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V. MULHOLLAND

LIQUID FUEL BURNER

Filed June 1, 1925

Fig. 1.

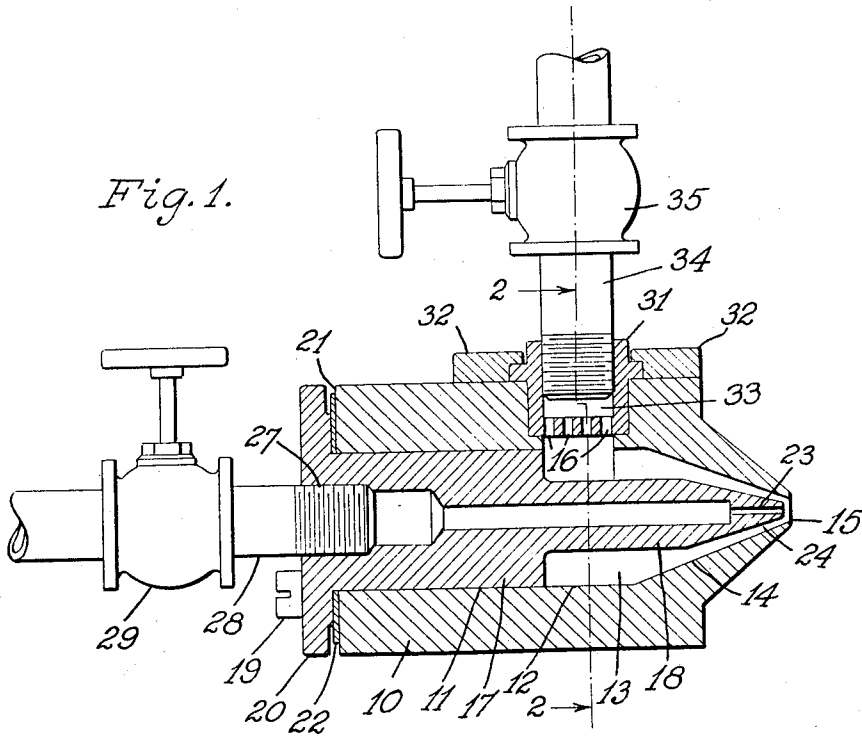
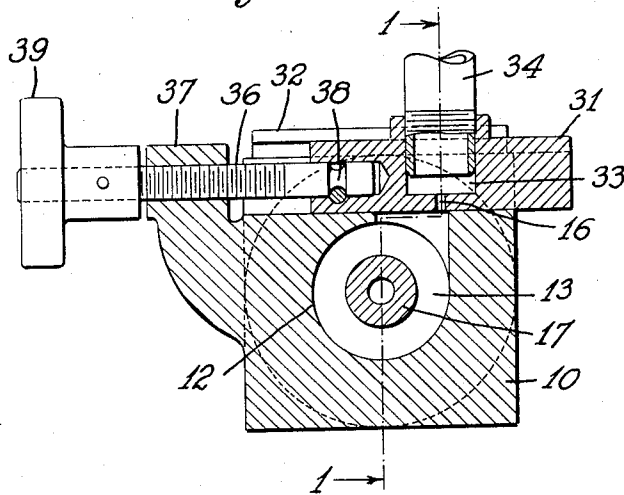


Fig. 2.



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UNITED STATES PATENT OFFICE.

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LIQUID-FUEL BURNER.

Application filed June 1, 1925. Serial No. 33,978.

My invention relates to liquid-fuel burners, and its object is to provide a burner which may be quickly and conveniently adjusted to control the spread and velocity of the combustion mixture projected therefrom.

In my prior Patent 1,646,703, granted October 25, 1927, of which the present application is a continuation in part, I have described and claimed a liquid-fuel burner characterized by convenient and accurate assembly in definite adjustment, and by the provision of effective and adjustable means for causing a whirling current of atomizing air to issue from the burner nozzle.

The present invention is concerned particularly with the adjustable admission of the atomizing air to the burner in such a way that the whirling movement of the air in the burner may be increased or decreased at will, so as to vary the character of the flame as may be desired. This is accomplished by introducing the atomizing air into the burner chamber through a port which is adjustable between a position in which the port is tangent to the periphery of the air chamber, and a position in which the port discharges the air radially into the chamber. The position of the inlet port thus determines the degree of whirling motion imparted to the air in the burner chamber, and thereby determines the long or short character of the flame delivered by the burner.

In the accompanying drawing, Fig. 1 is a central longitudinal section taken on line 1—1 of Fig. 2; and Fig. 2 is a transverse section taken on line 2—2 of Fig. 1, showing the air inlet ports adjusted to a position tangent to the periphery of the air chamber.

The burner shown on the drawing is of the same general construction as the burner described and claimed in my prior patent mentioned above and, like the burner of my prior application, includes a body or casing 10 provided with an axial bore 11, a part of which forms an exterior wall 12 of an annular air chamber 13 and which is tapered at one end to form the exterior wall 14 of an annular outlet 15 for a current of air under pressure admitted to the chamber 13 through a row of ports 16. A fuel supply tube 17, a reduced portion 18 of which forms the interior wall of the annular air chamber 13, is secured at one end to the body 10 by screws 19, and is provided at its rear end with a flange 20 which is separated from the adjacent end 21 of the

body 10 by a spacing washer 22 of the proper thickness to bring the discharge end of the fuel tube into the desired relation to the discharge end of the air outlet 15. As in the burner of my prior application, a reduced fuel nozzle 23 is provided at the front end of the tube 17, the exterior 24 of this nozzle being so tapered as to form the inside wall of the annular air outlet 15, and the tube 17 has a tapped rear opening 27 that is adapted to receive a pipe 28 in which is a regulating valve 29 for controlling the fuel supply.

The ports 16 which supply the atomizing air to the chamber 13 produce substantially the effect of a single elongated slot and extend in a longitudinal line through the inner side of a hollow slide 31 which is mounted for transverse adjustment in the casing 10 and is held slidably thereon by gibs 32 secured to the casing in any convenient manner. The hollow interior 33 of the slide 31 is connected with an air supply pipe 34 provided with a control valve 35. The pipe 34, or a portion thereof, should be flexible, so as to permit the slide 31 to be moved within its limits of adjustment.

The position of the slide 31 carrying the ports 16 is regulated by means of a screw 36 engaging a threaded ear 37 formed on or attached to the casing 10. This screw is rotatably connected with the slide by means of a groove and tangent pin connection 38 and is provided with a hand wheel 39.

By adjusting the handwheel 39 so as to bring the ports 16 into a tangential relation with respect to the air chamber 13, as shown in Fig. 2, a maximum whirling movement is imparted to the air in the chamber 13 and, consequently, to the air forced from the opening 15, thereby producing a short flame adjacent to the burner nozzle, as is desirable when the burner is lighted, since a short flame may be lighted more easily than a long flame. The slide 31 may then be moved by means of the hand wheel 39 so as to bring the ports 16 to any desired position between the tangential position of Fig. 2 and a radial position where the whirling movement of the air is entirely eliminated. By thus reducing or eliminating the whirling movement of the air in the chamber 13, the flame delivered by the burner may be lengthened at will, within considerable limits.

While I have used the term "air" throughout the specification and claims, I mean to

include by this term any suitable atomizing fluid such, for example, as steam, and this term is to be so construed.

The illustrated embodiment of the invention may be modified in construction, arrangement and mode of operation by those skilled in the art, without departing from the scope of the appended claims.

I claim as my invention:

10 1. A burner comprising a central fuel tube, a hollow member surrounding said tube, the said tube and the said member being formed to produce an annular air chamber surrounding said fuel tube, an air supply member
15 mounted in said outer member and slidable transversely of the axis of said fuel tube, the said air supply member being provided with an air inlet port, and the said outer member being provided with a recess adjacent to said
20 air supply member of such size as to permit the adjustment of said air inlet port between a position to project a stream of air substantially tangent to the said air chamber and a
25 position to project a stream of air substantially radially with respect to said air chamber, means for supplying air to said inlet port, and manually operable means for adjusting the position of said air supply member.

30 2. A burner comprising a liquid fuel projector, a member surrounding said projector and in spaced relation therewith to provide an annular atomizing fluid chamber, means for introducing atomizing fluid into said
35 chamber, said means including a member having an inlet port therein, said member being movable to vary the position of said inlet port laterally with respect to said chamber without varying the size of said port and
40 thereby to vary the character of the flame delivered by said burner.

3. A burner comprising a liquid fuel projector, means surrounding said projector and with it defining an atomizing fluid chamber
45 adjacent thereto, means for introducing atomizing fluid into said chamber, and means for varying the direction in which the atomizing fluid is introduced into said chamber without changing the volume of atomizing
50 fluid, and for thereby varying the character of the flame delivered by said burner.

4. A burner comprising a liquid fuel projector, means surrounding said projector and with it defining an atomizing fluid chamber
55 having an outlet, means for supplying atomizing fluid to said chamber and for causing the atomizing fluid to whirl in said chamber, and means for varying the whirling movement of the atomizing fluid in said chamber
60 without changing the pressure at which the atomizing fluid is supplied, and for thereby varying the character of the flame delivered by said burner.

5. A burner comprising a liquid fuel projector, means cooperating with said projector

to define an annular atomizing fluid chamber adjacent to said fuel projector and having an outlet, an atomizing fluid supply member having a port arranged to introduce atomizing fluid into said chamber, and means
70 for varying the position of said port transversely with respect to the axis of said chamber, while maintaining the cross sectional area of said port constant.

6. A burner comprising a liquid fuel projector, means cooperating with said projector to define an annular atomizing fluid chamber adjacent to said fuel projector and having an outlet, an atomizing fluid supply member
75 having a port arranged to introduce atomizing fluid into said chamber, and means for moving said supply member to shift said port along a line substantially tangent to said chamber while maintaining constant the size
80 of said port, and thereby to impart to the atomizing fluid introduced into said chamber a greater or less whirling movement.

7. A burner comprising a liquid fuel projector, means associated with said projector and disposed in spaced relation therewith to
85 define an annular atomizing fluid chamber surrounding said fuel projector and having an outlet, an atomizing fluid supply member having a plurality of aligned ports adapted to introduce a stream of atomizing fluid tangentially into said chamber to produce a
90 whirling current of air therein, and means for adjusting the position of said ports transversely with respect to the axis of said chamber, while maintaining constant the size of
95 said ports.

8. A burner comprising a liquid fuel projector, a substantially cylindrical member surrounding said projector in spaced relation therewith and forming an annular air chamber
100 therebetween, an air supply member having a plurality of air ports aligned longitudinally with respect to said projector and adapted to introduce air tangentially into said chamber to produce a whirling current
105 of air therein, an annular outlet passageway leading from said chamber and surrounding said outlet of said fuel projector, and means for varying the position of said ports transversely with respect to the axis of said chamber, while maintaining constant the size of
110 said ports.

9. A burner comprising a liquid fuel projector, a member surrounding said fuel projector and defining an annular air chamber
115 therebetween, an air supply member having an air port arranged to project air into said chamber, and means for varying the position of said air port between a tangential relation and a radial relation with respect to said
120 chamber, while maintaining constant the size of said ports.

10. A burner comprising a liquid fuel projector, a cylindrical member surrounding said fuel projector and forming therewith an an-
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nular air chamber, a slide mounted adjacent to said chamber and movable transversely with respect to the axis of said chamber, the said slide being provided with a plurality of air ports arranged to project air jets into said chamber, means for supplying air under pressure to said slide, means for moving said slide to alter the position of said ports with respect to said chamber, and means cooperating with said fuel projector to provide a conical discharge channel communicating with said chamber.

11. A burner comprising a liquid fuel projector, a member surrounding said projector in spaced relation therewith and defining an annular air chamber therebetween, a hollow slide mounted adjacent to said air chamber and movable transversely with respect to the axis of said chamber, means for supplying air under pressure to the hollow interior of said slide while permitting said slide to move a plurality of longitudinally spaced air ports formed in said slide and communicating with said air chamber, and means for manually moving said slide between a position in which said ports are substantially tangential to the periphery of said air chamber and a position in which said ports are substantially radial with respect to said chamber.

Signed at Hartford, Conn., this 28th day of May, 1925.

VERGIL MULHOLLAND.

CERTIFICATE OF CORRECTION.

Patent No. 1,692,853

Granted November 27, 1928, to

VERGIL MULHOLLAND.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 43, for the word "application" read "patent"; page 2, line 97, claim 7, for "air" read "atomizing fluid"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of January, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.