

March 15, 1927.

1,620,964

P. HAAS

FLUSHING VALVE MECHANISM

Filed March 16, 1926

4 Sheets-Sheet 1

Fig. 1.

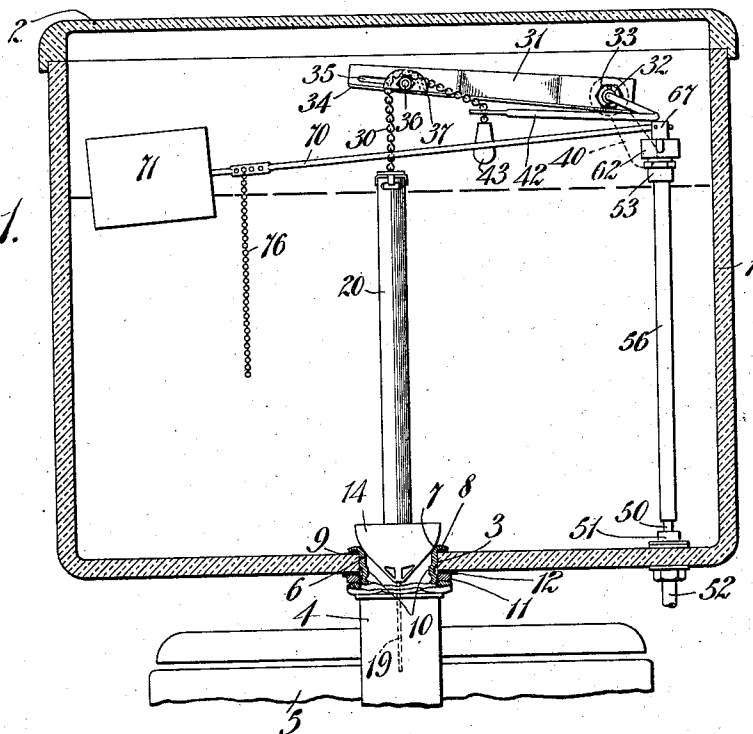
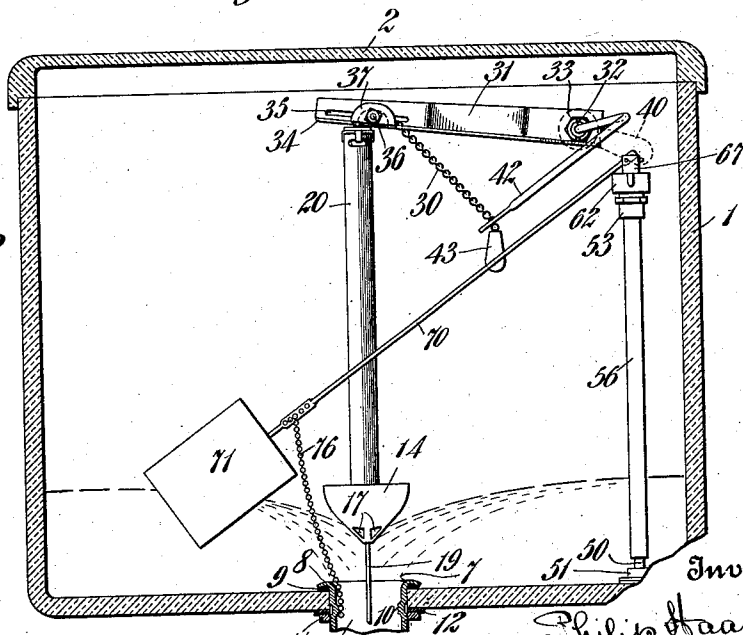


Fig. 2.



Inventor
Philip Haas
By his Attorney
Lewis Russell Chittaker

March 15, 1927.

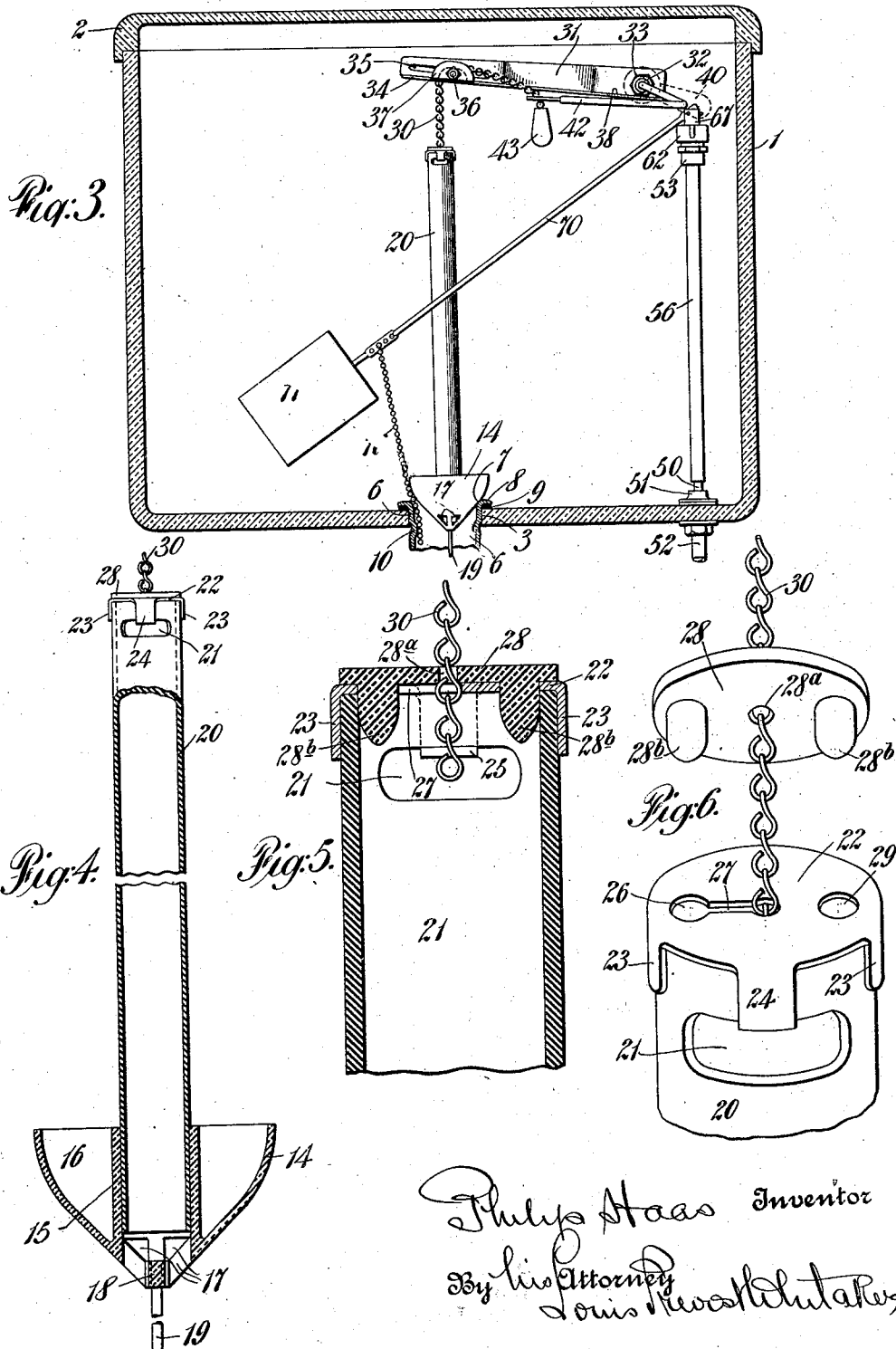
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P. HAAS

FLUSHING VALVE MECHANISM

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4 Sheets-Sheet 2



Philip Haas Inventor
By his Attorney
Louis Kwakchutay

March 15, 1927.

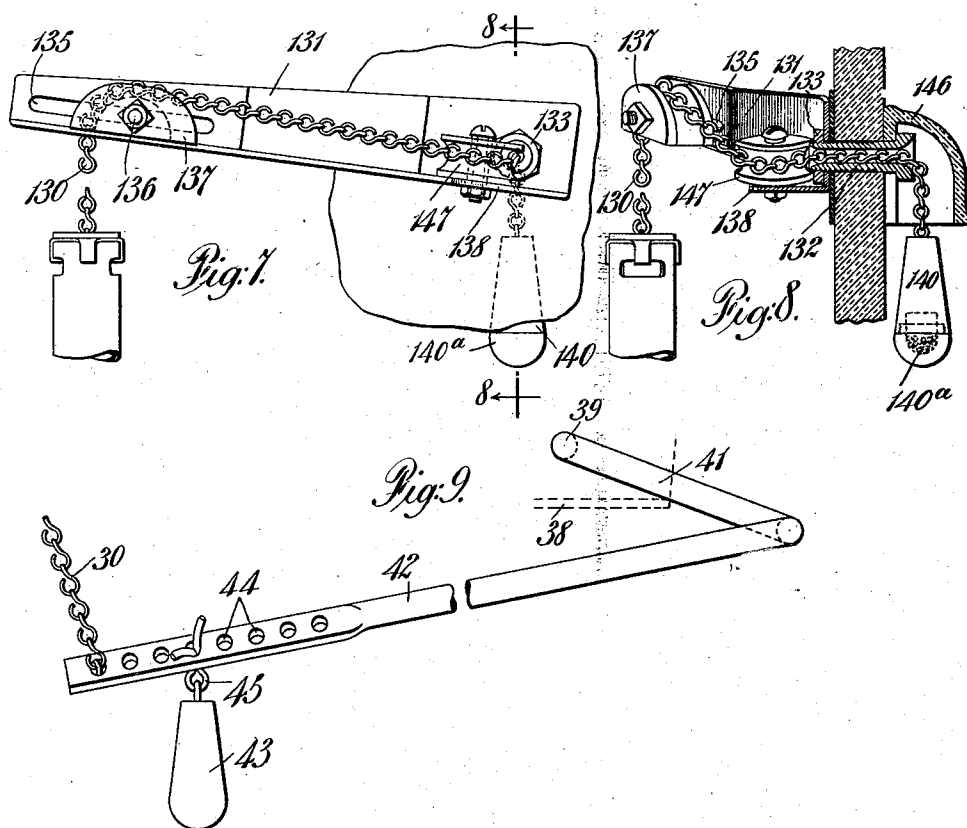
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P. HAAS

FLUSHING VALVE MECHANISM

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4 Sheets-Sheet 3



Inventor
Philip Haas
By his Attorney
Louis Revell Chitaker

March 15, 1927.

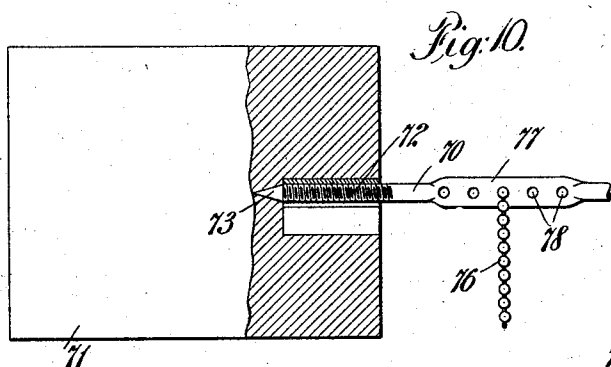
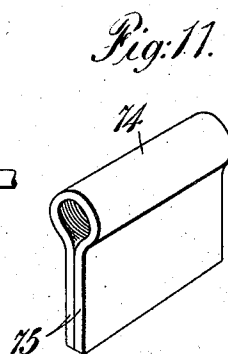
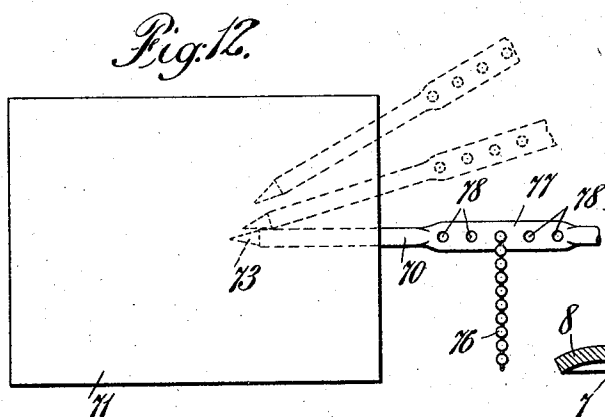
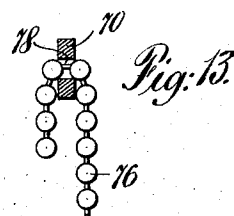
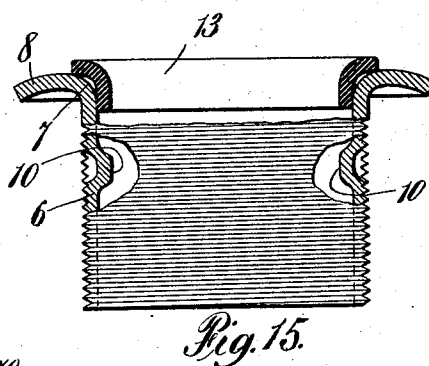
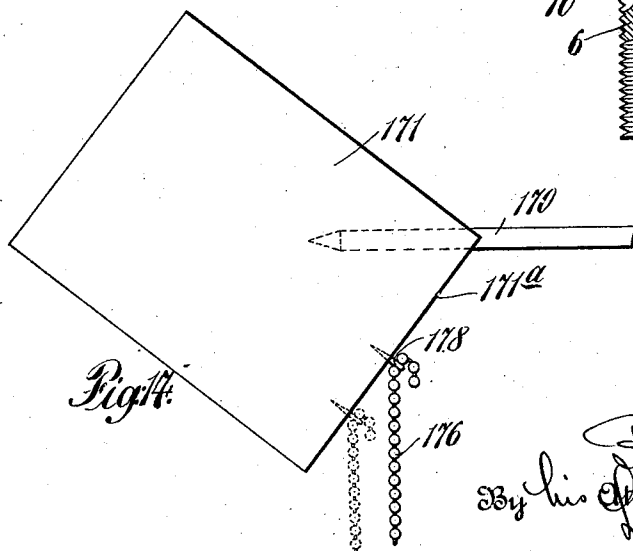
P. HAAS

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FLUSHING VALVE MECHANISM

Filed March 16, 1926

4 Sheets-Sheet 4



Inventor
Philip Haas
By his Attorney
Louis H. H. H. H. H.

Patented Mar. 15, 1927.

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UNITED STATES PATENT OFFICE.

PHILIP HAAS, OF DAYTON, OHIO.

FLUSHING-VALVE MECHANISM.

Application filed March 16, 1926. Serial No. 95,007.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate several embodiments of the same, selected by me for purposes of illustration, and the said invention is fully disclosed in the following description and claims.

The object of my invention is to provide a flushing tank and mechanism for water closets having the maximum efficiency combined with extreme simplicity and cheapness of manufacture, and so constructed and arranged that all necessary repairs and replacements can be made by the householder or any unskilled person, without the expense and delay incident to the employment of skilled labor, my invention being capable, as illustrated in the forms and embodiments thereof herein shown and described, of being readily employed in practically any of the ordinary flush tanks now in use for the purpose of repairing or refitting the same.

One of the important features of my invention is that I dispense with the ordinary afterfill tube usually employed in flush tanks for the purpose of refilling the bowl and insuring the sealing of the water seal, after a flushing operation has taken place. These tubes frequently become eaten through or broken off due to corrosion, with the result that a jet of water is shot against the lid of the tank if it is provided with a lid, or over the side if no lid is provided, in either case causing the water to be discharged over the sides of the tank on the bathroom floor, and often occasioning expensive repairs in the apartments below. According to my invention the pivoted float lever, or float, is provided with a depending flexible device, normally suspended above and out of line with the flushing valve seat, but in such position that as the float descends during a flushing operation, this depending flexible device will be carried by the currents of water into the flushing valve aperture and over the flushing valve seat, so that when the flushing valve seats, it will be held in slightly open position by such depending flexible device, permitting an adequate afterfill as the water enters the flush tank to refill the same. As the water level rises in the tank, lifting the float and float lever, this flexible depending device will be withdrawn from between the valve and its seat, permitting the

valve to close completely as the flushing tank is filled to its normal level. The duration of the afterfill can be readily determined by the adjustment of the depending flexible device, either by adjusting its length or its position with respect to the pivotal axis of the float lever, or both, and in connection therewith I prefer to employ a hollow valve of flexible rubber so that when it seats on the flexible depending device, as before stated, which is preferably a chain of non-corrosive metal, the flexible wall of the valve will be somewhat indented, and will prevent a too great afterfill aperture being provided, although substantially the same effect can be obtained by employing a depending flexible device of the requisite diameter.

According to my invention, I also provide an overflow pipe which is connected to the valve and communicates with a passage, or passages, extending through the valve so that the overflow pipe forms the valve stem, and the use of an eccentrically located overflow pipe is avoided, and the connection of such an overflow pipe with the flushing outlet below the valve seat, usual in flush tanks, is avoided, thus simplifying the construction of the flushing outlet and avoiding the use of screw threads. Simple and inexpensive means are also provided for preventing the valve from getting out of alignment with the flushing outlet and the valve, and parts attached thereto are adjustably connected with the valve operating mechanism in such manner that the weight of the valve and parts connected therewith, including the overflow pipe, is substantially counterbalanced, so long as the valve remains submerged in the water in the tank, but as soon as the valve is relieved from the supporting effect of the surrounding water, the weight of the valve and its connected parts will overcome the weight of the counterbalanced portion of the operating devices, and the valve will fall by gravity upon its seat. In carrying out this feature of my invention, I prefer to make the valve in cup shape, so that when in use, it will normally be and remain filled, with water, which has no effect when the valve is entirely surrounded by water, but which acts as a weight as soon as the water recedes below the level of the lifted valve.

My invention also includes other novel

features hereinafter fully described and particularly pointed out in the claims.

Referring to the accompanying drawings, which illustrate several embodiments of my invention, selected by me for purposes of illustration.

Fig. 1 represents a sectional view of a flushing tank and portions of the adjacent flushing pipe and bowl, the tank being provided with flushing mechanism embodying my invention, and the parts being shown with the tank filled and the flushing valve closed.

Fig. 2 is a sectional view of the tank illustrated in Fig. 1, showing the flushing valve raised and the water partially emptied therefrom during the flushing operation.

Fig. 3 is a view similar to Fig. 2, showing the position of the parts after the water has been discharged from the tank, and the flushing valve seated upon the flexible depending device connected with the inlet valve float lever, to effect the afterfill.

Fig. 4 is an enlarged detail view, partly in section, and partly broken away, of the flushing valve and parts connected therewith, including the overflow pipe and the depending device on the valve for holding it against accidental displacement with respect to the valve seat.

Fig. 5 is an enlarged sectional detail view of the upper portion of the overflow pipe, showing the means for securing the adjustment of the lifting chain or connection with respect to the overflow pipe and flushing valve, and also providing a bumper or elastic stop for limiting the upward movement of the valve.

Fig. 6 is a detail perspective view of the parts shown in Fig. 5.

Fig. 7 illustrates a slight modification of my invention for adapting it to tanks in which the exterior pull chain is desired instead of the lever operated construction illustrated in Figs. 1, 2 and 3.

Fig. 8 represents a sectional view on the line 8—8 of Fig. 7, the counterbalancing handle being illustrated in elevation.

Fig. 9 is an enlarged detail view of the flushing valve operating lever illustrated in Figs. 1, 2 and 3, showing a modified arrangement for securing the adjustment of the position of the counterbalance weight.

Fig. 10 is a view partly in section of the preferred form of float showing one means of connecting the float lever therewith, and one means for adjustably connecting the depending flexible afterfill device to the lever.

Fig. 11 is a detail perspective view of a clip which may be conveniently used, as shown in Fig. 13, for connecting the float lever with the float.

Fig. 12 illustrates the same type of float with different means for connecting the float to the float lever and illustrating various rel-

ative positions of the same which may be obtained for the purpose of regulating the water level without bending the float lever.

Fig. 13 is a sectional view of the float lever showing the preferred form of depending afterfill device and the arrangement for adjustably connecting it to the lever.

Fig. 14 represents the float and float lever and means for connecting the depending afterfill device to the float lever so as to secure both the vertical adjustment thereof and its adjustment with respect to the pivotal axis of the lever.

Fig. 15 represents a modified form of the flushing outlet fitting showing it provided with a detachable slip-in valve seat of hard rubber, bakelite, or other similar material, not affected by water.

In the embodiment of my invention illustrated in Figs. 1, 2 and 3, I have shown a form which is not only desirable for use in the equipment of flushing tanks in an original installation, but which can also be used advantageously in repairing or refitting tanks now in use. In these figures the tank, 1, itself is shown in section looking toward the front wall. These flush tanks are usually made of porcelain and provided with a cover, indicated at 2, but it is immaterial as to the particular composition of the tank wall, as the form and size of flushing tanks are approximately the same regardless of the material of which they are constructed. It is also customary to provide the front wall of the tank, adjacent to the upper corner at the left (when the tank is viewed from the front), with an aperture through which the valve operating mechanism extends and the bottom of the tank is provided approximately centrally with an aperture, 3, which receives the fitting connecting it with the flushing pipe, 4, leading to the bowl, 5, in any usual or desired manner. I have shown the bottom aperture, 3, provided with a metallic sleeve, indicated at 6, which may be provided with a valve seat, as indicated at 7, and a lateral flange, 8, on its upper end between which and the bottom of the tank is located a rubber or other suitable packing washer, 9. This sleeve, 6, is exteriorly threaded and is also provided, internally, with projections, 10, conveniently formed by indenting the sleeve before it is threaded, so that the sleeve can be held against rotation in the aperture, 3, while the securing nut, indicated at 11, is screwed thereon against a suitable washer, indicated at 12. The flush pipe, 4, is secured to the lower end of the sleeve, 6, in any usual or desired manner. I have shown one of these sleeves, enlarged in Fig. 18, and in this figure, I have illustrated a separate valve seat, indicated at 13, which is conveniently formed of hard rubber, bakelite, or any other suitable material, and pressed into position in the upper end of the metallic sleeve, 6, but

the sleeve may be employed either with or without the separate seat, 13, as preferred. The flushing valve, 14, as indicated in Fig. 4, is preferably formed of flexible rubber in cup shape, having a conical lower portion, and is provided with a central sleeve portion, 15, forming an annular pocket or water receptacle, 16, between the sleeve, 15, and the outer walls of the valve. The bottom portion of the valve at this extreme end is provided with one or more apertures, indicated at 17, communicating with the interior of the sleeve, but not communicating with the water compartment, 16, and these apertures, 17, serve as the ultimate discharge apertures for the overflow pipe. The extreme bottom portion of the valve, which is connected with the side walls of the valve by the strips of rubber between adjacent apertures, 17, is provided with an aperture, indicated at 18, to receive a depending auxiliary stem, 19. This may be formed of metal, but is more conveniently formed of wood, coated with asphaltum or other sealing material, which will render it impervious to water, and this makes a very cheap, and at the same time, efficient device. The auxiliary stem, 19, is simply inserted in the opening, 18, in the bottom of the valve, and retained therein by friction. 20 represents an overflow pipe, which also forms the valve stem of the flushing valve. This pipe is preferably formed of hard rubber or other suitable material, which is very light. I may employ aluminum or celluloid, or other suitable material, if preferred. This overflow tube is of considerable diameter, and is open at both ends, being ordinarily formed by cutting off the required length from a stock tube, and the lower end fits within the elastic sleeve, 15, of the valve, and is held united thereto by friction, or it may be cemented or secured in any other manner if necessary, but ordinarily the frictional engagement of the sleeve of the exterior of the tube will be sufficient. The upper end of the tube, 20, is provided with overflow apertures, indicated at 21, and I prefer to provide the extreme end of the tube with a cap, 22, shown in detail in Figs. 5 and 6. This cap comprises a circular disc or plate, substantially of the same diameter as the disc or tube, provided with guiding projections, 23, 24, engaging the exterior of the tube. Two opposite projections, as, 24, are of sufficient length to extend below the upper edge of the adjacent overflow aperture, 21, and are provided each with an inwardly turned flange, indicated at 25, in Fig. 5, which engages the upper edge of the said aperture, and holds the cap firmly on the end of the tube. The cap, 22, is provided with means for adjustably engaging a flexible connection, as a chain, for example, indicated at 30. In order to allow for the adjustment of this chain with respect to the tube, 20, I prefer to provide the cap with an eccentrically located aperture, 26, having a narrow slot, 27, communicating therewith and extending to the central part of the cap, so that the chain may be inserted through the cap, through the circular opening, 26, and moved to the center through the slot, 27, which is too narrow to permit the chain to pass through, but is wide enough to accommodate a portion of one of the links, so that the adjustment of the chain with respect to the cap can be readily effected. The upper end of the tube, 20, is also preferably provided with a buffer, for which purpose I conveniently employ a disc, 28, of rubber, or other elastic material which is provided with a central hole, 28^a, through which the chain, 30, passes, and I also prefer to provide the lower face of the disc, 28, with integral projections, 28^b, one of which is adapted to frictionally engage the aperture, 26, in the cap, and the other of which engages similarly another aperture, 20, in the plate, preferably on the opposite side of the center of the cap through the aperture, 26, so that after the chain is adjusted, which can be accomplished by simply lifting the rubber disc, 28, far enough to disengage the projections, 28^b, from the apertures in the plate, as indicated in Fig. 6, it can be positively retained in its adjusted relation with the tube, 20, by restoring the disc to position with the projections, 28^b, in engagement with the apertures in the plate, as shown in Fig. 5. In Figs. 1, 2 and 3, I have shown valve operating mechanism, of which the main element is a pivoted lever operated by an oscillating handle shown in dotted lines in these figures, in a well known way, and in connection therewith I have illustrated a supporting bracket adapted to be secured to the tank, and which may be used either with this type of operating means, or in connection with a pull chain operating means, as illustrated in Figs. 7 and 8, hereinafter described. While this bracket may be formed of cast metal, I find it convenient to form it of sheet metal by stamping process on account of the cheapness. This bracket is preferably composed of a vertical web, or plate, 31, provided at one end with an aperture engaged by the usual bearing sleeve, indicated at 32, extending through the usual aperture in the front face of the tank, and provided with the nut, 33, which clamps the bracket firmly against the inner face of the front wall of the tank. Where the device is made of sheet metal, I prefer to provide its lower edge with a horizontal stiffening flange, indicated at 34, and the outer end of the bracket is provided with a slot, 35, adapted to be engaged by a bolt, 36, which secures a grooved support, 37, formed preferably of porcelain,

on account of its almost frictionless surface, and the fact that it is not liable to corrosion, although it may be formed of other material. This support is grooved to enable the chain or flexible connection, 30, extending through the tube, 20, to slide freely with the minimum of friction over it and to guide it in its movement. The inner end of the bracket is bent inwardly and may be put in a vise and given a greater inward bend when required, so as to bring the groove in the support, 37, substantially in alignment with the axis of the flushing valve seat, and the slot, 35, is provided so that the support may be adjusted longitudinally of the bracket to bring the outer edge of the grooved portion of the support directly and accurately in vertical alignment with the axis of the flushing valve seat, and to compensate for slight variations in the distance between the axis of the valve seat and the axis of the hole in the front wall of the tank, which may occur in existing tanks. To enable the bracket to be used in connection with the pull chain type of operating means, it is also provided adjacent to the aperture through which the bearing sleeve, 32, passes, with a horizontal supporting flange, indicated at 38, which is provided with a threaded aperture, hereinafter referred to, and which flange is so located as to form a stop to limit the return movement of the operating lever and prevent any movement thereof in the wrong direction. The operating lever itself is shown in detail in Fig. 9, and comprises a bearing shaft portion, 39, which extends through the bearing sleeve, 32, and is provided at the outer end with the operating handle, indicated in dotted lines, at 40, and which is provided within the tank with an inclined portion, 41, adapted to engage the edge of the flange, 38, the position of which is indicated in dotted lines in Fig. 9, so as to limit the movement of the handle and lever in one direction, the portion, 41, being provided with an angularly disposed arm, 42, to which the flexible connection, 30, is connected in any usual or desired manner. The lever, 42, chain, 30, overflow sleeve, 20, and the flushing valve, 14, are so counterbalanced with respect to the grooved support, 37, that the flushing valve will remain in any position to which it is moved, so long as it is submerged, at which time the water in the annular compartment, 16, of the valve, does not tend to effect the downward movement of the valve. This counterbalancing may be effected in any desired way, by making the parts of the proper weight of material, for example, but for practical purposes I prefer to provide means for securing the proper counterbalancing of the parts by attaching a counterbalance weight, 43, to the chain, 30, or the lever arm, 42. This counterbalance, 43, may be of exactly the

right weight for the particular installation, but I prefer to provide the lever arm, 42, with means for adjusting the weight, 43, with respect thereto. In this instance, in Fig. 9, for example, I have shown the lever arm, 42, provided with a plurality of apertures, 44, in any one of which the weight, 43, may be secured, by means of a cotter pin, 45, as therein shown. This forms a very simple and convenient means of counterbalancing the parts, so that the correct balance will not be accidentally destroyed.

Figures 7 and 8 illustrate a slight modification of my invention, by which it can be readily adapted to the pull chain type, if this is desired. In this instance I have shown the bearing sleeve, indicated at 132, provided with a central aperture of sufficient size to permit the free passage of the chain, 130, therethrough, the outer end of the said aperture being flared so as to permit the free movement of the chain. The bearing sleeve is provided with the usual head at the outer end over which is slipped a slotted portion of a hood, indicated at 146, which may be of porcelain, or metal, and gives a neat finish to the exterior. The bearing sleeve, 132, passes through the bracket, indicated at 131, and is provided with a nut, 133, which secures both the bracket and the hood in place. The bracket is constructed exactly as previously described with reference to Figs. 1, 2, and 3, and is provided at its outer end with the adjustably curved support, 137, for the chain, which will be adjusted in the same manner as previously described. The horizontal supporting flange, 138, of the bracket is in this instance provided with a horizontally disposed grooved guide, preferably in the form of a roller, 147, which is preferably made of porcelain so as to insure the free passage of the chain. The chain, 130, passes over the support, 137, around the roller, 147, and out through the sleeve, 132, the exterior depending portion being provided with a counter-balance and handle, 140. The handle and exterior depending portion of the chain may be of such weight as to properly counter-balance the overflow pipe in the valve, and the interior depending portion of the chain, and in some instances I may provide a hollow handle with a removable cap, indicated at 140^a, as shown in Fig. 8, for example, in which small bullets of lead, or other suitable weights can be placed to effect the desired counterbalancing, or an additional length of chain may be interposed between the sleeve, 132, and the handle, for the same purpose.

In the present instance I have shown the tank provided with a water inlet pipe, indicated at 50, in Figs. 1, 2 and 3, supported by a connection, 51, in this instance in the bottom of the tank, and extending vertically

therefrom, said connection being united with the water main by a pipe, indicated at 52. The upper end of the water inlet pipe, 50, is provided with an inlet valve indicated at 53, the detailed construction of which is not claimed herein and need not be specifically described.

In the present embodiment of my invention I have illustrated a float lever, 70, connected with the inlet valve, 53, and provided with a float, indicated at 71, which is preferably formed of a block of compressed granulated cork, or small pieces of waste cork, held together by a suitable cementitious material, and given an exterior coating of waterproof material, which permeates sufficiently into the interstices of the block to prevent the possibility of any water entering, and therefore insuring that the cork float shall retain its original specific gravity and buoyancy during its immersion, or partial immersion in the water. Floats for flush tanks are usually made of spun metal in spherical form, and are liable to become damaged in shipment, and are also liable to become corroded and eaten through in use, so that they frequently fill with water and become useless. They are expensive and there is a considerable loss attending their use. My improved float is preferably made by taking a block of cork composition, that is to say, compressed cork particles, united by cementitious material, and impregnating and coating the block with asphaltum residue obtained in the distillation of petroleum having an asphaltum base, thus producing a very cheap and efficient float. In impregnating the blocks I prefer to first exhaust the air therefrom, by enclosing them in a vacuum chamber, after which the asphaltum residue is admitted in liquid form, so that it is forced to a considerable extent into the interior of the blocks, in addition to thoroughly coating the exterior, and when this asphaltum residue becomes dry and hard, the composition cork block is perfectly protected against the water in the tank. The shape of the block is immaterial, but I preferably make it in the form of a block or briquette, which gives the desired buoyancy without any additional expense, but they may be made in other forms, if desired. In order to attach the float to the float lever, 70, I may thread the extreme end of the said lever, as indicated at 72, the extremity of which is preferably sharpened to a point, as indicated at 73, and provide the float with a threaded clip, shown in detail in Fig. 11, which may be conveniently formed by bending a sheet of brass or other non-corrodible metal around a mandrel, to form a sleeve portion, 74, the ends being brought together, as indicated at 75, and the sleeve being subsequently threaded. This clip may be driven into one end of the block, either before or after coating, and by this means

the lever, 70, can readily be screwed into the end of the clip, as indicated in Fig. 10. This, however, is not strictly necessary, and in some instances, I may form the end of the lever, 70, as a smooth unthreaded rod, having a point, 73, on its extremity, to enable it to be driven or forced into the block in any desired position, as indicated in full and dotted lines in Fig. 12. By inserting the lever, 70, in the float at different positions, or in different angular positions, the desired water level in the tank may be regulated without bending the float lever.

According to my present invention, I also provide the float lever with a depending flexible device, preferably a ball chain, indicated at 76, which may be attached either to the float or the lever, and which is preferably adjustable both as to length and as to the distance from the vertical axis of the flushing outlet. In Figs. 1, 2, 3, 10, 11 and 12, I have shown the float lever, 70, provided with a flattened portion, 77, in which are formed a series of holes, 78, to receive the depending afterfill device, 76, which is preferably in the form of a ball chain. By making these holes substantially the same size as the exterior of the balls of the chain, the vertical adjustment of the chain to any desired length below the lever can be readily accomplished, by simply pulling the chain through one of these apertures in the manner indicated in Fig. 13, and letting the unused end hang from the lever. This puts a sufficient kink in the chain so as to lock the chain with respect to the lever in its adjusted position, and to regulate the length of the depending portion of the chain, but this adjustment may be obtained in any other desired manner. By inserting the chain through one or other of the holes, 78, the adjustment of the chain, 76, with respect to the axis of the flushing aperture, may also be varied to suit different installations for flush tanks with which the apparatus may be employed. The depending refill device is so arranged that it will normally hang slightly at one side of the inlet valve and flushing outlet when the lever, 70, is in raised position, so as not to interfere with the operation of the valve, and to prevent the possibility of its getting into the annular compartment, 16, of the valve, and altering the balance between the valve and its operating mechanism before described. When the flushing valve is raised and the flushing action takes place, the float lever and float will descend, and the rush of water to the outlet in the bottom of the tank will sweep the lower end of the chain, 76, down into the outlet, in the manner indicated in Fig. 2, so that when the valve seats, as indicated in Fig. 3, it will engage this chain, 76 (or other flexible device), and hold the valve slightly off of its seat, the flexible walls

of the valve, 14, which I prefer to use, flexing somewhat, so as to leave a comparatively small opening when the valve is thus held off of its seat. As the float descends, the inlet valve opens, admitting water to the tank, and as soon as the valve is partially seated on the chain, 76, the water level in the tank begins to rise and the effect of the chain, 76, is to permit a small quantity of water to be discharged through the flushing outlet to effect the afterfill, so long as any portion of the chain remains between the valve and seat. As the water level rises, the buoyancy of the float will gradually withdraw this chain, 76, until it is finally pulled clear of the valve, permitting the valve to completely seat and shut off the water from the flushing outlet, and by regulating the length of the chain, 76, the duration of the afterfill can be accurately regulated. This enables me to dispense with the ordinary afterfill tube, which, as before stated, is very apt to become corroded and broken, and there is no danger of water being discharged through an afterfill aperture to the exterior of the tank, as often happens where an afterfill tube breaks off, with the consequent damage to the apartment in which the tank is located.

In Fig. 14 I have shown a float, here indicated at 171, attached to the float lever, 170, by inserting the lever at a corner of the float, and providing a lower inclined face on the float, indicated at 171^a, and I have shown the afterfill device, 176, secured directly to the float by a staple, 178. By pressing this staple into the float at different positions along the inclined face 171^a, and by adjusting the chain with respect to the staple, it will be readily seen that the chain, 176, can be adjusted as to length and also can be adjusted laterally with respect to the axis of the flushing aperture.

It will be seen that, in carrying out my invention, I have provided a flushing apparatus of the utmost simplicity which can be readily installed in a tank made for it or in any of the ordinary tanks now in use, so that it can be furnished as a complete equipment, or as a repair equipment for an existent installed tank. When it is installed, it can be readily adjusted as to all its component parts, to accommodate different water pressures, the desired level of water in the tank, and other variations which may be encountered, and when once adjusted, it is practically fool-proof. The separate parts can be readily furnished for effecting repairs, if they become necessary, and any repairs or replacements can be made by any householder or unskilled person, without the use of either tools or skilled labor. For example, in case a new valve is to be installed, the householder can take hold of the upper end of the tube, 20, and

lift the tube and valve over the side of the tank, the chain, 30, (or 131), providing sufficient length to enable this to be done, so that the old valve can be slipped off of the tube, 20, a new valve applied to the tube, and the parts replaced. The inlet valve can be replaced when necessary by any one without even wetting the fingers as the parts are all above the level of the water in the tank. If a shorter overflow pipe is desired, it is only necessary to cut off a portion of the lower end of the tube, 20, before inserting it in the sleeve, 15, of the valve, to obtain the desired distance between the valve seat and the overflow apertures, 21. This distance can be increased by merely withdrawing the tube and valve, and partially withdrawing the tube from the sleeve, 15, of the valve, and the correct operative length of the chain, 30, (or 130) can be readily secured by the adjusting means previously described in connection with the sleeve, 20.

It is also to be noted that, as the overflow tube is secured frictionally to the valve, it may be made of very thin material, as there will be no threads to weaken it, and there is no danger of its becoming broken or corroded in use. To effect the flushing action with a tank provided with my invention it is only necessary to raise the flushing valve off of its seat, by operating the lever shown in Figs. 1, 2 and 3, for pulling the exterior depending chain, in the form shown in Fig. 7. The upward movement of the valve will be limited by the engagement of the buffer, 28, with the stiffening flange, 34, of the supporting bracket, 31, which will arrest the upward movement of the valve noiselessly. It is not necessary to hold the lever or pull chain as the parts are counterbalanced so long as the valve is submerged, and the water will immediately flow out of the flushing outlet to the bowl to effect the flushing action, the float lever descending with the fall of the water level in the tank. As soon as the depending afterfill device reaches the bottom of the tank, it will be swept by the water into the flushing outlet and will engage a portion of the valve seat. The lowering of the float lever also permits the inlet valve to open and allows water to flow into the tank, but obviously not so rapidly as it is flowing out. When the water level descends below the flushing valve, so as to relieve the valve of its support, the valve will descend upon its seat, but will be prevented from completely seating by the afterfill device. This permits a small quantity of water to be discharged into the flushing pipe, to effect the afterfill, as before described, during the refilling of the tank. As the float lever rises, with the water level, the afterfill device is drawn upward until it is withdrawn from between the flushing valve and its seat, permitting

the valve to seat completely and shut off a further supply of water to the bowl, and as the float rises, to its normal position, the inlet valve is closed and the admission of water to the tank ceases, the parts being in position for another operation.

It is also to be noted that in my flushing mechanism, the float and float lever affect both the inlet valve which it controls, and the outlet or flushing valve, which is held open for a predetermined period during the refilling of the tank to effect the afterfill, and therefore cooperates with both the inlet and outlet of the tank.

What I claim and desire to secure by Letters Patent is:—

1. The combination with a flush tank provided with a water inlet and inlet valve for controlling the same, and a flushing outlet and valve seat, of a vertically movable flushing valve adapted to engage said seat, and means for operating said valve, a float operated lever for the inlet valve, and provided with an aperture therein, of a depending after-drill device comprising a section of ball chain, the balls of which are of substantially the same diameter as said aperture, whereby, by drawing said chain through said aperture, the effective length of the after-fill device will be adjusted, and by permitting the chain to hang on opposite sides of the lever, it will be locked in adjusted position.

2. The combination with a flush tank provided with a water inlet and inlet valve for controlling the same, and a flushing outlet and valve seat, of a vertically movable flushing valve adapted to engage said seat, and means for operating said valve, a float operated lever for the inlet valve, and provided with a plurality of apertures arranged at different points longitudinally thereof, and adjacent to said flushing valve to detachably engage an after-fill device, and an after-fill device comprising a section of ball chain to adjustably and detachably engage one or other of said apertures, and having the balls thereof of substantially the same diameter as said apertures, whereby said chain may be adjusted longitudinally and longitudinally of said lever.

3. The combination with a flushing tank, provided with a flushing outlet having a valve seat, of a vertically movable flushing valve of cup shape, and composed of yielding material, provided with a centrally located sleeve forming an annular water containing recess surrounding said sleeve, said valve being provided with a socket at its lower end, and with apertures adjacent thereto communicating with the interior of said sleeve, an overflow pipe frictionally engaging said sleeve and forming the stem of the valve, an auxiliary valve stem frictionally engaging said socket and having

its lower end at a greater distance below the valve seat than the extent of the vertical movement of the valve, and valve actuating mechanism operatively connected with the upper end of said overflow tube, said tube being provided adjacent to its upper end with an overflow aperture.

4. The combination with a tank, provided with a flushing aperture and valve seat, of a cup-shaped flushing valve composed of flexible material, provided with an interior sleeve forming an annular water compartment around the same, an overflow tube frictionally engaging said sleeve at its lower end and provided with a horizontal closure at its upper end, and with a lateral overflow aperture, said closure being provided with means for adjustably engaging a chain, including an eccentrically located aperture in the closure, of sufficient size to permit the widest portion of the chain to pass through, and a narrower slot extending therefrom to the center of the said closure, and a locking device comprising a part provided with an aperture of sufficient size to permit the widest portion of the chain to pass through, engaging said chain, and provided with means for detachably connecting it with said closure, so as to hold the chain in engagement with the slot therein.

5. The combination with a tank, provided with a flushing aperture and valve seat, of a cup-shaped flushing valve composed of flexible material, provided with an interior sleeve forming an annular water compartment around the same, an overflow tube frictionally engaging said sleeve at its lower end and provided with a horizontal closure at its upper end, and with a lateral overflow aperture, said closure being provided with means for adjustably engaging a chain, including an eccentrically located aperture in the closure, of sufficient size to permit the widest portion of the chain to pass through, and a narrower slot extending therefrom to the center of the said closure, and a locking device comprising a disc of substantially the same size as the closure provided with a central aperture loosely engaging the chain, and means for holding said locking device in engagement with the closure to retain the chain in engagement with the slot therein.

6. The combination with a tank, provided with a flushing aperture and valve seat, of a cup-shaped flushing valve composed of flexible material, provided with an interior sleeve forming an annular water compartment around the same, an overflow tube frictionally engaging said sleeve at its lower end and provided with a horizontal closure at its upper end, and with a lateral overflow aperture, said closure being provided with means for adjustably engaging a chain, including an eccentrically located aperture

in the closure, of sufficient size to permit the widest portion of the chain to pass through, and a narrower slot extending therefrom to the center of the said closure, a combined
5 locking device and bumper consisting of a disc of elastic material provided with a central aperture engaging the chain and having elastic projections on its end surface for engaging apertures in the closure to hold said locking device detachably connected therewith, said tank being provided with a stop adapted to be engaged by said bumper to limit the upward movement of the valve.

In testimony whereof I affix my signature.
PHILIP HAAS.