G. A. HUMASON.

OIL BURNER.

APPLICATION FILED JUNE 24, 1918.

1,282,232.

Patented Oct. 22, 1918.

2 SHEETS—SHEET 1.

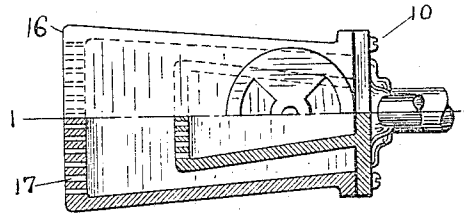


Fig. 3.

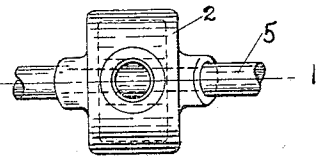


Fig. 4.

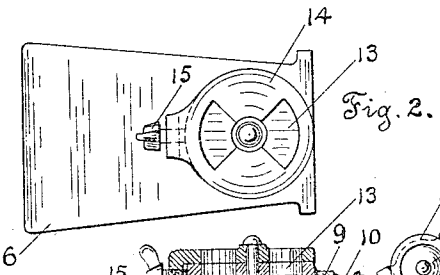


Fig. 2.

Fig. 1

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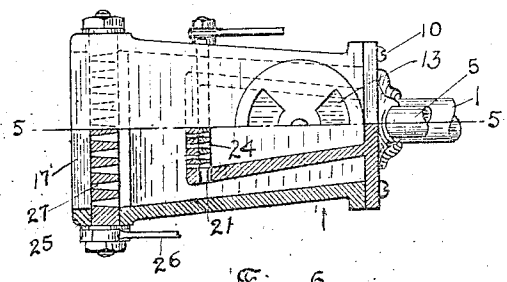


Fig. 6.

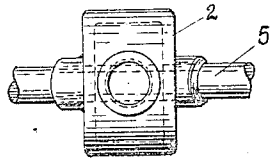


Fig. 7.

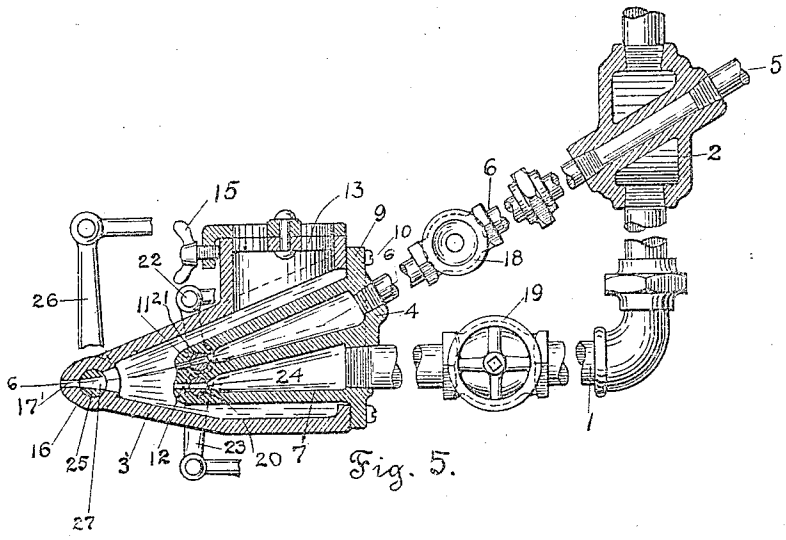


Fig. 5.

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UNITED STATES PATENT OFFICE.

GRANVILLE A. HUMASON, OF HOUSTON, TEXAS, ASSIGNOR OF ONE-HALF TO JOHN W. PARKER, OF HOUSTON, TEXAS.

OIL-BURNER.

1,282,232. Specification of Letters Patent. Patented Oct. 22, 1918.

Application filed June 24, 1918. Serial No. 241,457.

To all whom it may concern:

Be it known that I, GRANVILLE A. HUMASON, a citizen of the United States, residing at Houston, Harris county, Texas, have invented a certain new and useful Improvement in Oil-Burners, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to oil burners and has particular reference to a novel means of spraying oil, or a combination of oil with air or steam, or both air and steam, for the purpose of burning in a furnace.

One object of my invention is to provide a means of spraying the oil whereby the oil will be atomized in contact with air and steam in such manner that the most complete combustion of all oil particles will take place.

Another object is to provide an efficient chamber for properly mixing the oil with air and steam before it is sprayed for burning.

Another object is to provide means of regulating the amount of oil discharged and at the same time to regulate the fineness of the spray.

Another object is to so construct the burner as to permit of convenient disassembling of the parts for cleaning or repair.

Other objects and advantages will more clearly appear in the specification which follows.

Referring to the drawing forming a part of this specification, and wherein like numerals refer to like parts throughout the several views; Figure 1 is a side view, partly in section on line 1—1 of Figs. 3 and 4, of one embodiment of my invention; Fig. 2 is a top plan view of the mixing chamber of my improved burner; Fig. 3 is a similar view, partly in section on line 3—3 of Fig. 1 and with the air regulating means removed; Fig. 4 is a top plan of the oil heating chamber; Fig. 5 is a view similar to that shown in Fig. 1, illustrating a modified form of nozzle for the discharge of the oil; Figs. 6 and 7 are views similar to Figs. 3 and 4 but showing the embodiment illustrated in Fig. 5.

In the practice of my invention I have contemplated projecting steam and oil into a chamber where they will be mixed intimately in combination with air and forced outwardly through a nozzle in atomized and partly gaseous condition into contact with the fire and thus produce complete combustion. The oil is given a preliminary heating by contact with the steam pipe before entering the mixing chamber and the steam itself is superheated. In Fig. 1 I have shown the steam-pipe 1, leading from a steam boiler and superheater, not shown, through a small heating chamber 2 to the mixing chamber 3′. The steam enters an interior nozzle 7 in said chamber 3′, whereby it is spread out through small openings 12 into a fan shaped sheet for better mixing with the oil. The oil is forced from an oil tank and pump thereon, not shown, through the pipe 5 and the heating chamber 2 where it comes into contact with the steam from pipe 1 and is thereby heated somewhat. From this chamber it is conducted under pressure through pipe 6 to a nozzle 4 in the mixing chamber 3′. The two nozzles 4 and 7 are preferably made in one integral casting shaped as shown in the drawing. This casting fits into an opening 8 in said chamber and has lateral flanges 9 thereon by means of which it overlaps the margins of said opening and is secured in place by screws 10 or other similar means upon said chamber 3′. The two integral nozzles 4 and 7 are arranged to converge at the point of exit into the chamber 3′. The oil issues from the nozzle 4 into the mixing chamber 3′ through fine openings in 11 in a fan-shaped spray in the same manner as does the steam.

Air finds an inlet into the mixing chamber through sector shaped openings 13 in the top of the chamber. Pivoted rotatably upon the top of said chamber is a valve slide 14, having openings therein adapted, when properly adjusted, to register with the openings 13 in said chamber. A small thumb screw 15 serves to retain said valve in adjusted position. By means of this valve the amount of air supplied to said chamber may be regulated as desired in an obvious manner.

The mixing chamber 3′ is widened somewhat and flattened at the forward end thereof, as shown at 16, and has a series of small openings 17 through which the oil and steam are projected in atomized condition into the furnace. The mixing chamber is adapted for placing at a point just inside

the furnace. The pipes 1 and 6 outside the furnace are provided with hand operated valves 19 and 18 upon the steam and oil pipes, respectively, for the purpose of regulating the amount of each to be delivered to the furnace.

By means of this structure the oil before entering the mixing chamber 3′ is heated on its way by being conducted through the chamber 2 in contact with the steam pipe, 1. It is then forced through the spray nozzle 11 in a fine spray into the chamber 3′. It here comes in contact with the sheet of superheated steam from the nozzle 12. The steam and oil mix at a point in front of the said nozzles 11 and 12 and the oil spray, by contact with the steam, is heated to such a temperature as to be partially volatilized. The force of discharge of the oil and steam into the mixing chamber 3′ carries the mixture through the nozzle 16 in a highly inflammable condition into the furnace. The force of exit creates a suction of air into the mixing chamber through the openings 13 and thus supplies a further amount of oxygen for the purpose of complete combustion of the mixture.

In the modification shown in Figs. 5 to 7 inclusive, I have shown a means of regulating the quantity of material being sprayed as well as to secure a finer atomization of the said materials. At the points 12 and 11 on the interior steam and oil nozzles, respectively, where the said steam and oil are projected into the mixing chamber, I have provided rotatable cylinders 20 and 21. These cylinders are seated transversely of the two nozzles and have transverse holes 24 in each cylinder. Each cylinder acts as a sort of valve and is rotatable in its seat, being rotated by means of the jointed levers 22, 23 attached thereto in such manner as to be regulated from outside the furnace. When one of said cylinders is turned so that the holes 24 register with the line of openings, 11 or 12, as the case may be, the steam or oil will pass directly out unobstructed. But when the cylinder is rotated to constrict the opening the amount of fluid passing out is decreased in the degree in which the opening is thereby constricted.

The outer nozzle 16 is also provided with an interior cylindrical valve 25 regulated by the hand lever 26 extending back to the outside of the furnace. This cylinder is rotatable in its seat within said nozzle and has a series of openings 27 therein, said openings being tapered from the inside toward the outside of the nozzle and adapted to register with the opening 17′. This opening 17′ is a slot extending transversely of the nozzle 16. By this means it is obvious that the rotation of the cylinder 25 by the lever 26 will direct the openings 27 either upwardly or downwardly at will. If said cylinder is thus rotated the mixture of steam, air and oil will at first be projected in a direction inclined to the walls of the slot 17′ and will thus strike one of said walls at an angle and be deflected and further broken up and the atomization thereof increased. As the rotation of the valve is continued, however, the openings 27 will be constricted or entirely closed as desired.

This sort of valve has the advantage of being adapted to increase the atomization as desired and also to decrease the amount of material used according to the needs of the furnace.

My aim in constructing my improved nozzle has been to make the structure as simple and durable as possible and at the same time easy of access for cleaning or repair. The whole exterior of the chamber 3′ may be detached from the integral spray nozzles 4 and 7 and cleaned by simply removing the screws 10. The pipes 1 and 6 may be unscrewed from the nozzles 7 and 4, respectively, and thus said nozzles may also be removed for repair or cleaning at will. The parts are thus simple, compact and easily adjustable.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:

1. In an oil burner, a steam inlet pipe, an oil inlet pipe, means outside said burner to heat said oil pipe, a flattened fan-shaped nozzle on said oil pipe, a similar nozzle for said steam pipe below said oil nozzle, a mixing chamber outside said nozzles, and a horizontal series of exit openings for the mixture from said chamber.

2. In an oil burner, an oil nozzle, a steam nozzle integral therewith, said nozzles so inclined as to converge toward the point of exit of the materials therefrom, a mixing chamber outside said nozzles, means of supplying air to said chamber, and a means of exit from said chamber comprising a series of alined openings therein.

3. In an oil burner, a mixing chamber, oil and steam nozzles adapted to spray oil and steam into said chamber, said nozzles having adjustable openings leading therefrom, a spray nozzle on said mixing chamber and adjustable means for said last named nozzle.

4. An oil burner, comprising an outer chamber, an interior oil and steam nozzle detachable therefrom, an adjustable air inlet to said chamber and a nozzle leading from said chamber, said nozzle having a longitudinal slot, a perforated cylinder inside said chamber and adapted to coöperate with said slot to increase the atomization of materials and to act as a closure for said nozzle.

5. A spray nozzle for an oil burner comprising a chamber, a constricted perforated portion thereon, a valve in said perforated portion adapted to direct the material to be

sprayed at an angle to the walls of said perforated portion and to limit the amount of material sprayed.

6. In an oil burner, a mixing chamber, oil and steam pipes leading into said chamber, nozzles on said pipes within said chamber, valves in said pipes and in said nozzles, means for heating the oil outside said chamber, and a spray nozzle leading from said chamber.

In testimony whereof, I hereunto affix my signature this the 19th day of June, 1918.

GRANVILLE A. HUMASON.