

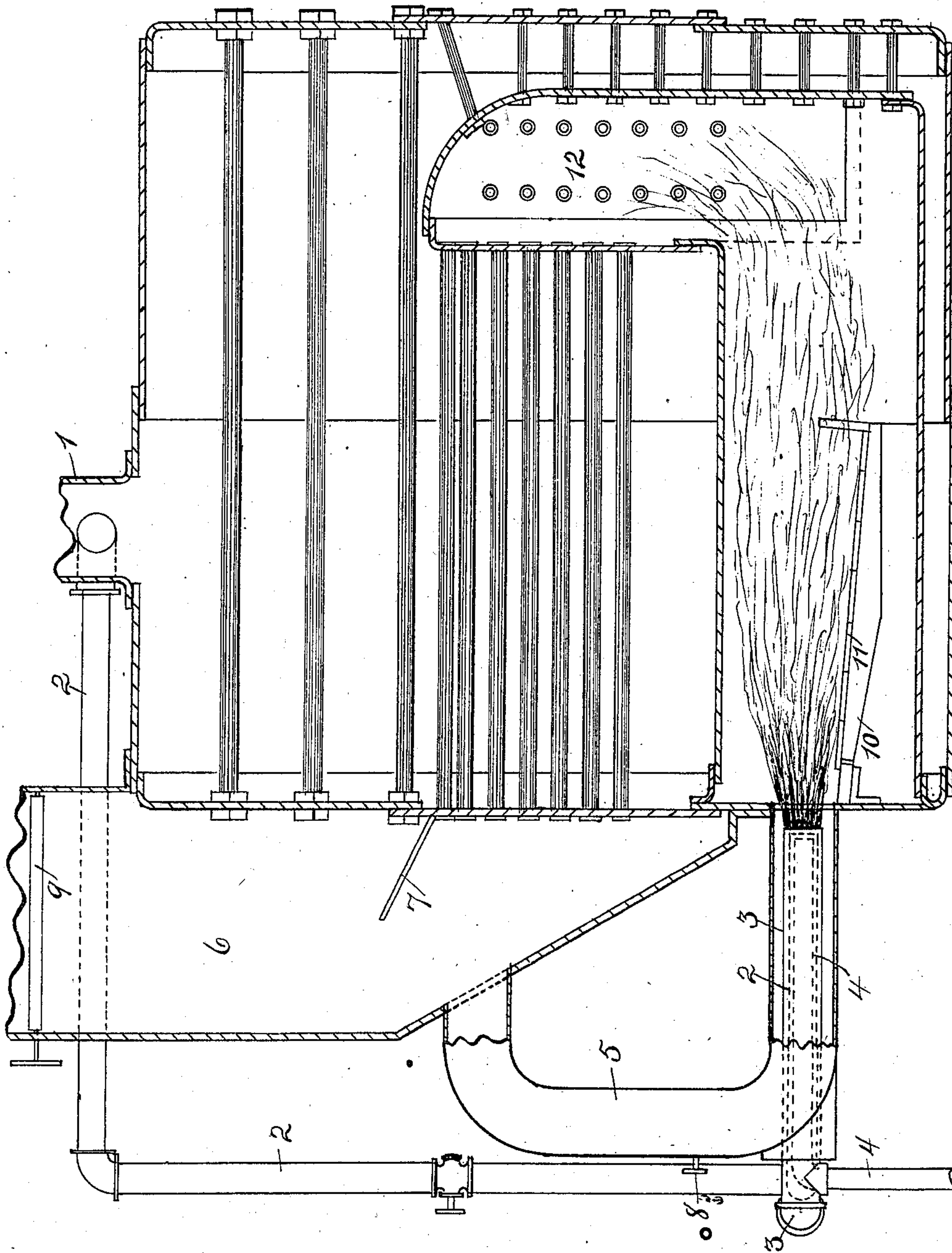
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J. S. CHAPMAN.
APPARATUS FOR BURNING OIL FUEL.

APPLICATION FILED SEPT. 2, 1902.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN S. CHAPMAN, OF ALBANY, NEW YORK.

APPARATUS FOR BURNING OIL FUEL.

SPECIFICATION forming part of Letters Patent No. 725,408, dated April 14, 1903.

Application filed September 2, 1902. Serial No. 121,817. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. CHAPMAN, a citizen of the United States, residing at Albany, Albany county, New York, have invented certain new and useful Improvements in Apparatus for Burning Oil Fuel; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the figures of reference marked thereon, which forms a part of this specification.

The object of my invention is to provide a new and improved apparatus for burning oil fuel, especially for heating steam-boilers.

In the drawing, the figure shows a vertical sectional view of a marine boiler fitted with my improved apparatus in operative construction.

The numeral 1 shows a portion of the steam-dome of the boiler, and 2 a steam-pipe leading from the dome to the burner and having a valve therein, as seen.

3 shows an air-pipe for conveying compressed air to the burner, it being connected to a compressed-air supply (not shown) in the ordinary manner, which may be an air-pump or other air-supply.

6 shows the uptake to the boiler, having a baffle-plate 7 therein, causing the products of combustion to be forced practically to the mouth of pipe 5, which is used to convey the hot gases to the fire-box of the boiler, as seen.

4 shows an oil-pipe fitted up to an oil-supply in the usual manner, the supply being preferably below the boiler and may consist of an oil-tank or other receptacle, the oil being forced into pipe 4 in the usual manner, the air pipe or conduit terminating inside and short of the exit end of the waste-gas conduit, the steam-conduit terminating inside and short of the exit end of the air-conduit and the oil-conduit terminating inside and short of the exit end of the steam-conduit, so that the oil will be compelled to centrally enter the other discharges from the other conduits, and thus be heated by the steam by direct contact and be thoroughly mixed with the other discharges from the other conduits.

At 10 is seen the fire-grates, and 11 shows

metal plates laid on the grates to stop the air from entering the furnace in its usual quantity, the plates being so laid as to allow some air, however, to enter the furnace.

The burner is composed of three pipes or members 2, 3, and 4, arranged as follows: The conduit or pipe 5 being the largest of the pipes contains the other three. Oil-pipe 4 is the innermost, and surrounding that and in which it lies is steam-pipe 2, and air-pipe 3 incloses both. When the burner is in operation, the oil is forced from the tank (not seen) through pipe 4 and with considerable pressure, enough to cause it to escape at the end of the pipe. As it reaches this point the steam-blast from pipe 2 heats it and causes it to become a spray and forces it into the air-blast, where it is mixed with the air and steam flowing out of the exit end of pipe 5, which causes a partial vacuum in that pipe. An initial fire having been made on the grates, the sprayed oil ignites and maintains a steady fire. This oil, air, and steam escaping from the burner and the heat in the furnace combined produces a suction in waste-gas pipe 5 and draws a portion of the heated and partly-burned products of combustion from the uptake 6 downward through pipe 5 and forces these gases into the burning flame; but before the gases escape into the furnace they are thoroughly intermixed within the mouth of the pipe 5 with the air and oil for the reason that the mouth of the burner lies considerably back of the exit of pipe 5, as shown, and no waste gases can escape without mingling with the sprayed oil and air as they leave the mouth of the burner. This thorough intermingling of the waste gases, oil, and air before they can enter the furnace produces certain combustion of the burnable parts of the waste gases to a far greater extent than by simply forcing them through a coal fire. As the oil is constantly supplying fresh fuel, the uptake must be constantly furnishing burnable products to be again forced through the flame by the burner, and thus to a large extent the combustible parts of the waste gases are burned. When it is desired that the draft or suction of the burner shall be for a time increased and oxygen and hydrogen supplied to the burning fuel, the valve in steam-pipe 2 is further opened, when a stronger cur-

rent of steam will flow through pipe 2 and produce the extra draft or suction and will mix with the oil and air and waste gases and in the intense heat will be dissociated and consumed, thus adding to the heat of the furnace. When the greatest possible heat is not desired, the steam may be partly shut off. My apparatus therefore makes use of the initial fuel, oil, forced atmosphere, the air under pressure, the burnable portion of the products of combustion otherwise wasted, the heated gases from the uptake, and steam from the boiler, all intimately combined by mixture and burned in the free atmosphere of the furnace without being deadened by contact with cold grate-bars or furnace-walls. In this manner the best possible combustion is produced. In the uptake I place a damper 9, so as to regulate the natural draft so as not to lose too much of the waste gases. If desired, the steam may be superheated before entering the burner.

Having described my apparatus, what I claim is—

25 An apparatus for heating steam-boilers by use of oil as fuel consisting of a conduit arranged to convey a portion of the inflammable waste gases from the uptake of the boiler to the fire-box; an air-conduit inside the

waste-gas conduit arranged to convey air under pressure to said fire-box and terminating inside and short of the exit end of the waste-gas conduit; a steam-conduit inside of the air-conduit and terminating inside and short of the exit end of the air-conduit arranged to convey and discharge steam into the fire-box; an oil-conduit inside of the steam-conduit and terminating inside and short of the exit end of the air-conduit arranged to convey and discharge oil into the fire-box, all arranged and operating so that the oil air and steam discharges shall combine, produce a suction in the waste-gas conduit and draw the waste inflammable gases from the uptake and so that the oil-discharge shall be compelled to pass centrally into the rapidly-moving steam-discharge, both the oil and steam discharges into the air-discharge and these discharges thus combined into the waste-gas discharge, and having means for controlling these discharges substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN S. CHAPMAN.

Witnesses:

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A. M. TURNER.