Oct. 20, 1936. E. J. LATTNER 2,057,783

PUMP FOR FUEL BURNERS

Original Filed Nov. 21, 1932

Fig. 1

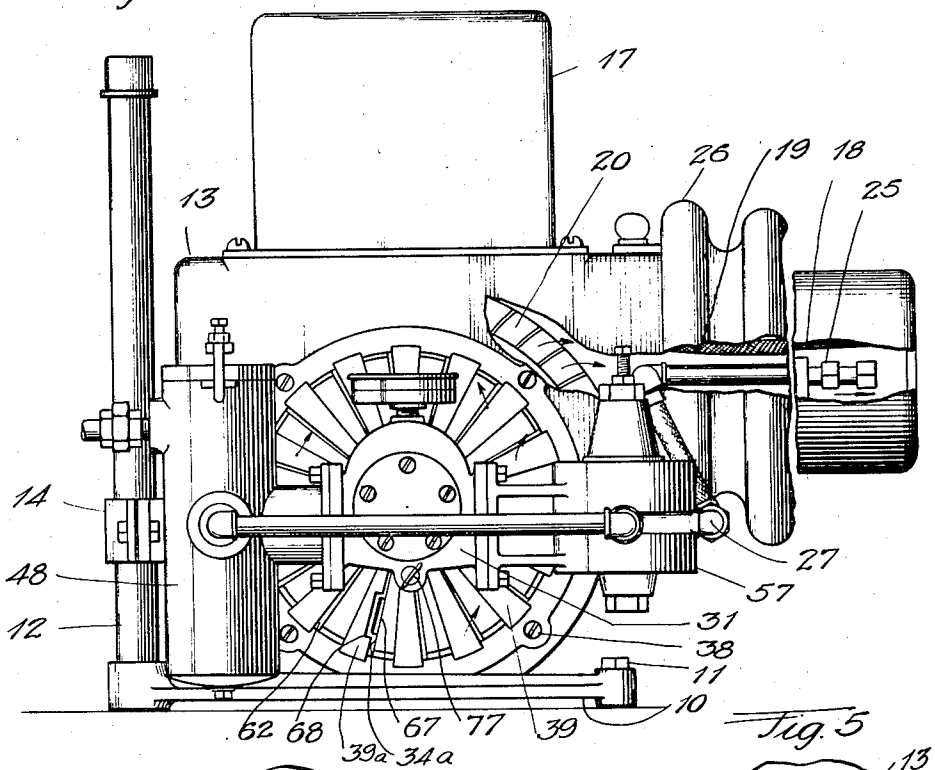


Fig. 2

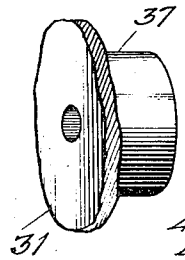


Fig. 3

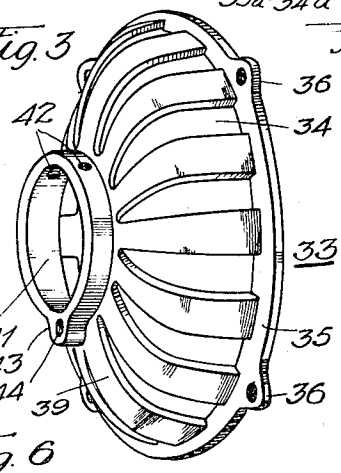


Fig. 4

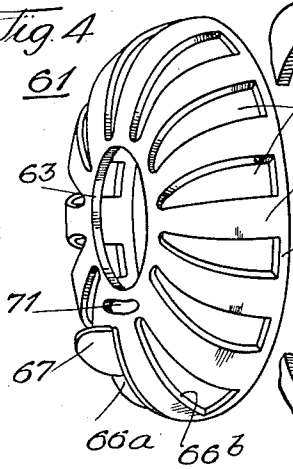


Fig. 5

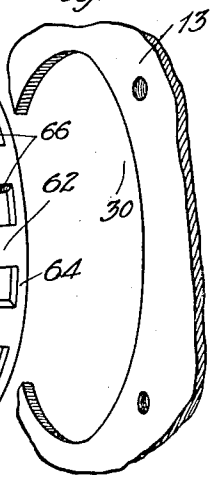
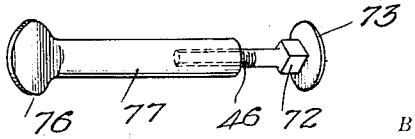


Fig. 6



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Patented Oct. 20, 1936 2,057,783

UNITED STATES PATENT OFFICE

2,057,783

PUMP FOR FUEL BURNERS

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Original application November 21, 1932, Serial No. 643,560. Divided and this application May 17, 1933, Serial No. 671,538

2 Claims. (Cl. 103—4)

This invention relates to fluid fuel burners and particularly to that type of burner in which liquid or gaseous fuel under pressure is atomized and mixed with a blast of air delivered into the furnace by suitable air circulating means.

This application is a division of my co-pending application, Serial Number 643,560 filed November 21, 1932, patented April 24, 1934, No. 1,955,852.

In burners of the type referred to the fuel and air are mixed by ejecting the fuel under pressure from a nozzle usually enclosed within a tube or conduit through which air at a fairly high velocity is delivered. The air with which the fuel is mixed is usually drawn into the rear end of the tube or conduit by means of a fan or blower located in the conduit and then delivered out of the conduit by means of the fan. The fuel is usually delivered to the nozzle by means of a pump driven by the same motor which drives the fan.

It is very essential for proper and efficient operation of the burner that means be provided for controlling the relative amount of air in proportion to fuel at all speeds of the fan. If the proportion of air and fuel is not correct the mixture is too lean or too rich and combustion is incomplete and inefficient.

The air flow control means must be adjustable to permit its adjustment to secure the correct volume of air in relation to the volume of fuel, and means should be provided for locking the air flow control means in the preferred position. The air flow control means must be simple and inexpensive in construction and must be built into the burner, and in a preferred construction is arranged so that fuel flow control devices may be supported by the air flow control means. It is also desirable that the air flow control means should break up the air stream as much as possible and cause it to eddy and swirl to promote mixing of the fuel and air. The air flow control means must also be so arranged as to minimize any sound the air may make in flowing into and out of the conduit.

A general object of my invention is to provide an air flow control means for fuel burners.

A more specific object of my invention is to provide an air flow control device for fuel burners which may be adjusted to regulate the quantity of air admitted to the burner, and to properly proportion the volume of air admitted to the volume of fuel delivered by the nozzle of the burner.

Another object of my invention is to provide an air flow control means which is a "built-in" part of the burner and which may be utilized as a mounting for other parts of the burner.

Another object of my invention is to provide an air flow control and mixing means which will promote proper mixing of the fuel oil and air and which will minimize or eliminate sounds made by the air as it rushes through the burner.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification, wherein is disclosed an exemplary embodiment of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention. The device may be used or adapted for use for other purposes.

In the drawing:

Figure 1 is a view in right side elevation of a fuel burner having as a part thereof an air flow control means constructed according to one embodiment of my invention. Portions of the structure have been broken away to show the remaining parts in greater detail.

Figure 2 is a view in perspective of the coupling flange of a pump which is adapted to be mounted upon one of the members of the air flow control means.

Figure 3 is a view in perspective of one of the members of the air flow control means constructed according to my invention.

Figure 4 is a view in perspective of another member of the air flow control means.

Figure 5 is a view in perspective showing the portion of the conduit to which the air flow control member shown in Figure 3 is secured. Figures 2, 3, 4 and 5 show the respective parts in exploded relation, and

Figure 6 is a view in perspective of the locking means used for locking the air flow control means in position when proper adjustment of the parts thereof has been secured.

Referring now to the drawing and more particularly to Figure 1, the burner structure as a whole is mounted upon a base 10 which may be secured to the floor or other suitable foundation by means of bolts 11. A standard 12 projects vertically from the base 10 and affords a means whereby the fan housing 13, which acts also as a main frame member, may be mounted upon the base.

The box-like housing 13 is provided with a clamping bracket member 14 at the rear wall thereof for clamping the housing 13 to the standard 12 at any suitable distance from the floor.

A driving motor (not shown) of any usual construction is preferably bolted to the left side of the housing and the shaft of the motor projects into the housing 13, and a fan, indicated at 20, for drawing air into the housing 13 and driving it through the blast conduit 26, is mounted on the end of the shaft. The rotating parts of the fuel pump 31 are also driven by the same motor which drives the fan and suitable connections are employed for driving the fan and pump from the motor. In the present instance any suitable motor, fan and fuel pump may be employed, and therefore these parts need not be further described.

It is very desirable that the axis of the fan be located below the center-line of the blast conduit 26 in order to lower the center of gravity of the mass of the burner, and in order that the fuel flow control devices mounted on the right-hand side of the housing 13 will be located below the nozzle 25 and nozzle feed pipe 27, so that when the burner is stopped, fuel within the feed pipe 27 immediately drains back into the fuel feed control means. This construction and location of parts is of considerable importance because the fuel flow control devices afford chambers into which fuel within the upper portion of the feed pipe 27 and nozzle 25 may drain back away from the nozzle as soon as the oil burner is shut down, thereby preventing burning and smoking of the oil which would normally be present in the feed pipe and nozzle and would drip from the nozzle after the burner had been shut off.

Ignition of the mixture of fuel and air may be secured in any suitable manner but in the present instance is secured by means of a transformer 17 energized by the same source of electrical energy which energizes the motor previously mentioned. The transformer furnishes high potential current for the ignition points 18 by means of cable 19.

A large circular opening 30 is provided in the right-hand side of the housing 13 and the opening is covered by means of an end bell 33 having radially slotted openings 34 to permit air to pass through the end bell, into the housing 13 and out through the blast conduit 26. The direction the air takes in passing through the burner is indicated by the small arrows. The end bell is provided with a large radially extending flange 35 having lugs 36 spaced about its periphery in order that the end bell may be secured to the face of the housing 13 over the circular opening 30 as by means of bolts 38.

The greater part of the end bell is comprised of curved triangular portions or louver strips 39 having their apexes connected by a cylindrical flange 41 and connected at their bases by the flange 35. The strips are spaced apart to provide the triangular openings or louvers 34 beforementioned. The cylindrical flange 41 is provided with tapped radial openings 42 in order that the cylindrical portion 37 of the pump 31 may be placed in the opening within the flange and clamped by means of set screws threaded into the tapped openings 42. The cylindrical portion 37 of the pump 31 projects through the cylindrical flange 41 and beyond the inner wall thereof. A lug 43 projects downwardly from the cylindrical flange or ring 41 and the lug is provided with an axially extending opening 44 in which a thumb screw 46 may be placed for receiving an elongated wing nut 76 thereon as hereinafter described.

A second bell-shaped member or shutter 61 is provided and this member is of substantially the same construction as the member 33 shown in Figure 3 except that the flanges 35 and 41 are not used but the inner ends of the louver strips 62 are connected by means of a circular webbed portion 63 and the outer ends by means of another webbed ring-like portion 64. The circular webbed portion 63 of shutter 61 fits over the inwardly projecting flange 37 of pump 31 and is rotatably supported thereby. The openings or louvers 66 are triangular and of substantially the same shape and area as the openings 34 in the end bell 33. The shutter 61 is of smaller diameter than the end bell 33 and its axial dimensions are less, so that the shutter nests in the end bell.

A lug 67 projects axially from one side of the lowermost of the louver strips 62, and when the shutter is in place in the end bell, the lug 67 projects out through the lowermost louver 34*a* in the end bell 33 so that it may be moved to rotate the shutter 61 within the end bell 33. A suitable indentation 68 is provided in the louver 39*a* of the end bell so that the lug 67 may move into the indentation to permit complete opening and closing of the louvers 34 of the end bell by the louver strips 62 of the shutter. The openings 66*a* and 66*b* of the shutter are slightly shorter than the other openings 66 so that the flange 63 is enlarged at the bottom of the central opening. A slot 71 is provided in this portion of the flange 63 and this slot is curved in a sector of a circle the center of curvature of which is at the axial center of the end bell 61.

The screw 46 is enlarged at the inner end of the shank to provide a squared portion 72 adapted to fit in the slot 71 and a button-like portion 73 adapted to bear against the inner wall of the shutter 61 adjacent the slot 71. The threaded shank of the screw projects through the opening 71 of the end bell 61 and through the opening 44 in the ring 41, and a wing nut 76 having a long shank 77 is threaded on the screw 46 with the inner end of the shank 77 bearing against the lug 43. It is apparent that when the thumb nut 76 is tightened on the screw 46, the shutter 61 is clamped in place within the end bell 33, but that when the wing nut 76 is loosened, the shutter 61 may be rotated by means of the lug 67 within the end bell 33 to a degree determined by the width of the opening 34*a*. It is apparent also that since the louver strips 62 are of such a width as to overlap the openings 34 in the end bell 33, that the shutter 61 may be rotated from a position in which the louver strips 62 offer no resistance to the passage of air through the end bell and shutter to a position such that the louver strips 62 entirely cover the openings 34 in the end bell 33. The shutter 61, of course, may be located at any position between these two extreme positions, and thus accurately control the area of the air passageways through the end bell and shutter.

The ring-like flange 41 on end bell 33 affords a means by which the pump 31 may be supported on the end bell and the pump 31 is provided with suitable flanges in order that a strainer 48 and a fuel flow control valve 57 may be fastened on the pump.

In operation with the burner located so that the conduit 26 projects into a furnace, the burner is started up and the position of the shutter 61 within the end bell 33 changed until the flame within the furnace burns with a blue color which indicates that complete and efficient combustion is being secured. The thumb nut 76 is then tightened on the thumb screw 46 and the shutter 61 is then locked in place with relation to the end bell 33.

The plurality of triangular openings of the

shutter and end bell cause the air being admitted to the conduit to swirl and eddy and thus promote better mixing of fuel and air, and the swirling action and baffle effect of the louver strips act to muffle sounds emanating from within the conduit.

Although this invention has been described in connection with a certain specific embodiment, the principles involved are susceptible of numerous other applications that will readily occur to persons skilled in the art. The invention is therefore to be limited only as indicated by the scope of the appended claims.

I claim as my invention:

1. In a liquid fuel burner, a blast conduit, means for propelling air through the blast conduit, a pump for delivering fuel to the blast conduit, control means for controlling the volume of air admitted to the air propelling means comprising a louvered member supported on said air propelling means and a shutter, the louvered member having a flange for supporting the pump and the pump having a cylindrical portion to support the shutter, the shutter being mounted for rotation on the pump and in the louvered member.

2. In a liquid fuel burner, a blast conduit, means for propelling air through the blast conduit, a pump for delivering fuel to the blast conduit, control means for controlling the volume of air admitted to the air propelling means comprising a louvered member supported on said air propelling means and a shutter, said member being provided with a central aperture, the pump having a portion extending within the aperture for supporting the pump upon the member, said shutter being provided with a central aperture and being supported for rotation upon the pump with said portion of the pump extending through the last-named aperture.

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