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1,743,245

APPARATUS FOR SPRAYING LIQUIDS

Filed Dec. 4, 1925

3 Sheets-Sheet 1

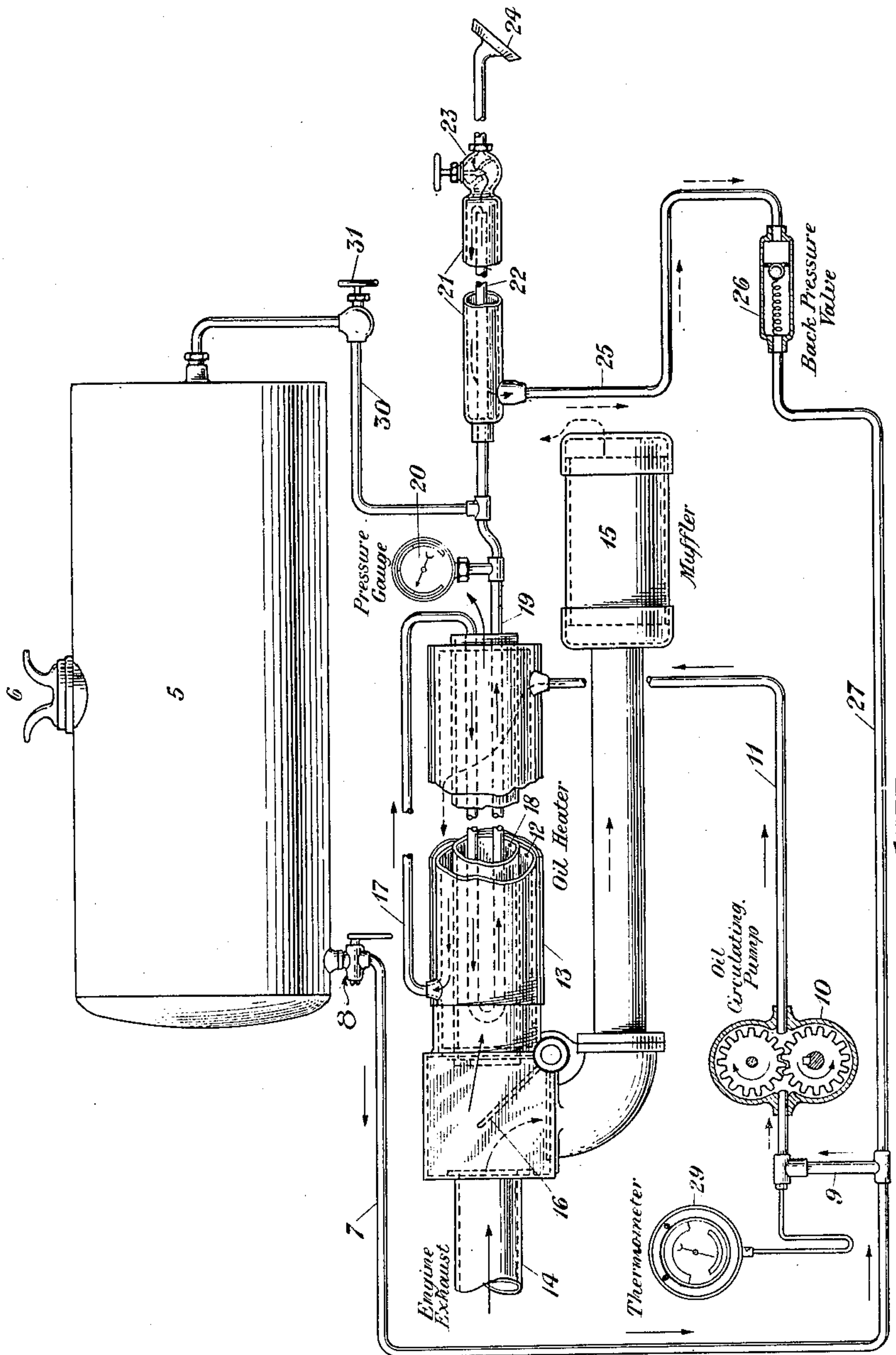


Fig. 1

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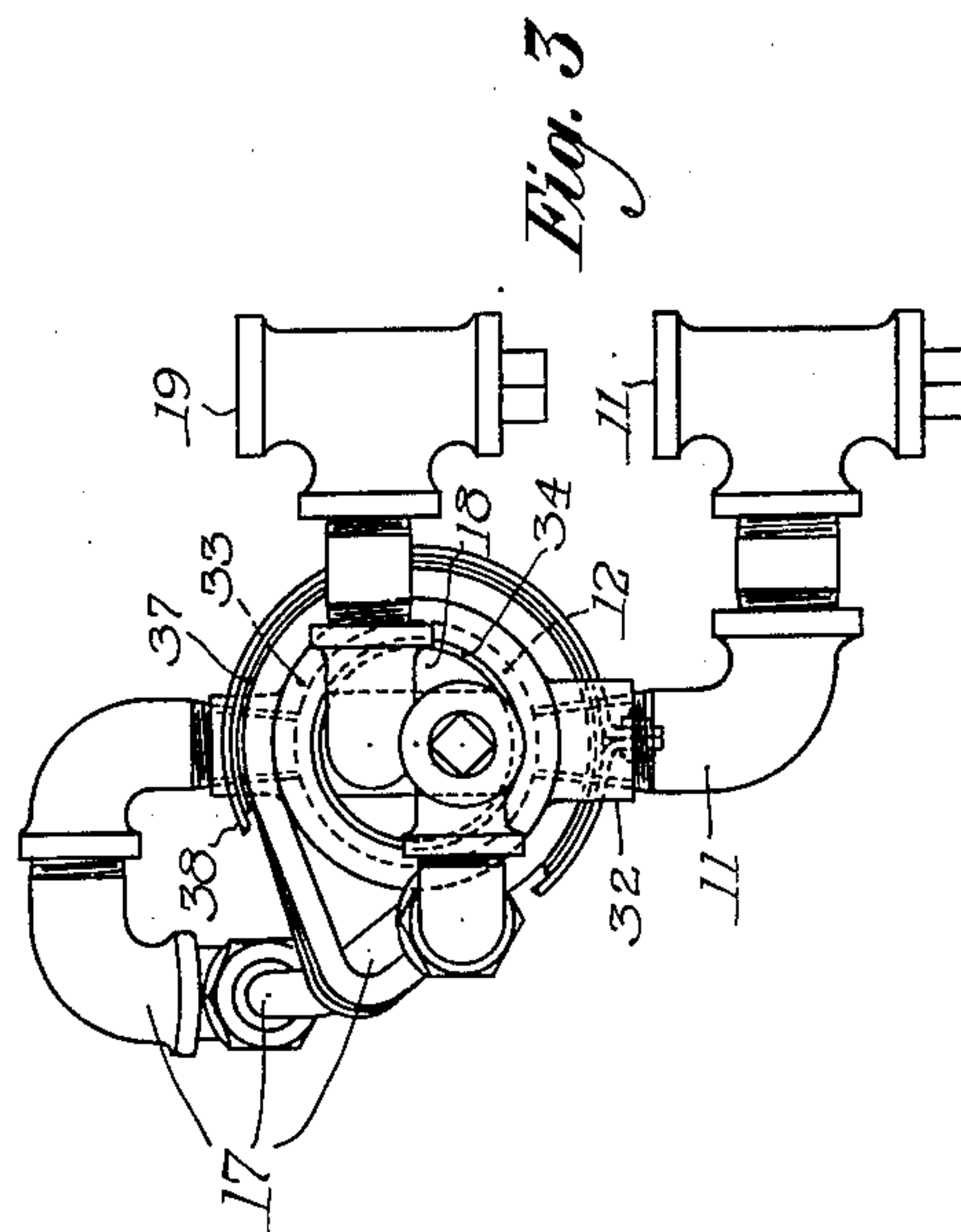
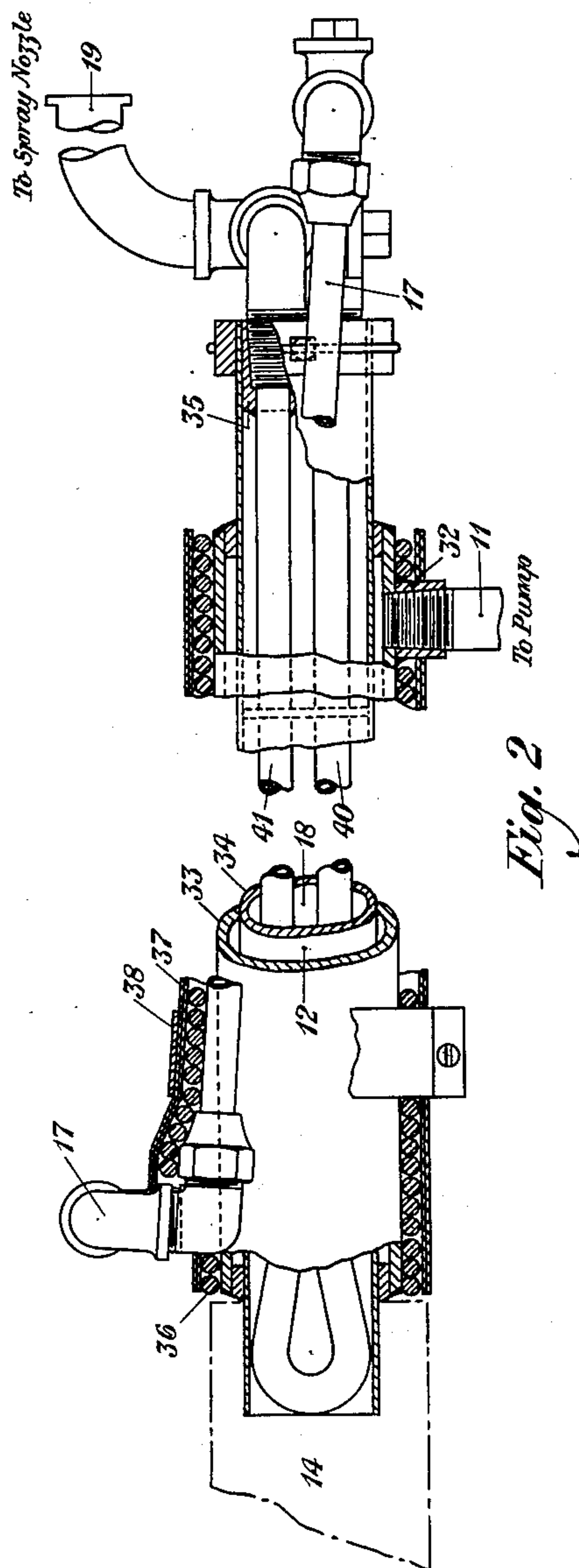
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3 Sheets-Sheet 3

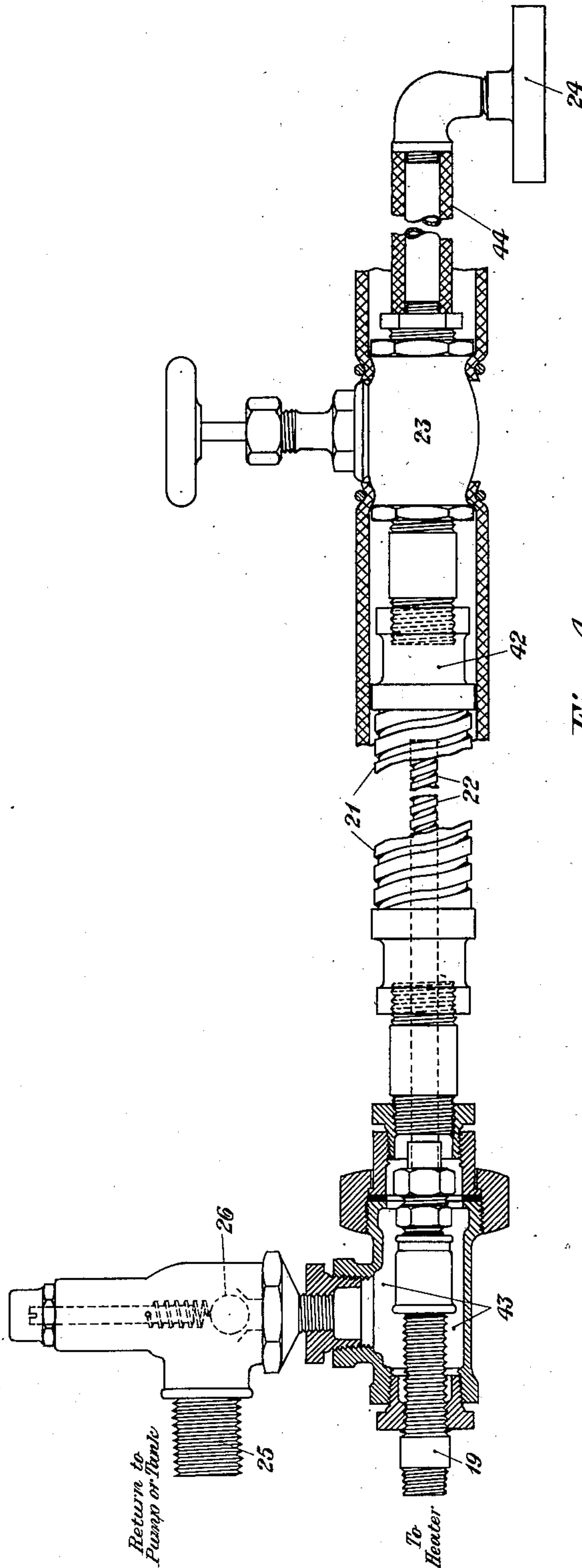


Fig. 4

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APPARATUS FOR SPRAYING LIQUIDS

Application filed December 4, 1925. Serial No. 73,250.

This invention relates to apparatus for spraying liquid on poles or other timber to preserve them from decay.

5 An object of the invention consists in providing an improved system through which spraying liquid is circulated.

Another object consists in providing improved pumping and heating equipment in connection with the circulating system.

10 A further object consists in providing mechanism for determining the temperature and pressure of the liquid in its passage through the circulating system.

Other and further objects will be appar-
15 ent from the following description, when considered in connection with the accompanying drawings, in which one embodiment of the invention is illustrated.

In the drawings, in which like characters
20 of reference designate like parts throughout, Figure 1 is a schematic view of a reservoir for holding the liquid to be sprayed, and the associated circulating system through which said liquid passes; Fig. 2 is a sectional view
25 of the heater assembly; Fig. 3 is an end view thereof; and Fig. 4 is a sectional view of the spraying attachment assembly.

Referring to the drawings, the numeral 5
30 represents a reservoir in which the liquid to be sprayed is contained. The liquid in this instance may be creosote, which is heated and applied in that state to poles or other timber in a manner to be presently described.

The unit comprising the reservoir 5 and its
35 associated equipment may be mounted on a motor-driven vehicle, and the flow of creosote or other wood preservative contained in the reservoir is controlled by a gear pump driven from the engine of said motor vehicle, while
40 a heater associated with the exhaust of said engine controls the temperature of the liquid which can be maintained at any point desired by controlling the retardation of the spark and the speed of the engine. A retarded
45 spark, or greater engine speed, causes the oil to heat more rapidly.

Referring to the schematic view of Fig. 1,
the liquid to be sprayed may be introduced
50 through a suitable cap 6 positioned on top of the reservoir 5. The circulating system for

the liquid extends from one end of said reservoir through the conduit 7 and is controlled by a valve 8 positioned on the bottom and near one end of the reservoir. The circulation of the oil continues from the conduit 55 7 to the conduit 9, thence through the circulating pump 10 through which it is introduced into pipe 11 by the gear teeth of the pump, which may travel in the direction indicated by the arrows applied to the gear members of 60 said pump. The flow of oil continues from the pipe 11 through the outer chamber 12 in a cylindrical tubing of a heater 13, which is controlled by heated gases incoming through the engine exhaust pipe 14. The other end of 65 the pipe 14 may be connected to a gasoline driven engine and the heated gases from the exhaust may be diverted through a muffler 15 when they are not employed for heating the unit 13. A heat control valve 16 is pivotally 70 associated with the heater at the point of connection with the exhaust pipe, in such manner that in its open position it permits the heated gases from the engine exhaust to pass through the chambers of the heater to 75 control the temperature thereof, and in its closed position said valve will cut off the heated gases from the heater so that said exhaust gases will escape through the muffler 15 in the well understood manner. The circulation of oil continues from the outer chamber 80 12 of the heater through the pipe 17 and again enters the heater 13 through an inner chamber 18 of an inner tubing lying concentrically within the outer tubing. The 85 pipe 17 extends horizontally within the inner chamber and is turned upon itself so that two parallel pipe lines are positioned therein. The outgoing portion extends from the end of the heater as shown by the numeral 19, and 90 the circulating system passes the pressure gauge 20 and continues through an inner metal hose 22 to an oil valve 23 and an outer hose 21 provides for a return flow of the oil as 95 will presently appear. The operation of the valve 23 permits the passage of oil through the spray nozzle 24. The passage of oil in the main circulating system through the heater 13 causes it to be heated thereby and be 100

sprayed in this condition through the nozzle. Between the valve 23 and the portion of the pipe line indicated by the numeral 19, a by-path 25 forms with the system just outlined an auxiliary system. A back pressure valve 26 is associated with the by-path and this path then extends through pipe 27 and pipe 9 and back through the oil circulating pump 10 and over the circulating path previously described. The oil return circulating system through the outer hose 21 through the pipes 25 and 27 permits excess return circulation of the oil which is not permitted to flow through the valve 23 and spray nozzle 24, and in its return passage it co-operates with the normal flow of oil from the reservoir through the pipe 9 and pump 10 over the main circulating system, so that an amount of oil in heated condition is always in readiness at the valve 23 to compensate for the amount which may be sprayed through the nozzle 24. A thermometer 29 is associated with the pipe line 9 so that the temperature of the circulating oil may be readily determined, and the pressure gauge 20, which is associated with the pipe 19, registers the pressure at which the oil is circulated through the system. A return system is provided for the reservoir 5 through the pipe 30, and the circulation of the oil to the return system is controlled by the valve 31. Thus, when it is desired to preheat the oil before it is sent through the spray nozzle, the valve 31 is opened and in this position will short-circuit the flow of oil, previously mentioned, through the spray nozzle 24 and return by-path and divert the flow through the opposite end of the reservoir 5 so that the circulation of the oil extends from one end of the reservoir through the circulating pump 10 and heater 13 and main circulating system to the opposite end and through the reservoir.

In Fig. 2, which illustrates the improved form of heater adapted to be used in connection with the circulating system, the pipe 11, which extends from the circulating pump as shown in Fig. 1, has its threaded end in engagement with the pipe sleeve 32, which enters the outer chamber 12 of the heater 13. The heater 13, which is shown in Fig. 2 as having two ends with its central portion broken away, may be of any desired length and may comprise an outer tube 33 and an inner tube 34. The tubes or jackets 33 and 34 may be made of standard tubing and extend approximately the entire length of the heater in concentric and suitably fixed spaced relation to each other. The left end of the outer tube 33 may have a collar fastened between it and the inner tube 34, and a coupling 35 may be provided intermediate the concentric tubes at the opposite or right ends of said tubes and tight joints are further provided at either end by soldering or brazing the members together. The tight closure thus provided for

the space between the two concentric tubes prevents the escape of the liquid in its circulation through the outer chamber 12. An insulating covering 36, which may be composed of any suitable material, such as twisted asbestos wicking, is applied to the outer surface of the tube 33 and over this may be placed a covering of asbestos cloth 37, and a wrapping clip 38 of sheet iron may provide an exterior covering for the insulating cloth 37.

The circulating system for the liquid extends from the pipe 11 through the outer chamber 12 between the outer tube 33 and the inner tube 34, thence to pipe 17 which is suitably connected with the chamber 12. The circulating system continues from the pipe 17 through the inner chamber 18 of the heater in a copper tubing 40, which extends from the right end of the heater toward the exhaust pipe, at which point the tubing 40 is bent upon itself, and returns by a parallel tubing 41 which is connected to the pipe 19 leading toward the spraying nozzle 24 and reservoir 5, as referred to in connection with Fig. 1. The connection of the tubes 40 and 41 to the outside pipes 17 and 19, respectively, may be made by any suitable standard pipe fittings.

Pipe 19 is connected by suitable conduits to the nozzle equipment assembly shown in Fig. 4 and the circulating system for the liquid continues from the pipe 19 through a T-union in valve 26 to an inner flexible hose 22, which is secured to said valve by suitable couplings. The hose 22 extends into the chamber 42, adjacent to valve 23, so that the liquid passing through said hose overflows into the chamber 42 and returns, if the valve 23 is closed, through an outer hose 21, which is coupled to said valve. If the valve is open, only the flow in excess of that permitted through the nozzle 24 returns. The outer hose 21 is concentric to the hose 22 so that the return flow of liquid is permitted through the space provided between the outer and inner members back to a chamber 43 in the valve 26 and through said valve to pipe 25 and back to the circulating pump 10 through the pipe 27 as shown in Fig. 1. The valve 26 which may be of the ordinary check valve type is adjusted to respond to a desired pressure. If the valve 23 is open, the liquid continues there-through and through the tubing 44 which connects the spray nozzle 24 with the opening in said valve, so that the liquid may flow through said nozzle.

The liquid may be pumped directly through the circulating system to the nozzle and sprayed thereby on the pole or other timber to which it is desired to apply it, and any excess flow through the circulating system, which cannot be sent through the nozzle, is returned over the by-path previously described back to the circulating pump.

While this improved arrangement is adapt-

ed to be used in a stationary position for the application of spraying liquid to any sort of timber desired, for the purpose of illustration it will be described as mounted upon a motor-driven vehicle, and it will be assumed that poles to be treated to prevent their decay are in standing position with their butts buried in the ground.

The spraying arrangement above described will heat the oil in the reservoir while the motor-driven vehicle travels from the supply base to the point at which the spraying operation is to begin, without racing or overheating the engine. During the spraying operation the improved heater connected with the engine exhaust absorbs enough heat from the exhaust gases to bring the oil to the required temperature as fast as it can be used, and the temperature of the oil is determined by the thermometer associated with the circulating system, and the pressure may be determined by the gauge associated with the system.

From the foregoing it is thought that the construction, operation and many advantages of the herein described and delineated invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention, as defined in the appended claims.

What is claimed is:

1. In a spraying apparatus, a pump and a heater directly connected therewith, a reservoir for containing a supply of liquid to be sprayed, a main circulating system including an output connection from the reservoir to the pump and heater and a valved return path to the reservoir, an auxiliary circulating system including a branch extending from the output of the heater back to the input of the pump to provide for a circulation of the liquid in said branch through said pump and heater, the return from the main circulating system to the reservoir being so associated with said branch to substantially short-circuit the branch when the return path is open, and the auxiliary system serving to circulate and heat a limited amount of liquid when the return path of the main system is closed.

2. In a spraying apparatus, a pump and a heater directly connected therewith, a reservoir for containing a supply of liquid to be sprayed, a main circulating system including an output connection from the reservoir to the pump and heater and a valved return path to the reservoir, an auxiliary circulating system including a branch extending from the output of the heater back to the input of the pump to provide for a circulation of the liquid in said branch through said pump and heater, the return from the main system to the reservoir being so associated

with said branch to substantially short-circuit the branch when the return path is open and the auxiliary system serving to circulate and heat a limited amount of liquid when the return path of the main system is closed, and a nozzle for drawing off the heated liquid from the auxiliary system, said output connection from the reservoir serving to supply to the auxiliary system an amount of liquid to replace that drawn off from the nozzle.

3. In a spraying apparatus, a pump and a heater directly connected therewith, a reservoir for containing a supply of liquid to be sprayed, a main circulating system including an output connection from the reservoir to the pump and heater and a valved return path to the reservoir, an auxiliary circulating system including a branch extending from the output of the heater back to the input of the pump to provide for a circulation of the liquid in said branch through said pump and heater, and a back pressure valve in the branch to substantially short-circuit the auxiliary system when the return path of the main system is open, said auxiliary system serving to circulate and heat a limited amount of liquid when said return path is closed.

4. In a spraying apparatus, a pump and a heater directly connected therewith, a reservoir for containing a supply of liquid to be sprayed, a main circulating system including an output connection from the reservoir to the pump and heater and a valved return path to the reservoir, an auxiliary circulating system including a branch extending from the output of the heater back to the input of the pump to provide for a circulation of the liquid in said branch through said pump and heater, and a back pressure valve in said auxiliary system whereby when the return path of the main system is open, the auxiliary system will be substantially short-circuited, said auxiliary system serving to circulate and heat a limited amount of liquid when said return path is closed, a nozzle for drawing off the heated liquid from the auxiliary system, said output connection from the reservoir serving to supply to the auxiliary system an amount of liquid to replace that drawn off from the nozzle.

5. In a spraying apparatus, a pump, a heater having an outer and inner chamber, a reservoir for containing a supply of liquid to be sprayed, a main circulating system including an output connection from the reservoir to the pump and serially through the chambers of the heater and a valved return path to the reservoir, an auxiliary circulating system including a bypath extending from the output of the heater to the input of the pump, the return of the main system being so associated with the auxiliary system to substantially short-circuit the latter when the return path is open, and the auxiliary system serving to circulate and heat a limited amount

of liquid when the return path of the main system is closed, a nozzle, means for connecting the nozzle with the main system for drawing off the heated liquid from the main system, and a chamber associated with said means for connecting the nozzle to said by-path whereby an amount of liquid in excess of that permitted through said nozzle is returned through said means to the input of said pump to cooperate with the supply from the reservoir to supply an amount of liquid to replace that drawn off from the nozzle.

6. In a spraying apparatus, a pump, a heater having an outer and inner chamber, a reservoir for containing a supply of liquid to be sprayed, a main circulating system including an output connection from the reservoir to the pump and serially through the chambers of the heater and a valved return path to the reservoir, an auxiliary circulating system including a branch extending from the output of the heater back to the input of the pump to provide for a circulation of the liquid in said branch through said pump and heater, the return from the main system to the reservoir being so associated with said branch to substantially short-circuit the branch when the return path is open, said auxiliary system serving to circulate and heat a limited amount of liquid when said return path is closed, a nozzle, a hose for connecting the nozzle with the auxiliary system, said hose having members concentrically positioned with respect to each other to provide in the one a flow of liquid to the nozzle from the auxiliary system and in the other a return flow to the auxiliary system of an amount of liquid in excess of that permitted through the nozzle.

In testimony whereof, I have signed my name to this specification this 3rd day of December, 1925.

TEMPLE C. SMITH.

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