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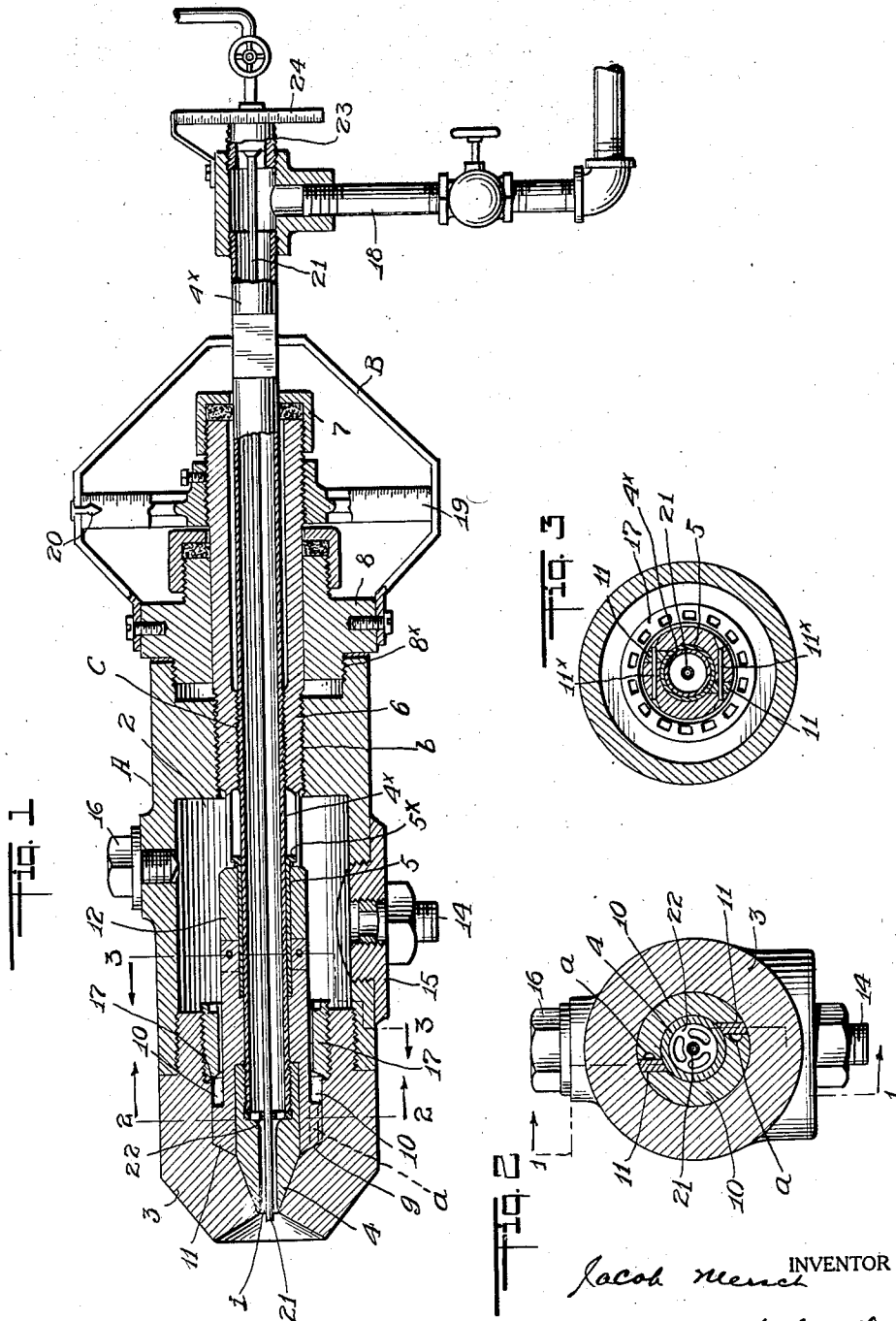
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J. MERSCH

OIL BURNER

Filed Aug. 24, 1923

2 Sheets-Sheet 1



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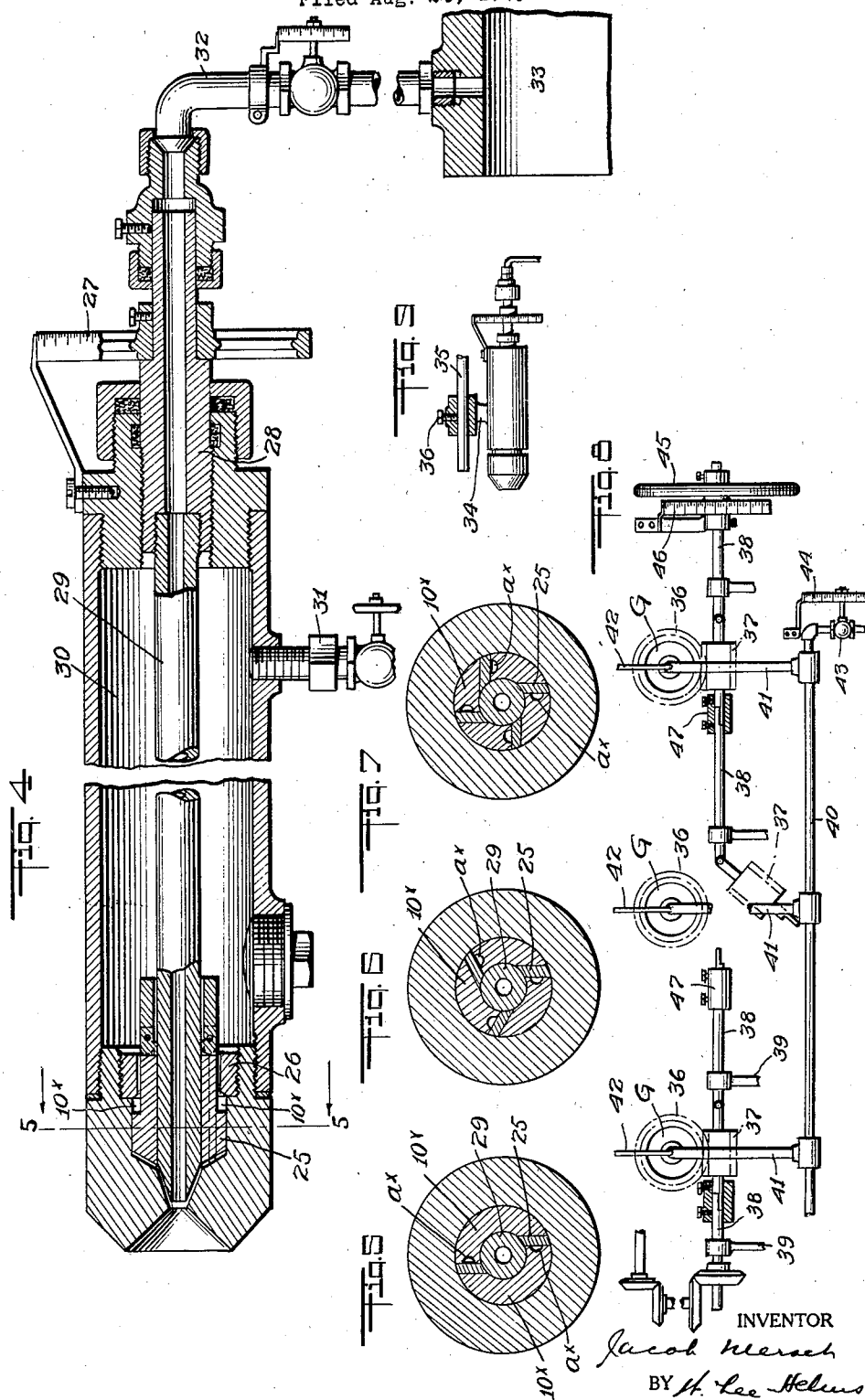
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UNITED STATES PATENT OFFICE.

JACOB MERSCH, OF JERSEY CITY, NEW JERSEY.

OIL BURNER.

Application filed August 24, 1923. Serial No. 659,033.

To all whom it may concern:

Be it known that I, JACOB MERSCH, a citizen of the United States, residing in Jersey City, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

This invention has for its object to provide a burner adapted for crude oils and to atomize the oil either by mechanical action or by the action of steam, or both. A further object of the invention is to provide a novel form of means for relieving excess pressure of the oil at the atomizing point by permitting a back flow of oil through a needle valve rod forming part of the burner, and thence to a steorage compartment. A further object is to provide means for varying the area of oil conduits leading to the burner opening in proportion with changes in the size of the opening. Further objects will hereinafter appear.

Reference will be made in this specification to the accompanying drawings, in which—

Fig. 1 is a longitudinal section through a burner constructed in accordance with the invention, and on the line 1—1, Fig. 2.

Fig. 2 is a cross section on the line 2—2, Fig. 1.

Fig. 3 is a cross section on the line 3—3, Fig. 1.

Fig. 4 is a longitudinal section through a modified, and simplified, form of the burner.

Fig. 5 is a cross section on the line 5—5, Fig. 4.

Fig. 6 is a cross section of the burner shown in Fig. 5 modified by the addition of a third oil feed duct and controlling valve blade therefor.

Fig. 7 is a view similar to the preceding view showing in cross section four oil feed ducts, and four controlling valve blades.

Fig. 8 is a diagrammatic view of a battery of the burners and means for simultaneously adjusting them.

Fig. 9 is a side elevation of the burner illustrated in Fig. 4 together with a convenient form of support therefor, providing for endwise movement of the burner relatively to the support.

Referring to Fig. 1 it will be seen that the embodiment of the invention therein shown comprises a main cylindrical body A having an inner central chamber 2 threaded toward its front end to receive the thread-

ed burner head 3. The burner head has a conical discharge orifice into which fits the conical head 4 of a hollow needle valve, the valve comprising the tube 4* which projects rearwardly of the main casing A. When tube 4* is moved rearwardly from its position shown in Fig. 1, it will carry with it the needle valve head 4 into which it is threaded. Mounted to slide upon tube 4* is a sleeve 5 having a flanged end 5*, the flange affording a connecting means for the complementary flanged annular head of an adjusting sleeve 6 which surrounds needle valve tube 4* and is both threaded on the tube and in the burner casing A. The two sets of threads are of different size to effect a specific result, as will hereinafter appear. At the rear end of the adjusting sleeve 6 a packing gland 7 is placed. At its rear end the burner casing A is closed by a plug 8 threaded at 8* within the casing and surrounding adjusting sleeve 6, a packing gland 9 being employed to seal the outer end of the plug.

The oil is fed from chamber 2 to the burner nozzle via oil ducts formed in the sides of the two halves of a sleeve 10, the ducts being denoted by the letter *a*. The sleeve 10 surrounds the head 4 of the needle valve, and its two halves are separated by adjusting valve blades 11 which lie adjacent the oil ducts *a*.

Each adjusting valve blade 11 is secured by a pin 11* to a sleeve 12 surrounding and sweated upon sleeve 5. Thus the endwise adjustment of the adjusting valve blades is controlled by adjusting sleeve 6.

In Fig. 1 the needle valve and adjusting valve blades are in closed position. When, however, adjusting sleeve 6 is rotated, both the adjusting valve blades and the needle valve will be moved to the right from the position shown in Fig. 1, the valve blades moving faster than the needle valve. This result is effected by the fact that the threads *b* on the exterior of the adjusting sleeve 6 are coarser than the threads *c* by means of which the needle valve is connected to the adjusting sleeve, and by the further fact that the needle valve is held against rotation by a member B which engages the squared section thereof.

In their movement from the right to the position shown in Fig. 1 the adjusting valve blades expose the front ends of the oil ducts *a* and permit the flow of oil somewhat

tangentially of the conical face *g* of the burner head thus causing a whirling motion of the oil, the oil then passing along the more restricted conical portion of the burner head from which it emerges in a spray, which spray is induced by pressure upon the oil and the mechanical action of the burner head. The oil may be led into oil chamber 2 through a port 14 in a plug 15 or at any other suitable point, such as the opening closed by stud bolt 16.

By means of plug 15 ready access may be had to chamber 2 for the operation of an adjusting nut 17 which has a conical inner face corresponding with the similar rear face of the sleeve 10, the front face of the sleeve 10 likewise being conical. Thus by rotating adjusting nut 17 so as to move it inwardly the two halves of the split sleeve 10 will be moved toward the adjusting blades so that the walls of said blades will effectually close the oil ducts *a* against the passage of oil except when the blades are moved rearwardly of conical wall *g* of the burner head.

As hereinbefore stated, my device comprises means for relieving undue pressure of the oil at the atomizing point, which pressure might tend to prevent complete atomization by the forcing of a core of unatomized oil through the oil spray, which core by its weight would fall in drops upon the lower furnace wall. The means in question comprises the tubular needle valve 4, 4*. When the needle valve is rearwardly moved from its position, Fig. 1, to permit passage of the oil about its conical head, communication will be effected between the outer portion of the head and the inner passageway *i*, leading throughout the length of the needle valve to a pipe 18 which may communicate with a storage tank. When the flow of oil, or the pressure of the oil becomes such that the oil is not completely atomized, a back pressure will be created which will carry the excess oil into passageway *i* and thence to the storage tank, as will be understood by those skilled in the art.

I have secured upon the rearward extension of adjusting sleeve 6 a dial wheel 19 which in co-action with arrow 20 on member B will serve to indicate to the operator the exact adjustment of the needle valve and adjusting valve blades.

As hereinbefore set forth, my device comprises means for both the mechanical and steam atomization of the oil. For the purpose of steam atomization, I have provided a steam pipe 21 which extends throughout the length of the needle valve and is supported in the needle valve head by a disk 22 having a central aperture for the passage of the same pipe and apertures on each side thereof for the passage of the oil in its back flow. The rear end of the steam pipe com-

municates with an adjusting nut 23 controlled by dial wheel 24, by means of which the longitudinal position of the steam pipe may be adjusted.

In Fig. 4 I have illustrated a simplified form of my device, as adapted for mechanical atomization of the oil. In the form of device therein shown, the adjusting valve blades 25 are set in their position and then locked by means of the nut 26 which acts upon the two halves of the sleeve 10* to move them toward each other, thus exerting a clamping action upon the blades. The opening and closing of the burner is then effected by rotation of wheel 27 fixed upon the hollow shaft 28 into which the hollow needle valve 29 is threaded. Oil may be led into oil chamber 30 via pipe 31. The oil is led through oil ducts *a** and thence to the burner nozzle and the excess oil passes through the hollow needle valve and thence is directed to a pipe 32 leading to a chamber indicated at 33.

In Figs. 6 and 7, I have shown my device provided with more than two oil ducts and controlling blades, providing for a greater flow of oil. In Fig. 9, I have shown a convenient method of supporting the burner, this comprising a bracket 34 having an aperture to receive the supporting rod 35, the bracket being held upon the rod by means of a screw 36.

In Fig. 8, I have shown means for simultaneously operating a plurality of the burners, the burners being indicated by G. In this case the adjusting wheel for each needle valve is formed as a worm wheel 36 engaged by worm 37 on a shaft 38 supported by brackets 39. Oil is led from the burners through a main pipe 40 and branch pipes 41, and steam is led from the burners through steam pipes 42. The flow of oil through main pipe 40 is controlled by valve 43 having a dial wheel 44, and the adjusting shaft 38 is controlled through a hand wheel 45 adjacent a dial wheel 46 which indicates the exact position of the adjusted elements. Shaft 38 is formed in sections connected by sleeves 47, so that each worm 37 may be carried out of engagement with its appropriate worm wheel 36 for manipulation and repositioning of the latter.

It will be understood that, if desired, a stream of air under pressure may be passed through steam pipe 21, as a substitution for the flow of steam.

It will be also understood that various modifications may be made in the form of the embodiments illustrated in the drawings without departing from the spirit of my invention, what I claim and desire to secure by Letters Patent being as follows:—

1. In an oil burner a barrel having an inlet and a discharge outlet, a needle for con-

trolling the discharge outlet and formed as a tube, a sleeve surrounding the needle and formed with a longitudinally extending oil duct, a controlling blade adjacent to and
5 movable longitudinally of said oil duct, and means for simultaneously adjusting the needle and the blade.

2. In an oil burner a barrel having an inlet and a discharge outlet, a needle for controlling the discharge outlet, a sleeve surrounding the needle and formed with a longitudinally extending oil duct, a controlling blade adjacent to and movable longitudinally of said oil duct, and means for simultaneously moving said blade and needle at
15 relatively different speeds.

3. In an oil burner a barrel having an inlet and a discharge outlet, a needle for controlling the discharge outlet, a sleeve surrounding the needle and formed with a longitudinally extending oil duct, a controlling blade movable to provide a passage intermediate said oil duct and the needle, an adjusting member surrounding the needle and
20 threaded thereon and also threaded within the barrel, and means for preventing rotation of the needle during the rotation of the adjusting member.

4. In an oil burner, a barrel having an inlet and a discharge outlet, a needle for controlling the discharge outlet and formed as a tube having its rear end projecting through the barrel and provided with an outlet for oil, means for effecting a flow of
35 oil intermediate the needle and discharge outlet, means for imparting endwise movement to the needle, a pipe supported within and extending longitudinally of the needle and having its outlet beyond that of the needle, a direct connection exterior of
40 the barrel for said pipe and a source of steam supply, and means for imparting endwise movement to said pipe.

5. In an oil burner, a barrel having an in-

let and a discharge outlet, a needle for controlling the area of the discharge outlet, the said needle having a conical head, oil ducts leading to said discharge outlet exteriorly of the needle head, endwise movable blades adapted to adjust the area of the oil ducts,
45 and means for simultaneously effecting a bodily movement to the needle and to said blades.

6. In an oil burner, a barrel formed with an inlet and with a conical discharge outlet, an endwise adjustable needle within the barrel and having a conical head for co-action with the conical discharge outlet, a sleeve surrounding the needle and having its forward face abutting a wall of the barrel, oil
55 ducts formed in said sleeve, endwise movable blades for controlling the flow of oil through said ducts and means for simultaneously imparting endwise movements to the needle and said blades, the needle being provided with a passage for the back-flow of
60 oil, substantially as described.

7. In an oil burner, a barrel having an inlet and a discharge outlet, a tubular needle for controlling the discharge outlet, the needle having a conical head, means for effecting a flow of oil intermediate the walls of the discharge outlet and the needle head, means for effecting endwise adjustment of the needle, a steam pipe disposed longitudinally within the needle and having its
75 outlet beyond that of the needle, the conical head of the needle in coaction with the walls of the barrel permitting a back flow of oil from the discharge outlet and through the needle longitudinally of the steam pipe.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB MERSCH.

Witnesses:

FREDERICK CRYER,
R. M. WALKER.