(No Model.) 2 Sheets—Sheet 1.

P. L. BEAR.

OIL BURNER.

No. 405,391. Patented June 18, 1889.

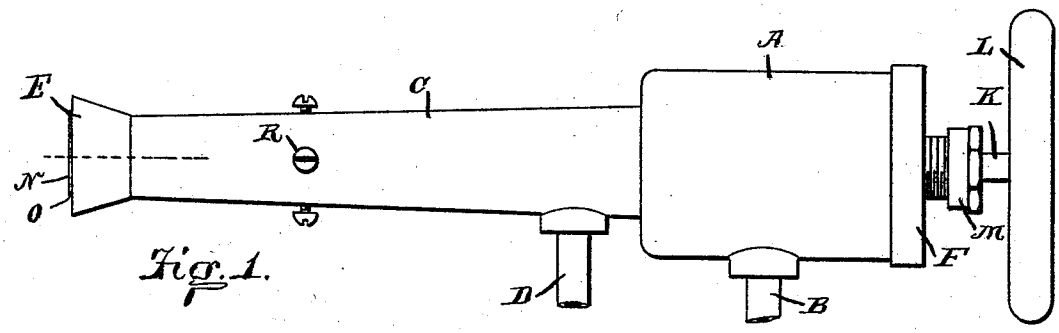


Fig. 1.

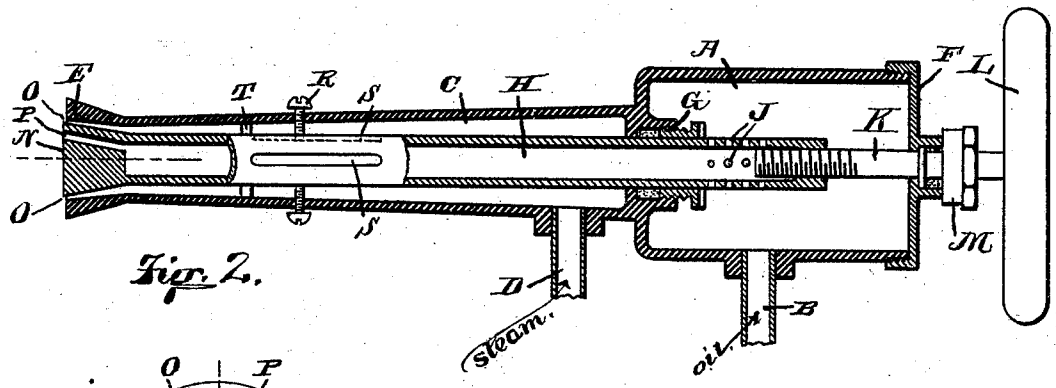


Fig. 2.

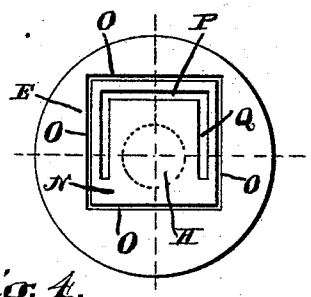


Fig. 4.

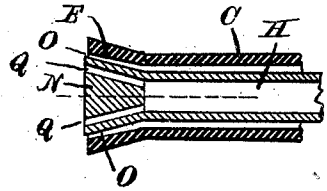


Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

P. L. BEAR.

OIL BURNER.

No. 405,391. Patented June 18, 1889.

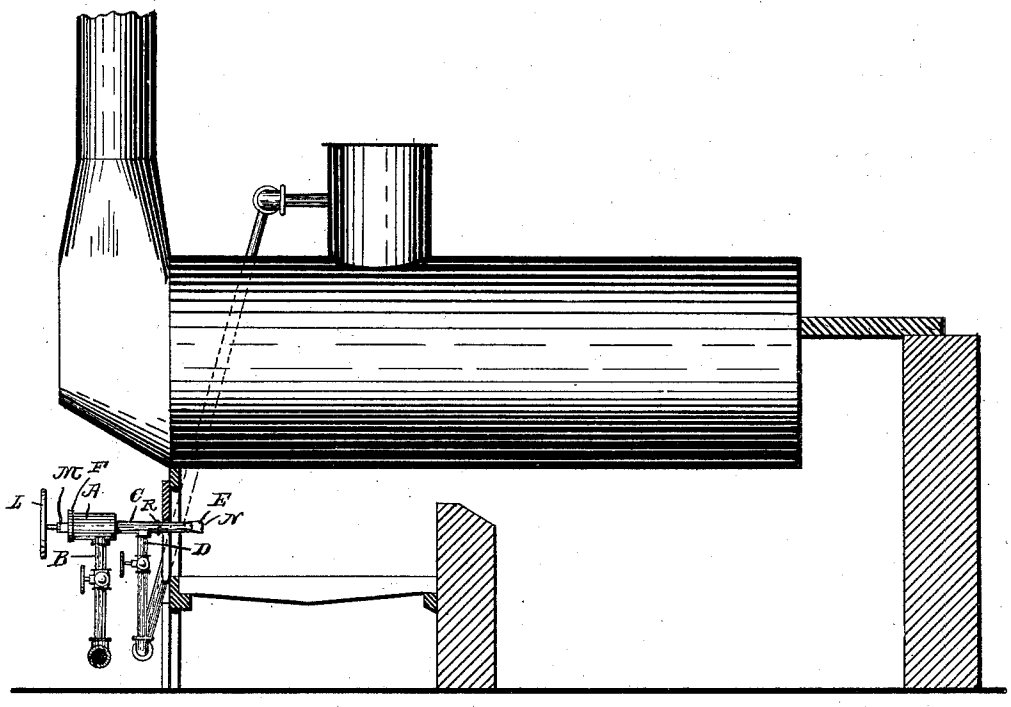


Fig. 5.

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UNITED STATES PATENT OFFICE.

PHILIP L. BEAR, OF HAMILTON, OHIO.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 405,391, dated June 18, 1889.

Application filed January 21, 1889. Serial No. 297,002. (No model.)

To all whom it may concern:

Be it known that I, PHILIP L. BEAR, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

This invention pertains to that class of devices employed in injecting a spray of inflammable oil into a boiler-furnace or other combustion-chamber by the action of a steam-jet.

The improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of an oil-burner illustrating my improvements; Fig. 2, a vertical longitudinal section of the same; Fig. 3, a horizontal longitudinal section of the discharge end of the same; Fig. 4, an elevation, upon an enlarged scale, of the discharge end of the burner; and Fig. 5, a vertical longitudinal section of a steam-boiler furnace provided with my improved oil-burner.

In the drawings, A indicates a metallic oil-chamber; B, a pipe leading thereto and adapted to be connected with a source of oil-supply under sufficient pressure to cause the oil to flow to and fill the chamber; C, a steam-chamber projecting axially from one end of the oil-chamber; D, a pipe connected with this steam-chamber and adapted to be connected with a source of supply of steam under pressure; E, the discharge or nozzle of the steam-chamber, located at that end of the steam-chamber farthest from the oil-chamber, this nozzle being preferably rectangular and having an outward flare; F, a removable cap serving to close the outer end of the oil-chamber; G, a stuffing-box in the wall separating the oil-chamber from the steam-chamber; H, an oil-tube axially disposed in the two chambers and extending from the nozzle of the steam-chamber back through the stuffing-box and into the oil-chamber; J, perforations in that portion of the oil-tube extending into the oil-chamber and serving to permit the oil to pass from the oil-chamber into the oil-tube; K, a regulating-screw journaled in the cap of the oil-chamber and screwing into the end of the oil-tube and serving as a means by which the oil-tube may be adjusted endwise; L, a hand-wheel on this regulating-screw to serve in manipulating the screw; M, a stuffing-box on the cap of the oil-chamber where the regulating-screw passes through the cap; N, the nozzle end of the oil-pipe, the same consisting of an externally-flared portion rectangular in cross-section to fit the rectangular nozzle E of the steam-chamber, this end of the oil-pipe being, in a general sense, closed; O, the steam-ajutage formed by such opening as may be left between the inner walls of the steam-nozzle E and the outer surface of the nozzle end of the oil-pipe; P, the upper portion of the oil-ajutage, the same consisting of a horizontal mortise extending from the face of the nozzle end of the oil-pipe backwardly into communication with the oil-tube, this mortise being disposed parallel to and near to the upper horizontal portion of the steam-ajutage O; Q, vertical portions of the oil-ajutage formed by vertical downward prolongations of the mortise P, the mortises Q, in common with the mortise P, leading backwardly into communication with the oil-tube, these mortises Q lying parallel with and close to the vertical portions of the steam-ajutage O; R, a circumferential series of screws screwed radially through the wall of the steam-chamber and engaging with their points shallow longitudinal grooves in the oil-tube H; S, the grooves just referred to, and T a circumferential series of pegs projecting inwardly from the wall of the steam-chamber into contiguity with the oil-tube.

Oil through pipe B fills oil-chamber A and finds its way through the perforations J to the oil-tube, and seeks to flow out of the oil-ajutage P Q. Steam through pipe D finds its way to the steam-chamber and seeks to jet out at the steam-ajutage O around the nozzle end of the oil-tube. By means of the regulating-screw the oil-tube can be drawn backwardly until this nozzle end practically closes the steam-ajutage, or the adjustment may be made so as to produce the desired width of steam-ajutage. The stuffing-box G prevents the leakage of steam into the oil-chamber or of oil into the steam-chamber. This stuffing-box may be manipulated, as by means of a forked screw-driver, when the cap F is removed from the oil-chamber. The pegs T serve to support the oil-tube and maintain it in proper general concentricity in the steam-

chamber. The screws R serve in adjusting the nozzle end of the oil-tube into accurate transverse relationship to the nozzle end of the steam-chamber, whereby the width of the steam-ajutage O may be made uniform entirely around the nozzle end of the oil-tube, or adjusted out of uniformity in case it is desired that the lower portion or the upper portion or either side portion of the steam-ajutage shall be individually excessive, it being understood that this delicate adjustment by means of the screws R is within the range of movement on the part of the oil-tube permitted by the pegs T, which pegs, if present, engage the oil-tube loosely. The screws R, or any one of them, engaging the grooves S, serve also in limiting the outward endwise movement of the oil-tube in the steam-chamber, thus preventing the steam from blowing the oil-tube entirely out of the burner in case the regulating-screw K should be improperly manipulated. The steam issuing from steam-ajutage O jets outwardly with a force dependent upon the pressure of the steam and the width to which the steam-ajutage has been adjusted. The steam-jet takes a hollow rectangular flaring form, with sensibly-defined and limited top and bottom and side elements. Oil issuing from the oil-ajutages P Q becomes vaporized by the steam, as usual, and jets forward with it, thus forming a combustible jet of steam and oil vapor, which is to be ignited and burned in the usual manner. The burner is to be set with its axis horizontal. The upper horizontal portion and the vertical portions or the greater lengths of the vertical portions of the steam-jet as it leaves the burner find themselves parallel with the oil flowing from the oil-ajutage, and at once enter upon their duty of vaporization. The lower horizontal portion of the steam-jet is not parallel to the oil-ajutage, and therefore is not at once called upon for the performance of a vaporizing duty. This lower portion of the steam-jet therefore retains a superior jetting-power, and serves in a superior manner in maintaining the outward prolongation of the entire jet, and at the same time in disposing below the body of combustible vapor a stratum of non-combustible steam. The heating features of the jet are therefore mainly upward and sidewise, and in case the device is used under a boiler a flame of superior prolongation and of superior upward heating effect can be produced. The nozzle end of the oil-tube may, by means of the screws R, be transversely adjusted, so as to increase the relative effectiveness of any particular individual portion of the steam-jet, whereby the heat of the flame may be caused to become more effective in any desired transverse direction.

I claim as my invention—

1. In an oil-burner, the combination, substantially as set forth, of a steam-tube having a discharge end or nozzle and an oil-tube within the same and having a nozzle end, entirely around which a steam-ajutage is formed between the exterior of the nozzle of the oil-tube and the interior of the nozzle of the steam-tube, the nozzle end of the oil-tube being provided with an oil-ajutage extending around within and close to said steam-ajutage, except at the lower portion, at which portion of the steam-ajutage the oil-ajutage is blank.

2. In an oil-burner, the combination, substantially as set forth, of a steam-chamber having a nozzle, an oil-tube disposed therein and having a general closure at its end at said steam-nozzle, and having two vertically-disposed oil-ajutages joined at their tops by a horizontal oil-ajutage.

PHILIP L. BEAR.

Witnesses:
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W. A. SEWARD.