Nov. 5, 1940. G. L. RILEY 2,220,828

OIL BURNER

Filed Nov. 11, 1937

Fig. 1.

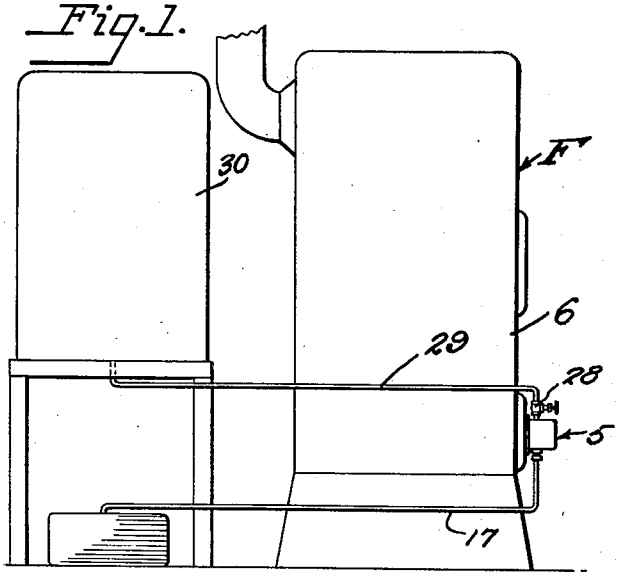


Fig. 4.

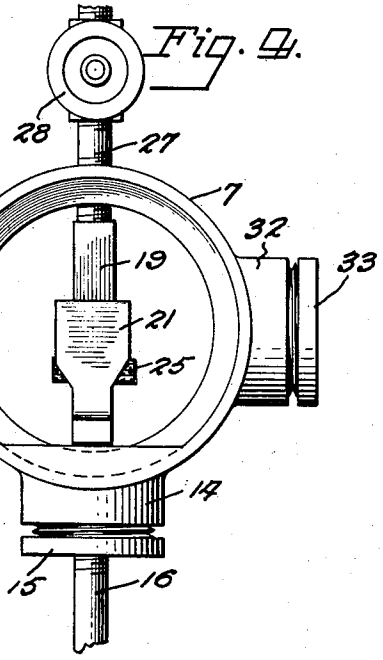


Fig. 2.

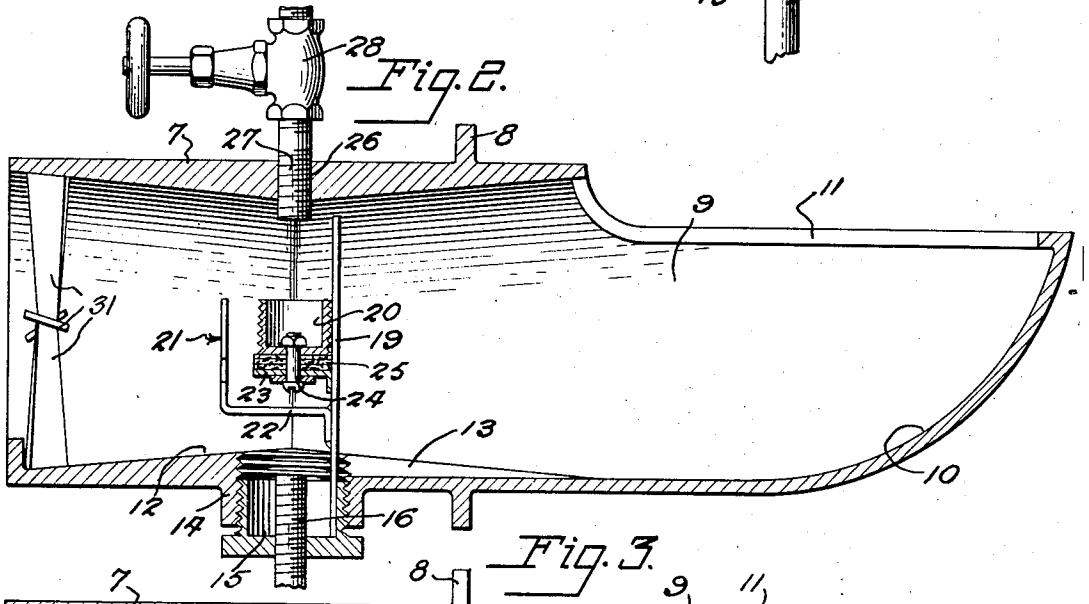
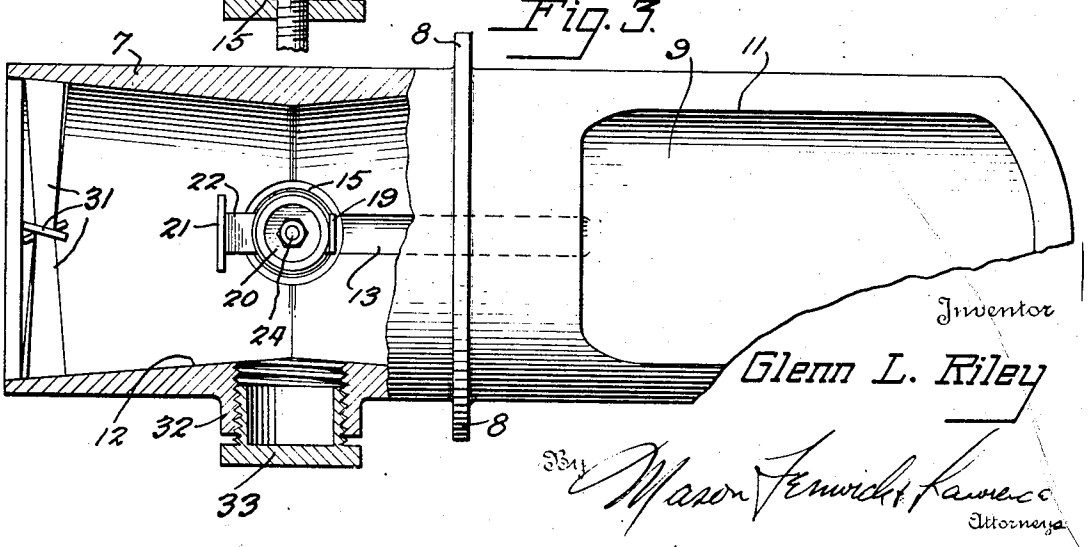


Fig. 3.



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Patented Nov. 5, 1940 2,220,828

UNITED STATES PATENT OFFICE

2,220,828

OIL BURNER

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Application November 11, 1937, Serial No. 174,113

5 Claims. (Cl. 158—91)

This invention relates to oil burners generally; and more particularly to oil burners adapted to be readily applied to practically all standard types of wood or coal burning furnaces for the purpose of converting such furnaces into oil burners.

The main object of the invention is to provide an oil burner of the so-called conversion type which can be built by a manufacturer into a furnace and sold as an integral part thereof, or which can be readily inserted through a circular aperture in the shell or casing of a wood or coal burning furnace to take the place of the fire grates with which said furnaces are ordinarily provided.

A further object of the invention is to provide a simple form of oil burner which will insure a thorough intermixture of air with the liquid fuel vapor to provide thorough combustion of the fuel so as to eliminate as far as possible deposits of soot and carbonaceous deposits on and about the burner.

Another object of the invention is to provide a burner of this type with means for draining any excess oil or unburned fuel which might accumulate in the burner.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawing:

Figure 1 is a side elevation of a furnace provided with a burner constructed in accordance with this invention, and connected to a source of liquid fuel supply and a tank for receiving liquid fuel drained from the burner;

Figure 2 is a central longitudinal section through the burner;

Figure 3 is a top plan of the burner with parts broken away and illustrated in section to show details of construction; and

Figure 4 is an end elevation of the burner with certain elements at the intake end thereof omitted.

As shown in the drawing, the burner designated generally by the reference numeral 5, is suitably secured to the shell 6 of a furnace F. The main body 7 of the burner is a tube having its outer surface formed as a cylinder provided with an outwardly projecting annular flange 8, which divides the tube 7 into an air-and-oil intake section 7' and a vapor outlet section 9' and forms a stop for positioning the fire or vapor fuel bowl 9 of the burner properly within the shell 6 of the furnace F. The flange 8 may be welded or secured in any other suitable way to the shell 6.

The fire bowl 9 is shaped to provide an upwardly curved continuation 10 of the bottom wall of the fire bowl 9, to provide a stream-lined surface for the burning vapor fuel. Above this curved surface of the burner, the cylindrical body 7 is cut away to form a somewhat rectangular vapor outlet opening 11 for the burning fuel. It is to be noted that no part of the fire bowl 9 projects outwardly of the cylinder formed by the outer surface of the main body 7. By this construction, it is only necessary to provide a circular aperture of the same diameter as the external diameter of cylindrical body 7 for the reception of the fire bowl 9, thereby adapting the burner to be applied very readily and inexpensively to an ordinary wood burning or coal burning furnace or stove of standard construction.

The inner surface of the body 7 is shaped to form a Venturi tube 12, provided with a slot, or channel 13 to form a drain for unburned or liquid fuel which might collect in the bottom of the burner. The channel 13 communicates with an internally screw threaded boss 14 having its axis lying in the plane of the throat of the Venturi tube. A receptacle 15 is threaded into the boss 14 to form a sump for the oil drained through the channel 13. This receptacle is provided with a screw threaded aperture to receive the nipple 16 connected by piping 17 to a drainage tank 18.

The receptacle 15 has a vertical plate 19 suitably secured thereto and forming a support for an oil cup 20 and a baffle plate 21 extending upwardly from a flanged strap 22 suitably secured to the plate 19. A flanged bracket 23 is also secured to the plate 19 above the strap 22 and is apertured to receive a stove bolt 24 which passes through several plies of a wick 25 and the bottom of the oil cup 20 to secure said cup and wick properly positioned on the supporting plate 19. It will be apparent from Figure 2 of the drawing that the cup 20 and the other elements fixed to the supporting plate 19 may be vertically adjusted in the burner by the rotation of the sump 15 in the boss 14.

The body 7 is provided with an internally screw threaded aperture 26 to receive a nipple 27 connected to a needle valve 28 of common construction which, in turn, is connected by piping 29 to a tank 30 adapted to contain a supply of fuel oil for the furnace F. The nipple 27 is co-axial with the cup 20 and may be adjusted on the cylindrical body 7 toward and from the said cup

to project inwardly of the cylindrical body 7 so that the liquid fuel will drip cleanly from the end of the nipple into the cup 20 and will not have a tendency to accumulate on the upper inner surface of said cylindrical body. The outer surface of the cup 20 may be corrugated so as to give it a large surface area; and, along with the nipples 15 and 27, should be located as shown in the drawing within the throat of the Venturi tube inner surface of the body 7.

To create high turbulence of the air drawn in through the intake end of the body 7, a plurality of curved vanes 31 are suitably secured at the intake end. These vanes give a swirling motion to the air; and, combined with the Venturi tube, effect a thorough mixture of the air and vaporized fuel, with resultant increase of efficiency in combustion.

One side of the burner body 7 is provided with a boss 32, internally screw threaded to receive an externally screw threaded closure cap 33. The axis of the boss 32 should lie in the plane of the throat of the Venturi tube section 12 because the opening through the boss 32 is intended to give access to the oil cup 20 for the purpose of igniting the oil vapor arising therefrom.

From the foregoing disclosure, it will be apparent that the invention involves a burner which is exceedingly simple in structure, inexpensive to manufacture and install, and embodying very few parts so arranged that liability to derangement will be greatly reduced.

What I claim is:

1. An oil burner comprising in combination a tube having a cylindrical outer face provided with an annular flange dividing said tube into an air and oil intake outer section, and a vapor outlet inner section, the latter section arranged for insertion in a furnace casing through an aperture therein and with said flange in contact with said casing about said aperture, said outer section being formed internally as a Venturi tube, means located in the throat of said venturi for vaporizing liquid fuel and comprising a support, means for adjusting said support radially of said tube and at the Venturi throat thereof, a wick mounted on said support and an oil cup mounted on said wick.

2. An oil burner comprising in combination a tube having a cylindrical outer face provided with an annular flange dividing said tube into an air and oil intake outer section, and a vapor outlet inner section, the latter section arranged for insertion in a furnace casing through an aperture therein and with said flange in contact with said casing about said aperture, said outer section being formed internally as a Venturi tube, means located in the throat of said venturi for vaporizing liquid fuel and comprising a support, means for adjusting said support radially of said tube, and at the Venturi throat thereof, a wick mounted on said support, an oil cup mounted on said wick, and a baffle plate carried by said support positioned between the air intake end of said tube and said cup.

3. An oil burner comprising in combination a substantially cylindrical tubular housing having an air intake at one end thereof and a combustion vapor outlet at the opposite end thereof, the interior wall of said housing being formed to provide a Venturi structure, an apertured boss extending through said housing at the throat of the Venturi structure, a sump detachably secured in said boss, a support carried on said sump, a fuel cup carried by said support and positioned centrally of said throat, wick means interposed between said support and said cup, an air shield movable with said support and interposed between the housing inlet and the cup, fuel feeding means providing a fuel inlet through the throat of said venturi and disposed above the open top of said cup, means for directing excess fuel in the housing into said sump, means for conveying fuel in said sump exteriorally of said burner housing, and means for securing said burner to a furnace structure.

4. An oil burner comprising in combination a substantially cylindrical tubular housing having an air intake at one end thereof and a combustion vapor outlet at the opposite end thereof, said outlet having its axis at right angle to the axis of said inlet, vanes positioned in said outlet arranged to impart a whirling movement to the intake air, the interior wall of said housing being formed to provide a Venturi structure having a throat, an apertured boss extending through said housing into the throat of the Venturi structure, a sump detachably and adjustably secured in said boss, a support carried on said sump, a fuel cup carried by said support and positioned centrally of said throat, wick means interposed between said support and said cup, an air shield movable with said support and interposed between the housing inlet and the cup, fuel feeding means providing a fuel inlet through the throat of said venturi and disposed above the open top of said cup, means for manually controlling the supply of fuel through said inlet, means for directing excess fuel in the housing into said sump, means for conveying fuel in said sump exteriorally of said burner housing, means for securing said burner to a furnace structure, and means in said throat arranged to effect the ready ignition of the combustible vapor.

5. An oil burner comprising a tube having a cylindrical outer surface provided with an annular flange dividing said tube into an air-and-oil intake outer section and a vapor outlet section, the latter section being adapted for insertion in a furnace casing through a circular aperture having the same diameter as said cylindrical surface and with said flange in contact with said casing, said outer section being formed internally as a Venturi tube, and an oil cup mounted in said tube at the axis thereof in the throat of said venturi, a valve controlled nipple extending through said outer section coaxial with said oil cup for supplying liquid fuel to said cup, said nipple being adjustable radially of said tube toward and from said cup.

GLENN L. RILEY.