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F. S. DENISON

CENTRIFUGAL FLUID FUEL BURNER

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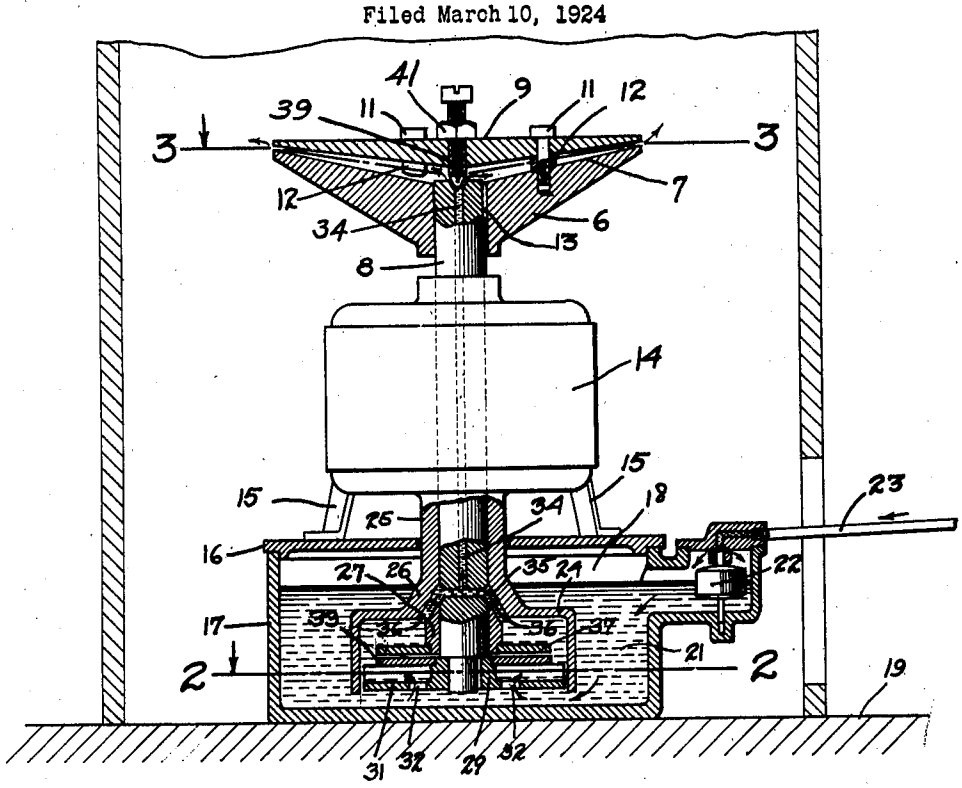


FIG. 1

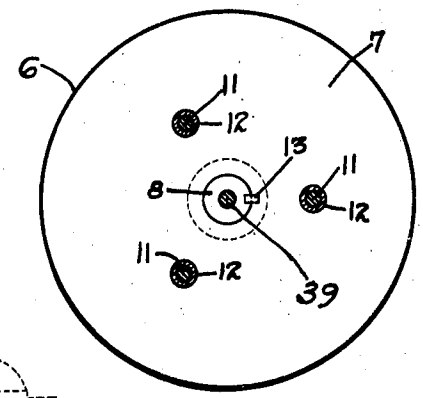


FIG. 3

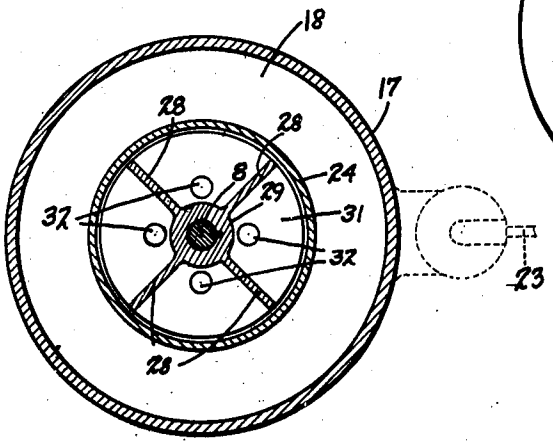


FIG. 2

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CENTRIFUGAL FLUID-FUEL BURNER.

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This invention relates to improvements in fluid fuel burners of the centrifugal type for the circumferential distribution of fluid fuel such, for example, as are known in the oil-burning art.

In burners of this type there are present a multiplicity of parts moving and stationary, their operative disposition entails a relatively large amount of space which is disadvantageous particularly in the case of installations in previously assembled furnaces, boilers and similar heating plants, and the operation of these many parts induces noise and vibration which is especially objectionable in residential installations.

This novel apparatus provides a burner of the centrifugal type which is a compact unitary structure, and one in which there are minimized the usual space requirements, the common noise and vibration, and power consumption.

Broadly, the invention includes a burner head rotatably mounted to distribute the fluid fuel circumferentially in combination with a pump to force the fuel to the head and a driving means. The head, pump and driving means are preferably mounted for rotation in axial alinement in a compact unitary structure.

The object therefore of this invention is to provide an improved fluid fuel burner of the centrifugal type.

Other objects of the invention will more fully appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings there has been disclosed a structure designed to carry out the objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a vertical sectional view through the novel burner;

Figure 2 is a cross-sectional view on the line 2—2 of Figure 1; and

Figure 3 is a cross-sectional view on the line 3—3 of Figure 1.

The selected embodiment of the invention, which is here illustrated for purposes of disclosure of the invention shows a centrifugal fluid fuel burner of the upright type although, with minor obvious changes in bearings, etc. the burner may be used at different angles to the horizontal or vertical.

The distributing head consists of two associated members, a base 6 having its upper surface 7 concave, and inwardly terminating in an aperture whereby the base may be mounted upon the upper end of the shaft 8 and a cap 9 having a convex inner face is mounted upon the base 6 with its convex face in opposition to the concave face 7 of the base. The cap 9 may be secured to the base in spaced relation by means of the threaded bolts 11 each having a spacing collar 12. The base 6 is preferably secured to the shaft 8 for rotation therewith as by means of the key 13.

The shaft is adapted to be rotated by a suitable driving means, such as an electric motor. The housing 14 of the electric motor may be supported by means of a plurality of legs 15 secured to the cover 16 of the casing 17 of an oil chamber 18. As is common in this art, the rotor of the electric motor may be keyed to the shaft 8 and the motor housing provided with the usual end-thrust bearings for the rotatable support and actuation of the shaft 8.

The casing of the fuel or oil chamber 18 rests upon a suitable support 19 and is adapted to contain a supply of the fluid fuel such as the oil 21. The oil in the chamber 18 may be maintained at a predetermined constant level by means of a common form of float valve 22 operatively mounted in an auxiliary recess of the chamber 18. The oil supply is received through the pipe 23 from a suitable source not necessary to be shown, and its entrance into the float recess is controlled by the float valve 22.

A pumping means is positioned within the oil chamber 18 and is adapted to force the fluid fuel to the distributing head. The housing or casing 24 of the pumping means is preferably provided by an integral extension of the motor housing 14. This pump casing is annular in form, as is shown in Figure 2, and is integrally connected to the motor housing by means of a sleeve-like member 25 having a flared annular intermediate portion 26 and an integral axially depending annular shoulder 27. The member 25 and the shoulder 27 provide bearing surfaces for the lower portion of the shaft 8.

The shell or casing 24 is spaced from the floor of the casing 17. Hence, oil in the chamber 18 may freely pass within the casing 24 for engagement by the blades or vanes 28 of the pumping means. The vanes are here shown as four in number and as radially extending from a common hub 29 keyed and fixedly secured to the adjacent end of the shaft. These vanes 28 are also held between two disk members which are rotatably carried by the hub 29. The lower disk 31 is apertured, as is shown by the quadrantal apertures 32, for the free admission of the fuel into the space between adjacent vanes. This lower disk has its circumference in close proximity to the inner face of the casing 24. The upper disk 33 terminates short of the inner face of the casing 24 and the fluid fuel which is drawn between the vanes, upon rotation of the shaft and pumping means, is upwardly forced.

A conduit is provided for communication between the fuel chamber 18 and the distributing head. In this embodiment of the invention, such communication is afforded by the conduit 34 axially extending through the shaft 8 to the space between the base 6 and cap 9 of the distributing head. The conduit, adjacent the lower end of the shaft, extends radially in opposite directions and opens into an annular groove 35 in the shaft. The material of the flared intermediate portions 26 and of the depending shoulder 27 is drilled or otherwise treated to provide the ports 36 leading from the interior of the chamber 18 to the shaft groove 35 which has communication by means of the radial extensions of the axial conduit 34. Preferably, a stationary disk 37 is fixed to the stationary shoulder 27 relatively closely to the upper disk 33 and effectually prevents a tendency of the fuel to churn idly within the chamber above the upper revolving disk 33.

Means are provided to control or regulate the rate of feeding of the pumped fuel to the head and therefore the rate of fuel distribution of the head. A simple means of effecting such regulation is by means of the needle valve 39 received in threaded engagement through an axial aperture in the cap 9 and adapted to be held in a plurality of selectively adjusted positions by means of the lock-nut 41. When this valve approaches its seat, the rate of fuel feeding is obviously decreased, and vice versa.

This needle valve construction has another function and that is of radially jetting the fuel which is upwardly forced thereagainst by the pump. The tapered pointed end portion of the valve is adapted to co-operate with, and to extend slightly within, a tapered bore in the upper end of the shaft conduit 34 which functions as the valve-seat. The construction of this seat and valve is therefore such that the pumped oil is initially radially sprayed by the needle valve to the distributing head which, in turn, by the centrifugal function of its rapid rotation efficiently sprays the fuel by ignition.

Through this preferred direct connection of the head, motor and pump there is provided a compact, quiet, efficient structure of few moving or stationary parts and one which is economical in power consumption and the dual function of the valve, of regulation and of initial and directional breaking-up of the pumped fuel, is of decided advantage in the regulation and efficient working of the burner.

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

1. A reservoir as a base, a motor housing upon the top wall of said reservoir having a cylindrical extension within the reservoir, said extension having a terminal chamber, a motor within the housing having a shaft journaled in said extension, said shaft having an axial passage, a disk-pump within said chamber supported thereby and by said shaft, and adapted to discharge into said axial passage, and a centrifugal burner head upon said shaft above the motor, adapted to receive oil from said axial passage and distribute the same in sheet form horizontally.

2. A device of the class described, having an oil reservoir as a base, a removable cover for said reservoir, a motor housing above and immovably secured to said cover and having a hollow cylindrical extension passing through the cover into the reservoir, said extension having a downwardly-opening terminal chamber, providing a central depending bearing having passages leading from its upper side inwardly for communication with the extension bore, a pump-disk carried by said bearing, a motor in said housing having a shaft journaled in said extension and having a central bore communicating with the passages of said bearing, a second pump-disk carried by said shaft below the first mentioned disk, and a centrifugal distributor head upon said shaft, above said motor, having a horizontal distributing passage communicating with the shaft bore.

3. A device of the class described, comprising a closed oil reservoir, a motor housing immovably mounted upon the top of said reservoir and having a depending hollow bearing extension extending within the reservoir, said extension having an enlarged downwardly-opening chamber, providing a central bearing having passages leading inwardly and communicating with the extension bore, a motor in said housing having a shaft journaled in said extension and having a bore communicating with said bearing bore, a burner head at the top of said shaft

communicating with said shaft bore, and a disk-pump carried by the shaft and extension and disposed within said chamber.

4. A shaft having an axial bore, a fuel distributor head having a base element secured to the shaft and having a concave upper face, a plate removably secured to the base element and having a convex lower face spaced from the concave face of said base to form an upwardly slanting passage adapted to discharge circumferentially of the vertical periphery of said head, the lowermost portion of said passage being substantially at the level of the upper end of said shaft, and a screw threaded through said plate and having a needle-valve relation to said axial bore.

In witness whereof, I have hereunto set my hand this 4th day of March, 1924.

FREDERICK S. DENISON.