

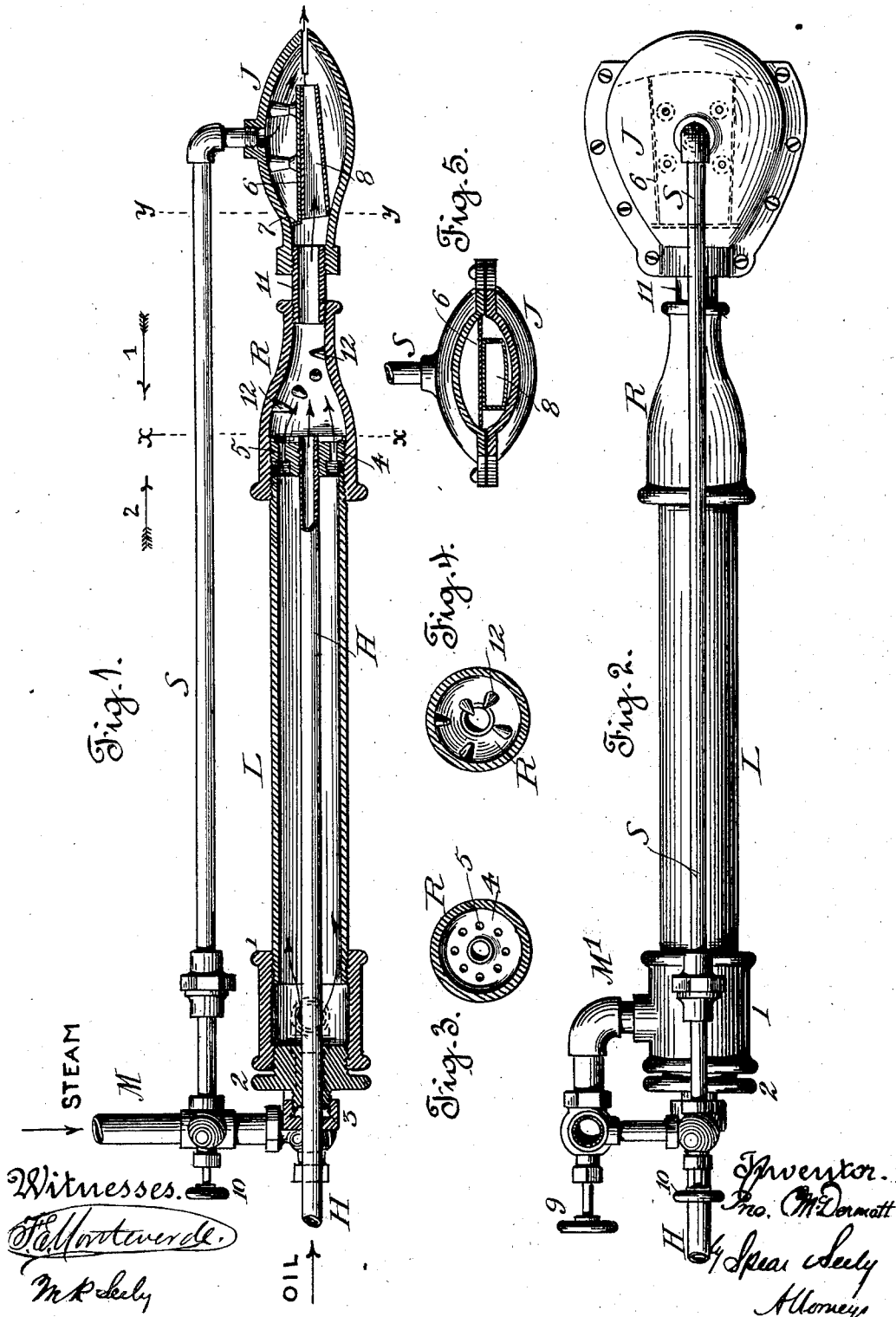
No. 727,415.

PATENTED MAY 5, 1903.

J. McDERMOTT.
OIL BURNER.

APPLICATION FILED FEB. 4, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

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OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 727,415, dated May 5, 1903.

Application filed February 4, 1902. Serial No. 92,540. (No model.)

To all whom it may concern:

Be it known that I, JOHN McDERMOTT, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

My invention relates to apparatus for burning oil as fuel, and more particularly to that type of such apparatus described and shown in an application for Letters Patent filed by me April 3, 1901, under the Serial No. 54,145. The main feature of that apparatus comprised a construction whereby oil escaping from an outlet at the end of a pipe or passage is mingled with steam at the point of exit and in a contracted mixing-space before reaching the burner proper, making an incomplete mixture of oil and steam, which I do not regard as suitable for combustion. This incomplete mixture is then carried beyond such space and into the burner proper, where it is subjected to a second and independent mixing and treatment with steam just before it escapes from the burner-orifice. This double treatment with steam produces marked and superior results in accomplishing the perfect combustion of the oil and the utilization of all the heat units, and this superior result is particularly marked in the case of crude heavy oil having an asphaltic base, such as is produced in great quantities on the Pacific coast and elsewhere. Actual practice has shown a substantially complete combustion of the oil without leaving any residuum in the form of coked or carbonized asphaltum, soot, &c.

My present invention is an improvement in details of construction, the essential features of the invention described in the application referred to being fully preserved.

In the accompanying drawings, Figure 1 is a longitudinal section. Fig. 2 is a plan. Fig. 3 is a cross-section at $x x$ of Fig. 1, indicated by arrow 1. Fig. 4 is the cross-section at $x x$ of Fig. 1, indicated by arrow 2. Fig. 5 is a cross-section at $y y$ of Fig. 1.

The oil-pipe H can be connected to any suitable oil-forcing pump, and an intermediate oil-heater can be employed for warming

the oil, as shown in my application referred to, or if the oil is of a kind which will feed freely it can supply the pipe H by gravity from an elevated tank. Surrounding the oil-pipe is another pipe or casing L of greater diameter, so that a space is left between. In actual construction a coupling 1 is threaded upon pipe L, which is closed by a cap 2, through which the oil-pipe passes, the cap being made tight by a stuffing-box 3. The forward end of the oil-pipe projects beyond the casing L and enters and is supported by a plug or diaphragm 4, having a series of perforations 5 and an external screw-thread. The contracted space or chamber in which the first mixture of oil and steam is made is a tapered coupling R, having an internal thread and so connected to the end of pipe L and also to the diaphragm 4. The latter has a cupped or beveled inner edge, so as to make a smooth joint with the inner surface of coupling R. The burner J is preferably connected to coupling R by a threaded sleeve 11. This burner is in general shape and construction similar to the one described and shown in the application before referred to, but differs in details of construction. It is composed of two concavo-convex plates, having side flanges by which they are secured together and which are rabbeted at their adjoining front edges to produce a long curved slit, which is the burner-orifice. Extending across the interior is a horizontal deflecting-plate 6, turned up and closed at the rear, as shown at 7, which extends nearly to the burner-slit. Beneath this deflector is a shallow slightly-tapered open-ended box or passage 8, which, like a nozzle, directs the mixture of oil and steam to the slit.

M represents a steam-pipe having a regulating-cock 9 and a branch M', which enters the coupling 1, and so supplies steam to the space around the oil-pipe. Another steam branch S extends from pipe M, enters the burner J on top and immediately above the deflector 6, and is provided with a regulating-cock 10.

In operation the burner is properly set under the boiler, passing through the furnace-door or furnace-wall, and oil is admitted to

the pipe H under pressure of the pump or otherwise. Steam is admitted in regulated quantity through both steam branches. The steam in the space surrounding the oil-pipe escapes in jets through the holes in the plug and mingles with the oil as it leaves pipe H. This first mingling takes place in the contracted space beyond the oil-outlet, the inner wall of which is studded with any sufficient number of projections or pins 12, preferably spirally disposed. The contraction of this space tends to retard the flow of the mixture, and a more or less thorough but still incomplete mingling takes place, the oil being partially broken up into globules enveloped in steam, in which action the projections 12 assist.

In oil-burners now operated with steam combustion of this mixture is attempted; but although the mixture will burn the atomization is not complete enough for perfect combustion, and this is proven by the smoke composed of unconsumed carbon and watery vapor invariably given off at the furnace-stack. I make no attempt to burn this mixture; but instead I allow it to pass into the burner proper and through the narrow passage 8. Just before it escapes from the burner the mixture is struck, penetrated by, and mingled with the altogether independent steam-supply from the branch S, which, deflected by the plate 6, has a general course toward the orifice. The effect of this second treatment is to completely break up the globules and atomize the oil, so that what actually issues from the orifice is really an oil-and-water gas of a quality that is perfectly combustible and burns without residuum and practically without smoke. The tangible result is a fan-shaped combustion which can be manipulated through the controlling-cocks from a feeble candle-like appearance to a fierce flame many feet long and of great intensity. All this is accomplished without any blowpipe action or forcing by the steam, such as is the case when steam is admitted behind the oil as a feeding and propelling force.

The influence of the steam as a feeding

means, if there is any, is merely incidental, as the injective action at the oil-outlet is very slight.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an oil-burner, a steam-chamber, a contracted mixing-tube connected to its forward end, a burner connected to said mixing-tube, a steam-pipe entering said steam-chamber near its rear end, a branch from said pipe entering directly into the burner and an oil-pipe passing through the steam-chamber and into the mixing-tube.

2. In an oil-burner, a steam-chamber, a steam-pipe entering such chamber near the rear end thereof, a contracted mixing-tube with which the front end of said chamber communicates, a perforated diaphragm adjacent to said front end, an oil-pipe passing through said chamber and having its front end supported by said diaphragm, a burner connected to the mixing-tube, and a steam-pipe directly connected to the burner.

3. A burner comprising a hollow chamber having a narrow slot or burner-orifice, an inlet for oil and steam thereto, a separate inlet for steam directly thereto so that steam admitted through said separate inlet will be mixed with oil and steam in the burner itself, a deflector within the burner and opposite the steam-inlet, and a passage or nozzle within the burner and adjacent to the said deflector.

4. In an oil-burner the combination with an oil-pipe and a steam-space surrounding it, of a contracted mixing-tube connecting with both oil-pipe and steam-space, a burner-chamber beyond and connected to the contracted mixing-tube, and interior superficial projections in said mixing-tube between the oil-pipe and the burner.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 8th day of January, 1902.

JOHN McDERMOTT.

Witnesses:

L. W. SEELY,
J. J. BURT.