

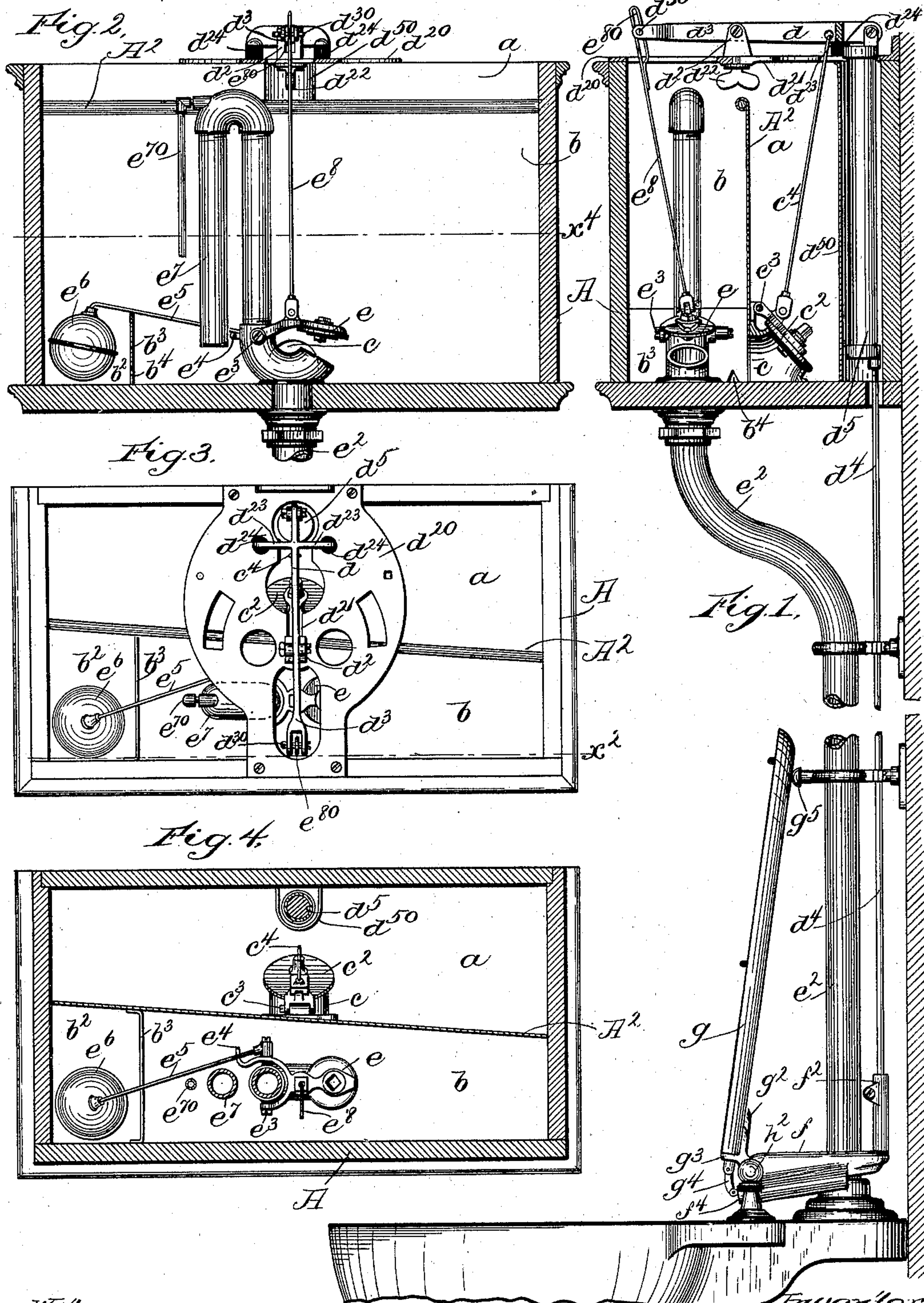
(No Model.)

2 Sheets—Sheet 1.

W. SCOTT.
FLUSHING DEVICE.

No. 591,016.

Patented Oct. 5, 1897.



Witnesses.
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J. P. Livermore.

Inventor.
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by J. P. Livermore
Att'y.

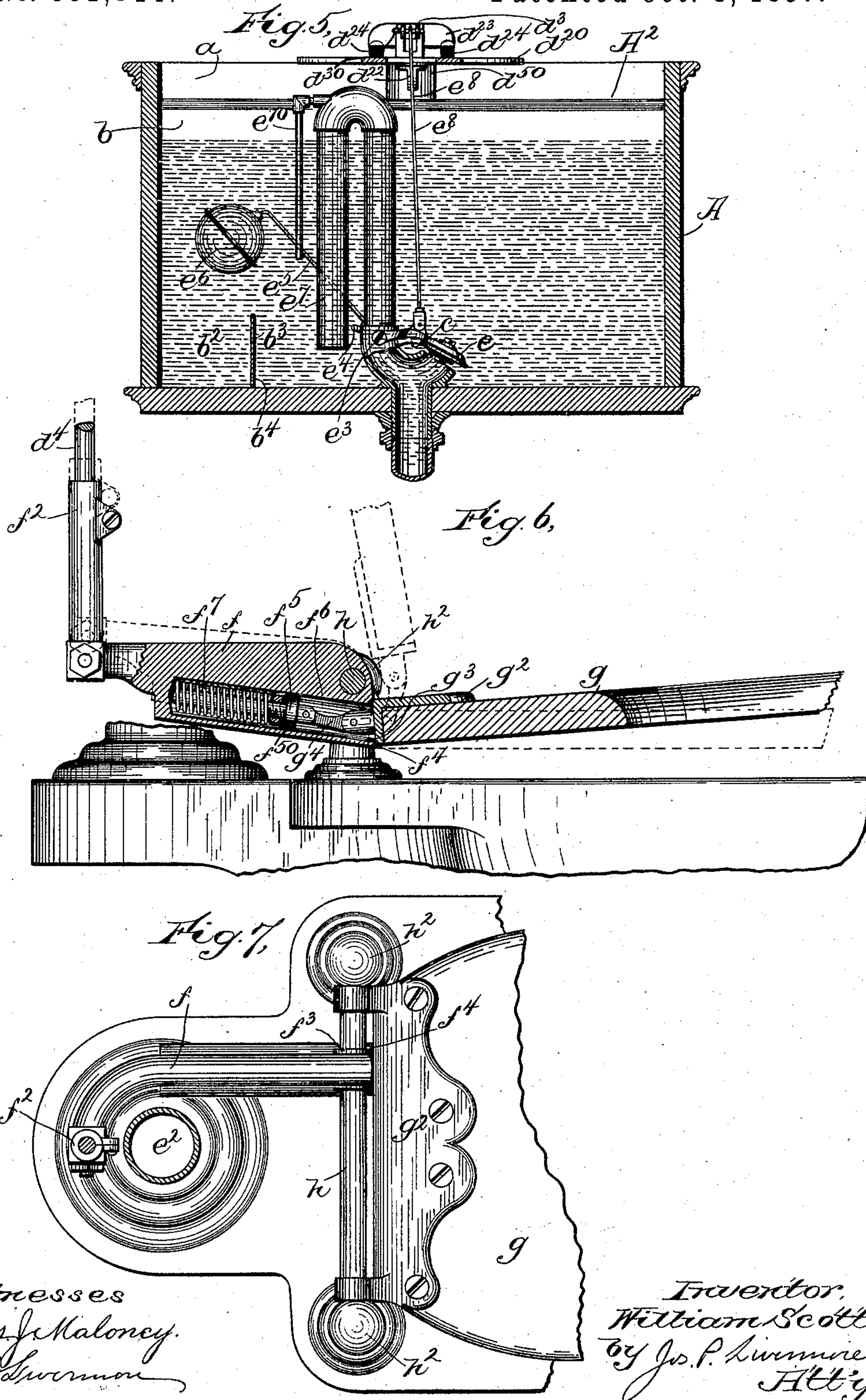
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM SCOTT, OF MEDFORD, MASSACHUSETTS.

FLUSHING DEVICE.

SPECIFICATION forming part of Letters Patent No. 591,016, dated October 5, 1897.

Application filed October 12, 1896. Serial No. 608,557. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SCOTT, of Medford, county of Middlesex, and State of Massachusetts, have invented an Improvement in
5 Flushing Devices, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a flushing
10 device for water-closets, and is intended as an improvement in apparatus of that class which is adapted to be automatically operated by the depression and release of the seat, the connecting devices being so ar-
15 ranged that the depression of the seat causes the water to flow from a tank to a service-box, while the release thereof closes the communication between the tank and service-box and opens the communication between the
20 latter and the service-pipe to flush the bowl.

The invention also relates to improved means for producing a preliminary wash, provision being also made for the slow discharge of water after the flushing operation
25 is completed in order to insure the proper filling of the traps.

The invention further relates to an improved device for operating the flushing device in response to a movement of the water-
30 closet seat.

In apparatus of the class to which the invention relates the tank and service-box are arranged upon substantially the same level, the former being provided with the usual
35 means for maintaining it supplied with water, such as a ball-cock, and a communicating passage is provided between the tank and service-box and controlled by a valve, which will be hereinafter referred to as the "tank-
40 valve," said valve being normally closed and adapted to be opened by the depression of the water-closet seat. The service-box is connected by the usual service-pipe to the bowl of the closet, the said service-pipe being controlled by a valve, which will be hereinafter
45 referred to as the "flushing-valve," which is normally open, but adapted to be closed automatically in response to the closure of the tank-valve.

50 The object of the present invention is to provide means for automatically regulating

the flushing operation to insure a complete flush at each operation, followed by a slower discharge to fill the traps. For this purpose the flushing-valve is arranged to be only partially opened at the beginning of the flushing
55 operation, and a siphon discharge-pipe is provided in conjunction with the service-pipe, so that such partial opening of the flushing-valve will produce siphonic action to discharge the
60 service-box with the full capacity of the service-pipe, it being obvious that after the level of the water falls below the mouth of the siphon that portion of the water which remains will be more slowly discharged through the
65 partially open flushing-valve to insure the proper refilling of the traps, it being obvious, moreover, that in any event a momentary opening of the flushing-valve will result in a complete flushing operation.

To provide for a preliminary wash, the flushing-valve is arranged to be self-closing and is normally held open to its fullest extent by means of a ball or float which is adapted to engage a portion of said valve when the service-
75 box is empty. When, therefore, the tank-valve is opened and the water flows into the service-box, the service-pipe is open and a portion of the water flows down through the same, the capacity of said service-pipe, however, being less than the capacity of the communicating passage between the tank and the service-box, so that the water flows into the service-box faster than it can flow out through the flushing-valve, whereby the float
80 which controls said flushing-valve is eventually lifted, permitting the said valve to close, after which the service-box fills until it reaches the level of the water in the tank, the parts remaining in this condition as long as
85 the closet-seat is depressed, the ball-cock or refilling device for the tank then operating so that both the tank and service-box are simultaneously filled.

In order that the flushing-valve during the
95 preliminary wash may be held open to its widest extent for a predetermined length of time and then immediately closed, a float controlling the same is preferably arranged to act in response to water contained in a sup-
100 plemental chamber or pocket formed in the service-box by means of a wall or partition

rising from the bottom of said service-box, so that the water is practically excluded therefrom until it rises in the service-box to the top of said wall and overflows the same, thus promptly filling the said pocket and lifting the float, permitting an immediate closure of the flushing-valve. The said partition is provided with a small opening at or near the bottom thereof, through which the water can flow out after the main portion of the service-box is discharged, thus permitting the float to fall to maintain the flushing-valve wide open. The said flushing-valve is also connected with the water-closet seat, so that when the latter is no longer depressed the flushing-valve will be partially opened and produce siphonic action, as above described, to discharge the contents of the service-box.

Figure 1 is a sectional elevation of a water-closet bowl provided with a flushing device embodying the present invention and an actuating device adapted to be operated by the water-closet seat. Fig. 2 is a sectional elevation of the service-box, taken on line x^2 , Fig. 3. Fig. 3 is a top plan view of the tank and service-box. Fig. 4 is a longitudinal section of the same on line x^4 of Fig. 2. Fig. 5 is also a section on line x^2 of Fig. 3, showing the parts in a different position from that indicated in Fig. 2. Fig. 6 is an enlarged sectional view of the water-closet seat and the hinge and valve-actuating device connected therewith, and Fig. 7 is a top plan view of the same.

The tank a and service-box b are preferably contained in a single main casing A , divided by a wall or partition A^2 , the tank being on one side of said wall and the service-box on the other. The said tank and service-box are provided with a communicating passage c , controlled by the tank-valve c^2 , herein shown as a clapper-valve pivoted at c^3 and connected by a rod c^4 with one arm of a lever d , pivoted at d^2 and provided with an arm d^3 , adapted to cooperate with the flushing-valve e , as will be hereinafter described. The said lever d may be rocked upon its pivot in any suitable way to open the tank-valve c^2 , and is herein shown as connected by a rod d^4 to a rocker or lever f , adapted to be operated by the seat g , the said rod being shown as provided with a weight d^5 . The rocker f is arranged, as will be hereinafter described, so that a depression of the water-closet seat g lifts the rod d^4 and opens the tank-valve c^2 , thus allowing the water to discharge from the tank a into the service-box b .

The flushing-valve e which controls the service-pipe e^2 , is pivoted at e^3 and provided with a projection e^4 , adapted to be engaged by the stem e^5 of a float e^6 , whereby it is normally held open to its fullest extent, as best shown in Fig. 2. When, therefore, the tank-valve c^2 is opened, the water flowing from the tank into the service-box will also flow through the service-pipe e^2 , thus affording a preliminary wash, which will take place until the level of

the water in the service-box has risen to a sufficient height to lift the float e^6 and permit the valve e to close, the said valve being arranged to close automatically when thus released, as by its own weight.

In order that the valve e may remain fully open during the preliminary washing operation and close promptly at the end of such operation, the ball e^6 is adapted to rise in response to the rise of level of water in a supplemental chamber or pocket b^2 , formed in the service-box by means of a wall or partition b^3 , extending across from one side to the other thereof, the said partition being provided with a small opening b^4 , communicating with the main portion of the tank to prevent the water from being permanently trapped therein, the said opening, however, being so small that the water in rushing into the service-box, when the tank-valve is open, will rise to the top of the partition b^3 and overflow the same before any material amount has entered through the said opening b^4 . The preliminary wash, therefore, will go on to the full capacity of the valve e until the water in the service-box has risen to the top of the partition b^3 , when it will overflow the same and fill the pocket b^2 , causing the float e^6 to rise at once, upon which the valve e will close of itself, so that the service-box will fill. As long, therefore, as the seat is depressed the tank-valve will remain open, so that the water in the tank and that which is admitted thereto through the ball-cock or other supply device is in communication with the service-box, which is thus charged with water while the flushing-valve remains closed. When the pressure upon the closet-seat is relieved, however, the tank-valve c^2 will at once be closed, owing to the weight d^5 or the equivalent thereof, and in order to produce the flushing operation means are provided whereby the same operation of the seat opens or partially opens the valve e , allowing a sufficient amount of water to flow through the service-pipe e^2 to start siphonic action in a siphon discharge-pipe e^7 , connected with said service-pipe e^2 and of substantially equal capacity therewith, so that a complete flushing operation is produced. For this purpose the lever-arm d^3 is loosely connected to a rod e^8 , connected, as shown, to the valve e and adapted by its upward movement to open the same. When, therefore, the valve e is closed and the lever-arm d^3 moves upward, it will engage the rod e^8 , which is herein shown as provided with a loop e^{80} , cooperating with a pin d^{30} at the end of the lever d^3 , and produce a sufficient upward movement thereof to lift the valve from its seat and produce siphonic action through the siphon discharge-pipe e^7 . As the water recedes in the service-box the float e^6 will be gradually lowered until it is supported only by the water in the chamber b^2 .

In Fig. 5 the service-box is shown as full of water and the lever in its normal position—that is to say, the position it takes when the

seat *g* is no longer depressed. It will be seen that the valve *e* is lifted from its seat and partially opened, so that sufficient water passes through to start siphonic action. A perfect flushing operation to the full capacity of the service-pipe is thus started and continues until the siphon is broken, after which the remainder of the water flows slowly down through the partially open valve. With the discharge of water the float *e*⁶ descends, and after the service-box is emptied of its contents the said float reaches its lowermost position, as shown in Fig. 1, the stem *e*⁵ engaging the projection *e*⁴ and fully opening the valve *e*.

At the end of the complete flushing operation—that is, the discharge of water through the siphon *e*⁷ and partially-opened valve *e*—water still remains in the said pocket *b*², owing to the fact that the opening *b*⁴ is so small in proportion to the outlet from the service-box that the latter becomes discharged before the pocket *b*² can discharge its contents through the said opening. The water contained in said pocket, therefore, will flow out slowly and assist in the proper refilling of the trap. Means are preferably provided, however, for breaking the siphon before the main portion of the contents of the service-box is fully discharged, and for this purpose the siphon is provided with a vent *e*⁷⁰, consisting of a pipe secured thereto at the bend of the siphon and extending downward to the level at which it is desired to stop siphonic action. When, therefore, the water reaches the level of the end of the pipe *e*⁷⁰, it is obvious that air will be admitted to the top of the siphon, thus stopping the siphonic action, the remainder of the discharge from the service-box taking place through the restricted valve-opening.

After the water is fully discharged from the service-box and the chamber *b*² the float *e*⁶, having returned to its normal position, as shown in Fig. 2, with the stem thereof engaging the projection *e*⁴, holds the valve *e* wide open, and thus provides for the proper preliminary wash at the next operation.

The supporting-lug *d*² for the lever *d* *d*³ may be adjustably connected with the tank, and is herein shown as supported upon a plate *d*²⁰, extending across the top of the tank and secured to the edge thereof and having a slot *d*²¹ in which the said lug *d*² is movable and adapted to be secured in any given position, as by a thumb-screw *d*²².

The weighted rod *d*⁵, which is secured to the lever *d*, is inclosed in a tubular passage *d*⁵⁰ within the main portion of the tank *A*, so that the said tank may be connected, as indicated, directly to the wall of the room within which it is to be used.

The downward movement of the lever *d* is preferably limited by means of cross-arms *d*²³, adapted to rest upon the surface of the plate *d*²⁰ and provided, as shown, with cushions *d*²⁴. The said plate *d*²⁰ may also serve as a sup-

port for the ball-cock, which is not herein shown, the construction of the tank thus being compact and neat.

The flushing device hereinbefore described may obviously be operated by any suitable or usual means, a novel actuating device, however, being herein shown and forming a part of the invention.

Referring to Figs. 1, 6, and 7, the rocker *f*, which is connected by a suitable slide-joint *f*² to the lifting-rod *d*⁴, is pivotally supported at *f*³ upon a supporting-rod *h*, shown as extending across between two studs *h*², secured to the surface of the bowl and adapted to support the hinge *g*² of the seat *g*. The said rocker *f* is provided below its pivotal support with a shoulder *f*⁴, adapted to be engaged, when the seat is turned downward on its hinge, by the shoulder *g*³ or rear edge of the seat, the said shoulder being herein shown as a portion of the hinge *g*². The said rocker *f* is normally maintained in the position shown in Fig. 6, owing to the weight *d*⁵, the parts being so adjusted that the seat *g* is slightly tipped up. When, therefore, the said seat is depressed, the rocker *f* will be rocked upon the rod *h*, whereby the rod *d*⁴ is lifted, as indicated in dotted lines, Fig. 6, thus rocking the lever *d* to properly actuate the valves. When the seat *g* is released, the weight *d*⁵, acting through the rod *d*⁴, restores the rocker *f* to its normal position, and the valves are correspondingly actuated by the consequent movement of the lever *d*.

It is obvious that the seat *g* is free to be turned back upon its hinge without producing any corresponding movement of the rocker *f*, since the said rocker is engaged thereby only during that portion of its movement from the position shown in full lines to that shown in dotted lines, Fig. 6.

It is desirable in some cases to maintain the seat permanently tipped back upon its hinge, as shown in Fig. 1, and in order that the said seat may be automatically restored to this position the shoulder *g*³ is herein shown as connected by a link *g*⁴ with a plunger *f*⁵, longitudinally movable in a guideway, herein shown as a bore or opening *f*⁶ in the rocker *f*, the said plunger being normally pressed outward by means of a spring *f*⁷. When, therefore, the seat is moved downward upon its hinge, the said plunger will be forced inward against the stress of the spring until the shoulder *g*³ engages the said rocker *f*, a further movement then operating the valves, as described. When the seat is released, it will be first positively moved by the rocker *f* to the full-line position, Fig. 6, and a further movement will be produced by the action of the spring *f*⁷, acting through the link *g*⁴ to throw the seat back to the dotted-line position shown in Fig. 6. The seat is thus automatically restored to the position shown in Fig. 1, a stop or cushion *g*⁵ being preferably provided, against which the said seat normally rests.

To properly restore the seat, it is necessary

to employ a stiff spring, and in order that the action of the seat may be easy and not liable to slam against the stop as it rises means are preferably provided for retarding the outward movement of the plunger f^5 , the said plunger being herein shown as provided for this purpose with a cup-leather f^{50} , having its edges turned toward the mouth or opening of the bore f^6 . When, therefore, the seat is lowered, the said cup-leather will collapse, allowing the air in the bore f^6 to escape by the same. Consequently when the seat is restored by the stress of the spring the upward movement thereof will be resisted by the air, so that such movement will be sufficiently retarded to prevent the seat from slamming.

It is not intended to have the cup-leather fit closely enough to produce an actual vacuum or to permanently exclude air from the bore f^6 .

It may in some cases be desirable to employ a seat-lifting device when the flushing device is not operated by the seat, in which case the guide for the spring-plunger may be stationary or fixed with relation to the bowl.

By use of the flushing device hereinbefore described a complete flushing operation is insured each time the valve-actuating device is operated, and it is not essential that the flushing-valve should be maintained open to permit the proper discharge of water, as in flushing devices of this class heretofore employed. For example, if the seat is occupied and it is desired to flush the closet without leaving the seat, a momentary relief of the pressure thereon will operate the flushing-valve and start siphonic action, which will continue, even if the seat is immediately depressed again, until the siphon breaks, after which if the seat is still occupied, the flushing-valve being closed, the service-box will refill, and if the seat is unoccupied the remainder of the water in the service-box will flow out through the flushing-valve, which is then partially open.

It is not intended to limit the invention to the specific construction herein shown and described, since modifications may be made without departing from the invention.

I claim—

1. The combination with the tank; of a service-box communicating therewith and provided with a service-pipe having a normally open flushing-valve, means for closing said flushing-valve dependent upon the rise of the level of the water admitted to said service-box, a siphon discharge-pipe communicating with said service-pipe, and means for starting siphonic action to discharge the service-box, substantially as described.

2. The combination with the tank; of a service-box communicating therewith and provided with a service-pipe having a normally open flushing-valve, means for closing said flushing-valve dependent upon the rise of the level of the water admitted to said service-box, a siphon discharge-pipe communi-

cating with said service-pipe, means for starting siphonic action to discharge the service-box, and a vent for breaking the siphon after the water has reached a predetermined level, substantially as described.

3. The combination with the tank, of a normally closed tank-valve controlling the outlet therefrom, a service-box adapted to receive water from said outlet, a self-closing flushing-valve controlling the outlet from said service-box to the service-pipe, a device connecting said valves whereby the flushing-valve is maintained open during the closure of said tank-valve, a siphon discharge-pipe communicating with said service-pipe, and means for starting siphonic action to discharge the service-box, substantially as described.

4. The combination with the tank and service-box provided with a communicating passage, of a tank-valve controlling said passage, a lever having one arm connected to said tank-valve, a flushing-valve connected with said lever whereby it is opened upon the closure of the tank-valve and adapted to be closed upon the opening thereof, and a siphon discharge-pipe communicating with the passage controlled by the flushing-valve; whereby siphonic action is started to discharge the service-box upon the opening of said flushing-valve, substantially as described.

5. The combination with the tank and service-box provided with a communicating passage, of a tank-valve controlling said passage, a normally open flushing-valve controlling the service-box outlet, a device for maintaining said valve open when the service-box is empty and closing the same after the water has risen to a predetermined level in the service-box, means for partially opening said flushing-valve in response to the closure of the tank-valve, and a siphon discharge-pipe communicating with said service-pipe, substantially as described.

6. The combination with a flushing-tank; of a service-box adjacent thereto; a passage leading from the flushing-tank to the service-box; a tank-valve for said passage; a flushing-valve adapted to control the outlet from the service-box to the service-pipe; a lever connected on opposite sides of its fulcrum with said valves respectively; means for rocking said lever upon its fulcrum; and a siphon discharge-pipe within the service-box communicating with the service-pipe, substantially as described.

7. The combination with the tank, of a service-box communicating therewith, a tank-valve controlling the communicating passage, a service-pipe and flushing-valve, a siphon discharge-pipe communicating with said service-pipe, a pocket or chamber in said service-box, a float in said pocket adapted when said pocket is empty to maintain the flushing-valve open, a valve-actuating device adapted by its movement in one direction to open the tank-valve without affecting the

flushing-valve, and by its movement in the other direction to close the tank-valve and partially open the flushing-valve, whereby siphon action is started to discharge the service-box, and an outlet from said pocket to the service-box, substantially as described.

8. The combination with the tank, of a service-box; a communicating passage between said tank and service-box, a tank-valve controlling the said passage, a self-seating flushing-valve adapted to control an outlet from said service-box, and an independently-pivoted float adapted when not supported by fluid to engage and open said valve, whereby the said valve may be opened without depressing the float, substantially as described.

9. The combination with the seat *g*, of a support therefor consisting of the rod *h* mounted

on the studs *h*² supported upon the bowl proper, a hinge secured to said seat and mounted on said rod *g*, a rocker also sleeved on said rod *h* and provided with a shoulder adapted to engage the rear edge of the said seat, a valve-actuating device connected to said rocker, a bore or recess in said rocker, a spring-plunger supported and guided in said recess and connected with said seat, and a retarding device for said plunger, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM SCOTT.

Witnesses:

H. J. LIVERMORE,
N. P. FORD.