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J. S. ZINK

2,216,508

COMBINATION GAS AND OIL BURNER

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FIG. 1.

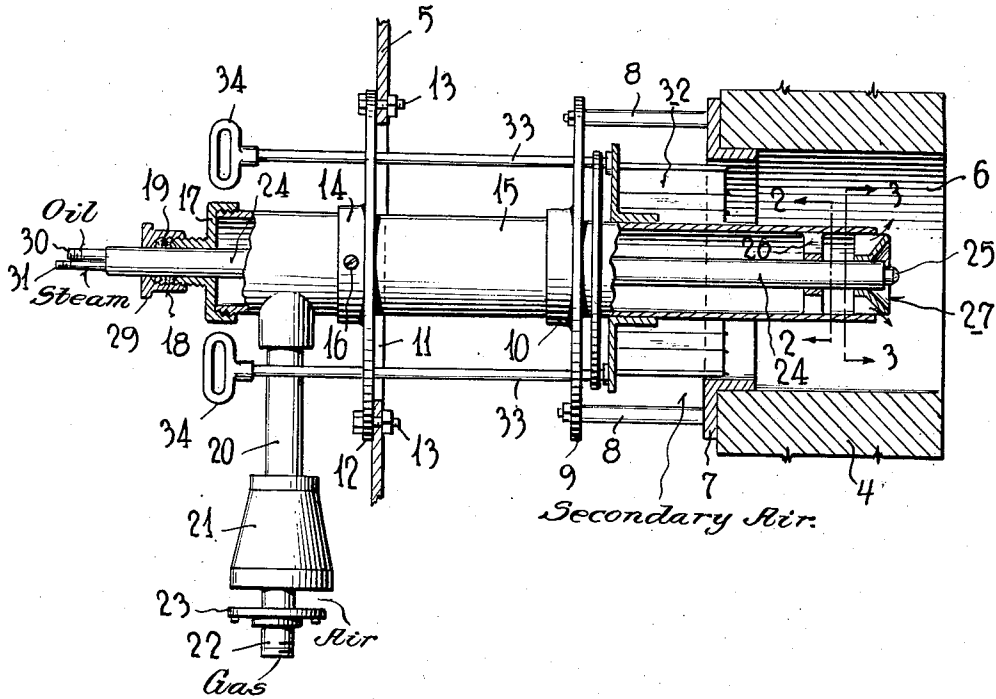


FIG. 2.

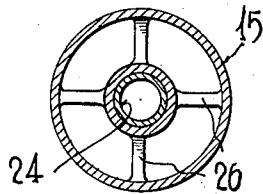
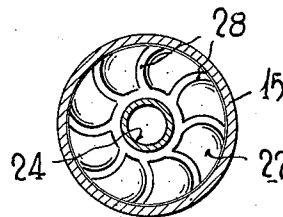


FIG. 3.



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COMBINATION GAS AND OIL BURNER

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2 Claims. (Cl. 158—11)

This invention relates to improvements in combination oil and gas burners and more particularly to a pre-mix gun for register type burners.

The primary purpose of the invention is to furnish a combination burner particularly applicable to refinery stills and furnaces in which it is necessary to generate large quantities of heat in a small fuel box with a short flame.

Another object is to supply a combination oil and gas burner that can be easily installed or removed and which can be readily adjusted and controlled from the exterior of the furnace.

Another object is to provide a combination oil and gas burner in which adjustment of the oil burner head toward and away from the interior of the furnace functions to control the amount of a primary mixture of air and gas introduced into the furnace.

Having now indicated, in a general way, the nature and purpose of the invention, I will proceed to a detail description thereof with reference to the accompanying drawing, in which I have illustrated a preferred embodiment, and in which:

Fig. 1 is a fragmentary sectional view of a furnace with my improved combination oil and gas burner structure shown associated therewith, such structure being partially in elevation and partially in longitudinal section.

Figs. 2 and 3 are transverse sectional views of a portion of the burner structure taken respectively on the lines 2—2 and 3—3 of Fig. 1.

Referring to the drawing, 4 designates a portion of a wall and 5 a portion of a wall of a wind box of a forced draft type of furnace. The wall 4 is provided with a port or doorway 6. At the outer end of the doorway, an annular supporting ring 7 is secured to the wall, and is provided with outwardly projecting rigid posts 8 which support and are detachably connected to a supporting plate 9; the latter having an annular centrally disposed flange 10.

The wall 5 is provided with an opening 11, closed by a plate 12 that is detachably secured to the wall 5 by means of bolts 13 or the like. The plate 12 is spaced from the plate 9 and has a centrally disposed annular flange 14 coaxial with the flange 10. Such flanges slidably support a gas tube 15 which extends therethrough and terminates at its discharge end within the central portion of the port 6; such tube being secured in any position of adjustment by means of a screw 16, threadedly connected to the flange 14 and impinging against the exterior of said tube.

A cap 17 is detachably secured to the inlet end

of the gas tube and is provided with an adjustable packing gland 18 containing packing 19.

A conduit 20 is connected at one end to the gas tube and at its opposite end to an aspirator 21, the latter receiving a combustible gas through a nipple 22 and having an opening for the admission of primary air; said opening being controlled by a disc 23 which is adjustably mounted on the nipple and is movable axially of said nipple to control the admission of primary air.

An oil-conveying tube 24 extends axially through the gas-conveying tube and terminates at its discharge end in an oil burner head 25 that is normally positioned beyond the discharge end of the tube 15. The tube 24 is supported at its discharge end portion by a spider 26 which is fixed to the tube 24 and is slidable in the tube 15. The tube 24 is further supported at its discharge end portion by an annular diffuser made up of a frusto-conical disc 27 which has a frusto-conical front surface surrounding the oil burner head 25. The opposite side of the disc is provided with substantially radially extending spaced curved vanes 28 (Fig. 3) which slidably engage the inner surface of the tube 15 and function to cause the mixture of primary air and gas discharging from the tube 15 to be whirled into the secondary air passing through the port 6.

The inlet end portion of the oil-conveying tube 24 extends through the gland 18 and when the nut 29 of the latter is loosened, the tube 24 can be adjusted relatively to the tube 15 whereby the diffuser 27 is moved inwardly or outwardly at the discharge end of the tube 15 to regulate the amount of the mixture of primary air and gas introduced into the secondary air. Oil is introduced into the tube 24 by means of an auxiliary tube 30 and steam is introduced into tube 24 through a pipe 31.

When the screw 16 is loosened and the nut 29 is tight, both tubes 15 and 24 can be moved axially to extend the discharge ends of these tubes more or less into the port 6.

A louvre type register or secondary air control means 32 surrounds the tube 15 and is arranged mainly between the plate 9 and the wall 4. It is controlled by means of rods 33 which extend through the plates 9 and 12 and terminate exteriorly of the furnace in handles 34. Such secondary air control means may be of the type disclosed in my Patent 2,103,605.

The structure illustrated being of the forced draft type, the secondary air is forced to the port 6 through the space between the furnace walls 4 and 5. However, it will be understood

that some of the novel features of the invention can be readily employed with a natural draft furnace.

As the diffuser 27 discharges the pre-mixed combustible gas and primary air in whirling fashion and as an annulus into the secondary air traveling as an annular stream between the surface of the port 6 and the exterior of the tube 15, it will be understood that the gas will burn as an annular flame. Therefore, this pre-mixed gas gun makes possible the burning of refinery gases continuously without burner trouble. There are no small ports to plug as the gas is discharged from the tube 15 through relatively large openings provided by the diffuser 27. Furthermore, refinery gases can be burned with a short flame.

As steam is introduced into the steam atomizing oil gun formed by the parts 24 and 25, it is obvious that such gun is of steam atomizing round flame type, and due to the shape of the diffuser the oil burns in a conical shape flame.

Moreover the structure is capable of producing either a luminous or non-luminous flame as required.

It will be understood that various structural modifications may be made in the combination burner disclosed without departing from the spirit of the invention as expressed in the appended claims.

What I claim and desire to secure by Letters Patent is:

1. In a structure of the character described, a gas-conveying tube having a cylindrical bore, said tube also having a gas inlet and a discharge end, means for mixing combustible gas and primary air and introducing such mixture into the inlet of said tube, a cap removably mounted on the end of the tube opposite its discharge end, a stuffing

box carried by the cap, an oil-conveying tube extending through said stuffing box, cap and gas-conveying tube and having an oil burner head at its discharge end disposed adjacent to the discharge end of the gas-conveying tube, said oil-conveying tube being slidably mounted in the stuffing box and axially movable in the gas-conveying tube, and a diffuser of less diameter than said bore fixedly secured to the exterior of the discharge end of the oil-conveying tube and forming with the gas-conveying tube a series of substantially radially disposed passageways arranged at the discharge end of the gas-conveying tube.

2. In a structure of the character described, a gas-conveying tube having a cylindrical bore, said tube also having a gas inlet and a discharge end, means for mixing combustible gas and primary air and introducing such mixture into the inlet of said tube, a cap removably mounted on the end of the tube opposite its discharge end, a stuffing box carried by the cap, an oil-conveying tube extending through said stuffing box, cap and gas-conveying tube and having an oil burner head at its discharge end disposed adjacent to the discharge end of the gas-conveying tube, said oil-conveying tube being slidably mounted in the stuffing box and axially movable in the gas-conveying tube, and a diffuser of less diameter than said bore fixedly secured to the exterior of the discharge end of the oil-conveying tube and forming with the gas-conveying tube a series of substantially radially disposed passageways arranged at the discharge end of the gas-conveying tube, said diffuser having a substantially frusto-conical surface confronting said oil burner head and also having curved vanes forming walls of said passageways.

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