

T. D. MILLEA.

FLOAT VALVE.

APPLICATION FILED SEPT. 13, 1906.

945,569.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.

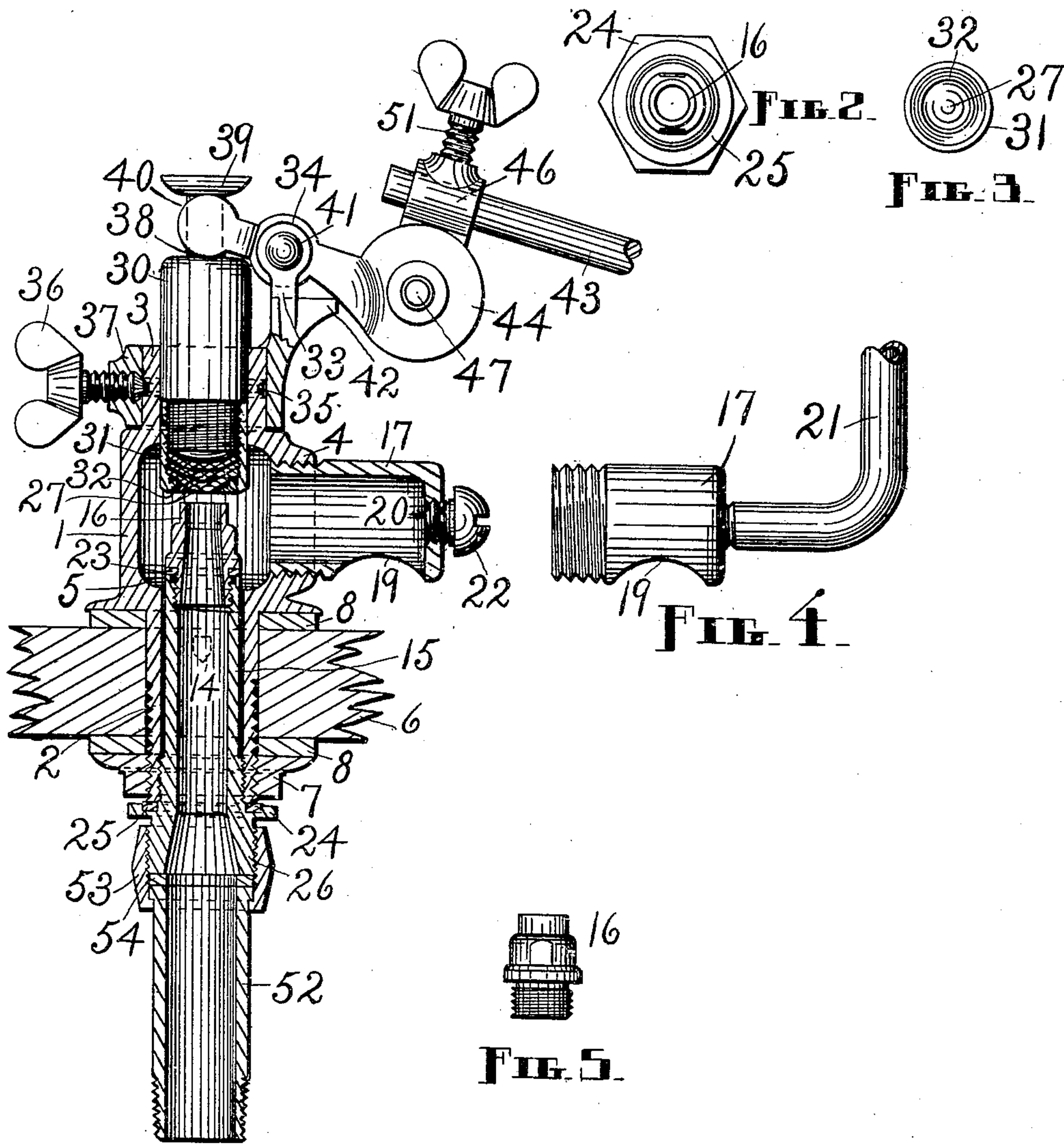


FIG. 1.

FIG. 5.

FIG. 4.

FIG. 2.

FIG. 3.

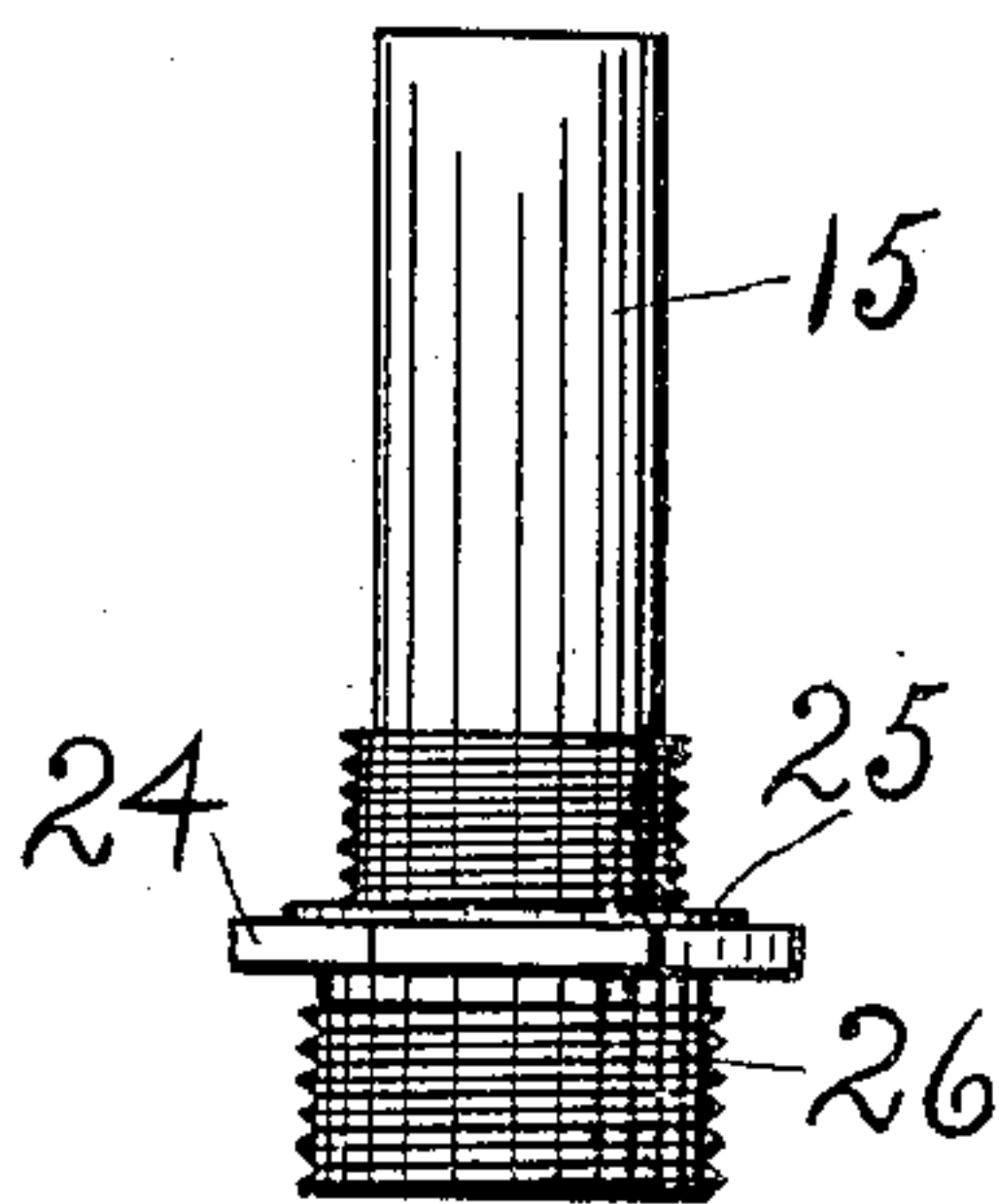


FIG. 6.

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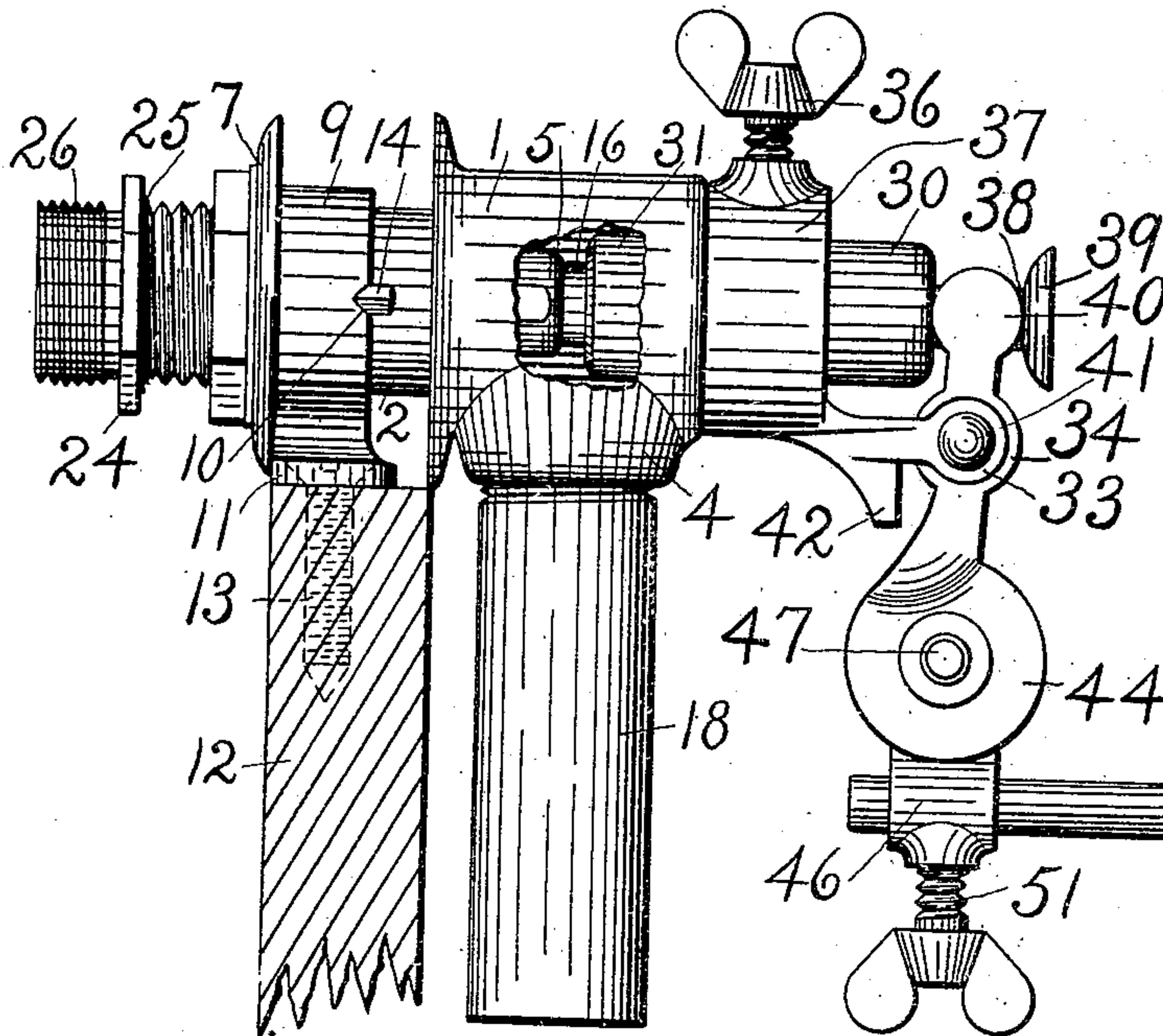


FIG. 7.

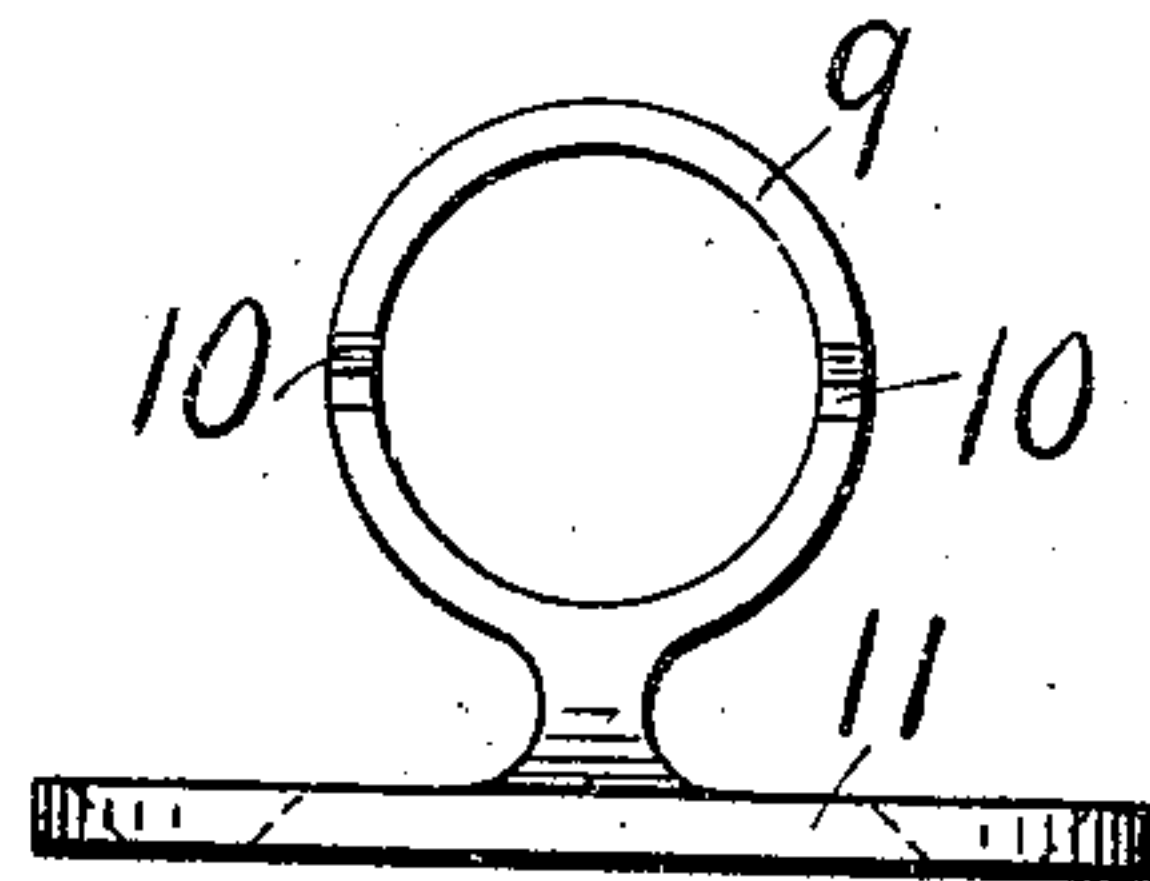
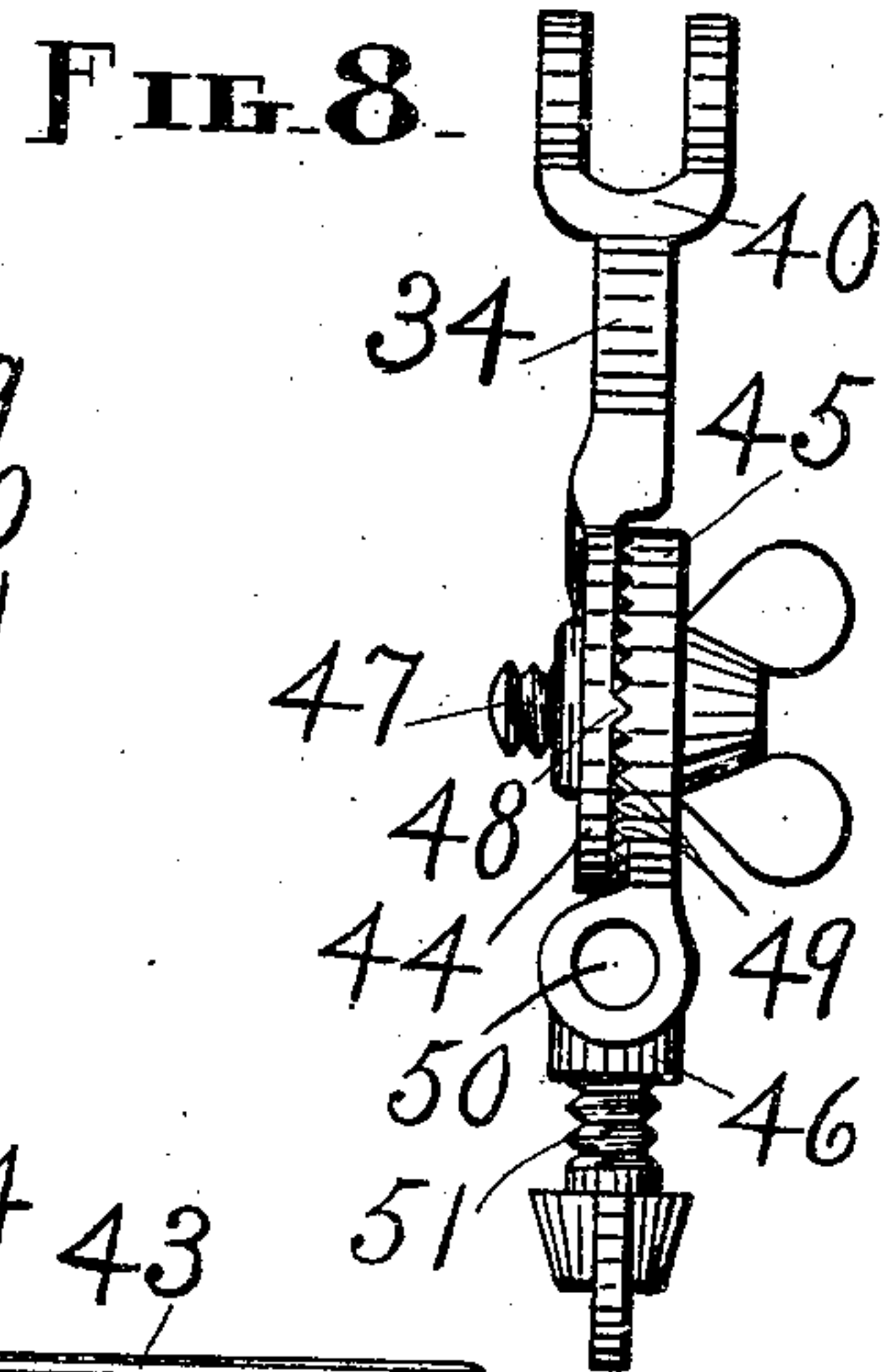


FIG. 9.

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THOMAS D. MILLEA, OF SPRINGFIELD, MASSACHUSETTS.

FLOAT-VALVE.

945,569.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed September 13, 1906. Serial No. 334,404.

To all whom it may concern:

Be it known that I, THOMAS D. MILLEA, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Float-Valve, of which the following is a specification.

My invention relates to improvements in ball-cocks or valves applicable to receptacles such as tanks for liquid and consists of the parts and combinations of parts substantially as hereinafter set forth; and the objects of my invention are, first, to produce a float valve which can be conveniently and properly attached to either the bottom, top or side of a tank, and can be used to advantage in a low-down tank, the different connections calling for no structural change and the different positions of the valve incident to the several modes of attachment in no way interfering with its successful operation; second, to provide a sensitive but durable valve, the wear being reduced to the minimum, which comprises few parts compactly assembled, is comparatively inexpensive because of the small amount of material, labor and time required in its manufacture, and has a tightly closing valve proper; third, to provide an interchangeable or removable valve-seat so constructed that it can be taken out and replaced through either end of the valve casing; fourth, to furnish a magazine valve proper for the device having a convex resilient surface; fifth, to afford an increased amount of leverage for the float and float rod, to the end that a smaller and cheaper float may be used, or a shorter float rod, or both, in consequence of which a shorter tank can be employed; sixth, to furnish a refill-tube connection, and seventh, to produce a serviceable, practicable and efficient float valve having certain of its members adjustable and for the repair of which no tools are required, a valve which is adequately adapted to the many and varied uses incident to this kind of device, the principal parts being conveniently removable at will for the purpose of readjustment and to enable certain interior members to be changed or duplicates substituted for removable parts when occasion requires.

I attain the objects and secure the advantages above noted, with others which will be hereinafter pointed out, by the means illus-

trated in the accompanying drawings, in which—

Figure 1 is a longitudinal section through the device which is arranged vertically, the valve being open; Fig. 2, an end view of the valve-seat mounted on its supporting member; Fig. 3, an end view of the valve proper; Fig. 4, a side view of a section of a refill-tube and its connection; Fig. 5, a side elevation of the valve-seat; Fig. 6, a side elevation of the shank which supports the valve-seat and affords means for connecting the ball-cock with a supply pipe; Fig. 7, a side elevation of the device mounted horizontally on top of an end of a tank, the valve being closed and a portion of the casing being broken away to show the contacting terminals of the valve-seat and valve; Fig. 8, an edge view of the valve-actuating arm and float rod holder, and, Fig. 9, a view of the top connection ring member used to hold the device in place when arranged as shown in Fig. 7.

Similar figures refer to similar parts throughout the several views.

Referring to the drawings, 1 represents a casing provided with end extensions 2 and 3 and a side extension 4, all of the extensions having passages or openings therethrough which connect with the chamber 5 in said casing, the axes of the passages in the extensions 2 and 3 being in the same straight line. The extension 2 is both internally and externally screw-threaded and the extension 4 is internally screw-threaded. For a bottom connection the extension 2 is passed through the floor 6 of a tank and securely held in position by a nut 7 beneath said floor, washers 8 8 being employed in the usual manner, and an end or wall connection is made in the same way except that said extension passes through a wall instead of the floor. For a top connection I prefer to employ a ring 9 notched at 10 and having a base-piece 11 perforated to receive the screws which fasten said base-piece to the upper edge of the end 12 of a tank, one such screw being shown in dotted lines at 13 in Fig. 7. After mounting the ring 9 on the end 12 the extension 2, which has a lug 14 properly situated on each side to enter each of the notches 10, is slipped through said ring and clamped in position by means of the nut 7 which bears against the outside edge of the ring and its base-piece and with

the lugs holds the casing 1 firmly in place. The flanged ring 9 affords a very convenient medium of attachment for the valve, when the latter is to be used in a horizontal position, and is the only extra part required in order to adapt my valve for use in this position.

The lugs 14 not only prevent the casing from turning in the case just explained, but also serve a like purpose when said casing has a bottom or end connection since they then bite into or enter grooves in the wood at the sides of the opening through which the extension 2 passes. The supply enters the chamber 5 through the passage in the extension 2 or rather the passage in a shank 15 and a valve-seat 16 at the inner end of said shank, presently to be described, and the outlet from said chamber is through either a connection 17 or a short pipe 18 screwed into the extension 4, the former being used with the vertical valve and the latter with the horizontal valve. Since the supply is taken through the shank 15, the lower part of the valve casing can be much lighter or thinner, a mere shell in fact, than would otherwise be required, the pressure being on said shank instead of on the casing.

The discharge connection 17 has an opening 19 in the bottom for the ordinary flow and an opening 20, the walls of which are screw-threaded, in the outer end to receive one terminal of a refill-tube 21 when the same is used; in the absence of the refill-tube the opening 21 is closed by means of a plug or screw 22.

The hollow shank 15 is internally screw-threaded at the inner terminal to receive the screw-threaded terminal with which the valve-seat 16 is provided, a packing-ring 23 being interposed between this end of said shank and a suitable flange on said valve-seat, and external screw-threads are provided on that portion of the shank which enters the extension 2 to engage the interior extension screw-threads. Outside of this threaded portion of the shank when in place is an integral nut 24, a packing-ring 25 being interposed between this nut and the adjacent end of the extension 2, and below or beyond said nut is an externally screw-threaded part which with so much of the shank 15 as is threaded to engage the extension 2 I term the bushing 26. The outer portion of the bore of the shank 15 is tapered so that a ground-joint can be formed with the shank as well as a packing-ring connection. The valve-seat 16 is supported by the shank in the chamber 5, and a valve 27 adapted to operate in connection with said valve-seat is also located in said chamber.

In the absence of any connection with the supply, that is, when the outer end of the bushing 26 is free, the shank 15 can be unscrewed from the extension 2 and it with the

valve-seat 16 removed from the casing, on the one hand, or, on the other, by introducing a suitable key or tool through the extension 3, when the passage therethrough is clear, and engaging said valve-seat the same can be unscrewed from said shank and taken out through such passage, the same or other members being replaced in either of the two ways mentioned. This double method of removing and replacing the valve-seat with the peculiar construction and arrangement of the shank and valve-seat constitute very valuable features of my invention, since it is thereby possible to easily and expeditiously make all necessary changes, such changes being demanded for different water pressures, different supply connections, etc.

The valve which I prefer to employ consists of one or more valve disks 27, of rubber or other suitable material, held against the inner end of a valve-stem 30 by a thimble 31 which is arranged to be screwed on and off of a diminished part of said valve-stem. The inner end of the valve-stem 30 is made convex or crowning and the disks 27 are secured between such crowning end and an interior flange 32 at the inner end of the thimble 31, whereby the exposed disk which constitutes the actual valve is given an outwardly convex formation. It is this disk which engages the valve-seat upon the closing of the valve and forms a tight joint therewith so that no liquid can escape into the chamber 5. Preferably the flange 32 is sharp and directed upward for the purpose of giving with the crowning end of the valve-stem the most desirable shape to the valve 27.

Such a crowning resilient valve as I have just described possesses all of the advantages without any of the disadvantages of a ball valve; my valve does away with much or all of the noise usually incident to the use of a ball-cock, insures a positive closure, is readily washed and kept clean by the liquid driven against it, and can be easily and quickly renewed by simply withdrawing the valve-stem 30 from the casing and either loosening or removing the thimble 31 so as to release the worn disk and expose a fresh one, after which the parts are restored to their former positions and conditions. The magazine feature of the valve may be discarded and only a single disk used, but heretofore such feature has been found to be very advantageous. The valve-stem 30 is mounted to reciprocate in the extension 3 and the diameter of the thimble 31 should not be greater than that of the major portion of said valve-stem so that said thimble will pass freely through the valve-stem passage. No packing for the valve-stem 30 is necessary in my construction for the reason that the chamber 5 and the outlet therefrom, through the extension 4, are large

enough in comparison with the inlet, through the valve-seat 16, to said chamber to relieve said valve-stem from pressure.

A bracket 33, mounted on the outside of the extension 3, supports an operating arm 34. A groove 35 around the extension 3 receives a thumb-screw 36 which holds the bracket 33 in place and permits the same to be removed and rotatably adjusted, said thumb-screw engaging the screw-threaded sides of an opening in a collar 37 of said bracket. The outer end of the valve-stem 30 is provided with a spindle 38 for a head 39, said spindle passing through a forked terminal 40 of the arm 34, which arm when oscillated imparts longitudinal movement to said valve-stem by bearing alternately against the outer end thereof and the inner face of said head. This arrangement leaves the valve-stem with its valve free to rotate, such rotation tending to equalize the wear on the valve. The valve-stem is actually revolved, slowly to be sure, during the reciprocating movement imparted thereto by the arm 34.

As above noted, the bracket 33, to the outer end of which the arm 34 is pivoted, at 41, between its ends, is provided with an annular base or collar 37 adapted to fit over the extension 3 and be adjustably held thereto by the thumb-screw 36. By providing an adjustable removable bracket, means are afforded for swinging said bracket around on the casing to any desired point so as to locate the float to the best advantage, also convenient means for permitting the valve-stem and its valve to be removed from said casing, which can be done when the thumb-screw 36 is loosened. The removal of the valve-stem gives access to the valve-seat in the manner and for the purpose already explained. A stop 42, on the bracket 33, with which the arm 34 contacts when moved to open the valve, serves to limit the outward displacement of the valve-stem.

Adjustable securing means for the float rod 43, whereby the leverage of said rod or the power exerted by the float through the rod on the valve-stem is augmented, thereby permitting the tank and rod to be shorter and a smaller float to be used, comprises a disk 44 or equivalent engaging part at the end of the arm 34 opposite the fork 40, a disk 45 or equivalent engaging part having a holder 46 for the rod 43, and a thumb-screw 47 passing through said disk 45 into threaded engagement with said disk 44, serrations being provided between the disks. In the present instance there is a single tooth 48 on the disk 44 and a plurality of teeth 49 on the disk 45, but of course this arrangement may be changed. When the disks 44 and 45 are clamped tightly together by means of the thumb-screw 47 the

holder 46 is held firmly in position through the medium of the teeth 48 and 49. By loosening the thumb-screw 47 any desired adjustment may be given the holder and connected float rod, or in other words said rod can be accommodated to whatever position the valve may occupy and to the functional requirements of the valve. One end of the rod 43 is received into a passage 50 in the holder 46 and there secured by a thumb-screw 51. The longitudinal center of the space between the arms of the fork 40 and the axis of the passage 50 are preferably in the same plane so as to insure an even application of force to the valve-stem, and the location of the holder 46 beyond or at one side of the edge of the disks gives the increase in leverage regardless of the position of said holder.

With the float rod holder properly adjusted according to the way in which the device is placed, the closing of the valve is brought about in the usual manner by the action of the rising liquid in the tank, said valve being forced onto its seat by the upwardly swinging rod 43 operating on the valve-stem through the medium of the arm 34 and connected holder members; when the liquid in the tank runs out the parts operate in reverse directions and open the valve.

Inasmuch as this valve is absolutely positive in action, and sensitive as well, it is not necessary in order to close the same that the float be submerged to any great depth, therefore there is not so much strain on the float rod as formerly and the life of the same is prolonged.

In Fig. 1 an ordinary coupling 52 is held to the bushing 26 of the shank 15 by an ordinary coupling nut 53, the usual packing-ring 54 being inserted between adjacent ends of said bushing and coupling. Instead of the packing-ring connection a ground-joint can be made with the shank 15 by using a coupling having an ordinary, tapering male part to fit the taper in the bore of the bushing 26.

From the foregoing it will be easily understood that my valve is not only efficient and practical, but readily adaptable without material change to many and varied usages, since the range of adjustment for the valve as a whole and of different members of the same is extensive, and I am not obliged to resort to numerous extraneous parts, complicated features or adjuncts devoid of utility so far as a true valve structure is concerned, in order to obtain the desired results.

My valve may of course be placed in any position between the vertical and horizontal should it be found necessary or desirable to do so.

It is conceivable that the valve-seat might be removed and replaced through the open-

ing in the extension 4, but not it is believed so conveniently as by the ways and in the manner previously described.

Various changes in shape, size and arrangement of some or all of the parts of the device may be made without departing from the nature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

10 1. The combination, in a device of the class specified, with a valve casing having an outlet opening, of a removable discharge connection attached to said casing at said outlet opening, said discharge connection
15 having a side opening and an opening in its outer end for the refill-tube.

2. The combination, in a device of the class specified, with a valve casing having an inlet passage, a valve-stem passage and an
20 intermediate chamber, of a hollow shank in said inlet passage and removable therefrom, and a valve-seat having a passage there-through supported on said shank in said chamber and removable from the shank
25 through said valve-stem passage.

3. The combination, in a device of the class specified, with a chambered valve casing having an inlet passage and a valve-stem passage, of a hollow shank in said inlet pas-
30 sage provided at its inner end with a removable seat-valve and adapted at its outer end for a coupling connection, said shank being removable with its valve-seat from the inlet passage and said valve-seat being re-
35 movable from the shank through said valve-stem passage.

4. The combination, of a valve casing having an inlet passage and a valve-stem passage, a removable hollow shank in said inlet
40 passage, a removable valve-seat on the inner end of said shank, a valve-stem in its passage, a flanged thimble on the inner end of the valve-stem, and one or more valve disks held between said inner end of the valve-
45 stem and the thimble flange, said valve-stem

with its thimble and the valve-seat being adapted to be removed by way of the valve-stem passage and to be replaced in the same manner.

5. The combination, in a float valve, of a 50 casing having a valve-stem opening circular in cross-section, a valve-seat mounted in said casing, a valve-stem also circular in cross-section mounted to reciprocate and free to rotate in its opening and provided at its
55 outer end with a spindle, of less diameter than such outer end, having an overhanging head, a thimble on the inner end of said valve-stem, such inner end of the valve-stem being convex and said thimble having
60 an internal flange at its inner end, one or more valve disks adapted to be held between said convex end of said valve-stem and the thimble flange and so held as to present a crowning surface to said valve-seat, and an
65 operating arm pivotally mounted and having a forked end located between the outer end of the valve-stem and said head on both sides of said spindle.

6. The combination, in a float valve, of a 70 casing having an extension with an inlet passage therein and another extension with a valve-stem passage therein, said last mentioned extension having an external groove, a hollow shank in said inlet passage, a re-
75 movable valve-seat on the inner end of said shank, a valve-stem in its passage provided with a valve at its inner end, a collar on the valve-stem passage extension provided with a bracket, an operating arm for said valve-
80 stem pivotally supported by said bracket, and a locking screw passing through said collar to enter said groove and prevent the removal of the collar, arm and valve-stem except when it is desired to take out the
85 valve or valve-seat.

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