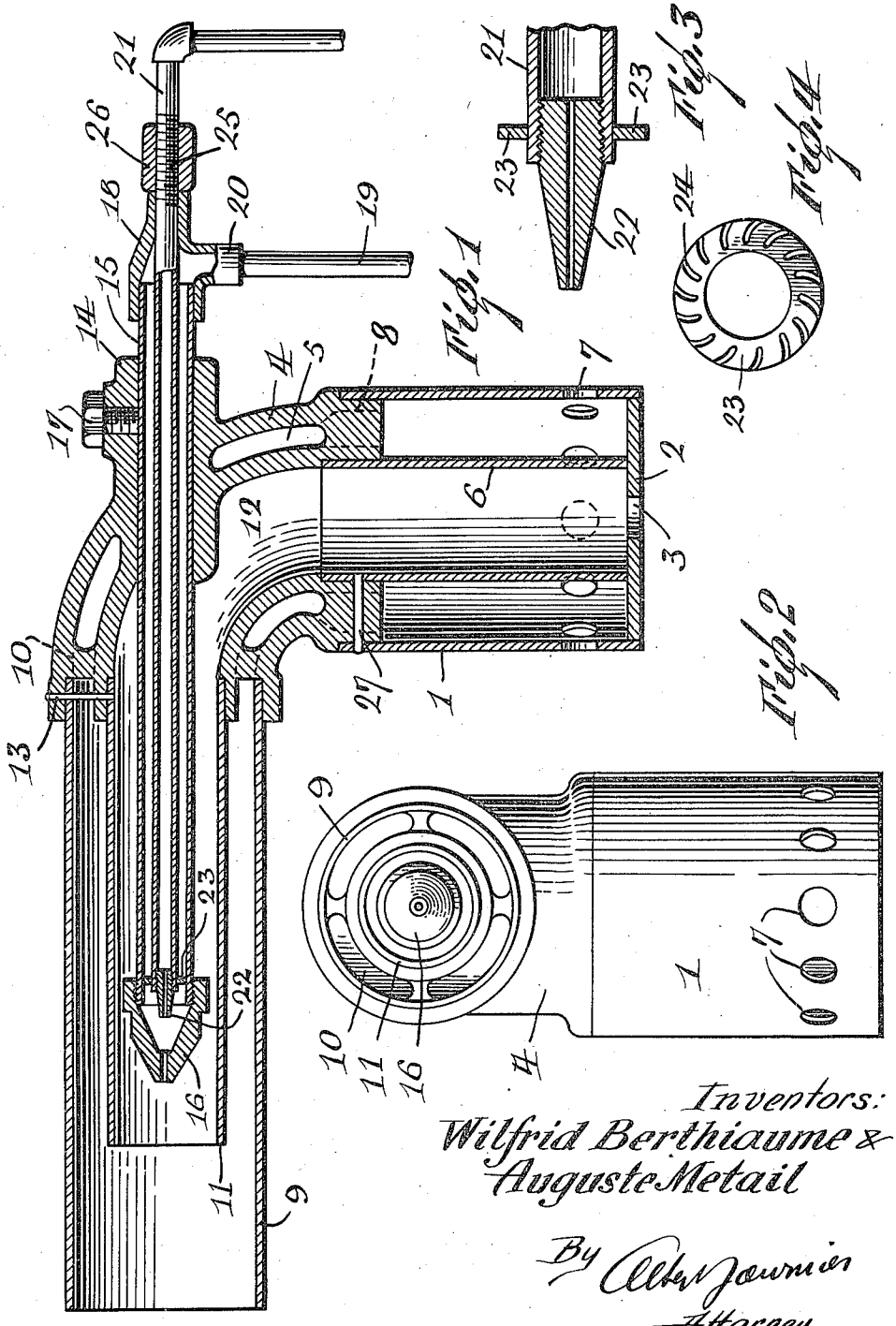
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OIL BURNER

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OIL BURNER

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1 Claim. (Cl. 158—74)

The present invention pertains to oil burners, and the principal object is to provide an oil burner capable of using various kinds of liquid fuel such as crude oil, waste oil and the like.

Another object incidental thereto is to provide a burner capable of consuming the fuel at a high thermal efficiency and producing a white smokeless flame. To this end, the invention embodies various features of adjustment of some of the parts for regulating the size of the principal combustion chamber and the relative quantity of air admitted to the mixture.

More particularly, the burner includes a liquid fuel tube that discharges the liquid fuel into a mixing nozzle fitted on the end of a surrounding air or steam tube. The latter nozzle, in turn, discharges into a surrounding air tube forming the principal combustion chamber, and this tube discharges into still another air tube providing a secondary combustion chamber. The discharge from the mixing nozzle produces a suction in the last two named tubes, and this suction draws air from the atmosphere. Moreover, the drawing of air reduces the velocity of discharge from the mixing nozzle to a point where complete combustion is obtained. Consequently, a high injection velocity may be used for thorough mixing, while the ultimate discharge velocity is not so high as to cause incomplete combustion.

The invention is fully disclosed by way of example in the following description and the accompanying drawing, in which:

Figure 1 is a longitudinal section of the device;

Figure 2 is a front end view;

Figure 3 is an enlarged detail, and

Figure 4 is a detail elevation of the whirler.

Reference to these views will now be made by use of like characters that are employed to designate corresponding parts throughout.

The device includes a cylindrical or other shaped vessel 1, preferably disposed below the axis of the burner and in any case above the floor of the boiler room, for a purpose that will presently be described. The vessel has a bottom closure 2 with a central aperture 3. On the other end of the vessel is mounted a double walled elbow 4 providing a chamber 5. A tube 6 is mounted in the vessel 1, reaching the bottom 2 thereof and extending into the elbow, as clearly illustrated in Figure 1. Thus, with the vessel elevated from the floor of the boiler room, air may enter the tube 6 through the bottom orifice 3. Further, the vessel 1 has lateral ports 7 enabling flow of air to the chamber 5 through passages 8 formed in the rear end of the elbow 4.

Into the other end of the elbow is fitted an outer tube 9 communicating with the chamber 5 through passages 10 formed in said end of the elbow. Another tube 11 is fitted into the same end of the elbow and communicates with the main passage 12 thereof as well as with the tube 6 and port 3. The tubes 9 and 11 may be assembled to the elbow 4 by any suitable means such as a series of pins 13 passed through these parts.

The elbow is formed with a bearing 14 coaxial with the tube 11 to receive slidably a tube 15 for air or steam. The latter extends well into the tube 11 but not quite to the forward end thereof and is fitted at its forward end with a nozzle 16. The tube 15 is slidably adjustable in the bearing 14 to regulate the distance between its forward end and the forward end of the tube 11. The adjustment is secured by a set screw 17 threaded in the bearing and adapted to bear against the tube 15.

The rear or outer end of the tube 15 is received in a T-coupling 18 having a pipe 19 fitted in its lateral branch 20. The coupling receives an oil pipe 21 extending into and co-axial with the tube 15. The latter has a nozzle 22 threaded in its forward end and spaced rearwardly from the nozzle 16. The same end of the pipe 21 is surrounded by a whirler 23 which has its outer circumference in engagement with the inner circumference of the tube 15, as may be seen in Figure 1. The whirler has a series of volute and oblique slots 24 cut from its outer edge, as shown in Figure 4, to impart a whirling motion to the material discharged from the tube 15 into the nozzle 16. The whirler also acts as a brace or support for the forward end of tube 15 with its nozzle 16.

The pipe 21 is threaded at 25 at and beyond the rear end of the coupling 18. A nut 26 engages with the threads 25 and bears against this end of the coupling. Thus, by turning the nut, the pipe 21 may be adjusted axially, particularly to regulate the spacing between the nozzles 16 and 22.

The vessel 1 and tube 6 may be assembled with the elbow 4 by pins 27 passed through these parts in the same manner as the pins 13.

In the operation of the device, oil is fed into pipe 21 and is discharged through nozzle 22 into nozzle 16. Air or steam, or a mixture thereof, is fed into pipe 19 and tube 15 and whirled from the latter by the member 23 into the nozzle 16 where it mixes with oil issuing from nozzle 22. Thus, the nozzle 16 functions as a mixing cham-

ber, and the fuel mixture is discharged therefrom into the tube 11.

The suction created by the flow through tubes 15 and 21 draws air into the tubes 11 and 9 through the ports 3 and 7 and communicating passages. This air, obviously, is necessary for combustion.

An important feature of the invention is that an excessively rapid discharge of fuel mixture from the nozzle 16 is prevented by the tubes 11 and 9. This results from the fact that some of the kinetic energy of the fuel stream is consumed in creating the suction, and hence the velocity of the stream is reduced. Consequently, a high velocity for mixing purposes within the nozzle 16 is possible without resulting in such a high ultimate discharge rate as to cause incomplete combustion. The outer tube 9, extending forwardly beyond the inner tube 11, provides a chamber for secondary combustion, inasmuch as an independent charge of air is delivered to the tube 9 through the ports 7 and communicating passages.

The rate and the character of combustion, as previously indicated, are governed by the relative axial positions of the tubes 9, and 11 and the nozzles 16 and 22. The latter is adjusted by the nut 26 in the manner already described. Likewise, the nozzle 16 is adjusted through the slidable mounting of the tube 15 and the locking thereof by the set screw 17. When proper adjustment has been made a white smokeless flame is obtained.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claim.

What we claim is:

A liquid fuel burner comprising a tube, a nozzle at the discharge end thereof, a pipe within and co-axial of said tube and discharging closely behind said nozzle, means for supplying oil to said pipe, means for supplying auxiliary combustion ingredients to said tube, and an air tube enclosing the first named tube and extending forwardly beyond said nozzle to provide a primary combustion chamber, the rear end of the last named tube extending laterally from the first tube, a vessel enclosing said rear end and forming an annular space therewith, and another air tube extending forwardly beyond the first named air tube to form a secondary combustion chamber and having its rear end communicating with said annular space, said vessel having an aperture in its bottom communicating with said rear end and ports in its sides communicating with said annular space.

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