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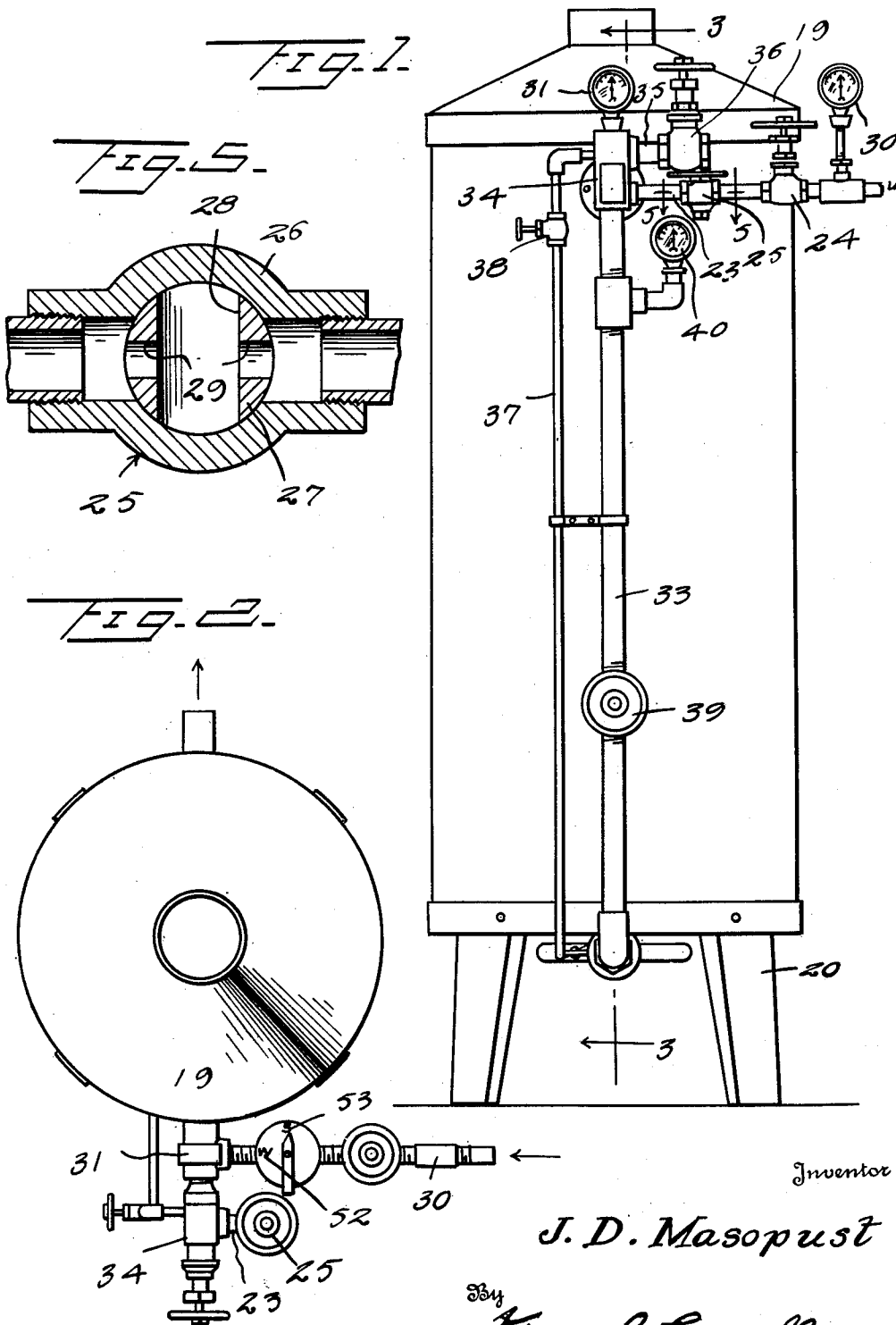
J. D. MASOPUST

2,604,881

STEAM CLEANER

Filed Aug. 26, 1949

2 SHEETS—SHEET 1



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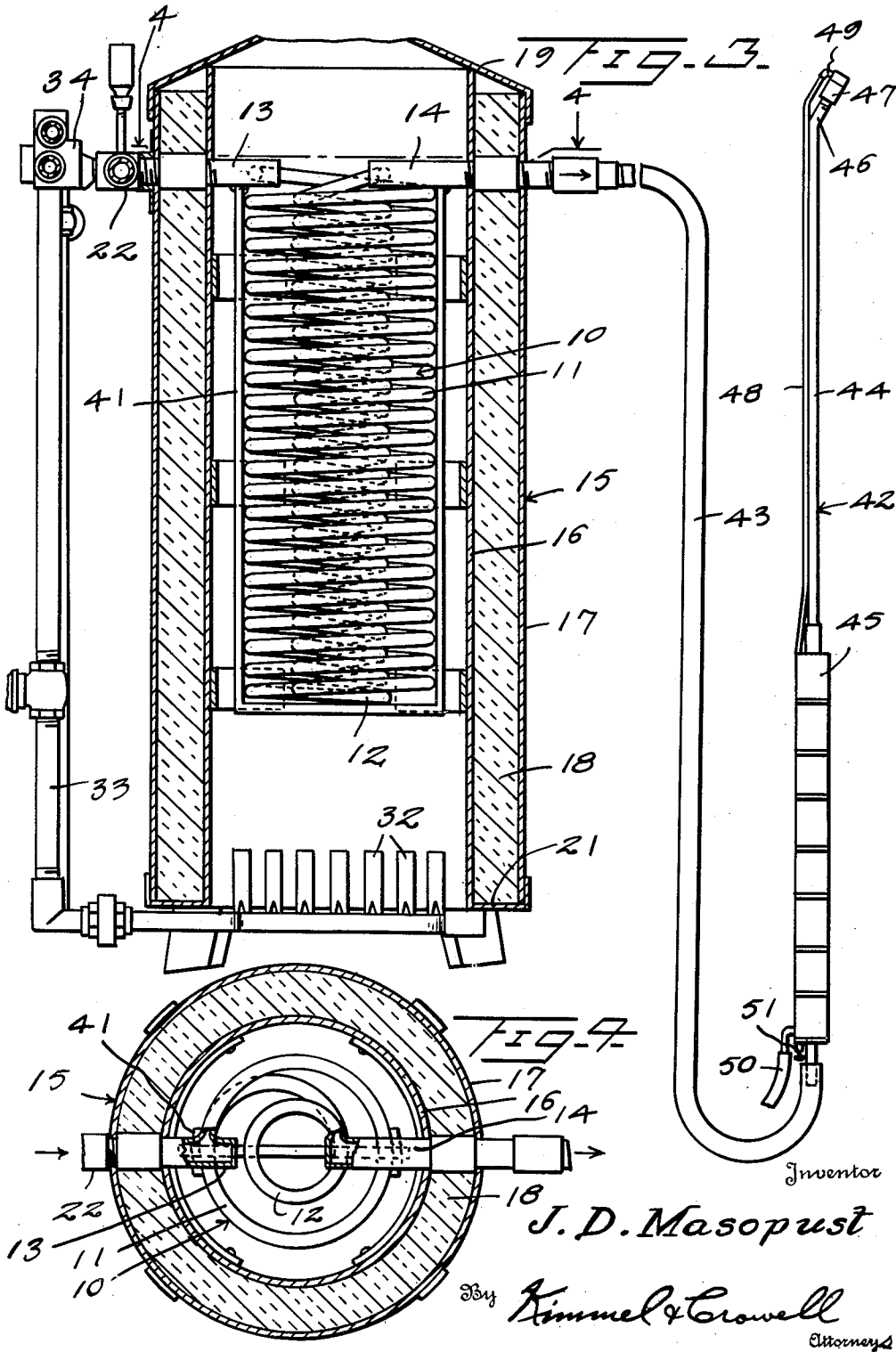
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2 SHEETS—SHEET 2



UNITED STATES PATENT OFFICE

2,604,881

STEAM CLEANER

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1 Claim. (Cl. 122-510)

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This invention relates to a combined hot water and steam generator.

An object of this invention is to provide a device which will provide either hot water or steam for cleaning or other purposes which is automatic in operation.

Another object of this invention is to provide in a device of this kind an improved coil wherein the incoming cold water travels downwardly through an outer coil so that the cold water will be preheated before entering an inner coil at the bottom of the latter and will quickly turn to steam as the preheated water rises in the inner coil.

A further object of this invention is to provide in an apparatus of this kind an improved metering valve which in one position thereof will pass only sufficient water to the coils for generation into steam, and in another position thereof will pass water in a quantity for heating hot water, the temperature of the latter being controlled by a thermostat connected to the coils and to the fuel line.

A further object of this invention is to provide a combined hot water and steam generator wherein steam may be quickly generated and the pressure of steam is determined by means of a pressure gauge mounted in the water intake line.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claim.

In the drawings,

Figure 1 is a detail front elevation of a combination hot water and steam generator constructed according to an embodiment of this invention,

Figure 2 is a plan view of the device,

Figure 3 is a sectional view taken on the line 3-3 of Figure 1,

Figure 4 is a fragmentary sectional view taken on the line 4-4 of Figure 3,

Figure 5 is a fragmentary sectional view taken on the line 5-5 of Figure 1.

Referring to the drawings, the numeral 10 designates generally a double heating coil which is formed of an outer coil 11 and an inner coil 12. The inner coil 12 is connected with the lower end of the outer coil 11, and the outer coil 11 is connected at its upper end to a water intake pipe 13 whereas the upper or outlet end of the inner coil 12 is connected to an outlet pipe 14.

The double coil 10 is mounted within an insu-

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lating housing generally designated as 15, which includes an inner jacket 16, an outer jacket 17, and heat insulating means 18 disposed between the two jackets 16 and 17. The housing 15 includes a substantially conical top 19 and is open at the bottom. The casing or housing 15 is supported from a base 20, in the present instance constructed in the form of at least three legs which are secured to the bottom 21 of the housing 15.

The intake pipe 13 extends through the upper portion of the housing or casing 15 and is connected to a T-coupling 22 with which a fluid supply pipe 23 is connected. A cut-off valve 24 is interposed in the liquid supply pipe 23 and a metering valve generally designated as 25 is interposed in the pipe 23 between the valve 24 and the coupling 22. The metering valve 25 shown in horizontal section in Figure 5, includes a housing 26 within which a valve plug 27 is rotatably disposed. The plug 27 is formed with a relatively large port 28 therethrough so that the full volume of water in pipe 23 may freely pass through the housing 26. At this time the water entering the double coil 10 will be heated to the desired degree which will be short of generation into steam.

Where it is desired to generate steam in the coil 10, the valve plug 27 is turned to dispose the port 28 at right angles to the length of the pipe 23 and at this time the water is adapted to flow through a relatively small bypass port 29 which extends through the plug 27 at right angles to the port 28. The port 29 will reduce the volume of water passed to coil 10 so that the water in coil 10 will be generated into steam.

A water pressure gauge 30 is connected with the pipe 23 outwardly from cut-off valve 24 and a steam pressure gauge 31 is connected with the T-coupling 22. The gauge 31 is placed at the intake end of the coil 10 so that the back pressure of steam in coil 10 can be readily indicated rather than the pressure at the outlet side or end of the heating coil 10.

A gas burner 32 is disposed in the lower portion of the housing or casing 15 and is connected to an upwardly extending pipe 33 which is connected to a thermostat housing 34. The thermostat housing 34, as shown in Figure 3, is also connected with the intake coupling 22 and the thermal element in this coupling or housing 34 which is of conventional construction is adapted to extend into the T-coupling 22 so that the thermal unit will be actuated by the tem-

perature of water in coupling 22 and also in the intake pipe 13.

The thermal member 34 includes a conventional thermostat operated valve and the thermal member 34 has connected thereto a fuel supply pipe 35 in which a fuel cut-off valve 36 is interposed. A relatively small pilot pipeline 37 is connected with the thermostat member 34 having a regulating valve 38 interposed therein and the pipe 37 extends downwardly to the burner 32 for maintaining a pilot light to assure the lighting of the main burner 32 when thermostat valve 34 is opened. Pipe 33 has a manual valve 39 interposed therein, whereby the gas supply to burner 32 may be cut off and a gas pressure meter 40 is connected with pipe 33 for indicating the gas pressure leading to the gas burner 32.

The heating coil 10 is suspendingly supported in the housing or casing 15 by means of a U-shaped support 41 which has the parallel legs thereof welded or otherwise firmly secured to the intake and outlet pipes as shown in Figure 3. A spray unit generally designated as 42 is connected with the outlet pipe 14 by a flexible hose 43. The spray unit 42 includes a pipe 44 extending through a tubular heat insulating handle 45, and the outer end of pipe 44 is bent on an obtuse angle as indicated at 46 and a spray or jet member 47 is secured to the obtuse extension 46.

In order to provide for mixing of a cleaning fluid with the water or steam passing through the pipe 44, I have provided a cleaning fluid conducting pipeline 48 which extends substantially parallel with pipe 44 and terminates at its forward or outer end in a right angular connection 49 discharging into the spray or jet nozzle 47. The cleaning fluid conducting line 48 extends through the handle 45 and is adapted to be connected to a source of cleaning fluid supply by means of a flexible hose 50. A spring-pressed normally closed valve 51 is connected with the rear end of the pipeline 48 so that the operator may closely regulate the quantity of cleaning fluid which is to be discharged for mixture with the hot water or steam discharging from the nozzle 47.

In the use and operation of this device where it is desired to produce hot water, valve 25 will be turned to the W position shown by numeral 52 in Figure 2. At this time valve plug 27 will be turned to align port 28 with pipe 23. The incoming water will flow downwardly through the outer coil 11, being gradually heated as it flows down-

wardly and will then pass into the lower end of inner coil 12. The water will be discharged from the upper end of coil 12 into outlet pipe 14 and may then be discharged from jet or nozzle 47. Where it is desired to generate steam, valve plug 27 is turned to the S position as shown at 53 in Figure 2. In this latter position valve plug 27 will be in a position shown in Figure 5 where the restricted port 29 will be in communication with pipe 23 to provide for a restricted flow of water to coil 10. As the restricted water flows downwardly in outer coil 11, this water will be heated to a relatively high degree and will be generated into steam in substantially the lower region of coils 11 and 12.

I do not mean to confine myself to the exact details of construction herein disclosed, but claim all variations falling within the purview of the appended claim.

What I claim is:

A heat insulating casing and coil for a fluid heater, said coil being positioned in said casing and formed of connected together inner and outer coils, a horizontal intake pipe connected to the upper end of said outer coil, a horizontal outlet pipe oppositely positioned and aligned diametrically with said intake pipe connected to the upper end of said inner coil, an integral U-shaped coil support having one end dependingly secured to said intake pipe and its other end dependingly secured to said outlet pipe, the bight of said U-shaped coil support extending diametrically beneath the bottom of both of said coils, and a fluid supply line connected with said intake pipe.

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