J. B. ANDERSON.

OIL BURNER.

APPLICATION FILED NOV. 3, 1917.

1,306,458. Patented June 10, 1919.

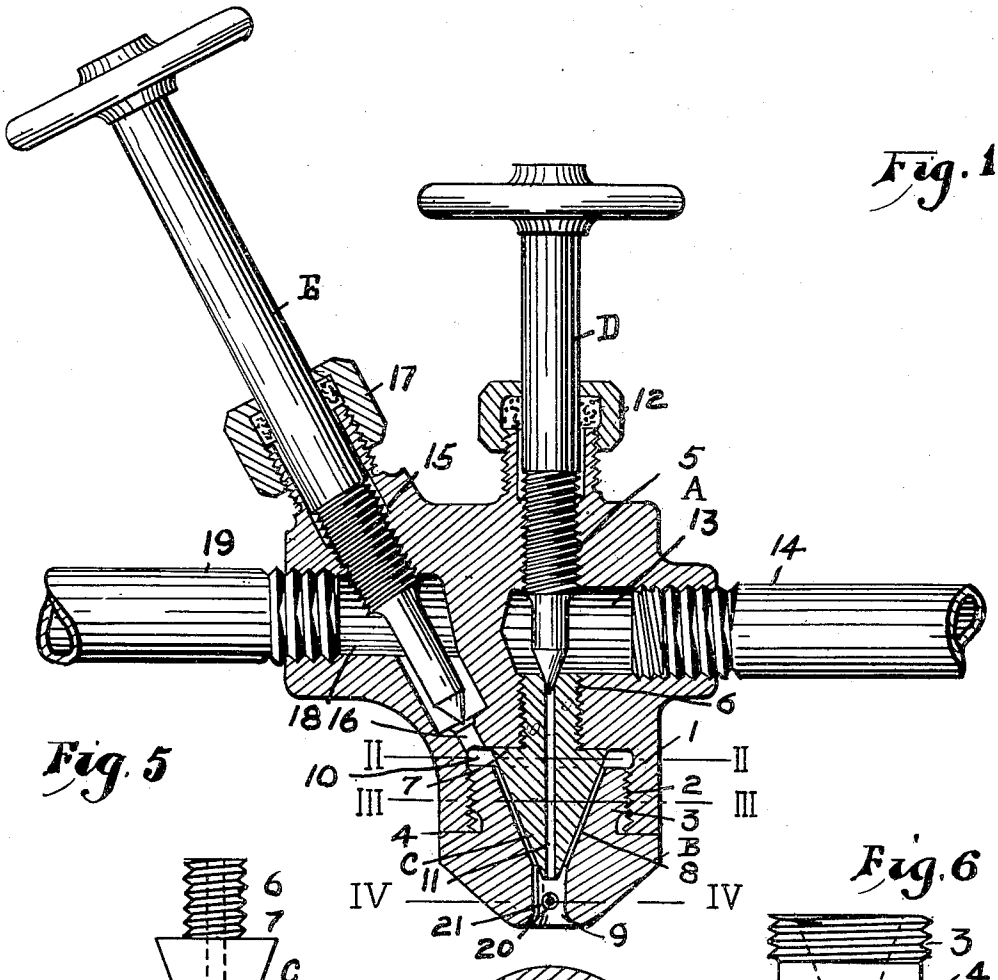


Fig. 1

Fig. 5

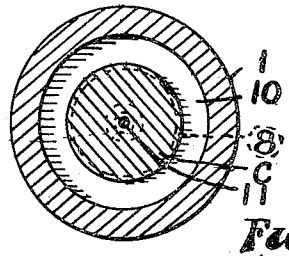


Fig. 2

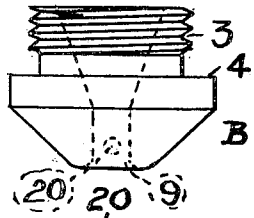


Fig. 6

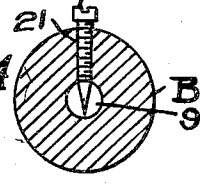


Fig. 4

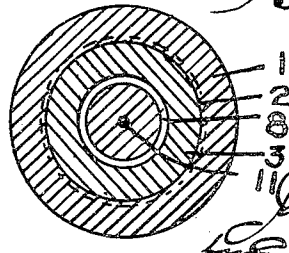


Fig. 3

WITNESS

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UNITED STATES PATENT OFFICE.

JAMES B. ANDERSON, OF SHALER TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA.

OIL-BURNER.

1,306,458. Specification of Letters Patent. Patented June 10, 1919.

Application filed November 3, 1917. Serial No. 200,024.

To all whom it may concern:

Be it known that I, JAMES B. ANDERSON, a citizen of the United States, and residing in the township of Shaler, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Oil-Burners, of which the following is a specification.

My invention consists in a new and improved oil burner for furnaces, boilers and similar purposes.

The object that I have in view is the provision of an inexpensive, yet durable and easily repaired burner which will effect a proper mixture of the oil fuel with steam or air; wherein the flame may be easily adjusted for the purpose in hand; which will burn in the open air or in drafts without blowing out or blowing back into the burner, and which may be readily ignited without the use of a pilot light or special ignition mechanism.

In the accompanying drawings, Figure 1 is a sectional view of my burner showing the supply connections; Fig. 2 is a section taken along the line II—II in Fig. 1; Fig. 3 is a similar view taken along the line III—III in Fig. 1; Fig. 4 is a similar view taken along the line IV—IV in Fig. 1; Fig. 5 is an elevation of the spud member, and Fig. 6 is a similar view of the nozzle member.

The following is a detailed description of the drawings.

A is the burner casting provided with a plurality of bores.

1 is a bore or seat internally threaded, as at 2, to receive the exteriorly threaded cylindrical neck 3 of a nozzle member B provided with a circumferential shoulder 4 to limit the insertion of the neck 3 into the seat 1 by contact with the casting. Thus a space is left between the inner end of the neck and the inner end of the seat.

5 is a bore of smaller diameter than seat 1 but axially concentric therewith and extending through the casting. The inner end of the bore 5 is threaded to receive the reduced threaded cylindrical neck 6 of a cone shaped projection or spud member C provided with a circumferential shoulder 7 which abuts against the casting. The head of the spud C is cone shaped and the inner bore of the nozzle member B is of corresponding shape to loosely fit the spud, thus leaving between the spud and the inner wall of the nozzle member an annular passage 8 which tapers diametrically toward the mouth of the nozzle. The outer end of the spud extends into the cylindrical outer bore 9 of the nozzle, said bore being preferably slightly flared at its outer end to reduce the friction.

The inner end of the passage 8 communicates around its entire circumference with the annular chamber 10 formed in the inner end of the seat 1 between the wall of seat 1 and the spud C. The chamber 10 is of greater cross sectional capacity than is the passage 8, as shown, thus furnishing a choked outlet for the chamber 10.

The spud C is provided with a reduced axial passage 11 whose inner end is flared to form a seat for the tapered end of the needle valve D working in the bore 5 and having its shank threaded to engage the threaded outer end of said bore. 12 is a stuffing box at the outer end of the bore 5 through which the needle valve extends.

13 is a chamber intersecting the bore 5 and having its outer and open end threaded to receive an oil or other fluid supply pipe 14.

15 is a bore in the casting A approaching the bore 5 at an acute angle and connected at its inner end with the chamber 10 by means of a reduced port 16 whose outer end is flared to form a seat for the tapered end of the needle valve E working in the bore 15 and having its shank threaded to engage the threaded outer end of said bore. 17 is a stuffing box at the outer end of the bore 15 through which the needle valve E extends.

18 is a chamber intersecting the bore 15 and having its outer and open end threaded to receive the supply pipe 19.

20 is a tapered end screw working in a threaded hole 21 which intersects the outer bore 9 of the nozzle, whereby the flame may be regulated.

The method of operating my improved oil burner is as follows:

Oil and compressed air or steam are supplied to the oil chamber 13 and the fluid pressure chamber 18, respectively, and the needle valves D and E adjusted to admit the desired amount and proportions of the two fluids to the burner. The oil may be under low pressure, such as five pounds or simply under a flowing head, while the air or steam may be at five pounds or more pressure.

The compressed air or steam enters the chamber 10 through the port 16 and fills

the same completely and uniformly, the overflow escaping in the form of a continuous, cone-shape sheet through the choked escape port 8. The current of fluid forming said sheet reaches its apex and crosses over on itself just in front of the outer end of the oil passage 11, baffling and shattering the sheet of fluid against the wall of the discharge port 9. The result is a siphonic action exerted on the oil, drawing it through the passage 11 from the chamber 13 and thoroughly mixing the oil with the baffled current of air or steam. The result is a perfect intermingling of the oil with the other fluid, giving a uniform and highly combustible fuel mixture.

When the burner is to be lighted, the regulating member 20 is screwed in until the discharging fuel at the mouth of the bore 9 is given an expanded or rose form of reduced velocity which can be readily ignited with a match. The screw may then be adjusted to give the desired form of fuel jet. The flame may thus be long or short, confined to a narrow diameter of stream or diverging laterally in a more or less rose or spray form.

If desired the oil may be admitted through the supply chamber 18, port 16, chamber 10 and passage 8, while the steam or compressed air may be admitted through chamber 13 and passage 11. This is particularly useful in the case of an open hearth furnace where a long, far-reaching flame over the melting floor is required, as in such case the axial stream under fluid pressure tends to shoot the fuel mixture in the form of a compact narrow jet to a relatively great distance.

The construction of the burner prevents the blowing out of the flame even where the fuel pressure is reduced to a minimum, an excessive pressure to carry the flame not being required as in many other types of burners. Thus very low fuel pressures may be used, and the burner may be installed in the open air or where it is subject to a strong draft. Again, the flame cannot blow back into the burner, as frequently happens with many types of liquid fuel burners.

The construction of the burner is simple and inexpensive, yet no part is subjected to excessive wear. In case the nozzle becomes damaged, a new nozzle member may be cheaply and quickly substituted. Leakage is prevented by the expansion of the intermingling parts under the influence of the heat.

What I desire to claim is:—

An oil burner comprising a body provided with an oil supply and a fluid pressure supply, a fuel discharge bore, a passage alined with said bore and communicating therewith, a valve interposed between one of said supplies and said passage, an annular chamber concentric with said passage, a valve interposed between said chamber and the other of said supplies, a choked conical annular passage concentric with said first mentioned passage connecting said annular chamber with said discharge bore, and an adjustment screw radially intersecting said discharge bore, substantially as and for the purposes set forth.

Signed at Pittsburgh, Penna., this 23rd day of October, 1917.

JAMES B. ANDERSON.