

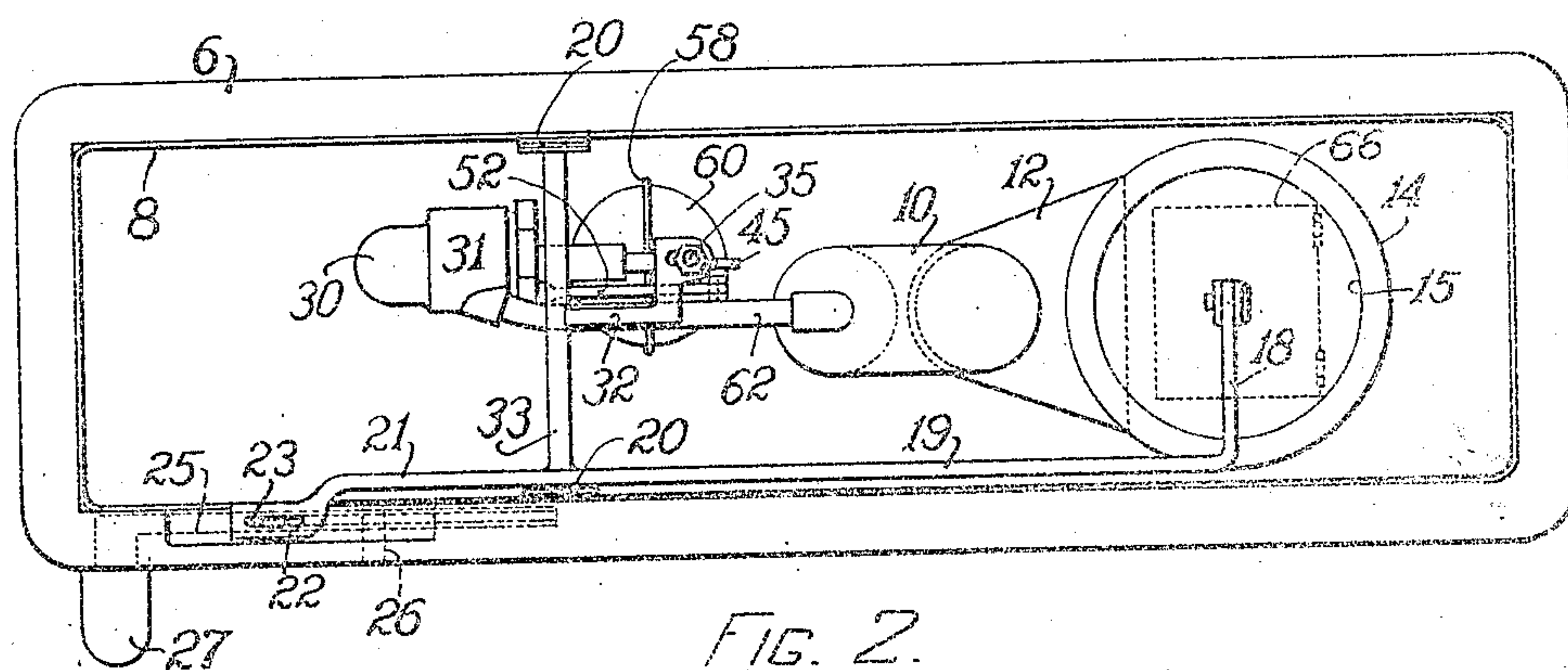
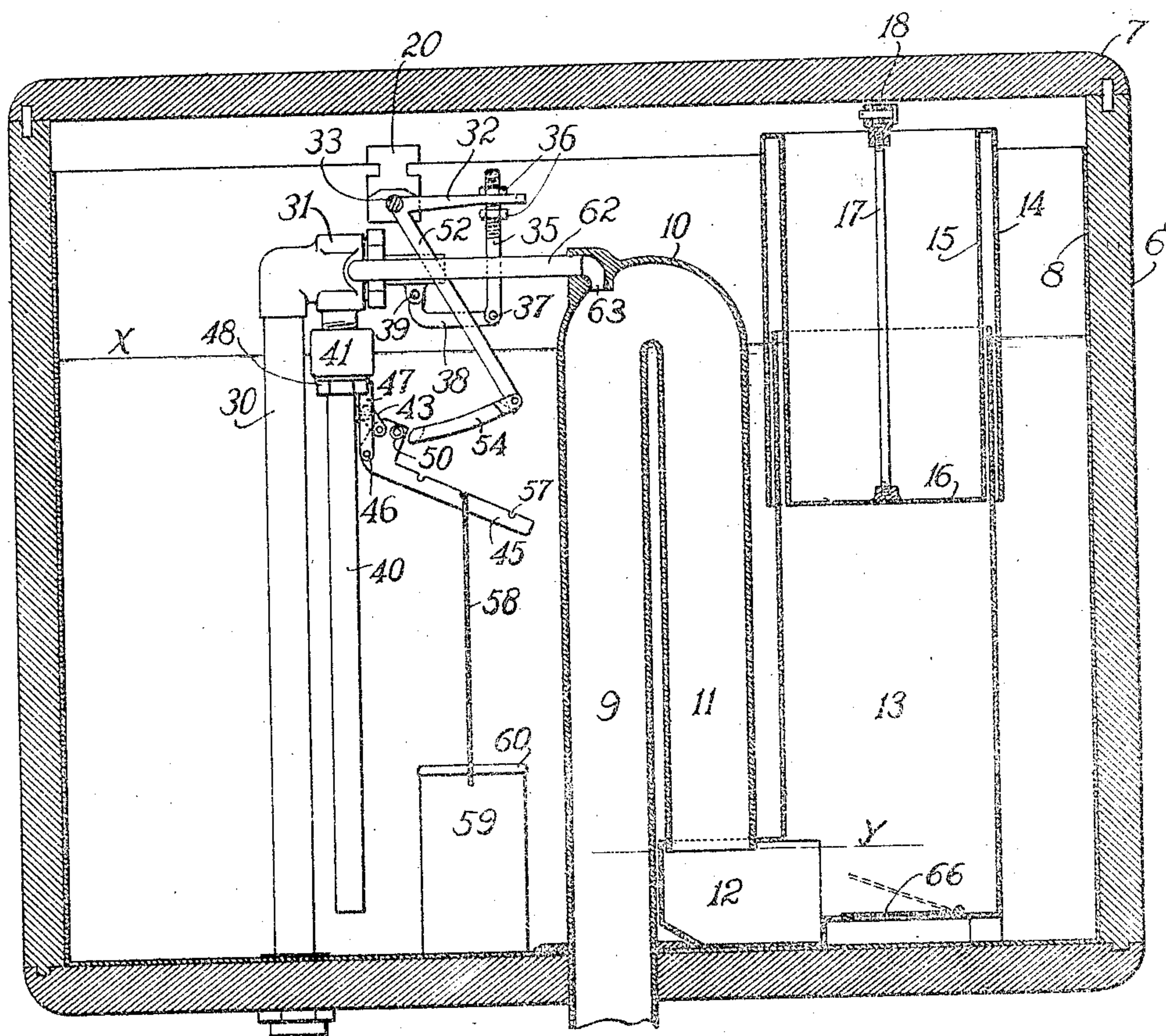
No. 881,145.

PATENTED MAR. 10, 1908.

G. W. PALMER & F. E. PIERCE.
FLUSHING TANK.

APPLICATION FILED AUG. 21, 1906.

2 SHEETS—SHEET 1.



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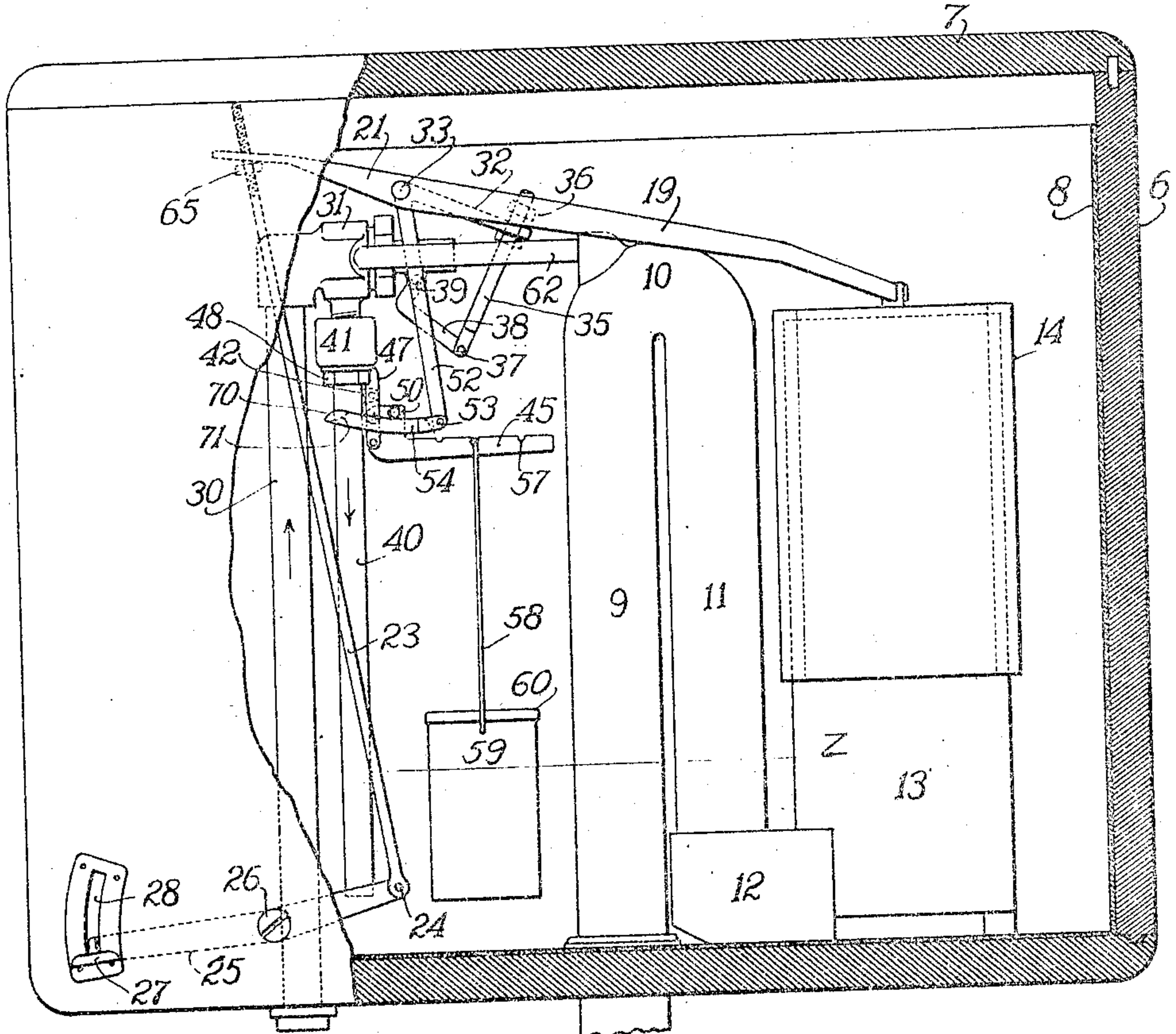


FIG. 3.

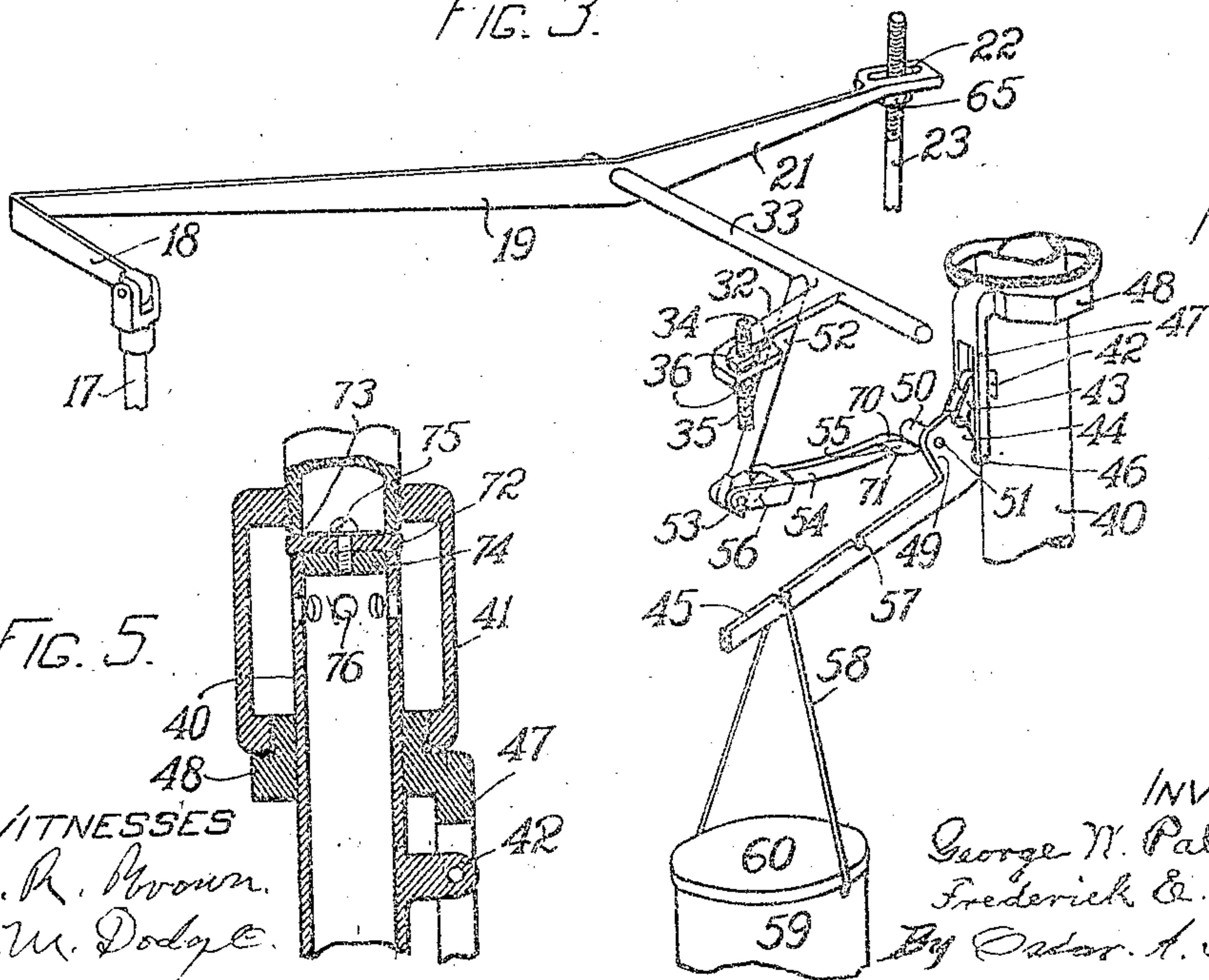


FIG. 4.

FIG. 5.

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UNITED STATES PATENT OFFICE.

GEORGE W. PALMER AND FREDERICK E. PIERCE, OF LANCASTER, MASSACHUSETTS.

FLUSHING-TANK.

No. 881,145.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed August 21, 1906. Serial No. 331,457.

To all whom it may concern:

Be it known that we, GEORGE W. PALMER and FREDERICK E. PIERCE, both of Lancaster, in the county of Worcester and State of Massachusetts, have invented new and useful Improvements in Flushing-Tanks; and we do hereby declare that the following is a full, clear, and exact description of the same.

The object of this invention is to provide improved flushing apparatus especially adapted for low-down tanks in distinction from those requiring for the flushing operation considerable elevation above the bowl to be flushed.

Our apparatus is especially compact and positive in its operation and embraces novel features hereinafter described, illustrated in the drawings and especially referred to in the appended claims.

Some of the features characteristic of our invention are: the operative mechanism inclosed in and largely mounted on the upper edges of a water tight metallic or equivalent shell within the wooden casing: the usual pull chain dispensed with and a lever system substituted, one lever with protruding handle and one with transverse rock-shaft and arms and a reciprocating connecting rod: enlarged concentric cup and plunger for priming the siphon, actuated by said two levers and rod: outflow through siphon energized by direct downward jet of water from main supply under pressure and not entering tank body: tank filling tube having a limited vertical reciprocation, the valve opening by a downward movement of said tube due to a weight effective as such on a peculiar lever only when the tank empties, and the upward, closing movement also involving a toggle action.

Minor improvements and advantages will appear in the accompanying description and drawings which form part of this specification and wherein like numbers indicate like parts throughout.

Figure 1 is a vertical longitudinal central section of our apparatus in a position ready for operation. Fig. 2 is a top plan view of the same. Fig. 3 is a side elevation with part of the casing broken away, and shows the tank in operation. Fig. 4 is a perspective view of a portion of the operating mechanism. Fig. 5 is a sectional detail of the filling valve.

6 is the box or casing supplied with a cover

7 and contains a tank 8 preferably of sheet copper, open at the top and nearly as deep as the box, for which it forms a water-tight lining.

The discharge leg 9 of siphon 10 passes through the floor of the tank 8 and box 6 and is connected in any well-known manner with the bowl to be flushed. The short leg 11 of siphon 10 enters the top of a water passage 12 leading from the foot of a fixed vertical tube 13,—such passage resting on the floor of tank 8 and forming the principal rest or support for tube 13.

At the upper end of tube 13 is mounted a telescoping plunger 14, which coöperates with tube 13 to prime the siphon. This plunger is formed, as shown most clearly in Fig. 1, of two concentric vertical cylinders which inclose the circular wall of tube 13 and are closed or connected to each other at the top. The inner cylinder 15 has a floor 16, on which is mounted a central stem or piston rod 17 extending slightly above the tops of the two cylinders, for the purpose of forming a hinge joint for the bent end 18 of lever 19, see Figs. 3 and 4.

Lever 19 is shown in Figs. 1 and 2 as pivoted in ears 20; detachably mounted on the upper edge of tank 8, and has a short arm 21 which is offset at its left end to enter a recess in the casing and slotted at 22 to receive the upper end of connecting rod 23 which works in said recess. Rod 23 is pivotally connected at 24, Fig. 3, to operating lever 25 which is pivoted at 26 in the sides of box 6 and is provided with the actuating handle 27 projecting through slot 28 in the side of the box.

The water inlet pipe 30 is provided with an ordinary angle valve 31 operated by lever 19 through the agency of arm 32, rigidly connected to the transverse rock shaft or pivot pin 33 of said lever 19, arm 32 being slotted at 34 to receive a threaded bolt 35 provided with nuts 36 adapted to engage arm 32, Figs. 1 and 3, said bolt being pivotally connected at 37 to the bent valve-stem 38, pivotally mounted at 39 on valve 31.

Connected to inlet pipe 30 by valve 31 is a depending tank-filling tube 40 mounted for a limited vertical movement in filling-valve box 41, and provided with an outwardly extending ear 42, Fig. 5, to which is pivotally connected a pair of links 43 which coöperate with the shank 44 of bent lever 45 to form a

toggle joint for sliding tube 40 up and down see Fig. 4. Bent lever 45 is pivotally mounted at 46 in a pair of depending ears 47 rigidly mounted on bushing 48 in valve-box 41. Shank 44 of lever 45 is extended forward, as at 49, Fig. 4, to receive a roller 50 mounted on stud 51.

To rock shaft 33 is rigidly secured an arm 52, Fig. 4, to which is pivoted, at 53, a curved arm 54 formed at its outer end with a projecting lug 55 to engage roller 50. Arm 54 has its socket formed with an inclination, as at 56, to prevent downward movement when engaging roll 50 and permit upward movement when engaged by roll 50, as will be presently explained.

The free end of bent lever 45 has a series of notches 57 in its upper edge for adjustable engagement of bail 58 of weight 59.

Weight 59 is preferably a hollow copper pail filled with water and provided with a cover 60 for keeping out the sediment, or is formed solid of a substance having the same specific gravity as water, in order that it may act as a weight only when the water level in the tank is below the line of this device, gravitation only acting on it at such times.

Mounted in valve box 31 is a small conduit 62 leading to the discharge leg 9 of siphon 10 and terminating in a downwardly projecting nozzle 63 Fig. 1.

The operation of the apparatus is as follows:—Fig. 1 represents the tank in readiness for operation. The water level is indicated by line *x*, leg 11 is full almost to the siphon bend and leg 9 empty. Valve 31 is closed and valve 41 open, but as valve 31 controls the openings both to conduit 62 and tube 40 neither can operate. The service of valve 41 is to close tube 40 while conduit 62 is in operation. When handle 27 is depressed the parts take position as represented in Fig. 3, and may be explained as follows:—Handle 27 being lowered, connecting rod 23 is raised and nut 65 thereon raises the short end 21 of lever 19, depressing its bent end 18 and giving partial oscillation to rock shaft 33 with its arms 32 and 52. Downward movement of said end 18 causes telescoping plunger 14 to descend and force the water within fixed tube 13 through passage 12 into leg 11 of siphon 10, and by filling the crown of the siphon it is made operative. Then the water in the tank 8 is drawn by natural siphonage through flap valve 66, which only opens upwardly, and through said passage 12, the abundant flushing flow continuing until the water level in tank 8 reaches the line marked *Y* in Fig. 1, when the siphon breaks. The downward movement of arm 32 as in Fig. 3, causes valve 31 to open as before described and water under full pressure from the main inlet 30 flows through conduit 62 and nozzle 63, axially downward in the discharge leg 9

of siphon 10, thus expediting the flow. The downward, advance movement of arm 52 causes lug 55 at the tip of arm 54, to contact with roller 50 and push it inwardly toward tube 40, thus straightening the toggle joint; compare Figs. 1 and 3. As roller 50 moves inwardly it also rises in its arc of travel, being helped therein by the cam surface 70 on lug 55, see Fig. 4. By the time bent lever 45 has assumed the position shown in Fig. 3, lug 55 has ridden under and past roll 50 which is then free to resume its original position when properly acted upon. Valve 41 is closed by means of leather valve packing 72 seating against valve seat 73. 74 is a solid metal filler in the upper end of tube 40 and screw 75 secures packing 72 in place, see Fig. 5. The change in position of bent lever 45 raises pail or hollow weight 59 from its position on the floor of tank 8; and as tank 8 is but partially emptied, the submerging water offsets the amount inclosed in the pail, the weight of the metal parts alone not being sufficient to overcome the inertia and friction of the toggle members, 43, 44. When the water is lowered to about line *z* of Fig. 3, the weight of 59 becomes sufficient to operate bent lever 45 and move it to its original position as in Fig. 1. This sets the toggle members at an angle, opens valve 41, and water is delivered to tube 40 through openings 76 in its upper end, see Fig. 5, and thence noiselessly into the water in bottom of tank 8. As tube 40 is considerably smaller than leg 9 of the siphon the discharge exceeds the supply and the water level gradually drops to level *Y*, when the siphon ceases to act. At this stage valves 31 and 41 are both open and water is entering tube 40 to fill tank 8 and conduit 62 for the purpose of "re-filling" the bowl after the flush. This "refill," by other means, is a well-known operation in most flush tanks and need not be further described here. When the water in tank 8 rises to a height sufficient to float telescoping plunger 14, lever 19 gradually resumes its original position, and lever 25 is returned to its position by the rise of the plunger 14. Valve 31 is thus soon closed and arm 54, in returning to its initial position, does not operate lever 45, as when cam surface 71 on lug 55 contacts with roll 50, the inclined socket 56 permits arm 54 to ride over roll 50 and drop into its first position.

We claim as our invention:

1. In a flushing apparatus, a tank connected to supply and discharge pipes for the water current and inclosing the operative mechanism including a permanent siphon, in combination with inclosed siphon priming means comprising a tubular base self-filled at the bottom and connected with the leg of the siphon, a telescoping plunger with vertical stem and two vibrating levers and a

connecting rod for actuating said plunger, and means whereby said plunger controls in its movement, the supply pipe.

2. In a flushing apparatus, a tank connected to supply the discharge pipes for the water current and inclosing the operating mechanism including a permanent siphon in combination with inclosed siphon priming means comprising a fixed tubular base self-filling at the bottom and connected with the short leg of the siphon, a telescoping plunger with a vertical stem and two vibrating levers, means for operating the plunger, a connection between the siphon and the supply pipe, and means whereby said plunger controls in its movement the connection between the supply pipe and the siphon.

3. In a flushing apparatus, a tank connected to supply and discharge pipes for the water

current and inclosing the operating mechanism including a permanent siphon in combination with inclosed siphon priming means comprising a fixed tubular base self-filling at the bottom and connected with the short leg of the siphon, a telescoping plunger with a vertical stem and two vibrating levers, means for operating the plunger, a connection between the siphon and the supply pipe, and means whereby said plunger controls in its movement the connection between the supply pipe and the siphon, and the supply pipe.

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