June 6, 1933. D. E. HOLMES 1,912,843

AUTOMATIC DEVICE FOR DRAINING LIQUIDS FROM CONTAINERS

Filed June 7, 1932 2 Sheets-Sheet 1

FIG. 1.

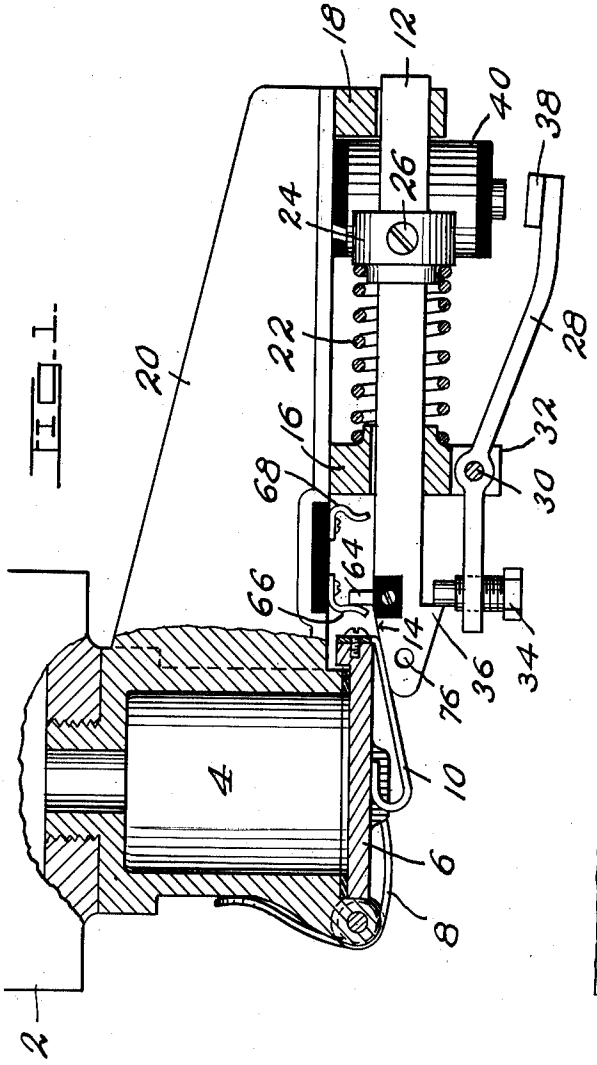
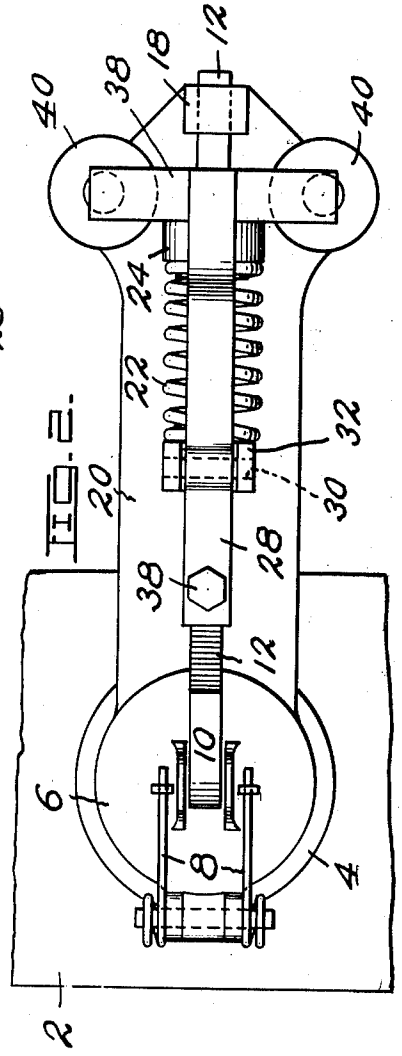


FIG. 2.



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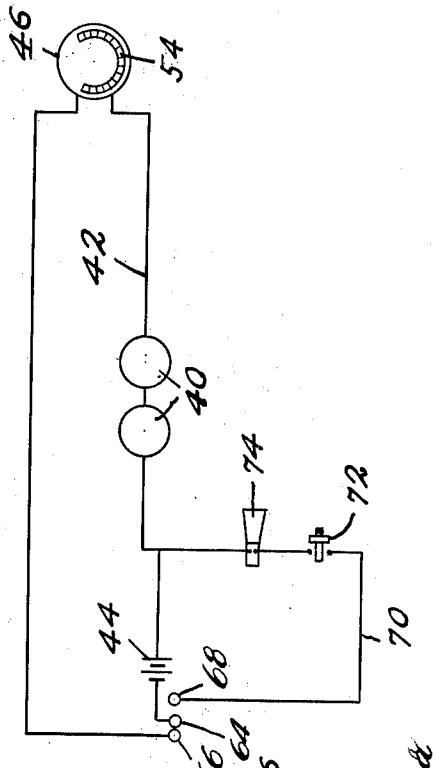


FIG. 5.

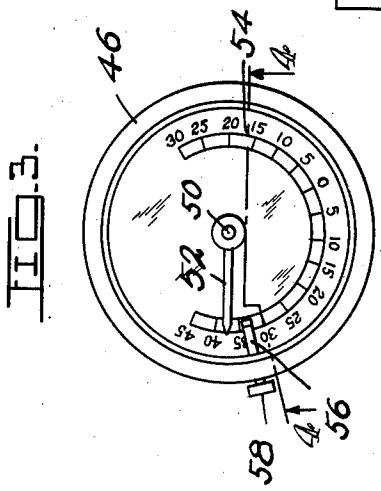


FIG. 3.

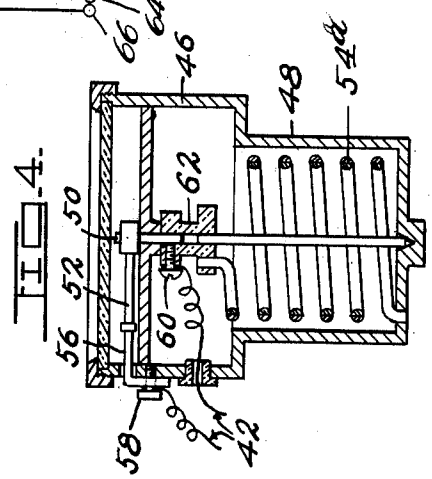


FIG. 4.

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AUTOMATIC DEVICE FOR DRAINING LIQUIDS FROM CONTAINERS

Application filed June 7, 1932. Serial No. 615,784.

My invention relates broadly to an automatic device for draining liquids from automobile radiators, water pipes, storage tanks and other containers when the temperature approaches the respective freezing points of such liquids, so that there will be no danger of their freezing in the containers and bursting the same.

The invention contemplates the employment of a drainage valve normally secured in closed position against the action of a spring by means of a latch held in active position by magnetic means arranged in a thermostatically controlled electric circuit. The thermostat may be manually set to close the circuit at any predetermined temperature. Closing of the circuit energizes the magnetic means, causing the same to release the latch which in turn is instantly moved to inactive position by a spring and permits the valve to open so that the liquid may run from the container. As the latch is moved to inactive position it opens the thermostatic circuit and thereby avoids the loss of current.

The invention also contemplates the use of a manually controlled electric signal circuit whereby the operator may determine whether the valve has been automatically opened without making an actual inspection, as the valve is usually located at a point where it is inconvenient to make such inspection.

Other features will hereinafter appear and in order that the invention may be fully understood reference will now be had to the accompanying drawings, in which:

Fig. 1 is a side elevation partly in section of the device connected to the lower portion of a container.

Fig. 2 is an inverted plan view of the device.

Fig. 3 is a plan view of the thermostat for controlling the circuit.

Fig. 4 is a vertical cross section of the thermostat on line 4—4 of Fig. 3.

Fig. 5 is a diagram of the electric circuits.

Referring in detail to the different parts, 2 designates a container in the outlet orifice of which a valve 4 is threaded. The valve 4 is provided at its lower end with a hinged gate or closure 6 adapted to open by the force of gravity assisted by a spring 8. The gate 6 is provided with a spring member 10 arranged in the form of a wedge for a purpose which will hereinafter appear.

12 designates a latch having a beveled end 14 adapted to press against the spring member 10 and thus firmly hold the gate 6 in closed position. The latch 12 is reciprocably mounted in guide members 16 and 18 depending from a bracket 20 projecting from the valve 4.

22 designates an expansible spring for moving the latch 12 backwardly to inactive position. The spring 22 is interposed between the guide member 16 and a collar 24, which latter is firmly secured to the latch 12 by suitable means such as a set screw 26.

28 designates a lever mounted upon a fulcrum 30 carried by the bifurcated lower end 32 of the guide member 16. The lever 28 is provided at its forward end with an adjustable set screw 34 for engagement with a shoulder 36 at the forward portion of the latch 12 for the purpose of securing the latter in active position against the action of the spring member 22, as shown by Fig. 1. The rear end of the lever 28 is provided with an armature 38 arranged in the field of a pair of electromagnets 40 secured to the under side of the bracket 20 but insulated therefrom.

The electromagnets 40 are arranged in an electric circuit 42 energized by a suitable source 44 which may be the battery of an automobile when the device is applied to the radiator thereof. The circuit 42 is normally retained in open position by a thermostat 46 provided with a casing 48 having a rotatable shaft 50 mounted therein and equipped with a fixedly mounted needle 52 adapted to sweep over a gage 54 calibrated to indicate various temperatures.

The shaft 50 is controlled by a thermal unit 54*a*, which under a lowering temperature rotates said shaft 50 in a direction to swing the needle 52 towards a contact 56 adjustably secured in place by a set screw 58, so that said contact may be set adjacent to any degree indicated on the gage 54. One end of the thermal unit 54*a* is secured to the casing 48 and the other end to an insulating collar 62 secured to the shaft 50 by a set screw

60. The circuit 42 is connected at one end to the set screw 58 and at its other end to the set screw 60.

With the parts arranged in the position shown by Figs. 1 to 3, inclusive, it is evident that when the temperature reaches the degree at which the thermostat 46 is set to act that the needle 52 will be carried into engagement with the contact 56 and thereby close the circuit 42. Closing of the circuit 42 energizes the electromagnets 40 which attract the armature 38 and thus release the latch 12. Immediately on being released the latch 12 is retracted by the spring 22 and permits the valve 4 to open so that the liquid may run from the container 2.

As the latch 12 moves backwardly to inactive position it opens the circuit 42 through the intermediary of a switch 64 carried by said latch. The switch 64 includes a contact 66 in the circuit 42 and a contact 68 forming one terminal of an electric signal circuit 70 connected at its opposite terminal to the circuit 42. After opening the circuit 42 the switch 64 is carried into engagement with the contact 68 and thus closes the signal circuit 70. The signal circuit 70 includes a push-button 72 and a suitable signal such as the horn 74 of the motor vehicle. If the horn 74 sounds when the push-button 72 is closed it indicates that the valve 4 has opened and thus relieves the operator of the necessity of inspecting said valve.

Preparatory to refilling the container 2 with liquid the gate 6 is closed and held in that position by the latch 12 which is advanced against the action of the spring member 22 until engaged by the set screw 34. Forward adjustment of the latch 12 may be accomplished from in front of the container 2 by reaching backwardly with a hook and engaging the same in an eye 76 in the forward end of said latch.

If the operation of refilling the radiator 2 is performed when the weather is still cold enough to maintain the needle 52 in engagement with the contact 56 the latter may be moved to open the circuit 42 and thereby prevent the electromagnets 40 from effecting the opening of the valve 4 by releasing the latch 12. After the engine has run long enough to warm up the thermostat 46, the contact 56 may again be adjusted close to the freezing point on the gage 54.

Should an antifreezing agent be intermixed with the water in the container 2, the contact 56 may be set as far below the freezing point, as recommended by the manufacturer in order to prevent useless draining of said container.

From the foregoing description it is apparent that I have provided a device which is well adapted for the purpose intended, and while I have shown and described one embodiment of the invention I reserve all rights to such changes and modifications thereof as properly fall within the spirit and scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, a bracket projecting from said valve, latch means supported by said bracket and normally holding said valve in closed position, magnetically controlled means supported by the bracket and normally holding said latch means in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means and thereby cause the latter to release the latch means, and means for moving said released latch means to inactive position to permit the valve to open.

2. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, a bracket projecting from said valve, guide means on said bracket, latch means operably mounted in said guide means and normally holding said valve in closed position, magnetically controlled means normally holding said latch means in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means and thereby cause the latter to release the latch means, springs means for moving said released latch means to inactive position to permit the valve to open, and means for opening said valve.

3. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, said valve comprising a closure hinged to the valve casing and tending to open to permit the liquid to drain from said container, a wedge member on said closure, latch means normally pressing against said wedge member to hold the closure in closed position, magnetically controlled means normally holding said latch means in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means and thereby cause the latter to release the latch means, and means for moving said released latch means to inactive position to permit the closure to open.

4. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, said valve comprising a closure hinged to the valve casing and tending to open to permit the liquid to drain from said container, a resilient wedge member on said closure, latch means having a beveled portion nor-

mally pressing against said wedge member to hold the closure in closed position, magnetically controlled means normally holding said latch means in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means and thereby cause the latter to release the latch means, and means for moving said released latch means to inactive position to permit the closure to open.

5. An automatic device for draining liquid from a container comprising liquid releasing means normally closing the outlet to said container, latch means normally holding said liquid releasing means in closed position and tending to move to inactive position, a lever provided with an adjustable element normally holding said latch means in active position, magnetic means for actuating said lever and causing said element to release the latch means so that the latter may move to inactive position and allow the liquid releasing means to open, and a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetic means.

6. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, latch means normally holding said valve in closed position, magnetically controlled means normally holding said latch means in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means and thereby cause the latter to release the latch means, means for moving said released latch means to inactive position to permit the valve to open, and switch means actuated to open the circuit by said latch means as the latter is moved to inactive position.

7. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, latch means normally holding said valve in closed position, magnetically controlled means normally holding said latch means in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means and thereby cause the latter to release the latch means, means for moving said released latch means to inactive position to permit the valve to open, and an electric signal circuit whereby it may be determined if the outlet valve is open when said latch means is in its inactive position.

8. An automatic device for draining liquid from a container comprising an outlet valve adapted to be connected to said container, a latch normally holding said valve in closed position and having a tendency to move to inactive position, magnetically controlled means normally holding said latch in active position, a thermostatically controlled electric circuit adapted to be closed at a predetermined temperature and energize said magnetically controlled means, thereby causing the latter to release the latch so that it may move to inactive position and permit the valve to open, an electric signal circuit whereby it may be determined when the valve is open, a switch controlled by the latch for opening the thermostatically controlled electric circuit and closing a part of said signal circuit when said latch moves to inactive position, and a manually controlled switch for cooperating with the first-mentioned switch in completely closing the signal circuit.

In testimony whereof I affix my signature.

DWAYNE E. HOLMES.