(No Model.)

A. E. SMITH.

CONTROLLING DEVICE FOR TANK SUPPLY VALVES.

No. 542,900. Patented July 16, 1895.

Fig. 1.

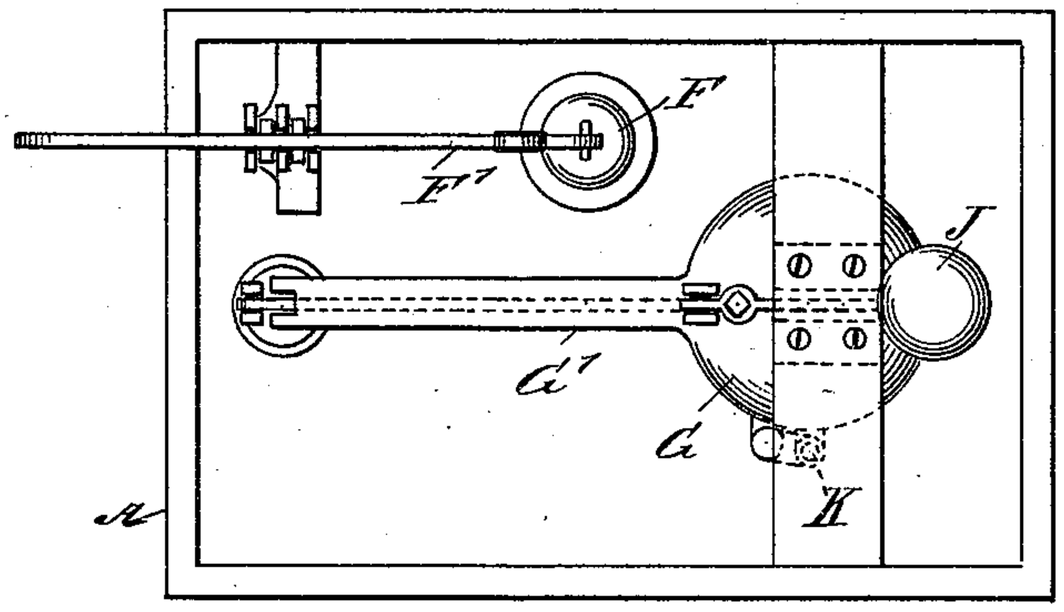


Fig. 2

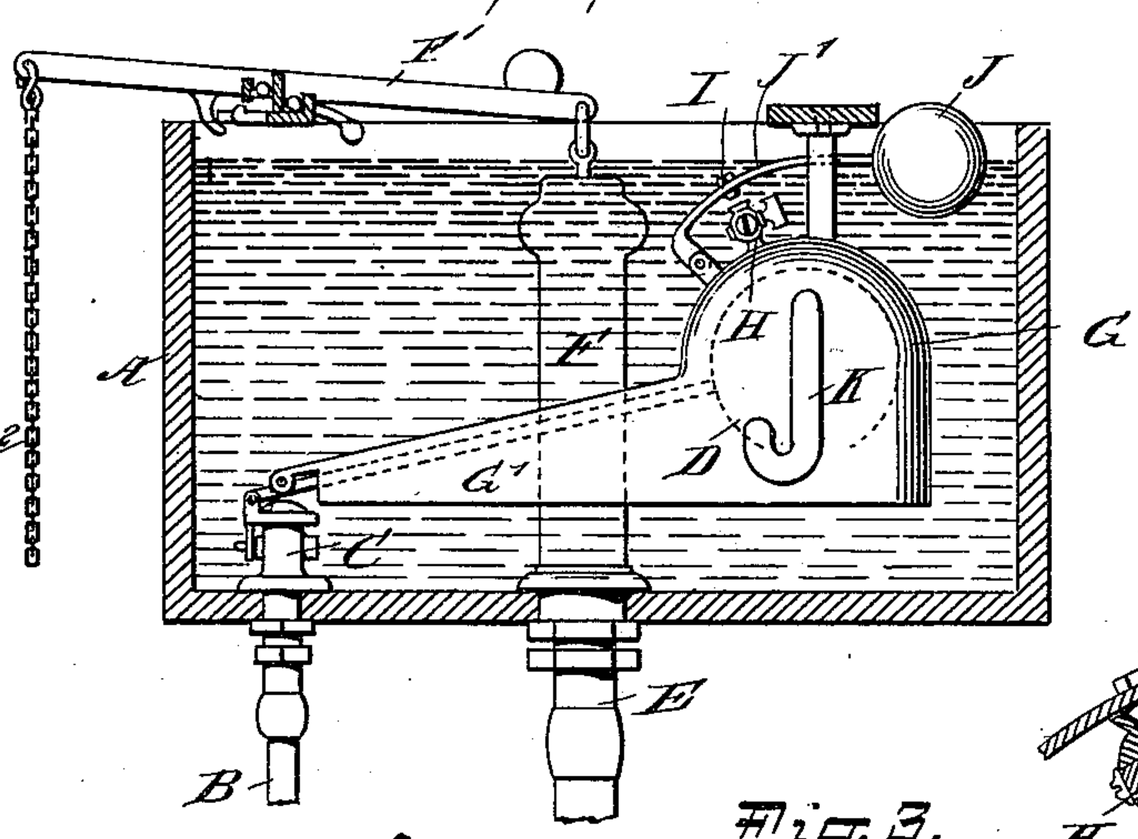


Fig. 4.

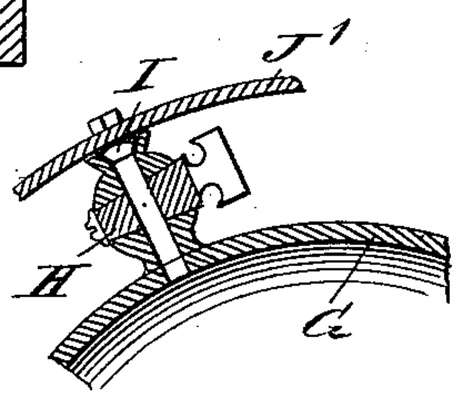
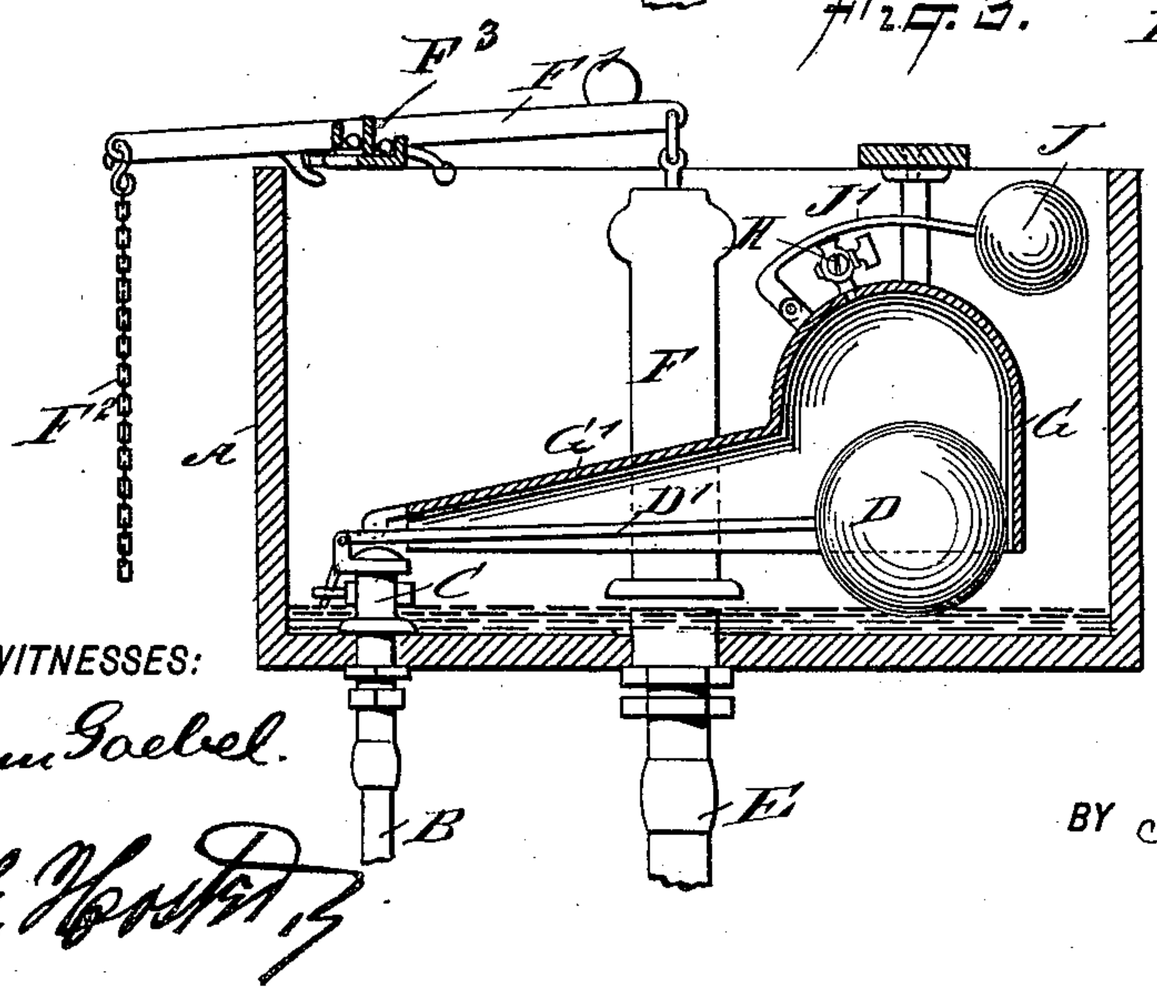


Fig. 3.



WITNESSES:

William Goebel.

Herbert Foster

INVENTOR

A. E. Smith

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

AUGUSTUS E. SMITH, OF BROOKVILLE, PENNSYLVANIA.

CONTROLLING DEVICE FOR TANK SUPPLY-VALVES.

SPECIFICATION forming part of Letters Patent No. 542,900, dated July 16, 1895.

Application filed December 21, 1894. Serial No. 532,588. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS EUGENE SMITH, of Brookville, in the county of Jefferson and State of Pennsylvania, have invented a new and Improved Controlling Device for Tank Supply-Valves, of which the following is a full, clear and exact description.

The invention relates to water-closet flush-tanks, and its object is to provide a new and improved controlling device for tank supply-valves, which is comparative simple and durable in construction, very sensitive in operation, and arranged to enhance or perfect the working efficiency of the supply-valve and to insure a positive closing of the same at the time the tank is filled to the point of overflow, also permitting of regulating the amount of overflow after the tank is filled.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the improvement as applied. Fig. 2 is a sectional side elevation of the same, showing the tank filled and the supply-pipe valve closed. Fig. 3 is a similar view of the same, showing the water in the tank discharged and the supply-pipe valve opened, and Fig. 4 is an enlarged side elevation of part of the fixed pneumatic casing and its air-escape.

The flush-tank A is provided with the usual supply-pipe B, controlled within the tank A by a valve C, adapted to be opened and closed by a float D, connected by its lever D′ with the stem of the valve C in the usual manner. From the tank A leads the usual outlet-pipe E to the water-closet below, and the said outlet-pipe E is adapted to be opened and closed within the tank A by the usual valve F hung on the lever F′ under the control of the operator pulling or releasing the chain, rod, or rope F^2, the said lever F′ being provided with the usual automatic clutch device F^3 for releasing flush-valve F after the chain has been pulled.

The float D is adapted to be operated within a fixed pneumatic casing G, formed with an extension G′ in which swings the lever D′ of the said float D. The casing G and its extension G′ is open at the bottom and its lower edge is a suitable distance above the bottom of the tank A and a suitable distance above the upper end of the outlet-pipe E, so that when the valve F is raised and the water of the tank A is discharged into the pipe E, then the casing G, though full of water, as represented in Fig. 2, is also emptied, and the order of operation becomes as shown in Fig. 3—that is, empty throughout.

On the top of the casing G is arranged an air-cock H to permit the air contained in the casing G to escape at the time the water is rising in the tank A, when receiving the latter through the supply-pipe B and the float-opened valve C. Now it will be seen that this air-cock H can be set in such a manner that the air escaping therefrom permits the water in the pneumatic casing G to rise slower than in the tank A, so that the float D rises slower within the said casing G as the water accumulates in the tank A than it would rise if the casing were omitted, and the said float D would rise with the water as it accumulated in the tank, the same as in tanks now used. The outer end of the air-cock H may, in addition, be controlled by a float-valve I, held on the lever J′ of a float J rising and falling with the water accumulating in or leaving the tank A. The lever J′ is for this purpose fulcrumed on a lug projecting from the top of the casing G, as is plainly illustrated in the drawings, so that when the tank A is filled to the overflow point, or has been regulated to cause an overflow or afterwash of a given quantity, then the float J in rising with the water causes the lever J′ to swing upward to move the valve I from the outlet-opening of the cock H, so that the air compressed in the casing G can escape through the cock H to permit the water to quickly fill the casing G, entirely enveloping or submerging the float D, so as to raise the float D and to immediately and firmly with full buoyant pressure shut off or close the valve C. On the casing G is also arranged a vent-pipe K, for a purpose fully explained hereinafter.

The operation is as follows: When the several parts are in the position illustrated in Fig. 2, then the tank A is filled to the over-

flow point with water and the supply-pipe valve C is closed and the casing G is filled with water, owing to the open-air cock H. Now when the operator pulls the chain F^2 to lift the valve F off its seat on the upper end of the discharge-pipe E, then the water within the tank A flows through the discharge-pipe E to its destination. As the tank A is emptied of the water the float J descends and closes by its valve I the air-cock H, and when on the further outflow of the water from the tank the level of the water sinks so far as to admit air into the casing G, the float D, whose position changes but slightly before the air can enter the casing, falls so as to finally assume the position shown in Fig. 3 at the time the tank A has nearly discharged its entire contents of water through the pipe E. As the float D moves into its lowermost position it opens the valve C, and consequently the water from the supply-pipe B passes into the tank A to refill the same, it being understood that the valve F has meanwhile been automatically released from suspended position and reseated on the upper end of the pipe E by the operator releasing the chain F^2. As the water accumulates in the tank A it closes the lower end of the pneumatic casing G, so that the air confined within is compressed to a certain extent, and consequently the water rises slower within the casing G than within the tank A. As the water rises slower within the casing G the float D rises comparatively slower than it would if within the tank A only, as in the case of flush-tanks now constructed. Now when the water nearly rises within the tank A to the point of overflow, then the float J is lifted to move the valve I off its seat on the air-cock H, so that the air contained within the casing G can escape and the water within the casing G will rise rapidly to cause a like rising of the float D and a consequent closing of the valve C. The supply of water is thus shut off at the time the point of overflow is reached, or, if desired, after a regulated quantity of the water has overflown down the flush-pipe E. The several parts are then again in position, as shown in Figs. 1 and 2, and the above-described operation is repeated as soon as the operator pulls the chain F^2.

The vent-pipe K operates as follows: For instance, when the tank and casing are full of water, as shown in Fig. 2, and a small obstruction passes under the valve F to produce a leak, so as to lower the level of the water in the tank, then the water in the casing is not lowered and the float D is held in an uppermost position with the valve C tightly shut, notwithstanding the water is falling in the tank. When the water passes below the water-seal in the lower end of the vent-pipe K, then air is admitted into the top of the casing through the said pipe and the water is liberated from the casing and float D falls to open the valve C to refill the tank.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the tank, the valve controlling the supply of liquid thereto, the fixed casing apertured in its lower part so as to permanently communicate with the tank, and provided with an air escape of reduced diameter, whereby the liquid will be caused to rise slower in the casing than in the tank when the supply valve is open, and a float contained in the casing and operatively connected to the said valve, substantially as described.

2. A controlling device for tank supply valves, consisting in the combination, with the supply valve, of a fixed pneumatic casing having an air escape, a float contained in the casing controlling the supply pipe valve to retard the closing of the latter as the water accumulates in the tank, and means for automatically controlling the said air-escape of the fixed pneumatic casing, substantially as shown and described.

3. The combination of the tank, the liquid supply valve, the casing permanently communicating with the tank and provided with an air cock in its upper part, and a float contained in the casing and operatively connected to the said valve, substantially as described.

4. A controlling device for tank supply valves, comprising a supply valve and a float for controlling the same, a pneumatic casing arranged within the flush tank, and adapted to contain the said float, an air cock held in the top of the said casing, and a second float provided with a valve adapted to open and close the said air cock, the said second float being arranged to rise and fall with the water in the tank, the latter nearly reaching or receding from the point of over-flow, substantially as shown and described.

5. The combination of the tank, the supply valve, the float controlling said valve, the casing in which said float is contained, said casing being provided with an air escape, and a float controlling the said air escape, substantially as described.

6. The combination of the tank, the supply valve, the float controlling said valve, the casing in which said float is contained, and a vent pipe leading from the casing into the tank proper, substantially as described.

AUGUSTUS E. SMITH.

Witnesses:
W. F. STEWART,
NORMAN STEWART.