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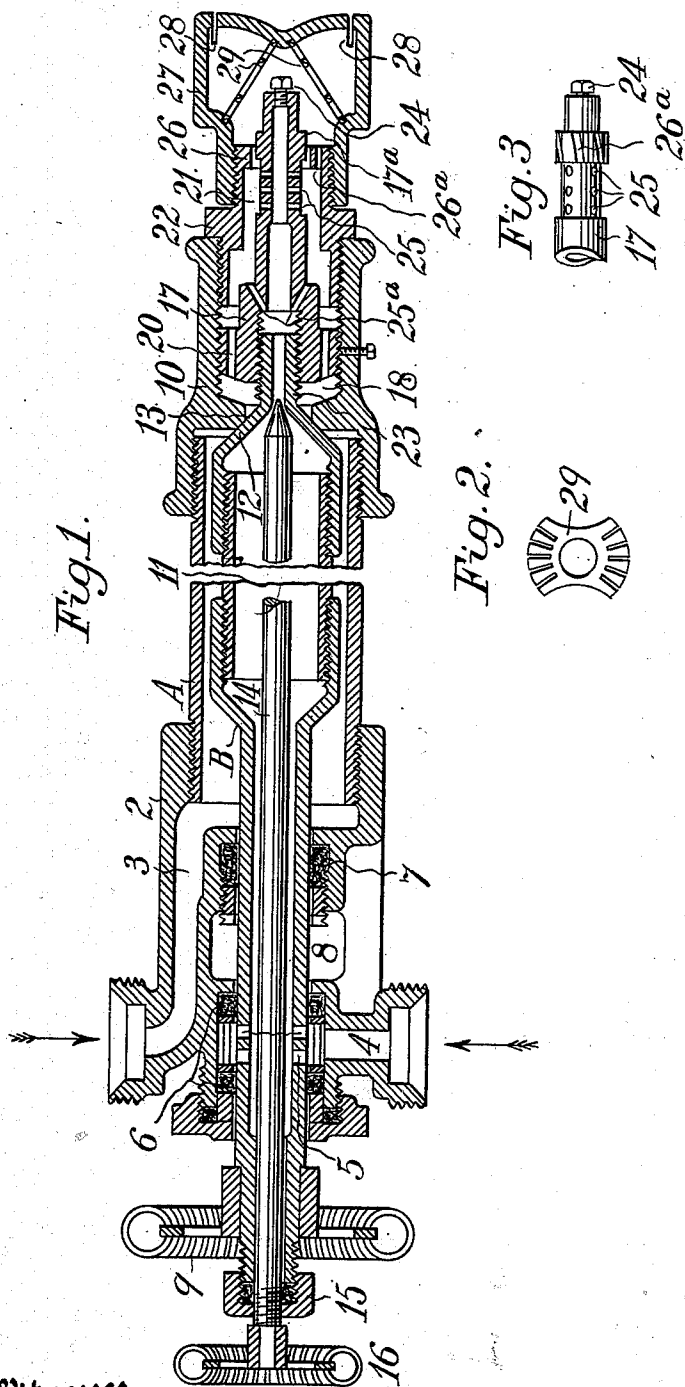
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OIL BURNER.

(Application filed June 23, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 714,394, dated November 25, 1902.

Application filed June 23, 1902. Serial No. 112,790. (No model.)

To all whom it may concern:

Be it known that we, LOUIS ALBERT PFEIFFER and LYMAN D. STAPLES, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Oil-Burners; and we hereby declare the following to be a full, clear, and exact description of the same.

The object of this invention is to construct an apparatus for the burning of hydrocarbon oils, and preferably for crude or unrefined oil, by the use of concentric tubes, into the inner one of which the oil is admitted and into the outer surrounding one of which steam is admitted, so as to heat the oil and to retain the steam under boiler-pressure in the chamber which incloses the one through which the oil flows and also to mix the steam and oil at this high temperature and deliver the two eventually through the burner-nozzle. Within the inner tube is a longitudinal movable rod having a valve at its front end which controls the discharge of oil, while said inner tube is in itself movable and has its front end so formed as to control the discharge of the steam into the mixing-chamber, where it unites with the oil.

Referring to the accompanying drawings, Figure 1 is a longitudinal section through the axis of our invention. Fig. 2 is a face view of a perforated plate. Fig. 3 is an exterior view of the forward end of the head.

As illustrated in the present drawings, the apparatus consists of an outer tube A and an inner tube B. The outer tube has its rear end screwed into a head or casting 2, and the inner tube B has its rear end made slidable through the central portion of this casting.

3 is a passage through which either steam or air may be admitted into the annular space within the tube A and surrounding the tube B, and 4 is an oil-inlet passage opening into an annular channel surrounding the inner tube and connected with its interior by an opening, as shown at 5, so that the oil may pass directly into the inner tube. Upon each side of the annular channel are stuffing-boxes, as shown at 6, to prevent leakage of oil. 7 is another stuffing-box, surrounding the tube B just behind the passage 3 and the chamber

into which it opens around the tube B. This stuffing-box is designed to prevent the escape of the steam around the tube B.

Between the stuffing-boxes 6 and 7 is an open space 8, so that any possible leakage of steam through the stuffing-box 7 may be discharged and prevented from entering the oil-chamber through the passages 5 and by condensing and mixing with the oil to cause an uneven and imperfect combustion. The rear end of the tube B carries a hand-wheel 9, by which it may be turned, causing it to advance or recede, as will be hereinafter described.

The front end of the tube A is screwed or otherwise secured into a head or casting 10, and the tube B is connected by a coupling 11 with a cone-shaped end 12, into which it may be screwed, as shown. The exterior of this cone serves as a valve closing against a seat 13 in the interior of the casting 10, and when thus closed it prevents the escape of steam from the annular chamber A into the front part of the apparatus. The interior of the cone 12 has a conical seat, and this receives the front cone-shaped end of a rod 14, which extends longitudinally through the center of the tube B, and the rear end of this rod is screw-threaded, and it is turnable in corresponding threads in the stuffing-box 15, through which it passes. This stuffing-box also makes a joint to prevent any leakage of oil through the rear end of the tube B. The rod 14 has a hand-wheel 16 upon it, and by turning this hand-wheel the rod may be advanced, so that its front cone-shaped end closes the discharge-opening through the center of the cone 12. By retracting the rod an opening of any desired size may be made for the escape of oil to mix with the steam which escapes between the cone 12 and the outer casing 10. The front portion of the casing 10 is substantially cylindrical and is screw-threaded inside. Into this screw-threaded portion is fitted the tubular head 17, which may be adjusted within the part 10 so as to leave a space behind it, as at 18, into which the steam from the chamber A first escapes, and by means of a series of openings 20 this steam passes from the chamber 18 into a chamber 21, which is formed within a coupling-

piece 22, which screws into the front end of part 10, as shown. The interior of the tubular part 17 is also screw-threaded, and the front end of the cone 12 is screw-threaded, as shown at 23, to fit the part 17, so that when the tube B is turned by turning the hand-wheel 9, as previously described, the screw-threads of the part 23 will cause it to advance within the part 17, and thus seat the cone-shaped valve 12 and prevent passage of steam, or by turning in an opposite direction the valve will be retracted and the steam-passage opened to any desired extent. The head or part 17 is hollow or tubular, as shown, and its outer end may be closed by a screw-plug, as at 24. Through the sides of this tubular part 17 openings 25 are made, which allow the oil which passes from the interior of the tube B into the part 17 to escape into the outer chamber 21, where it meets and is mixed with the steam. The part 22 is contracted or has an inwardly-turned flange 26 at its outer end, and between this and the projecting end of the part 17 are slots or channels 26^a, which allow the mixed oil and steam to escape into the interior of the burner-head 27, which is removably screwed or secured upon the outer end of the coupling 22. This head has discharge slots or channels 28 at the top and bottom, as shown, these channels discharging parallel with the axis of the apparatus. Within the head 27 are the diagonally-disposed perforated plates 29, through which the mixed oil and steam are again caused to pass before reaching the final discharge-openings 28, and they are thus very perfectly mixed and ready for combustion.

All parts of the apparatus are screwed or otherwise united together in such a manner that the burner, the burner-head, the coupling 22, and the other parts may be removed, so as to allow access to the interior for cleaning and other purposes.

Although the burner-head is here shown with a plurality of discharge-openings, it will be understood that a single opening may be employed, if desired.

The shapes of the interior of the coupling 22 and of the exterior of the part 17 are such as to interpose abutments or surfaces against which the steam and oil impinge during their flow to the burner, and this more thoroughly pulverizes and mixes them. In some cases divergent holes 25^a may take the place of the holes 25 at right angles, and these divergent holes discharge against an abutment or surface in the coupling 22.

The contracted flange at the front of the coupling 22 fits closely around an enlargement 17^a on the front smaller part of 17, and this enlargement on collar may have the openings 26^a made through its periphery in spiral lines, so as to produce a twist of the passing steam and oil. The openings 20 in the rear portion of 17 may have a similar twist or spiral. The diagonal plates 29 may

also have slots or channels in their peripheral edges, all these devices being effective in breaking up and mixing the particles of oil and steam.

The burner-head may have any desired shape and may have one or more discharge-openings. These openings are out of line with the passages 26^a and prevent a direct discharge from one set of openings through the other.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination in an oil-burner of concentric tubes forming a steam-space between them, an inlet at one end and a convergent discharge at the other, a core forming an annular space between itself and the inner tube, said inner tube having the rear end connecting with the oil-inlet, and the front provided with a discharge-opening which is surrounded by the steam-discharge and is controlled by the movement of the central core, an adjustable tubular sleeve having openings made near its periphery for the passage of steam, and a mixing-chamber, said sleeve having radial openings near its front opening into the mixing-chamber.

2. The combination in an oil-burner of concentric tubes having a steam-space between the two, and an oil-chamber in the interior of the inner one, means through which steam and oil are independently delivered from the chambers, and coacting valves and seats by which the proportionate discharge is controlled, a mixing-chamber, means through which steam and oil are delivered thereto, a burner-head having a plurality of discharges parallel with the axis of the apparatus, and perforated diagonally-disposed plates through which the mixed steam and oil pass to said discharges.

3. The combination in an oil-burner of concentric tubes having steam-space between, and an oil-space interior to the inner tube, steam and oil inlet passages connecting respectively with said spaces, a stuffing-box at the rear of the oil and the steam inlet and other stuffing-boxes upon each side of the oil-inlet, and an air-opening between the steam stuffing-box and the oil stuffing-boxes whereby any steam leakage is prevented from mixing with the oil.

4. The combination in an oil-burner of a hollow cylindrical head, an annular valve-controlled steam-inlet, a tubular centrally-disposed oil-conducting sleeve, the rear portion of which is adjustably fitted within the head, and the front portion reduced by successive offsets, peripheral passages around the rear portion for the escape of steam, a burner and intermediate coupling with interior offsets forming abutments against which the steam and oil impinge.

5. The combination in an oil-burner, of a hollow cylindrical head, a burner with one or more discharge-slits opening from its front,

a coupling connecting the burner with the head and having interior offsets between the rear and the front end, an interior concentric tubular sleeve closed at the front and having 5 oil-discharge openings between the rear and the front end, openings for the admission of steam-jets into the space around the sleeve to mix with the oil, and openings through which the mixed oil and steam are delivered 10 into the burner.

6. The combination in an oil-burner of an exterior tubular head and a concentric tubular sleeve adjustable therein, means for admitting oil into the sleeve and steam into the 15 surrounding space within the head oil and steam-jet openings through which they pass and meet, interior abutments with discharge-openings against which the mingled products impinge, a burner and passages through 20 which the combustible mixture is delivered thereto from the mixing-chamber, and diagonally-disposed, perforated plates located within the burner.

7. The combination in an oil-burner of a 25 hollow head, an annular valve-controlled steam-inlet; a tubular centrally-disposed oil-

conducting sleeve, the rear portion of which is adjustably fitted within the head, and the front portion reduced by successive offsets; a burner-head having one or more discharge- 30 openings; and a member having spirally-disposed channels through which the mixed products are delivered into the burner-head.

8. An oil-burner comprising an outer tube with means for admitting steam thereto; an 35 inner tube having an oil-inlet; said inner tube having a cone-shaped head; a casting secured to the outer tube and having a seat for said head; a rod operating in the oil-tube and closable against the interior of the said 40 cone-shaped head; a coupling member fitted to said casting and having spiral passages through it; and a burner-head having one or more discharge-openings in its end.

In witness whereof we have hereunto set our 45 hands.

LOUIS A. PFEIFFER.
LYMAN D. STAPLES.

Witnesses:

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JESSIE C. BRODIE.