. An oil line 26 is passed through the elbow 16 and extended into the rear end of the tube 21 where it is flattened as indicated by the numeral 27 in Figure 1.

In the operation of the device as thus far described, it will be evident that air is delivered to the space 23 and a mixture of air and oil to the space 24. The stream issuing from the space 23 is rotated by the vanes 25 and is directed to a point as illustrated by the outer arrows in Figure 5, partly because of the draft within the furnace and partly because of the tapering of the tube 18 towards its outlet. The stream issuing from the space 24 is directed within the air stream issuing from the space 23 and is prevented from breaking through the outer air stream or envelope partly because of the aforementioned draft and partly because of the high rotary speed of the envelope caused by a shaft rotation of the approximately 3000 R. P. M. The relative rotation of the outer stream or envelope around the inner stream results in a highly efficient mixing of the two streams for combustion purposes.

The burner is also suitable for the efficient delivery of natural or prepared gas which is supplied by a pipe 30 leading to the air pipe 15. A screen diffuser 31 is inserted in the air line between the gas pipe and the nozzle. When gas is burned, the oil line 26 is obviously shut off. The motor 3 is operated as previously, and a mixture of gas and air is delivered to both spaces 23 and 24 and ejected in the form of the two streams previously described.

In the air intake pipe 13 are mounted upper and lower butterfly valves 32 and 33 respectively. The former is adjustable by hand to accommodate the air supply for the burning of gas or oil, inasmuch as a different proportion of air is required in each case. The valve 33 is automatically adjusted from a solenoid 34 which in turn is operated by a thermostatic switch (not shown) mounted in the space to be heated in a manner already well known in the art. The same mechanism may also be employed to regulate the oil or gas supply so that the ratio of fuel to air remains constant as the position of the valve 33 is altered in accordance with the heating requirements.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claim.

What we claim is:—

In an oil burner, an outer tube, a blower connected to said outer tube and providing a forced air current therein, a shaft rotatably mounted in said tube, a motor connected to said shaft and adapted to rotate the same at a rate of speed of approximately 3000 R. P. M., an inner tube, means supporting said inner tube on said shaft whereby said inner tube divides the space within said outer tube and surrounding said shaft into two annular chambers, an oil supply member having its outlet extending within said inner tube and being adapted to be connected to a source of supply, and vanes mounted on said inner tube and extending into the annular space between said inner tube and said outer tube, said vanes being adapted to impel the air forced into said outer tube and passing between the inner and outer tubes to create a high speed spiralling current, and said inner tube being adapted to permit passage of air therethrough with a minimum amount of rotation resulting from friction with the surfaces of said rotating inner tube and shaft, said outer tube being tapered to direct the current of air passing between the same and said inner tube to a point located within the line of travel of the air passing through said inner tube.

OLIVER E. BARTHEL.
JOHN J. POWER.