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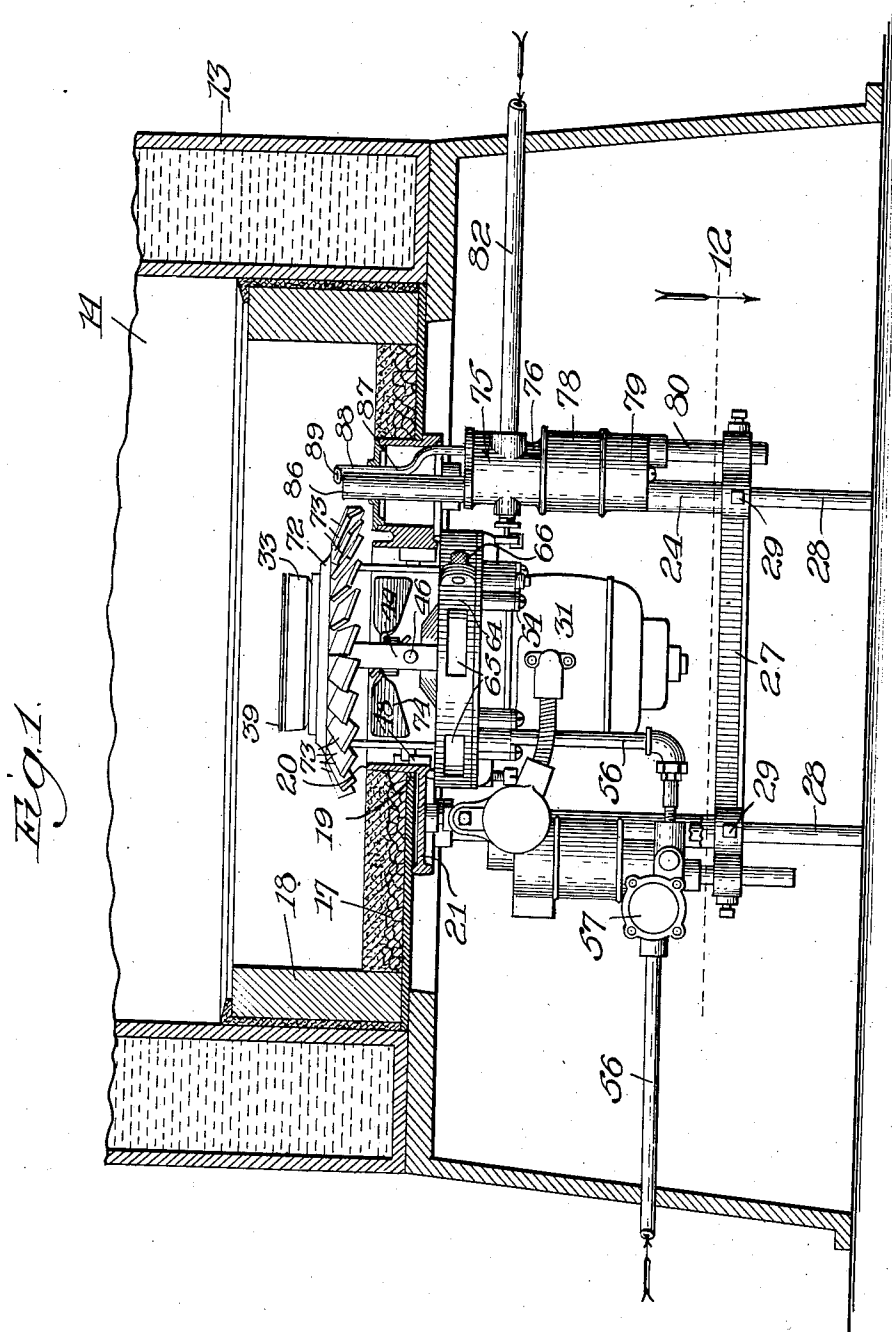
S. PERRY

1,891,835

OIL BURNER

Filed Jan. 21, 1929

7 Sheets-Sheet 1



Inventor:
Stanley Perry,
By Sydenforth, Sec., Pittsburg, Mo.,
Attys.

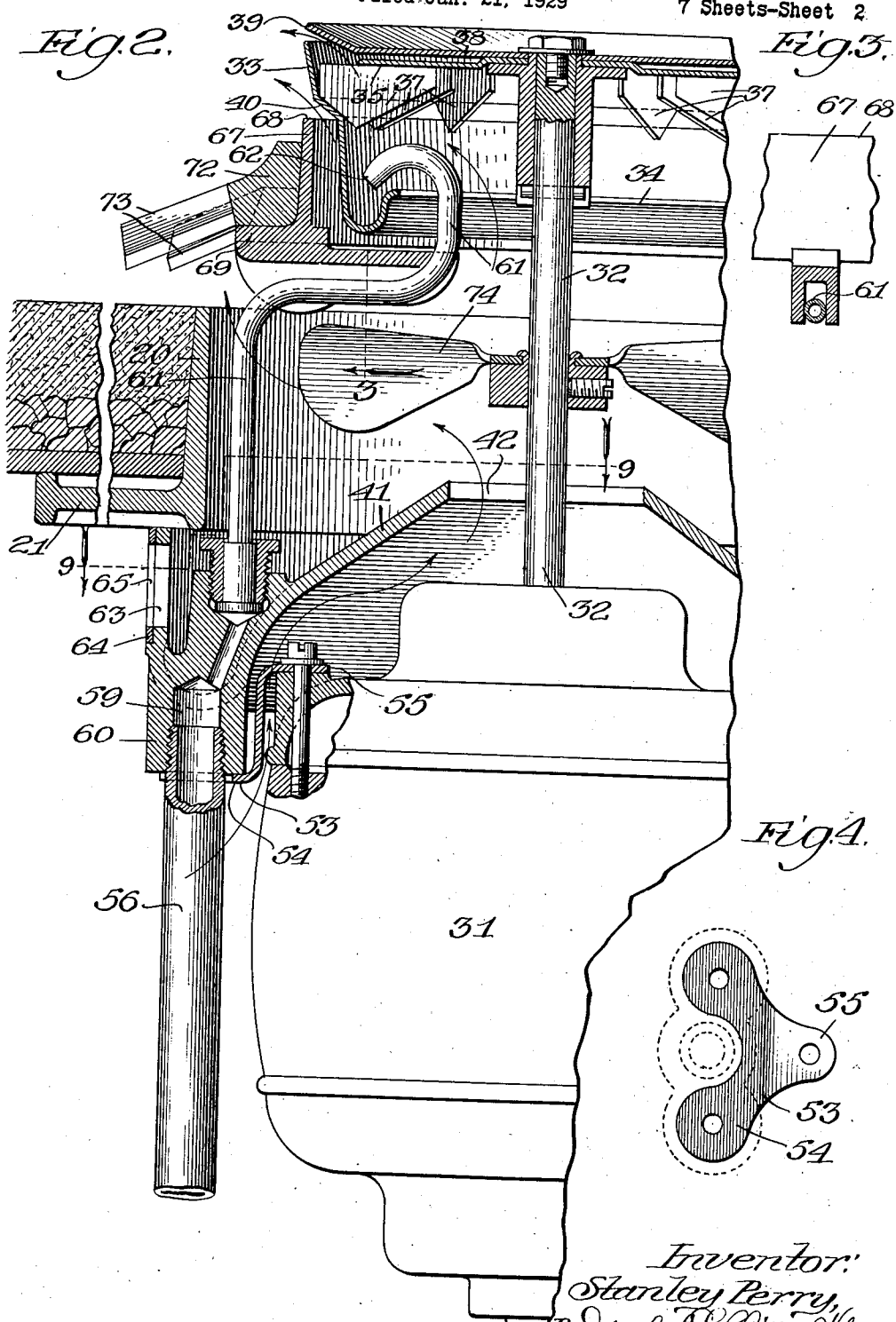
Dec. 20, 1932.

S. PERRY
OIL BURNER

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7 Sheets-Sheet 2



Inventor:
Stanley Perry,
By *Benjamin F. Smith*, Attorney,
Albany, N. Y.

Dec. 20, 1932.

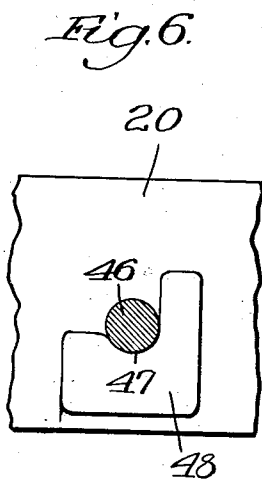
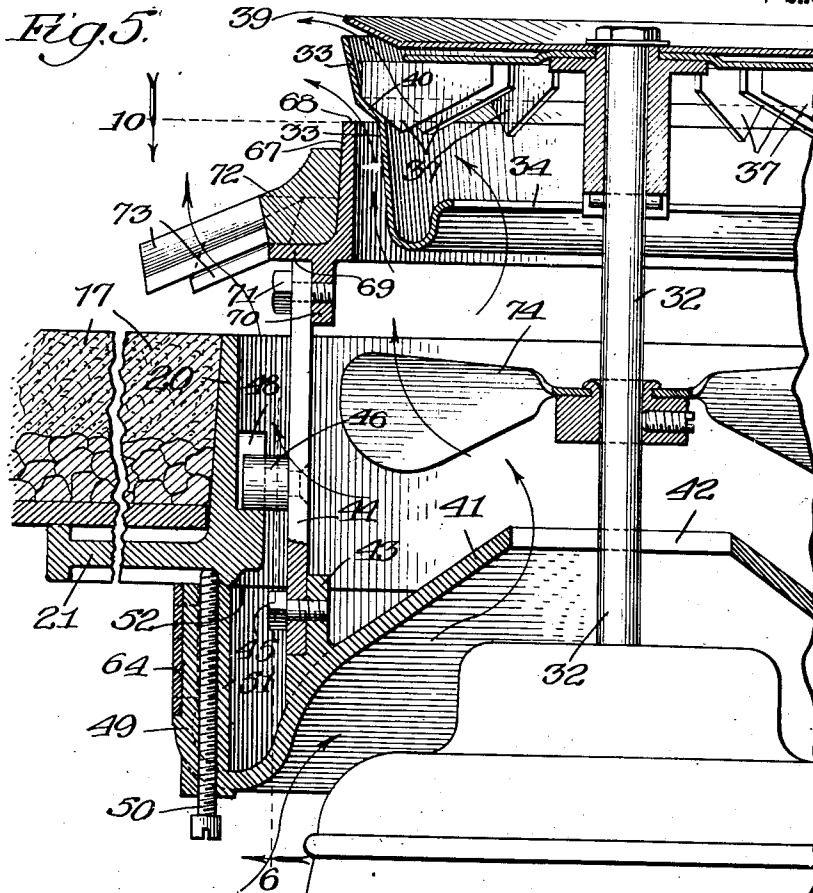
S. PERRY

1,891,835

OIL BURNER

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7 Sheets-Sheet 3



Inventor:
Stanley Perry,
By *James H. Smith, Attorney*

Dec. 20, 1932.

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Fig. 7.

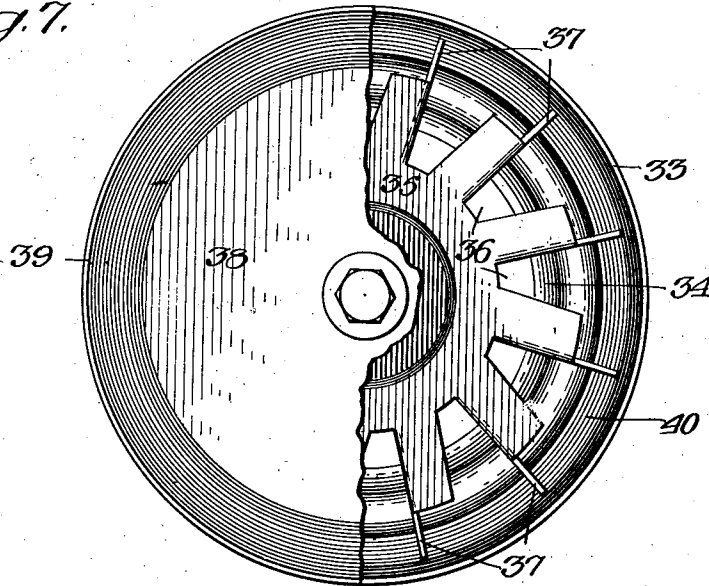
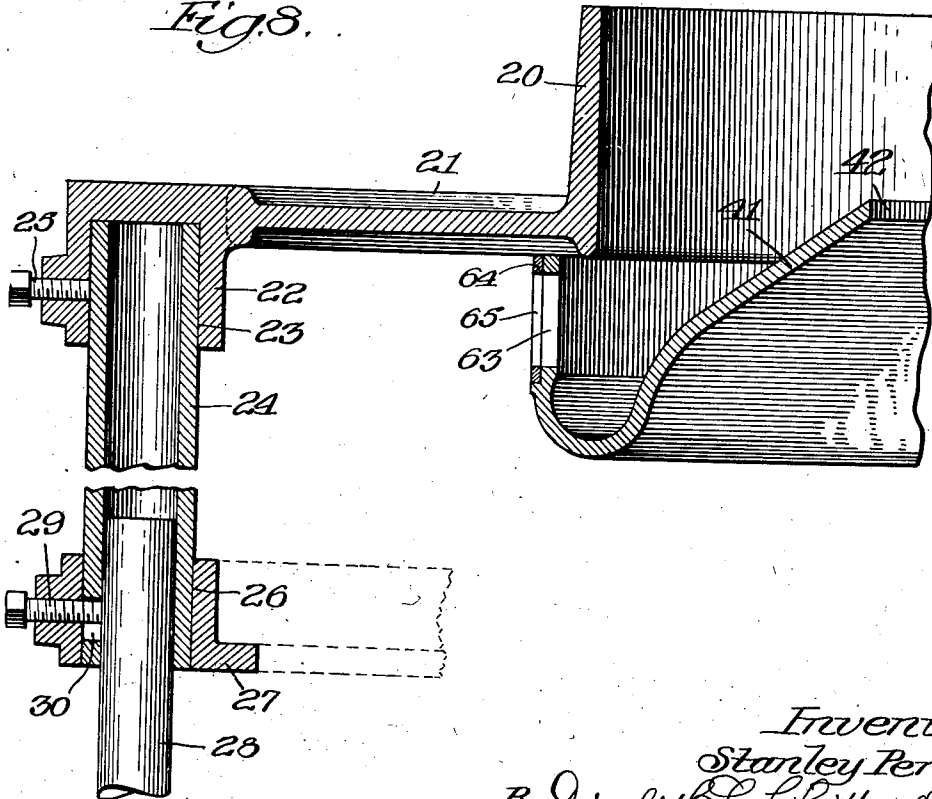


Fig. 8.



Inventor:
Stanley Perry
By *Dyrenforth, Lee, Crittton, & Mills*
Attys.

Dec. 20, 1932.

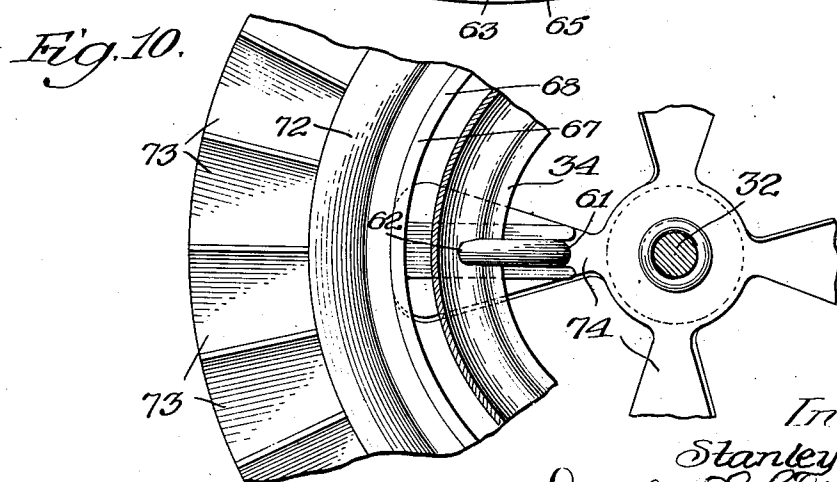
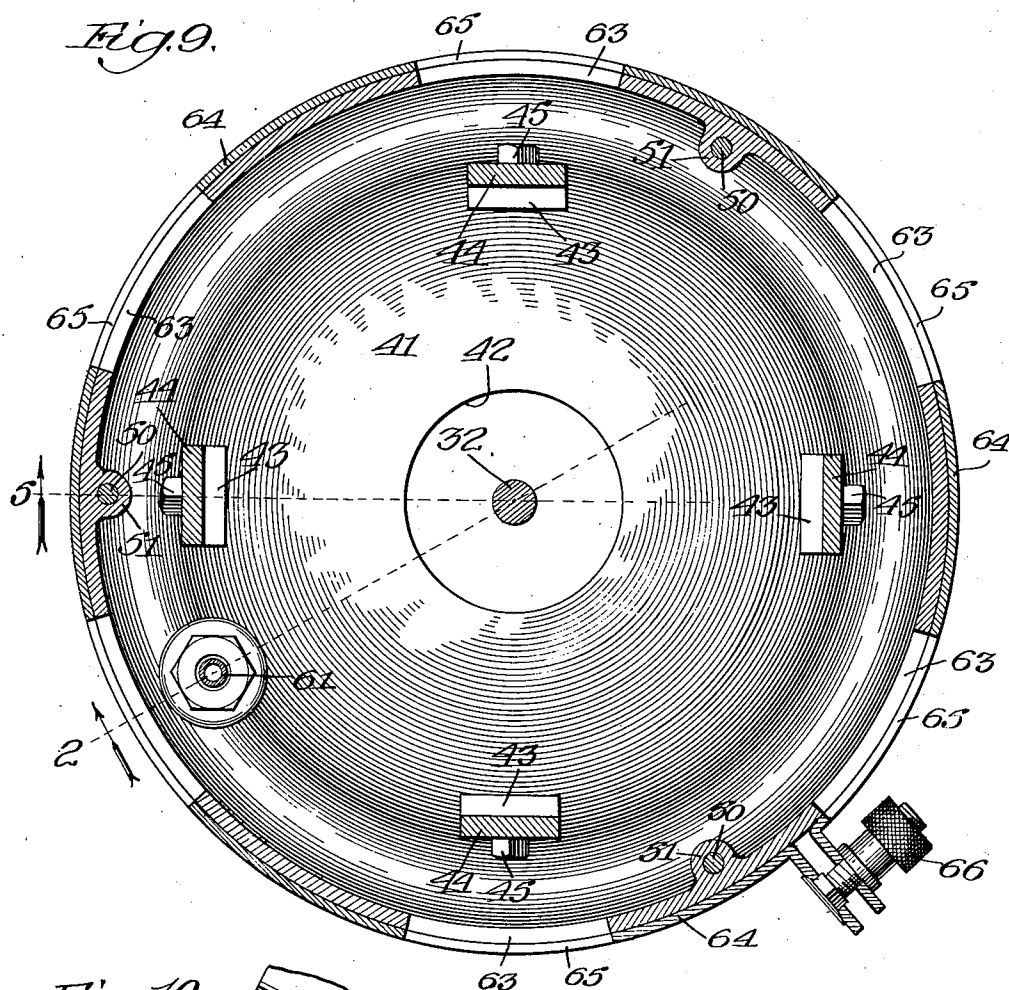
S. PERRY

1,891,835

OIL BURNER

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7 Sheets-Sheet 5



Inventor:
Stanley Perry,
By Dyrenforth, Lee, Crittenden & Miles,
ATTORNEYS

Dec. 20, 1932.

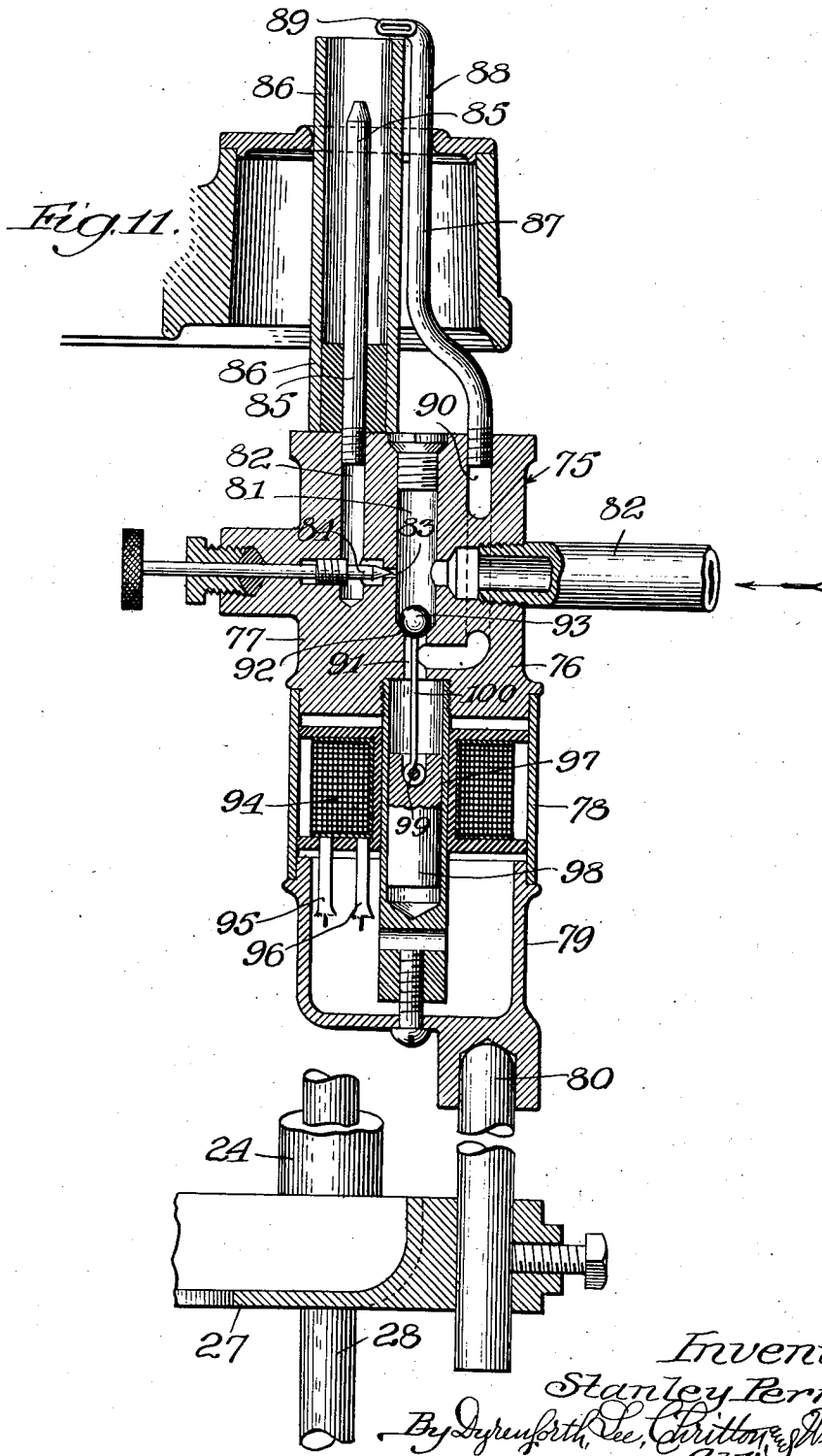
S. PERRY

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OIL BURNER

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S. PERRY

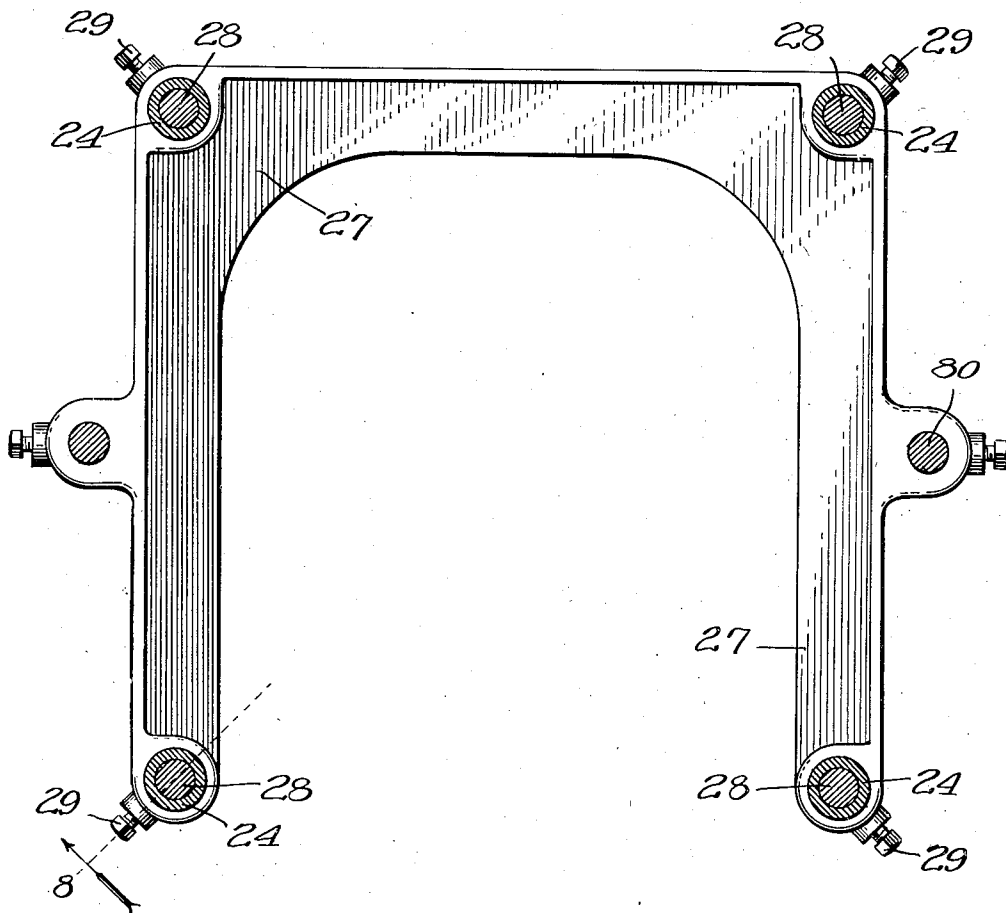
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OIL BURNER

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Fig. 12.



Inventor:
Stanley Perry,
By *Byrd, Smith, Lee, Christian & Mills,*
Attorneys

UNITED STATES PATENT OFFICE

STANLEY PERRY, OF CHICAGO, ILLINOIS, ASSIGNOR TO AUTOMATIC BURNER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

OIL BURNER

Application filed January 21, 1929. Serial No. 333,832.

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.

5 Another object is to provide a simple and economical construction of oil burner and of compact form.

10 Another object is to provide a construction of oil burner the parts of which may be maintained relatively cool and the formation of carbon on the stationary parts thereof prevented.

15 Another object is to provide a construction of oil burner in which all grades of domestic fuel oil may be used.

20 Another object is to provide a construction of oil burner whereby such a mixture of fuel and air and moving at such a rate of speed, that it may be ignited close to the part of the burner from which it issues thereby permitting of its ready ignition by an electric spark; and other objects as will be manifest from the following description.

25 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 shown being represented in 30 sectional elevation.

Figure 2 is a broken view in sectional elevation of the burner structure, the section being taken at the line 2 on Fig. 9, and viewed in the direction of the arrow.

35 Figure 3 is a broken sectional detail view taken at the line 3 on Fig. 2 and viewed in the direction of the arrow.

Figure 4 is a plan view of one of the similar clips for supporting the motor of the 40 burner.

Figure 5 is a broken section taken at the line 5 on Fig. 9 and viewed in the direction of the arrow.

45 Figure 6 is a broken sectional detail taken at the line 6 on Fig. 5 and viewed in the direction of the arrow.

Figure 7 is a plan view of the atomizer portion of the burner, a portion of the upper air deflecting plate being broken away.

50 Figure 8 is a vertical sectional view showing

a portion of the burner structure, the section being taken at the line 8 on Fig. 12 and viewed in the direction of the arrow.

Figure 9 is a plan sectional view taken at the line 9 on Fig. 2 and viewed in the direction of the arrow.

Figure 10 is a broken plan sectional view taken at the line 10 on Fig. 5, and viewed in the direction of the arrow.

Figure 11 is a view in vertical sectional elevation of the ignition device and the means for controlling the supplying of gas thereto; and

Figure 12, an enlarged plan sectional view taken at the line 12 on Fig. 1 and viewed in the direction of the arrow.

Referring to the particular construction shown, 13 represents a furnace having a combustion chamber 14 the bottom of which is formed of a plate 15 having a covering 17 of refractory material and the wall of which is lined with refractory material represented at 18, the bottom plate 15 containing an aperture 19 in which a neck ring 20 having an outwardly extending flange 21 is confined.

75 The flange 21 of the neck ring is provided about its periphery at intervals with depending bosses 22 containing downwardly opening annular recesses 23 into which the upper ends of pipes 24 clamped to the bosses by set screws 25 extend, the lower ends of the pipes 24 extending into openings 26 in a base plate 27. Extending upwardly into the pipes 24 are rods 28 supported on the floor and slidable in the pipes, these several parts being held in vertically adjusted position by set-screws 29 on the plate 27 which extend through openings 30 in the pipes 24 and bear at their inner ends against the rods 28.

The construction shown also comprises a 90 vertically disposed electric motor 31, the armature shaft 32 of which extends upwardly centrally through the opening in the neck ring 20 and is provided at its upper end, in a plane above the neck ring, with a cup member 33 containing a large central opening 34 in its bottom, a disk member 35 containing peripheral openings 36 flanked by depending vanes 37, and a deflector plate 38 above the disk 35 and having its continuous peripheral 100

edge upwardly inclined as represented at 39. The assembly just referred to and comprising the armature shaft 32, cup member 33, vane-equipped disk 35 and air-deflector plate 38, is of common and well-known construction, the cup member 33 being rigidly secured to rotate with the other parts just referred to, as by welding it to edges of the vanes 37 along the lines represented at 40.

The parts of the assembly just referred to are so constructed and arranged, in accordance with common practice, that oil fed to the interior of the cup member 33 rises upwardly along the inner surface of the annular side wall of this cup member and discharges laterally outwardly throughout the periphery of the cup member through the space between the cup member and the marginal edges of the air deflector plate 38, during the rotation of the armature shaft 32, the fan device comprising the plate 35 and the vanes 37 operating to force air upwardly for discharge through the space between the cup member 33 and the deflector member 38 for atomizing the oil delivered by the cup member 33 as stated.

The motor 31 is shown as supported by a hollow member 41 of general frusto conical form arranged concentric with the opening through the neck ring 20, the upper extremity of the member 41, which contains a central opening 42, preferably extending a slight distance above the lower edge of the neck ring, as shown. The member 41 is provided at intervals with upwardly extending lugs 43 to which the lower ends of upwardly extending bars 44 are connected as by the screws 45, these bars being equipped with outwardly extending studs 46 adapted to seat in depressions 47 formed in inwardly extending bosses 48 on the neck ring 20.

The member 41 is provided about its peripheral edge with an upwardly extending continuous flange 49 and is held rigidly to the neck ring 20 as by means of set screws 50 threaded in bosses 51 on the inner surface of the flange 49 and screwing against the underside of the flange 21 of the neck ring beyond, and adjacent to, a depending annular bead 52 on the flange 21, the member 41 being thus clamped by the studs 46 and screws 50 to the neck ring.

The motor 31 is supported from the member 41 as by a circular series of brackets 53, preferably resilient, secured at their lower horizontal portions 54 to the underside of the member 41 and at their upper horizontal portions 55 to the casing of the motor 31 as represented in Fig. 2.

The means for supplying oil to the cup member 33 comprise a pipe 56 containing oil-flow-controlling means represented at 57 as for example as 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 59 in a boss portion 60 of the member 41, the upper end of the passage 59 communicating with a pipe 61 which leads upwardly through the neck ring 20 and the opening 34 in the cup member 33 and has its discharge end 62 so positioned, as shown, that the oil forced through this pipe discharges into the lower trough portion of the cup member.

The upwardly extending annular flange 49 of the member 41 contains a circular series of openings 63 preferably disposed equidistantly about this flange for the passage there-through, controllably, of air for discharge into the combustion chamber of the furnace, these openings 63 being controlled by a split damper band 64 surrounding the apertured portion of the flange 49 and containing openings 65 therein which in one position of the band 64 register with the openings 63. By rotatably adjusting the band 64 on the flange 49 and clamping it thereto, as by the clamping device represented at 66, the inlet of air to the furnace through the flange 49 may be regulated, as desired.

The construction shown also comprises a ring member 67 which concentrically surrounds the cup member 33 and is spaced therefrom throughout its periphery as shown to provide the annular space 68 between these parts. The ring 67 is provided with an outwardly extending annular flange 69 at its lower edge provided at intervals with depending lugs 70 at which the ring 67 is supported on the upper ends of the bars 44, as by screws represented at 71.

Surrounding the ring 67 and resting upon the flange 69 is a ring 72 provided about its periphery with a series of radially disposed vanes 73 which incline slightly downwardly. The outer marginal edge of the ring 69 is located above the plane of the top edge of the neck ring 20 and slightly inwardly of this top edge, and the vanes 73 thus project across the space between the flange 69 and the neck ring 20, 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 33 and out through the space between this cup member and the air deflector plate 38, but also through the space 68 and through the space over which the vanes 73 extend, air being supplied to the burner through the opening 42 in the member 41 and also, controllably, through the ring-flange 49.

The apparatus also comprises a fan 74 shown as of the propeller type and having blades of either a fixed or adjustable pitch, this fan being fixed on the armature shaft 32 preferably at the point shown in the drawings, namely, within the neck ring 20 and thus below the various air passages above referred to.

The fan 74, in the particular construction shown, operates not only to force air upwardly through the opening 34 in the cup member 33, but also to force air outwardly through the passage 68 and the passage over which the vanes 73 extend, it having been found in practice that by forcing air into the cup member 33, to augment the flow of air produced therethrough by the operation of the fan device comprising the vanes 37, and particularly by forcing air through the air passage 68 and the passage across which the vanes 73 extend, that the same effective combustion of the fuel may be effected by a relatively slow speed motor as that produced by a burner construction not employing such supplemental fan and operating at relatively high speed, it being understood that the use of a high speed motor, as compared with a low speed motor, presents many disadvantages certain of which are relatively high cost, noise, and rapid wear.

Furthermore, I have discovered that by providing means supplemental to the fan within the cup 33, for forcing air as above stated, the fuel may be ignited relatively close to the point at which it discharges from the cup in atomized condition, which is of great advantage as it is highly desirable that the ignition means for igniting the fuel be located as close to the atomizer as possible.

The ignition means of the structure shown are represented generally at 75. While such means may be of any desirable construction, the construction shown is preferred it being of the gas pilot type comprising a burner at which a relatively small flame is maintained at all times and a flare burner which when gas is supplied thereto is ignited by the constant pilot and projects, against the fuel issuing from the atomizer, a relatively long, large, flame stream.

The construction of ignition means shown, comprises a member 76 formed of a block 77, a shell 78 of magnetic material secured to the lower end of the block and a second, hollow, member 79 secured to the lower end of the shell, this structure being mounted on the upper end of a post 80 secured to the bed-plate 27. The block 77 contains a chamber 81 into which a pipe 82 leading from any suitable constant source of gas supply, opens, between the top and bottom of this chamber. The block also contains a passage 82 which opens, through a constricted portion 83, into the chamber 81, this passage being equipped with a needle-valve 84 for controlling the amount of gas fed into the passage 82, from which latter it discharges into a gas-pilot tube 85 which extends at its upper end adjacent the atomizer, the pilot tube 85 being shown as surrounded by a sleeve 86.

The ignition means also comprises a flare-jet device 87 shown as in the form of a pipe

88 projecting upwardly above the upper end of the pilot tube 85 with its upper extremity deflected to extend substantially horizontally as represented at 89 and in such position that the gas issuing from the pipe 88 will be directed across the flame at the pilot tube 85 and towards the burner structure, the gas issuing from the pipe 88 becoming ignited by the pilot and in turn igniting the fuel discharged from the burner.

The pipe 88 opens at its lower end into the upper end of a passage 90 in the block 77, the lower end of this passage opening into a passage 91 communicating with the bottom of the chamber 81, with a tapered valve seat 92 therebetween, controlled by a ball valve 93 which when in engagement with the seat 92 closes the passage 90 to the chamber 81.

In the use of oil burner structures in accordance with common practice gas is supplied to the flare-jet 87 only upon the starting of the supplying of oil to the burner, the supplying of gas to the flare-jet being discontinued after ignition of the fuel issuing from the burner, this being commonly effected by mechanism operated automatically upon starting the flow of oil to the burner, and commonly involving an electric valve.

In the arrangement shown, such an electric valve is employed, this valve comprising a solenoid 94 which is located within the shell 78 and is energized by current supplied through the wires 95 and 96 as for example in accordance with common practice; the solenoid 78 containing a sleeve 97 of non-magnetic material in which the core 98 of the solenoid, is reciprocable, the core 98 being connected by a pin 99 with the lower end of a stem 100 secured to, and depending from, the ball valve 93.

From the foregoing description it will be understood that when the solenoid 94 is energized, the valve 93 is raised from the seat 92 and gas thereupon flows to the flare-jet 88 for the purpose above stated.

Provision of the constant pilot and the flare-jet device, together with the valve controlling the supplying of gas to the flare-jet and the controlling mechanism for the valve, as a unitary device, presents considerable advantage over prior structures wherein these elements are not combined, certain of which are compactness of structure, economy and rapidity of installation and simplicity of structure.

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 an oil burner, the combination of a motor, an atomizer open for the passage of

air therethrough and driven by said motor and to which the oil is supplied, members spaced from each other and from said atomizer, and a fan positioned to direct air into and through said atomizer and also through the space between said members and between said members and said atomizer.

2. In an oil burner, the combination of a motor, an atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, members spaced from each other and from said atomizer, and a fan positioned to direct air into said atomizer and also through the space between said members and between said members and said atomizer, and a series of vanes against which the air forced through the space between said members impinges and by which said air is deflected.

3. In an oil burner, the combination of a motor, an atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, members spaced from each other and from said atomizer, and a fan positioned to direct air into said atomizer and also through the space between said members and between said members and said atomizer, and a series of vanes against which the air forced through the space between said members impinges and by which said air is deflected, said vanes extending from the top of said last-referred-to space partway only across said space thereby affording a lateral outlet for air below said vanes.

4. In an oil burner, the combination of a motor, an 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 located adjacent the discharge portion of said atomizer and operating to force atomizing air 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, and a fan operating to supplement said air-forcing element in forcing the air through said atomizer.

5. In an oil burner, the combination of a motor, an 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 located adjacent the discharge portion of said atomizer and operating to force atomizing air 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 said element flow, and a fan driven by said motor and operating to supplement said air-forcing

element in forcing the air through said atomizer.

6. In an oil burner, the combination of a motor, an 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 a fan located adjacent the discharge portion of said atomizer and operating to force atomizing air through said atomizer, a deflector above said fan 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, a member surrounding said atomizer and spaced therefrom, and a fan positioned to direct air into and through said atomizer and also through the space between said atomizer and said member.

7. In an oil burner, the combination of a motor, a cup member having an open bottom and driven by said motor and to which oil is supplied and along the inner surface of the side of which the oil travels upwardly in the rotation of said cup member, a fan in said cup member adjacent the upper edge thereof and operating to force atomizing air through said atomizer, a deflector above said fan and forming with the upper edge of said cup member a laterally opening space through which the oil and the air operated on by said fan flow, and a second fan positioned to force air into said cup member through the bottom thereof and around said cup member for mixture with the atomized fuel discharged from the cup member.

8. In an oil burner, the combination of a motor, a cup member having an open bottom and driven by said motor and to which oil is supplied and along the inner surface of the side of which the oil travels upwardly in the rotation of said cup member, a fan in said cup member adjacent the upper edge thereof and operating to force atomizing air through said atomizer, a deflector above said fan and forming with the upper edge of said cup member a laterally opening space through which the oil and the air operated on said fan flow, and a second fan driven by said motor and positioned to force air into said cup member through the bottom thereof and around said cup member for mixture with the atomized fuel discharged from the cup member.

9. In an oil burner, the combination of a motor, a cup member having an open bottom and driven by said motor and to which oil is supplied and along the inner surface of the side of which the oil travels upwardly in the rotation of said cup member, a fan in said cup member adjacent the upper edge thereof and operating to force atomizing air through said atomizer, a deflector above said fan and forming with the upper edge of said cup member a laterally opening space

through which the oil and the air operated on by said fan flow, a second member surrounding, and spaced from, said cup member, and a second fan positioned to discharge air into said cup member and through the space between said cup member and said second member.

10. In an oil burner, the combination of a motor, an atomizer open for the passage of air therethrough and driven by said motor and to which the oil is supplied, said atomizer rotating about a substantially vertical axis, a fan in said atomizer located adjacent the discharge portion of said atomizer and operating to draw air into said atomizer and discharge it therefrom to atomize the oil, a deflector above said fan 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, and a second fan operating to supplement said first named fan in forcing air through said atomizer.

11. In an oil burner, the combination of a motor, an 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 located adjacent the discharge portion of said atomizer and operating to force atomizing air 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, members spaced from each other and from the atomizer and a fan positioned to direct air into and through said atomizer to supplement said air forcing means and also through the spaces between said members and between said members and said atomizer.

STANLEY PERRY.

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