

G. W. COLLIN.
FLUSHING VALVE.
APPLICATION FILED AUG. 17, 1907.

1,027,818.

Patented May 28, 1912.

2 SHEETS—SHEET 1.

FIG. 1

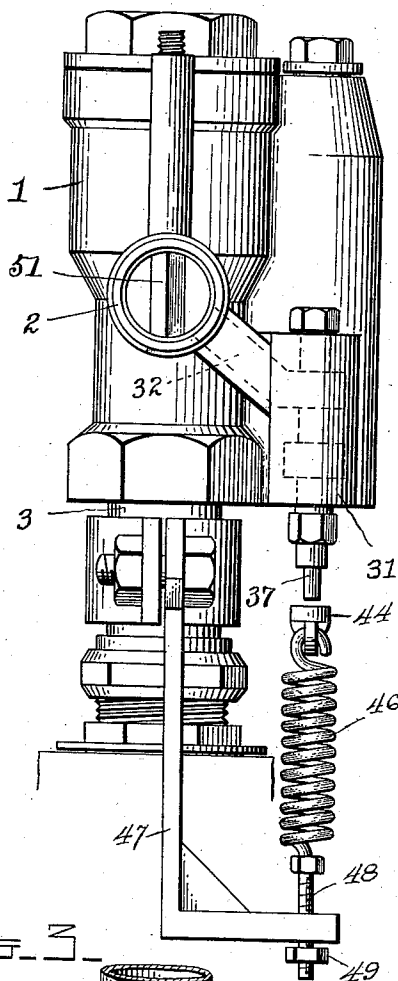
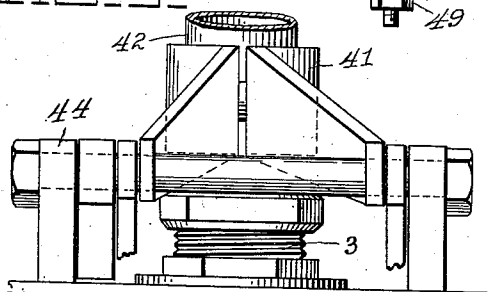


FIG. 3



Witnesses

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FIG. 5

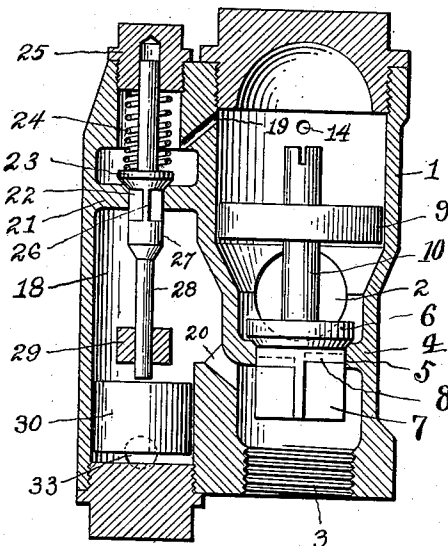
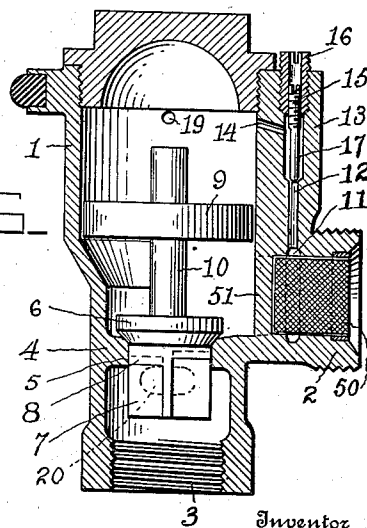


FIG. 6



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2 SHEETS—SHEET 2.

FIG. 2

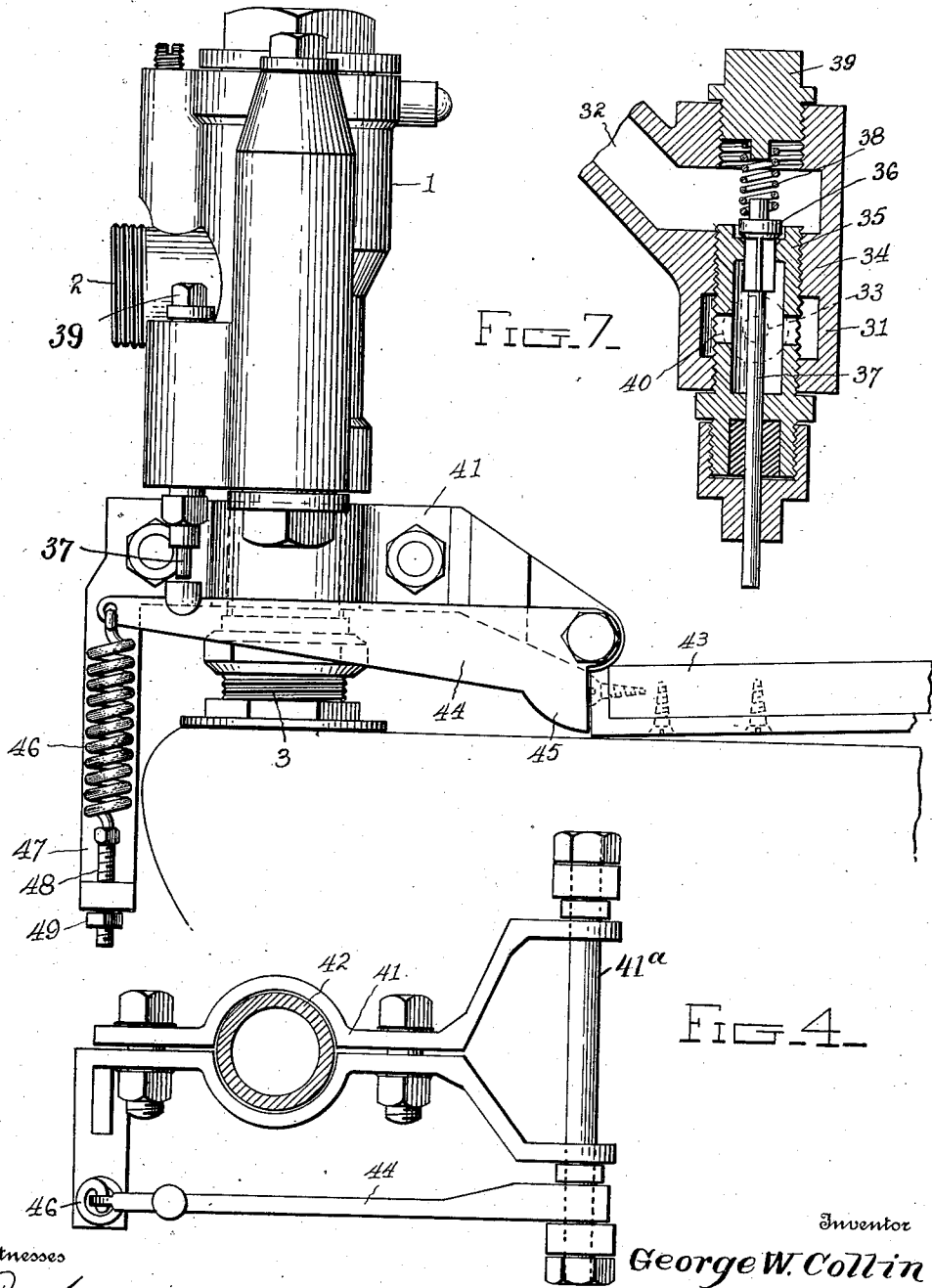


FIG. 7

FIG. 4

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE W. COLLIN, OF MANSFIELD, OHIO, ASSIGNOR TO THE COLLIN VALVE COMPANY,
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FLUSHING-VALVE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE W. COLLIN, a citizen of the United States, and resident of Mansfield, in the county of Richmond and State of Ohio, have invented certain new and useful Improvements in Flushing-Valves, of which the following is a specification.

This invention has relation to automatic flushing valves, and it consists in the novel construction and arrangement of its parts as hereinafter shown and described.

The object of the invention is to provide a valve of the character indicated which consists of a trinity of valves arranged to operate automatically to accomplish a flushing operation. Of the said valves the primary valve is of the piston type and is pressure operated; the secondary or intermediate valve is of the check valve type and is pressure operated, and the third valve is lever operated while the casings of all of the valves are connected with each other by suitable ducts, whereby the automatic operation is accomplished when the lever is moved. A seat is operatively connected with the said lever for moving the same. The casing of the valve proper is provided with a water inlet and water outlet and means is provided for regulating the quantity of flow during the flush. The seat is mounted upon a bracket of a special construction, which is connected with the pipe leading to the water outlet and the said lever is fulcrumed to the said bracket.

In the accompanying drawings,—Figure 1, is a rear view of the valve. Fig. 2, is a side elevation of the same. Fig. 3, is a front elevation of the bracket with the seat removed. Fig. 4, is a top plan view of the bracket. Fig. 5, is a vertical sectional view of the valve. Fig. 6, is a vertical sectional view of the valve cut at a right angle to the view shown in Fig. 5, and Fig. 7, is a vertical sectional view of the lever operated valve.

The valve consists of the casing 1 which is provided with a water inlet 2 and an outlet 3. The casing is provided with a partition 4 which in turn is provided with a port 5. The valve 6 is adapted to close the port 5 and is provided with the cruciform depending portions 7 which pass through the port 5. The respective spaces between the members of the portions 7 are provided with the graduations or thickened portions 8, each of which is of a distinctive thickness and

which constitutes a means causing the valve 6 to close gently against its seat without causing water hammer. The piston 9 is attached to the valve stem 10 and operates above the inlet 2 and within the upper cylindrical portion of the casing 1. The interior of the inlet 2 is provided with an annular groove 11 which is connected by means of a relatively minute duct 12 with the interior of the regulator chamber 13. The duct 14 also connects the interior of the said chamber with the casing 1 above the piston 9. The regulator comprises a screw 15 located in the bushing 16, and the said screw is provided with a depending stem 17 which operates over the upper end of the duct 12. By adjusting the screw 15 in the bushing 16, the stem 17, thereof may be moved toward or away from the end of the duct 12, thus diminishing or increasing the area of exit from the said duct. The intermediate chamber 18 is located adjacent the casing 1, and the upper portion of the said chamber is connected with the upper portion of the casing 1 by means of a duct 19. The lower portion of the intermediate chamber 18 is connected by means of a duct 20 with the water outlet 3. The chamber 18 is provided with a partition 21, which in turn is provided with a port 22. The valve 23 normally closes the port 22, and the coiled spring 24 surrounds the upper portion of the stem of the said valve and is interposed between the valve and the top of the chamber 18, which top may be in the form of a removable cap 25, as shown in Fig. 5.

The valve 23 is provided with the reduced portion 26, which passes through the partition 21 and merges into the portion 27 which is of the same transverse dimensions as the transverse dimensions of the port 22, the parts 23 and 27 forming a double valve which operates successively to open and close the port. The lower portion 28 of the stem of the valve 23 passes through the guide 29. The piston 30 is located in the lower cylindrical portion of the intermediate chamber 18 immediately below the lower end of the portion 28 of the valve stem. The valve chamber 31 is located adjacent the casing 1 and the chamber 18 and is connected with the groove 11 of the inlet 2 by means of a duct 32. The duct 33 connects the lower portion of the chamber 31 with the chamber 18 at a point below the piston 30. The

chamber 31 is provided with a partition 34 through which passes a bushing 35. The valve 36 normally seats against the upper end of the bushing 35 and the stem 37 of the said valve passes down through the bushing 35 and projects beyond the lower end of the chamber 31. The coiled spring 38 is interposed between the top of the chamber 31, which may be in the form of a removable cap 39, and the valve 36, and is under tension to hold the said valve closed against its seat while the water pressure is exerted on the upper side of the said valve. The bushing 35 is provided with the openings 40, which establish communication between the ducts 32 and 33 when the valve 36 is open.

The bracket 41 is composed of binate members which clamp about the water supply pipe 42 to bowl, and the seat 43 is pivoted to the rod 41^a in bracket 41. The lever 44 is fulcrumed to the rod 41^a and is provided with a lug 45 which is located adjacent the rear edge of the seat 43. The lever 44 extends under the lower end of the valve stem 37, and the free end of the lever 44 is connected by means of a spring 46 with the depending portion 47 of one of the members of the bracket 41. The lower end of the spring 46 is connected with the screw 48 which passes through a perforation provided in the depending portion 47 and is provided with a nut 49 by means of which the tension of the spring 46 may be increased or diminished as desired. The tension of the spring 46 is such as to hold the free end of the lever 44 away from the valve stem 37 and against the rear edge of the seat 43, whereby the said seat is normally held at a slight incline.

The operation of the valve is as follows: When weight is applied to the seat 43 the same is swung down on its pivot, and through the abutting lug 45 the lever 44 is swung upon its fulcrum against the tension of the spring 46 and free end thereof is elevated which carries up with it the valve stem 37 thus the valve 36 is lifted from its seat and communication is established between the ducts 32 and 33, thus the water pressure from the supply is directed against the bottom of the piston 30 and the said piston is elevated, striking the stem 28 and lifting the valve 23 quickly from its seat and immediately raising the portion 27 sufficiently to close the port 22, the latter being thereby opened and closed so quickly that no appreciable water can escape from above the valve 23. The parts thus remain set, in this position until the stem 37 is released as by the raising of the seat whereupon a cycle of operations takes place to perform a flushing operation as follows:—The piston 30 fitting loosely in the chamber 18 permits the water thereunder to escape and with the

gradual lowering of the piston 30 the stem 28 and its valve 23, the pressure escapes from above the main piston through the ducts 19 and 20 and reduced portion of valve 23 in a way to permit the main piston to lift and open the main valve thus allowing the water supply to directly pass through the valve in such quantities as desired, the same being determined by the adjustment of the screw controlled stem 17 regulating the duct 12, as before mentioned.

It is to be understood that the farther open the stem 17 is set the quicker the pressure above the piston 9 is again established and consequently the quicker the main valve closes and the less water is used in flushing. Therefore the regulator can readily be set to permit the flow of any desired amount of water for the flushing of a bowl and an equal amount with each operation.

At the completion of the operation of flushing, the graduated thickened portion 8 causes the valve 6 to assume its seat gently without shutting off suddenly and causing water hammer in the pipe.

The foraminous cylinder 50 is inserted in the inlet 2 and prevents foreign matter from entering the minute duct 12 and obstructing the operation of the smaller valve. The water inlet 2 is also provided with a deflector 51 which is triangular in cross section and which extends parallel with the valve stem 10. Said deflector is located in alinement with the line of pressure and the said valve stem and prevents the pressure from exerting force directly against the said valve stem in a lateral direction thus preventing binding of the parts.

The construction of the valve is such that it will supply at each cycle of operations a definite amount of water according to adjustment, which makes it applicable for use in connection with cement, grout and concrete mixtures or in fact in any such apparatus requiring charges of specified amounts of water.

The valve above described is devoid of packing or similar material and its trinity of members have a mutuality of action which establishes a strictly automatic action throughout. It will be obvious that the novelty of the invention resides in the special construction and arrangement of the flusher which is shown connected to be operated by a seat attachment but that other means of lifting the stem 37 of the valve 36 may be used as for instance an ordinary hand lever instead of the lever 44.

What is claimed is:—

1. In a valve such as described, a trinity of valves proper operatively connected together two of which are pressure operated while the third is adapted to be positively moved, a detached piston for operating one of the pressure operated valves by striking

the stem thereof to lift and open the same by water passing the positively operated valve.

2. A flushing valve comprising a casing having an inlet and outlet, a valve located in the casing between the inlet and outlet, an intermediate valve chamber within the casing and communicating with the outlet, a double valve located in said intermediate chamber, a piston also located in the said intermediate chamber and under the double valve and disconnected therefrom and adapted alternately to open the double valve and to permit it to close, and means for admitting water from the inlet into the intermediate chamber under the piston.

3. In a flushing valve such as described, a trinity of valves proper operatively connected together, two of which are pressure operated, while the third is adapted to be positively moved, a disconnected piston for operating one of the pressure operated valves and adapted to be lifted by water passing the positively operated valve, and a regulator for determining the rate of flow of water to be fed to the other pressure operated valve.

4. A flushing valve comprising a casing having an inlet and outlet and provided with a chamber above the inlet, a primary valve located in the casing between the inlet and outlet, a piston connected with the primary valve and operating in said chamber in the casing between the inlet and the outlet, a second valve chamber in the casing between the inlet and the outlet, a pressure-operated double-valve located in said second chamber adapted to allow a limited amount of water to flow therepast for each operation to thereby alternately open and close the primary valve, means for operating said double valve, a third chamber connected with the inlet and with the first said chamber, and a valve in said third chamber adapted to control said means.

5. A flushing valve comprising a casing having an inlet and outlet, a primary valve having a connected piston located in the casing between the inlet and outlet, a duct leading from the inlet to the piston chamber, an adjusting device for said duct to determine the rate of flow of water to be passed there-through, an annular screen within the inlet to cover the duct, a double valve for controlling the aforesaid main valve, a detached piston adapted to be operated by the water pressure to open the said double valve and to permit the same to close.

6. A flushing valve comprising a casing having an inlet and outlet, a primary valve having a connected piston located in the casing between the inlet and outlet, a duct leading from the inlet to the piston chamber, an adjusting device for said duct to determine the rate of flow of water to be passed there-

through, an annular screen within the inlet to cover the duct, an intermediate valve chamber within the casing, a double valve located in said intermediate chamber, a detached water controlled piston beneath said last named valve to operate the same, and a valve for admitting water from the inlet to said detached piston chamber.

7. A flushing valve, comprising a casing having an inlet and an outlet, a piston chamber, a valve located in the casing between the inlet and the outlet and provided with a connected piston mounted in the chamber above the inlet, an intermediate valve chamber within the casing and communicating with the outlet, a pressure actuated valve located in the intermediate chamber to relieve the chamber above the piston, a disconnected pressure operated means beneath the last named valve to strike and operate the same and means for admitting water from the inlet to the pressure operated means.

8. A flushing valve, comprising a casing having an inlet and outlet, a main valve having a connected piston located in the casing between the inlet and outlet, a duct leading from the inlet to the piston chamber, a second valve for releasing the pressure in said piston chamber above the piston of the main valve, a detached piston adapted to be lifted by water pressure to strike the stem of the said second mentioned valve to open the same, a chamber having a manually operated valve therein and a port leading from the manually operated valve chamber to beneath the detached piston, whereby the same is raised by the opening of the said manually operated valve, and allowed to fall by the release of said last valve.

9. A flushing valve comprising a casing having an inlet and an outlet, a piston and valve located in the casing between the inlet and outlet, a chamber within the casing and communicating with the outlet and containing a valve seat, a second valve located in the said chamber adapted to engage the seat and having an intermediate reduced portion, said second valve controlling the movement of said piston and first named valve, means beneath the said second valve adapted to be elevated by water pressure to quickly raise, open, and close the said valve and to hold the same closed until the pressure beneath the said means is released, and a manually operated valve for admitting water to the chamber beneath said means to elevate the same.

10. In a valve of the class described, the combination of a casing having a water inlet and outlet and an annular recess within the inlet, a main valve in the casing and having a connected piston for operating the same, a by-pass leading from the recess in the inlet to the chamber above the piston, a cylindri-

cal screen within the inlet and covering the recess and entrance to the by-pass, an adjustable plug valve located in said by-pass, a port leading from said upper chamber of the casing to the outlet, a valve located in said port, a manually operated valve controlling the operation of said port valve, and a handle pivoted to the casing and connected with the manually operated valve.

- 10 11. A flushing valve comprising a casing having an inlet and an outlet, a piston and valve located in the casing between the inlet and outlet, a chamber within the casing and communicating with the outlet and containing a valve seat, a second valve located in the said chamber adapted to engage the seat and having an intermediate reduced portion, said second valve controlling the move-

ment of said piston and first-named valve, a detached piston beneath the said second valve adapted to be elevated by water pressure to quickly raise the second valve from its normal position to a second closed position, and to hold the same in its second closed position until the pressure beneath the piston is released, and a manually operated valve for admitting water to the chamber beneath the detached piston to raise the same.

Signed at Mansfield, in the county of Richmond, and State of Ohio this 29th day of July, A. D., 1907.

GEORGE W. COLLIN.

Witnesses:

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P. J. KELLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."