

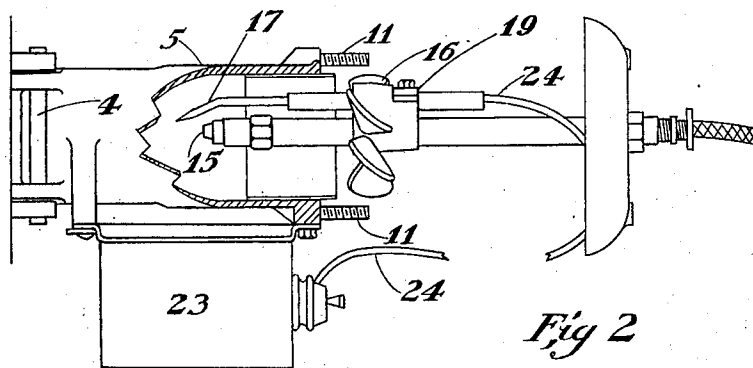
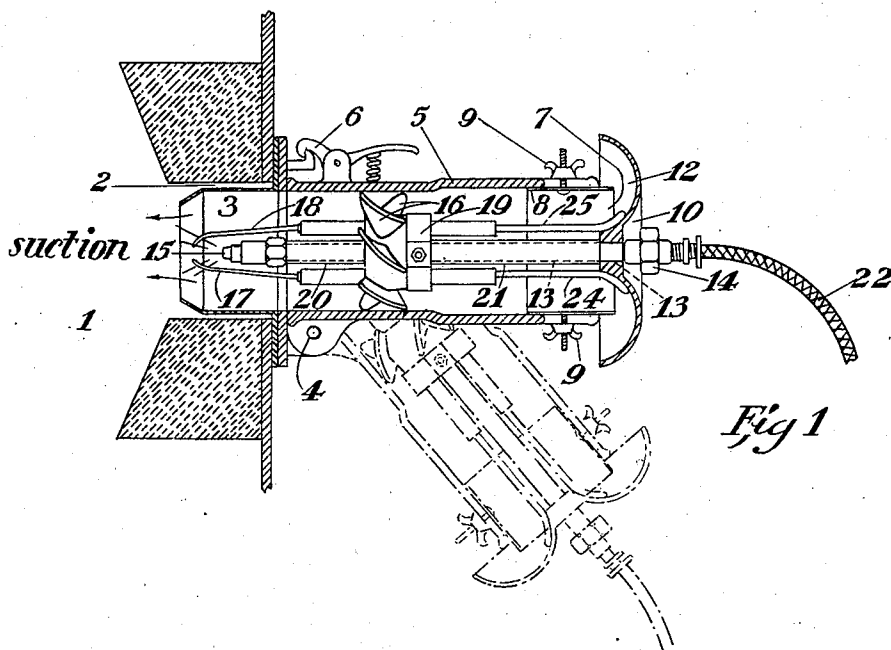
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OIL BURNER

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2,119,952

OIL BURNER

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1 Claim. (Cl. 158—76)

This invention relates to oil burners for furnaces, as for bake ovens and the like, and has for its object the provision of a burner which shall be reliable and efficient in operation, simple and inexpensive to construct, and accessible for quick and easy inspection, cleaning or repairs.

The invention by which I have attained these objects consists primarily of an oil burner having a fuel nozzle to which oil is supplied under pressure and into which the combustion air is drawn by suction in the furnace or combustion chamber. More specifically, it consists of the following structure:

A cylindrical burner shell, at its inner end, is hinged or otherwise removably attached to the outer furnace wall over a port opening into the fire-box or combustion chamber. At the outer end of the burner shell is an air inlet through which air is drawn by induced draft or suction in the combustion chamber, and which is provided with a damper or shutter for regulating the flow of air to the burner shell. The outer end of the shell is provided with a removable cover or shield plate which carries a burner assembly, comprising a fuel pipe fixed to the cover plate and extending axially through the burner shell, a fuel nozzle at the inner end of the pipe, and behind the fuel nozzle one or more helically directed radial vanes fixed to the pipe, and adapted to impart to the air drawn through the shell a helically swirling motion as it passes over the burner nozzle. Also fixed to the fuel pipe are the ignition electrodes or other ignition means which project within the range of the fuel nozzle. The ignition electrodes and the fuel nozzle are connected outside of the shell by flexible connections to the sources of current and oil, so that the entire burner assembly is removable as a unit from the burner shell for cleaning or easy replacement of the parts.

By the novel construction of my burner I have made it possible to swing or otherwise quickly remove the shell and the associated burner assembly away from the port in the furnace wall for easy inspection or cleaning of the fuel nozzle and ignition electrodes.

By removing the cover plate from the end of the burner shell the entire burner assembly can be slipped from the shell and made further accessible for easy replacement or repair of any of its elements.

The improved operation of my burner over the oil burners heretofore available together with further structural features will be set forth in the following specification.

In the accompanying drawing forming a part of this specification, Fig. 1 shows a top plan view partly in section of an oil burner, according to the invention, installed on an outer wall or door of a furnace combustion chamber.

Fig. 2 is a side elevation, partly broken away, of the burner shell shown in Fig. 1, showing the cover plate and attached burner assembly partially withdrawn from the burner shell.

Referring to Fig. 1, a furnace or fire-box 1 is provided with a port 2 in its outer wall. Fixed to the outer wall and projecting through the port is a cone 3 of known form for directing the incoming air convergently into the fuel sprayed from the fuel nozzle. Hinged to the outer furnace wall at 4 is a cylindrical burner shell 5 normally held in place over the port by a spring latch 6. Shell 5 of the burner is provided at its outer end with an air inlet 7. Slidably fitted within the outer end of the burner shell 5 is a sleeve 8 which is secured in adjusted position by wing nuts 9. A circular baffle plate or shield 10 is secured to the outer, air-inlet end of burner shell 5 by studs 11 (see Fig. 2) and its inner peripheral face is curved or dished at 12 to present a section of a torus to provide a fixed clearance from the end of shell 5 for the free passage of air into the shell.

A fuel pipe 13 passes through a central bore in shield plate 10 and is secured thereto by a nut 14. At the inner end of the fuel pipe is a fuel nozzle 15 of known kind, located at or beyond the inner end of the burner shell 5 to project into the cone 3 within port 2 of the furnace wall. A helical air deflector 16 having a plurality of radially directed vanes is mounted on the fuel pipe 13 behind the nozzle 15. Deflector 16 imparts a swirling motion to air passing through the burner tube and serves also to space the fuel pipe 13 from the walls of the burner shell 5.

Ignition electrodes 17 and 18 of known kind are fastened to the pipe 13 by a clamp 19. Thus the tube 13 carries the spray nozzle 15, the air deflector 16, and the ignition electrodes 17 and 18 and their associated wires 24 and 25, which assembly is removable from the burner shell 5 as a unit with the cover plate 10. Cylindrical bushings or sleeves 20, 21 on the burner tube 13 fixedly maintain the spacing of the fuel nozzle 15, the air deflector 16, and the cover plate 10.

Outside of the cover plate 10 the fuel pipe 13 is connected by a flexible tubing 22 to a source of oil under pressure, not shown.

As shown in Fig. 2, an ignition transformer 23 may be conveniently mounted on the shell

5 and connected to the electrodes 17 and 18 by the cables 24 and 25.

The burner described is particularly adapted to the heating of bake ovens in which the combustion chamber is maintained at a sub-atmospheric pressure, as described in my United States Patent No. 1,857,447, issued May 10, 1932. The combustion air is drawn at high velocity through the intake 7 at the outer end of the burner shell 5, is given a rapidly swirling helical rotation by deflector 16, and at the fuel nozzle 15 impinges upon and mixes with the fuel oil sprayed from the nozzle.

My improved burner has the following important advantages in operation: After shutter 8 has once been adjusted to the degree of suction prevailing in a given furnace, so that the proper minimum of excess air is fed to the flame when the combustion chamber is hot, with no adjustments of any kind the proper amount of excess air is automatically provided whenever the burner is started with the furnace cold, to insure prompt ignition and clean initial combustion. This is due to the fact that when the suction fan, injector or other draft inducing means (not shown) is started, it handles cold dense air and consequently produces a higher degree of suction in the furnace and through the burner shell. After the burner has ignited and the combustion chamber has been heated to a point where excess air is no longer desirable, the density of the flue gas handled by the suction fan diminishes, and accordingly the suction and the volume of air drawn through the burner shell 5 decreases, thus providing the fuel-air ratio which produces the most efficient combustion.

From the standpoint of easy maintenance and

repair, the improved burner assembly offers notable advantages. As indicated in broken lines in Fig. 1, the burner shell and the burner assembly contained therein can be swung as a unit about the hinge 4 away from the port 2 in the furnace wall, so that the fuel nozzle 15 and the ignition electrodes 17 and 18 are instantly accessible for inspection and cleaning. Should repair or replacement of any of the parts be necessary, the burner assembly may quickly be removed as a unit from the burner shell 5. Nuts (not shown) on the studs 11 are removed, and the cover plate 10 is drawn away from the burner shell, carrying with it the burner tube 13, the attached air deflector 16, and electrodes 17 and 18, as indicated in Fig. 2. Thus all of the operative elements of the burner are made accessible for easy maintenance.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

In an oil burner, in combination, a tubular burner shell open at both ends, a shield plate removably secured thereto in spaced relation therewith to define an annular air inlet, a fuel pipe extending axially through said shell to a point adjacent its outlet end and secured to the center of said shield plate, a nozzle at the outlet end of said fuel pipe, a pair of ignition electrodes, and an air deflector secured to said fuel pipe intermediate its ends, said deflector comprising a plurality of helically-directed radial vanes and means for holding said electrodes, whereby said deflector maintains the electrodes and nozzle in operative relation to each other and supports the fuel pipe and nozzle centrally in the tubular shell.

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