L. H. DAVID.

FUEL OIL BURNER.

APPLICATION FILED JUNE 2, 1914.

1,131,480.

Patented Mar. 9, 1915.

2 SHEETS—SHEET 1.

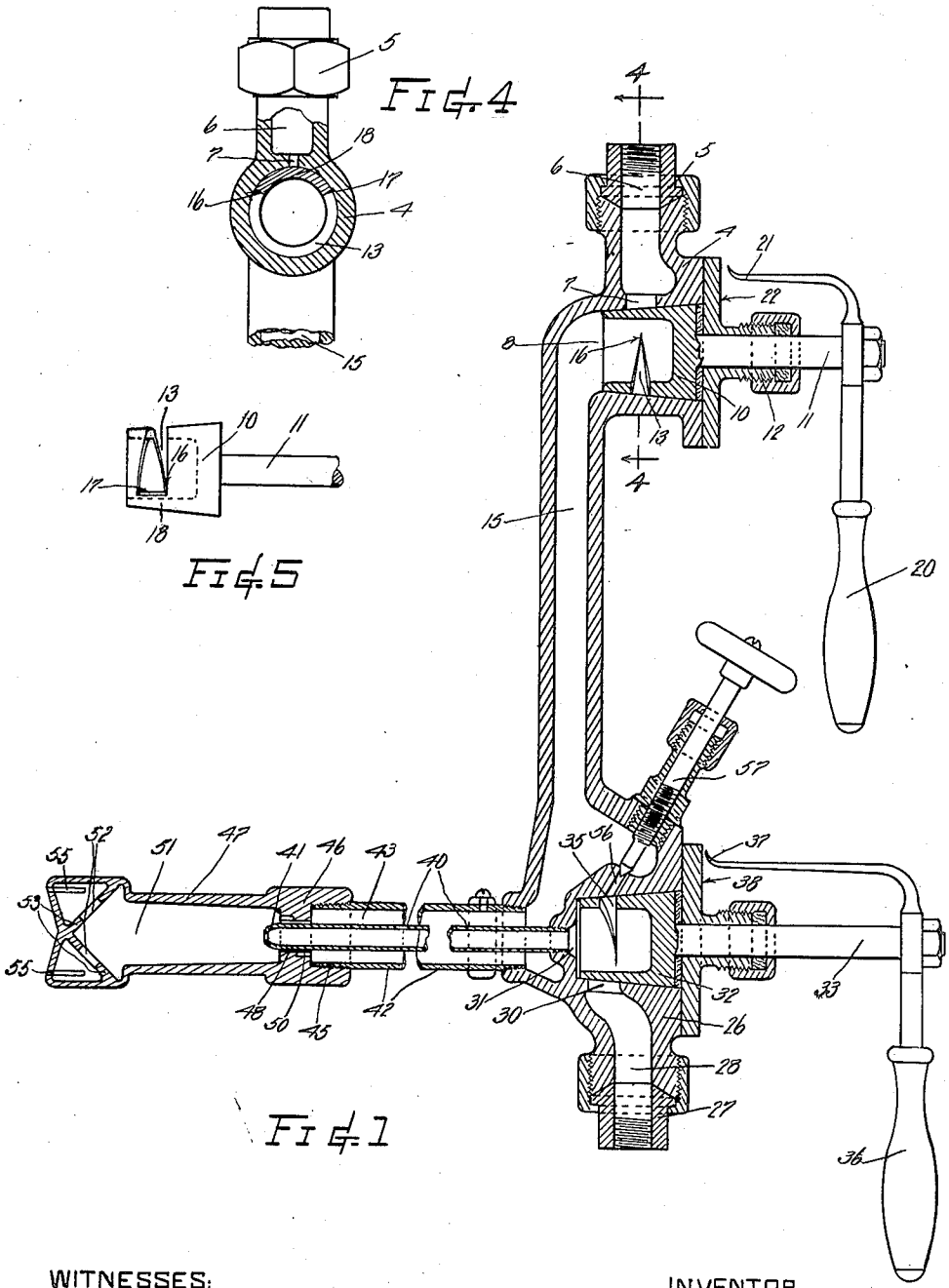


Fig. 4

Fig. 5

Fig. 1

WITNESSES:

Horace Barnes

A. L. Bowen.

INVENTOR

Leon H. David.

BY

Pierce Barnes

ATTORNEY.

L. H. DAVID.

FUEL OIL BURNER.

APPLICATION FILED JUNE 2, 1914.

1,131,480.

Patented Mar. 9, 1915.

2 SHEETS—SHEET 2.

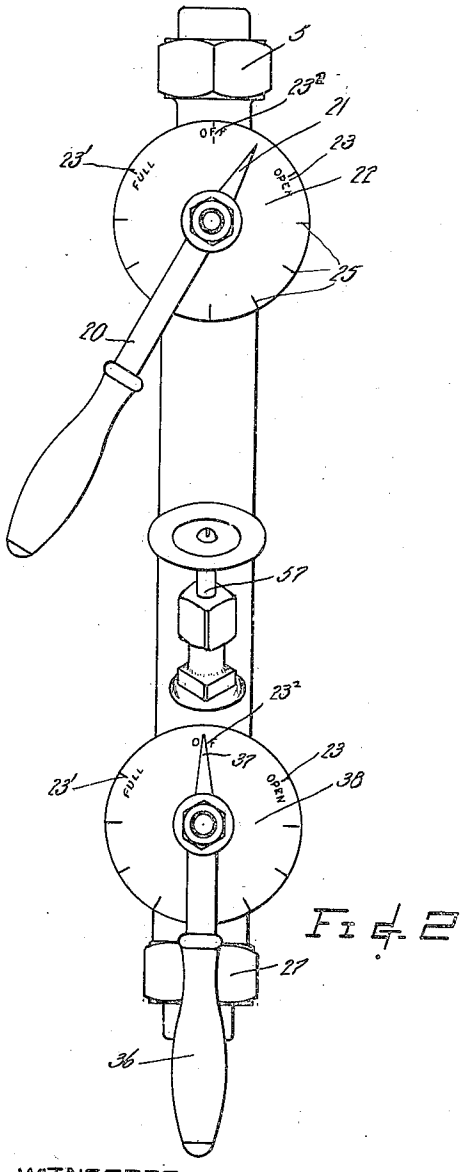


FIG. 2

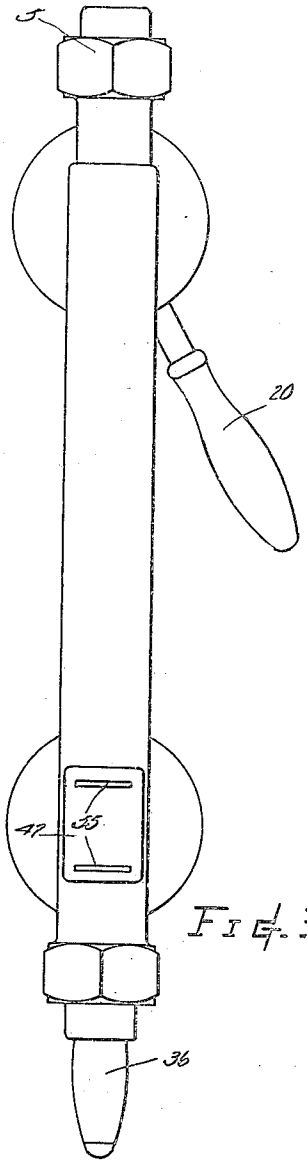


FIG. 3

WITNESSES:

Horace Barnes

A. L. Bowen

INVENTOR

Leon H. David.

BY

Horace Barnes

ATTORNEY.

UNITED STATES PATENT OFFICE.

LEON H. DAVID, OF FORT CASEY, WASHINGTON.

FUEL-OIL BURNER.

1,131,480. Specification of Letters Patent. Patented Mar. 9, 1915.

Application filed June 2, 1914. Serial No. 842,463.

To all whom it may concern:

Be it known that I, LEON H. DAVID, a citizen of the United States, residing at Fort Casey, in the county of Island and State of Washington, have invented certain new and useful Improvements in Fuel-Oil Burners, of which the following is a specification.

This invention relates to improvements in fuel oil burners, and has for its object the provision of means for atomizing and breaking up the heavy hydro-carbons and securing a perfect admixture of steam therewith to insure the complete combustion thereof.

A further object of the invention is the provision of valve-controlling means of simple construction whereby the passage of steam and oil may be regulated to a relatively fine adjustment and which is not liable to become clogged or otherwise rendered unfit for successful and economical service.

A still further object of the invention is the provision of means whereby, should the oil passages become clogged, they may be instantly cleared by passage of steam therethrough under pressure in a reverse direction to the normal course of the oil.

The invention consists in the novel construction of oil-atomizing devices and of valve-passages for the admission of oil and steam thereto, the combination of such elements and the adaptation therewith of parts and devices, as will be hereinafter fully explained, illustrated in the accompanying drawings, and finally set forth in the appended claims.

Referring to said drawings, Figure 1 is a view in vertical section of apparatus embodying my invention partly broken away. Figs. 2 and 3 are front and rear elevational views of the same, respectively. Fig. 4 is a fragmentary detail view partly in vertical section, on line 4—4 of Fig. 1. Fig. 5 is a fragmentary detail side elevational view of a valve element shown detached.

Referring to said views, the reference numeral 4 indicates a steam valve casing having a tubular fitting 5 adapted to be communicatively connected to a pipe leading to a source of steam supply under pressure (not shown). Said fitting includes a passage 6 and a restricted aperture 7 communicating with the valve chamber 8. Said aperture 7 is preferably of relatively long and narrow configuration having its larger axis extending longitudinally of the burner. Said valve-chamber 8 is formed with a tapered seat arranged to receive a frusto-conical interiorly chambered valve member 10 having its axis of rotation in parallel with said major axis of the aperture 7. The valve stem 11 extends forwardly thereof and is mounted in packed gland-bearing 12, as customarily. The valve member 10 is provided with a port 13 adapted to register when suitably manipulated, with said aperture 7. Said port extends through the side walls of said valve and communicatively connects said aperture with the interior chamber of the valve and with the passage 15 leading to the burner proper. Port 13 extends circumferentially in alinement with the aperture 7 for a considerable distance about the valve 10 in a progressively diverging opening from a point 16 at one extremity to its opposite extremity 17 where it is approximately of a width to include the entire length of the aperture 7. A portion of the material of said valve is retained, as at 18, sufficient to lend integrity and strength to the valve member and whereby the valve is closed to the passage of steam when the same is caused to block the aperture 7, as indicated in the views.

20 indicates a handle operatively connected to said valve stem 11 which is provided at its opposite end with a pointer 21 adapted to be associated with a dial 22 mounted or formed on the valve casing and suitably inscribed with inscriptions, as at 23, 23^1 and 23^2, respectively, indicating the relative position of the valve; thus, when the relatively narrow point 16 is in register with the aperture 7, the pointer 21 will indicate the inscription 23 descriptive of the open condition of the valve between said inscription about said dial to a point corresponding to the widest portion 17 of the port, as indicated at 23^1. The dial is divided into equal graduate marks 25 as an assistance to the operator in regulating the proportions of steam and oil. The balance of the per-

imeter of said dial corresponds to the blank portion 18 of the valve and is distinguished by an inscription 23^2 signifying the same.

Immediately below said steam valve apparatus is positioned a fuel-oil controlling valve consisting of a casing 26 provided with a fitting 27 adapted to make communicative connection of the oil passage 28 of said casing and an oil-supply pipe, not shown, leading from a source of oil-supply under pressure.

A restricted aperture 30 of substantially similar configuration and dimensions to the aperture 7 of the steam passage connects the passage 28 with a valve chamber 31 in which a valve member 32 is seated. Said valve member 32 is in all essential respects similar to the valve 10 of the steam inlet apparatus, having valve stem 33 and V-shaped port 35 substantially similar to port 13. Said valve stem is provided with a handle 36 and pointer 37 associated with a dial 38 inscribed in an analogous manner to the described dial 22. Mounted at one end in said casing 26 and communicatively connected with said chamber 31 is an oil-pipe 40 extending horizontally therefrom and adapted to extend within a discharge pipe and tip to protrude within a furnace and provided at its opposite extremity with a nozzle 41 having an outlet opening for the emission of oil therethrough. Communicatively connected with said passage 15 is a horizontally arranged steam pipe 42 disposed concentrically about said oil pipe 40 having a bore of sufficient diameter to afford a passage 43 thereabout. The steam pipe 42 extends to within a short distance of the inner extremity of oil-pipe 40 and is provided at such extremity with screw-threads 45 making connection with the base 46 of a burner-tip 47. Axially of said burner the base is formed with an opening 48 adapted to receive the nozzle 41 of the oil pipe, the opening 48 being of sufficient diameter to allow of the passage of steam about said nozzle and also provided with a plurality of spirally directed grooves 50 through which the major portion of the steam is permitted to pass and give a whirling or spiral direction. The burner-tip 47 is provided with a chamber portion 51 beyond the opening 48 and into which the nozzle 41 slightly projects and in which the oil and steam are intermingled and through the velocity and whirling motion of the escaping steam the oil is thoroughly broken up or atomized. The combined oil and steam is thereupon permitted to escape through the apertures 52, 52 in bevel plates 53, 53, whence it issues into the combustion chamber of the furnace through slots 55, 55. The upper portion of said valve casing 26 is provided with a by-pass 56 connecting the chamber 31 with the steam passage 15 in alinement with the aperture 30 and port 35. Said by-pass is provided with a needle-valve 57 controlling same whereby steam may be caused to pass from the passage 15 through the port 35 into the chamber 31, and thence through the oil pipe 40 or through the aperture 30 into the oil passage 28 accordingly as the valve member 32 is shifted to expose or cover the aperture 30.

It will be noted that the adjustment of the steam valve 10 may be set with great accuracy and delicacy, ranging from the slightest opening equivalent to a pin-point at the extremity 16 of the valve 10 to the fullest area of the aperture 7, it being understood that the axis of said aperture 7 extends transversely to the length of the port 13 and the full opening of said aperture is only obtained by the rotation of the valve through the major portion of a revolution and through the movement of the valve from initial point indicated at 23^2 wherein the valve is closed, past the point indicated at 23 whereat the valve is slightly open. The opening progressively widens as the handle is rotated in the proper direction until the full opening is obtained at the point indicated at 23^1. A further movement of the valve handle in the same direction immediately shuts off the supply of fluid or reversely, the handle may be rotated in the opposite direction whereby a full opening is obtained at once without further operation of the valve handle. The valve 32 is operated in a similar manner.

The invention is simple in its construction and mode of operation, is durable in use and is not liable to become disordered in service. The valves are adapted to give perfect regulation and are well adapted for the purposes intended.

Having described my invention, what I claim, is—

1. In a device of the class described, steam and oil supply pipes, a valve for each of the pipes consisting of a chambered casing having an elongated aperture in its side wall, the major axis of the aperture lying parallel with the axis of the casing chamber, a rotatable valve member having an elongated triangular port whose greatest length is disposed transversely to the major axis of the aperture, and outer and inner concentric steam and oil tubes communicatively connected to the supply pipes.

2. In a device of the class described, a steam tube arranged to protrude within a furnace, an oil tube arranged concentrically within the steam tube, a steam supply pipe and oil supply pipe respectively connected with the tubes, valves in the supply pipes each consisting of a tapered valve chamber forming a portion of the supply duct, the

valve chamber being provided with a restricted aperture of relatively elongated configuration, and a valve member arranged to be rotatively seated in the chamber and provided with a triangular port having its major axis arranged transversely to the like axis of the restricted aperture.

Signed at Fort Casey, Wash., this 26th day of May, 1914.

LEON H. DAVID.

Witnesses:
D. W. CRADDOCK,
JOHN J. ERNST.