

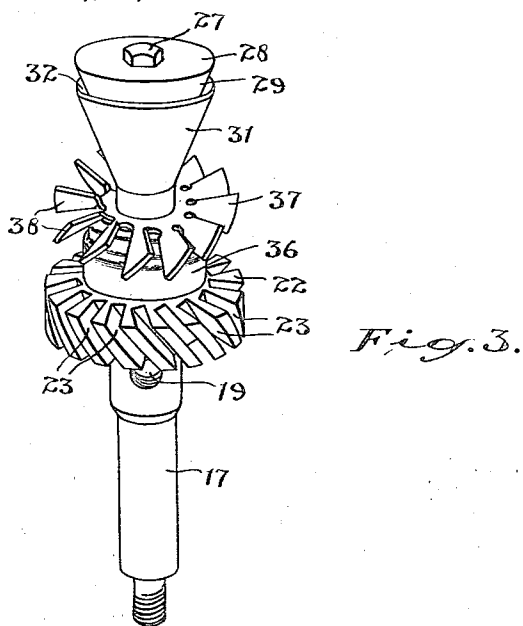
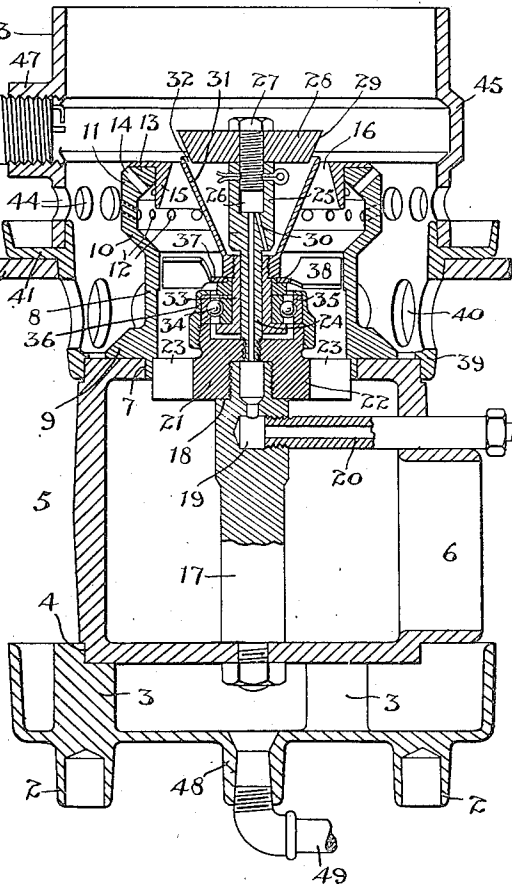
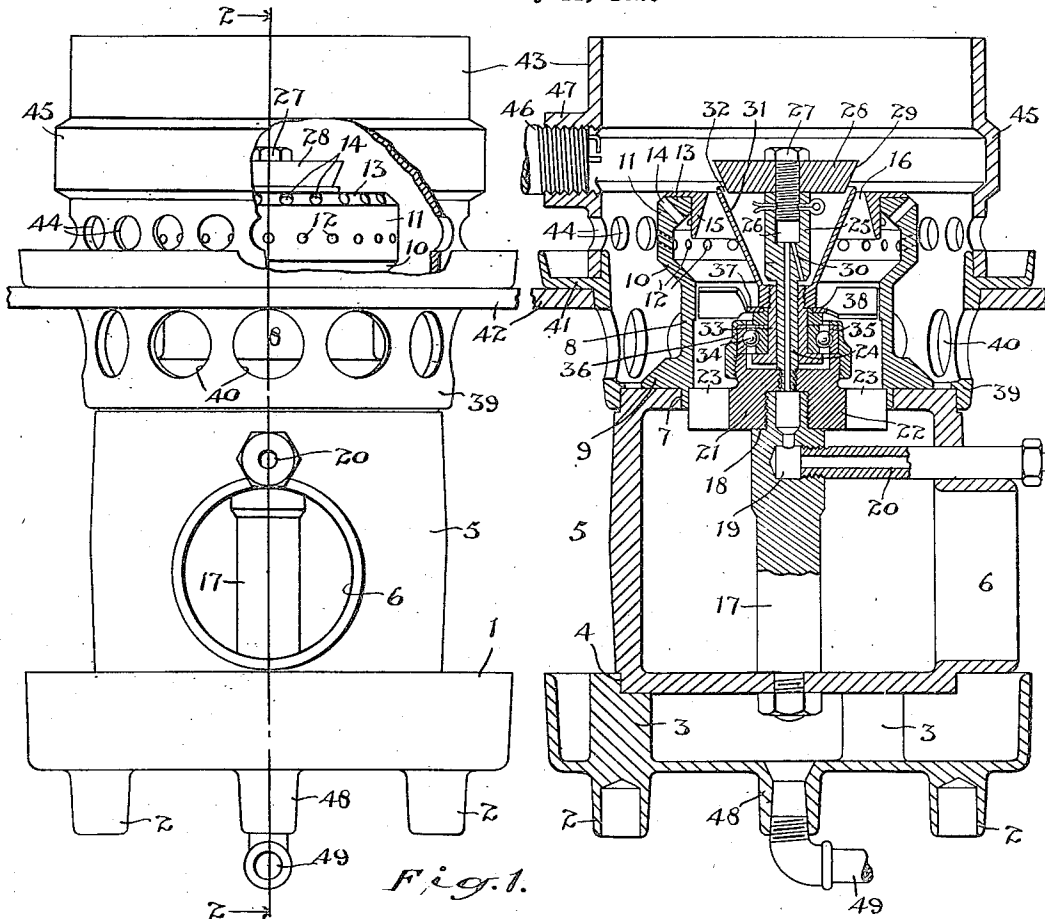
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OIL BURNER

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OIL BURNER.

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The principal objects of the invention are, to accomplish the burning of fuel oil in a very economical manner, utilizing the maximum quantity of air in the combustion of the fuel.

5 A further object is to devise a very simple form of atomizing device which may be readily placed in any furnace.

The principal features of the invention consist in directing a current of air through 10 a tubular passage to rotate the oil spraying nozzle located centrally thereof and to effectively mix the maximum quantity of air with the oil to thoroughly atomize same.

15 A further important feature consists in the novel construction and arrangement of parts, whereby the burner mechanism is rendered easily accessible and may be readily taken apart, thus enabling easy cleansing, or renewal, or repair.

20 A still further important feature consists in the novel construction of the delivery tube whereby coking of the oil thereon is eliminated.

25 In the drawings, Figure 1 is an elevational view of my improved burner, being shown partly broken away.

Figure 2 is a vertical mid-sectional view through the line 2—2 of Figure 1.

30 Figure 3 is a perspective detail of the oil nozzle and the associated air directing member.

35 In the burning of fuel oils it is well understood that there is a very great diversity in the specific gravities and they are all of low volatility.

It is necessary therefore that the oil to be properly burnt must be atomized to a very fine state by some mechanical means. In the present invention this is accomplished by 40 throwing the oil centrifugally in a very small quantity into air moving past the point of delivery at high velocity and having an extraordinary amount of turbulence.

45 In the construction herein illustrated, the cup-shaped base 1 provided with short legs 2 is formed with a plurality of studs 3 projecting upwardly from the bottom and the upper ends of these studs are formed with angular recesses 4 to receive and hold in central loca- 50 tion, the cylindrical casing 5.

The casing 5 is provided with an air inlet 6 in the side wall and has a circular central orifice 7 in the top.

55 A tubular member 8 fitted in the orifice 7 is provided with a flange 9 to rest upon the

top of the casing 5 and toward the upper end is formed with an outward flare 10 leading to a cylindrical portion 11 having a plurality of radial holes 12 therein.

The holes 12 are preferably bored with an 60 upward incline.

An inwardly projecting flange 13 at the top of the member 8 is provided with a row of holes 14 corresponding with the holes 12 and preferably staggered on relation thereto. 65

A flanged ring 15 fits in the upper end of the member 8 and projects below the flange 13 forming an annular recess 16 communicating with the holes 12 and 14, the inner wall of the flanged ring 15 preferably converging 70 upwardly.

A stud 17 shouldered at the bottom end is rigidly secured centrally of the cylindrical casing 5 and is provided with a reduced threaded upper end forming a shoulder 18 75 arranged slightly below the flanged top of the cylindrical casing 5.

The stud is provided with a central orifice 19 communicating with the oil feed pipe 20 which leads through an opening in the side 80 wall of the casing 5.

Threaded upon the upper end of the stud and abutting the shoulder 18 is a member 21 provided with a flanged portion 22 which engages the inner wall of the tubular member 85 8 at the bottom thereof, said wall being slightly countersunk to receive the flange. This flange is mill cut forming a plurality of spirally arranged slots 23 through which the air entering the inlet 6 in the casing 5 90 is directed.

A tubular member 24 is secured centrally in the top of the member 21 and communicates with the central orifice in the stud 17, the opening in the tube being of a small 95 bore.

The upper end 25 of the tube 24 is enlarged and is formed with a chamber 26 which is threaded at the upper end to receive the cap screw 27 which passes through and secures the 100 disc 28 to the top thereof. This disc is formed with a bevelled edge 29.

A small passage 30 leads downwardly from the chamber 26 in the upper end of the tubular member 24 and forms an oil discharge pas- 105 sage into the tapering atomizing cup 31 which surrounds the enlarged upper end 25 of the said tube.

The disc 28 is of slightly smaller diameter than the mouth of the cup at its underside 110

and is slightly larger than the mouth of the cup at the upper side so that the narrow annular opening 32 between the cup and the disc is protected against foreign matter falling into the cup from above and fouling same.

The cup 31 is threaded upon the upper end of a sleeve 33 loosely surrounding the tube 24 and said sleeve is mounted in a ball bearing 34 which bearing is supported on the member 21 carried by the stud 17.

The outer bearing ring 35 is secured to the member 21 by a flanged threaded cap 36 so that the bearing cup may be very easily and quickly removed if desired.

A fan member 37 formed with spirally disposed blades 38, preferably set at the opposite angle to the slots 23 in the flange member 22, are secured to the sleeve 33 above the ball bearing, said fan extending outwardly to the inner wall of the tubular member 8 and rotating freely.

It will be readily seen that when a current of air is directed into the cylindrical chamber 5 that it is directed spirally through the member 8 by the arrangement of the slots 23 and as the fan blades 38 are set at an angle opposite to the angle of the slots 23 the air will impinge against these blades to rotate the fan with the maximum velocity and force. The fan is connected to the ball bearing supported sleeve carrying the oil cup 31 and the oil fed through the passage 30 is thrown outwardly by the centrifugal force and directed upwardly by the shape of the cup and controlled by the annular opening 32 so that it will spread in conical form above the cup.

The inwardly converging wall of the flanged ring 15 forms with the external wall of the oil cup a convergent throat through which a current of air is directed past the mouth of the nozzle formed by the rotating cup 31.

The air passing through the fan 37 is allowed freedom to expand owing to the flaring enlarged portion 10 of the member 8 and a portion of this air escapes through the upwardly inclined radial holes 12 and 14. A cylindrical casing 39 rests upon the top of the casing 5 and is spaced from the outside of the tubular member 8 and has a plurality of holes 40 therethrough through which air may enter from the outside.

The casing 39 is provided with a flange 41 which preferably fits over a horizontal plate 42 within the furnace and a cylindrical casing 43 extends upwardly from the flange 41. This casing is provided with a row of holes 44 which are arranged about opposite the enlarged portion 11 of the member 8 and immediately above the holes 44 the casing is formed with an annular enlargement 45.

An igniting spark plug 46 is introduced into the threaded boss 47 in a line with the annular enlargement 45.

A boss 48 is arranged in the centre of the

base 1 and to this is connected a drain pipe 49 to carry off any oil that may by chance escape from the atomizer without ignition.

In the operation of this device the inlet 6 to the cylindrical chamber 5 is connected to a suitable pressure blower and the oil feed pipe is connected to a suitable oil feed supply.

The oil feeds upward through the tube 24 and out of the passage 30 into the cup 31. The air entering the chamber 5 flows upwardly through the inclined slots in the disc 28 and passing through the tubular member 8 with a spiral swirling motion, it strikes the face of the fan 37 rotating the cup 31 connected with the fan at a high rate of speed. Part of the air flows out through the annular passage surrounding the cup and intercepts the thin film of oil being discharged from the cup, breaking it up and mixing therewith. Part of the air is trapped in the enlarged portion of the tubular member 8 and is projected upwardly and outwardly through the holes 14 and 16. This together with the natural draft in the furnace in which the burner is located draws air through the holes 40 and 44 and the different directions of flow of air from these various openings creates a considerable amount of turbulence so that the oil that is broken up by the first impact of the air flowing around the mouth of the cup is thoroughly mixed with the entire body of air.

The arrangement of the annular enlargement 45 is a very important feature as without this enlargement it is found that the centrifugal action throws the heavier particles in the oil against the wall of the casing and as combustion commences at this particular zone, a coking effect occurs.

By the provision of the annular channel in the inner wall the air rushing upwardly from the lower holes 40 and 44 and forming a pocket in the annular recess which prevents the gathering of the oil particles upon the metal and eliminates coking.

The metal of the casing 43 becomes very hot around the enlargement 45 and the heat thereof is refracted inwardly against the oil being atomized.

A burner such as described forms a small and very compact unit which may be readily placed within a combustion chamber and no operating mechanical connections therewith are required. It is extremely efficient and effects a very thorough atomization and consequently a complete combustion of the oil.

What I claim as my invention is:—

1. An oil burner, comprising the combination with a combustion chamber of a centrifugal oil distributor, a rotary fan secured to said distributor below the same, a tubular casing encircling said oil distributor and terminating immediately below the level of the plane of the distributed oil and enclosing the rotary fan, a second tubular casing spaced

from and encircling the aforesaid casing and extending beyond the discharge end of said oil distributor into the interior of said combustion chamber, means for supplying air under pressure to the interior of the inner casing, circumferentially spaced openings through the wall of said outer casing in a plane immediately below the plane of the distributed oil, admitting a restricted inflow of air from the interior of the combustion chamber into the interior of said outer casing, circumferentially spaced openings in the wall of said outer casing in a plane below the aforesaid openings and admitting a free flow of air from the combustion chamber interior, and means for supplying oil to said centrifugal oil distributor.

2. An oil burner, comprising a rotatable oil distributing cup, means for feeding oil to said cup, a tubular member encircling said cup having an enlarged portion formed with an inturned flange and upwardly directed radial holes through the enlarged portion arranged outside of said inturned flange, a fan member secured to the cup within said tubular member adapted to rotate said cup through the flow of air through the tubular member, and a tubular casing spaced outside of said tubular member and having air openings therethrough, said casing extending beyond the tubular member encircling the cup and effecting the induction of secondary air to encircle the pressure flow.

3. An oil burner, comprising a rotatable oil distributing cup, a rigid support for said oil distributing cup, means for directing a pressure flow of air around said cup, a fan connected to the cup actuated by said flow of air to rotate the cup, a tubular member encircling said support and cup and having an outwardly flaring upper portion provided with outwardly and upwardly inclined radial holes, a flange extending downwardly and inwardly into said outwardly flared portion and forming an annular air passage around said cup and an annular air chamber communicating with said radial holes and directing a portion of the volume of air into said annular chamber and through the radial

holes in the outwardly flared portion of said tubular member and effecting the discharge of air in two distinct directions and an outer casing surrounding said tubular member having air openings therein and receiving the directed air and oil.

4. An oil burner, comprising a rotatable centrifugal oil distributor, a tubular member surrounding said distributor having an enlarged upper end and an inwardly extending flange, said flange forming an air channel surrounding the edge of said distributor, radial holes extending through the enlarged portion of said tubular member in an upward direction, a casing encircling said tubular member and spaced therefrom and having air openings at the bottom leading outwardly past the enlarged portion of said tubular member and having an annular groove in its inner wall adjacent to the upper end of the tubular member, means for directing a flow of air into said tubular member, and means actuated by said flow of air for rotating said cup.

5. An oil burner in combination, a base, a cylindrical casing supported from the bottom of the base and having an air inlet opening in the side, a stud rigidly secured centrally of said casing and extending vertically thereof, a flanged member secured to the top of said stud and having diagonally disposed slots in the periphery of said flange, a ball bearing mounted on said flanged member above the flange, a cup rotatably supported in said ball bearing, a circular fan secured to and rotating with said cup, an oil passage in said stud opening to the top, a hollow stem leading upwardly from the stud through said bearing into said cup and having a discharge orifice, a cap on said stem spaced above the rim of the cup, a tubular member supported from said cylindrical casing and enclosing the diagonally slotted flanged member and fan and cup and forming air discharge passages around the cup at the top, and a cylindrical casing encircling and spaced from the tubular member having openings therein arranged below the top of the tubular member.

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