A. M. BAIRD & H. D. PALMER.

OIL BURNER.

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1,111,520.

Patented Sept. 22, 1914.

Fig. 1.

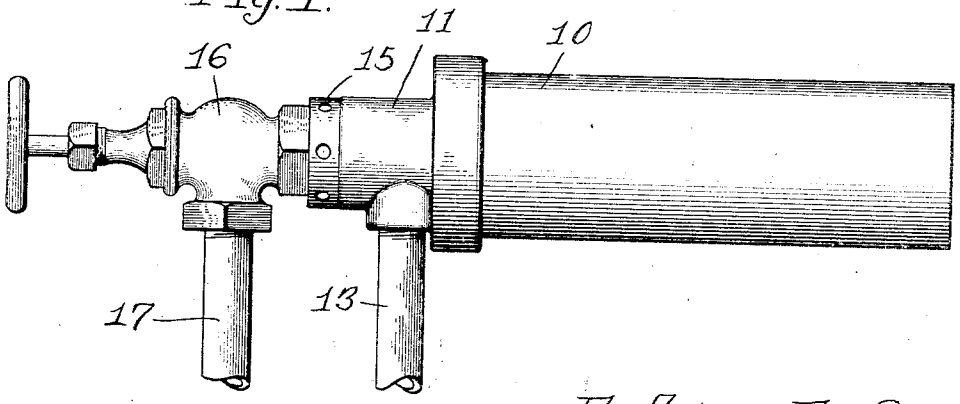


Fig. 5

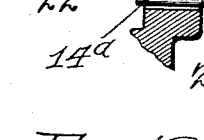


Fig. 6

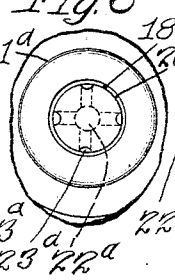


Fig 7

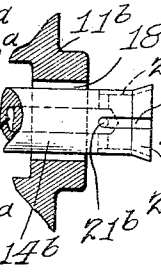


Fig. 8.

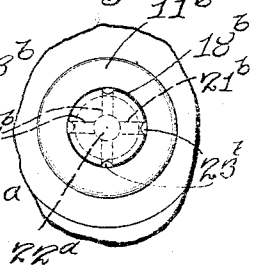


Fig. 2.

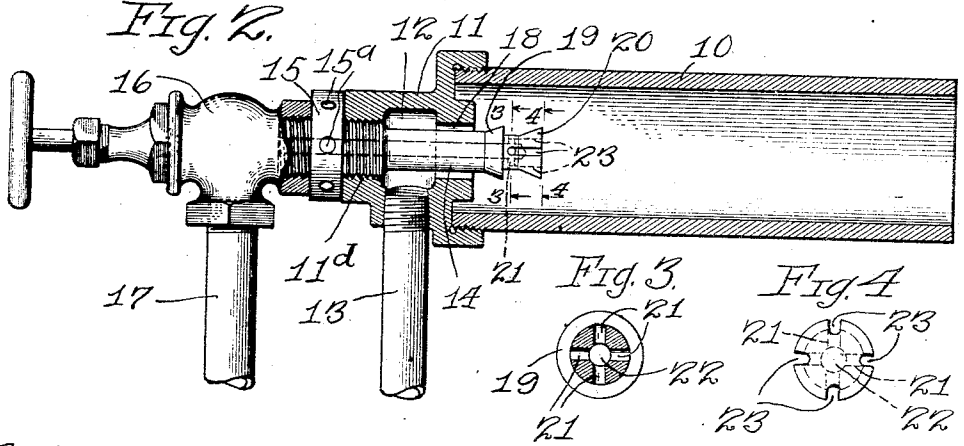


Fig. 3.

Fig. 4

Witnesses:
L. B. Graham
R. E. Wighton.

Inventors,
Archie M. Baird
Harvey D. Palmer,
By Hiddman Strath
Attys

UNITED STATES PATENT OFFICE.

ARCHIE M. BAIRD AND HARVEY D. PALMER, OF TOPEKA, KANSAS.

OIL-BURNER.

1,111,520. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed January 7, 1914. Serial No. 810,707.

To all whom it may concern:

Be it known that we, ARCHIE M. BAIRD and HARVEY D. PALMER, citizens of the United States, and residents of Topeka, in the county of Shawnee and State of Kansas, have invented a certain new and useful Improvement in Oil-Burners, of which the following is a description, reference being had to the accompanying drawing, which forms a part of our specification.

Our invention relates to oil burners adapted for use in connection with furnaces, rivet forges, and the like, wherein crude oil is intended to be used to produce a blow pipe flame suitable for heating metal, such as rivets, boiler plates and the like.

The object of the invention is to produce a burner whereby an intense flame may be obtained and the flame directed against a small surface or area; the burner being of the class wherein oil and air are thoroughly mixed; the construction being such that the oil will be entrained with a jet or stream of air under pressure, the oil being finely divided thereby, so as to cause thorough atomization of the oil, thus affording a hydrocarbon mixture especially adapted for heating purposes, without, however, involving the serious objections that are encountered in constructions wherein the oil is forced, either under pressure or by gravity, into the burner.

In the present construction, the oil is lifted or brought into the burner or mixing chamber by means of vacuum or suction induced by the particular manner of delivering and deflecting the air in the mixing chamber relative to the oil delivery to the chamber, thus providing a burner which will be absolutely safe in manipulation and the danger through the improper spreading or throwing of the oil entirely eliminated.

In the drawing:—Figure 1 is a side elevation of our improved burner. Fig. 2 is a longitudinal sectional view of the burner with the conduits and valve shown in elevation. Fig. 3 is a detail sectional view taken on the line 3—3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is a detail view or end elevation taken on the line 4—4 of Fig. 2 and looking in the direction of the arrows. Fig. 5 is a detail and partial sectional view of a modified form of burner tip or nozzle. Fig. 6 is a front elevation thereof. Fig. 7 is a detail sectional view of another modified form of nozzle which is shown in elevation. Fig. 8 is a front or end elevation of the same.

In the particular exemplification of our invention as illustrated in the drawing, the burner consists of the body portion or mixing chamber 10, preferably made cylindrical in shape and open at one end, as very clearly shown in Fig. 2; while the other or opposite end is closed by the sleeve member 11, which may screw onto the end of member 10, as clearly shown in Fig. 2. The sleeve member 11 is provided with a chamber 12, with which the air supply conduit 13 communicates.

One end of the sleeve member 11 is shown internally threaded at 11^b to receive the threaded end of nozzle 14. The nozzle 14 is preferably shown provided with a flange 15 whereby the nozzle may be screwed into and out of member 11. The flange 15 is shown circular, although it may be given any desired shape that will permit it to receive a wrench; in the construction illustrated, where it is shown circular, we have provided the flange with a number of holes as at 15^a whereby purchase on the flange may be obtained in screwing the nozzle up tightly into place. The threaded end of the nozzle is extended beyond the flange 15 in order that it may screw into one end of the angle valve 16, which valve also receives a suitable oil supply pipe or conduit 17; the flow from pipe 17 and through nozzle 14, is controlled by the valve 16.

The chamber 12 of member 11 communicates with the main portion or mixing chamber 10, preferably by means of an opening 18. This opening 18 is made of a sufficient size to permit nozzle 14 to extend therethrough and still allow communication between the chamber 12 and member 10 as very clearly shown in Fig. 2.

The outer end or tip of nozzle 14, in the preferred construction illustrated in Fig. 2, is provided with a pair of shoulders or flanges 19 and 20, the sides whereof toward chamber 12, are tapered or beveled so as to produce a gradual deflecting surface as shown in Fig. 2; the flange or shoulder 20 being at the immediate tip or end of the nozzle. Intermediate of the flanges or shoulders 19 and 20, the nozzle is preferably provided with a number of radially disposed openings or ports 21 which communicate with the longitudinally disposed passage 22, whereby the oil passing through

nozzle 14 will be discharged in a number of small streams or jets; it being understood that the longitudinally disposed passage 22 does not extend beyond the ports 21. The shoulder 20 is provided with grooves or channels 23 which extend longitudinally of the nozzle and communicate with the radially disposed ports 21; the channels 23 preferably corresponding in number with the number of ports 21.

In Figs. 5 and 6, we illustrate a modified form of the nozzle 14^a, wherein it is provided with the radially disposed ports 21^a which communicate with the longitudinal passage 22^a and with the grooves or channels 23^a; the nozzle in this construction, however, is not provided with the shoulders 19 and 20. In Figs. 7 and 8, we illustrate still another modified form of the invention wherein the nozzle 14^b has longitudinal passage 22^a which terminates in the radially disposed ports 21^b, somewhat removed from the tip or end of the nozzle as in the previous constructions; and the outer end or tip of the nozzle is provided with the grooves or channels 23^b which connect with the ports 21^b, as in the previous constructions. In the modification shown in Figs. 7 and 8, the tip of the nozzle is shown provided with a single shoulder 20^a of slightly less width than shoulder or flange 20 in Fig. 2. The shoulders or flanges on the nozzle in the various constructions, however, are of such diameter that they may pass through the opening 18 in member 11 when the burner is assembled.

It is evident from the constructions shown and described that the air under pressure from a suitable source of supply is allowed to flow through conduit 13 into chamber 12 and thence through the opening 18 surrounding the nozzle 14: the valve 16 is then opened so that communication may be established through conduit 17 with a suitable supply of oil or liquid fuel. The air rushing through opening 18 and around the end of nozzle 14, and therefore above the ports, will induce a vacuum or suction effect which will entrain or cause the oil to be drawn up through conduit 17, valve 16, and through nozzle 14, and be forced along the channels 23 and become thoroughly mixed with the air in mixing chamber 10.

In the preferred construction shown in Fig. 2, a considerable portion of the air is deflected by the flange or shoulder 19 and insures a better flow of the oil, while a portion of the air will come into contact with the sloping or beveled surface of shoulder 20 and by reason of the beveled surface be induced to move in a lateral direction intermediate the channels 23, thus causing a somewhat circulatory action and inducing a thorough atomization of the oil whereby the chamber 10 will be filled with a fine mixture of highly combustible nature. The quantity of oil lifted, of course, may be regulated through the manipulation of valve 16.

The relation between chamber or member 10 and the tip or end of nozzle or member 14, and the location of the radial ports 21, is such, that the air discharged through opening 18 may expand without, however, causing back pressure in the radially disposed ports 21, which would, of course, prevent the oil being lifted.

It is evident from the construction shown and described that not only a complete atomization of the oil is obtained, but a burner produced which is absolutely safe in manipulation because the air and oil supplies are absolutely independent of each other; and if, for any reason, the flow of one medium is interfered with, not only will combustion immediately cease, but lifting of the oil prevented, so that the danger of oil coming into contact with the heated portions of the burner or furnace is made impossible.

We have shown and described what we believe to be the simplest and best forms of the invention, but it is apparent that slight modifications may be made without, however, departing from the spirit of the invention, and we do not wish to be understood, therefore, as limiting ourselves to the exact constructions shown and described.

What we claim is:—

1. An oil burner, comprising a mixing chamber open at one end, an oil supply pipe and an air supply pipe, the air being under pressure, both of said pipes being in communication with the closed end of said chamber, the oil supply pipe extending into said chamber slightly beyond the end of the air supply pipe and having its inner end provided with radially disposed ports a distance removed from the inner end thereof, said ports terminating in longitudinally disposed channels arranged beneath the normal surface of said oil supply pipe, so the oil will be drawn into the mixing chamber through the action of the air discharged therein.

2. An oil burner, comprising an elongated member open at one end, while the other end is provided with an air-receiving chamber opening into said member, conduits leading respectively from an oil supply and an air supply, the latter supply being under pressure, the air conduit being adapted to discharge the air into said chamber, and a nozzle connected with the oil conduit and extending through said chamber and into the closed end of said chamber, said nozzle being provided with radially extending ports terminating in longitudinally disposed channels extending to the tip of the nozzle whereby the oil is delivered in small streams or jets, the end of the nozzle being formed to deflect the air away from said

nozzle and cause the oil to be entrained thereby.

3. An oil burner, comprising a comparatively large mixing chamber open at one end, conduits leading respectively from an oil supply and an air supply, the latter being under pressure, the air conduit being adapted to deliver the air in an annular jet at one end of said chamber and about the oil conduit, while the oil conduit extends into said chamber slightly beyond the point of air delivery, with the delivery end of the oil conduit provided with radially disposed ports terminating in longitudinally disposed channels extending to the tip of said oil conduit.

4. An oil burner, comprising a comparatively large mixing chamber open at one end, conduits leading respectively from an oil supply and an air supply, the latter being under pressure, the air conduit being arranged to deliver the air in an annular jet at one end of said chamber and about the oil conduit, while the oil conduit extends into said chamber slightly beyond the delivery end of the air conduit, the delivery end of the oil conduit being provided with radially disposed ports, and means surrounding the oil conduit whereby the air is deflected at the rear of the point of discharge of said oil conduit so as to cause the oil to be entrained thereby.

5. An oil burner, comprising a mixing chamber open at one end, conduits leading respectively from an oil supply and an air supply, said conduits being concentrically arranged so that the air is delivered into the closed end of the mixing chamber in an annular stream or jet, the oil conduit extending beyond the air conduit whereby the oil is delivered at a point beyond the delivery of the air into the mixing chamber, the end of the oil conduit being provided with a number of radially arranged ports at a point removed from the inner end of said conduit and with a radially disposed flange arranged intermediate of said ports and the delivery end of the air conduit whereby the air is deflected away from said ports and the flow of oil induced thereby.

6. An oil burner, comprising a mixing chamber open at one end, conduits leading respectively from an oil supply and an air supply and arranged to deliver the oil and air at the closed end of said chamber, the conduits being arranged concentrically so that the air will be delivered in an annular jet about the delivery end of the oil conduit, while the oil conduit extends into the chamber slightly beyond the delivery end of the air conduit and is provided with a series of deflecting surfaces spaced apart and with a number of discharge openings arranged intermediate of said deflecting surfaces whereby the oil is induced to flow into said mixing chamber through the action of the air.

7. An oil burner, comprising a mixing chamber open at one end, means communicating with a combustion-sustaining medium under pressure and arranged to discharge the same at the closed end of the mixing chamber, and an oil delivery nozzle arranged concentrically with said means and extending into said chamber a short distance beyond the delivery point of said means, said nozzle being provided with radial ports arranged perpendicular to the discharge end of said means and with longitudinally disposed channels intermediate of the ports and the end of the nozzle whereby the oil is induced to flow into said mixing chamber through the action of the air.

ARCHIE M. BAIRD.
HARVEY D. PALMER.

Witnesses:
JOHN HEIM,
F. K. CLARE.