Aug. 28, 1934. S. PERRY 1,971,874

OIL BURNER

Filed Feb. 16, 1931 3 Sheets-Sheet 1

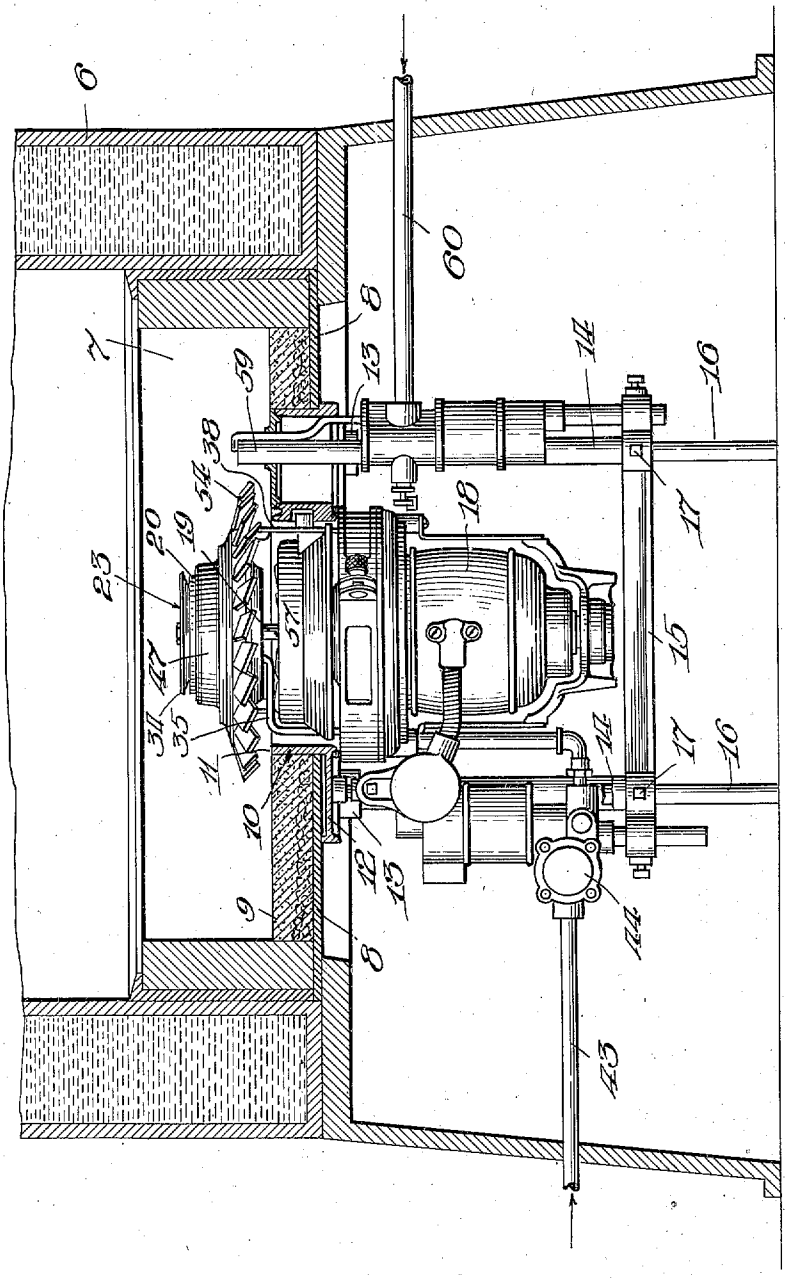


Fig. 1.

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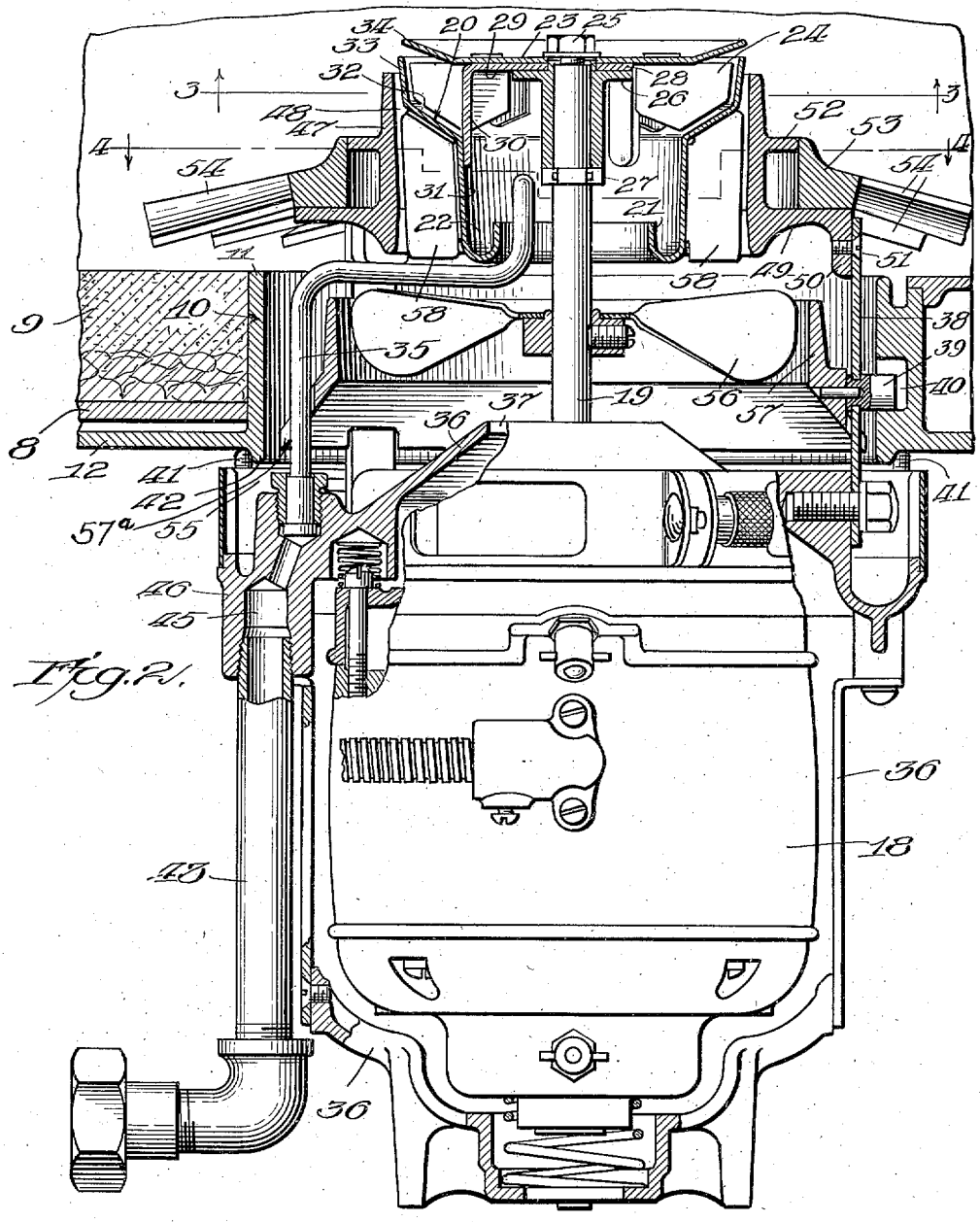


Fig. 2.

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Fig. 3.

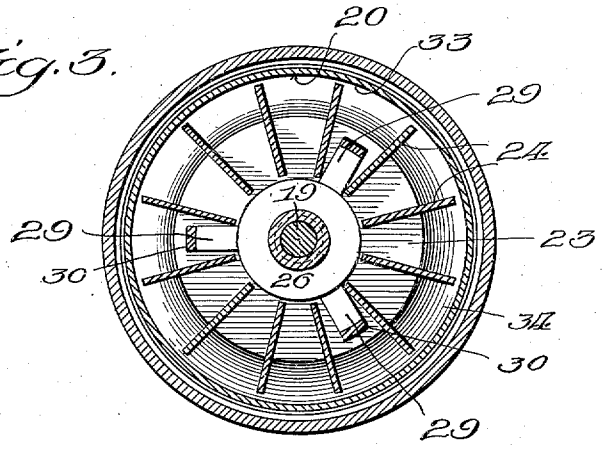


Fig. 4.

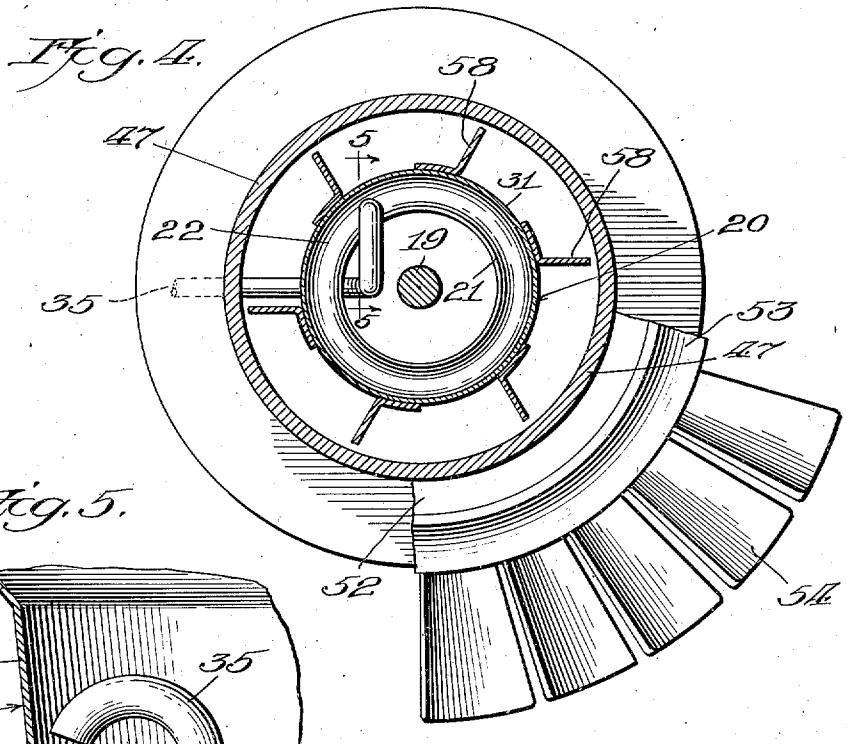
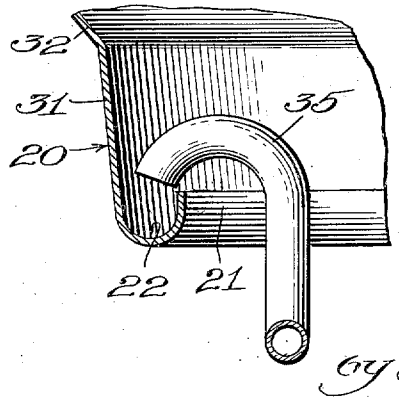


Fig. 5.



Inventor:
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Patented Aug. 28, 1934

1,971,874

UNITED STATES PATENT OFFICE

1,971,874

OIL BURNER

Stanley Perry, Chicago, Ill., assignor to Automatic Burner Corporation, Chicago, Ill., a corporation of Illinois

Application February 16, 1931, Serial No. 516,186

11 Claims. (Cl. 158—77)

My invention relates more particularly to oil burners of the type comprising a hollow atomizer, as for example of general cup form, to which the oil to be consumed is supplied and along the upwardly extending side wall of which the oil flows upwardly discharging from the upper edge of the wall, and becoming atomized by the flow of air into contact with the oil.

One of my objects is to provide a construction of oil burner in which by the use of a slow speed motor, the desired combustible mixture may be produced.

Another object is to provide for the supplying of air at high velocity along the outside of the atomizer for atomizing, and mixing with, the oil.

Another object is to provide for the effective shielding of the atomizer from the heat generated by the burner; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a view in elevation of a furnace equipped with an oil burner constructed in accordance with my invention, certain parts of the structure being represented in sectional elevation.

Figure 2 is a broken view in sectional elevation of the burner structure.

Figure 3 is a section taken at the line 3—3 on Fig. 2 and viewed in the direction of the arrows.

Figure 4 is a section taken at the irregular line 4—4 on Fig. 2 and viewed in the direction of the arrows; and

Figure 5, an enlarged section taken at the line 5—5 on Fig. 4 and viewed in the direction of the arrows.

Referring to the particular construction shown, 6 represents a furnace having a combustion chamber 7 the bottom of which is formed of a plate 8 having a covering 9 of refractory material, the bottom plate 8 being provided with an aperture 10 in which a neck-ring 11 having an outwardly extending flange 12, is confined.

The flange 12 of the neck ring is provided about its periphery with depending bosses 13 containing downwardly opening sockets into which the upper ends of pipes 14 are secured; the lower ends of the pipes 14 extending into openings in a base plate 15. Extending upwardly into the pipes 14 are rods 16 supported on the floor and slidable in the pipes 14, these several parts being held in vertically adjusted position by set-screws 17 on the plate 15 which extend through the pipes 14 and bear at their inner ends against the rods 16.

The construction shown also comprises a vertically disposed electric motor 18 the armature shaft 19 of which extends upwardly centrally through the opening in the neck ring 10 and is provided at its upper end, in a plane above the neck ring, with a cup member 20 provided with a large central opening 21 in its bottom which is upwardly deflected as shown to provide an annular trough 22, and a deflector plate 23 extending above the cup member 20 and provided with a set of vanes 24 depending into the cup member.

The deflector plate 23 is secured to the upper end of the shaft 19 by a nut 25 clamping the plate 23 between it and the annular flange 26 of a sleeve surrounding the shaft 19 and bearing at its lower end against a stop 27 on the latter, with a ring 28 interposed between the flange 26 and the plate 23. The ring 28 is provided with radial fingers 29 which extend between certain of the vanes 24 and are provided with depending extensions 30 secured to the inner side of the cup member 20 for supporting the latter on the shaft 19 whereby the cup member 20 and the deflector plate 23 rotate with this shaft.

The cup member 20 is preferably of the form shown, having a lower side wall portion 31 preferably slightly flaring upwardly, an intermediate portion 32 which flares upwardly to a much greater degree than the portion 31 and an upper portion 33 which preferably slightly flares upwardly. The vanes 24 at their outer edges conform in shape generally to the wall portions 32 and 33 from which they are spaced a slight distance as shown, the vanes 24 thus extending over the side-wall portion 32. The deflector 23 preferably is of the form shown to provide an upwardly and outwardly inclined marginal edge portion 34 which extends above the upper portion of the cup member 20 in vertically spaced relation thereto.

The arrangement of the parts of the assembly just described is such that oil fed to the interior of the cup member 20, as through a pipe 35 supplied with oil as by means hereinafter described, rises upwardly along the inner surface of the annular side wall of the member 20 and discharges laterally outwardly throughout the periphery of the cup member through the space between the cup member and the marginal edge of the air-deflector-plate 23, during the rotation of the armature shaft 19, the fan device comprising the vanes 24 operating to force air upwardly for discharge through the space between the cup member 20 and the deflector plate 23 for atomizing the oil delivered by the cup member as stated.

The motor 18 is shown as supported on a hol-

low member 36 coaxial with the opening through the neck ring 10, the upper extremity of the member 36, which is provided with a central opening 37 through which the armature shaft 19 projects, preferably extending a slight distance above the lower edge of the neck ring as shown. The member 36 is provided at intervals around its upper edge with upwardly extending bars 38, one only of which is shown, each provided with an outwardly projecting stud 39 adapted to seat in slots 40 of bayonet joint form provided in the inner peripheral surface of the neck ring 10.

The member 36 is rigidly held to the neck ring 10 as by means of set screws 41 carried by the member 36 and screwing against the underside of the neck ring beyond, and adjacent to, a depending annular bead 42 on the neck ring, the member 36 being thus clamped by the studs 39 and the screws 41 to the neck ring.

The means shown for supplying oil to the cup member 20 comprises a pipe 43 having oil-flow-controlling means 44 commonly used in burner structures and leading from any suitable source of oil supply under moderate pressure or gravity head to the lower end of a passage 45 in a boss portion 46 of the member 36, the upper end of the passage 45 communicating with the pipe 35.

The construction also comprises an air-directing member in the form of a ring 47 which is concentric with and surrounds the cup member 20 and is spaced therefrom throughout its periphery, as shown, to provide the annular space 48 between these parts, the member 47 extending upwardly in close proximity to the upper edge of the cup 20. The ring 47 is provided with an outwardly extending annular flange 49 adjacent its lower edge, this flange being provided at intervals about its circumference with depending lugs 50 at which the ring 47 is supported on the upper ends of the bars 38, as by screws 51.

Surrounding the ring 47 and resting upon the flange 49 and against an upper annular flange 52 on the ring 47, is a ring 53 provided about its periphery with a series of radially disposed vanes 54 which incline slightly downwardly. The outer marginal edge of the flange 49 is located above the plane of the top of the neck ring 10 and slightly inwardly of this top edge, and the vanes 54 thus project across the space betwen the flange 49 and the neck ring 10, as shown.

It may be here stated that in accordance with the particular construction shown provision is made not only for the passage of air upwardly through the cup member 20 and out through the annular space between this cup member and the air deflector plate 23, but also through the space 48 and through the space over which the vanes 54 extend, air being supplied to the burner through the opening 37 in the member 36, and also, and preferably controllably, through the space 55 between the neck ring 10 and the upper portion of the member 36.

The apparatus also comprises a fan 56 shown as of the propeller type and having blades of either a fixed or adjustable pitch, this fan being fixed on the armature shaft 19 preferably at the point shown in the drawings, namely, within the neck ring 10 and preferably within a ring 57 connected with the studs 39, the fan 56 thus being located below the air passage over which the vanes 54 extend, the air passage 48 and the air passage between the cup member 20 and the deflector plate 23.

The fan 56, in the particular construction shown, operates not only to force air upwardly through the opening in the bottom of the cup member 20, but also to force air outwardly through the passage 48 and the passage over which the vanes 54 extend.

The construction shown also comprises a set of vanes 58 which extend generally radially of the longitudinal axis of the cup member 20. The vanes 58 which are secured to the cup member 20 extend from points substantially coincident with the lower edge of the member 20 to points substantially coincident with the lower extremity of the side wall portion 33 of the member 20, these vanes at their inner edges and their upwardly inclined edges fitting against the exterior surfaces of the wall portions 31 and 32, respectively, of the member 20, and extending at their outer edges closely adjacent to the inner surface of the ring 47. While the vanes 58, to perform their function, may extend radially of the longitudinal axis of the cup member 20, it is preferred that they be set at a slight angle, as for example 10° to the radial plane to extend into a position in which these blades present a lead of about 10° as represented in Fig. 4, assuming that the cup member 20 is rotated in clockwise direction in this figure. By so disposing the vanes 58 the air displacing action produced thereby is augmented as compared with the positioning of these vanes radially.

The fan formed of the vanes 24 operates to force air through the cup member 20 and out through the space between the upper marginal edge of the latter and the edge of the plate 23, the air forcing effect of this fan being augmented by the auxiliary fan 56, which also operates as above stated, to force air through the passage 48 and through the passage over which the vanes 54 extend whereby the driving of the fan formed of the vanes 24 at high speed is not necessary.

The vanes 58 are desirable inasmuch as they operate, particularly in a construction such as that shown presenting a relatively constricted passage between the upper edge of the ring 47 and the cup member 20, to supply air from the outside of the cup member 20 to the oil and air discharging through the space between the upper edge of the cup member 20 and the deflector plate 23, at a higher velocity than is possible by employing the fan 56 only for forcing air through the space between the cup member 20 and the ring 47, the vanes 58 thus contributing to the functioning of the burner in a highly satisfactory manner without requiring the use of rapidly driven fan devices.

The feature of the ring 47 extending to the elevation referred to is of advantage inasmuch as it serves very effectually as a shield protecting the burner parts which it surrounds, from the intense heat produced by the burner.

Any suitable means for igniting the fuel issuing from the burner may be provided, as for example those shown which comprise a pilot burner structure 59 controllably supplied with gas as through a pipe 60 leading from any suitable source of supply.

Inasmuch as in the construction shown, wherein the ring 57 is spaced from the ring 10, there may be a possibility, under some conditions, of the gases in the combustion chamber being drawn by the fan 56 downwardly through the space between the rings 10 and 57, I provide means for substantially closing this space, these means shown in the construction illustrated

comprising an outwardly flaring skirt 57ª on the bottom of the ring 57.

While I have illustrated and described a particular construction embodying my invention, I do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is:

1. In a rotary type oil burner, an atomizing cup adapted to atomize oil, a motor adapted to rotate said cup having a shaft connected to said cup, a fan on the motor shaft between the motor and the atomizing cup adapted to supply air to the atomized oil to promote combustion, a circular ring member surrounding the fan which has arms which are secured to the motor, a second circular ring member surrounding the atomizing cup and secured to the first mentioned ring member, an air diffusing plate supported by the second ring member.

2. In an oil-burner, the combination of an annular rotary atomizer to which the oil is supplied and having an outwardly and upwardly extending side wall, the upper end of which forms the discharge portion of the atomizer, means for rotating said atomizer, a series of spaced air forcing blades on the exterior of said wall of the atomizer, a portion of said wall closing the spaces at the tops of said blades, the wall of the atomizer rising above the closed upper ends of said spaces, and a ring surrounding said atomizer in spaced relation thereto, with an edge of the ring adjacent the discharge end of the atomizer, said blades being so proportioned and arranged that the air is forced by said blades upwardly lengthwise of said blades through the space between said ring and atomizer to the discharge portion of said atomizer exteriorly of the latter.

3. In an oil-burner, the combination of a rotary cup-shaped atomizer to the interior of which the oil is supplied and having an outer upwardly extending side wall, the upper end of which forms the discharge portion of the atomizer, said side wall of said atomizer comprising an upper portion, a lower portion and an intermediate portion, said intermediate portion sloping upwardly and outwardly at an abrupt angle to the lower portion, a series of spaced air forcing blades on the exterior of said side wall of the atomizer, a portion of said side wall closing the spaces between the blades at their upper ends, said blades being of greater length than width and substantially straight and disposed substantially parallel with the axis about which said atomizer rotates and operating to force air upwardly lengthwise of said blades to the discharge portion of said atomizer exteriorly of the latter, and a ring surrounding said blades, said intermediate portion and a part of said upper portion and in spaced relation thereto, with an edge of the ring adjacent the discharge end of the atomizer, whereby the air discharged by said blades passes through the space between said ring and atomizer.

4. Oil combustion apparatus comprising a combustion chamber having an opening in its bottom and an oil burner in said opening and comprising a motor, an atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, a fan for forcing air through said atomizer, said atomizer being mounted in said opening and spaced from the wall defining said opening, a ring in said opening and surrounding said fan and spaced from the wall of said opening, and means substantially closing the space between said ring and the wall defining the opening, to prevent downward flow through said space, and into the bottom of said ring, of gaseous fluid in said combustion chamber.

5. Oil combustion apparatus comprising a combustion chamber having an opening in its bottom and an oil burner in said opening and comprising a motor, an atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, a fan for forcing air through said atomizer, said atomizer being mounted in said opening and spaced from the wall defining said opening, a ring in said opening and surrounding said fan and spaced from the wall of said opening, and a downwardly and outwardly flaring skirt on the lower portion of said ring substantially closing the space between said ring and the wall defining the opening, to prevent downward flow through said space, and into the bottom of said ring, of gaseous fluid in said combustion chamber.

6. In an oil burner, the combination of a hollow rotary atomizer the upper edge of which is the delivery portion, means to supply oil to said atomizer, a deflector above said atomizer for directing air flowing through said atomizer outwardly in a lateral direction, a fan below said atomizer and rotatable therewith, means surrounding the fan and means surrounding the atomizer for confining air flow about and through said atomizer in an upward direction to said delivery portion, and fan blades on the exterior of said atomizer for forcing air to the delivery portion of said atomizer.

7. In an oil burner, the combination of a rotary cup shaped atomizer to the interior of which the oil is supplied, and having an outer upwardly extending side wall the upper end of which forms the discharge portion of the atomizer, the side wall of said atomizer having an intermediate portion sloping outwardly and upwardly at an abrupt angle to the lower portion, said side wall rising above said intermediate portion, means for rotating said atomizer, a series of spaced air forcing blades on the exterior of said side wall of the atomizer, a portion of said wall closing the spaces between the blades at their upper ends, and a ring surrounding said atomizer in spaced relation thereto, with an edge of the ring adjacent the discharge end of the atomizer, said blades being so proportioned and arranged that the air is forced by said blades upwardly lengthwise of said blades through the space between said ring and atomizer to the discharge portion of said atomizer exteriorly of the latter.

8. In an oil burner, the combination of a motor, a hollow rotary atomizer open for the passage of air therethrough and driven by said motor and rotatable about a substantially vertical axis and to which the oil is supplied and comprising an air forcing element causing the air to flow through said atomizer, a deflector above said element and forming with the upper edge of said atomizer a laterally opening space through which the oil and the air operated on by said element, flow, fan blades on the exterior of said atomizer delivering air to the oil discharging from said atomizer, means surrounding the fan blades for confining the air for upward flow about said atomizer to a point adjacent said space, and a fan operating to supplement said air forcing element and said fan blades for forcing the air upwardly through

said atomizer and upwardly through said means along the exterior of said atomizer.

9. In an oil burner, the combination of a hollow rotary atomizer the upper edge of which is the delivery portion, a deflector above said atomizer for directing air flowing through said atomizer outwardly in a lateral direction, a fan for forcing air upwardly through and around the atomizer, stationary means spaced outwardly from and surrounding the atomizer for confining air flow about the atomizer in an upward direction to said delivery portion, and fan blades on the exterior of said atomizer for forcing air to the delivery portion of said atomizer.

10. In an oil burner, the combination of a hollow rotary atomizer the upper edge of which is the delivery portion, a deflector above said atomizer for directing air flowing through said atomizer outwardly in a lateral direction, means for forcing air through said atomizer, fan blades on the exterior of said atomizer, and stationary means spaced outwardly from and surrounding said fan blades for confining air flow through said last-named means, due to the action of said fan blades, to said delivery portion.

11. In an oil burner wherein the upper part is the discharge portion, the combination of a motor, an annular rotary atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, an air-directing member surrounding said atomizer, a deflector member, said members being spaced from each other and said atomizer discharging the oil through the space between the members and at the upper end of the atomizer, fan blades mounted in said atomizer, fan blades mounted on the atomizer in the space between said atomizer and the air directing member, and a fan positioned to direct air into and through said atomizer and also through the space between said air-directing member and said atomizer.

STANLEY PERRY.

DISCLAIMER

1,971,874.—*Stanley Perry*, Chicago, Ill. OIL BURNER. Patent dated August 28, 1934. Disclaimer filed September 7, 1935, by the assignee, *Automatic Burner Corporation*.

Hereby enters this disclaimer to that part of the claim in said specification which is in the following words, to wit, claim 10, reading as follows:

"10. In an oil burner, the combination of a hollow rotary atomizer the upper edge of which is the delivery portion, a deflector above said atomizer for directing air flowing through said atomizer outwardly in a lateral direction, means for forcing air through said atomizer, fan blades on the exterior of said atomizer, and stationary means spaced outwardly from and surrounding said fan blades for confining air flow through said last-named means, due to the action of said fan blades, to said delivery portion."

[*Official Gazette October 1, 1935.*]

said atomizer and upwardly through said means along the exterior of said atomizer.

9. In an oil burner, the combination of a hollow rotary atomizer the upper edge of which is the delivery portion, a deflector above said atomizer for directing air flowing through said atomizer outwardly in a lateral direction, a fan for forcing air upwardly through and around the atomizer, stationary means spaced outwardly from and surrounding the atomizer for confining air flow about the atomizer in an upward direction to said delivery portion, and fan blades on the exterior of said atomizer for forcing air to the delivery portion of said atomizer.

10. In an oil burner, the combination of a hollow rotary atomizer the upper edge of which is the delivery portion, a deflector above said atomizer for directing air flowing through said atomizer outwardly in a lateral direction, means for forcing air through said atomizer, fan blades on the exterior of said atomizer, and stationary means spaced outwardly from and surrounding said fan blades for confining air flow through said last-named means, due to the action of said fan blades, to said delivery portion.

11. In an oil burner wherein the upper part is the discharge portion, the combination of a motor, an annular rotary atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, an air-directing member surrounding said atomizer, a deflector member, said members being spaced from each other and said atomizer discharging the oil through the space between the members and at the upper end of the atomizer, fan blades mounted in said atomizer, fan blades mounted on the atomizer in the space between said atomizer and the air directing member, and a fan positioned to direct air into and through said atomizer and also through the space between said air-directing member and said atomizer.

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