

H. W. THEIS.

BALL COCK.

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1,047,333.

Patented Dec. 17, 1912.

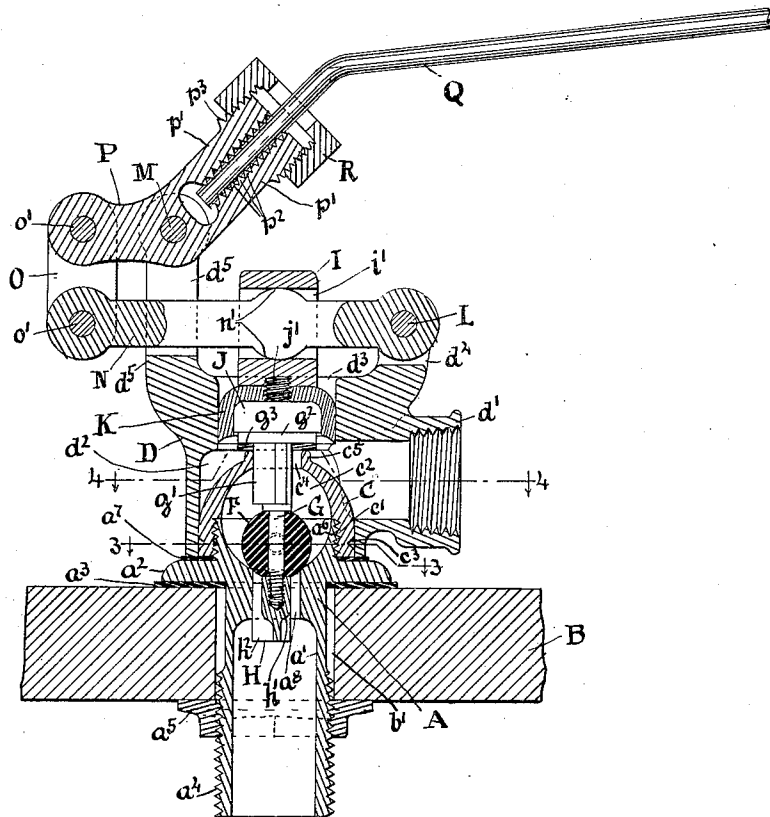


Fig. 1

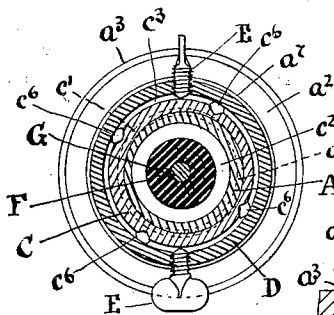


Fig. 3

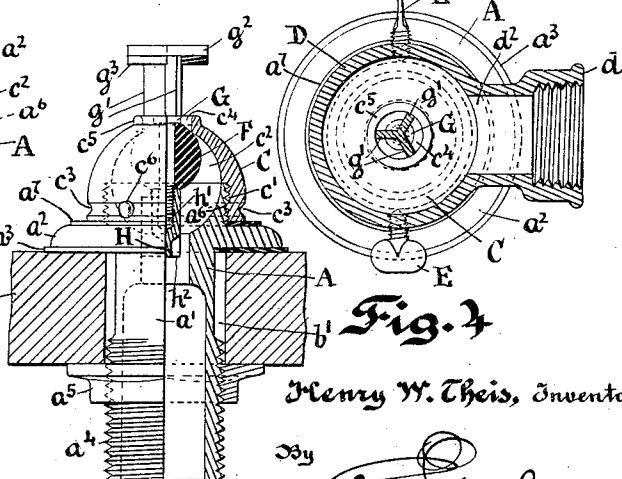


Fig. 2

Witnesses

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HENRY W. THEIS, OF MILWAUKEE, WISCONSIN.

BALL-COCK.

1,047,333.

Specification of Letters Patent.

Patented Dec. 17, 1912.

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To all whom it may concern:

Be it known that I, HENRY W. THEIS, of Milwaukee, Wisconsin, have invented a Ball-Cock, of which the following is a specification.

This application relates to ball-cocks employed as supply-valves in self-filling tanks, and generally in those situations where it is desired to keep the water in a tank at a certain level, and where the supply-valve opens when the water goes below that level, and closes when it reaches it again. These devices are commonly operated by means of a float on the end of a lever, which moves the plug of the valve up or down.

The object of my present invention is to provide an improved device of this class, and to this end I provide, first, a double closure whereby the water is more completely and certainly stopped from flowing when it reaches the given level, and secondly, a means whereby the valve closes itself automatically when the top-portion carrying the automatic devices is removed, so that for example in case of repairs said top-portion can be taken out without closing off the water at any other cock, as the cock will close itself automatically.

The nature of and improvements contained in my invention will best be understood from the following detailed description thereof, and are specifically set forth in my claims. Said description is illustrated by the accompanying drawings showing the most improved form thereof, wherein—

Figure 1 is a longitudinal central section through the ball-cock complete in closed position; Fig. 2 shows the stationary portion of the same in its self-closing position when the top-portion is removed, the right-hand half being in section; and Figs. 3 and 4 are horizontal sections taken on the planes 3 and 4 respectively.

The reference letters refer each to the same part in each figure of the drawings.

The device comprises three principal castings forming the frame parts, together with others forming the plug or closure elements, and a compound lever-system connecting the latter with the float. Said frame-parts comprise a base-member A, which has a tubular neck-portion a' adapted to pass through a hole b' in the bottom B of the tank, said neck-portion being surrounded at the top by a flanged head-portion a^2 adapted to compress a washer a^3 , and the lower end of

said neck-portion being provided with threads a^4 and a nut a^5 acting in opposition to the head a^2 to secure it to said bottom B; a middle casing-member C, which has an internal screw-thread c' engaging an external screw-thread a^6 on that portion of the member A which lies above the head a^2 , the two members A and C having their opposing faces hollowed out so as to form a spherical chamber c^2 , here styled the inner valve-chamber; and an outer-casing-member D which fits neatly around the outer circumference of the member C and rests with it upon a sealing-washer a^7 on the top of the head a^2 . The member D carries the valve-mechanism to be presently described and also the outlet nozzle d' , which may be internally threaded as shown to provide for a pipe-connection (this being immaterial to my invention), and the internal space between the members C and D forms an outer valve-chamber d^2 . The method of securing the member D to its seat is an important feature of my invention, for reasons that will be seen. The member C is provided on its periphery with an annular groove c^3 adapted to receive the conical ends of a pair of set-screws E, which are threaded into the lower edge of the member D at opposite sides thereof, so that the member D can be placed upon the member C and turned in any direction it may be desired, and in order to remove it, it is merely necessary to turn back the screws E; thus the top-portion D can be removed without disturbing the joint between the members A and C.

The spherical chamber has an inlet a^8 and an outlet c^4 , which are axial with the tubular neck a' , the former opening from said neck and the latter opening into the chamber d^2 . Within the chamber c^2 is mounted a spherical plug F, which may conveniently be made of rubber or other flexible material adapted to form a resilient joint; said plug is adapted to seat upon the inner edge of the passage a^8 , and also of the passage c^4 , according as it may be at the bottom or at the top of its movement. Said plug is mounted upon a vertical stem G, which extends up through the passage c^4 and has three lateral parallel-sided wings g' (see Fig. 4) whereby it is guided in an axial position with respect to the openings without closing the passage to the egress of water. On its upper end the stem G has a disk-shaped head g^2 , below which is a resilient washer g^3 , which is adapt-

ed to form a closure with the upstanding margin c^5 of the member C. The lower end of the stem G is threaded to enter into a threaded socket h' in a guiding-member H, which holds the plug F in place on its stem, and has three lateral wings h^2 similar to the wings g' and performing the same function, viz., holding the lower end of the stem concentric with the passageway a^3 . The relative positions of the plug F and washer g^3 are such that on depression of the stem G the two passages a^3 and c^4 are simultaneously closed, thus shutting off the water at two places at once, and forming double security for a tight closure.

The member D immediately over the member C and coaxial with the valve-stem is perforated by a cylindrical passage d^3 , in which reciprocates a device consisting of three parts, to wit: a transversely-perforated member I, which has a screw-threaded socket on the bottom, a member J having an enlarged flattened head, and a screw-stem j' screwing into said socket; and between the members I and J a leather cup K, which forms a hydraulic joint, closing the passageway d^3 . The head of the member J is adapted to press upon the head g^2 of the stem G, thus depressing the same, its rising motion being effected by the pressure of the water from below. On opposite sides of the passage d^3 the member D carries two forked standards d^4 and d^5 , which carry at their ends pivots L and M, forming the fulcrums of my compound lever-system. Upon the pivot L is fulcrumed a lever-arm N, which passes through the transverse aperture i' in the member I, having circular bosses n' on opposite sides, which abut against the top and bottom of said aperture. The free end of said lever N passes between and beyond the parallel arms of the standard d^5 , and is connected by a pair of links O and two pins o' to one end of a second lever-arm P, which is fulcrumed upon the pivot M; the other end of this lever P is cleft longitudinally, and the two branches form jaws p' having their inner faces clothed with teeth or serrations p^2 adapted to grip between them the end of a float lever-arm Q, as shown. The gripping is performed by means of a nut R, which engages a taper-thread p^3 on the end of the member P, that is to say, on the ends of the two jaws p' , so that as the nut R is screwed up the ends of the jaws p' are brought together with a clamping action, and the serrations p^2 cause the end of the arm Q to be firmly grasped. This is an important feature of my invention, and is much superior to the old way of applying the float-rod by means of a screw-thread, because any size of rod can be gripped and does not require to be threaded. This is important because in many cases the proper length of float-arm is not known until after

the device is set up, so that the end of the rod, if threaded, might subsequently have to be cut off and rethreaded, if the lever were found too long. Another important advantage is gained also by my construction, because the actual fulcrum of the float-arm is brought to the back of the valve, that is to say, to the opposite side from the nozzle d' , thereby increasing the possible leverage, which is an important advantage in a small tank.

Now it will be seen that when the parts are mounted in the position shown, the depression of the float will raise the free end of the lever N, and thereby permit the raising of the stem G, thereby opening the passages a^3 and c^4 , and giving egress to the water; and when the float is raised to the desired level, said passages are in converse manner closed again. Should it be desirable or necessary to remove the top for the purpose of repairs, this is done as aforesaid by releasing the screws E, and thereupon the plug F is immediately raised to the top of the chamber G, as shown in Fig. 2, so that it now seats upon the inner edge of the passage c^4 , and closes said passage.

The set-screws E may be utilized for the screwing on and off of the inner casing-member C, by providing the latter with one or more pairs of depressions e^6 at diametrically opposite points of the groove c^3 . Two such pairs are shown in the drawing. When the member D is turned to the right position, the set-screws E can be made to enter said depressions and thereupon the member C can be turned off or screwed on to the member A.

I wish it understood that my invention is not limited to the use of all the above described features and constructions, for some may be omitted and others may be varied or modified in various ways, as will readily occur to those skilled in the art.

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

1. In a device of the class described, a valve-chamber having an inlet and an outlet passage at opposite sides thereof, a reciprocating plug in said chamber adapted to close the inlet passage when it is at one end of its movement and to occupy a position intermediate between said passages when it is at the other end of its movement, and an automatic plug-operating device adapted to move said plug from said intermediate position to the first-named end of its movement; said device being removable independently of said plug and the latter being in such case free to be moved by water pressure to the opposite side of said chamber and close said outlet.

2. In a device of the class described, the combination of a valve-chamber having an

inlet and an outlet respectively at the bottom and top thereof, a plug reciprocating in said chamber and adapted to seat against either said inlet or outlet and an automatically operated device which actuates said plug and holds it more or less depressed from a mid-position downward depending on certain conditions of the water outside the valve; said automatic-device being removable independently of said plug whereby the latter is free to close said outlet and is caused to do so by the pressure of the water from below.

3. In a device of the class described, the combination of the three casing-elements, to wit: a base-member, an inner casing-member having a screw-threaded connection therewith, the opposite faces of said base-member and inner casing-member being hollowed to form an inner valve-chamber, said valve-chamber having an inlet through the base-member and having an outlet through said casing-member, and an outer casing-member secured over said inner casing-member in a manner permitting its release therefrom, a valve-stem extending into said outer casing-member, and an automatic device adapted to actuate said valve-stem.

4. A ball-cock comprising in combination a base-member having an external thread, an inner casing-member having an internal thread engaging the same, the two opposed faces of said base-member and inner casing-member being each hemispherically concave forming a spherical inner valve-chamber, said base-member having an inlet passageway to the bottom of said chamber and said inner casing-member having an outlet passageway from the top thereof, an upright reciprocating stem having means for guiding it centrally of said passageways and carrying closure-means exterior to said valve-chamber for closing said outlet passageway, a closure-plug mounted on said stem within said valve-chamber and adapted to close said inlet passageway simultaneously with the closure of said outlet passageway by said closure means, said plug being also adapted when released to rise to the top of said chamber and seat against and close said outlet passageway from within, and automatically operating means for holding said stem more or less depressed, said means being removable independently of the other parts.

5. A ball-cock comprising in combination a base-member having an external thread, an inner casing-member having an internal thread engaging the same, the two opposed faces of said base-member and inner casing-member being each hemispherically concave forming a spherical inner valve-chamber, said base-member having an inlet passageway to the bottom of said chamber and said inner casing-member having an outlet pas-

sageway from the top thereof, an upright reciprocating stem having means for guiding it centrally of said passageways and carrying closure-means exterior to said valve-chamber for closing said outlet-passageway, a closure-plug mounted on said stem within said valve-chamber and adapted to close said inlet-passageway simultaneously with the closure of said outlet-passageway by said closure-means, said plug being also adapted when released to rise to the top of said chamber and seat against and close said outlet passageway from within, an outer casing-member mounted upon and surrounding said inner casing-member in an independently removable manner and the interior of which forms an outer valve-chamber, said outer member having a discharge-nozzle, and means carried by said outer member for automatically depressing to a greater or less extent said valve-stem.

6. A ball-cock comprising in combination a base-member having an external thread, an inner casing-member having an internal thread engaging the same, the two opposed faces of said base-member and inner casing-member being each hemispherically concave forming a spherical inner valve-chamber, said base-member having an inlet passageway to the bottom of said chamber and said inner casing-member having an outlet passageway from the top thereof, an upright reciprocating stem having means for guiding it centrally of said passageways and carrying closure-means exterior to said valve-chamber for closing said outlet passageway, a closure-plug mounted on said stem within said valve-chamber and adapted to close said inlet passageway simultaneously with the closure of said outlet passageway by said closure-means, said plug being also adapted when released to rise to the top of said chamber and seat against and close said outlet passageway from within, an outer casing-member mounted upon and surrounding said inner casing-member in an independently removable manner and the interior of which forms an outer valve-chamber, said outer member having a discharge-nozzle, a reciprocating-plug carried by said outer member and adapted to press upon said closure-means, and automatic mechanism carried by said outer member and adapted to depress said last-named plug.

7. A ball-cock comprising in combination a base-member having an external thread, an inner casing-member having an internal thread engaging the same, the two opposed faces of said base-member and inner casing-member being each hemispherically concave forming a spherical inner valve-chamber, said base-member having an inlet passageway to the bottom of said chamber and said inner casing-member having an outlet pas-

sageway from the top thereof, an upright reciprocating stem having means for guiding it centrally of said passageways and carrying closure-means exterior to said valve-chamber for closing said outlet passageway, a closure-plug mounted on said stem within said valve-chamber and adapted to close said inlet passageway simultaneously with the closure of said outlet passageway by said closure-means, said plug being also adapted when released to rise to the top of said chamber and seat against and close said outlet passageway from within, an outer casing-member mounted upon and surrounding said inner casing-member in an independently removable manner and the interior of which forms an outer valve-chamber, said outer member having a discharge-nozzle, a reciprocating-plug carried by said outer member and adapted to press upon said closure-means, and a float-operated lever mechanically connected with and adapted to reciprocate said plug.

8. A ball-cock comprising in combination a base-member having an external thread, an inner casing-member having an internal thread engaging the same, the two opposed faces of said base-member and inner casing-member being each hemispherically concave forming a spherical inner valve-chamber, said base-member having an inlet passageway to the bottom of said chamber and said inner casing-member having an outlet passageway from the top thereof, an upright reciprocating stem having means for guiding it centrally of said passageways and carrying closure-means exterior to said valve-chamber for closing said outlet passageway, a closure-plug mounted on said stem within said valve-chamber and adapted to close said inlet passageway simultaneously with the closure of said outlet passageway by said closure-means, said plug being also adapted when released to rise to the top of said chamber and seat against and close said outlet passageway from within, an outer casing-member mounted upon and surrounding said inner casing-member in an independently removable manner and the interior of which forms an outer valve-chamber, said outer member having a discharge-nozzle, a reciprocating-plug carried by said outer member and adapted to press upon said closure-means, a lever fulcrumed on said outer casing-member on one side of said reciprocating plug and connected therewith to reciprocate it, and a float-operated lever fulcrumed on the opposite side of said outer casing-member and having an arm connected with the free end of said first-named lever.

9. In a ball-cock, the combination of a base-member, an inner casing-member having a screw-threaded connection therewith,

and a peripheral annular groove and an outer casing-member having one or more set-screws adapted to engage in said groove; said inner casing-member inclosing an inner valve-chamber, and valve-mechanism reciprocating therein; and said outer casing-member inclosing an outer valve-chamber and carrying automatically-operated devices which act upon said valve-mechanism.

10. In a ball-cock, a base-member having a screw-thread, an inner casing-member having a screw-thread engaging with said first-named thread and having an annular groove on the outside, and an outer casing-member carrying one or more set-screws adapted to enter said groove when said outer casing-member is set in place.

11. In a ball-cock, a base-member having a screw-thread, an inner casing-member having a screw-thread engaging with said first-named thread and having one or more depressions on its periphery, and an outer casing-member carrying one or more set-screws adapted when said member is in place to engage with said depressions whereby said outer member is held in place and adapted to be used as a handle to screw up or unscrew said inner casing-member.

12. In a ball-cock, a base-member having a screw-thread, an inner casing-member having a screw-thread engaging with said first-named thread and having an annular groove on its periphery and one or more depressions in and deeper than said groove and an outer casing-member carrying one or more set-screws adapted to engage in said groove when in place whereby it is held in place at any angle at which it may be placed, said set-screw or set-screws being adapted by further screwing in when in proper position to engage in said depression or depressions thereby adapting said outer member to be used as a handle or wrench for screwing or unscrewing said inner casing-member.

13. In a device of the class described, the combination of a valve-chamber having an inlet and an outlet respectively at the bottom and top thereof, a valve-stem carrying a plug in said chamber adapted to close said inlet, an element outside said chamber adapted to close said outlet simultaneously with the closure of said inlet when said stem is depressed, a reciprocating-plug unconnected with and adapted to press upon said element and thereby close said inlet and outlet, and an automatic-operating device for operating the plug.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

HENRY W. THEIS.

Witnesses:

GEORGE W. COLLES,
CHARLES M. SCANLAN.