J. A. MAHR.

OIL BURNER.

APPLICATION FILED JULY 14, 1909.

945,967. **Patented Jan. 11, 1910.**

Fig. 1

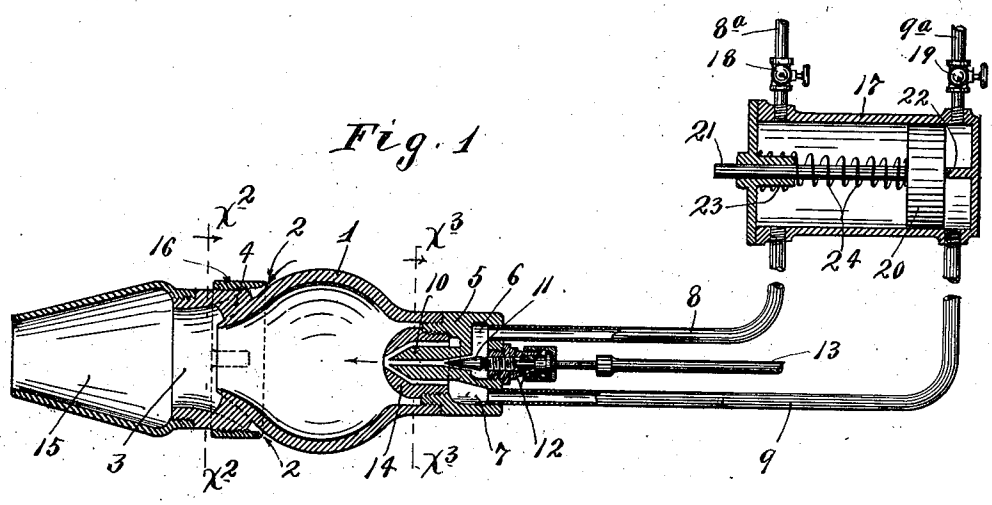


Fig. 2

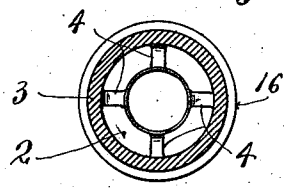


Fig. 3

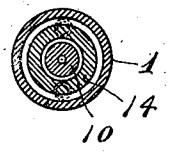
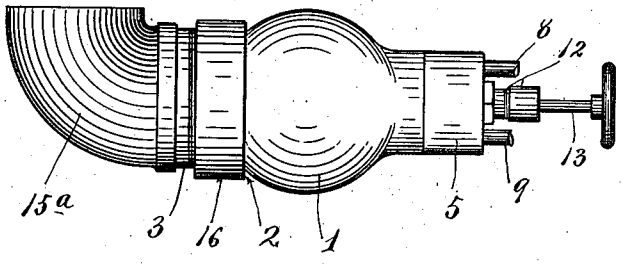


Fig. 4



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UNITED STATES PATENT OFFICE.

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OIL-BURNER.

945,967. Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed July 14, 1909. Serial No. 507,531.

To all whom it may concern:

Be it known that I, JULIUS A. MAHR, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Oil-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.

My invention has for its object to provide an improved oil burner especially adapted for use in burning crude oil, and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view in vertical section, showing the improved burner; Fig. 2 is a transverse section taken on the line x^2 x^2 of Fig. 1; Fig. 3 is a transverse section taken on the line x^3 x^3 of Fig. 1; and Fig. 4 is a plan view of the burner, showing a modified form of the nozzle applied thereto.

The main body portion of the burner is in the form of a shell 1, which constitutes the primary combustion chamber and is open at its outer end. Cast integral with the discharge end of this shell 1, and spaced apart therefrom to form an air intake passage 2, is a nozzle coupling 3 which, as shown, is connected to the said shell 1 by integrally cast radial fins 4. A valve casing 5 is screwed into the other end of the shell 1 and this valve casing is formed with an oil chamber 6 and with an air chamber 7. The air chamber 7 nearly but not quite surrounds the oil chamber 6 and the said chambers 6 and 7 are connected to the delivery ends of oil and air supply pipes 8 and 9, respectively. The valve casing 5, as shown, is provided with an integrally cast hollow discharge nipple 10 that leads into the primary combustion chamber formed within the shell 1, directly from the oil chamber 6. The passage through this oil discharge nipple 10 is adapted to be opened and closed by a needle valve 11, the stem of which has threaded engagement with a stuffing box sleeve 12 which, as shown, is screwed into the outer end of the valve casing 5. The extended end of the valve stem 11 is connected to an operating rod 13 which extends to a suitable point from which it is desired to operate the valve. An air discharge nipple 14 surrounds the oil discharge nipple 10 and, as shown, is screwed into the inner end of the valve casing 5. With this arrangement, the oil delivered by the nipple 10 will be taken up by the surrounding blast of air delivered by the nipple 14 and will be thrown into a very fine spray within the primary combustion chamber, also the initial combustion will take place within this primary combustion chamber, to-wit, within the shell 1.

A large discharge nozzle 15 is connected, preferably by threaded engagement, to the outer end of the coupling nozzle 3. In the construction shown in Fig. 1, this discharge nozzle 15 has a straight axis, but is contracted toward its rear end. In the construction shown in Fig. 4, which is otherwise like that above described, the discharge nozzle 15^a is curved, so that it delivers at one side. In either instance, the blast of air delivered into the primary combustion chamber from the nipple 14 will produce a strong force draft which will draw a large amount of air into the nozzle 15 or 15^a so that increased combustion will take place within the said nozzle, due to the additional supply of oxygen afforded by the auxiliary current of air drawn in through the annular air intake passage 2. The flame will, of course, be discharged from the said nozzle.

To regulate the amount of air taken in through the annular auxiliary air intake passage 2, a valve or gate in the form of a collar 16 is mounted for lateral movements on the nozzle coupling 3 and preferably has threaded engagement therewith. As is obvious, when the collar 16 is screwed rearward into engagement with the shell 1, the auxiliary supply of air will be entirely cut off, while the said passage 2 may be opened up to any desired extent by adjustments of the said collar away from the shell 1 and toward the nozzle 15. By such adjustments, exactly the right amount of air may be supplied which is required to perfect the best combustion of oil.

While especially designed for burning crude oil, the burner may be used for burning very different kinds of hydrocarbons. Oil or air will preferably be delivered to the burner through the respective pipes 8 and 9 from suitable sources of supply under the same pressure.

To prevent dripping of oil after the burner has been turned out of action and the further supply of oil or air thereto are cut off, I provide a novel device which constitutes one feature of this invention. This device is preferably constructed and involves a cylinder 17, to the opposite ends of which the pipes 8 and 9 are connected, and to the corresponding ends of said cylinder oil and air supply pipes 8^a and 9^a are connected. These supply pipes 8^a and 9^a are provided, respectively, with valves 18 and 19. Working within the cylinder 17 is a piston 20, the stem 21 of which, as shown in Fig. 1, works through the lefthand head of the cylinder 17. A stop projection 22 on the righthand head of the cylinder limits the movement of the piston toward the right and a hub 23 on the lefthand head of the cylinder limits the movements of the said piston toward the left. A light coiled spring 24, which surrounds the piston stem 21, yieldingly presses the piston 20 toward the right. This spring 24 is of such light tension that when oil and air are turned into the opposite ends of the cylinder under the same pressure, the piston will be moved toward the left against the tension of said spring, due to the greater effective area of the piston on the righthand side than on the left, it being, of course, understood that the diameter of the piston rod 21 is subtracted from the total area of the piston on its lefthand side. Hence, when the burner is in action, the piston 21 will be as far toward the left as permitted by the hub 23, but cannot close the oil pipe 8—8^a. When, however, the air and oil are cut off by closing the valves 18 and 19, the spring 24 will move the piston 20 back to its extreme position toward the right, thereby causing the said piston to draw back into the cylinder oil which has been delivered into the pipe 8, chamber 6 and discharge nipple 10. This prevents oil, after the burner has been turned out of action, from dripping and flooding the air discharge nipple 14 and chamber 7 or from running into the primary combustion chamber. From a broad point of view, a diaphragm and casing might be used instead of the cylinder and piston, although the cylinder and piston are preferred for several reasons, but chiefly for the reason of their large oil containing capacity.

The improved burner above described has been put into actual use and found highly efficient for the purposes had in view.

What I claim is:

1. In an oil burner, the combination with a casing constituting a primary combustion chamber, of a secondary combustion chamber connected to the delivery end of said casing, an approximately annular air intake passage between the two combustion chambers, means for delivering both oil and air into the receiving end of said primary combustion chamber and an annular valve mounted on said combustion chambers for longitudinal movement for opening and closing said air intake passage, substantially as described.

2. In an oil burner, the combination with a shell constituting a primary combustion chamber, of means for delivering oil and air into the receiving end of said shell, an annular nozzle coupling connected to the delivery end of said shell but spaced apart therefrom to afford an annular air intake passage, a collar mounted for lateral movements on said nozzle coupling to open and close said auxiliary air intake passage, and a discharge nozzle connected to said nozzle coupling and constituting a secondary combustion chamber, substantially as described.

3. In an oil burning device, the combination with oil and air delivery conduits, of a cylinder through which both the air and oil are delivered to said conduits, a yieldingly pressed piston in said cylinder having a stem working through said cylinder on the oil containing side thereof and operating when the oil and air are cut off to draw oil back into said cylinder from the delivery portion of said oil conduit, substantially as described.

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

JULIUS A. MAHR.

Witnesses:
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