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AIR DIRECTING MEANS FOR GUN TYPE OIL BURNERS

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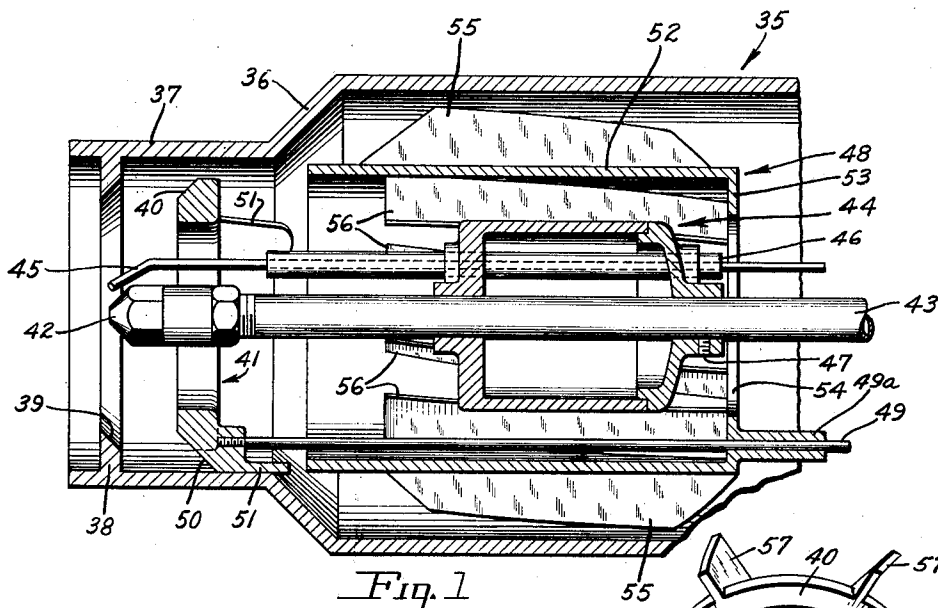


Fig. 1

Fig. 5

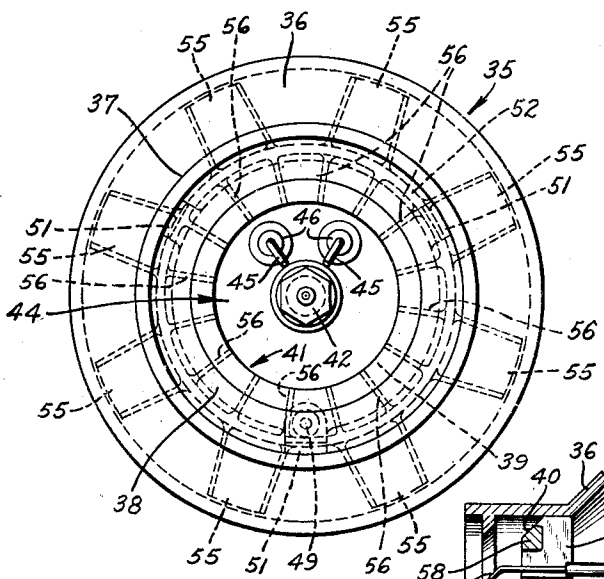
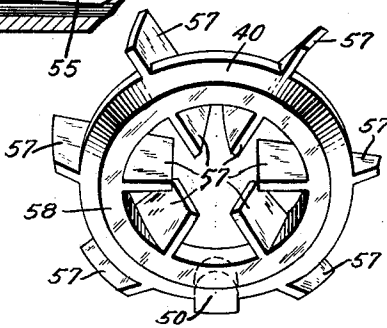


Fig. 2

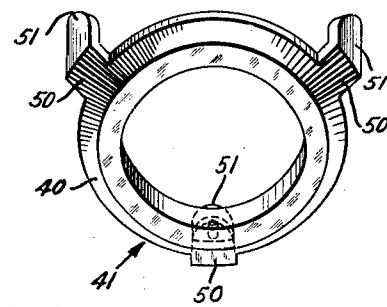
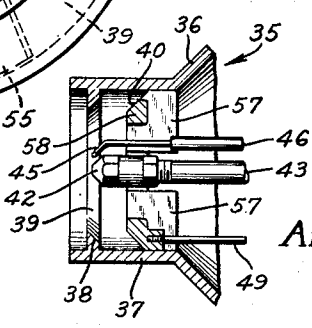


Fig. 3

Fig. 4



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AIR DIRECTING MEANS FOR GUN TYPE
OIL BURNERS

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5 Claims. (Cl. 158—1.5)

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This invention relates to new and useful improvements in liquid fuel burners and has particular relation to an oil burner of the so-called gun type.

An object of the invention is to provide an improved means for regulating the passage of air through the air blast pipe of an oil burner of the type indicated whereby to provide for the control of and the obtaining of a more efficient flame.

Another object is to provide an oil burner including adjustments whereby to adapt a burner having a given diameter of air blast pipe to different fuel capacities as may be required by different installation.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein satisfactory embodiments of the invention are shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:

Fig. 1 is a central vertical sectional view through the forward end portion of an oil burner having an air blast pipe with the air passage regulator means of the invention in open position;

Fig. 2 is an elevational view looking into the end of the burner;

Fig. 3 is an isometric view of a shiftable ring employed in the burner;

Fig. 4 is a sectional view on a smaller scale showing a modification of the ring structure of Figs. 1-3; and

Fig. 5 is an isometric view of the shiftable ring member of Fig. 4.

Referring in detail to the drawing, at 35 is generally indicated the forward end portion of an air blast pipe of an oil burner. Pipe 35, toward its forward end, is reduced or drawn inwardly, as at 36, and then extends forwardly whereby it includes a discharge end portion 37 of reduced diameter. In this end portion 37, a ring 38 is shown as formed integral with the pipe 35 and such ring is bevelled at the inner side of its free edge, as at 39, to provide a seat for the bevelled portion 40 of an adjustable closure ring 41, shown in open position in Fig. 1, and shown detached in Fig. 3.

A fuel spray nozzle 42 is located adjacent the discharge end of the portion 37 of pipe 35 and is adapted to be supplied with liquid fuel as

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through a tube 43 arranged in the longitudinal center of the pipe 35 and serving to support a head-like means, generally designated 44, located coaxially of the longitudinal center line of pipe 35. Means 44 in turn provides a support for electrodes 45 insulated from said means, as at 46. The means 44 is located rearwardly of the reduced diameter end portion 37 of pipe 35 and may be secured in position along the tube 43 as by a set screw 47.

An air passage regulating means, generally designated 48 is located within the pipe 35 and associated with the head-like means 44. Such air passage regulating means is adjustable in the pipe 35 between an open and a closed position and the same is true of the ring 41. The means for effecting adjustment of the ring comprises a rod 49 connected with the ring and extending rearwardly through the pipe 35. For the purpose of supporting the ring and maintaining it in concentric relation with the pipe portion 37, the ring is provided with a series of radially extending arms 50 each at its outer end carrying a foot-like portion 51 engaging the inner surface of the reduced diameter pipe portion 37.

The legs 50 and feet 51 maintain the ring 41 in concentric relation with the flange 38 and with the pipe 35 and mount said ring for movement toward and from said flange. Actually, ring 41 is movable from a closed position, where its bevelled surface 40 seats against the bevelled surface 39 of flange 38. In this position the ring partly enters into said flange and reduces the effective diameter of the pipe portion 37 about the nozzle 42. From this closed position the ring may be shifted inwardly or rearwardly on manipulation of the rod 49, as for example, to the position of Fig. 1.

The air passage regulating means 48 includes a relatively long cylindrical portion 52 of a diameter to enter into the reduced diameter end portion 37 of pipe 35 and at its inner or rear end includes an inwardly directed flange 53 having a central opening 54 therethrough of a diameter to pass over or to receive the head-like means 44. Means 48 is also adjustable to and from a closed position as on manipulation of a tubular rod 49a through which the rod 49 is carried for convenience. Clearly either rod may be operated independent of the other. When means 48 is in closed position, its forward end portion has entered into the reduced diameter end portion 37 of the pipe 35 (Fig. 4) and its flange 53 is about and in relatively close relation to the head-

like means 44. Thus movement of air through the pipe 35 is substantially prevented.

Means 48 may be adjusted to a variety of positions, as for example, to the position of Fig. 1, wherein said means is in an open position. When in open position, the cylindrical portion 52 of means 48 is rearwardly of the reduced diameter end portion 37 of the pipe 35 and the flange 53 is rearwardly of the head-like means 44 so that air, as suggested by the arrows in Fig. 1, moving forwardly through the pipe 35 may pass about the outer side of the cylindrical portion 52 and may also pass through said portion entering through the opening 54 in the flange 53.

The air moving about the cylindrical portion 52 is given a twist due to the presence of helically arranged vanes 55 on the outer surface of said portion. Further, these vanes ride against the inner surface of the full diameter portion of pipe 35 and serve to keep the means 48 centrally located in the pipe. The vanes 55 do not extend to the forward end of the cylindrical portion 52 and thus do not interfere with the entrance of the same into the reduced diameter pipe portion 36.

Air entering through the opening 54 and passing through the cylindrical portion 52 of the air regulating means 48 is also given a spiral twist. This is accomplished due to the presence of vanes 56 carried by the inner walls of cylindrical portion 52. While the vanes 55 and 56 need not be arranged at exactly the same angle or pitch, they are preferably arranged at the same general angle or pitch so that the air passing about the cylindrical portion 52 is given a twist in the same general direction as the air passing through said portion.

It is believed that the operation of the modified structure will be understood, but it is briefly pointed out that the volume of air passing through the pipe 35 may be carefully regulated from a minimum, when the air passage regulating means 48 is in closed position, up to a maximum, such as to support relatively large fuel consumption. The ring 41 also assists in controlling the passage of air, and in confining such passage to a comparatively small opening about the nozzle 42 when such ring is in closed position. Thus the means of the invention is adapted to control flame and to provide for the passage of air to support proper combustion in accordance with the fuel burning capacity required for any particular installation and as provided for by the fuel spray nozzle employed.

The modification in Figs. 4 and 5 relates exclusively to the placing of vanes 57 on a ring 58 corresponding in other respects with the ring 41. Where the parts in Figs. 4 and 5 are the same as those in Figs. 1-3, the same reference characters have been applied. In the modified construction the ring 58 is supported centrally in the reduced diameter end portion 37 of pipe 35 by the spirally arranged vanes 57 and it is noted that such vanes extend outwardly beyond the outer periphery of ring 58 and inwardly of the inner periphery of such ring. Thus, these vanes serve to impart or insure of a spiral or twisting movement of air passing about and through said ring. The vanes 57 are constructed and arranged to impart to the air a twist in the same general direction as is imparted by the vanes 55 and 56 of the means 48.

Having thus set forth the nature of my invention, what I claim is:

1. In a liquid fuel burner including an air blast pipe having a reduced diameter discharge end portion, an annular flange extending radially inwardly from the inner surface of said reduced diameter end portion, a ring within said portion and of an outside diameter to engage and seat against said flange in radially spaced relation to the wall of said end portion and of an inside diameter less than the inside diameter of said flange, said ring movable in said end portion of said air blast pipe longitudinally of the latter to an open position spaced inwardly along the axis of the pipe from said flange and a closed position seated against the flange and projecting radially inwardly of the inner periphery thereof and thereby reducing the effective internal diameter of said pipe portion at said flange to the diameter of the inner periphery of said ring, and vanes on said ring and extending outwardly of the outer periphery thereof into sliding engagement with the inner surface of the wall of said reduced diameter pipe portion and inwardly of the inner periphery thereof and arranged helically with respect to the longitudinal axis of said air blast pipe for imparting a twist to all air passing about and to at least some of the air passing through said ring when the latter is in said open position and through said ring when it is in closed position.

2. In a liquid fuel burner including an air blast pipe having a reduced diameter discharge end portion, an annular flange extending radially inwardly from the inner surface of said reduced diameter end portion, a ring within said portion and of an outside diameter to engage and seat against said flange in radially spaced relation to the wall of said end portion of an inside diameter less than the inside diameter of said flange, said ring movable in said end portion of said air blast pipe longitudinally of the latter to an open position spaced inwardly along the axis of the pipe from said flange and a closed position seated against the flange and projecting radially inwardly of the inner periphery thereof and thereby reducing the effective internal diameter of said pipe portion at said flange to the diameter of the inner periphery of said ring, and vanes on said ring and extending rearwardly thereof and outwardly of the outer periphery thereof into sliding engagement with the inner surface of the wall of said reduced diameter pipe portion and arranged helically with respect to the longitudinal axis of said air blast pipe for imparting a twist to all air passing about said ring when the latter is in said open position.

3. In a liquid fuel burner including an air blast pipe having a reduced diameter discharge end portion, an annular flange extending radially inwardly from the inner surface of said reduced diameter end portion, a ring within said portion and of an outside diameter to engage and seat against said flange in radially spaced relation to the wall of said end portion and of an inside diameter less than the inside diameter of said flange, said ring movable in said end portion of said air blast pipe longitudinally of the latter to an open position spaced inwardly along the axis of the pipe from said flange and a closed position seated against the flange and projecting radially inwardly of the inner periphery thereof and thereby reducing the effective internal diameter of said pipe portion at said flange to the diameter of the inner periphery of said ring, and vanes on

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said ring and extending outwardly of the outer periphery thereof into sliding engagement with the inner surface of the wall of said reduced diameter pipe portion and arranged helically with respect to the longitudinal axis of said air blast pipe for imparting a twist to all air passing about said ring when the latter is in said open position.

4. In a liquid fuel burner including an air blast pipe having a reduced diameter discharge end portion, an annular flange extending radially inwardly from the inner surface of said reduced diameter end portion, a ring within said portion and of a diameter to engage and seat against said flange in radially spaced relation to the wall of said end portion and of an inside diameter less than the inside diameter of said flange, said ring movable in said end portion of said air blast pipe longitudinally of the latter to an open position spaced inwardly along the axis of the pipe from said flange and a closed position seated against the flange and projecting radially inwardly of the inner periphery thereof and thereby reducing the effective internal diameter of said pipe portion at said flange to the diameter of the inner periphery of said ring, spaced radially extending means on said ring and engaging the inner surface of said reduced diameter end portion and supporting said ring substantially concentrically therein for said movements to and from closed and open relation with said flange, and means for adjusting said ring.

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5. A combustion regulating member for mounting in and for adjustment longitudinally of an air blast pipe of a gun type oil burner, said member comprising a ring having a body of narrow transverse section, and circumferentially spaced helical vanes on said ring and extending rearwardly thereof and inwardly of its inner periphery and outwardly of its outer periphery.

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