

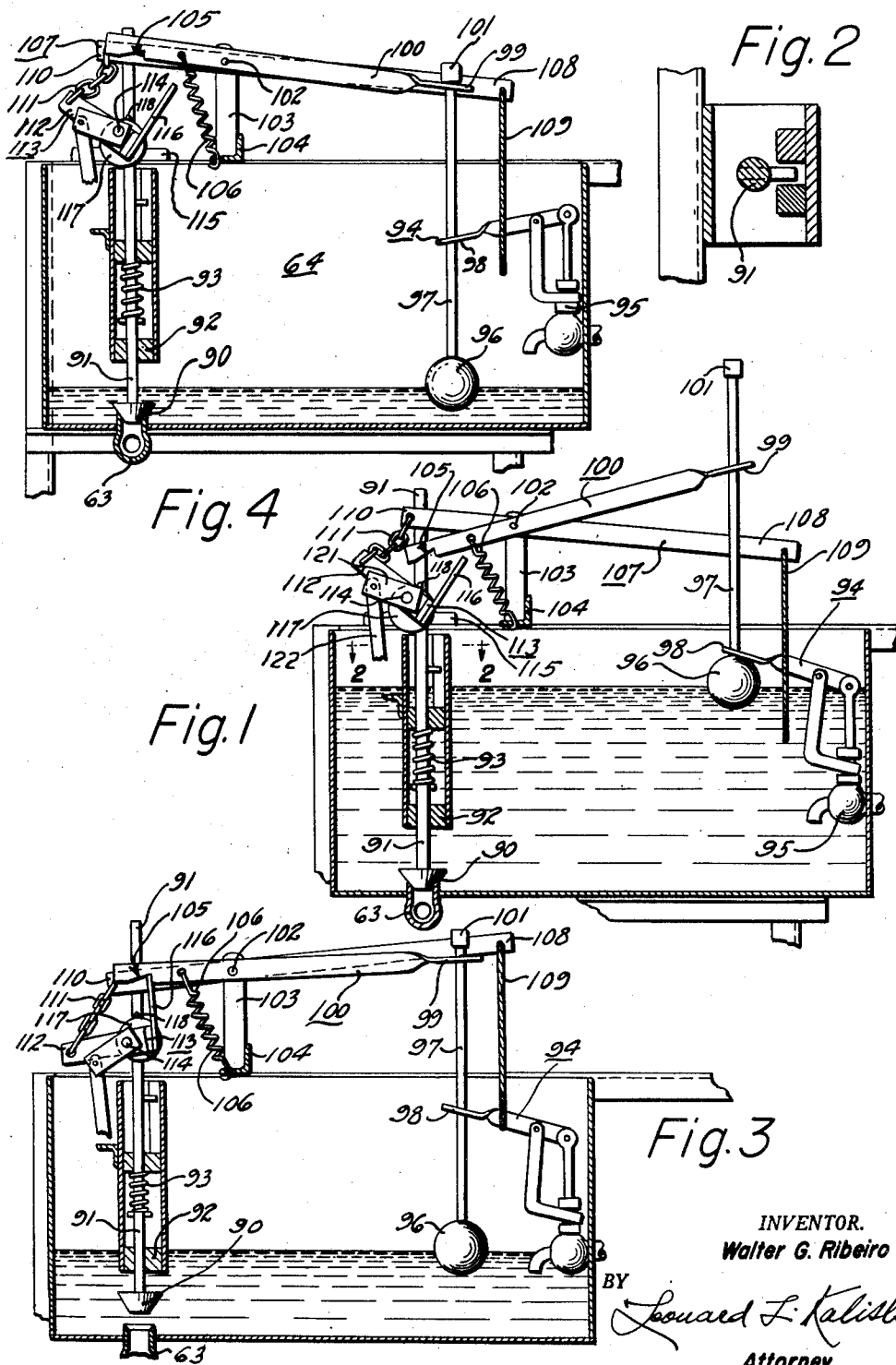
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WATER-RESERVOIR CONSTRUCTION

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WATER-RESERVOIR CONSTRUCTION

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2 Claims. (Cl. 137—391)

1

The present invention relates generally to ice-making equipment and it relates more particularly to novel water-reservoir means for use in the manufacture of ice or the like.

An object of the present invention is to provide a novel water-reservoir construction which is particularly well suited for use in conjunction with automatic ice-making equipment but which may have other uses as well. Another object of the present invention is to provide a novel construction for a liquid-containing reservoir which will deliver an accurately predetermined quantity of liquid. Still another object of the present invention is to provide a reservoir construction which will fill with liquid to a predetermined point and which will thereafter deliver the liquid by drainage and which will not begin refilling until after drainage has been substantially completed.

Other objects and advantages of the present invention are apparent in the following detailed description, appended claims and accompanying drawings.

The present application is a division of my co-pending application Serial No. 89,407, filed April 25, 1949, now Patent 2,550,497, issued April 24, 1951, claims to the present subject matter having been originally presented in said application Serial No. 89,407, as filed, and having been cancelled therefrom, simultaneously with the filing of this application, pursuant to a requirement for division.

In my aforesaid co-pending application Serial No. 89,407, I have disclosed a novel fully-automatic ice-making mechanism which goes through the cycle of filling one or more ice-cans with a predetermined amount of water-to-be-frozen, freezing, spraying the outside of the cans (to loosen the ice), draining off the spray-water, tilting the ice cans to dump the freed ice blocks therefrom, returning the ice cans to their original upright position, and refilling with water-to-be-frozen.

As disclosed in my co-pending application Serial No. 89,407, the novel reservoir construction of the present invention is adapted to supply the accurately-predetermined quantity of water-to-be-frozen to the ice cans.

Generally speaking the novel reservoir construction of the present invention includes a tank having a lowermost drain or outlet opening, a valve-member normally closing the outlet opening, externally-actuated means for raising the valve member at predetermined intervals, means including a ball-float for automatically closing

2

the outlet valve-member after the reservoir has drained down to a predetermined level, a normally-open water-inlet valve, means including the aforesaid ball-float for automatically closing the water-inlet valve when the water level in the tank has reached a predetermined height, and mechanism for retaining the water-inlet valve in closed position during the draining period so that the water-inlet valve is released to open only as the outlet valve-member closes; thereby eliminating variations in quantity of water delivered which would otherwise result if the water-inlet valve were to open during the draining period.

For the purpose of illustrating the invention, there is shown in the accompanying drawings one form thereof which is at present preferred, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

Referring to the accompanying drawings in which like reference characters indicate like parts throughout:

Figure 1 represents a vertical cross-sectional view of the water-reservoir of the present invention shown in filled position.

Figure 2 represents a horizontal cross-sectional view generally along the line 2—2 of Figure 1.

Figure 3 represents a vertical cross-sectional view generally like that of Figure 1 but showing the appearance of the parts after the outlet valve has been opened and the reservoir partially emptied.

Figure 4 represents a vertical cross-sectional view like those of Figures 1 and 3 but showing the reservoir after it has been fully drained and the outlet-valve reclosed and the filling-valve opened.

In one embodiment of the present invention, shown in Figures 1-4, I may provide a water-supply tank or reservoir 64, the normal closed filled position of the tank being shown in Figure 1, wherein an outlet opening 63 is closed by a valve-member 90 mounted on a vertical stem 91 which extends through a guide-member 92 and is normally urged to lowermost closed position by a helical spring 93.

With the water in the tank 64 at its predetermined upper level, the normally downwardly-tensioned control-arm 94 of a normally-open inlet-valve 95 is raised to uppermost valve-closing position by a ball-float 96. The ball-float 96 is provided with an upwardly-extending rod 97 which extends intermediate the oppositely-di-

rected bifurcated end 99 of a lever 100 to be described hereinbelow. The upper end of the rod 97 is provided with an enlarged head 101 whose function will be described below.

The lever 100 is pivotally mounted intermediate its ends upon a horizontal shaft 102 supported between end-brackets 103 fastened to a structural member 104 extending transversely across the top of the tank 64. The other (forwardly-extending) end of the lever 100 is notched on its underside as at 105 and is normally urged to downward position (counter-clockwise in Figures 1 and 3) by a coil spring 106 whose other end is fastened to the structural member 104.

Also pivotally mounted on the shaft 102 is a restraining arm 107 whose rearmost end 108 is provided with a closed loop 109 which passes underneath the control-arm 94 of the inlet-valve 95.

The forward end 110 of the restraining arm 107 is connected, by a chain 111, to one arm 112 of a generally L-shaped detent or pawl member 113. The arm 112 is fixedly mounted, intermediate its ends, upon a transversely-extending rotatable shaft 114 journaled in blocks 115 mounted at the top of the tank 64.

The other arm 116 of the pawl member 113 is disposed below and in alignment with the forward end of the lever 100 when the tank is in its normal filled position, as shown in Figure 1. However, when the shaft 114 and the pawl member 113 are rotated counter-clockwise, the arm 116 swings up until it contacts the forward end of the lever 100 and rotates it clockwise (against the action of the spring 106) to a point at which the arm 116 seats itself within the notch 105 as shown in Figure 3.

This counter-clockwise rotation of the pawl member 113 also results in a counter-clockwise rotation of the restraining arm 107 by the action of the chain 111, as indicated in Figure 3.

Mounted upon the shaft 114, on either side of the valve stem 91, are a pair of cam discs 117 against which downwardly bear a pair of oppositely-extending horizontal cam-followers 118 mounted on the valve stem 91.

When the tank 64 is filled and the valve member 90 is in its lowermost closed position, the cam-followers 118 contact low-points of the cam discs 117. However, when the shaft 114 is rotated counter-clockwise from the position shown in Figure 1, the cam discs 117 swing to raise the cam-followers 118, thereby to lift the stem 91 (against the spring 93) and to open the valve member 90.

One end of the shaft 114 is provided with a crank 121, the upper end of which is pivotally connected to the uppermost end of a generally vertical crank-shaft 122. The lower end (not shown) of the crank-shaft 122 may be connected to any suitable actuating mechanism; as for example the mechanism shown in my co-pending application Serial No. 89,407.

This actuating mechanism results in downward movement of the crank-shaft 122 and counter-clockwise rotation of the crank 121 and the shaft 114 as described hereinabove.

When the crank 121 and the shaft 114 are rotated counter-clockwise as described above, the cam-discs 117 operate to raise the cam-followers 118 and the shaft 114 from the position shown in Figure 1 to that shown in Figure 3. During this rotation, the detent member 113 is also swung counter-clockwise to the position shown in Figure 3 wherein its arm 116 is engaged within the

notch 105 and holds the lever 100 in generally horizontal clockwise-rotated position, and wherein its arm 112 is moved counter-clockwise and downward to pull the chain 111 and to tilt the restraining arm 107 counter-clockwise. In this position the loop 109 on the rearmost end 108 of the restraining arm 107 is raised to maintain the control-arm 94 of the inlet valve 95 in its uppermost valve-closing position, even after the ball-float 96 moves downward, as indicated in Figure 3, as the water-level drops, due to flow of water through the opened outlet valve.

In this way, only the predetermined amount of water is delivered from the tank 64, no additional water being delivered to the tank 64 from the inlet valve 95 during the time required to drain the tank.

However, as the level of water continues to drop, the ball-float 96 is lowered to the point at which the enlarged upper head 101 on the rod 97 contacts the bifurcated end 99 of the lever 100 and tilts it clockwise to the position shown in Figure 4 so as to raise the notched end 105 above the arm 116, thereby releasing the detent member and permitting the shaft 114 and its associated cam-discs 117 to rotate clockwise (due to its weight distribution). This clockwise rotation of the cam-discs 117 permits the valve member 90 to close under the action of its spring 93 so as to return to the position shown in Figure 1.

During this clockwise rotation of the shaft 114, the crank-shaft 122 is raised back to the original position shown in Figure 1.

This clockwise rotation of the shaft 114 and its associated detent member 113 also slackens the chain 111, thereby permitting the restraining arm 107 to move clockwise (due to its weight-distribution) so as to lower the loop 109 and to release the control-arm 94 of the inlet-valve 95 which thereupon drops to its normal lowermost position opening the inlet-valve to begin the re-filling of the tank 64.

As the level of water in the tank rises, the ball-float 96 gradually moves upward from the position shown in Figure 4 to that shown in Figure 1 at which it forces the control-arm 94 to its uppermost valve-closing position, stopping further flow of water.

The tank 64 then remains in the filled position of Figure 1 until the crank-arm 122 is again actuated (as, for example, when the freezing, thawing and dumping operations described in my co-pending application Serial No. 89,407 have been completed and the ice cans are ready for re-filling).

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim as my invention:

1. For use in delivering a predetermined amount of water in an ice-making machine or the like, a water-reservoir having a discharge opening formed in its bottom wall, an outlet valve normally urged to lowermost position closing said discharge opening, an inlet valve having a control-arm normally urged to lowermost position opening said inlet valve, a float-member adapted to move vertically in buoyant relationship to the water-level within the reservoir and constructed and arranged to raise said control-arm to close

5

said inlet valve when the water-level reaches a predetermined point within said reservoir, said float-member having an elongated rod extending upwardly therefrom beyond the control-arm of the inlet valve and having an enlarged portion at its uppermost end, operating means for raising said outlet valve to permit the water to drain out of the reservoir through its bottom opening, said operating means including an elongated stem extending upwardly from said outlet valve and having a cam-follower extending generally horizontally therefrom, a generally horizontal rotatable shaft having a cam-disc arranged in operative relationship to said cam-follower and constructed and arranged to raise said stem when said rotatable shaft is turned in one direction and to permit said stem to be lowered when said rotatable shaft is rotated in the other direction, and a latch-mechanism for retaining said outlet valve in its upper open position and for maintaining the control-arm of the inlet valve in uppermost valve-closing position while the reservoir is draining, said latch-mechanism including a generally horizontal lever pivoted intermediate its ends and having one end bifurcated so as to straddle the rod of said float-member and having its other end notched adjacent said rotatable shaft, said lever being normally urged so as to maintain its notched end in lowered position adjacent said rotatable shaft, said rotatable shaft carrying a detent-member constructed and arranged to be moved into locking relationship with said notch when said shaft is rotated to valve-raising position, a second lever pivotally mounted intermediate its ends and carrying a generally enclosed loop at one end, said second lever being normally urged so that its loop-carrying end is lowermost, said loop passing underneath the control-arm of the inlet valve, said second lever being connected, at its other end, to said rotatable shaft so that rotation of said rotatable shaft to valve-raising position will tilt said second lever and raise said enclosed loop to position maintaining the control-arm of said inlet valve in uppermost valve-closing position, the enlarged upper end of the rod of said float-member being constructed and arranged to contact the bifurcated end of the first lever just before said float-member reaches its lowermost position as the reservoir is drained, thereby to tilt said lever so as to raise the notched end thereof and to release the detent-member, thereby permitting the shaft to rotate to its original position closing the outlet valve and permitting tilting of the second lever to its original position lowering the enclosed loop and releasing the control-arm so as to open the inlet valve.

2. For use in delivering a predetermined amount of water in an ice-making machine or the like, a water-reservoir having a discharge opening formed in its bottom wall, an outlet valve normally urged to lowermost position closing said discharge opening, an inlet valve having a control-arm normally urged to lowermost position opening said inlet valve, a float-member within the reservoir adapted to move vertically in buoy-

6

ant relationship to the water-level within the reservoir and constructed and arranged to raise said control-arm to close said inlet valve when the water-level reaches a predetermined point within said reservoir, said float-member having an elongated rod extending upwardly therefrom beyond the control-arm of the inlet valve, operating means for raising said outlet valve to permit the water to drain out of the reservoir through its bottom opening, said operating means including an elongated stem extending upwardly from said outlet valve, outlet valve regulating means including a rotatable shaft in operative engagement with said stem and arranged to raise said stem when said rotatable shaft is turned in one direction and to permit said stem to be lowered when said rotatable shaft is rotated in the other direction, and a latch-mechanism for retaining said outlet valve in its upper open position and for maintaining the control-arm of the inlet valve in uppermost valve-closing position while the reservoir is draining, said latch-mechanism including a generally horizontal lever pivoted intermediate its ends and having one end operatively engaged with the rod of said float-member whereby downward movement of the float-member to its lowermost position will cause tilting of said lever and having its other end adjacent said outlet valve regulating means, said lever being normally urged so as to maintain its end adjacent said outlet valve regulating means in lowered position adjacent thereto, said outlet valve regulating means arranged to be moved into locking relationship with the adjacent end of said lever when said shaft is rotated to valve-raising position, a second lever pivotally mounted intermediate its ends, means connecting an end of said second lever to the control-arm of the inlet valve whereby raising said end will prevent lowering of said control-arm from its uppermost valve-closing position, and said second lever being connected at its other end to said rotatable shaft so that rotation of said rotatable shaft to valve-raising position will tilt said second lever and raise said control-arm of said inlet valve to uppermost valve-closing position, and whereby the downward movement of the float-member to its lowermost position will tilt said first lever so as to raise the other end thereof and permit the shaft to rotate to its original position closing the outlet valve and permitting tilting of the second lever to its original position thereby releasing the control-arm so as to open the inlet valve.

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