March 31, 1925. 1,531,959

A. LEFEBVRE

DISTRIBUTING HEAD FOR LIQUID FUEL BURNERS

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Fig. 1.

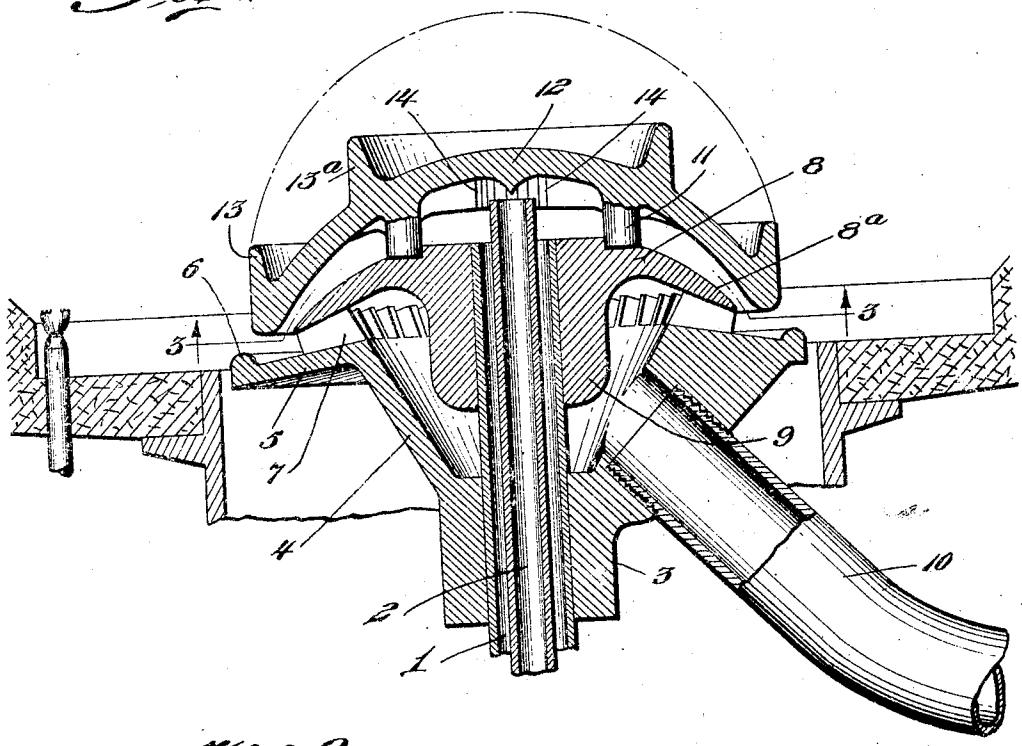
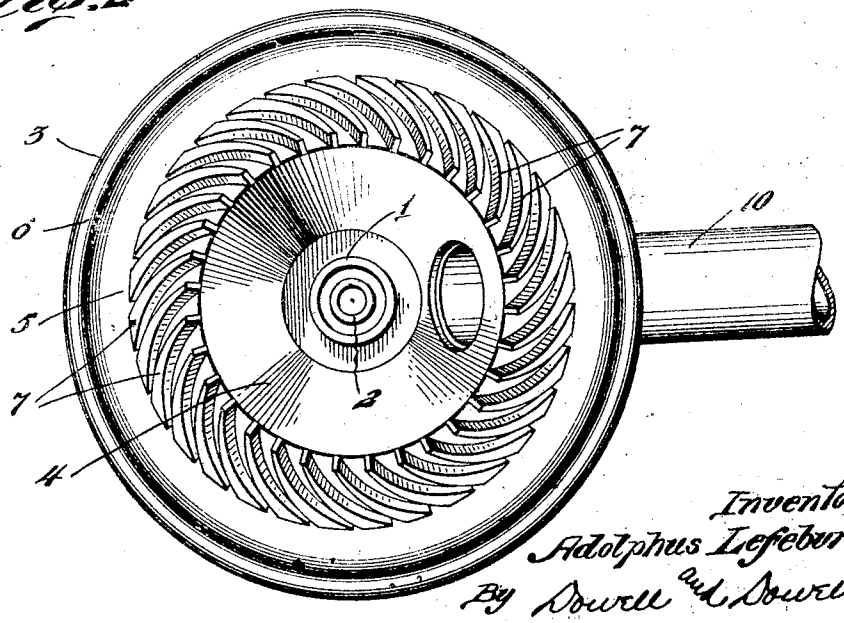


Fig. 2.



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Fig. 3.

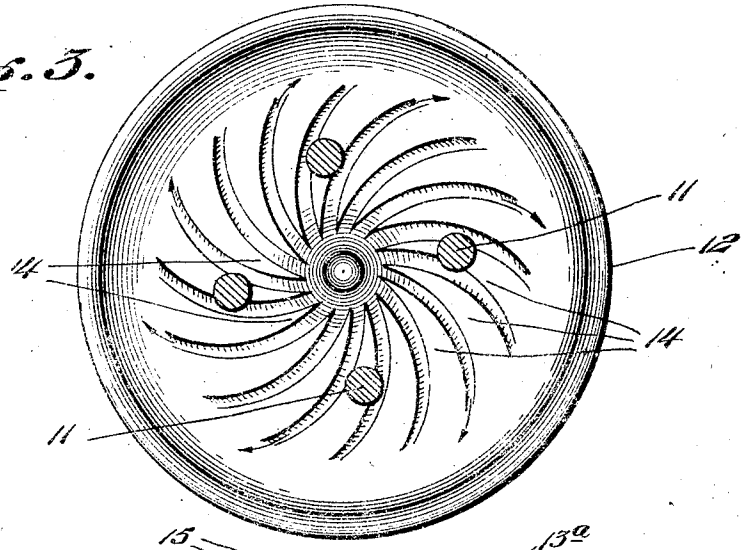


Fig. 4.

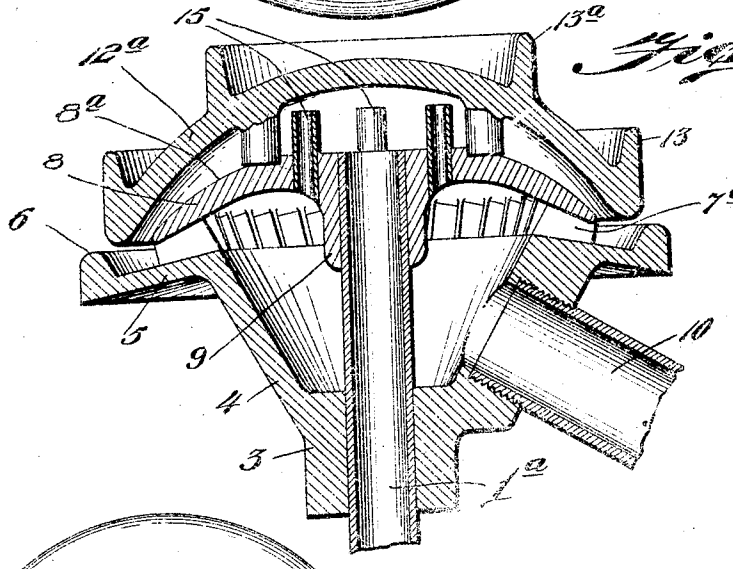
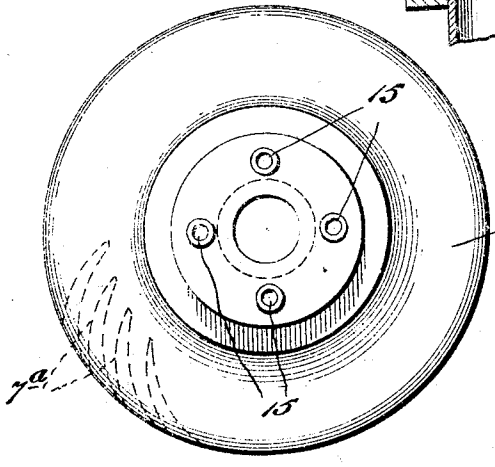


Fig. 5



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Patented Mar. 31, 1925. 1,531,959

UNITED STATES PATENT OFFICE.

ADOLPHUS LEFEBVRE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO JOHN SCHEMINGER, JR., OF PROVIDENCE, RHODE ISLAND.

DISTRIBUTING HEAD FOR LIQUID-FUEL BURNERS.

Application filed April 15, 1924. Serial No. 706,695.

To all whom it may concern:

Be it known that I, ADOLPHUS LEFEBVRE, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Distributing Heads for Liquid-Fuel Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to liquid fuel burners, and more particularly to burners of the blower type, in which the oil is delivered to the distributing head by means of a pump and thrown out from the head by means of a blast of air from a blower.

The objects of the invention are to provide a stationary distributing head designed and adapted to effect an even distribution of liquid fuel over the surface of the head together with means for introducing air in such manner as to produce a swirling motion thereof and thereby impart a swirling motion to the oil as it is delivered into the fire box or combustion chamber, thus facilitating and accelerating the atomization and insuring complete combustion of the atomized oil.

The invention will first be hereinafter more particularly described, with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims at the end of the description.

In said drawings, Fig. 1 is a central vertical sectional elevation of a stationary distributing head embodying my invention and showing adjacent parts of a fire box or combustion chamber;

Fig. 2 is a plan view of the lower members of the distributing head, showing the form and arrangement of an annular series of air distributing vanes;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a central vertical sectional elevation illustrating a modification of the invention; and

Fig. 5 is a plan view of the centrally disposed member of the distributing head of said modified form.

Referring to said drawings, in which the same reference characters are used to denote corresponding parts in different views, my improved distributing head is composed of three annular members mounted on an oil supply pipe 1 within which and suitably spaced therefrom is an air pipe 2, for a purpose hereinafter described. On the oil supply pipe is secured, by any suitable means, the hub portion 3 of a casting which forms the lower member of the distributing head and is constructed with an outwardly flaring annular wall 4 which terminates in a substantially horizontally disposed annular flange 5, having a peripheral bead or rib 6 extending upwardly therefrom and an annular series of air distributing vanes 7 rising from the flange 5 at its junction with the annular upwardly diverging or flaring wall 4; the vanes 7 extend outwardly in curved lines toward the bead or rim 6, resembling in general appearance the vanes of a turbine water wheel. Above the lower member of the head is placed a member 8 having a hub portion 9 secured by any suitable means upon the pipe 1. Said hub 9 extends downwardly into the space around the pipe 1 provided by the flaring wall 4 of the lower member of the head, and said member 8 has an outwardly and downwardly extending circumferential portion 8^a which may rest upon the vanes 7. A main air pipe 10 leads from a suitable source of supply (not shown) through an opening in the flaring wall 4 of said lower member of the head into the air space surrounding the hub 9, and forming an air chamber between said hub and flaring wall which serves to properly distribute the air blast entering said air chamber. A cover-plate 12 of substantially concavo-convex form is mounted upon and supported by the intermediate member 8 and is formed or provided with depending studs 11 for supporting it on the convex surface of the latter member. Said cover-plate is also provided on the upper surface thereof with annular upwardly extending flanges 13 and 13^a suitably spaced to receive and retain therebetween insulating material, such as a pad of fire clay, asbestos or the like. On the under side of the cover-plate 12 are formed or provided an annular series of depending air distributing vanes 14, similar in form to the vanes 7, and arranged to cooperate therewith in effect-

ing the desired distribution of oil and its atomization and admixture with air for delivery into the fire box to support combustion.

In operation, oil conducted through the pipe 1 is distributed and flows downwardly over the upper convex surface of the member 8 of the distributing head and passes therefrom at its periphery where the oil is caught up and forced out by the air entering through the pipe 10 and passing out through the channels formed by and between the vanes in such manner as not only to increase the velocity of the air but also to impart thereto a swirling motion which is calculated to increase the speed of the commingled oil and air as it travels around the combustion ring. Increasing the speed as described also serves to more rapidly complete the circle of combustion initiated by the pilot light located usually at one side of the distributing head, as shown in Fig. 1. The oil delivered upon the upper convex surface of the member 8 is evenly distributed over said surface, by means of air supplied through the pipe 2 from the same source as that which supplies the pipe 10, or a separate source; the air from the pipe 2 being discharged underneath the cover plate 12 so as to impinge upon the under surface thereof from which it is directed downwardly and outwardly in such manner that a swirling motion is imparted thereto by the vanes 14; the oil spread over the convex surface of the member 8 being delivered therefrom with a swirling motion, by means of the air introduced through the pipe 2. By these means an extremely thin and well distributed layer of oil is delivered between an upper and a lower layer of air to which is imparted a rapid swirling motion, which tends to greatly facilitate and accelerate atomization of the oil and also serves to accomplish a complete combustion around the walls of the fire box or combustion ring.

In the modification shown in Figs. 4 and 5 of the drawings, an oil pipe 1^a is used but the air pipe 2 of Fig. 1 is dispensed with, and instead thereof a plurality of short tubes 15 are arranged to extend up through the intermediate member 8^a of the distributing head to within close proximity to the concave under surface of the cover plate 12^a. In this instance the air distributing vanes 7^a are formed integrally with the member 8^a instead of being formed as a part of the lower member, as in Figs. 1 and 2. Furthermore, in such modification the air distributing vanes 14 shown in Figs. 1 and 3 are dispensed with, and the air is caused to impinge upon the smooth under surface of the cover-plate and be thereby directed downwardly upon the convex surface of the intermediate member of the distributing head. Otherwise the construction shown in Figs. 5 and 6 is substantially as described with reference to Figs. 1 to 3 of the drawings.

It will be understood, of course, that various changes may be made in the details and arrangement of parts without departing from the spirit and scope of my invention, and I do not desire to be limited in the appended claims to the specific construction and arrangement shown and described.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A distributing head for liquid fuel burners comprising, in combination with an oil supply pipe, an upper, a lower and an intermediate member mounted upon said pipe; said lower member having a hub portion secured upon said pipe and an upwardly and outwardly flaring annular wall which terminates in a substantially horizontally disposed annular flange, said flange carrying a circular series of curved vanes arranged to provide air channels therebetween; said intermediate member being of substantially concavo-convex form and having a hub portion secured upon said oil pipe and extending downwardly into the air space within the flaring wall of the subjacent member; said upper member being of substantially concavo-convex form and carrying on the under side thereof an annular series of vanes arranged to provide air channels therebetween, means for forcing air into the annular space surrounding the hub of said intermediate member, and means for forcing air into the space between said upper and intermediate members.

2. A distributing head for liquid fuel burners comprising, in combination with an oil supply pipe, upper, lower and intermediate members, said lower member having a hub portion secured upon said pipe and constructed with an upwardly and outwardly flaring annular wall which terminates in a substantially horizontally disposed annular flange, said flange carrying a circular series of curved vanes arranged to provide air channels therebetween; said intermediate member having a hub portion secured upon said pipe and extending downwardly into the space within the flaring wall of the subjacent member, the upper surface thereof being smooth and substantially convex; said upper member being substantially concave on the under side thereof facing the convex surface of said intermediate member and carrying on said under side an annular series of vanes arranged to provide air channels therebetween, an air pipe leading into the annular space surrounding the hub of said intermediate member, and an air pipe leading into the space between said upper and intermediate members of the head.

3. A distributing head for liquid fuel burners comprising, in combination with an oil supply pipe enclosing an air supply pipe, upper and lower and intermediate oil and air distributing members; said lower member having a hub portion secured upon said oil pipe and constructed with an upwardly and outwardly flaring annular wall and a substantially horizontal marginal portion carrying a circular series of curved vanes arranged to provide air channels therebetween; said intermediate member having a substantially convex upper surface and a hub portion secured upon said oil pipe and extending downwardly into an air space within the flaring wall of the subjacent member; said upper member being substantially concave on the under side thereof and carrying on said under side an annular series of curved vanes arranged to provide air channels therebetween, and an air pipe leading into the annular space surrounding the hub of said intermediate member.

4. A distributing head for liquid fuel burners comprising, in combination with an oil supply pipe, upper, lower and intermediate members, said lower member having a hub portion secured upon said pipe and constructed with an upwardly and outwardly flaring annular wall which terminates in a substantially horizontally disposed annular flange, said flange carrying a circular series of curved vanes arranged to provide air channels therebetween; said intermediate member having a hub portion secured upon said pipe and extending downwardly into the space within the flaring wall of the subjacent member, the upper surface thereof being smooth and substantially convex; said upper member being substantially concave on the under side thereof facing the convex surface of said intermediate member and carrying on said under side an annular series of vanes arranged to provide air channels therebetween, an air pipe leading into the annular space surrounding the hub of said intermediate member, and an air pipe leading into the space between said upper and intermediate members of the head; the concave surface of said upper member and the convex surface of said intermediate member converging toward their peripheries.

5. A distributing head for liquid fuel burners comprising, in combination with an upright oil supply pipe, a top-plate of dish-like form inverted having on the under concave side thereof an annular series of air distributing vanes arranged to provide air channels therebetween extending downwardly and converging toward its periphery, a lower member constructed with an outwardly and upwardly diverging annular wall and substantially horizontally disposed peripheral portion carrying an annular series of curved vanes spaced apart to provide air channels therebetween, an intermediate member having a hub portion secured upon said oil supply pipe and extending downwardly into the space within said diverging wall of the subjacent member and having an outwardly and downwardly extending circumferential portion arranged under said top-plate, a main air pipe leading into the annular space surrounding the hub portion of said intermediate member, and an air pipe leading into the space between said top-plate and intermediate member.

In testimony whereof I affix my signature in the presence of two witnesses.

ADOLPHUS LEFEBVRE.

Witnesses:
B. M. OFFUTT,
THOMAS F. BURKE.