May 7, 1940. K. P. BRACE 2,199,777

LIQUID FUEL BURNER

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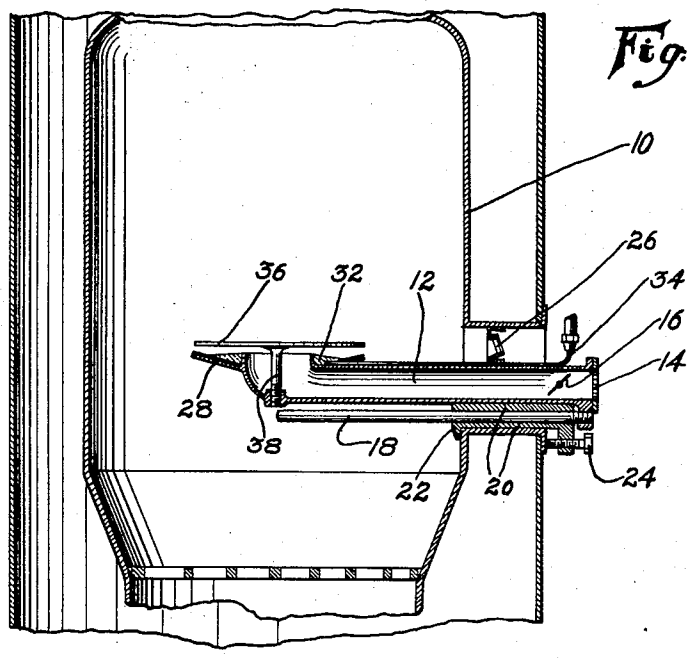


Fig. 1

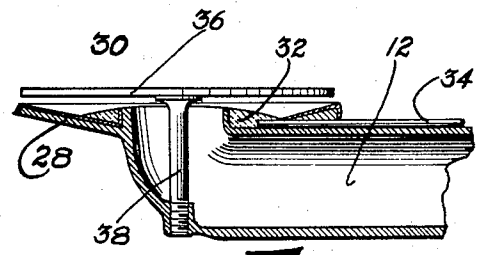


Fig. 2

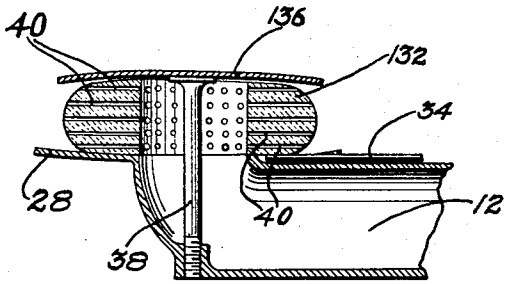


Fig. 3

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LIQUID FUEL BURNER

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3 Claims. (Cl. 158—96)

This invention relates to liquid fuel burners and the like, and is illustrated as embodied in an oil burner of the "conversion" type—i. e. one adapted for installation in a furnace not originally built for it.

An object of the invention is to provide effective vaporization of the fuel, and mixture with the air, by allowing the fuel to seep through an annular porous refractory element across which the air passes. Various features of the invention relate to the construction and arrangement of the refractory element and for passing the air across it. Other features of the invention relate to the mounting of the burner in the side door of the furnace.

The above and other objects and features of the invention, including various novel structural details and advantageous arrangements, will be apparent from the following description of the illustrative embodiments shown in the accompanying drawing, in which:

Figure 1 is a vertical section through a hot-air furnace having one embodiment of my invention mounted therein;.

Figure 2 is a section on a larger scale through the part of the burner in the central portion of the furnace; and

Figure 3 is a section corresponding to Figure 2, but showing a second embodiment.

In Figure 1 the burner is shown mounted in the usual side fuel-door opening of a hot-air or other furnace 10. The burner comprises a support in the form of a hollow tubular air duct 12, discharging upwardly approximately at the center of the fire box of the furnace. The air may be forced through the duct under pressure, but in the arrangement illustrated it is sucked through the duct by the stack action of the chimney connected to the furnace. The intake of the duct 12 is of course outside the furnace, and is shown covered by a grille 14. The volume of air may if desired be adjusted by means of a manually-operable damper 16.

The duct 12 has secured to its intake end, and paralleling the duct proper, two guide rods 18, slidable frictionally in tubular clamp elements 20, on which the duct 12 rests, and which have heads or hooks 22 to engage the inner face of the furnace wall, and clamp screws 24 to engage the outer face of the furnace wall.

By loosening the screws 24 the entire burner is readily removed from the furnace without disturbing the adjustment of guide rods 18, for inspection or repair, or even to ignite the burner if no electric igniter or pilot is employed. Any suitable means 26 (preferably including a glazed opening through which the burner flame may be observed) may be provided for closing the fuel-door opening around the burner. Secondary air may pass through the closing means 26, or may enter through the ash-pit of the furnace.

The outlet end of the duct 12 discharges upwardly axially of a conical supporting flange 28, conforming to and resting on which is a stamping 30 carrying a porous refractory element 32 across which the air passes. Oil or other fuel is supplied to the element 32 by a conduit 34, and seeps through the porous structure of the element 32 and spreads out over its surface, to be taken up by and vaporized in the primary air passing across that surface.

I prefer to form this element with a relatively wide flat upper surface and rather thin tapering cross-section to provide a large area in proportion to its volume in contact with the air and exposed to radiation from the flame resulting from the combustion of fuel and air.

The primary air is directed radially outward, across the oil-impregnated element 32, by means such as a horizontal deflector plate 36, shown as adjustable vertically by being carried by a post 38 threaded into a lug formed in the wall of the duct 12.

The arrangement of Figure 3 differs from that of Figure 2 in that, being intended for use in a larger furnace, the porous refractory annular element 132 is considerably thicker than element 32, and has a considerable number of air passages 40 formed radially therethrough. The deflector plate 136 for this thicker element may be dished instead of flat, as in Figure 2, facing downwardly and being adjusted quite close to the upper face of the element 132.

In both arrangements, the fuel diffuses through the porous structure of the element 32 or 132, and spreads out over a large area across which the primary air passes, thus insuring effective carburetion of the air.

While two illustrative embodiments have been described in detail, it is not my intention to limit the scope of the invention to those particular embodiments, or otherwise than by the terms of the appended claims.

I claim:

1. A burner comprising a tubular air duct having fuel-vaporizing means at its outlet end, tubular clamp elements on which the duct rests and which have shoulders to engage with one side of a furnace wall and clamp screws to engage the other side of said wall, and guide rods paralleling

and secured at their ends to the inlet end of said duct and slidably arranged in said tubular clamp elements.

2. A burner comprising a tubular air duct having fuel-vaporizing means at its outlet end and having an air-controlling damper near its inlet end, tubular clamp elements on which the duct rests and which have shoulders to engage with one side of a furnace wall and clamp screws to engage the other side of said wall, and guide rods paralleling and secured at their ends to the inlet end of said duct and slidably arranged in said tubular clamp elements.

3. A burner comprising a hollow support adapted to be mounted at one end in a furnace and to have its other end arranged in the central portion of the furnace and having an upwardly directed opening at said other end, means for introducing air through said opening, a solid annular porous refractory element mounted on said support around said opening and constructed and arranged to have a large area, in proportion to its volume, exposed to the air and to the radiation of the flame resulting from the combustion of fuel and air, said element being relatively thick and having a plurality of radial air passages formed therein, a deflector plate over the top of said element constructed and arranged to deflect the air from said opening radially outwardly in contact with said element, and means for delivering liquid fuel to said element to be distributed by seepage therethrough and to be taken up by the air.

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