(No Model.) 3 Sheets—Sheet 1.

P. CONNOLLY.

TANK FOR WATER CLOSETS.

No. 401,640. Patented Apr. 16, 1889.

Fig. 2.

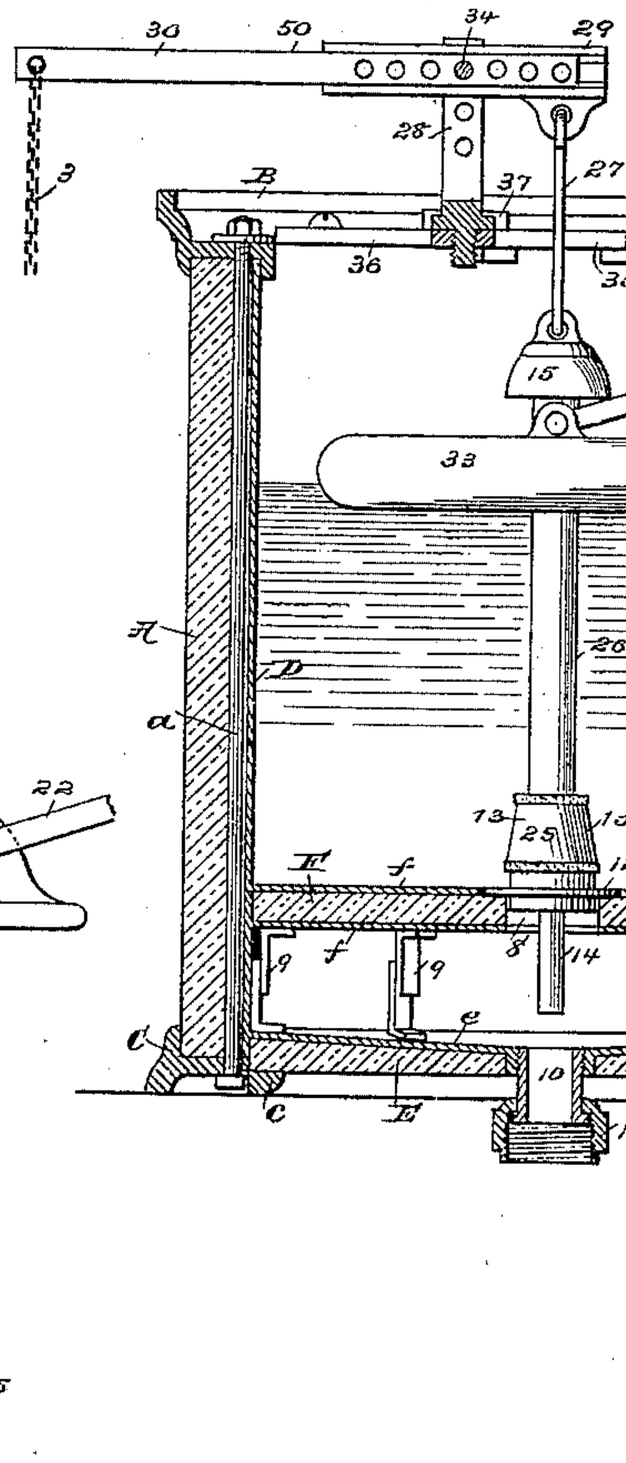


Fig. 12

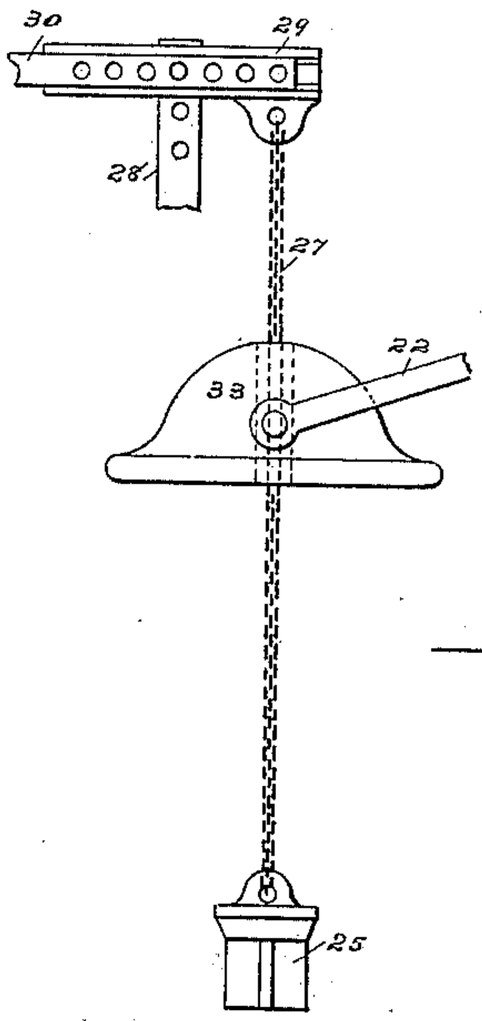


Fig. 7.

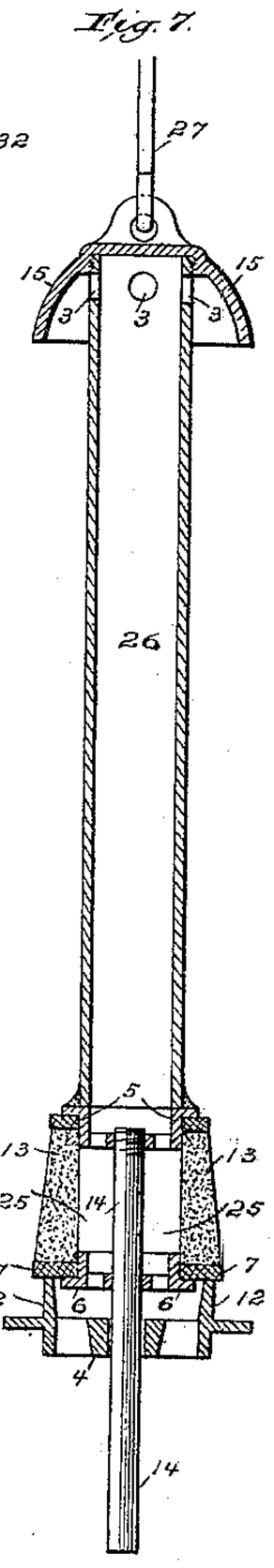
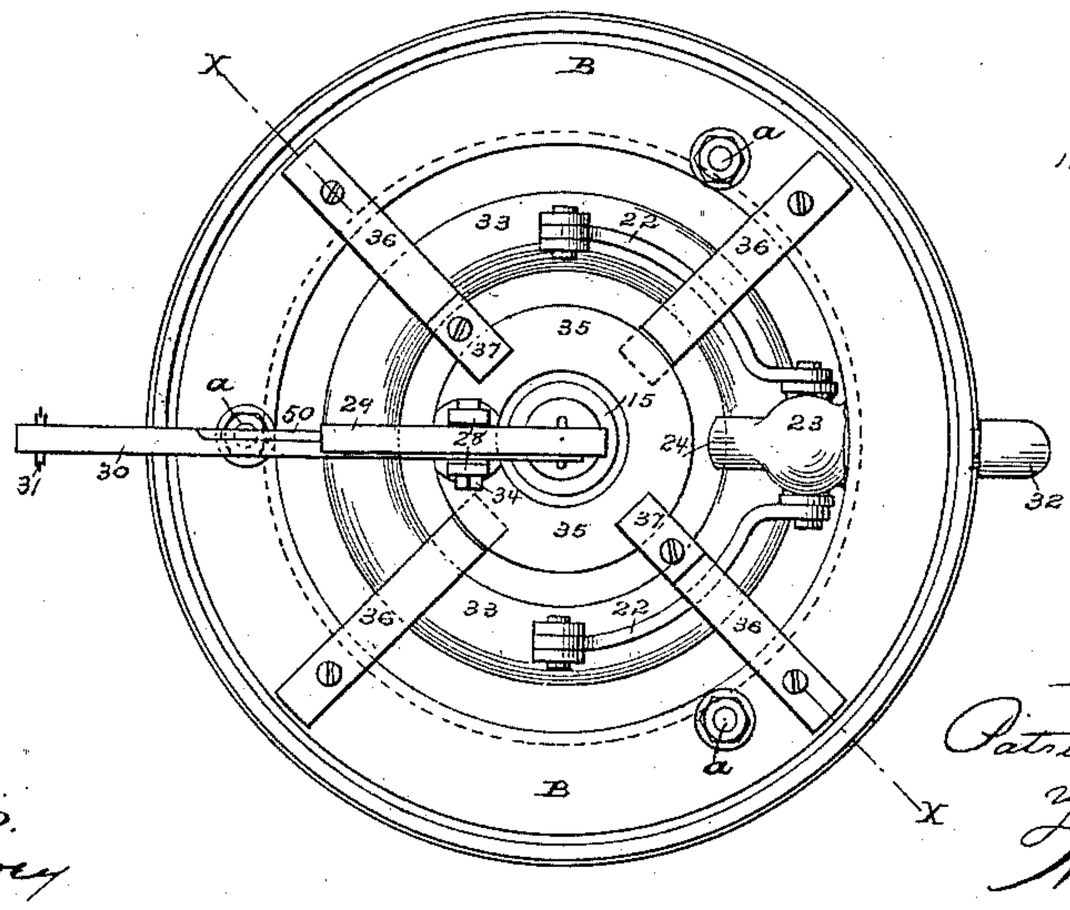


Fig. 1.



Attest:
Geo. H. Betts.
J. A. Hoover

Inventor:
Patrick Connolly
by Munson & Philipp
Atty's.

(No Model.) 3 Sheets—Sheet 2.

P. CONNOLLY.

TANK FOR WATER CLOSETS.

No. 401,640. Patented Apr. 16, 1889.

Fig. 4.

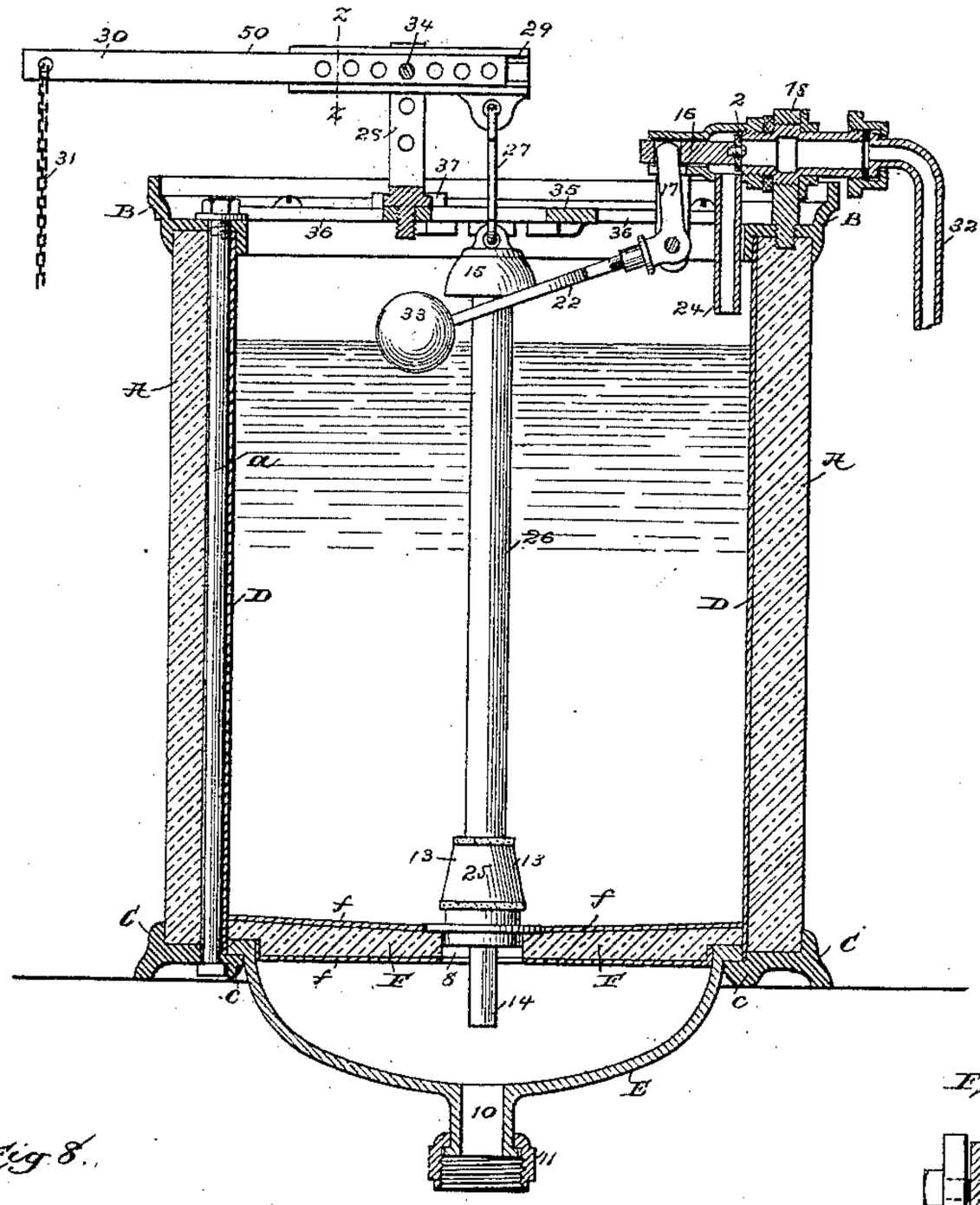


Fig. 9.

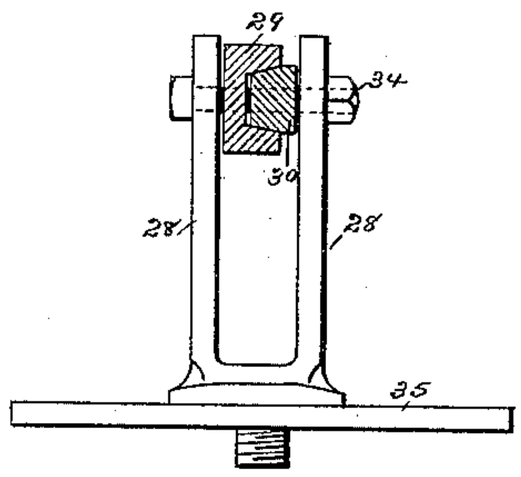


Fig. 8.

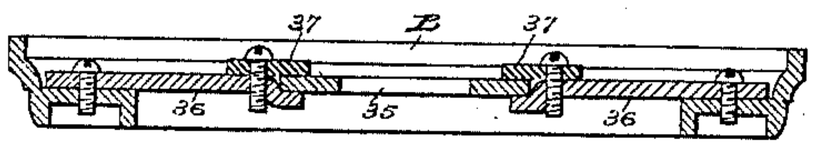
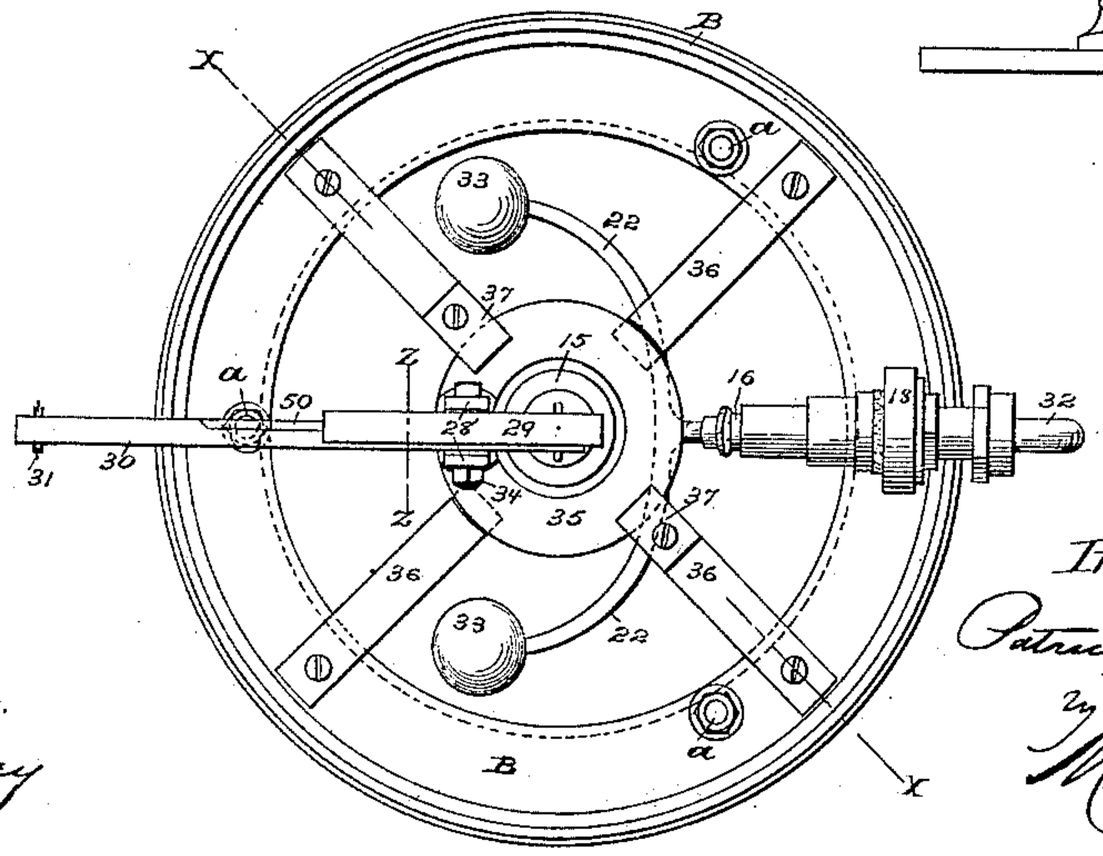


Fig. 5.



Witnesses:
Geo. H. Botts.
J. A. Covey

Inventor:
Patrick Connolly
by Munn & Co
Attys.

(No Model.) 3 Sheets—Sheet 3.

P. CONNOLLY.

TANK FOR WATER CLOSETS.

No. 401,640. Patented Apr. 16, 1889.

Fig 6.

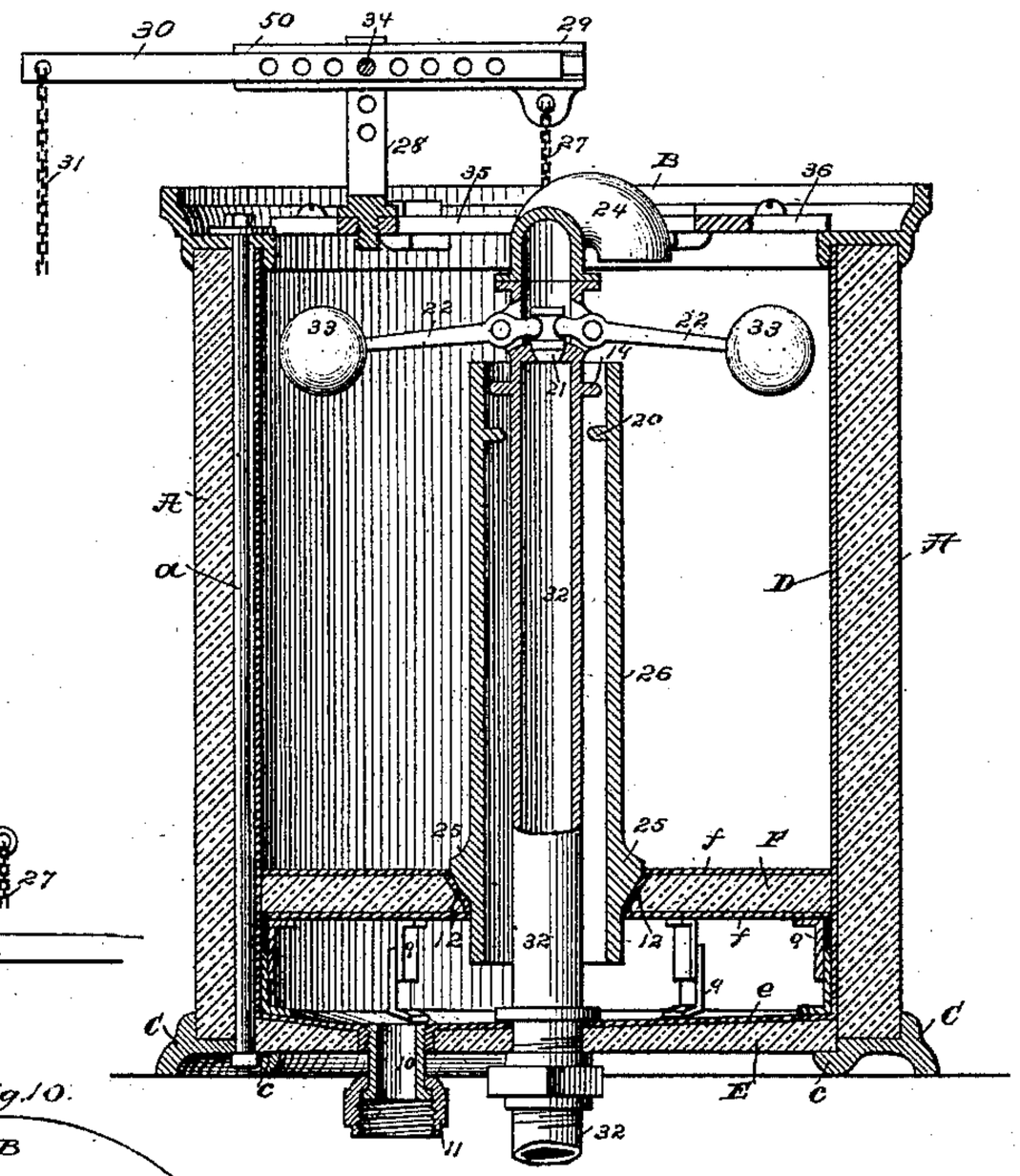


Fig. 11.

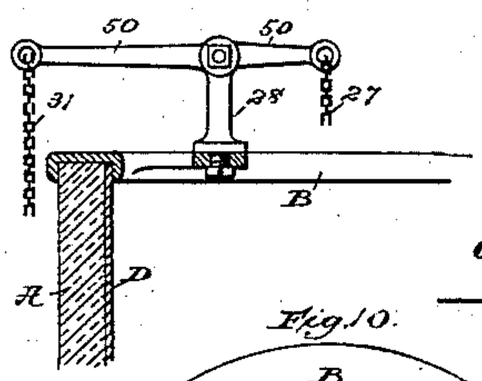


Fig. 10.

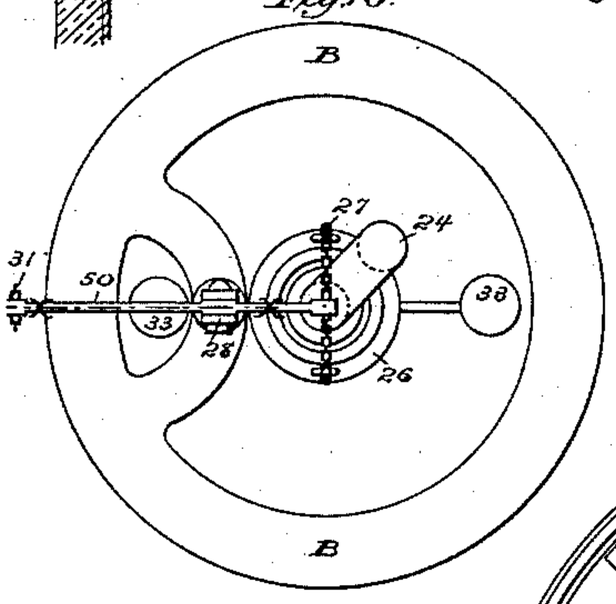
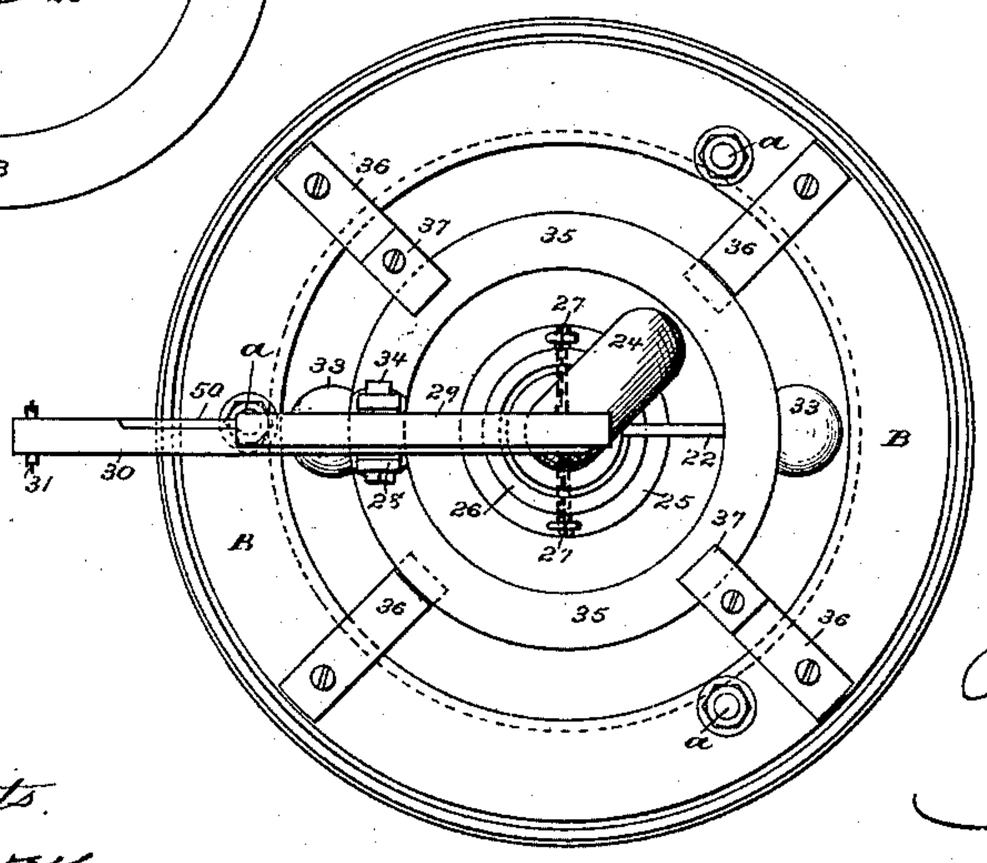


Fig. 5.



Attest:

Geo. H. Botts.

J. A. Keevy

Inventor:

Patrick Connolly

by Munson & Philipp

Atty's

UNITED STATES PATENT OFFICE.

PATRICK CONNOLLY, OF BROOKLYN, NEW YORK, ASSIGNOR TO MARTIN DEASE, OF SAME PLACE.

TANK FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 401,640, dated April 16, 1889.

Application filed May 29, 1885. Serial No. 167,044. (No model.)

To all whom it may concern:

Be it known that I, PATRICK CONNOLLY, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Tanks for Water-Closets, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of cisterns or tanks which are used in connection with water-closets to contain a supply of water for immediate use in the closet.

The invention embraces various improvements in the valve and overflow apparatus, and also in the construction of the tank proper, all of which will be hereinafter fully explained, and particularly pointed out in connection with the accompanying drawings, in which—

Figure 1 is a plan view, and Fig. 2 a sectional elevation, of a tank or cistern embodying the present invention. Figs. 3 and 4 are similar views showing modifications in certain details of the construction, which will be hereinafter explained. Figs. 5 and 6 are similar views showing still other modifications, which will also be hereinafter explained. Fig. 7 is an enlarged sectional elevation of the outlet-valve and overflow-pipe shown in Figs. 1 to 4. Fig. 8 is a section taken upon the line *x x* of Figs. 1 and 3, showing the adjustable support upon which the lever for operating the outlet-valve is fulcrumed; and Fig. 9 is a cross-section of said lever, taken upon the line *z z* of Figs. 3 and 4. Fig. 10 is a plan view, upon a reduced scale, showing a modification in the arrangement of the lever for operating the outlet-valve; and Fig. 11 is a sectional elevation of the same, taken upon the line *x x* of Fig. 10; and Fig. 12 is a view illustrating a modified form of the float for operating the inlet valve or cock.

Referring now particularly to Figs. 1 to 6, it will be seen that the tank illustrated in the present case is cylindrical in form and of comparatively small diameter, but is of sufficient depth to give it the necessary capacity. The tank may, if preferred, or if found more convenient, be made of other form in cross-section. By making the tank of this form—that is, deep and of small diameter—it is possible to place it in a recess or in a corner of the room, so that it will occupy but very little space, and it is rendered so compact in form that even if it projects into the room it will not present a particularly unsightly appearance. Another advantage due to making the tank of small diameter and considerable depth is that the height of the column of water is increased, and consequently a greater pressure is obtained for the outlet. This tank is composed of an outer shell or casing, A, which is preferably made of narrow strips of wood jointed together like the staves of an ordinary barrel or bucket, and held in position by means of two frames, B C, which receive the ends of the strips forming the shell A, the two frames B C being held together by means of a suitable number of tie-rods, *a*, which are arranged in any suitable manner, but preferably as shown in the drawings. The casing A may, however, be made of other material, if desired.

The casing A is provided with a lining, D, of copper or other metal suitable for the purpose, and with a bottom, E, which fits into the interior of the casing A and rests upon a flange formed upon the frame C. This bottom E may be made of wood, as shown in Figs. 2 and 6, in which case it is also provided with a copper or other metal lining, *e*. The bottom E is provided with an opening, 10, having an ordinary coupling, 11, by which the tank can be connected to the outlet-pipe leading to the closet. A short distance above the bottom E the tank is provided with a cross-partition, F, which is supported in any suitable manner, preferably by brackets 9, as shown in Figs. 2 and 6, and is covered both upon its upper and under sides with a sheeting, *f*, of copper or other suitable metal. The partition is provided at or near its center with an opening, 8, in which is located a valve-seat, 12, upon which rests an upwardly-opening outlet-valve, 25, which is attached to the lower end of the overflow-pipe 26. The overflow-pipe 26 extends upward to a point near the top of the tank, and is connected at its upper end by a rod or chain, 27, to one end of a lever, 50, the opposite end of which is provided with a chain or rod, 31, which passes down-

ward and is connected with the seat of the closet, or a pull-rod located at the side of the seat in the usual manner.

The valve 25 may be of any suitable construction; but in the preferred form, as shown in Figs. 2, 4, and 7, it consists of a leather annulus, 7, which is arranged to rest upon the seat 12, and is held in position between a disk, 6, and a mass of lead, 13, which serves to give the necessary weight to the valve, and is connected to a second disk, 5, which is attached to the lower end of the overflow-pipe 26. The valve thus constructed is provided with a stem, 14, which passes through the disks 5 6, and moves up and down in a guide, 4, formed in the center of the valve-seat 12, and by which the valve is prevented from being moved laterally off its seat. The disks 5 6 are provided with suitable openings, as shown in Fig. 7, by which any water passing into the pipe 26 is allowed to flow freely downward through the openings in the valve-seat 12 into the chamber below the partition F. The upper end of the overflow-pipe 26 is provided with a number of lateral openings, 3, through which the water will flow into the pipe when it has reached the proper height in the tank, and the top of this pipe is provided with a hood, 15, which extends downward below the openings 3, for a purpose that will hereinafter appear.

As shown in Figs. 1 to 4, the inlet-pipe 32 is arranged to enter the tank at a point near its top, and is provided with the usual downwardly-turned nozzle, 24, so as to deliver the water in such direction as to prevent it from spattering over the top of the tank. As shown in Figs. 1 and 2, the nozzle 24 is provided with an ordinary cock, 23, by which the flow of the water from the inlet-pipe can be shut off after it has risen to a certain height in the tank. The cocks for this purpose have usually been operated by means of a lever, one end of which was attached to the plug of the cock while the other end was provided with a float which rested upon the surface of the water in the tank. Owing, however, to the small diameter of the tank shown in the present case it is impossible to provide a lever of sufficient length to properly operate the cock when the float is constructed and arranged in the manner just stated. To overcome this difficulty I make the float 33 of annular form and of such size that it will have the necessary buoyancy to properly operate the cock.

In order to properly transmit the pressure of the water from the float thus constructed to the plug of the cock, I so construct the plug that its stem will extend beyond both ends of the shell, as shown in Fig. 1, and I provide the opposite ends of the stem with a pair of curved levers, 22, which bend outward and are pivotally connected to the float at points diametrically opposite each other. By this means it will readily be seen that a float is obtained which is capable of exerting a very great amount of power within a very small compass, and that it is so connected to the cock as to be perfectly balanced, and thus work freely without any tendency to bind or become locked.

The operation of the apparatus just described is as follows: When the tank is empty, the float 33 will drop, so as to open the cock 23 and permit the water to flow into the tank through the pipe 32. As the water rises in the tank, so as to reach the float, the latter will ride upward upon the surface of the water, and as the water continues to rise will turn the cock 23, so as to gradually shut off the water until, when the proper height is reached, the water will be entirely shut off, and will remain shut off until its surface is lowered by the opening of the outlet-valve 25. If for any reason the cock 23 should fail to operate, so as to shut off the water, it will continue to rise in the tank until it reaches the openings 3 in the overflow-pipe 26, after which any water which enters the tank will flow through the overflow-pipe into the chamber below the partition F and thence to the closet, thus preventing the overflowing of the tank. When it is desired to have the water flow to the closet, the lever 50 will be operated through the chain 31 so as to raise the valve 25, thus permitting the water to flow directly from the tank into the chamber beneath the partition F and thence to the closet. As the water is thus drawn from the tank the float 33 will fall, so as to open the cock 23 and permit the water to again flow into the tank until the proper level is restored. The opening in the valve-seat 12 is considerably larger in area than the outlet-opening 10, from which it results that when the valve 25 is raised the water will flow downward into the chamber below the partition F faster than it can flow out through the opening 10, thus causing the chamber below the partition F to be filled. When the chamber is thus filled with water, the air which is in the chamber must, of course, find an escape, and it consequently rushes upward through the openings in the disks 5 6 into the overflow-pipe and thence outward through the openings 3, and in rushing upward through the overflow-pipe in this manner it will have a tendency to carry some of the water with it. The upper end of the overflow-pipe is therefore provided with the hood 15, so that any water which is carried upward through the pipe in this manner will be directed downward into the tank and be prevented from being forced outward, so as to spatter over the top of the tank.

It will readily be seen that modifications may be made in many of the details of the apparatus just described without departing from the essential features of the invention, and also that certain parts of the invention may be used without the others. For example, instead of using an ordinary cock, 23, for controlling the inlet-pipe 32, a valve may be employed for this purpose, as illustrated in Figs. 3 and 4, and whether a cock or valve is

used to control the inlet-pipe this pipe may pass over the top of the tank, as shown in Figs. 3 and 4, instead of entering through its side, as shown in Figs. 1 and 2.

The valve illustrated in Figs. 3 and 4 is of an ordinary construction, consisting of a disk, 2, which is arranged to close against a seat formed in the pipe 32, and is provided with a stem, 16, which is acted upon by one arm of a bell-crank lever, 17, to the other arm of which are connected the curved levers 22, which are acted upon by the float 33. When the inlet-pipe 32 passes over the top of the tank, it will be supported in a suitable bearing, 18, secured to the annular frame B. The operation of the apparatus when thus constructed is the same as already described. The construction of the float 33 may also be different from that shown in Figs. 1 and 2 without departing from the invention. Instead of being of annular form it may be in the form of a disk, as shown in Fig. 12, or in some cases it may consist of two or more independent spherical floats, as shown in Figs. 3 and 4. If the float is in the form of a disk, as shown in Fig. 12, it will be provided with a central opening of sufficient size to accommodate the overflow-pipe 26. The construction of the tank proper may also be somewhat modified. For example, the bottom E, instead of being flat or nearly flat, as shown in Figs. 1 and 2, may be of the form shown in Fig. 4 and arranged to project below the frame C. In this case the partition F may be arranged lower down than in the construction first described, as also shown in Fig. 4.

In some cases, instead of attaching the outlet-valve 25 to the overflow-pipe, as in the construction already described, an independent overflow-pipe may be provided, which will be arranged in the usual manner, and in such case the valve 25, either of the construction shown in Fig. 7 or of any similar suitable construction, will be connected directly by a rod or chain to the end of the lever 30, as shown in Fig. 12. In this case the float 33, if of the disk form, will of course be provided with a suitable opening for the passage of the end of the overflow-pipe.

The inlet-pipe 32, instead of entering the tank either over its top or through the side, as already described, may, if desired, enter the bottom of the tank and pass upward through the overflow-pipe, as shown in Figs. 5 and 6. In such case the pipe 32 is provided with one or more stops, 19, and the overflow-pipe with corresponding stops, 20, arranged to engage therewith, so as to prevent the latter pipe from being raised so far that the valve 25 will not be guided back to its seat. In this case also the construction of the valve 25 and seat 12 is somewhat modified, as will be observed, the valve being of conical form and arranged to fit into its seat, instead of being flat and arranged to rest on the top of the seat. The inlet-pipe in this case, instead of being provided with an ordinary cock or a valve of the construction shown in Figs. 3 and 4, is provided with an upwardly-opening valve, 21, which is acted upon directly by the levers 22, to which the floats 33 are attached, the levers being pivoted in bearings formed in the pipe 32.

As shown in the drawings, only two of the floats 33 and levers 22 are employed; but it is to be understood that the float may be of the annular form hereinbefore described or that more than two of the independent floats may be provided, if desired. If the float is of the annular form, it will be connected to the levers 22 by an ordinary sliding connection. The operation of the apparatus when thus constructed is the same as already described.

When the exact situation in which the tank is to be placed is known in advance of the construction of the tank, so that the exact position which it is desirable that the lever 50 shall occupy and also the exact length of the lever can be known, the lever may be made of a single bar, as shown in Figs. 10 and 11, and be fulcrumed in a standard, 28, permanently secured to the frame B. It frequently happens, however, that the exact position which it will be necessary for the lever 50 to occupy and also its exact length cannot be determined in advance of the placing of the tank in position. This is particularly the case when the tanks are made and kept in stock to fill orders as they may be received. It is therefore desirable that the lever 50 should be so mounted that it can be adjusted to different positions, so that the chain or rod 31 can pass down upon either side of the tank, and also so that the length of the lever can be varied to suit the position in which the tank may be placed. To effect this the lever is made in two parts, 29 30, the part 29, which constitutes the short arm, being provided with a recess formed in its side, into which fits the part 30, which forms the long arm of the lever, as shown in Fig. 9. The part 30 is provided with a number of openings made at different points along its length, through any one of which the bolt 34, upon which the lever is fulcrumed in the standard 28, can be inserted. From this arrangement it will be seen that by withdrawing the bolt 34 the arm 30 of the lever can be shifted, so as to adjust the lever to any desired length, after which the bolt 34 can be reinserted through the proper hole in the arm 30 and the lever secured in position. In order to permit the lever 50 to be adjusted to different positions around the top of the tank, the standard 28, in which it is fulcrumed, is secured to an annular plate, 35, which rests upon a series of arms, 36, extending inward from the frame B, and is held in position by two or more buttons, 37, which are screwed to the arms 36 and rest upon the upper side of the plate 35, as shown in Fig. 8. From this construction it results that by loosening the buttons 37 the plate 35, carrying the standard 28 and the lever 50, can be turned upon the

arms 36, so as to cause the arm 30 of the lever to project in any desired direction.

From the foregoing it will be seen that a tank thus constructed is not only very compact in form, but requires no extra casing or woodwork around it after it is in position. This makes the operation of putting up the tank very simple, and also makes it possible to remove the tank bodily when repairs become necessary, without disturbing or injuring the room in which it is located.

What I claim is—

1. The combination, with the shell or casing A, having the metal lining D and the bottom E, of the frames B C, the former of said frames being arranged to fit over the upper end of the casing A, and the latter to fit over the bottom end of said casing, and also to support the bottom E, substantially as described.

2. The combination, with the shell or casing A, having the metal lining D and the bottom E, of the frames B C, the former of said frames being arranged to fit over the upper end of the casing A and the latter to fit over the bottom end of said casing, and also to support the bottom E, and the tie-rods *a*, for holding the frames B C together, substantially as described.

3. The combination, with the lever 50 and the standard 28, of the adjustable plate 35, whereby the position of the lever can be varied, substantially as described.

4. The combination, with the tank and the outlet-valve 25, located in the tank, of the operating-lever 50, fulcrumed on top of the tank and having the adjustable arm 30, whereby the position of the chain or rod 31 can be varied, substantially as described.

5. The combination, with the outlet-valve 25, of the operating-lever made in two parts, 29 30, the standard 28, and the adjustable plate 35, whereby the position of the lever and the length of its long arm can be varied, substantially as described.

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

PATRICK CONNOLLY.

Witnesses:

J. A. HOVEY,

JAS. J. KENNEDY.