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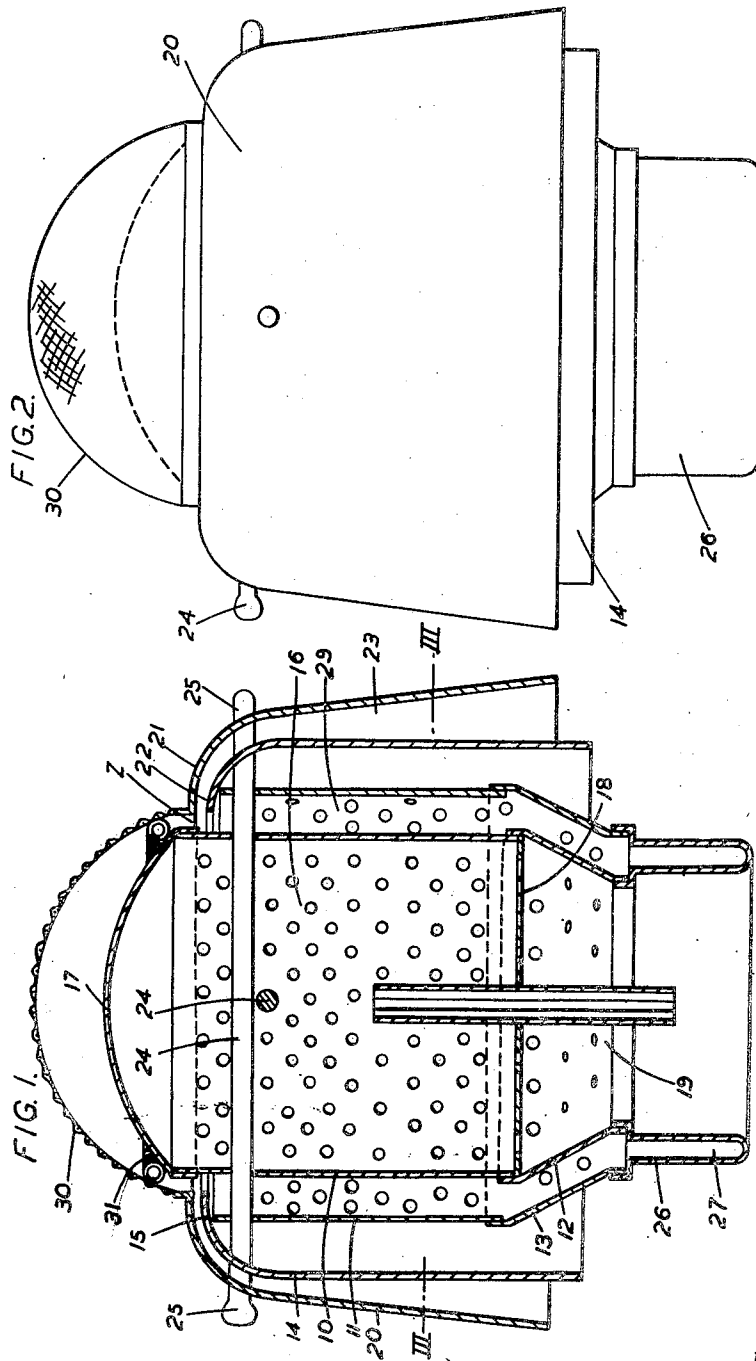
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COMBUSTION TUBE FLUID FUEL BURNER

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 3

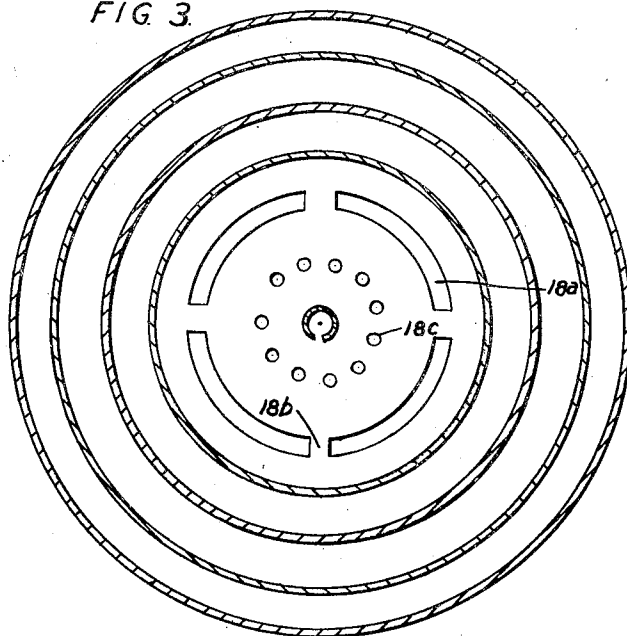
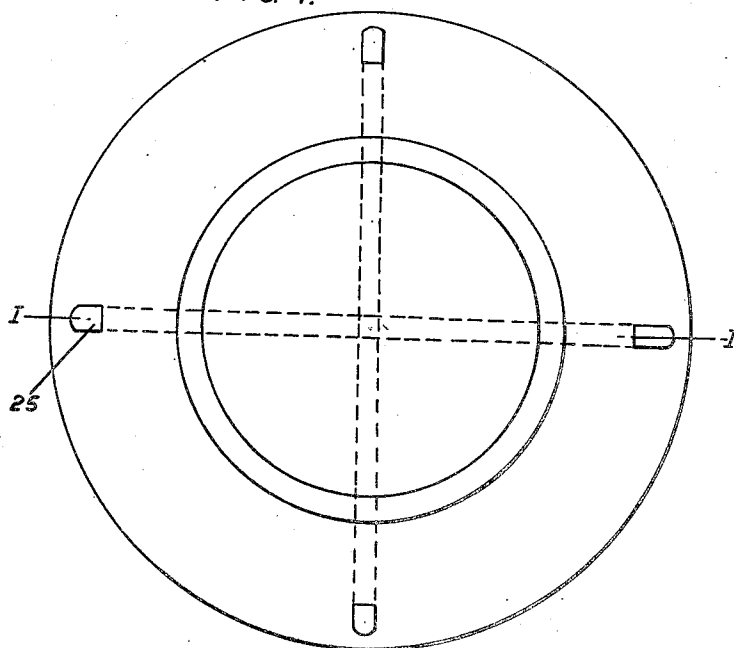


FIG. 4.



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UNITED STATES PATENT OFFICE

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COMBUSTION TUBE FLUID FUEL BURNER

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6 Claims. (Cl. 158—86)

1

This invention relates to an improved fluid fuel vapourising oil burner of the type in which gases and/or vapours formed by the fuel ascend in a combustion chamber bounded by perforated walls, through the openings of which primary air has access to the said space and in which secondary air is used to effect substantially complete combustion.

One object of the invention is to provide a vapourising oil burner, for apparatus such as cookers or room heaters, in which substantially complete combustion is attained thus greatly reducing if not completely eliminating the obnoxious odor normally associated with this type of burner.

A further object of the invention is to provide a burner for apparatus such as cookers or room heaters, with an improved efficiency of combustion by reason of a controlled air flow along the inner perforated wall.

In this specification the expression "combustion chamber" is used to denote the space, bounded by the perforated walls.

According to the invention there is provided a burner of the type described in which at least one secondary air passage is provided its inlet being open to atmosphere at the bottom and its outlet extending over and partially closing the upper portion of the combustion chamber so as to direct air across the path of the vapourised fuel which ascends therethrough.

Conveniently the shape of the secondary air passage is such that its cross sectional area decreases in the direction of the flow of air through that passage to the combustion chamber.

A baffle plate or deflector may, with advantage, be located across the air passage bounded by the inner perforated wall and in which the baffle plate has slots or apertures adjacent the said wall and so shaped as to direct an air flow along the inner wall. It will be appreciated that in a burner of the type with which the invention is concerned air is induced into the central passage bounded by the inner perforated wall by reason of the flame in the zone of combustion of the burner; with the slotted and drilled baffle plate arrangement an improved efficiency of combustion is obtained and it is thought that this is due to the fact that the air is directed by the slots along the inner perforated wall and that the velocity of this air is greater than it would be with an entirely unobstructed space within the inner perforated wall.

One embodiment of a burner, according to the present invention, will now be described by way

2

of example with reference to the accompanying drawings.

On the drawings:

Figure 1 is a sectional elevation of the burner on the line I—I of Figure 4,

Figure 2 is an outside elevation of the burner,

Figure 3 is a cross-sectional view on the line III—III of Figure 1, and

Figure 4 is a plan view of the burner.

The burner shown on the drawings comprises two co-axial perforated cylindrical shells 10 and 11 having a short inward taper 12 and 13 at their lower ends and located within an outer casing 14 curved inwardly at 15 so as to be closed or partly closed onto the upper periphery of the outer perforated shell 11. The casing 14 extends down below the point where the inward taper 13 on the outer perforated shell commences. The central cylinder 16 formed by the inner perforated shell 10 is closed at the top end by a dome 17 and a drilled and slotted deflector plate 18 is fitted across the central cylinder 16 at the point where the inward taper 12 commences at its lower end; the bottom end 19 of the internal cylinder 16 is open to the air. The slots 18a in the deflector plate or baffle extend round the entire inner face of the inner perforated shell 10, being interrupted only by the bridge pieces 18b required to support the baffle plate in position. The baffle plate may be flat, convex or concave and preferably also has a central group of circular holes 18c. Around the cylindrical casing of the burner is fitted a tapered shroud 20, the upper end of which is curved or bent inwards to form a flange 21 which gradually restricts the annular orifice or outlet 22 from the air duct 23 formed by the shroud external to the burner casing 14 and having its air outlet 22 directed into and across the combustion chamber just above the level of the upper periphery of the outer perforated wall 11 but not above the upper periphery of the inner wall 10. The lower end of the shroud 20 forming the supplementary external air duct 23 stops short of the lower end of the burner casing 14. The perforated walls or shells 10 and 11, the cylindrical burner casing 14 and the outer shroud 20 forming the secondary air passage are secured together by a transverse rod or rods 24, which support the shells, casing and shroud, and maintain them at the appropriate spaced relationship, these rods having flattened ends 25.

The perforated shells 10 and 11 are mounted over an annular trough 26 having an annular groove or channel 27. This may be filled with absorbent material such as asbestos (not shown),

which is fed from a reservoir (not shown) of liquid fuel in the usual manner for this type of burner. The gases and/or vapour formed from the fuel ascend in the combustion chamber 29 bounded by the perforated shells 10 and 11, through the openings of which air for combustion of the gases has access to the chamber, and in addition a further supply of secondary air is directed into the rising gases near the top of the perforated shells. This supplementary supply of air is pre-heated while passing through the external air duct 23 and on discharging from the air duct outlet 22 assists in obtaining substantially complete combustion of the vaporised fuel. By tapering the air duct 23 as shown on the drawing a Venturi effect is obtained at the outlet 22.

The burner may be covered with a dome 30 of woven wire or other material suitable for forming a radiant element at its upper end and the inwardly turned outlet 22 of the supplemental air duct 23 may be so proportioned that the maximum amount of flame issuing from the combustion chamber at Z is directed against the radiant element so as to produce a considerable area of "glow" on that element. When the burner is applied to a cooking apparatus the woven wire cover 30 may be omitted and a fixed corrugated or helical wire 31 located in the zone of combustion at the outlet from the space 29 if required.

The length of the burner casing or chimney 14 and the outer shroud 20 forming the external air duct 23 may be adjusted or adjustable to provide the desired air flow conditions.

I claim:

1. A vaporising oil burner comprising an annular fuel trough surmounted by inner and outer perforate walls defining an annular combustion chamber, an imperforate wall surrounding said outer perforate wall and defining therebetween an annular primary air passage open to atmosphere at the bottom and closed at the top, a second imperforate wall surrounding said first-mentioned imperforate wall and defining therebetween an annular secondary air passage open to atmosphere at the bottom, said imperforate walls being directed radially inwards at the top and extending over and partially closing said combustion chamber to direct the whole of the air rising through said secondary air passage across the path of and into admixture with the vaporised fuel within said combustion chamber.

2. A vaporising oil burner as claimed in claim 1 in which said outer imperforate wall is conical throughout its length so that its inwardly directed upper end tapers toward the upper end of the inner imperforate wall and the cross-sectional area of said secondary air passage decreases towards the combustion chamber over substantially its whole length and is restricted to a relatively narrow passage at the combustion chamber.

3. A vaporising oil burner as claimed in claim 1 in which said trough is of a smaller diameter than and concentric with said perforate walls, said perforate walls being substantially concentrically flared outwardly and upwardly from said fuel trough and then continue upwards cylindrically, said inner imperforate wall extends downwardly at least as far as said flared portion of said combustion chamber.

4. A vaporising oil burner as claimed in claim 1 in which said trough is of a smaller diameter than and concentric with said perforate walls, said perforate walls being substantially concentrically flared outwardly and upwardly from said fuel trough and then continue upwards cylindrically, and said outer imperforate wall extends downwardly at least as far as said flared portion of said combustion chamber.

5. A vaporising oil burner as claimed in claim 1 in which the said trough is of a smaller diameter than and concentric with said perforate walls, said perforate walls being substantially concentrically flared outwardly and upwardly from said fuel trough and then continue cylindrically, said imperforate walls extend downward by at least as far as said flared portion of the combustion chamber and the outer of said walls converges inwards and upwards and the inner wall extends downwardly lower than said outer wall.

6. A vaporising oil burner comprising an annular fuel trough surmounted by inner and outer perforate walls defining an annular combustion chamber, an imperforate wall surrounding said combustion chamber and defining with said outer perforate wall an annular primary air passage open to atmosphere at the bottom and closed at the top, a second imperforate wall surrounding said primary air passage and defining with said first-mentioned imperforate wall an annular secondary air passage open to atmosphere at the bottom, said walls defining said secondary air passage being directed radially inwards at the top and extending over said combustion chamber whereby to define for the vaporised fuel rising through said combustion chamber an outlet of smaller cross-sectional area than that of the body of said combustion chamber.

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