

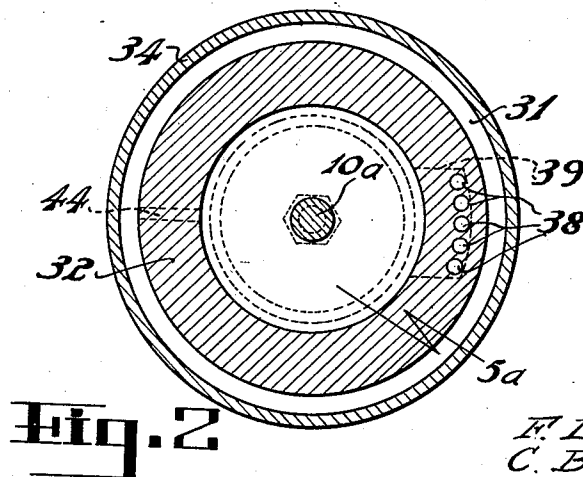
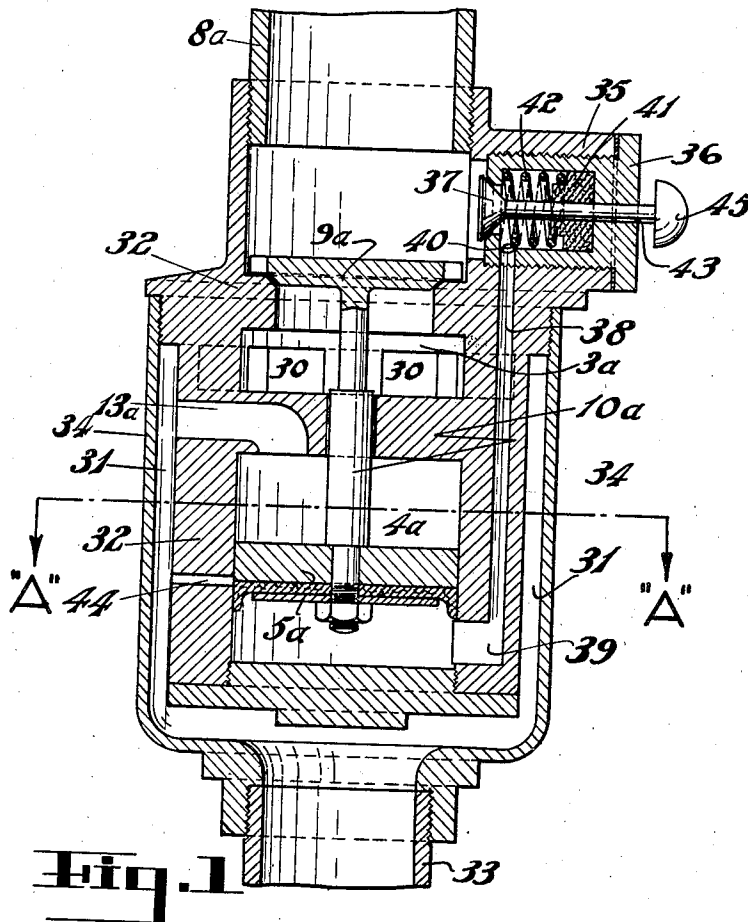
June 18, 1940.

F. L. DREYER ET AL

2,205,033

FLUSHING VALVE FOR URINALS, WATER CLOSETS, AND THE LIKE

Original Filed June 15, 1937



Inventors,
F. L. Dreyer &
C. Bromley

by Glascock Downing & Seebold
Attys.

UNITED STATES PATENT OFFICE

2,205,033

FLUSHING VALVE FOR URINALS, WATER CLOSETS, AND THE LIKE

Francis Louis Dreyer, Pretoria, Transvaal, and
Colin Bromley, Bloemfontein, Orange Free
State, Union of South Africa; said Bromley as-
signor to said Dreyer

Original application June 15, 1937, Serial No.
148,362, now Patent No. 2,177,099, dated
October 24, 1939. Divided and this application
March 8, 1939, Serial No. 260,652. In the Union
of South Africa June 22, 1936

5 Claims. (Cl. 137—93)

This invention is composed of subject matter divided out of our co-pending United States of America application having the Serial Number 148,362, and the filing date of June 15, 1937, and now Patent No. 2,177,099, granted October 24, 1939, and relates to an improved flushing valve for use in connection with urinals, water closets, and the like, which eliminates the usual elevated cistern and its attendant disadvantages. The improved device, which is adapted for direct connection to the water supply main irrespective of the pressure therein, is simple and robust in construction, and, since it has the minimum number of moving parts it consequently needs little or no attention over long periods of service.

The improved device comprises in known manner a control valve permitting the supply of water at will from the main supply to a cylinder containing a piston, whose rod carries a main valve controlling the admission of water from the main supply to the flush pipe, there being a leakage path, which when the control valve is released permits the gradual escape of water from beneath the piston and thereby determines the flushing period before the main valve closes.

According to the present invention the improved flushing valve comprises a cylinder divided by a partition into upper and lower chambers, an outer concentric casing adapted to be connected at its lower end to the flush pipe and surrounding said cylinder to form an annular space therebetween, radial ports providing communication between the upper cylinder chamber and said annular space, a piston moving in the lower cylinder chamber, a main valve carried by the piston rod and controlling the supply of water from the main supply into the upper cylinder chamber, means hydraulically connecting the lower cylinder chamber below the piston with the main supply through a flush control valve, an air escape passage between the lower cylinder space above the piston and the said annular space, and a relief passage independent of the flush control valve connecting the lower cylinder space below the piston with said annular space adapted to permit the slow escape of water from beneath the piston. Preferably the cylinder is extended above the level of the main valve, for connection to the main supply pipe, and the flush control valve is fitted as a self contained unit into a lateral bore in said extension which bore is connected by one or more passages in the wall of the cylinder with the interior of the lower chamber of the cylinder below the piston.

According to further features of the invention

the air escape passage for the lower cylinder space above the piston passes through the partition to the annular space, and said air escape passage is adapted to be closed by the piston when the latter is in its highest position. Preferably also the relief passage which provides communication between the lower cylinder below the piston and the annular space, passes through the cylinder wall in such a position that it is closed by the piston before this reaches its lowermost position.

The invention is distinguished from a somewhat similar prior construction in several important respects, notably by the upper cylinder chamber communicating by radial ports with the surrounding annular space connected to the flush pipe, and by the relief passage for the lower cylinder space being independent of the flush control valve, as well as by other minor constructional features forming the subject matter of subsidiary claims.

To enable the invention to be more clearly understood and carried into practice, reference is now made to the accompanying drawing in which like reference numerals denote like parts.

Figure 1 is a vertical section through a flushing valve particularly suitable for a water closet, and

Figure 2 is a sectional plan taken on line A—A of Figure 1.

The main valve 9a controlling admission of water from the supply main 8a to the upper cylinder chamber 3a is connected to a piston 5a in the lower cylinder chamber 4a by the rod 10a. The upper and lower cylinder chambers 3a and 4a are divided off by a partition, and the upper chamber 3a is connected by radially disposed ports 30 with an annular flush passage 31 surrounding the valve body 32 and leading to the usual flush pipe 33. It will be observed that this annular flush passage 31 is formed by an outer cylindrical casing 34 which is screwed onto the top end of the valve body 32. In the portion which divides off the upper and lower cylinder chambers is bored an air escape passage 13a which provides communication between the lower cylinder space above the piston 5a and the annular space 31. The inner end of the passage 13a is closed by the piston 5a when this is in its highest position.

The flush control valve assembly is located in an extension 35 of the body 32 and is self-contained in its own casing 36 which, being in the form of a plug is adapted to be screwed into the extension 35, so that the flush valve 37 is held on to its seating by the full pressure in the

water main 8a. The means of communication between the lower chamber of cylinder 4a and the interior of the flush control valve, consists of one or a plurality of small holes 38 drilled longitudinally through the side wall of the valve body 32, so as to meet a recess 39 in direct communication with the lower cylinder space 4a below the piston 5a. The valve casing 36 is holed or slotted, as at 40, so as to coincide with the top ends of said holes 38 when in position. A packing 41 is held in place by the spring 42 and is for the purpose of preventing leakage past the valve stem 43. A relief orifice or orifices 44 is, or are, provided in the side wall of the valve body casing 32 and leads directly to the flush passage 31. This orifice is so positioned that it is covered by the piston 5a before it reaches the end of its downward travel.

In operation the action of the device is as follows:

On momentary pressing of the button 45 the valve 37 is opened and water under the full pressure in the main 8a flows past said valve down the connecting holes 38 to the underside of the piston 5a. The main valve 9a is thereby opened and flushing commences by way of the radially disposed ports 30, the annular flush passage 31 and the flush pipe 33. The slow escape of the water trapped beneath the piston 5a, by way of the relief orifice 44, determines the speed of travel of the piston 5a and consequently the length of the flushing operation. As the piston 5a approaches the end of its travel it covers the orifice 44 and the rate of downward travel of the valve 9a is accordingly diminished to a speed determined by the slow leakage of the remaining water past the piston 5a. By this arrangement shock and noise, due to rapid seating of the valve 9a, is avoided.

Figure 1 shows the relief orifice 44 covered by the piston 5a and the valve 9a just on the point of seating. Air in the space above the piston 5a has free access to the flush passage 31 by way of the air escape passage 13a.

For practical reasons it may be advisable to provide spring means for returning the flushing control valve 37 to its seating, to make provision for occasions when the water supply is cut off. Such means may conveniently comprise a light coil spring located beneath the knob 45.

What we claim is:

1. An improved flushing valve adapted for direct connection to a supply main, comprising a cylinder divided by a partition into upper and lower chambers, an outer concentric casing adapted to be connected at its lower end to the flush pipe and surrounding said cylinder to form an annular space therebetween, radial ports providing communication between the upper cylinder chamber and said annular space, a piston moving in the lower cylinder chamber, a main valve carried by the piston rod and controlling the supply of water from the main supply into the upper cylinder chamber, means hydraulically connecting the lower cylinder chamber below the piston with main supply through a flush control valve, an air escape passage between the lower cylinder space above the piston and the said annular space, and a relief passage independent of the flush control valve connecting the lower cylinder space below the piston with said annular space adapted to permit the slow escape of water from beneath the piston.

2. A flush control valve according to claim 1, in which the cylinder is extended above the level of the main valve for connection to the main supply pipe, and the flush control valve is fitted as a self-contained unit into a lateral bore in said extension, which bore is connected by one or more passages in the wall of the cylinder with the interior of the lower chamber of the cylinder below the piston.

3. A flush control valve according to claim 1, in which the air escape passage from the lower cylinder space above the piston passes through the partition to the annular space.

4. A flush control valve according to claim 1, wherein the air escape passage is adapted to be closed by the piston when the latter is in its highest position.

5. A flush control valve according to claim 1, in which the relief passage which provides communication between the lower cylinder space below the piston and the annular space passes through the cylinder wall in such a position that it is closed by the piston before this reaches its lowermost position.

FRANCIS LOUIS DREYER.
COLIN BROMLEY.