

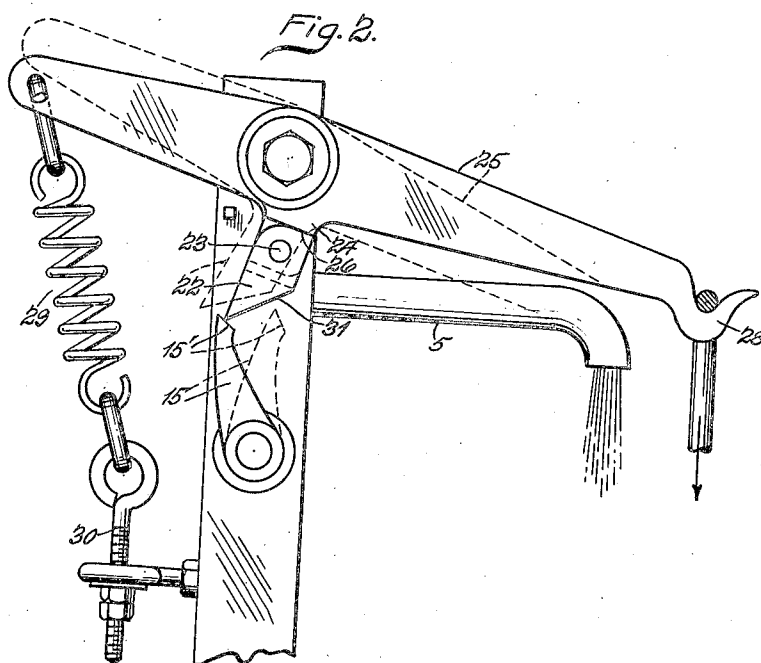
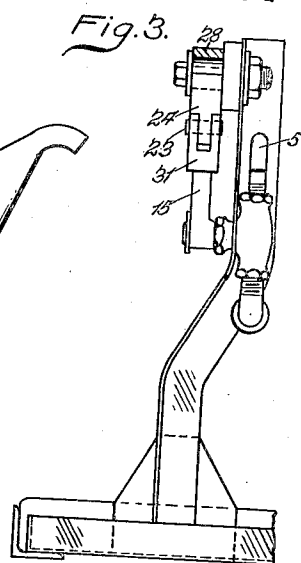
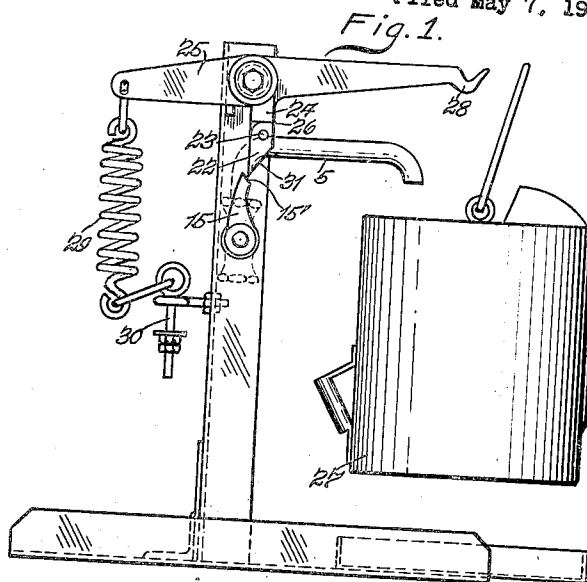
May 14, 1940.

J. W. HARRIMAN
AUTOMATIC WEIGHING DEVICE

2,200,602

Filed May 7, 1938

3 Sheets-Sheet 1



INVENTOR.
JOHN W. HARRIMAN
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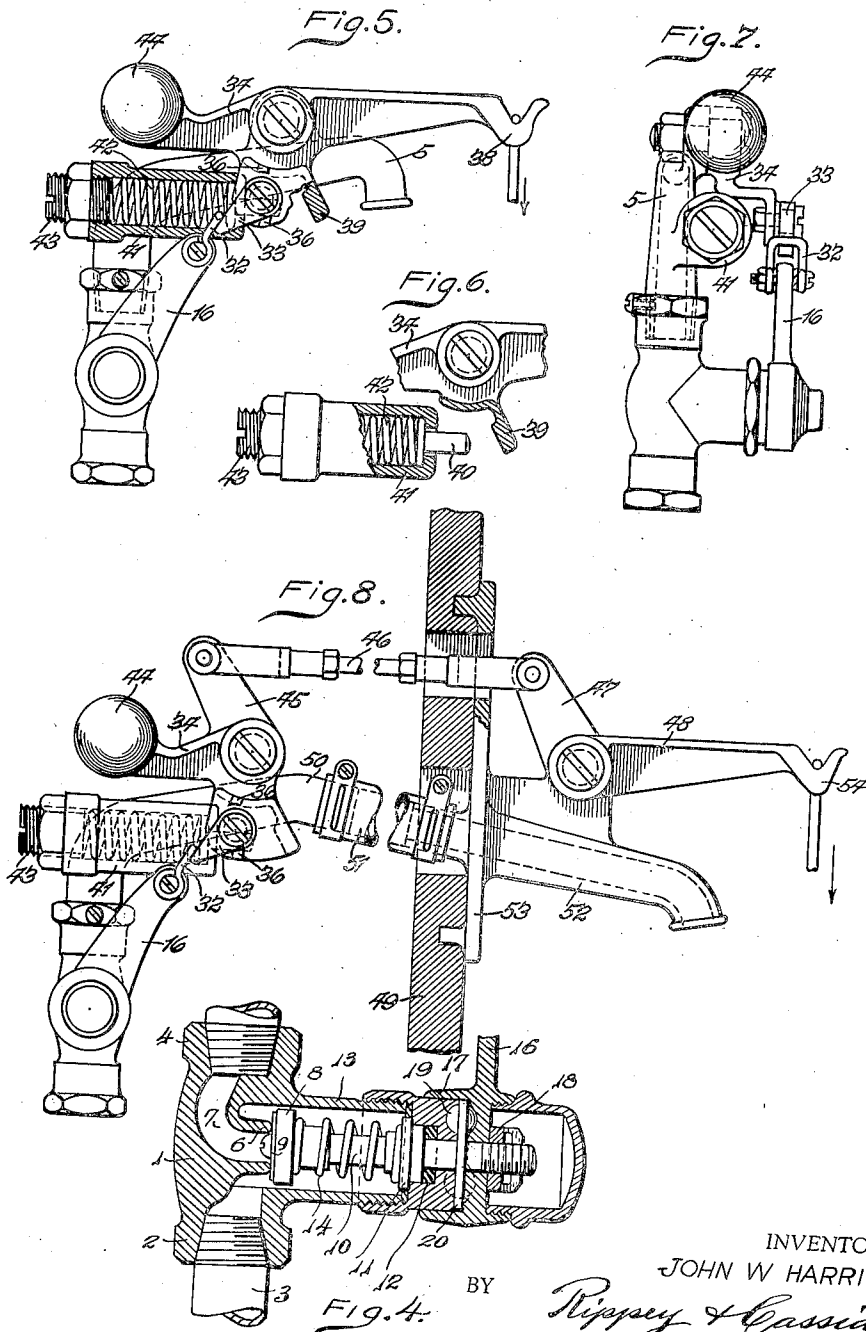
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 9.

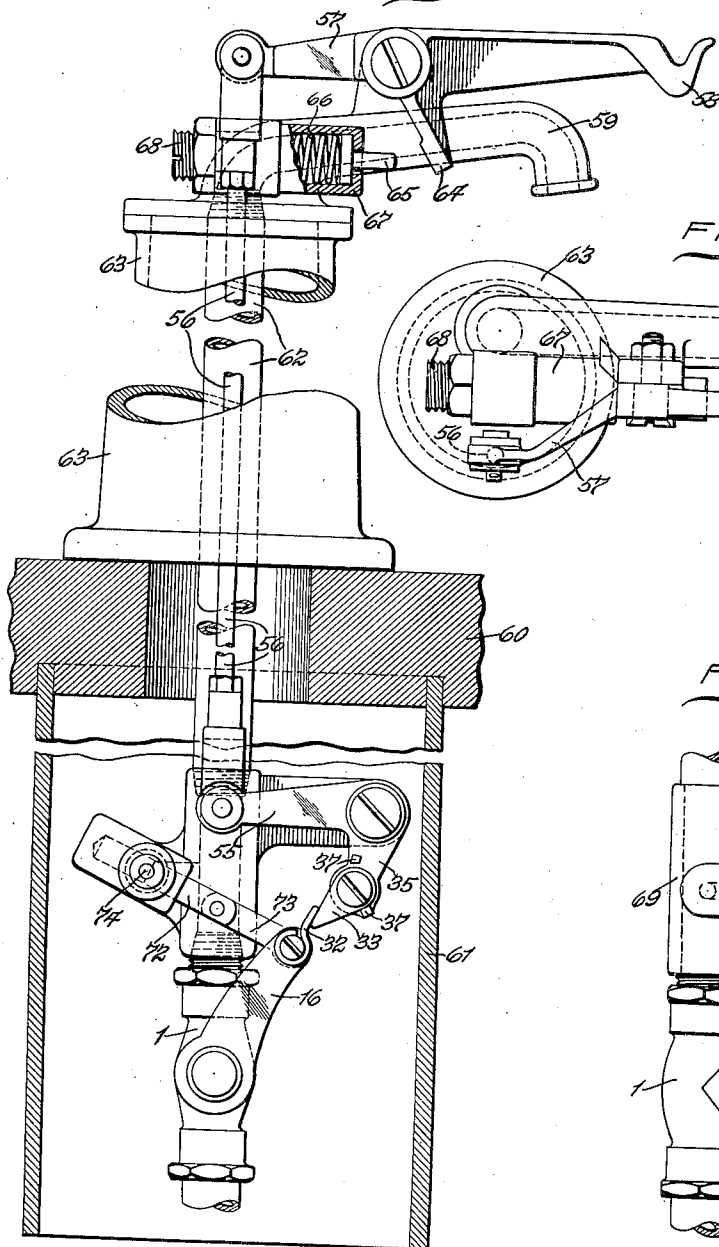


Fig. 10.

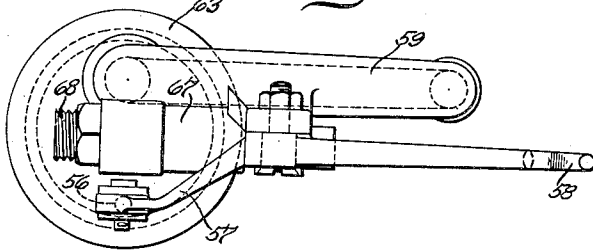
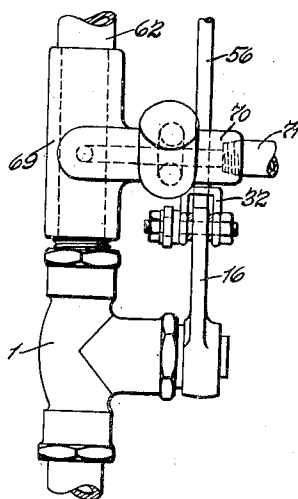


Fig. 11.



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UNITED STATES PATENT OFFICE

2,200,602

AUTOMATIC WEIGHING DEVICE

John W. Harriman, St. Louis County, Mo.

Application May 7, 1938, Serial No. 206,661

11 Claims. (Cl. 249—58)

This invention relates to automatic weighing device; and an object of the invention is to provide a device for opening standard self-closing valves automatically by the weight of a receptacle, such as an empty bucket or pail suspended from the device, in combination with means for causing the valve to close when a predetermined amount of weight of liquid has been discharged through the valve and into the bucket or pail.

Another object of the invention is to provide an improved automatic weighing device comprising a pivoted element for supporting a bucket or pail and adapted to be operated by an empty bucket or pail supported thereby, in combination with means operated by said element for opening a valve to permit flow of liquid therethrough into said bucket or pail and thereby increase the force applied to said element with the result that said element is operated to a position in which said element no longer controls the valve but leaves the valve free to be closed by the self-closing mechanism associated therewith.

Another object of the invention is to provide improved automatic weighing device including a pivoted lever or support adapted to sustain an empty bucket or pail in position to receive fluid discharged through a valve, means operated by said lever or support for opening the valve when said lever or support is moved by the empty bucket or pail suspended therefrom, means controlling extent of movement of said lever or support by the empty bucket or pail supported thereby and controlling further movement of said lever or support by the bucket or pail and the liquid contained therein until said lever or support is moved beyond position to control the valve, thereby leaving the valve free to be closed by the usual device provided for that purpose.

Various other objects and advantages of the invention will be apparent from the following description, reference being made to the annexed drawings, in which—

Fig. 1 is a side elevation of one satisfactory embodiment of the invention.

Fig. 2 is a front elevation of the mechanism shown in Fig. 1.

Fig. 3 is an enlarged view of the invention, showing the lever or support in one of the positions it occupies when the valve is held open thereby.

Fig. 4 is a sectional view of one type of several types of standard self-closing valves with which the invention may be satisfactorily combined.

Fig. 5 is a side elevation with parts in section of a modified form of the invention.

Fig. 6 is a fragmentary view of a part of the can supporting lever and the combined resistance and return spring device therefor.

Fig. 7 is a rear elevation of the device shown in Fig. 5.

Fig. 8 is a view showing the device arranged to discharge water or other liquid from one side of a wall to the other.

Fig. 9 is a broken side elevation with parts in section showing connections for operating a remote valve within the scope of the invention.

Fig. 10 is a plan view of the device shown in Fig. 9.

Fig. 11 is a rear elevation of the valve and the immediate connections for operating the same.

The valve shown in Fig. 4 (sheet 2) is only for illustrative purposes and is one of several well known and satisfactory types of standard self-closing valves. This valve comprises a fitting or valve housing 1 having at one end an internally threaded portion 2 adapted to be screwed into connection with a liquid supply pipe 3 and having at its opposite end an internally threaded portion 4 adapted to be engaged with a nozzle 5. This fitting or valve housing has therein a valve seat 6 provided with an opening or passage 7 through which water or other liquid may flow for discharge through the nozzle 5. The valve seat 6 is on the influent side of the opening 7.

A valve 8 equipped with a seating member 9 adapted to engage the valve seat 6 to close the valve and to be moved from said valve seat to open the valve, is attached to the inner end of a valve stem 10. The valve stem 10 extends for sliding movements through a washer 11 and through a packing gland 12 screwed onto the lateral extension 13 of the fitting or valve housing 1. A spring 14 is mounted between the valve 8 and the washer 11 and functions to press the valve 8 to closed position against the seat 6.

An arm which may be of the form shown in Figs. 1 and 2, or of the form shown in Figs. 5, 6 and 9, is operatively connected with the stem 10. In the form shown in Figs. 1 and 2, said arm 15 is mounted on the outer end of the valve stem 10 and, when moved in a counter-clockwise direction from the dotted line position in Fig. 2 to the solid line position, will move the valve stem longitudinally to an extent to open the valve. A cam surface 15' is formed on the outer end portion of the arm 15 for cooperative engagement with the valve operating mechanism. In the form shown in Figs. 4, 5, 8 and 9, the arm 16 has a hole through which the valve stem 10 extends and has a hub 17 enclosing the outer end of the

gland 12. A nut 13 screwed on the threaded outer end of the valve stem 10 presses the arm 16 against an annular series of balls 19 supported by a ring 20 mounted on the valve stem 10 and seating in cavities in the end of the valve 12. As is known, the arm 16 is formed with cams 21 operating against the cam balls 19 so that, when the arm 16 (Figs. 5, 8 and 9) is moved in a counter-clockwise direction for a short distance, the cams 21 operating against the cam balls 19 will move the stem 10 outwardly in opposition to the spring 14 and thereby open the valve 8 to permit water or other liquid to flow from the pipe 3 through the passage 7 and the nozzle 5. The arm 16 may be rotative about the stem 10 as an axis so that said stem 10 need not be rotated by the arm 16. When the arm 16 is released after having been moved in counter-clockwise direction (Figs. 5, 8 and 9), as described, the spring 14 immediately closes the valve 8 and stops further flow of liquid through the nozzle 5.

The arm 15 (Figs. 1 and 2) is moved in a counter-clockwise direction by a pawl 22 mounted on a pivot 23 on a downward extension 24 of a lever 25. The upper end of the pawl 22 forms a knuckle joint 26 with a shoulder on the extension 24 of the lever 25. In the unoperated position of the lever 25, the lower end of the pawl 22 extends downwardly against the front or clockwise side of the arm 15 adjacent to the cam 15'. When the empty receptacle 27 is suspended on the hook 28, the weight thereof depresses the free end of the lever 25 and thereby causes the pawl 22 to move the arm 15 in counter-clockwise direction sufficient to open the valve, such as the valve 8, and to hold said valve open for a time. When the valve 8 is opened, water flows past said valve and thence through the nozzle 5 and into the receptacle 27, thereby progressively increasing the weight suspended from the end of the lever 25.

A spring 29 connects one end of the lever 25 with an adjusting member 30, and said spring and adjusting member are moved upwardly by the weight of the receptacle 27 and the liquid therein. As the receptacle becomes filled with liquid and the weight thereof is increased, the suspending end of the lever 25 is moved downwardly to a further extent. When a predetermined amount of liquid has been discharged into the receptacle 27, the lower end of the pawl 22 moves beyond and out of engagement with the cam end 15' of the arm 15 and the valve 8 is thereupon closed to prevent any further flow of liquid thereby. The valve will then remain closed irrespective of whether the receptacle remains on the hook 28 or not. When the receptacle 27 is removed from the hook 28, the weight on the opposite end of the lever 25 swings the lever to the position shown in Fig. 1, causing a cam surface 31 on the lower end of the pawl 22 to rub against the end of the arm 15 and thereby permit the pawl to move to the position shown in Fig. 1. Thus the lever 25 and the pawl 22 are automatically returned to their unoperated positions ready for another operation by an empty receptacle suspended on the hook 28.

As shown in Figs. 5, 8 and 9, an adjustable abutment 32 may be attached to the end of the arm 16 in substitution for the cam 15' for engagement by a pawl 33 pivoted on an operating lever 34 (Figs. 5 and 8) or on an operating lever 35 (Fig. 9). Extent of swinging movement of the pawl 33 is limited by lugs 36 (Figs. 5 and 8) and by analogous lugs 37 (Fig. 9).

In Fig. 5, the lever 34 is formed with a suspending hook 38 for the receptacle 27 and with an arm 39 adapted to engage a plunger 40 mounted for sliding movements in a barrel 41 enclosing a spring 42 the tension of which may be varied by a regulating screw 43 screwed into the open end of the barrel 41, as shown. When the empty receptacle is suspended on the hook 38 (Fig. 5), the lever 34 is operated to open the valve 8; and, when the receptacle is sufficiently filled, the pawl 33 escapes beyond the abutment 32 and the valve is immediately closed irrespective of whether the receptacle is removed from the hook 38 or not. When the receptacle is removed from the hook 38, the counterweight 44 on the lever 34, and the spring 42 acting against the arm 36, cooperate to move the lever 34 to its unoperated position, as shown.

In the arrangement shown in Fig. 8, an arm 45 on the lever 34 is connected by a link 46 with an arm 47 of a lever 48 on the opposite side of the wall 49 from the lever 34. In this arrangement, the water supply mechanism including the valve and the lever 34 for opening the same may be within a building and the operating and discharge mechanism therefor may be on the outside of the building. In this arrangement, a nozzle 50 analogous to the nozzle 5 is connected by a hose connection 51 with a nozzle 52 on the outside of the wall 49 and attached to a supporting member 53 which is secured to the wall 49 and also supports the lever 48. When the empty receptacle is suspended from the hook 54 of the lever 48, said lever and the connections therefrom to the lever 34 are operated to an extent to open the valve 8 and permit liquid to flow past said valve and to be discharged through the nozzle 52 into the nozzle 5 and into the receptacle. When a sufficient amount of liquid has been discharged into the receptacle, the pawl 33 escapes from the abutment 32, as is obvious from the description of Fig. 5.

In the arrangement shown in Figs. 9, 10 and 11, the lever 35 has an arm 55 to which is pivoted the lower end of a link 56 the upper end of which is pivoted to one end of a lever 57 analogous to the levers 25, 34 and 48, and having on one end a hook 58 adapted to support a receptacle 27 to receive water from a nozzle 59 the same as the receptacle receives water from the nozzles 5 and 52. In this form of the invention, the valve mechanism including the arm 16 and the lever 35 is located below a wall or floor 60 and within a protecting enclosure 61. A pipe 62 is connected with the valve housing 1 and the nozzle 59 is attached to the upper end of said pipe 62 for discharging water passing through said pipe from the valve housing. The device may be extended to any height desired and above the floor a protecting enclosure 63 may be provided for the pipe 62. The lever 58 has an arm 64 operating against a plunger 65 which is actuated by a spring 66 within a spring barrel 67 and provided with an adjusting screw device 68. This spring barrel arrangement is similar to that shown in Figs. 5 and 6 and heretofore described. When a receptacle 27 is suspended on the hook 58 in position to receive liquid from the nozzle 59, said receptacle will operate the lever 57 and thereby the lever 35 to move the arm 16 in a counter-clockwise direction to open the valve 8 and permit water to flow upwardly through the valve housing 1 and the pipe 62 and thence through the nozzle 59 into the receptacle. When the receptacle is filled to the proper extent, the

pawl 33 escapes from the abutment 32, permitting the valve to be closed by the spring 14, as hereinbefore explained.

This form of the device may include a fitting 5 69 for connecting the pipe 62 with the valve housing 1, and this fitting includes a lateral tubular extension 70 opening into a pipe 71 for conducting liquid therefrom to any desired point of discharge. The opening through the extension 70 10 may be controlled by a slide valve 72 pivotally connected by a link 73 with the arm 16. When the arm 16 is in its starting position and the valve 9 is closed, the valve 72 leaves open the passage 74 through the extension 70, as may be 15 seen by reference to Fig. 9. Thus, when the valve 9 is closed and the arm 16 is in its unoperated position, the water or other liquid in the pipe 62 may flow therefrom through the opening 74 in the extension 70 and thence through the discharge pipe 71 to the original source of supply, 20 or any other point of discharge. The first movement of the arm 62 to open the valve 9 moves the valve 72 far enough to close the opening and prevent flow of liquid therethrough so long as 25 the valve 9 remains open.

Other means for supporting the receptacles 27 to operate the valves may be provided, and the illustration and description of the specific levers therefor do not constitute a limitation in this 30 particular.

Other variations of the invention than those specifically suggested may be made without departure from the nature and spirit of the invention.

I claim:

35 1. Mechanism for operating a valve having an operating stem comprising an arm attached to said stem for pivotal swinging movements about the axis thereof to operate the same, a pivoted lever, a pawl pivotally supported by said lever 40 for engaging said arm to operate the same about the axis of said stem and operate said valve as aforesaid, means for supporting a receptacle in connection with said lever to operate said 45 lever and thereby swing said arm and operate said valve as aforesaid and to move said pawl out of engagement with said arm by continued movement of said lever, and means for closing said valve after said pawl has moved out of engagement with said arm.

50 2. The combination with a longitudinally movable valve and a spring for closing said valve, of an arm attached to said valve for pivotal swinging movements about the axis of movement of said valve for opening the same in opposition to 55 said spring, a lever, a pawl pivotally supported and operated by said lever for engaging and pivotally moving said arm as aforesaid, means for supporting a receptacle in connection with said lever to operate said lever and thereby said arm 60 to open said valve and in position to receive liquid discharged through said valve when said valve is opened by operation of said arm by said lever, said pawl being released from said arm 65 by continued operation of said lever when a predetermined amount of liquid has been received in said receptacle, and means for restoring said lever to unoperated position when the receptacle is removed therefrom.

70 3. The combination with a longitudinally movable self-closing valve having an arm attached thereto for pivotal swinging movements about the axis of movement of said valve to open the same, of a lever, a pawl pivotally connected with 75 and operated by said lever for engaging and

swinging said arm as aforesaid to open said valve, means for supporting a receptacle in connection with said lever to swing the same and thereby operate said arm as aforesaid to open 5 said valve and to disengage said pawl from said arm by continued movement of said lever, and means for closing said valve while said receptacle remains supported by said lever and after a predetermined amount of liquid has passed 10 through said valve and into said receptacle and said pawl has been disengaged from said arm.

4. The combination with a longitudinally movable self-closing valve having an arm attached thereto for pivotal swinging movements about the 15 axis of movement of said valve to open the same, of a lever, a pawl pivotally connected with and operated by said lever for engaging and swinging said arm as aforesaid to open said valve, means for supporting a receptacle in connection 20 with said lever to swing the same and thereby operate said arm as aforesaid to open said valve and to disengage said pawl from said arm by continued movement of said lever, means for 25 closing said valve while said receptacle remains supported by said lever and after a predetermined amount of liquid has passed through said valve and into said receptacle and said pawl has been disengaged from said arm, and means for restoring said lever to position for another operation 30 when the receptacle is removed therefrom.

5. Mechanism for operating a valve having an operating stem comprising an arm mounted on said stem for swinging movements about the axis 35 thereof, a pivoted lever, a pawl pivotally supported by said lever for engaging and swinging said arm in one direction about the axis of said stem, means for supporting a receptacle to operate said lever and thereby said pawl to swing 40 said arm as aforesaid and to move said pawl out of engagement with said arm by continued movement of said lever, and means for closing said valve after said pawl has been moved out of engagement with said arm by said receptacle.

6. The combination with a longitudinally movable valve and a spring for closing said valve, of 45 an arm attached to said valve for swinging movements about the axis of movement of said valve, a lever, a pawl pivotally supported and operated by said lever for engaging and moving said arm in one direction about and at right angles to the 50 axis of said valve, means for supporting a receptacle in a relationship to operate said lever and cause said pawl to engage and move said arm and in position to receive liquid discharged 55 through said valve when said valve is opened by operation of said arm by said lever, said pawl being released from said arm by continued operation of said lever when a predetermined amount of liquid has been received in said receptacle, and means cooperating with said arm 60 to open said valve when said arm is moved by said lever and leaving said valve free to be closed by said spring after said pawl is released from said arm irrespective of the position of said lever.

7. The combination with a longitudinally movable self-closing valve having an arm attached 65 thereto for swinging movements about the axis of movement of said valve, and means cooperating with said arm for opening said valve when said arm is moved in one direction about said axis as aforesaid, of a lever, a pawl pivotally connected 70 with and operated by said lever for engaging and moving said arm in said direction, means for supporting a receptacle in position to operate said lever and thereby said pawl to move said arm in 75

said direction to open said valve and to disengage said pawl from said arm by continued movement thereof by said lever, and means for closing said valve while said receptacle remains supported as aforesaid and after a predetermined amount of liquid has passed through said valve and into said receptacle and said pawl has been disengaged from said arm.

8. The combination with a longitudinally movable self-closing valve having an arm attached thereto for swinging movements about the axis of movement of said valve, and means for opening said valve when said arm is moved in one direction as aforesaid, of a lever, a pawl pivotally connected with and operated by said lever for engaging and moving said arm in said direction to open said valve, means for supporting a receptacle in position to operate said lever and thereby said pawl to move said arm in said direction to open said valve and to disengage said pawl from said arm by continued movement thereof by said lever, means for closing said valve while said receptacle remains supported as aforesaid and after a predetermined amount of liquid has passed through said valve and into said receptacle and said pawl has been disengaged from said arm, and elements for restoring said lever and thereby said pawl to position for another operation when said receptacle is removed from said position.

9. Mechanism for operating a valve having an operating stem comprising an arm attached to said stem for swinging movements about the axis thereof, a pivoted lever, a pawl pivotally supported by said lever for moving said arm in one direction about the axis of said stem as aforesaid, means for operating said lever and thereby said pawl to move said arm in said direction about the axis of said stem and to release said pawl from said arm, means cooperating with said arm to

open said valve when said arm is moved as aforesaid, and means for closing said valve and thereby returning said arm to its starting position after said pawl is released therefrom as aforesaid.

10. Mechanism for operating a valve having an operating stem comprising an arm attached to said stem for swinging movements about the axis thereof, a pivoted lever, a pawl pivotally supported by said lever for moving said arm in one direction about the axis of said stem as aforesaid, means for operating said lever and thereby said pawl to move said arm in said direction as aforesaid and to release said pawl from said arm, means for opening said valve when said arm is moved as aforesaid, means for closing said valve and thereby returning said arm to its starting position after said pawl is released therefrom as aforesaid, and a spring for restoring said lever and said pawl to position for another operation of said arm.

11. Mechanism for operating a movable valve comprising an arm connected with said valve for swinging movements in opposite directions about the axis of movement of said valve from and to a starting position, means for opening said valve when said arm is moved from said starting position, means for closing said valve when said arm is moved to said starting position, a lever, a pawl pivoted on said lever for moving said valve from said starting position, mechanism for operating said lever and thereby said pawl to move said arm from said starting position to open said valve and to move said pawl out of engagement with said arm, and mechanism for restoring said arm and thereby said pawl to their starting positions preparatory for another operation of said arm.

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