

H. M. KIRBY.
 FLUSHING MECHANISM.
 APPLICATION FILED JAN. 27, 1917.

1,253,982.

Patented Jan. 15, 1918.
 2 SHEETS—SHEET 1.

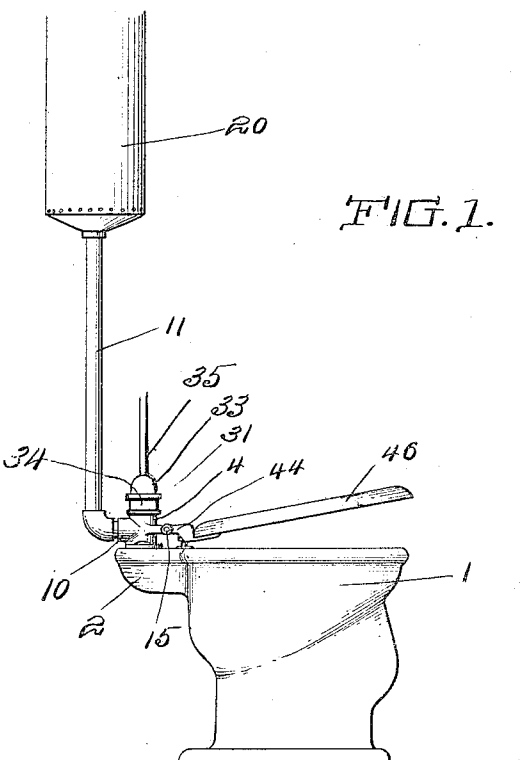


FIG. 1.

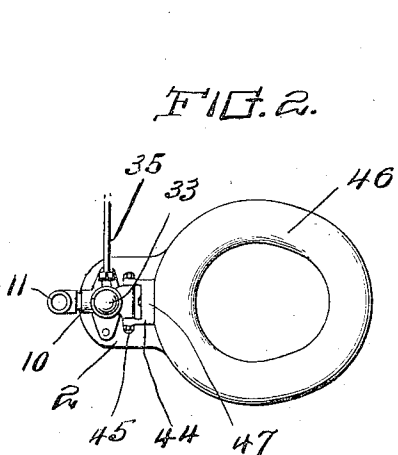


FIG. 2.

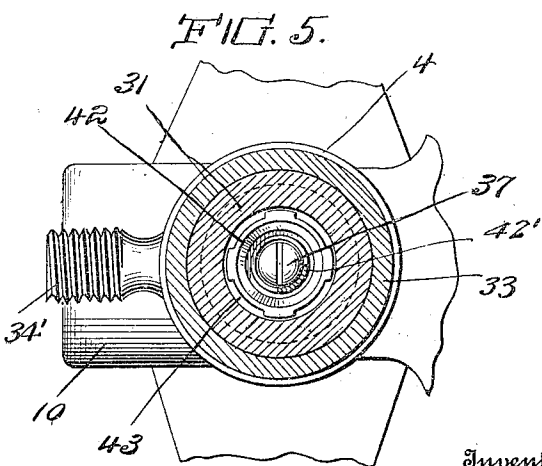


FIG. 5.

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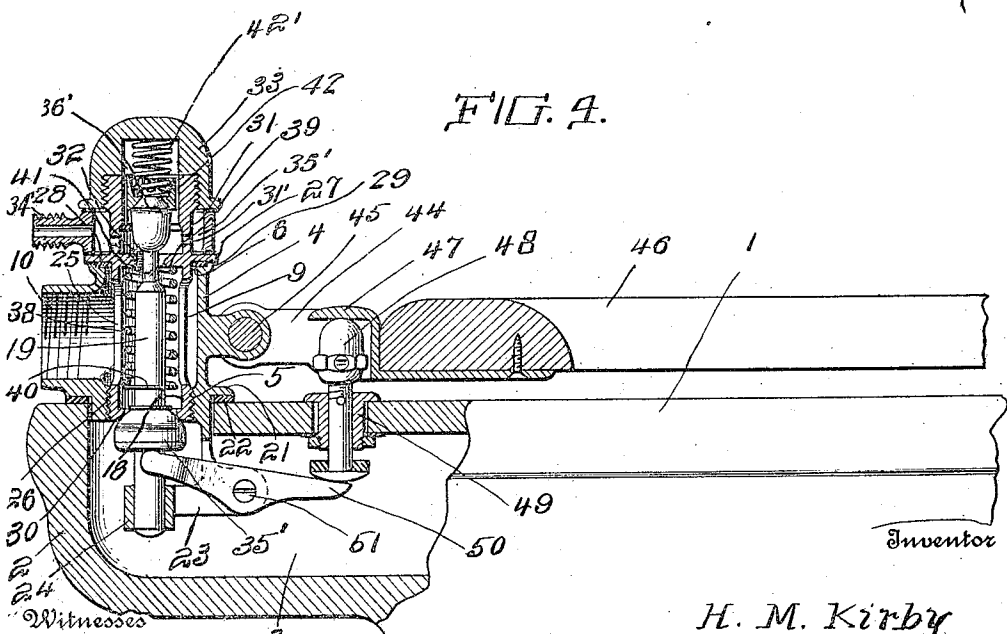
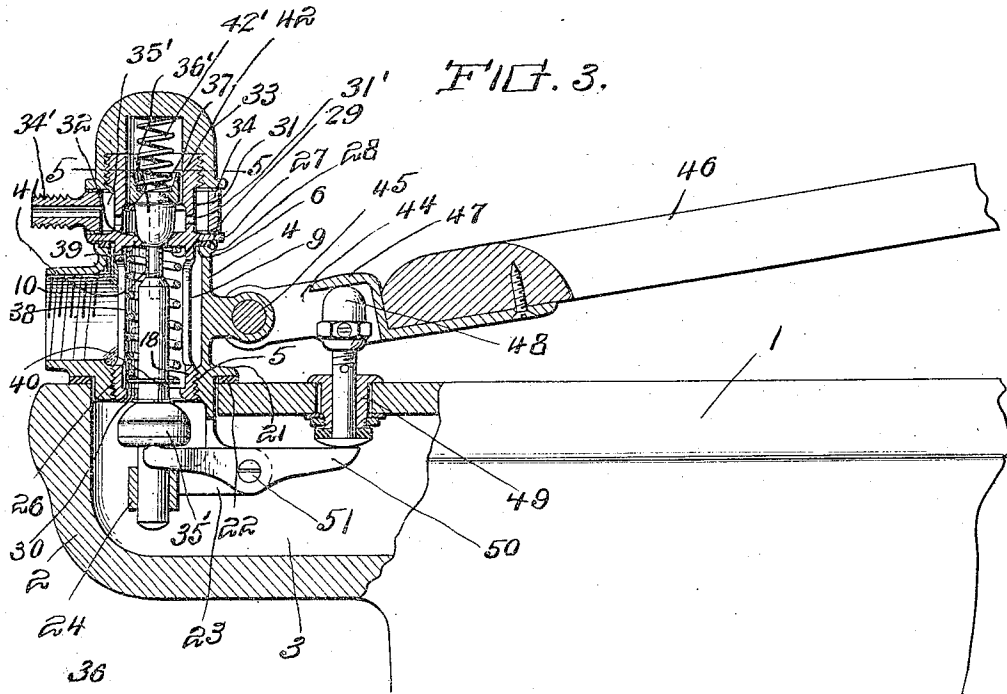
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UNITED STATES PATENT OFFICE.

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FLUSHING MECHANISM.

1,253,982.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed January 27, 1917. Serial No. 144,938.

To all whom it may concern:

Be it known that I, HOWARD M. KIRBY, a citizen of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented new and useful Improvements in Flushing Mechanism, of which the following is a specification.

This invention relates to certain new and useful improvements in flushing mechanism of the type wherein the flushing mechanism is operatively controlled by the pressure of the closet seat, and particularly to that class of flushing mechanism of the stated type in which valves control the flow of water from a supply pipe to a closed tank wherein the contained air is compressed, and from thence to the hopper or bowl for the flushing action.

The invention more particularly relates to a flushing mechanism of the character set forth wherein the flush water is admitted directly to the upper rear portion of the bowl through the medium of a seat-controlled valve mechanism mounted directly upon the bowl.

The primary object of the present invention is to provide a flushing mechanism in which valves are arranged within a casing to which easy access is afforded, and in which the valve mechanism as a whole is so mounted as to permit of its ready and convenient removal for cleaning, repairs and renewal of parts as occasion requires in service.

A further object of the invention is to provide a flushing mechanism which is simple of construction, reliable and efficient in action, comparatively inexpensive of production and installation, composed of comparatively few parts, and devoid of complex stuffing elements or other parts easily subject to wear or liable to clog or get out of order.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings in which:—

Figure 1 is a side elevation showing the application of the flushing mechanism to a bowl.

Fig. 2 is a top plan view of the bowl and

the parts of the flushing mechanism mounted thereon.

Fig. 3 is a vertical longitudinal section through the bowl and valve mechanism, showing the parts as they appear when the seat is in normal or raised position.

Fig. 4 is a similar view showing the parts of the valve mechanism as they appear when the seat is in a depressed position.

Fig. 5 is a detail section on the line 5—5 of Fig. 3.

Referring to the drawings, 1 designates a bowl of any ordinary or preferred construction which is provided at its upper rear portion with an extension 2 forming an inlet passage 3 for the flow of the flush water thereto, which passage 3 opens at its inner end into the upper rear portion of the bowl and at its outer end through the upper portion of the extension 2.

Fitting at its lower end within the said opening in the top of the extension 2 is a valve casing 4 having at its lower end an internally threaded outlet 5 and at its upper end an inlet opening 6, the body portion of the valve casing being chambered for the reception of a cylindrical valve cage 9. At the rear of the valve casing is an internally threaded opening 10 receiving the proximate end of a pipe 11 leading to the bottom of a closed or air-tight storage tank 20.

The lower end of the valve casing is formed with a supporting flange 21 which rests upon a gasket or washer 22 seated upon the top of the extension 2 about the inlet opening of the water inlet passage therein, and forming an air and water-tight connection between the two. From said lower end of the valve casing depends a bracket arm 23 which is disposed in the passage 3 and is provided with a guide member 24 for a purpose hereinafter described. The valve cage 18 is vertically disposed and provided in its sides with ports 25 connecting the interior of the cage with the valve chamber and opening 10, for the flow of water through the valve cage to the casing, and thence through the opening 10, and pipe 11 to the tank 1, and from the tank 1 back into the passage 3 for the flushing action. The lower end of the valve cage is externally threaded at 26 to detachably engage the threaded opening 5, and at its upper end the valve

cage projects outwardly through the opening 6 and is provided with an external annular flange or head 27 which closes said inlet 6, a gasket 28 being provided between
 5 said flange and the top of the casing to form an air and water-tight joint, and the adjacent edge of the casing being provided with an annular bead or shoulder 29 to hold said gasket against outward movement or displacement. The cage is provided at its
 10 lower end with a valve seat 30 and at its upper end with a tubular extension 31 having a valve seat 32, said extension 31 being externally threaded at its upper end to receive a closure cap 33. Surrounding the tubular extension 31, which is provided in its sides with an annular series of water inlet ports 31', is a collar 34 provided with a nipple 34' for connection with a water
 15 supply pipe 35, leading from the water service system. This collar is of greater diameter than the tubular extension 31 to form an intervening annular water channel 35' connecting the nipple 34' with the ports 31', whereby water from the service system will be supplied, without jets or pulsations, for admission to the valve casing through the valve cage. The collar is normally clamped against the head or flange 27 by the cap 33,
 20 a packing washer or gasket being interposed between the lower edge of the collar and the flange to form a water-tight connection. By the described construction and arrangement of the ports and the water admission chamber forming collar, the supply pipe 35 may be coupled to the valve cage at any angle or led thereto from any point around the cage, since the collar 34 may be turned to dispose the nipple 34' at any
 25 point around the circumference of the extension 31.

Arranged for movement within and upon the valve cage is a duplex valve device comprising a main stem 19 mounted for reciprocating motion at its lower end in the guide 24 and carrying at its lower end a valve member 35' adapted for engagement with the seat 30, for controlling communication between the valve casing and cage
 30 and the passage 3. A second valve member 36' is secured to the upper end of the stem 34'', as by means of a screw 37, and is adapted for engagement with the seat 32 to control communication between the water supply pipe and the valve casing and cage. A coiled spring 38 arranged within the cage between abutment surfaces 39 and 40 upon the cage and valve stem, respectively, is provided to normally exert its expansive force
 35 to hold the stem depressed, so as to normally maintain the valve member 35' in open position and the valve member 36' in closed position, as will be readily understood.

The valve 35'' may, in practice, be remov-
 40 ably mounted upon the stem so that, when worn, a new valve member may be readily and conveniently substituted therefor, and for a similar purpose the valve member 36' is detachably connected by the screw 37 with
 45 the valve stem and spaced therefrom in any suitable manner, as by means of a spacing tube 41. Secured to the upper end of the valve member 36' by means of the head portion of the screw 37 is a cup-shaped guide member or head 42 which may be made of metal, rubber or other suitable material, it being understood, of course, that the valve members may also be made of rubber, metal or other suitable material. The guide member or head 42 is peripherally winged or fluted so as to leave one or more passages
 50 43 between its periphery and the portion of the tubular extension 31 within which it moves, for the free and unobstructed passage of air. It will be observed that the upper end of the valve member 36' is disposed so as to be normally subjected to the pressure of the water entering through the ports 31', and that upward movement of the valve is normally resisted by a spring 42' bearing upon the head 42 and disposed between the same and the cap 33. In practice the valve 36' is normally subjected substantially to the full force of the pressure of the water in the service system, as well as to the pressure of spring and is thus held closed or forced tightly to its seat, so that when the parts of the flushing mechanism are in normal position, as shown in Fig. 3, the flow of water from the supply pipe to the pressure tank will be cut off, it being evident from the foregoing description and the illustrated disclosure that the duplex valve device is adapted in its opposite movements to alternately and simultaneously admit of the flow of water from the supply pipe to the pressure tank while cutting off the flow of water from the supply pipe to the bowl, and to close communication between the bowl and water supply pipe while admitting of the flow of water from the flushing tank to the bowl. Hence if there should be any tendency of the valve to stick or bind in open position this will be overcome by the pressure of the water on the valve and pressure of the spring on the head 42, whereby the valve member 36 will normally be kept closed against admission of water to the valve casing.
 55 The means for imparting motion to the valve comprises a forked bracket or yoke 44 which is pivotally connected to the casing, as shown at 45 and is fastened in any suitable manner to the rear portion of the seat 46. The bracket or yoke 44 carries a head 47 which bears upon the upper end of a vertically movable plunger 48 movable through a guide member 49 carried by the extension 2, the lower end of said plunger
 60 65

being arranged within the bowl and for contact with one arm of a rocking lever 50, pivotally mounted upon the bracket 23, as shown at 51, and having its opposite arm forked or bifurcated to embrace the lower 5 guiding end of the valve stem and bear upon the underside of the valve member 35', whereby upon the depression of the seat 46 the valve device will be raised to close the valve 35' and open the valve 36' against the resistance of the spring 38, which upon the subsequent release of the seat will return the valve to normal position, thus elevating the seat and simultaneously closing the valve 15 36' and opening the valve 35', as will be readily understood.

It will thus be apparent that when the seat is depressed the valve device as a whole will be raised against the resistance of the 20 spring to close communication between the bowl and the water service pipe and tank, while opening communication between the service pipe and tank, for the flow of water into the tank within which the contained air is compressed for subsequent discharge of 25 the water. Also it will be evident that when the seat 46 is released the spring will automatically raise it and at the same time depress the valve device, thus closing the valve member 36' to cut off the further supply of 30 water and opening the valve member 35' for the flow of the flush water from the tank to the bowl.

An important feature of my invention resides in the mounting and novel arrangement of the valve mechanism upon the upper rear portion of the bowl or extension thereof, for the delivery of the flush water into the upper rear portion of the bowl and 40 which arrangement of the valve casing allows the bowl to be set close to a wall or other surface and in such position as to be easily and conveniently applied and removed in setting up or dismantling the flush mechanism. 45

By the construction of valve casing described it will also be apparent that the internal parts of the valve mechanism may be easily and conveniently removed for cleaning, repairs or other purposes, and that owing to the simplicity of construction economy of manufacture, installation and maintenance is insured. Furthermore provision is made for keeping the parts of the valve 50 mechanism free, by washing action, from all sediment, and for preventing sticking of the valve in service.

I claim:—

1. In a flushing apparatus, a bowl having 60 a rearward extension at its upper rear portion forming an inlet passage, a valve casing mounted upon said extension, a valve device controlling the flow of water from the casing to the passage, said valve device 65 including a stem projecting into said pas-

sage, guiding and supporting means arranged within the passage and depending from the casing, said means forming a guide for said valve stem, a hinged seat, and means operable by the seat for actuating the 70 valve.

2. In a flushing apparatus, a bowl having a rearward extension at its upper rear portion forming an inlet passage, a valve casing mounted upon said extension, a valve device controlling the flow of water from the casing to the passage, said valve device including a stem projecting into said passage, 75 guiding and supporting means arranged within the passage and depending from the casing, said means forming a guide for said valve stem, a valve actuating member mounted on said guiding and supporting means, a plunger movable through the upper wall of the extension for transmitting 80 motion to said actuating device, and a seat for transmitting motion to said plunger.

3. In a flushing apparatus, a bowl having an extension forming an inlet passage, a valve casing mounted on said extension, a valve device within the casing including a stem projecting into the passage, a stem 85 guiding element connected with the casing and arranged within the passage and a stem actuating lever fulcrumed on the guiding and supporting element. 90

4. In a flushing apparatus, a bowl having an extension forming an inlet passage, a valve casing mounted on said extension and having a guiding and supporting element depending within the passage, a valve device 95 arranged within the casing and including a stem with a projection within the passage in engagement with the guiding and supporting element, a valve actuating lever fulcrumed on said guiding and supporting element within the passage, a hinged seat, and a plunger operable by the seat to actuate the valve actuating lever. 100

5. In a flushing apparatus, a bowl having an extension forming an inlet passage, a valve casing mounted upon said extension and having a guiding and supporting element depending within the passage, a valve 105 guided in the casing and having a stem projecting within the passage in engagement with the guiding and supporting element, a valve actuating lever fulcrumed on the guiding and supporting element, a plunger guided through the top wall of the bowl extension and engaging the valve actuating lever, and a seat carrying element hinged on the valve casing and engaging the plunger to actuate the latter. 110

6. In a flushing apparatus, a bowl having an extension forming an inlet passage, a valve casing mounted upon said extension and having a guiding and supporting element depending within the passage, a valve 115 guided in the casing and having a stem pro-

jecting within the passage in engagement with the guiding and supporting element, a valve actuating lever fulcrumed on the guiding and supporting element, a plunger 5 guided through the top wall of the bowl extension and engaging the valve actuating lever, and a seat carrying element hinged on the valve casing and engaging the plunger to actuate the latter, the top wall of the bowl extension being provided with a guiding element for the plunger. 10

In testimony whereof I affix my signature.

HOWARD M. KIRBY.

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