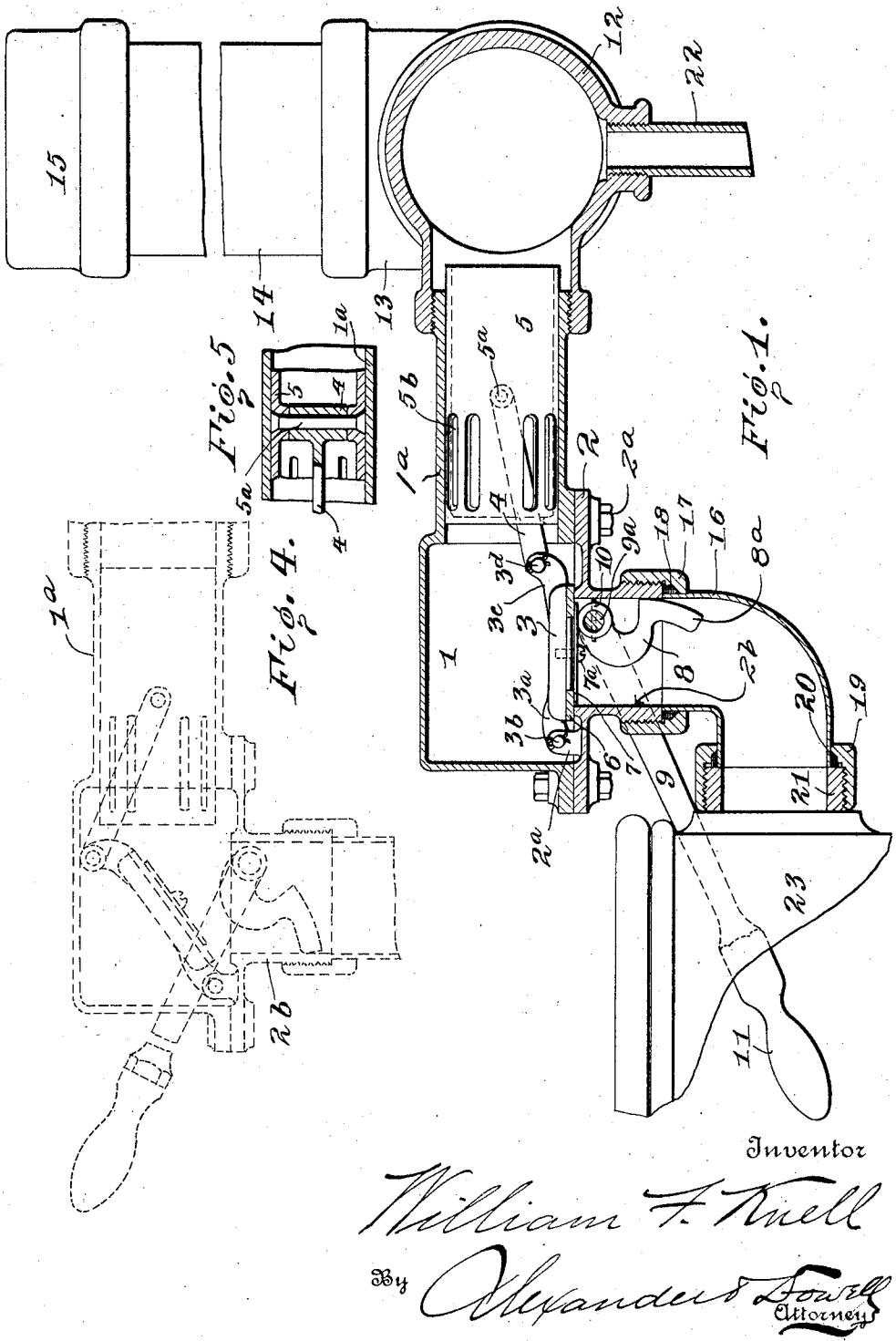
W. F. KNELL.

FLUSHING VALVE.

APPLICATION FILED OCT. 18, 1919.

1,338,638. **Patented Apr. 27, 1920.**

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

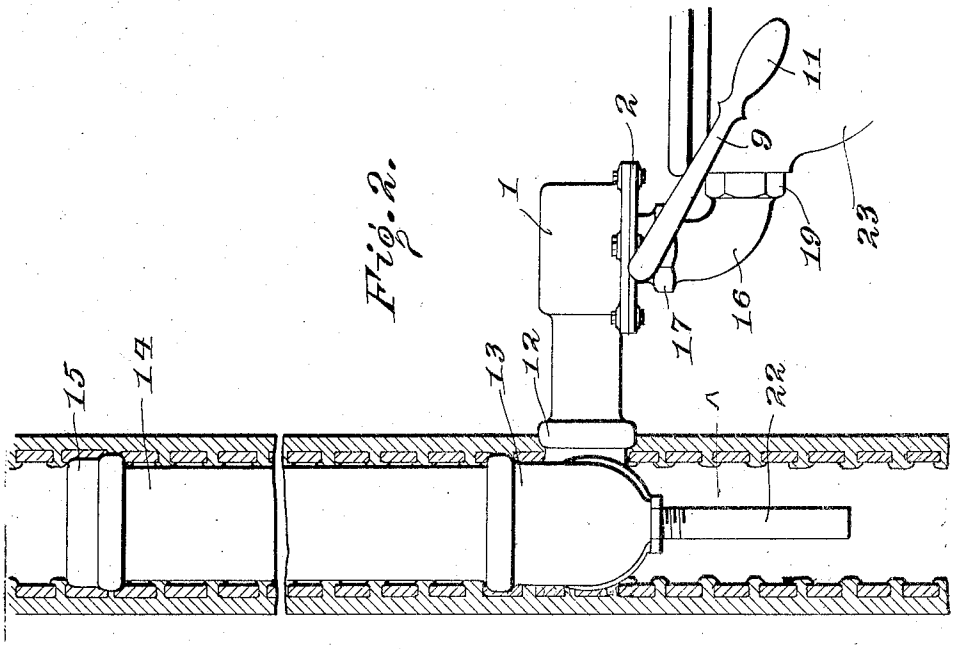
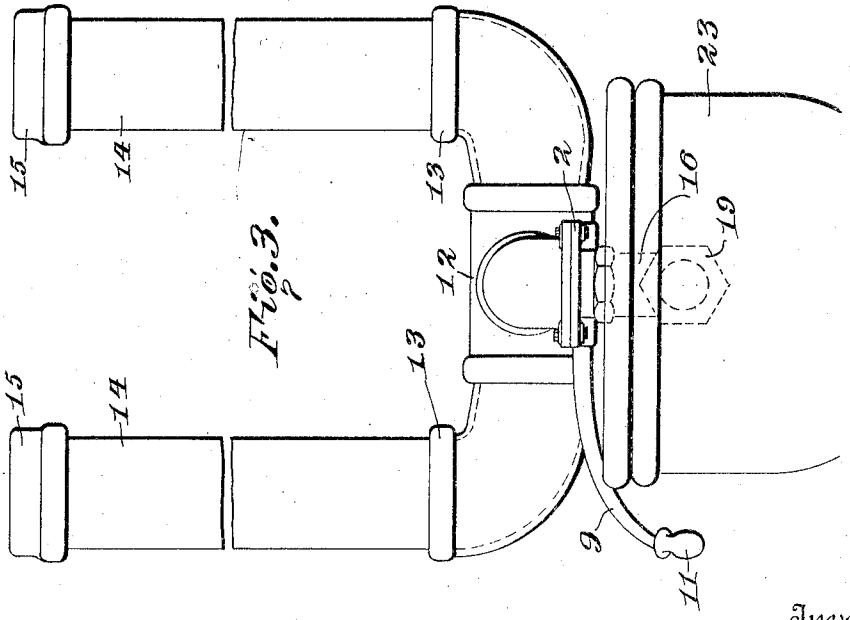


Fig. 3.



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WILLIAM FRANKLIN KNELL, OF DETROIT, MICHIGAN.

FLUSHING-VALVE.

1,338,638. Specification of Letters Patent. Patented Apr. 27, 1920.

Application filed October 18, 1919. Serial No. 331,541.

To all whom it may concern:

Be it known that I, WILLIAM F. KNELL, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Flushing-Valves; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel flushing valve for water closets and the like, and its objects are to provide a flushing valve which will be quiet in operation and avoid the objectionable noises attendant on the use of present known valves.

Another object is to provide a valve which will not need frequent adjusting and repairs, as are required by the complicated present known valves and devices used for similar purposes.

In the accompanying drawings I have shown one practical embodiment of the invention and will describe same with reference to said drawings to enable others to understand and use the same, and then set forth in the claims the essential features of the invention and novel construction and combinations of parts for all of which I desire protection.

In the said drawings Figure 1 is a longitudinal sectional elevation of the valve closed; also showing its connection with the bowl and the reservoir.

Fig. 2 is a reduced side elevation of Fig. 1, showing an arrangement of reservoir pipes within the partition of the building.

Fig. 3 is a front elevation of Fig. 2, with one arrangement of reservoir pipes in elevation.

Fig. 4 is a dotted view showing the valves in open position.

Fig. 5 is a horizontal section of a detail of one of the valves.

In the construction shown in the drawings the body of the valve comprises a housing casing 1, having a cylindric extension 1^a at rear for the accommodation of a piston valve, and having an opening in its under side closed by a plate 2, which may be secured thereto by any suitable means, as by bolts 2^a. Plate 2 preferably has a central outlet opening in its bottom which is surrounded by an externally threaded collar or nipple 2^b. The opening in the bottom plate 2 is normally closed by a valve 3, which may be provided with a rubber packing ring 6, retained in place by washers 7, and attached to the valve by a screw 7^a, or other suitable means. The valve 3 may be provided at one side with ears 3^a, pivotally connected or hinged to ears 2^a on the bottom plate 2 by means of a pin 3^b; the pivot of the valve being opposite the extension 1^a; and the valve is preferably provided at the side next extension 1^a and opposite ears 3^a, with an ear 3^c to which one end of a link 4 is pivoted by means of a pin 3^d; the other end of the link 4 is pivotally connected by a pin 5^a to a piston valve 5, slidably fitted in extension 1^a; and the raising or falling movements of the valve 3 (in opening or closing) will impart a longitudinal sliding movement to the piston valve 5.

The piston valve 5 is preferably closed at its inner end, adjacent valve 3, except for the slot through which the link 4 projects, and this valve 5 may be provided with radial slots 5^b in its wall adjacent such end, which slots however are closed by the walls of the cylindric extension 1^a when the valve 3 is closed and the piston valve 5 is in its retracted position, as shown in full lines in Fig. 1.

Mounted below the valve 3, and preferably within the collar 2^b, is a cam member 8, preferably mounted on a rock shaft 9^a and secured thereto by a pin 10. The rock shaft 9^a may be journaled in suitable bearings in or on the collar 2^b, and is provided on its exterior end with a lever 9, which may be provided with a handle 11. The construction is such that when the lever 9 is raised the cam 8 engages the under side of the valve 3 and lifts the latter, as indicated in Fig. 4, until the toe 8^a of the cam strikes the wall of the collar 2^b; or the ears 3^c of the valve strike the top of the casing 1, as in Fig. 4.

The arrangement is such that the movement of lever 9 upwardly through an arc of approximately 60° will lift valve 3 from its seat and break the toggle, (consisting of the valve 3, ears 3^a, 3^c, link 4 and pivots 3^b, 3^d, 5^a); but when the valve is closed and the handle lowered the central pivot 3^d in this toggle drops slightly below the lines of the pivots 3^b, 5^a, and effectively locks the valves in closed position against the water pressure in the flushing tanks or reservoirs and supply means, hereinafter referred to.

When the valves are closed, as shown in Fig. 1, no water can flow to the bowl as the valve 3 is closed and the openings 5^b in piston valve 5, which communicate with the flushing tank or reservoirs, are closed by the walls of the extension 1^a of the casing. But when the valve 3 is opened as indicated in Fig. 4, the piston valve 5 is simultaneously drawn inward and the water can freely escape through the slots 5^b into the casing 1, and thence through the uncovered opening in the bottom plate 2.

The extension 1^a is externally threaded on its rear end so that it can be screwed into the side of a pipe T 12. This T 12 is provided with a threaded opening for connection to a water supply pipe 22, which is connected with the supply main. Connected with the end of this T 12 are elbows 13; and connected with these elbows are reservoir or tank pipes 14 which have their ends closed by caps 15. The bottom plate 2 may may be connected by means of a nipple 17 and packing washer 18 to an elbow 16, which in turn is connected by a nipple 19 and packing washer 20 with a threaded extension 21, such as is usually formed integral with or fixedly attached to the water closet bowl 23.

Before valve 3 is closed the water supply coming through the pipe 22, can pass to the bowl—but when valve 3 is closed the incoming water will fill the valve casing 1, and reservoir pipes 14, rising in said pipes until the pressure of the air trapped therein equals the pressure of the incoming water; but the pressure of the incoming water cannot open the valves when valve 3 is closed, as shown in Fig. 1, because the central pivot 3^d of the toggle is below the end pivots 3^b, 5^a, thereof. But when the lever 9 is raised, so as to cause cam 8 to lift valve 3, the pivot 3^d is raised above the line between the pivots 3^b, 5^a, and the toggle is broken, and water under pressure from reservoir 14 is forced in volume through the valve 5 and casing 1 into the bowl 23, and the pressure of the water forces the valves open as far as possible and maintains them in open position as long as the water is flowing under pressure from the reservoir. The pressure of water flowing from the reservoir is sufficient to keep valve 3 open; but the quantity of water entering from the small water-supply pipe 22 is not sufficient to hold it open, consequently when the water confined in pipes 14 becomes exhausted the valve 3 will close of its own weight, thereby closing valve 5 and trapping a new supply of water in reservoir pipes 14.

The reservoir pipes 14 and connections 12 and 22 are preferably concealed within the walls of the building as indicated in Fig. 2. Any desired number of reservoir pipes 14 can be connected with the casing 1 or header T 12, according to the quantity of water desired to be discharged at each operation of the valve and according to the position in which the bowl is to be placed.

In this invention the valve 3 will remain open while under the influence of the water flowing from the reservoir or tank, but will automatically close when the reservoir is emptied, and will remain closed when subjected only to the influence of the pressure of water entering through the supply pipe 22.

Having described my invention what I claim is:

1. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve closing said inlet; a hinged valve closing the outlet; a toggle connection between the valves whereby the valves are locked in closed position; and manually operable means for opening the valves.

2. In a flushing valve, a casing having an inlet and an outlet; a valve closing said inlet; a valve closing the outlet; a toggle connection whereby the valves are locked in closed position; a collar surrounding the opening in the casing below the outlet valve; a cam for opening the valves, and a lever for actuating the cam.

3. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve closing said inlet; a hinged valve closing the outlet; a toggle connection between the valves whereby the valves are locked in closed position; a collar surrounding the opening in the casing below the outlet valve; a rock shaft mounted below said valve; a cam on said rock shaft for opening the valves, and a lever connected with said rock shaft for actuating the cam.

4. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve in said inlet; a hinged valve in the casing for closing the outlet; a toggle whereby the valves are locked in closed position; and manually operable means for opening the valves.

5. In a flushing valve, a casing having a tubular extension at one side with an inlet and an outlet in its bottom adjacent the extension; a sliding piston valve in said extension; a hinged valve in the casing for closing the outlet; a toggle connection between the valves and casing whereby the valves are locked in closed position; and manually operable means for breaking the toggle to permit the opening of the valves.

6. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve for said inlet; a hinged valve in the casing for closing the outlet; a toggle connection whereby the valves are locked in closed position; a collar surrounding the opening in the casing below the hinged outlet valve; a rock shaft mounted in said collar; a cam

on said rock shaft for opening the outlet valve; and a lever for actuating the rock shaft.

7. In a flushing valve, a casing having a tubular extension at one side with an inlet and an outlet in its bottom adjacent the extension; a sliding piston valve in said extension; a hinged valve in the casing for closing the outlet; a toggle connection between the valves and casing whereby the valves are locked in closed position; a collar surrounding the opening in the casing below the pivoted outlet valve; a rock shaft mounted in the collar below the valve; a cam on said rock shaft for opening the outlet valve; and a lever connected with said rock shaft for actuating the cam.

8. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve for said inlet in said extension; a valve hinged to the casing for closing the outlet; a link pivotally connected to the hinged valve and to the sliding valve, the link valve and pivots thereof forming a toggle whereby the valves are locked when in closed position; and manually operable means for breaking the toggle and opening the valves.

9. In a flushing valve, a casing having a lateral tubular extension in one side with an inlet and an outlet in its bottom adjacent the extension; a sliding piston valve in said extension; a valve hinged to the casing for closing the outlet; a link pivotally connected to the hinged valve and to the sliding valve, the link valve and pivots thereof forming a toggle whereby the valves are locked when in closed position; and manually operable means for breaking the toggle and opening the valves.

10. In a flushing valve, a casing having an inlet and an outlet; a valve closing said inlet; a valve closing the outlet; a toggle connection whereby the valves are locked in closed position; and manually operable means for opening the valves; with means for connecting the casing outlet with a water closet bowl; a reservoir connected with the inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe; substantially as described.

11. In a flushing valve, a casing having an inlet and an outlet; a valve closing said inlet; a valve closing the outlet; a toggle connection whereby the valves are locked in closed position; a collar surrounding the opening in the casing below the outlet valve; a cam for opening the valves, and a lever for actuating the cam; with means for connecting the casing outlet with a water closet bowl; a closed reservoir connected with the inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe; substantially as described.

12. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve in said inlet; a hinged valve in the casing for closing the outlet; a toggle whereby the valves are locked in closed position; and manually operable means for opening the valves; with a connection between the outlet in the casing and a water closet bowl or the like; a closed reservoir connected with the inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe for the reservoir.

13. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve for said inlet; a hinged valve in the casing for closing the outlet; a toggle connection whereby the valves are locked in closed position; a collar surrounding the opening in the casing below the hinged outlet valve; a rock shaft mounted in said collar; a cam on said rock shaft for opening the outlet valve; and a lever for actuating the rock shaft; with a connection between the outlet in the casing and a water closet bowl or the like; a closed reservoir connected with the inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe for the reservoir.

14. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve for said inlet in said extension; a valve hinged to the casing for closing the outlet; a link pivotally connected to the hinged valve and to the sliding valve, the link valve and pivots thereof forming a toggle whereby the valves are locked when in closed position; and manually operable means for breaking the toggle and opening the valves; with a connection between the outlet in the bottom of the casing and a water closet bowl or the like; a closed reservoir connected with the extension inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe for the reservoir.

15. In a flushing valve, a casing having an inlet and an outlet; a sliding piston valve for said inlet; a valve hinged to the casing for closing the outlet; a link pivotally connected to the hinged valve and to the sliding valve, the valves, link and pivots thereof, forming a toggle whereby the valves are locked when in closed position; a collar surrounding the opening in the casing below the hinged valve; a cam for opening the valve; and a lever for actuating the cam; with a connection between the outlet in the bottom of the casing and a water closet bowl or the like; a closed reservoir connected with the inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe for the reservoir.

16. In a flushing valve, a casing having a lateral tubular extension in one side with an inlet and an outlet in its bottom adjacent the extension; a sliding piston valve for said inlet in said extension; a valve hinged to the casing for closing the outlet; a link pivotally connected to the hinged valve and to the sliding valve, the valves, link and pivots thereof forming a toggle whereby the valves are locked when in closed position; a collar surrounding the opening in the casing below the pivoted valve; a rock shaft mounted below the valve; a cam on said rock shaft for opening the valve; and a lever connected with said rock shaft for actuating the cam; with a connection between the outlet in the bottom of the casing and a water closet bowl or the like; a closed reservoir connected with the extension inlet adapted to supply a volume of water under pressure to the casing when the valves are opened; and a water supply pipe for the reservoir.

In testimony that I claim the foregoing as my own I affix my signature.

WILLIAM FRANKLIN KNELL.