No. 889,575. PATENTED JUNE 2, 1908.

A. BOWSER.

DISTRIBUTING SYSTEM FOR LIQUIDS.

APPLICATION FILED JULY 2, 1906.

2 SHEETS—SHEET 1.

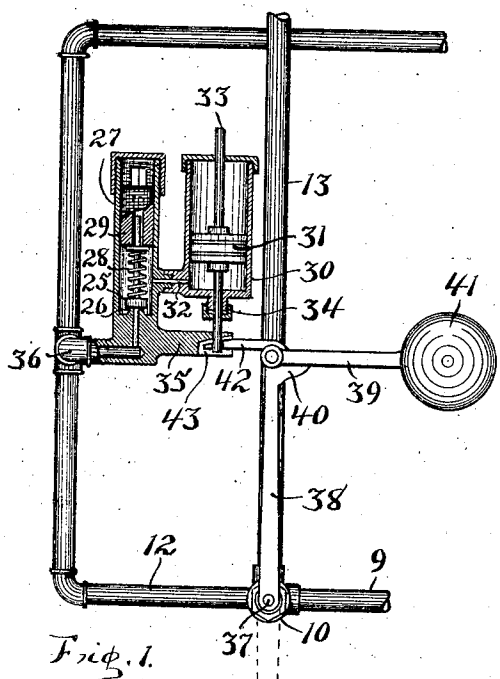


Fig. 1.

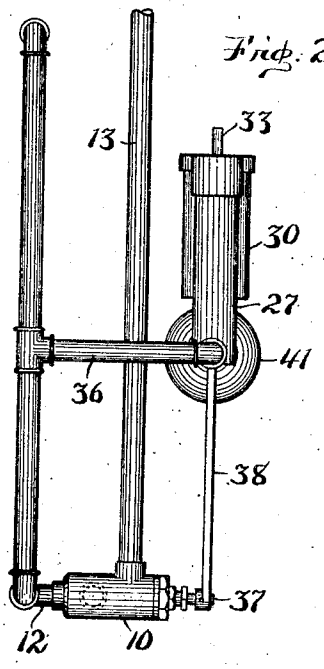


Fig. 2.

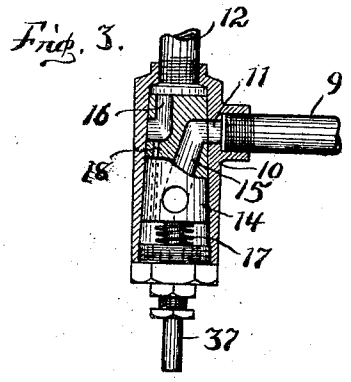


Fig. 3.

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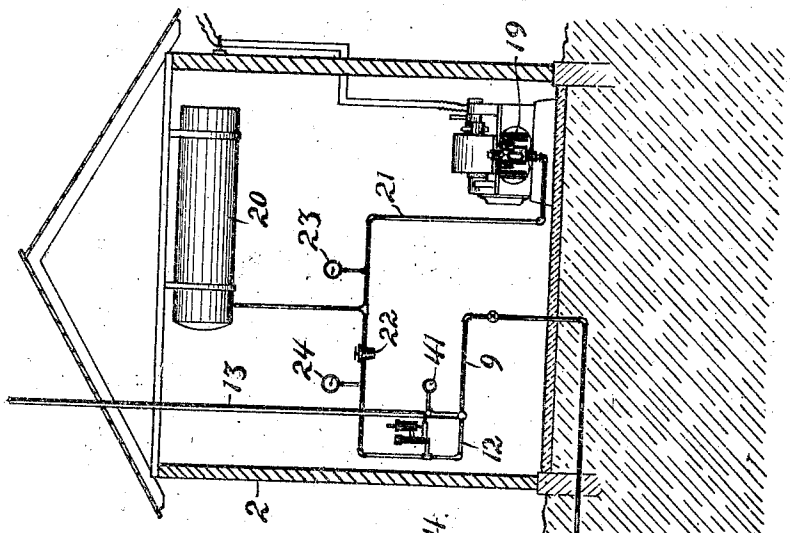


Fig. 4.

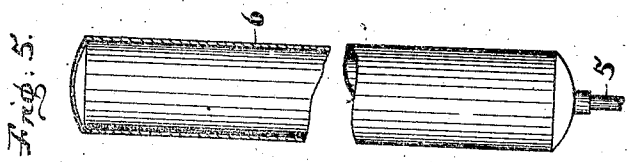


Fig. 5.

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DISTRIBUTING SYSTEM FOR LIQUIDS.

No. 889,575. Specification of Letters Patent. Patented June 2, 1908.

Application filed July 2, 1906. Serial No. 324,303

To all whom it may concern:

Be it known that I, AUGUSTUS BOWSER, a citizen of the United States of America, and resident of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Distributing Systems for Liquids, of which the following is a specification.

This invention relates to improvements in distributing systems for liquids, and is especially intended for use in delivering oil and the like to various departments of factories where inflammable fluid is employed.

The objects of the improvements are first, to provide a device of the class described which will automatically effect drainage of the distributing pipe in case the latter becomes excessively hot due to conflagration; and second, to afford a constant head of fluid in the distributing pipe supplied from a suitable reservoir.

The objects of this invention are accomplished by the construction illustrated in the accompanying drawings in which

Figure 1 is a side view of the apparatus which controls the supply of air to the reservoir, and the outlet of air therefrom through the vent pipe, part of the apparatus being shown in vertical section; Fig. 2 is another view of the same apparatus in a plane at right angles to Fig. 1; Fig. 3 is an enlarged detail view, showing a partial horizontal section of the controlling valve and its case; Fig. 4 is a view showing the application of this invention in connection with a building, part of the view being in vertical section; and Fig. 5 is an enlarged detail view showing the expansion tank which is connected at the top of the distributing pipe, the tank being shown partially in vertical section.

Similar numerals of reference indicate corresponding parts throughout the several views, and referring now to the same: 1 indicates a building, and 2 indicates a power house separated from the former building.

3 is a reservoir which is preferably buried in the ground, and which has a closed pipe 4 communicating therewith by means of which the same may be filled with liquid. A distributing pipe 5 is erected in a vertical position in close proximity to the building 1, and has at its top an expansion tank 6 which is closed to external atmosphere but has at all times free communication with the distributing pipe 5 with which it is connected. In connection with the distributing pipe 5, at various points beneath the expansion tank 6, are suitable faucets 7 through which liquid may be drawn from the distributing pipe 5. These faucets may have a suitable measuring apparatus 8 in connection therewith to indicate the amount of liquid drawn through them respectively. The particular construction of said measuring apparatus is immaterial to the present invention and may be of any construction adapted for that purpose. The lower end of the distributing pipe leads into the reservoir 3 and extends to the bottom thereof where it has open communication therewith. The reservoir 3 is normally closed to external atmosphere and is such as to be capable of withstanding internal pressure to the extent required for the purpose which hereinafter appears.

An air pipe 9 leads into the reservoir 3 and has free communication therewith at the upper part of the latter. It is the intention to supply air under pressure through the air pipe 9 into the reservoir 3, and thereby displace the liquid contained in the latter and drive the same up through the distributing pipe 5 to the faucets 7 through which it may be withdrawn at will. The upper end of the air pipe 9 connects with the valve case 10 at the side port 11 of the latter, and the supply pipe 12, for air, connects with said valve case at the end thereof.

A vent pipe 13 connects with the valve case 10 at the top thereof, and the valve 14 in said case has a port 15 which affords communication between the pipe 9 and vent pipe 13 when turned accordingly. The valve 14 has also a port 16 which, when the valve is properly turned, affords communication between the pipe 9 and supply pipe 12. The valve is slightly tapered and fits within the valve case which is correspondingly tapered, and the valve is held in seated position by a coil spring 17. A small port 18 leads from the port 16 to the forward end of the valve and admits air therethrough to the forward end of the valve case, and thereby the valve is balanced therein.

An air compressor 19 has connection with an air reservoir 20 by means of a pipe 21, and the latter has connection with the supply pipe 12 through the medium of a step-valve 22 the latter being of any suitable construction. Each of the pipes 21 and 12 have in connection therewith a pressure gage 23 and 24 respectively. The object of the compressor and air reservoir 20 is to maintain a

constant source of supply of air under pressure, and the object of the step-valve 22 is to afford a supply of air through the pipes 12 and 9 to the reservoir 3, at a reduced but unvarying pressure.

In connection with the pipe 12 is a pop-valve 25 which rests upon a seat 26 in the cylinder 27. The valve 25 is held on said seat by a compression spring 28 which may be made to act with more or less force against said valve by means of a screw plug 29. The lower part of the cylinder 27 has communication with the adjacent cylinder 30 at the lower end of the latter, and a piston head 31 is movably mounted in the cylinder 30 at a point therein above the port 32 which connects the two cylinders. The piston 31 is mounted rigidly upon a rod 33, the lower end of which passes through a suitable stuffing box 34 into a slotted lug 35, the latter projecting from the lower part of the cylinder 27. The upper end of the rod 33 projects through the top of the cylinder 30. The cylinder 27 has connection, by means of a pipe 36, with the supply pipe 12, and air from the latter, when of sufficient pressure, is adapted to enter the cylinder 27 by lifting the valve 25 from its seat.

The valve 14 has a stem 37, and thereon is rigidly mounted an arm 38, which has pivoted thereon at its outer end a lever 39. The arm 38 has also at its outer end a bracket 40 adapted to hold said lever in horizontal position when the former projects vertically upward, and the lever 39 has at its extending end a weight 41, and at its opposite end a perforated extension 42. When the arm 38 is moved to its upward position as indicated in Fig. 1 the extension 42, of the lever 39, projects into the slot 43 of the lug 35, and is engaged by the lower end of the rod 33 and thereby held in the position shown. When the arm 38 is in the position just described, the port 16 of the valve 14 communicates with the pipes 9 and 12, while the port 15 of said valve is closed by the wall of the case 10, and when the arm 38 is in the position shown in dotted outline in Fig. 1, the port 15 connects the pipes 9 and 13, and the port 16 is then closed at one end by the wall of the case 10.

In the operation of this invention the reservoir 3 is filled with liquid through the pipe 4 which is afterward closed tightly. The air reservoir 20 is then charged with air under high pressure by means of the air compressor, and consequently air passes from said air reservoir through the step-valve 22 into the pipe 12 from whence it passes through the port 16 of the valve 14 into the pipe 9 and into the reservoir 3. It will therefore appear that a constant air pressure is maintained in the reservoir 3, which has the effect of displacing the liquid therein so as to cause the latter to pass upward into the distributing pipe 5. The expansion tank 6 is so proportioned as to be sufficiently capacious to compensate for the rise of liquid in the distributing pipe by receiving the air in said distributing pipe above the liquid therein. The capacity of the expansion tank is such as to permit the liquid in the distributing pipe to rise therein to a point above the connection of the uppermost faucet 7 with said pipe. As the air in the reservoir 3 is expended, the pressure in said reservoir is maintained by admission of air through the step-valve 22 from the air reservoir 20, so that the oil is maintained at a level in the distributing pipe at a point above the uppermost of the faucets.

If the distributing pipe should become excessively heated, the oil therein would expand and consequently the pressure in the reservoir 3, and pipes 9 and 12 would thereby become raised, and it is the intention that when the pressure in the pipe 12 becomes raised above its normal pressure, the valve 25 will thereby become lifted and consequently air will enter the cylinder 27 and pass through the port 32 into the lower part of the cylinder 30 which has the effect of raising the piston 31 therein. When the piston 31 is raised, the lower end of the rod 33 is withdrawn from engagement with the extension 42 of the lever 39, and when said lever is thus released, the weight 41 at its outer end gravitates and carries the arm 38 to the position shown in dotted outline in Fig. 1, and the valve 14 is correspondingly turned to the position shown in Fig. 3. Thus the supply of air from the pipe 12 to the reservoir 3 is thereby shut off, and the pipe 9 is then connected by means of the port 15 with the vent pipe 13, so that the air in the reservoir 3 will then be free to escape through the pipes 9 and 13. When the reservoir 3 is thus relieved of internal pressure, the liquid in the distributing pipe 5 will become forced to reënter the reservoir 3 because of the expansion of the air in the tank 6. While the apparatus is in this condition the escape of liquid from the reservoir 3 is prevented, and should the distributing pipe become broken or destroyed with the building in case of conflagration, the liquid in the reservoir will not pass out the remaining part of the distributing pipe and thus cause the conflagration to be aggravated.

If it be desired at any time to cause the return of the liquid from the distributing pipe, it is only necessary to lift the weight 41 so as to disengage the extension 42 from the lower end of the rod 33 and then turn the arm 38 downward, when the result will be the same as just described. To again raise the liquid in the distributing pipe, it is only necessary to raise the arm 38 to a vertical position and connect the extension 42 of the lever 39 to the lower end of the rod 33 as in the first instance.

Having described my invention, what I

claim as new and desire to secure by Letters Patent is:

1. In apparatus of the class described, a closed reservoir for liquid having in connection therewith a distributing pipe for the discharge of liquid contained therein; a closed expansion tank at the upper end of the distributing pipe and having free communication therewith; a connecting pipe leading to and connecting with the reservoir; an air supply pipe having means in connection therewith for the supply of air under pressure; a vent pipe; a valve adapted to afford either communication between the air supply pipe and connecting pipe or between the connecting pipe and vent pipe accordingly as the valve is turned; a weighted lever in connection with said valve; a movable piston having a rod in connection therewith adapted to engage with said lever and hold the same in uppermost position; and a pop valve adapted to be operated by air from the supply pipe, and having means in connection therewith to conduct air, passing the pop valve, to said piston to actuate the latter.

2. In apparatus of the class described, a closed reservoir for liquid in combination with apparatus for supplying air thereto under pressure, which apparatus consists of a supply pipe, vent pipe and connecting pipe together with a valve having ports for connecting either the supply pipe with the connecting pipe or the connecting pipe with the vent pipe accordingly as the valve is turned; two cylinders, one of which has connection with the supply pipe and which contains a pop-valve, the other cylinder of which contains a movable piston and has communication with the former cylinder above said pop-valve; and a weighted lever in connection with the former valve, the said piston having means in connection therewith to engage and hold said lever in uppermost position.

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

AUGUSTUS BOWSER.

Witnesses:
MATHILDA METTLER,
W. G. BURNS.