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COMBINATION GAS AND OIL BURNER

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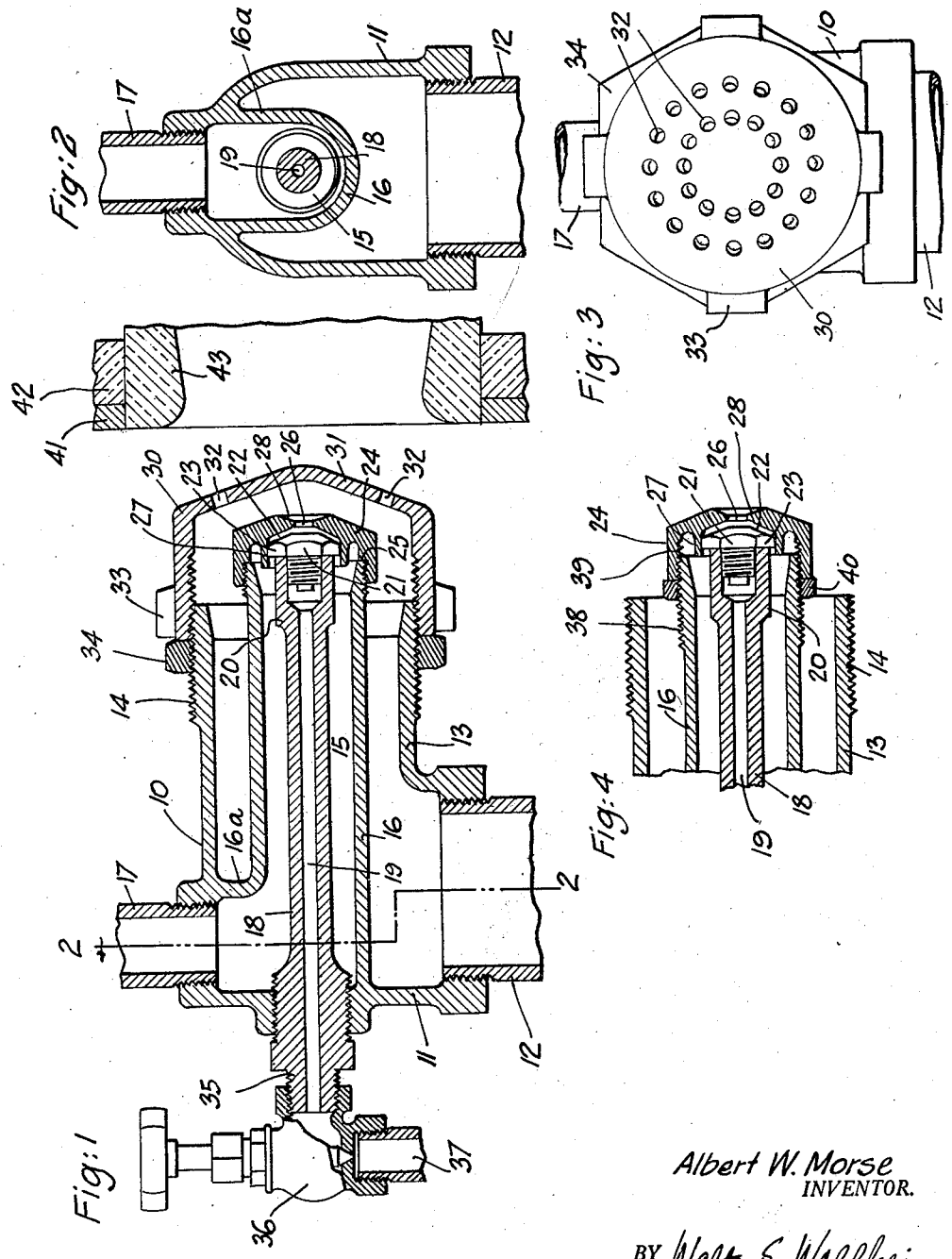

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COMBINATION GAS AND OIL BURNER

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This invention relates to improvements in fuel burners and more especially to burners which, while primarily intended for use with gas, have attached to them certain instrumentalities to enable them to burn oil atomized by air or steam equally as well.

It is the particular object of the invention to provide a burner of this kind which can be operated with gas at low pressure in combination with atmospheric air and without air under pressure. Another object is to equip a burner of this type with means to enable the same to be changed over from gas fuel to oil fuel, whenever the gas supply should fail. Still another object is to so locate adjustably within a gas burner, an oil burning unit, so that operation with oil can be obtained without the necessity of relocating the burner or varying its relation to the furnace to which it is applied. Further objects will become apparent in the following specification in which a preferred embodiment of the burner is described.

The invention is illustrated by the aid of the accompanying drawings in which

Fig. 1 is a vertical longitudinal sectional view of the burner;

Fig. 2 is a transverse cross sectional view taken along the plane of line 2—2 in Fig. 1;

Fig. 3 is an end view of the burner; and

Fig. 4 is a fragmentary sectional view showing a modified form of adjustably attaching a deflector to the inside of the burner.

Like characters of reference denote similar parts throughout the several views and the following specification.

10 is a cylindrical casing of substantially L shape, its shorter branch 11 is threaded interiorly to receive a gas supply pipe 12. The terminal of the longer branch 13 of casing 10 is threaded exteriorly at 14. A tubular chamber 15, formed by a wall 16 extends through the casing 10 in axial alignment with its longer branch 13. Wall 16*a* connects the chamber 15 with the outer wall of casing 10 opposite its shorter branch 11 and is threaded interiorly for connection with an air or steam supply pipe 17.

Casing 10 is bored out adjacent to branch 11 to receive what is commonly termed an "oil spindle" 18. This oil spindle is of hollow construction, being provided with a central duct 19, and extends through the tubular chamber 15 in central alignment therewith. 20 is an enlarged upper end of spindle 18 threaded interiorly to receive an atomizer plug 21 of the usual design, now known in the art as "Anthony Nebulyte" plug. The outlet face of plug 21 is slightly conically shaped at 22, its sides having polygonal wrench surfaces 23.

24 is a deflector cap screwed onto the exterior of the cylindrical chamber 15 formed by wall 16, making a tight joint therewith at 25, and is provided with a circular central opening 26 which is smaller than the outside diameter of plug 21. Cap 24 is also provided with a tubular extension 27 slidingly engaging the edges of polygonal sides 23 of plug 21 providing passages along the polygonal sides, the bottom of the extension 27 being in spaced relation to and preferably parallel with the conical shaped top 22 of plug 21. 28 is an oil deflecting surface extending from outlet 26 to the top of the cap 24.

30 is a gas cap adapted to be screwed onto the threaded end 14 of branch 13 of casing 10. This cap is closed by conically disposed walls 31 substantially parallel to the outer surface of the deflector cap 24. 32 are perforations through the walls 31. These perforations are drilled, preferably, radially i. e. their axes converge to a common center within the burner and are, in other words, diverging outwardly from the axis of the burner outlet, and they are further, preferably, arranged in two or more circular rows and in staggered relation to each other. 33 are lugs on the outside of cap 30 to facilitate screwing the same onto the threaded part 14. 34 is a lock nut also screwed onto threaded part 14 and adapted to bear tightly against the end face of cap 30 locking the same onto the thread gas tightly in any desired spaced relation between walls 31 and deflector cap 24.

35 is a reduced portion of oil spindle 18, projecting outside of the casing 10 and is threaded exteriorly to receive a needle valve

36 of standard construction, controlling the flow of oil to the burner from a pipe 37.

In the modified construction shown in Fig. 4, the deflector cap 24 instead of being screwed against a fixed joint 25 on top of chamber 15, the wall 16 of this chamber is provided with a longer thread 38, engaging a similar thread 39 in the cap, and a lock nut 40 also screwed onto threaded part 38 makes a steam or air tight joint with the end face of the cap 24 at the same time locking the same in such relation to the plug 21 as is found to be most desirable.

41 is a fragmentary section of a shell of a furnace, having a refractory lining 42, and a combustion block 43 set into an opening of the furnace in axial alignment with the longitudinal axis of the burner and in certain spaced relation to the end of the burner.

The operation of the device is as follows:

When the burner is normally used as a gas burner, the gas supply valve (not shown) is opened. Gas then passes through the pipe 12 into the casing 10, around walls 16 of chamber 15, around the deflector cap 24 and out of the burner through perforations 32 in the gas cap 30. Gas at any available pressure down to ½" of water has been found sufficient.

Should it be desired to change the fuel from gas to oil on account of failure of gas supply or too great a drop in pressure, the gas supply valve is closed, and the gas cap 30 removed. Oil is then admitted through supply pipe 37 and needle valve 36, whence it passes through plug 21 out at the front end of the cap 24, where it mixes with air or steam forced into the casing 10 through pipe 17. This air or steam is deflected by means of cap 24 and more particularly by the passage between the outer face 22 of the plug 21 and the bottom of extension 27 of the cap toward the atomized spray of oil issuing from the plug 21, and out of the burner through opening 26. Attention is particularly called to the fact that the burner is so located in front of the furnace that ignition of the gas occurs in the center of the combustion block in accordance with well established practice. But combustion characteristics of gas and oil vary considerably, and the spray of oil must be adjusted so that ignition also occurs in the center of the combustion block. This can be achieved by simply varying the position of the deflector cap with respect to the atomizer plug, as shown in Fig. 4, which changes the oil flame to a wide or narrow one, long or short one, and permits the oil burning unit to be so adjusted that ignition occurs at the desired point.

While I have shown and above described one certain form of oil burner, operable by either air or steam, in connection with the gas burner, still other styles may be employed so long as the characteristics of the gas burner are not changed and the oil burning unit is located within the gas burner and means are provided to adjust the point of ignition of the oil burning unit.

As an atomizing medium for oil when used instead of gas, either steam or air under pressure may be employed, and reference to one of these media in the appended claims is to include as an alternative the other.

Various changes in the form, proportion and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as defined in the appended claims.

What I claim as new, is:

1. In a burner of the kind described, a liquid fuel supply pipe extending through the burner, an atomizer plug at the outlet end of the said pipe, an air chamber surrounding the said pipe, and air supply connection to the said chamber, a deflector cap having a central outlet surrounding the said plug and adapted to close the said air chamber when contacting with the said plug, a perforated gas cap at the end of the burner enclosing the said deflector cap, and means to admit gas into the burner around the said chamber to be discharged through the perforations in the said gas cap, the said liquid fuel supply pipe and atomizer plug being externally adjustable longitudinally within the burner.

2. In a burner as defined in claim 1, an adjustable deflector cap.

3. In a burner as defined in claim 1, an adjustable gas cap.

4. In a burner as defined in claim 1, the combination of an adjustable deflector cap and an adjustable gas cap.

5. In a burner as defined in claim 1, the gas cap having a number of perforations having their axes converged to a common center, adapted to discharge diverging jets of gas.

6. In a burner as defined in claim 1, means to vary the relation between atomizer plug and deflector cap for the purpose of causing ignition of oil to occur in the combustion block of a furnace at substantially the same point as with gas.

7. In a burner as defined in claim 1, means to vary the relation with the combustion block in a furnace, of the gas cap, the deflector cap, and the atomizer plug.

8. In a burner as defined in claim 1, the gas cap, the deflector cap and the atomizer plug being adjustable, independently of each other, with respect to the combustion block of a furnace.

In testimony whereof I have hereunto set my hand.

ALBERT W. MORSE.