

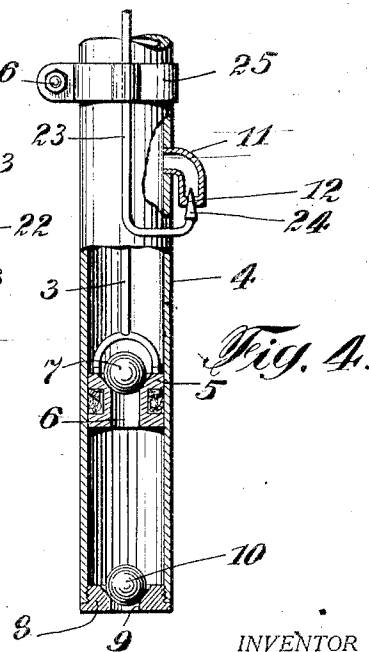
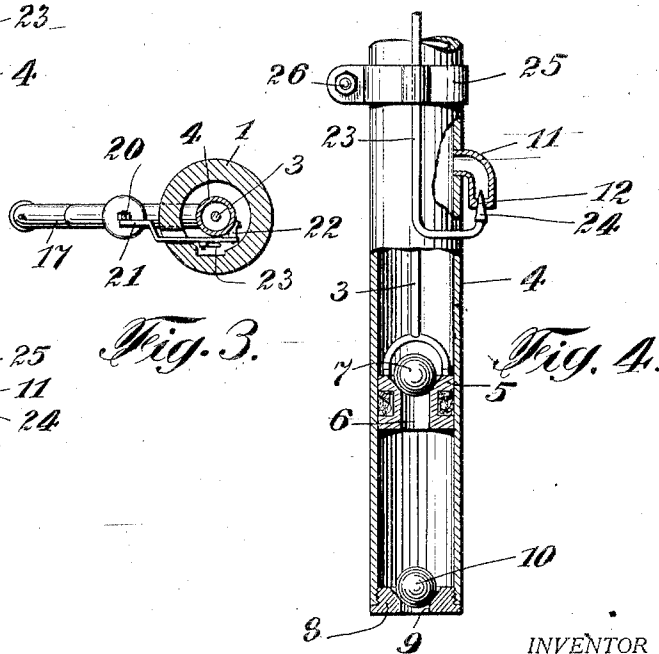
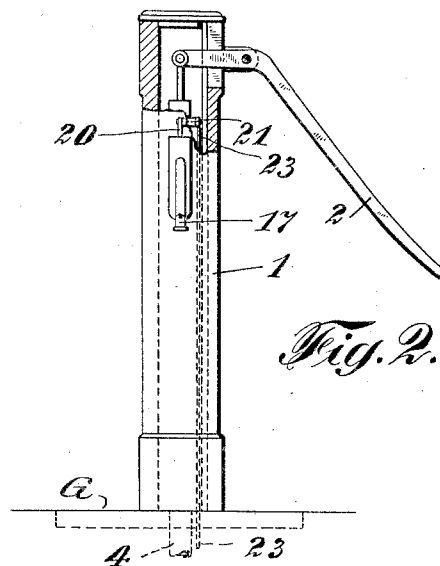
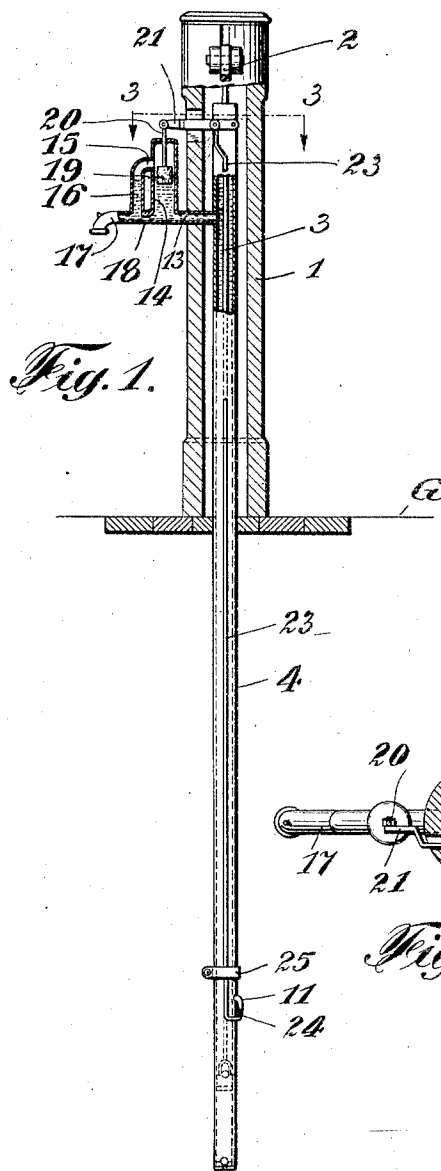
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PUMP

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PUMP.

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This invention relates to drain valves for pumps and to means for automatically controlling the same to prevent freezing.

The principal object of the invention is to provide means for draining the pump to a point below the level where freezing may occur, when the pump is not in use, and this in an entirely automatic manner; that is to say, without the necessity of any adjustment by the operator or any attention from him whatever. Such means are suitable for use either in pumps operated manually or by power means.

In accordance with the preferred form of the invention, and as herein illustrated, a drain valve located below the freezing level is controlled by the water, itself, the valve being closed and opened, respectively, by the rise and fall of a float. The float is located in a float chamber above the discharge pipe of the pump. A pipe of small diameter connects the lower part of the float chamber with a discharge pipe and is effective to drain the float chamber as soon as the pumping is discontinued. This causes the float to fall and, through suitable connections between the float and the drain valve, opens the drain port below the freezing level and drains all of the water out of the pump above said port.

Other objects and advantages will hereinafter appear.

In the drawings:

Figure 1 is a side elevation, partly in section, showing a pump embodying the improvements of the present invention;

Figure 2 is a front elevation, partly in section, of the upper portion of the pump;

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1, and looking in the direction of the arrows, but on a larger scale than Figure 1; and

Figure 4 is a side elevation, partly in section, of the lower portion of the pump, on a larger scale than Figure 1.

The pump comprises a casing 1 having a handle 2 pivoted thereon. The handle is connected to the upper end of a piston rod 3 which extends down into the main pipe 4 and carries at its lower end a piston 5. This piston has a passage 6 which is controlled by a ball valve 7 and cooperates with a plug 8 having an opening 9, and a ball valve 10, to pump water from the well in the usual, well known manner. A drain pipe 11 of small diameter as compared with the main

pipe 4, and having a drain port 12, connects with the main pipe 4 below the level where freezing is likely to occur, that is, some distance below the ground G. The drain port 12 is always open when the pump is idle so that no water normally stands in the pump above this level. The water pumped through the pipe 4 passes through pipe section 13, and most of it then passes upward through pipe section or float chamber 14, thence through sections 15 and 16, and through discharge pipe 17. A pipe 18 of small diameter as compared with the pipe section 13 connects the lower part of the section 14 with the discharge pipe 17 and is always open, so that a small portion of the water passes through it to the discharge pipe so long as the water is being pumped. A float 19 is located in the float chamber 14 slightly below the section 15, and is connected by a stem 20, which passes through a small guide opening in the upper end of the float chamber, with a rock arm 21 pivoted on a bearing bracket 22 upon the exterior of the pipe 4. A rod or wire 23 is pivotally connected to the rock arm 21 between the pivot of the rock arm and the connection of the rock arm to the float stem 20. This rod extends down along the exterior of the pipe 4 and has an upturned lower end which carries a needle valve 24 in position to seat in the port 12 and close the same when the float 19 is raised. A guide collar 25, made of a non-corrodible metal, is clamped upon the pipe 4 by a clamping screw 26 and has an eye for receiving and guiding the rod 23.

When the pumping is begun the port 12 is open and the water stands substantially at the level of the port. The water is pumped through the main pipe 4, and due to the small diameters of the pipes 11 and 18 the water quickly fills the pipe section or float chamber 14, raising the float 19. The raising of the float is effective through the stem 20, rock arm 21, rod 23, and needle valve 24 to close the port 12 of pipe 11, so that no water is wasted as the pumping proceeds. This condition prevails so long as the pumping is continued, a small portion of the water being continuously delivered to the discharge pipe 17 through pipe 18, but the major portion passing up through the float chamber. When the pumping is discontinued the water in the float chamber is drained through pipe 18, being delivered by it to discharge pipe 17. As the level of the

water in the float chamber falls the float falls, permitting the valve 24 to move downward and thereby opening the port 12. The water is thus caused to drain to the level of the port 12, which is below the freezing level. It will be seen that the valve 24 is controlled entirely by the water, itself, without its being necessary for the operator to have any knowledge of the pump, and in fact, that it is impossible for a person, through ignorance, to prevent the proper operation of the valve.

The various pipe sections may be connected together in any approved manner, either by casting two or more of them integrally, or by the use of the usual well known pipe connecting means suitable for the purpose.

Attention is called to the fact that although the pump is drained below the freezing level, it is not drained below the level of the valve 7, and that the pump is therefore maintained always in a primed condition.

While the pump is in operation a constant circulation of water is maintained through the float chamber and through the small pipe section 18, so that there is no danger of freezing in these parts during prolonged use of the pump. The drain pipe 11 is located below the freezing level so that it will always be open. There is no danger, therefore, of the automatic drain's failing to work properly, even in the most severe weather.

Variations may be resorted to within the scope of the invention.

I claim:

1. In a pump, water raising means, a discharge pipe, and means controlled by the water, itself but independently of the dynamic force thereof, to cause all of the water pumped to be delivered through the discharge pipe while the pump is in use and to automatically drain the pump below the freezing level when the pumping is discontinued.

2. In a pump, water raising means, a main pipe having a drain below the freezing level which is always open when the pump is not in use, and means controlled by the water, itself, but independently of the dynamic force thereof for automatically closing the drain and keeping it closed while the pump is in operation.

3. In a pump, water raising means, a main pipe having a drain below the freezing level, and means operating independently of the dynamic force of the water for automatically closing the drain when the pumping is begun and for automatically opening the drain when the pumping is discontinued.

4. In a pump, water raising means, a main pipe having a drain below the freezing level, a discharge pipe through which the pumped water is delivered, a chamber above the discharge pipe, a drain for said chamber which is always open, said drain being too small to

conduct the water from the chamber as fast as it is pumped, so that water is caused to accumulate in the chamber during pumping, and means controlled by the level of the water in said chamber to automatically close the drain below the freezing level when the water rises above a predetermined level in the chamber and to automatically open the drain below the freezing level when the water falls below said predetermined level in the chamber.

5. In a pump, water raising means, a water transmitting pipe having an opening below the freezing level, said opening being normally unobstructed to permit all of the water above it to be drained from the pump, and means operated independently of the dynamic force of the water, constructed and arranged to automatically prevent egress of water through said opening so long as the pumping is in progress.

6. In a pump, water raising means, a drain below the freezing level, a valve controlling the drain, a discharge pipe, means above the discharge pipe for automatically closing the drain valve when the water rises above a predetermined level in the pump and for automatically opening the drain valve when the water falls below said predetermined level in the pump, and means for causing the water to stand above said level while the pump is in use and for causing it to fall below said level when the pumping is discontinued.

7. In a pump, water raising means comprising a piston, a drain below the freezing level but not below the piston, and means automatically controlled by the level of the water in the pump to open and close said drain.

8. In a pump, water raising means, a main pipe, a drain below the freezing level, a valve controlling the drain, a float chamber, a float in the chamber connected to the drain valve to open the drain when the float is down and to close the drain when the float is raised, and means constructed and arranged to cause the float to be raised throughout the pumping operation and to cause the float to be lowered when the pumping is discontinued.

9. In a pump, a main pipe, a drain below the freezing level, a discharge pipe above the ground, a float chamber above the discharge pipe, a float in the float chamber, means operated by the float for controlling the drain below the freezing level, a pipe section of substantial diameter connecting the upper part of the float chamber with the discharge pipe and through which the major portion of the water pumped is delivered to the discharge pipe, a pipe of relatively small diameter connecting the lower part of the float chamber with the discharge pipe and through which a small portion of the water

5 pumped is delivered to the discharge pipe, the construction and arrangement being such that the water is caused to raise the float in the float chamber when the pumping is begun and thereby to close the drain below the freezing level, and is drained from the float chamber by the relatively small pipe when the pumping is discontinued to lower the float and thereby open the drain below the
10 freezing level.

10 10. In a pump, water raising means compressing a piston, a drain below the freezing level but not below the piston, a float chamber, a float in the chamber, means controlled
15 by the float to open and close the drain, and means for automatically controlling the level of the water in the float chamber to control the position of the float and thereby control the drain.

20 11. In a pump, a main pipe, a drain below the freezing level, a discharge pipe, a float chamber through which water is constantly pumped to the discharge pipe while the pump is in use whereby the temperature of
25 the float chamber is kept above the freezing point, a float in the chamber, drain controlling means operated by the float to close the drain below the freezing level when the float is raised, and to open said drain when the
30 float is lowered, and a float chamber drain pipe connecting the lower part of the float chamber with the discharge pipe and through which water is constantly conducted to the discharge pipe while the pump is in
35 use, thereby keeping the temperature of the float chamber drain pipe above the freezing point, said float chamber drain pipe being effective to drain the float chamber when the pumping is discontinued, to lower the float
40 and thereby open the drain below the freezing level.

45 12. In a water supplying system, a water supplying main pipe, extending below the freezing level, a drain below the freezing level, a chamber above the freezing level, means for draining the chamber when the supplying of the water thereto is discontinued, and means controlled by the level of the water in said chamber to automatically
50 close and open said drain below the freezing level.

13. In a pump, a main pipe extending below and above the freezing level, a drain below the freezing level, a float chamber above the freezing level, a float in the chamber, a
55 discharge pipe above the freezing level but below said float chamber, a small pipe connecting the lower part of the float chamber with said discharge pipe, a large pipe connecting the upper part of said float chamber
60 above the float with the discharge pipe, a rock arm connected to the float, a rod or wire connected to the rock arm and extending down to said drain, and a valve carried by the rod or wire for closing and opening the
65 drain, the construction and arrangement being such that the small pipe connecting the lower part of the float chamber with the discharge pipe is too small to lower the level of the water in the float chamber sufficiently
70 between strokes to permit the float to fall, so that the float is maintained in a uniform elevated position throughout the pumping to keep the drain below the freezing level closed, but said float chamber drain pipe being
75 effective to drain the float chamber when the pumping is discontinued, to lower the float and thereby open the drain below the freezing level.

14. In a pump, a main pipe, water raising
80 means, a float chamber above the freezing level, a float in the float chamber arranged to be raised by the water pumped into the chamber, a drain below the freezing level, a valve for closing the drain, connections
85 between the valve and the float for moving the valve into engagement with the drain to close the drain by the raising of the float, the upward movement of the float being limited by engagement of the valve with the
90 drain, an overflow pipe connected with the upper part of the float chamber at a level to cause the water to rise in the float chamber substantially above the level necessary to close the drain below the freezing level,
95 and a small drain connected with the bottom of the float chamber to slowly drain said chamber when the pumping is discontinued, to lower the float and open the drain below the freezing level.

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