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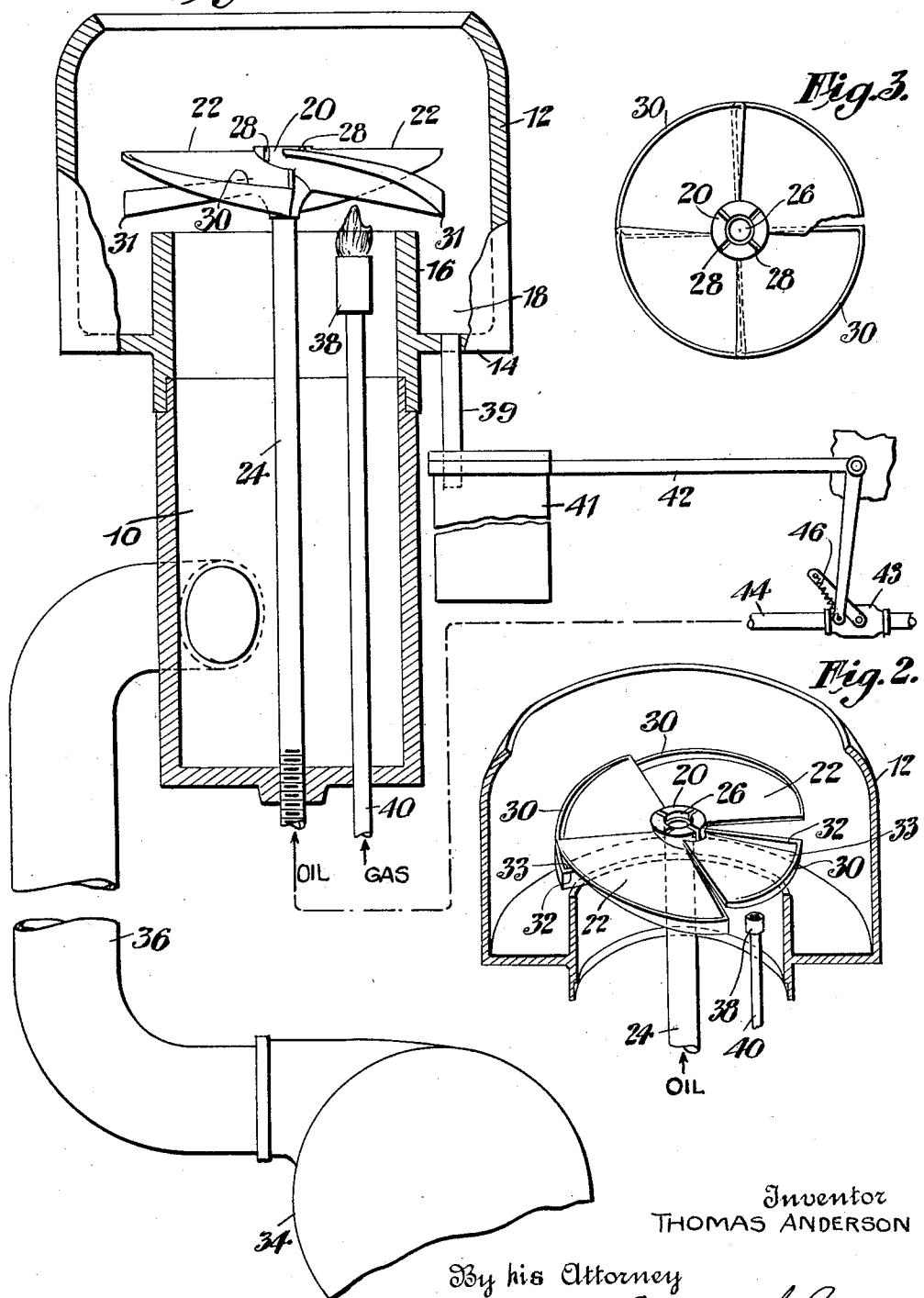
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OIL BURNER

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Fig. 1.



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OIL BURNER

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The present invention relates to fuel burners and particularly to burners for use in connection with the combustion of liquid fuels.

A large number of types of burner apparatus have been placed on the market for burning oil or light fuel, but few of them have been able to operate satisfactorily under conditions where the fuel and draft varies considerably.

10 It is accordingly one of the objects of the present invention to provide a burner for liquid fuels which is simple in design, easy to install and operate, efficient and reliable in operation.

15 A number of the burners now on the market designed for oil and like fuels are limited either to forced or to natural draft and are not adapted to use either one or the other as circumstances of different installations may 20 require.

It is the second object of the present invention to provide a burner for liquid fuel adapted to operate with either natural or forced draft air supply.

25 In a number of prior art designs of burners for liquid fuel the efficiency has suffered because the apparatus has formed a non-uniform mixture of the oil vapor and air.

It is another object of the present invention to provide a burner for liquid fuel in which the fuel supplied is vaporized and the vapors are thoroughly and uniformly admixed with the air for combustion immediately before combustion takes place.

35 Certain prior burners for liquid fuel have given trouble on account of forming carbon deposits which have accumulated in the apparatus.

40 A further object of the present invention is to provide a liquid fuel burner arranged to effect vaporization and combustion of the fuel without deposition and accumulation of carbon deposits when operating with a relatively small excess of air.

45 With these and other objects in view, the invention consists in the improved liquid fuel burner hereinafter described and more particularly defined in the appended claims.

50 Various features of the invention are illus-

trated in the accompanying drawings, in which:

Fig. 1 is a vertical transverse sectional view with parts and elevations of a burner of the type constituting the preferred embodiment 55 of the invention.

Fig. 2 is a perspective view of the upper portion of the burner and vaporizing element.

Fig. 3 is a plan view of the vaporizing element illustrated in Figs. 1 and 2, parts being 60 broken away for the purpose of illustration.

Referring to the drawings more in detail, the apparatus herein illustrated includes an air duct 10 which extends vertically upward into a bowl 12 serving as a primary combustion chamber of the apparatus. Bowl 12 has a horizontal bottom 14 and preferably the duct 10 extends upwardly into the bowl forming a flange 16 to provide an annular channel or pocket 18 within the lower portion thereof, the purpose of channel 18 appearing herebelow. The vaporizing means for the oil or other liquid fuel is disposed immediately over the upper end of the duct 10 and includes a hub 20 whose central vertical axis 65

preferably coincides with the axes of the duct 10 and bowl 12. The hub 20 has affixed thereto a series of inclined spaced parallel vanes or plates 22, 22. In the arrangement illustrated, four blades 22 are employed. 70 Vanes 22 resemble the helical blades of an ordinary desk fan in their general form and arrangement, but warped somewhat from the true helical form as hereinafter appears. Each blade 22 is a segment of a substantially 75 helical surface whose axis coincides with that of the vertical axis of the hub 20. In plan view, the blades 22 are substantially quadrants of the circle whose center is at the center of the hub 20, the segments 22 being conveniently made similar to quadrants of a multi-threaded screw, being in this respect similar to the ordinary propeller type wind mill or propeller type fan. As appears in 80 Fig. 1, the segments 22 are warped from the helical so that their lower edges slant downwardly in passing outwardly from hub 20. Therefore, any oil which is not burned drips 85 from the outer lower corners of the segments. The hub 20 and vanes 22 do not revolve, but 90

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serve to give a swirling motion to the air which passes up into the bowl 12 through the duct 10, the vanes or segments 22 being spaced as illustrated to permit the air to pass between them.

Oil to be burned in the bowl 12 is brought up through a pipe 24 which extends vertically through the center of the duct 10 and supports the hub 20 at its upper end. Hub 20 has an axial bore 26 therein communicating with the duct through pipe 24, and hub 20 has radial slots 28, 28 in its upper edge leading outwardly from the bore 26 and adapted to deliver liquid from bore 26 to the upper surface of each of the segments 22. Oil delivered through slots 28, 28 to the upper surfaces of the segments spreads out on the segments 22 and flows toward the lower edges of the segments. The lower portions of the outer circular edges of segments 22 and the lower radial edges of the segments are provided with upstanding vertical flanges 30 and 32 respectively forming shallow pockets or receptacles 33 so that, in case the oil is supplied to the segments 22 faster than it evaporates, small pools of liquid fuel will be formed at the lower corners of the segments. The outer edges of segments 22 extend beyond the flange 16 so that all the air passing up through the duct 10 will be given a whirling motion and also so that any excess fuel that may drip off the lower corners of segments 22 when the burner is being started will fall into channel 18. It will be seen that air which comes up through the duct 10 will be caused to whirl or rotate by the inclined segments 22 and, moreover, the air will pass along the upper surfaces of the segments in contact with the fuel which spreads over the upper surfaces of the segments from the slots 28. The ribs 32 along the radial edges of the segments 22 cause whirls or eddies in the air as it passes over the upper edges of the flanges, thereby throwing the air downwardly and causing it to come into more intimate contact with the oil on the upper faces of the segments 22. In order to produce a strong whirling action of the air at the top of the duct 10, and also to increase the eddy and downward tendency of the air at the lower edges of the segments 22, the upper edge of the segments 22 are extended over the lower edges of adjacent segments to some extent as clearly illustrated in Figs. 1 and 3.

If desired, the air may be forced into the duct 10 by means of a fan. In the arrangement illustrated, the fan 34 delivers air to duct 10 by means of conduit 36. The use of a fan, however, is in no wise essential to the invention.

It is preferred that a pilot burner be employed in connection with the present invention, and a pilot burner 38 is illustrated, this being preferably placed close under one of

the segments 22, 22. Burner 38 may be conveniently supplied with gas through pipe 40 running through the duct 10 parallel to the oil pipe 24.

When it is desired to place the burner according to the present invention in use, oil is turned on so as to flow up through the pipe 24 and through slots 28 on to the segments 22. When the fuel is first lighted the segments, of course, are relatively cool and the vaporization is at a minimum. Usually at this period of the operation the oil is supplied somewhat faster than it burns and some of it collects in the pockets formed by the flanges 30 and 32. As segments 22 warm up, however, the oil is vaporized as rapidly as it is supplied and normally little, if any, oil remains in the pockets at the lower corners of the segments.

If the main burner and pilot 38 are both extinguished by accident when the oil feed of the main burner is on or if the pilot 38 is extinguished when the oil is off the main burner and the oil is then turned on the main burner again, it is desirable to turn off the oil automatically. For this purpose, a drain pipe 39 is provided and arranged to drain off oil which may fall from the outer corners 31 of segments 22 into the annular space or channel 18. Pipe 39 delivers into a drip pan or bucket 41. Bucket 41 is suspended by a bell-crank 42 which is connected to the rotatable member of cock 43 in such a manner that when the bucket 41 is nearly full of oil the member 43 is turned, to cut off the flow of oil to the main burner through the oil pipe 44. A snap mechanism 46 holds the cock 43 normally open. According to the arrangement above described, the apparatus is able to burn oil with practically no carbon formation and at the same time very little excess air over that theoretically required for the combustion of the oil. It will be obvious also that the apparatus according to the present invention is very simple and rugged, requiring no motor where the natural draft is strong, since, unless a fan is used, there are no rotating parts in the apparatus.

It will be understood that, while I have described above a specific apparatus, I do not limit myself to details of the foregoing description except insofar as such details are clearly and positively incorporated in the appended claims. In particular, it will be understood that the outline of segments 22 in plan preferably depends upon the shape of the cross-section of duct 10, the outer edges of segments 22 being illustrated as circular in plan view in order to have the desired amount of overhang above pocket or channel 18 without waste of material in blades or segments 22.

Having thus described my invention I claim:

1. A liquid fluid burner having an air duct,

a number of inclined partially overlapping spaced fuel vaporizing plates arranged at one end of said duct, and a conduit arranged to deliver liquid fuel to the upper surfaces of each of said plates. 5

2. A liquid fluid burner having an air duct, a number of inclined spaced stationary fuel vaporizing plates arranged radially over the discharge end of said duct, and a conduit arranged to deliver liquid fuel to the upper surfaces of each of said plates, said duct terminating in a bowl partially enclosing and forming a combustion chamber for said burner. 10

15 3. A burner for liquid fuel having an air conduit, a plurality of inclined spaced stationary fuel vaporizing plates arranged radially above a central hub over the upper end of said conduit, and a fuel pipe running from below said plates and connected to deliver oil to the upper surfaces of each of said plates.

20 4. A fuel burner including an air conduit, a plurality of inclined spaced fuel vaporizing plates arranged over the upper end of said conduit, and a duct arranged and connected to deliver liquid fuel to the upper surfaces of each of said plates, said plates having flanges forming shallow pockets on the lower edges 30 thereof.

25 5. A burner for liquid fuel including a vertical air duct, a plurality of partially overlapping spaced inclined fuel vaporizing plates over the upper end of said duct, said plates extending outwardly beyond the edge of said duct, and a conduit arranged and connected to deliver liquid fuel to the upper surfaces of each of said plates. 35

30 6. A burner for liquid fuel including a vertical air conduit, a series of inclined partially overlapping spaced fuel vaporizing plates arranged above the upper end of said conduit, a central hub to which said plates are connected, and a fuel duct running from below said plates through said hub, said hub having slots arranged to deliver fuel from said duct to the upper surfaces of said plates. 40

45 7. A burner for liquid fuel including a vertical air conduit, a series of helically inclined spaced plates arranged above the upper end of said conduit, adjacent edges of adjoining plates lying one above the other, and a fuel duct arranged and connected to deliver liquid fuel to the upper surfaces of said plates. 50

55 8. A burner as set forth in claim 6 and in which said plates have upstanding flanges forming shallow pockets thereon. 55

60 9. A burner for liquid fuel including a vertical air conduit, a bowl enclosing the upper end of said conduit and forming a pocket therewith, a plurality of helically inclined partially overlapping spaced fuel vaporizing plates arranged within said bowl above the upper end of said conduit and extending outwardly beyond the edge thereof to drain into 65

said pocket, and a conduit arranged and connected to deliver liquid fuel to the upper surfaces of each of said plates. 70

10. A burner apparatus for liquid fuel including a vertical air conduit, a bowl enclosing the upper end of said conduit and forming a pocket therewith, a plurality of inclined spaced oil vaporizing plates arranged radially within the bowl above the upper end of said conduit and around a vertical hub, and means to feed liquid fuel through the hub to the upper surfaces of each of said plates, said plates having upwardly extending flanges along their lower radial edges to retain oil thereon and being arranged so that excess unburned oil will overflow into said pocket and so that air is caused to swirl upwardly thereover in intimate contact with the upper surfaces thereof. 75

15 11. A liquid fuel burner comprising a combustion chamber, an air duct having a discharge outlet in said chamber, a combined stationary baffle and fuel vaporizing member mounted over said air duct discharge, said baffle member comprising a plurality of fuel vaporizing vanes arranged for swirling air into the combustion chamber in intimate contact with the fuel vaporizing surfaces thereof, and a conduit arranged and connected to deliver liquid fuel to the vaporizing surfaces 80 of each of said vanes. 85

In testimony whereof I affix my signature.

THOMAS ANDERSON.

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