S. C. LAIDLEY.

FLUSHING VALVE.

APPLICATION FILED APR. 4, 1911.

1,042,568.

Patented Oct. 29, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

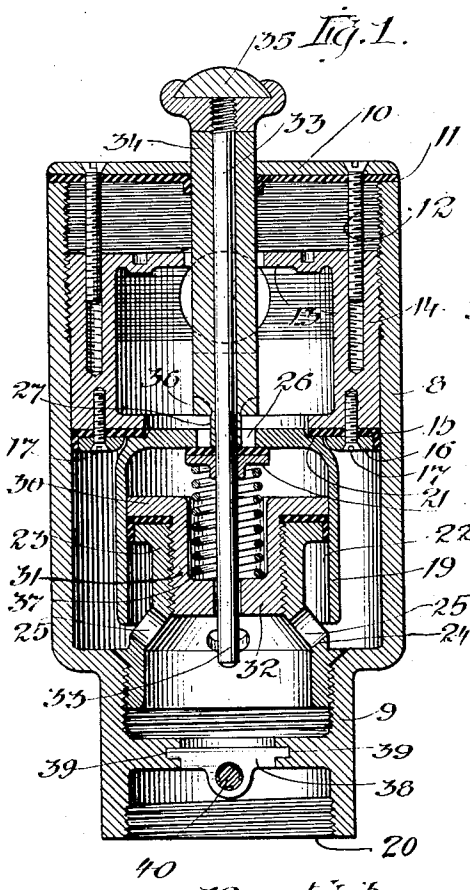


Fig. 2.

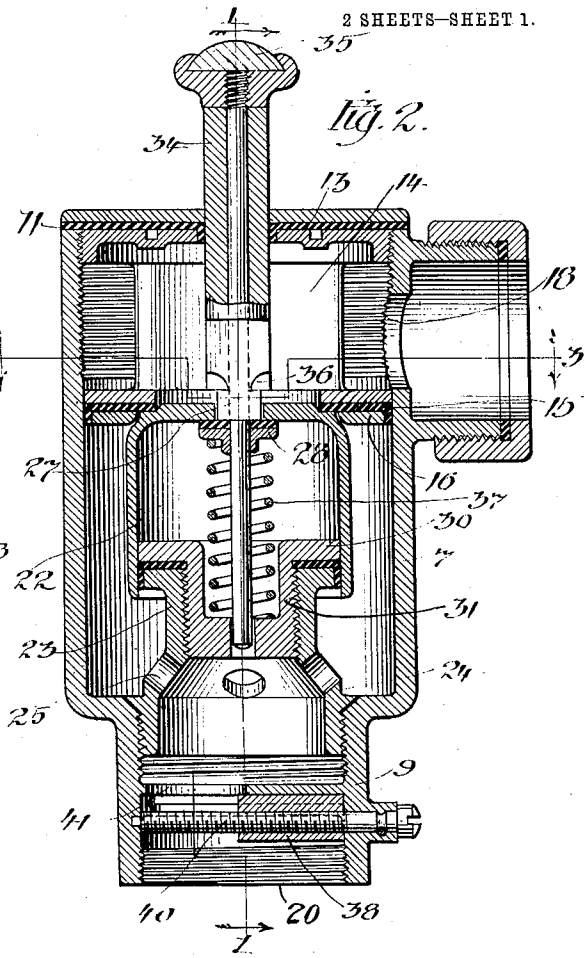


Fig. 3.

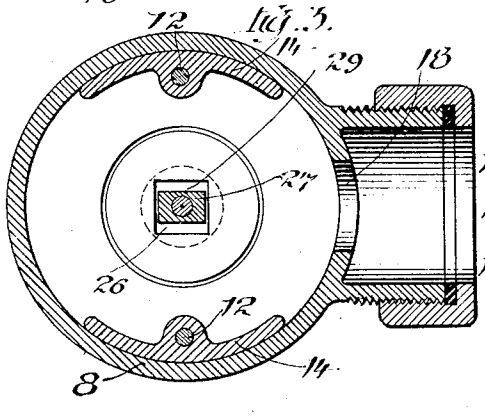
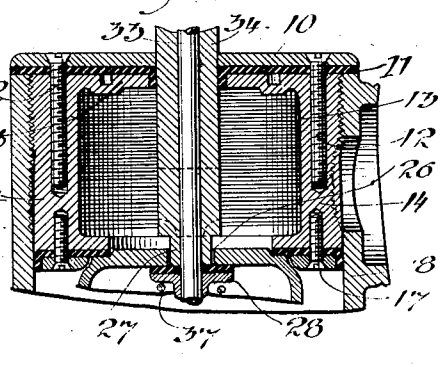


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 6.

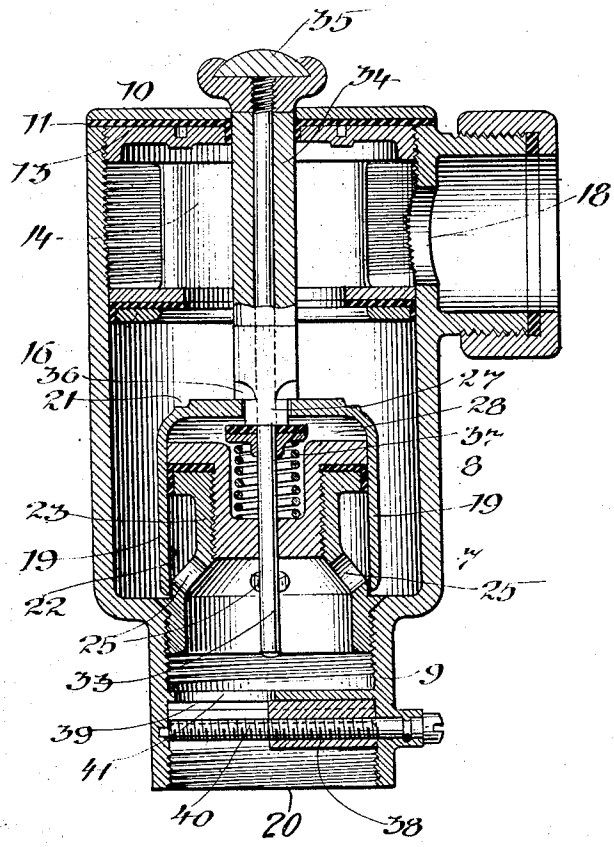
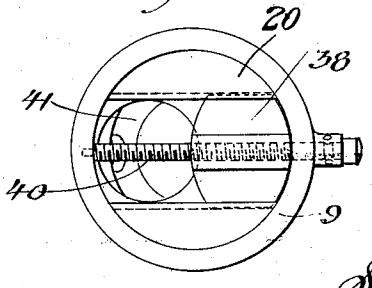


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FLUSHING-VALVE.

1,042,568. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed April 4, 1911. Serial No. 618,851.

To all whom it may concern:

Be it known that I, SAMUEL C. LAIDLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Flushing-Valves, of which the following is a specification.

The present invention relates to a flushing valve of the type usually employed in conjunction with toilet fixtures.

The primary object of the present invention is to produce a device which is cheap and simple of manufacture, which will contain but few parts, and which will be compact in size and of a strong and durable construction.

Further objects of the invention are, to provide means for varying the amount of movement of the main controlling valve, so as to permit a relatively long or short duration of flushing; to provide means for adjusting the flow of liquid through the outlet passage so as to permit of the flow being entirely cut off if necessary; and to provide means for adjusting the flow of water through the inlet passage so as to permit of the cutting off of the flow of water through said passage in order to repair or adjust the operating portions of the valve.

The invention further consists in the features of construction and the combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal sectional view of the valve of the present invention; Fig. 2 is a view similar to Fig. 1, showing the parts adjusted to permit of an increased movement of the main controlling valve; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a detail showing the controlling member for the outlet port when it is in position to close said port; Fig. 5 is a detail showing the mechanism for closing the inlet port; and Fig. 6 is a view similar to Fig. 2, showing the main controlling valve in unseated position.

The device as shown in the drawings is inclosed within a casing 7, consisting of an upper enlarged portion 8, which terminates in a lower reduced portion 9, the upper end of the casing being closed by a cap or cover 10. Interposed between the cap or cover and the upper edge of the casing is a packing member 11, and extending through said cap or cover are a series of locking members 12, which engage with a member 13 that is mounted to revolve within the casing, and which has its side walls cut away at intervals, as shown more clearly in Fig. 3, to provide cut-off members 14 for the water outlet passage. Secured to the lower end of the member 13 is a cup washer or other suitable packing 15, held in place by a ring 16 which is locked in position by suitable locking members 17. The member 13, as shown, is screw-threaded into the interior of the enlarged portion 8 of the casing, and is capable of being raised and lowered therein. The purpose of this raising and lowering will be more fully hereinafter stated.

In addition to the up and down adjustment, the cup-shaped member may be turned within the casing so as to bring the cut-off members 14 to the desired position with respect to the outlet passage. When they are in the position shown in Fig. 3, the outlet passage 18 is entirely unimpeded and a free flow of water from the casing through the outlet passage is permitted. If, however, the members are turned so as to lie in a position at right angles to the position in which they are shown in Fig. 3, one of the cut-off members 14 will be positioned across the outlet passage 18, and in this position it will cut off the flow of liquid from the casing through the outlet passage. This complete cutting off of the flow of water through the outlet is to permit of the removal of the fixture for the purpose of repair, substitution, etc., without the danger of leakage of water ensuing by reason of the disconnecting of the fixture from the outlet conduit of the flushing valve. By manipulating the member 13 so that the cut-off members 14 assume positions intermediate the two extreme positions formerly described, said cut-off members may assume a position so that the outlet passage will be more or less restricted and the flow of water out from the casing into the fixture more or less voluminous.

The cup washer 15 and the ring 16 serve as a seat for a hollow valve member 19, which in the form shown is of cup-shaped formation, this valve member 19 being the main controlling valve between the outlet passage 18 and the inlet passage 20. The valve member 19 is formed, on its upper portion, with a seating face 21, and is provided with unbroken side surfaces 22, which engage, with a sliding fit, the side faces of a head 23, from which depends a sloping wall 24 secured to the body of the casing

to hold the head in position. The wall 24, as shown, is provided with openings 25, which permit a flow of water from the inlet passage to the interior of the valve casing. The upper face of the valve member 19 is provided with an opening 26, through which enters a reduced lower end 27 of a sleeve 34. As shown, the opening 26 is approximately square in cross section, and the reduced end 27 rectangular in cross section, so as to provide openings 29, as shown in Fig. 3, for the passage of fluid from the interior of the valve member 19 into the valve casing, although, obviously, this arrangement may be changed as to the configuration of the parts, so as to otherwise provide this excess space without changing the principle of operation of the invention.

The head 23 is formed with an upper flange 30 and with a chamber 31. Through the bottom wall 32 of the head 23 passes a stem 33. Connected to the sleeve 34 and secured to the upper end of the stem is a handle 35, and the sleeve 34 is cut away just above the reduced lower end 27 to form recesses 36, which overlie the openings 29 and form means to permit the escape of fluid through the openings 26 when the valve 28 is unseated.

Interposed between the valve member 28 and the lower wall 32 of the chamber 30 is a spring 37, which tends to maintain the valve 28 normally seated and to return said valve to seated position. Located, in the neck 9 is a sliding plate-like member 38, best shown in Fig. 5, which travels in guideways 39 and is moved rectilinearly through the manipulation of a fixed screw-threaded stem 40. By moving this plate backward and forward within the inlet passage, the port 41 of the inlet passage can be regulated so as to permit a large or small amount of water to enter the casing through said passage. Said plate can be moved so as to entirely cut off the flow of water through the inlet passage, to permit of the adjustment or repair of the operative portions of the valve, which would be impossible while water was constantly entering the valve.

The operation is as follows: The flushing operation is performed by depressing the sleeve 34 by means of pressure exerted upon the handle 35. The initial depression of the handle causes the reduced lower end 27 of the sleeve 34, by its engagement with the valve 28, to move said valve into open position. This establishes communication between the interior of the valve casing and the outlet, the fluid passing through the opening 26 and the recesses 36.

A further depression of the operating member lowers the member 19 into a position similar to that shown in Fig. 6, and unseats the valve, permitting a flow of water from the inlet passage to the outlet passage, and allowing the flushing operation to be performed.

Immediately upon the releasing of the handle 35, the spring 37 will act to return the valve 28 to its normal position, thus cutting off communication between the interior of the cup-shaped member and the valve casing. If under these conditions a return of the valve to normal position were attempted, it could not be effected, because of the fact that a certain suction would be created, which would have to be broken in order to permit of the return movement of the cup-shaped member.

The stem 33 is entered into the wall 32 with a sliding fit, so that a restricted passage for water between the stem 33 and the walls of the opening in the lower face 32 is effected. The water thus entering will pass through the space between the stem and the wall of the opening with a relatively slow movement because of the restriction. As fast as the water enters the interior of the cup-shaped member, it serves to break the suction within the cup-shaped member and permits this latter member to slowly return to normal position. The return movement cannot progress, however, any faster than the water enters through the opening around the stem 33, and, since this is a relatively restricted opening, the return movement will necessarily be slow, so that the valve will remain in open position a relatively long period of time and permit the flow of liquid from the inlet to the outlet passage for a similar period of time. The tension member 37 will assist in this returning operation, due to the following conditions: The force of the entering water would not be sufficient to effect the returning movement by itself, but if assisted to a greater or less degree by this tension member, the two forces combined, namely, that of the entering water, and that of the tension member, would be sufficient to effect the returning movement, but the force of neither one by itself would be sufficient.

Obviously, the greater the distance the main controlling valve 19 has to travel, the longer will be the communication established between the inlet and outlet ports, and the longer the flushing operation will continue. By raising and lowering the member 13, the cup-shaped member can be brought to an initially higher or lower position within the valve casing, and hence will have to travel a greater or less distance in returning from its farthest depressed position to its seated position. It is, of course, understood that it reaches the same point in the valve casing when it is depressed to its farthest extent, no matter at what point in the valve casing it may normally seat. This will be readily understood by referring to Figs. 1 and 2, in Fig. 1 of which the parts

are so arranged as to give the valve member a relatively short movement, while in Fig. 2 the parts are arranged to give it a relatively long movement. It is, of course, understood that the head 23 is fixed at all times and does not vary its position with the adjustment of the main controlling valve 19. It is the presence of this fixed head, located in the interior of the hollow valve member, which enables the suctional force to be created that acts as a retarder to prevent the quick return of the valve member to normal position.

It will be noted that the stem 33, which forms a restriction for the entrance of the fluid into the interior of the main controlling valve, operates in a manner so that it is continually cleansed during operation, thus preventing the gathering of sediment, which would tend to check its movements and interfere with the proper operation of the valve. This point of cleansing the operating parts of the valve applies equally well to the parts other than the stem, and, in fact, the valve is so arranged that there is a passage of water at each operation, which tends to remove any dirt or sediment which may enter, and thus keep the operative parts in the most desirable condition for satisfactory operation.

I claim:

1. In a flushing valve, the combination of a main casing, an inlet passage and an outlet passage communicating therewith, valvular means for controlling the communication between the inlet and outlet passages, including a sliding valve, means for actuating said valve, a circular box-like member adjustably mounted in the interior of the casing and interposed between the inlet and outlet passages, said box-like member having an opening in its bottom wall kept normally closed by said valve, said opening forming the communicating passage between the inlet and outlet ports, the location of the box-like member determining the degree of movement of the valve, the side walls of the box being cut away to provide a plate-like member adapted to overlie and govern the size of the outlet passage, said governing member being moved to different positions by an adjusting movement of the box-like member, substantially as described.

2. In a flushing valve, the combination of a main casing, an inlet passage and an outlet passage communicating therewith, valvular means for controlling the communication between the inlet and outlet passages, including a sliding valve, means for actuating said valve, a circular box-like member adjustably mounted in the interior of the casing and interposed between the inlet and outlet passages, said box-like member having an opening in its bottom wall kept normally closed by said valve, said opening forming the communicating passage between the inlet and outlet ports, the location of the box-like member determining the degree of movement of the valve, the side walls of the box being cut away to provide a plate-like member adapted to overlie and govern the size of the outlet passage, said governing member being moved to different positions by an adjusting movement of the box-like member, and means for locking the said box-like member against movement within the casing, substantially as described.

3. In a flushing valve, the combination of a main casing, an inlet passage and an outlet passage communicating therewith, valvular means for controlling the communication between the inlet and outlet passages, including a sliding valve, means for actuating said valve, a circular box-like member adjustably mounted in the interior of the casing and interposed between the inlet and outlet passages, said box-like member having an opening in its bottom wall kept normally closed by said valve, said opening forming the communicating passage between the inlet and outlet ports, the location of the box-like member determining the degree of movement of the valve, the side walls of the box being cut away to provide a plate-like member adapted to overlie and govern the size of the outlet passage, said governing member being moved to different positions by an adjusting movement of the box-like member, a cap for the casing, and locking members depending from the cap and engaging with the box-like member to prevent movement thereof, substantially as described.

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Witnesses:
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C. F. NEWTON.