

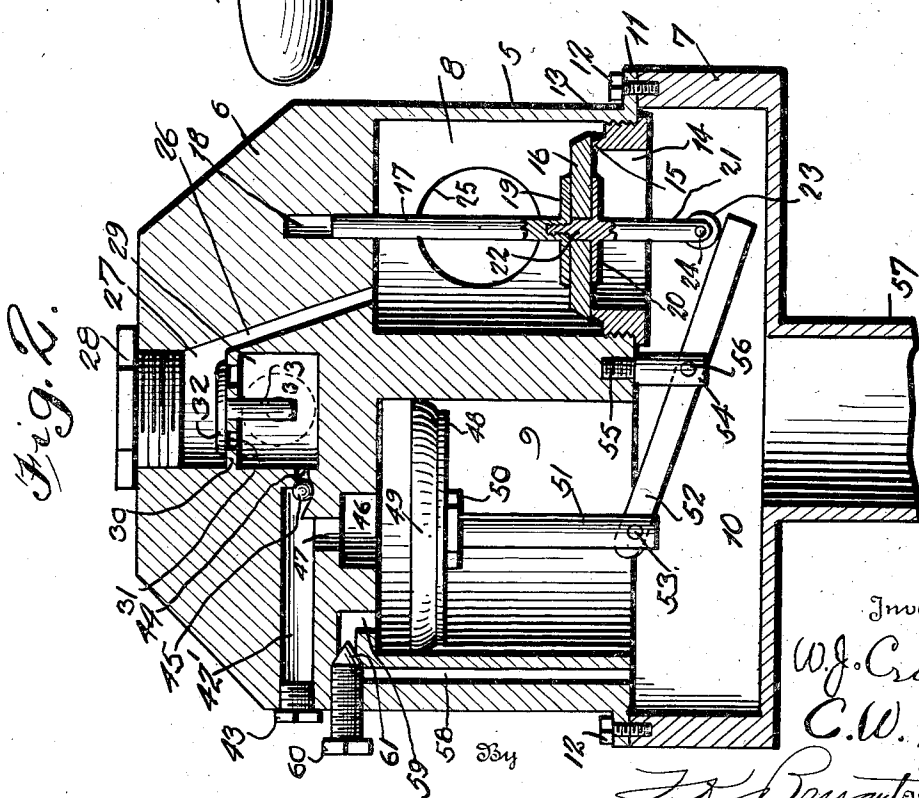
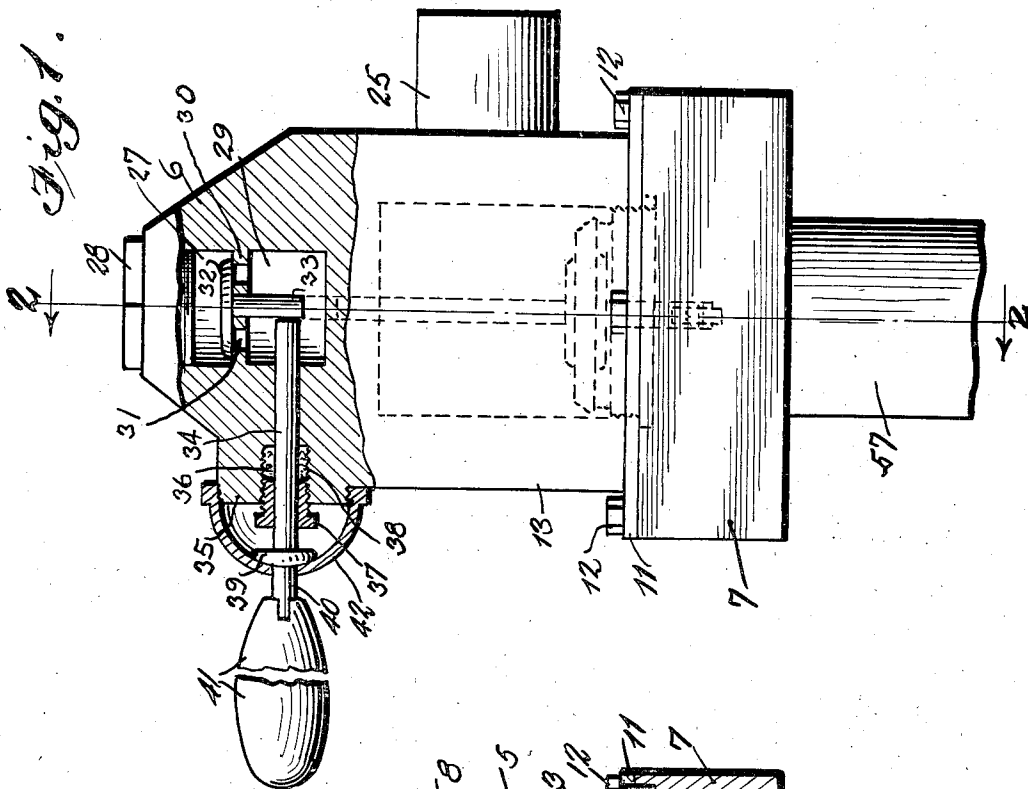
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FLUSH VALVE

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FLUSH VALVE

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1 Claim. (Cl. 137—93)

This invention relates to certain new and useful improvements in flush valves.

The primary object of this invention is to provide a flush valve particularly intended for use in connection with toilet bowls wherein it is desirable of releasing a body of water under full pressure into the bowl after operation of the trip valve.

A further object of this invention is to provide a flush valve comprising separable casing members which may be easily assembled and taken apart for the purpose of making repairs to portions of the valve and also for purposes of cleaning.

A further object of this invention is to provide a valve structure including a casing member having a pair of parallel bores for receiving a valve and piston operator, both of which may be covered by a common base member, held in place by bolts or rivets.

A further object of this invention is to provide a flush valve of the above mentioned character including a manually operated trip valve for allowing water pressure to act on a piston thereby causing the release of the control valve and the resultant flushing of the bowl for a predetermined period of time.

A further object of this invention is to provide a flush valve having means for releasing pressure upon the valve operating piston after expiration of a time limit to effect closing of the main control valve.

A further object of this invention is to provide a piston operated flush valve in which the valve and piston are mounted in separate chambers and are connected together by a rocker arm to cause the piston and valve to reciprocate alternately.

Other objects and advantages of the invention will become apparent during the course of the following description, taken with the drawing, wherein,

Figure 1 is a vertical cross-sectional view of the flush valve embodying this invention illustrating the parallel chambers formed in the main chamber portion and showing the arrangement of the communicating bores for conducting water under pressure to the piston chamber and further illustrating the manual valve for controlling the passage between the parallel chambers;

Figure 2 is a vertical cross-sectional view taken on line 2—2 of Figure 1, looking in the direction of the arrows illustrating the manually operated valve and its operating mechanism and further showing the rocker bar connecting the operating valve with the piston.

In the drawing, wherein for the purpose of illustrating the invention and wherein like reference characters will be employed to designate like parts throughout the same, the reference character 5 will generally be employed to designate a flush valve casing comprising a cylinder block portion 6 with a communicating chamber portion 7.

Formed in the block section 6 are parallel cylinders or bores 8 and 9, the lower ends of which are open and communicate with the casing portion 7 into a chamber 10. The sections 6 and 7 may be connected by means of a flange 11 formed on the section 6 and being bolted to the section 7 by means of a machine screw 12.

The lower end of the valve chamber 8 may be screw threaded as at 13 for receiving a valve seat ring 14 having a valve seat 15 to be engaged by a valve disk 16 carried upon a slide rod 17 having its upper end guided in a bore 18 formed in the upper portion of the chamber block 6. It will be noted that the disk 16 is mounted between flanges 19 and 20 formed on the guide rod 17 and operating rod 21 respectively. A projection 22 extends through a bore formed in the valve 16 and is threaded into an opening formed in the lower end of the guide rod 17. The lower end of the operating rod portion 21 is bifurcated for receiving a roller 23 held in place by a suitable pin or bearing 24.

The casing section 6 is provided with an inlet pipe 25 having communication with the chamber 8 whereby water pressure will seat the valve 16.

Communicating with the valve chamber 8 is a duct 26 which enters a trip valve chamber 27, formed in the upper portion of the casing section 6 and said chamber 27 is formed by boring an opening centrally with respect to the casing. The upper portion of the bore may be closed by a plug 28 having screw threads corresponding with screw threads formed in the bore. The bore 27 is formed adjacent a valve stem chamber 29 and is separated therefrom by means of a partition 30 having a series of openings 31 arranged in circular fashion, adapted to be normally covered by a mushroom valve 32, the stem of which as at 33 passes through an opening formed in the partition 30 and has its lower end extending into the chamber 29. An operating rod 34 projects into the chamber 29 and has its inner end presented to the valve stem 33 so that inward movement of the rod 34 will tilt or unseat the mushroom valve and allow passage of water through the inlet 25 of the chamber 28, duct 26 and valve chamber 29. The operating rod extends through a boss 35

formed on a side wall of the block section 6 and sealed against escape of water by means of a packing gland 36 held in place by a plug 37 screw threadedly mounted in the opening 38. The outer end of the operating rod 34 is adapted to be engaged by a semi-spherical member 39 mounted on the end of a rod 40 having a handle 41 and said rod 40 is loosely mounted in an opening formed in a semi-spherical cap 42 having internal screw threads adapted to be threaded upon the boss 35 upon correspondingly arranged screw threads.

Communicating with the chamber 29 is a bore 42' extending inwardly from the side wall of the casing section 6 adapted to be closed by a screw threaded plug 43. The innermost end of the bore 42' is restricted as at 44 and is provided with a ball valve 45 whereby passage of water from the chamber 29 to the bore 42' will only be allowed. The bore 42 communicates with the piston chamber 9 through an opening 46 having a restricted portion 47 whereby water under pressure may enter the chamber 9 after tripping of the mushroom valve 32.

Reciprocally mounted within the piston cylinder or chamber 9 is a piston 48 having a flexible packing element 49 secured in assembled position by means of a nut 50 upon the piston rod 51. The lower end of the piston rod 51 is bifurcated for receiving one end of a rocker arm 52 as at 53 which rod is fulcrumed upon a stud 54 having one of its ends screw threaded as at 55 to be received in the block section 6, while the opposite end of the stud 54 is bifurcated for the passage of the rocker arm 52 which is held in place with respect to the stud 54 by means of a pin 56. The opposite end of the rocker arm 52 may be engaged by the roller 23 carried by the lower end of the valve rod 21. It will thus be seen that downward movement of the piston 48 will effect the raising or unseating of the valve 16 after operation of the mushroom valve 32 thereby causing water to flow from the chamber 8 through the chamber 10 and out of the opening or outlet 57 formed in the chamber section 7, while outlet 57 may lead to the toilet bowl for flushing purposes.

Upon closing of the mushroom valve 32 after release of the handle 41 water pressure will be cut off from the piston chamber 9 with its resultant action upon the piston 48. This operation will cause the seating of the valve 16 along with the

raising of the piston 48 in a slow and even fashion by reason of the vent duct 58 which communicates with the upper portion of the piston chamber 9 through an angular by-pass 59 while the opposite end of the duct 58 communicates with the chamber 10 on the underside of the piston 48.

For the purpose of preventing the valve 16 from being closed too suddenly, a screw threaded needle valve 60 is mounted in the casing and has its pointed end 61 presented to the angular by-path 59 so that water escaping from the chamber 9 will be retarded by reason of the restricted passage connecting the by-pass 59 and the duct 58.

When it is desired to clean portions of the valve structure within the casing section 6, the bolts 12 may be removed and the casing 6 lifted off of the section 7 after the water connection with the inlet 25 has been disconnected, thereby allowing free access to the interior of the valve structure and its valve part thereby making it easier for the part of the valve to be cleaned, repaired and replaced.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the invention and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

We claim:—

A flush valve comprising a casing having separable upper and lower sections and flush valve mechanism carried by the upper section to permit access thereto when the two sections are separated, said flush valve mechanism including a pair of parallel chambers formed in the upper section, a valve located in one of the chambers, a piston mounted in the other chamber, a rocker arm connecting the valve and piston and extending across the lower ends of the two chambers, a manually operable valve interposed between the upper ends of the two chambers, and including a stem, a hand operated plunger laterally engaged with the stem for unseating the valve, a duct at each side of the valve respectively leading to the chambers, a check valve in the duct leading to the piston chamber, a vent extending from the upper end of the piston chamber to the lower section of the casing and means for varying the area of the vent.

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