(No Model.)

P. HARVEY.

STOP AND WASTE CONNECTION FOR TANKS.

No. 354,700. Patented Dec. 21, 1886.

Fig. 1.

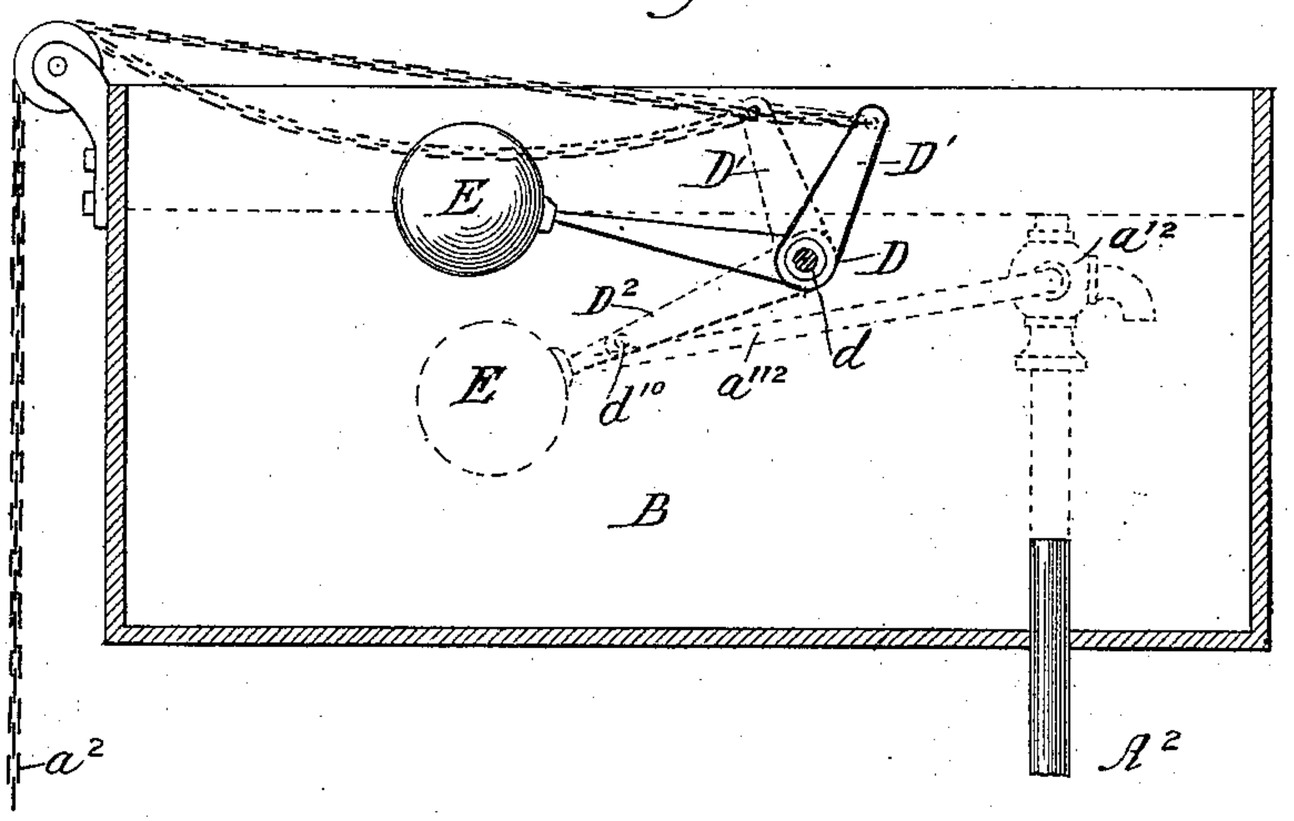


Fig. 2.

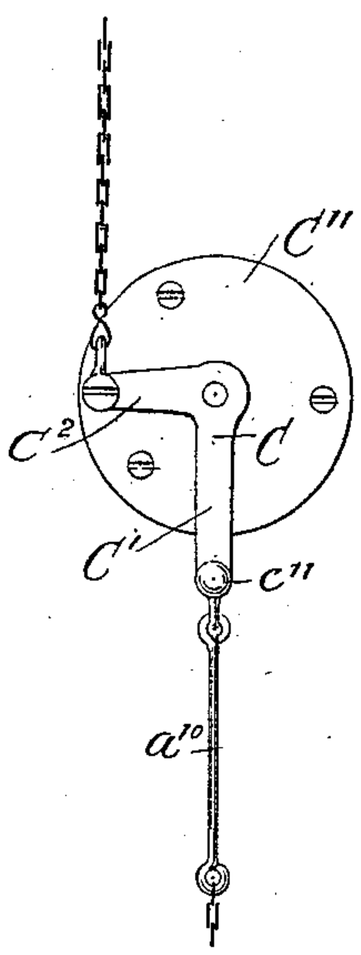


Fig. 3.

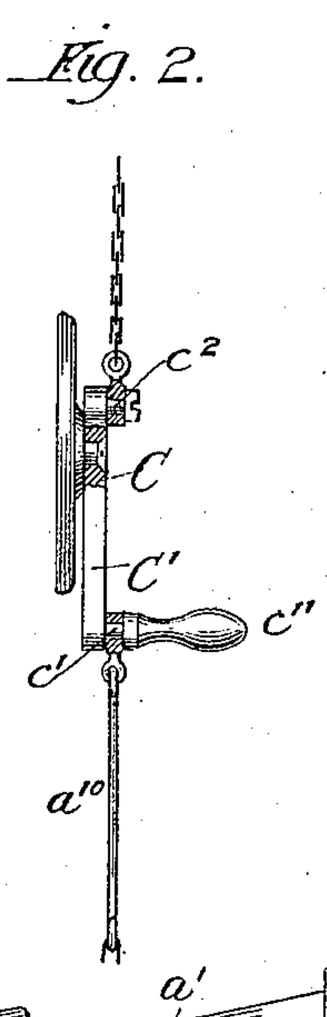


Fig. 4.

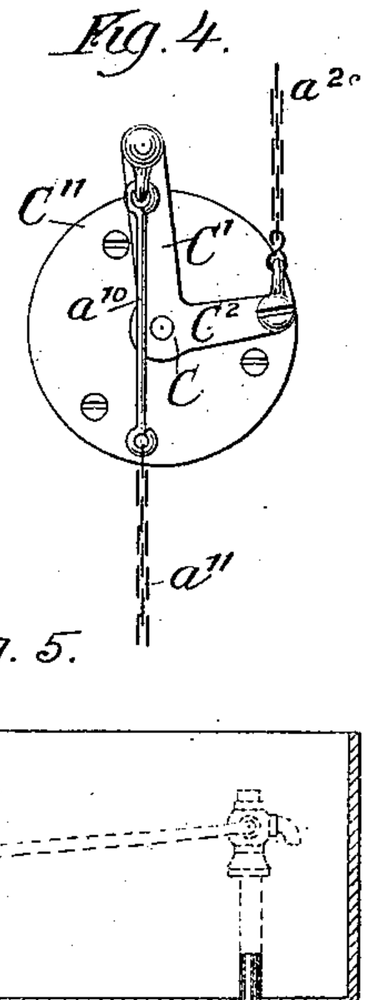


Fig. 5.

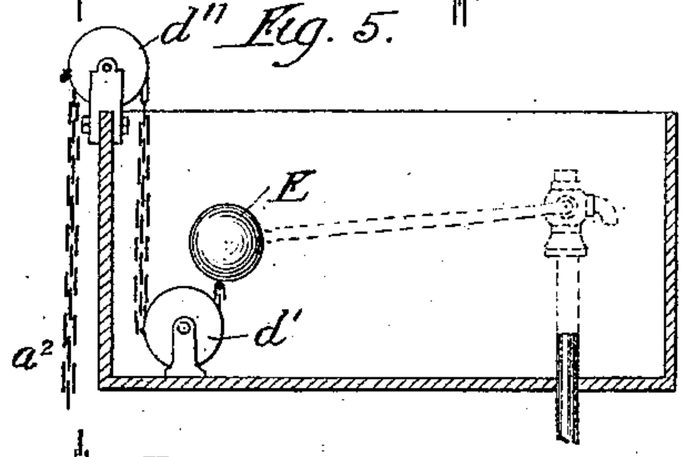
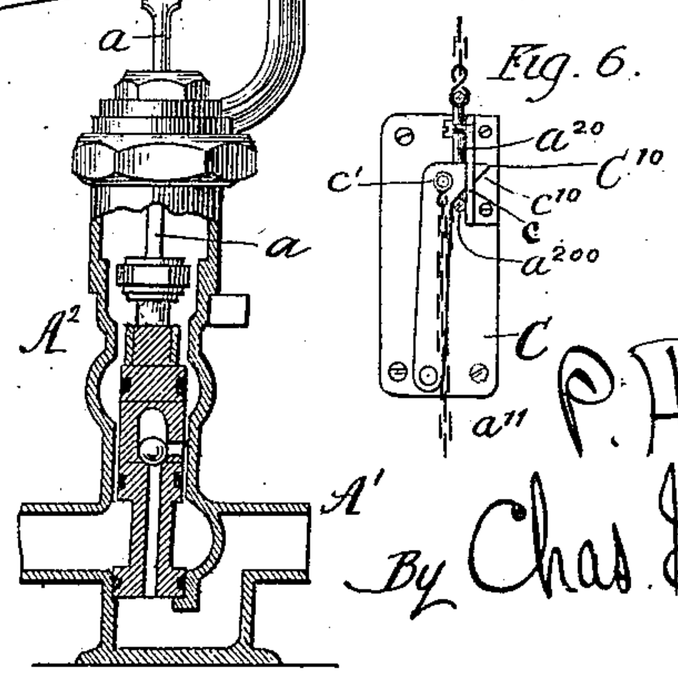


Fig. 6.



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UNITED STATES PATENT OFFICE.

PATRICK HARVEY, OF CHICAGO, ILLINOIS.

STOP-AND-WASTE CONNECTION FOR TANKS.

SPECIFICATION forming part of Letters Patent No. 354,700, dated December 21, 1886.

Application filed October 27, 1885. Serial No. 181,045. (No model.)

To all whom it may concern:

Be it known that I, PATRICK HARVEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stop-and-Waste Connection for Tanks, which is fully set forth in the following specification.

This invention relates particularly to tanks connected with water-closets; but its use is not limited to such tanks, and it may be applied to any tank or reservoir. Its purpose is to provide convenient means for operating the stop-and-waste valve at will to admit the water to the service-pipes and supply the tank, and means whereby the water in the tank shall automatically operate the stop-and-waste valve to close the supply and open the waste when a predetermined depth of water is obtained in the tank. A stop-and-waste valve either must be so constructed that the supply-port is closed before the waste-port is opened, or must be operated instantaneously, so that the interval when both are open shall be as brief as possible. It is evident, therefore, that if the stop-and-waste valve be operated directly in any familiar manner by the float in the tank, so that it is gradually opened as the water falls and gradually closed as the water rises, if the valve is of the first sort, there will come an instant when the valve will be closed and the supply will cease, and consequently all further action of the device will cease, so that the waste will not be opened, and the pipes will remain filled and the purpose of the stop-and-waste valve will be defeated. If the stop-and-waste valve is of the second sort above mentioned, the gradual action of the stop-and-waste valve occasioned by the rise of water in the tank will reach that stage where both the supply and waste ports are equally opened. All further supply to the tank will thereupon cease, the water entering through the supply-port all passing out through the waste-port, and no further actuation of the valve being caused by the water in the tank, which is now stationary, both valves will remain thus equally open and the water will be wasted. It is evident, therefore, that to accomplish the purpose of the invention above stated it is necessary that instantaneous action of the stop-and-waste valve must be produced by the operation of the water in the tank reaching a predetermined stage, in distinction from a gradual action due to its gradually approaching such stage, and this result is accomplished by the mechanism hereinafter described, and illustrated in the drawings, wherein—

Figure 1 is a vertical section through a tank and the stop-and-waste valve which controls the system of service-pipes by which said tank is fed. Fig. 2 is an edge elevation of the lever and the plate on which it is mounted, which is the peculiarity of my invention. Figs. 3 and 4 are front elevations of the same, showing the lever in different positions. Fig. 5 is a sectional elevation showing a modified form of float-connection. Fig. 6 is an elevation showing a modified form of the lever.

A is the stop-and-waste valve. A′ represents the service-pipe system; A^2, the pipe in said system, which supplies the tank B.

a is the valve rod or stem. *a′* is the lever-arm which actuates it. a^{11} is a chain connected thereto and to the longer arm, C′, of the bell-crank lever C, which is pivoted upon the plate C^{11}, which is secured in any convenient location.

a^2 is a chain connected to the shorter arm, C^2, of the bell-crank lever C, and extends to arm D′ of the rock-shaft D, which is journaled on the tank B, and has the arm D^2, which carries the float E.

The position shown in Fig. 1 is with the stop-and-waste valve closed and the tank full. The tank may become empty without altering the position of any of the parts, except the rock-shaft D, and its arms and the float E, and the chain a^2, which will be slackened, as illustrated in dotted line, when the float E and arms D′ D^2 assume the position shown in the dotted lines in Fig. 1.

If it is now desired to fill the tank, the handle c^{11}, which is preferably made as an extension of the stud *c′*, to which the chain a^2 is connected, is seized, and the bell-crank lever C is swung over into the position shown in Fig. 3, thus lifting the lever-arm *a′* and depressing the valve-rod *a*, and opening the supply-port of the stop-and-waste valve. The chain a^{11} encountering the stud or wrist-pin c^2 on the arm C^2 of the bell-crank lever C, prevents the lever swinging farther in the direction in which it

was moved to reach that position. In this position the stud or wrist-pin c' on the longer arm, C', is just past the center or vertical plane of the pivot of the bell-crank lever C, and the wrist-pin or stud c^2 is a little below the horizontal plane of said pivot—that is to say, a little lower than its first position on the opposite side. As the water in the tank rises, being supplied through the pipe A^2, and approaches high-water mark, the float E is lifted and carries up the arm D^2, rocks the shaft D, and causes the arm D' to take up the slack of the chain a^2, and then to lift the arm C^2 enough to carry the wrist-pin c' on the arm C' over the center of the bell-crank lever C, this last movement being through a horizontal arc and only very slightly lifting the valve-lever a', and thereupon the weight on the valve-arm a' acts to pull down the arm C' of the bell-crank lever to the lowest point, as at starting, and as shown in Fig. 1, closing at the same movement the supply-port and opening the waste-port of the stop-and-waste valve, and so cutting off the flow into the tank and leaving the tank valve and connections in the same position shown in Fig. 1.

If the stop-and-waste valve is arranged to open downward and close upward, the connection of the chain a^{11} to the valve-lever would be made on the opposite side of its fulcrum.

In order most effectually to make the wrist-pin c^2 serve as a stop for the bell-crank lever by coming in contact with the chain a^{11}, the latter is made to terminate in a long link, a^{10}, longer than the distance in direct line between the two wrist-pins c' and c^2. Any further movement of the lever after this link collides with the wrist c^2 would lift the lower end of said link, rocking it as a lever over c^2 as a fulcrum. The whole weight of the valve-actuating lever-arm and of the weight on the same tend to prevent such action.

A substitute for the bell-crank lever C and the connections from it to the float are illustrated in Fig. 5. The shorter arm, C^2, is omitted. A stop, c, is provided on the plate. The chain a^2 terminates in a long link or hooked rod, a^{20}, which hangs against the stop c. The lever-arm C has the horn or spur C^{10}, provided with the oblique under edge, c^{10}, and when the lever-arm C is thrown up said horn C^{10} passes in by the rod a^{20}, or, if it be a link, through it, and overhangs the hook of the rod (or lower loop of the link) a^{200}, and the lever comes to a stop, resting against said hook or loop, which rests against the stop c. Now, when the float pulls the rod or link a^{20} upward, it is guided by the stop c, and, acting against the oblique lower edge of the horn C^{10}, it crowds the lever C away from the stop c until the wrist c' is past the vertical line of the center of the pivot of the said lever, and the result is as above described.

A substitute for the rock-shaft D and its arms D' and D^2 is illustrated in Fig. 6. The float is connected directly to the chain a^2, which is carried down therefrom around the pulley d', and thence up and over the pulley d^{11}, and thence down to the connection with the lever C. Obviously the connections from the float to the lever C may be varied indefinitely, according to the position of the various parts.

If desired, the supply-pipe A^2 may be provided with a valve, a^{12}, whose stem may be connected to the float by the lever-arm a^{112}. If the form shown in Fig. 1 is employed, the lever-arm D^2 may be provided with a pin, d^{10}, under which the arm a^{112} will engage and lift the arm D' when the float is lifted by the water. If the form shown in Fig. 5 is employed, said float is simply connected both to the chain a^2 and to the lever-arm a^{112}. In either case the lengths of the several connections should be such that the valve a^{12} will not be fully closed before the water has risen high enough to operate the stop-and-waste valve connections. Thus the valve a^{12} will only serve as a precautionary device, and will be fully closed only in case, (by reason of leakage of the stop-and-waste valve,) the water continues to flow after the stop-and-waste valve has been operated to cut off the water, in which case the tank will be prevented from overflowing by the closing of the valve a^{12}, caused by the float upon a slightly-greater depth of water being obtained than was sufficient to operate the stop-and-waste valve.

I claim—

1. In combination with the stop-and-waste valve and its actuating mechanism, the float in the tank, the lever swinging in a vertical plane having one arm connected to the valve-actuating mechanism, and stopped above its pivot just beyond the vertical line through the same, and mechanism operated by the float to swing the lever back past said vertical line, substantially as and for the purpose set forth.

2. In combination with the stop-and-waste valve and its actuating mechanism, the float in the tank, the bell-crank lever swinging in a vertical plane, having one arm connected to the valve-actuating mechanism, and holding the valve open when it is vertical above the pivot of the lever, and having the other arm connected to the float and raised by the rising of the float, whereby the rising float swings the valve-actuating arm of the lever past the vertical line through its pivot, substantially as and for the purpose set forth.

3. In combination with the stop-and-waste valve and its actuating mechanism, the float in the tank, the lever swinging in a vertical plane connected to the valve-actuating mechanism, and stopped above its pivot just beyond a vertical line through the same, and the rock-shaft actuated by the float, and mechanism operated by its lever-arm to swing the lever back past said vertical line, substantially as and for the purpose set forth.

4. In combination with the stop-and-waste valve and its actuating mechanism, the float in the tank, the bell-crank lever swinging in a

vertical plane, and having one arm connected to the valve-actuating mechanism, and holding the valve open when it is vertical above its pivot, the rock-shaft operated by the float and connected to the other arm of the bell-crank lever and raising the same when the float rises, whereby the float rising causes the valve-actuating arm of the lever to swing past the vertical line through its pivot, substantially as set forth.

5. In combination, substantially as set forth, the stop-and-waste valve, the bell-crank lever having one arm connected to the valve-actuating mechanism, the float connected to the other arm of said lever, said latter arm having a lateral projection and being shorter than the former arm, whereby said projection affords a stop to arrest the motion of the bell-crank lever.

6. In combination with the stop-and-waste valve and its actuating mechanism, the float, the bell-crank lever having its shorter arm provided with a wrist and connection therefrom to the float, and having its longer arm connected with the valve-actuating mechanism, the last link in said connection being a rigid one, longer than the distance from its connection with said arm to the wrist on the short arm, whereby said wrist serves to stop the motion of the bell-crank lever and make further motion impossible without further raising the valve-rod, substantially as set forth.

7. In combination with the stop-and-waste valve, the service-pipe leading therefrom to the tank, the valve controlling the discharge from said pipe into the tank, the lever C and its connections to the stop-and-waste valve, and the float in the tank, and connections by which it actuates both the lever C and the valve in the service-pipe, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 23d day of October, A. D. 1885.

PATRICK HARVEY.

Attest:
CHAS. S. BURTON,
FRANCIS W. PARKER.