

F. McGHAN.

Improvement in Water Closets.

No. 124,003.

Patented Feb. 27, 1872.

Fig. 1.

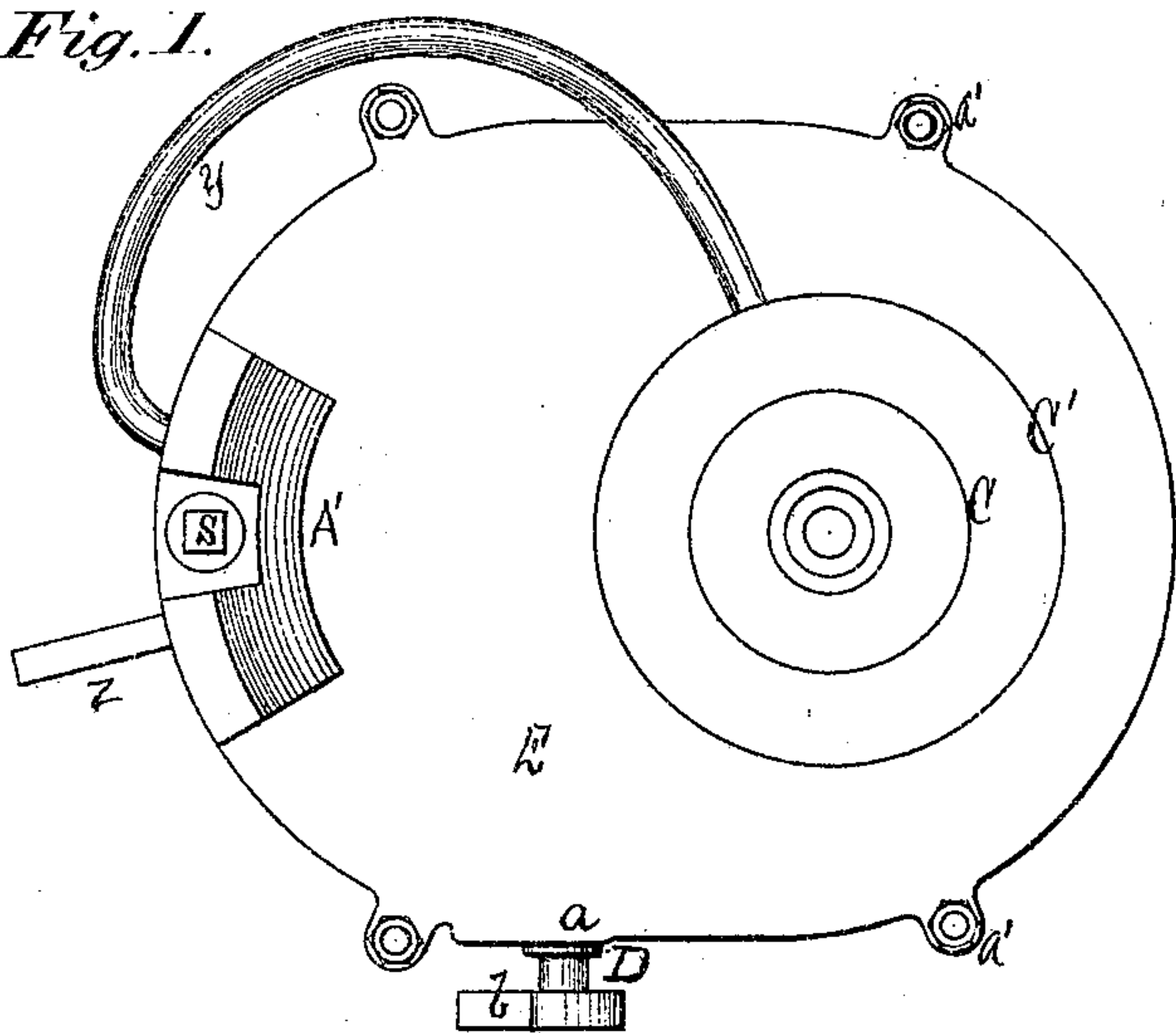


Fig. 2.

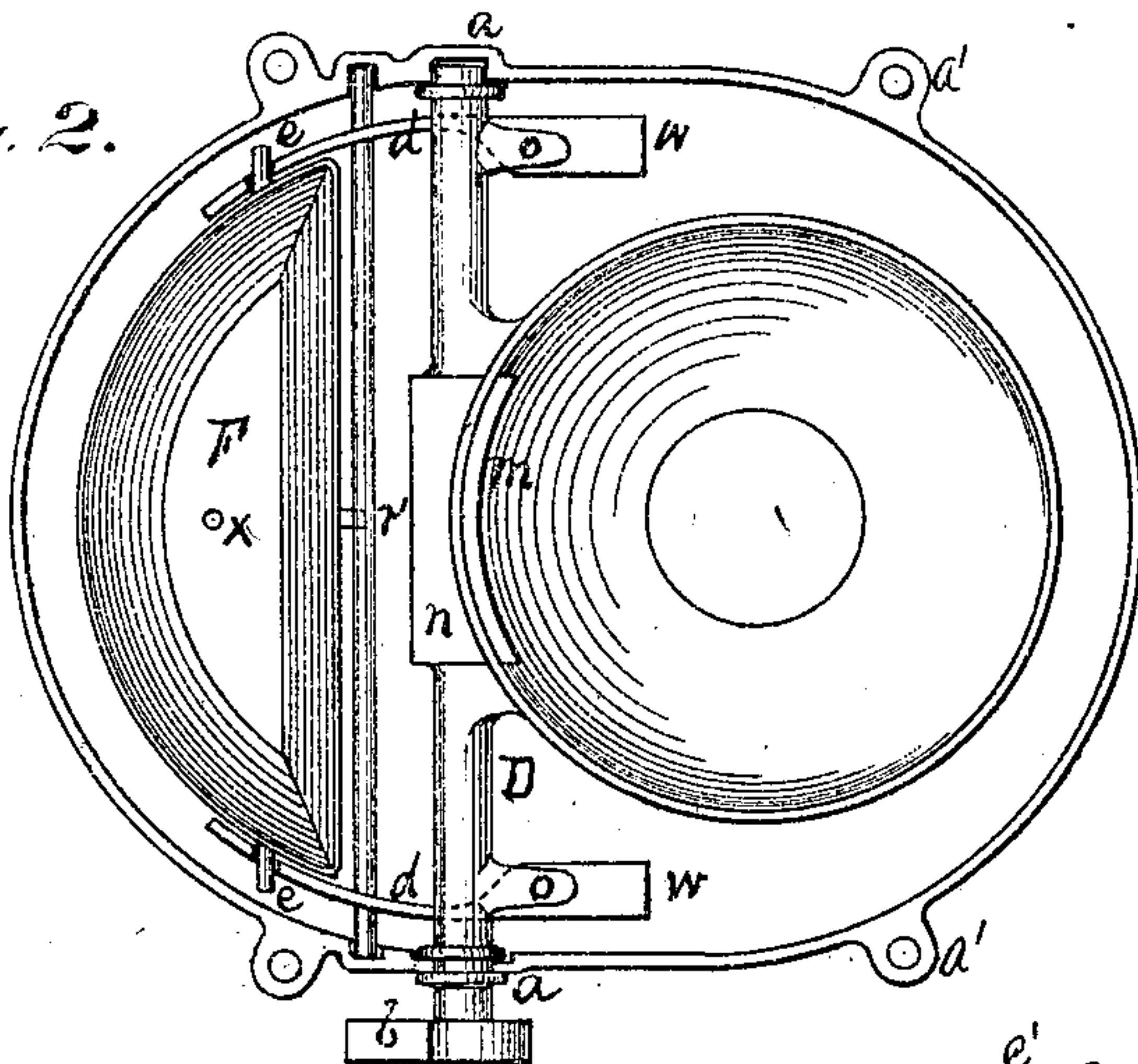


Fig. 3.

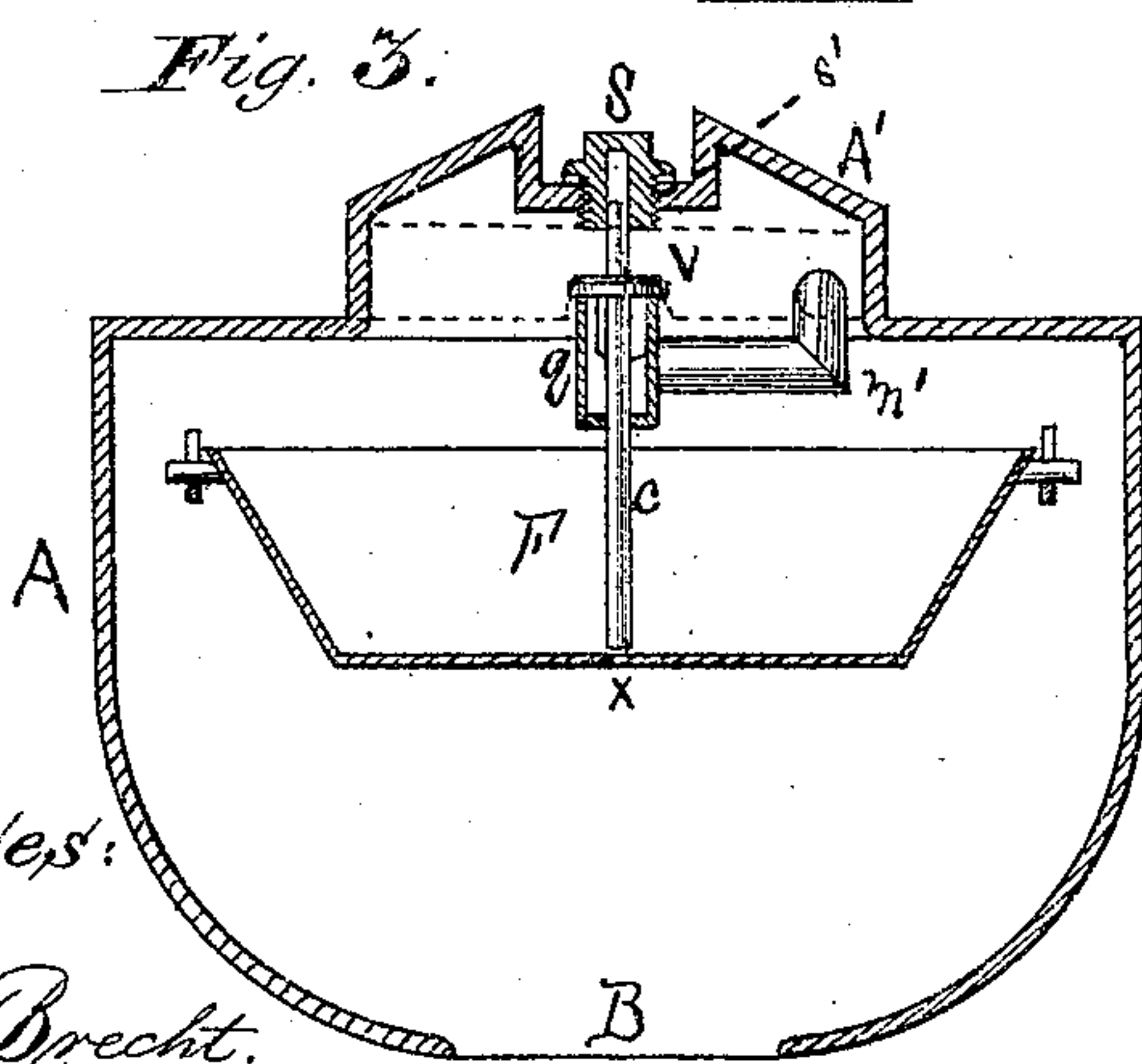
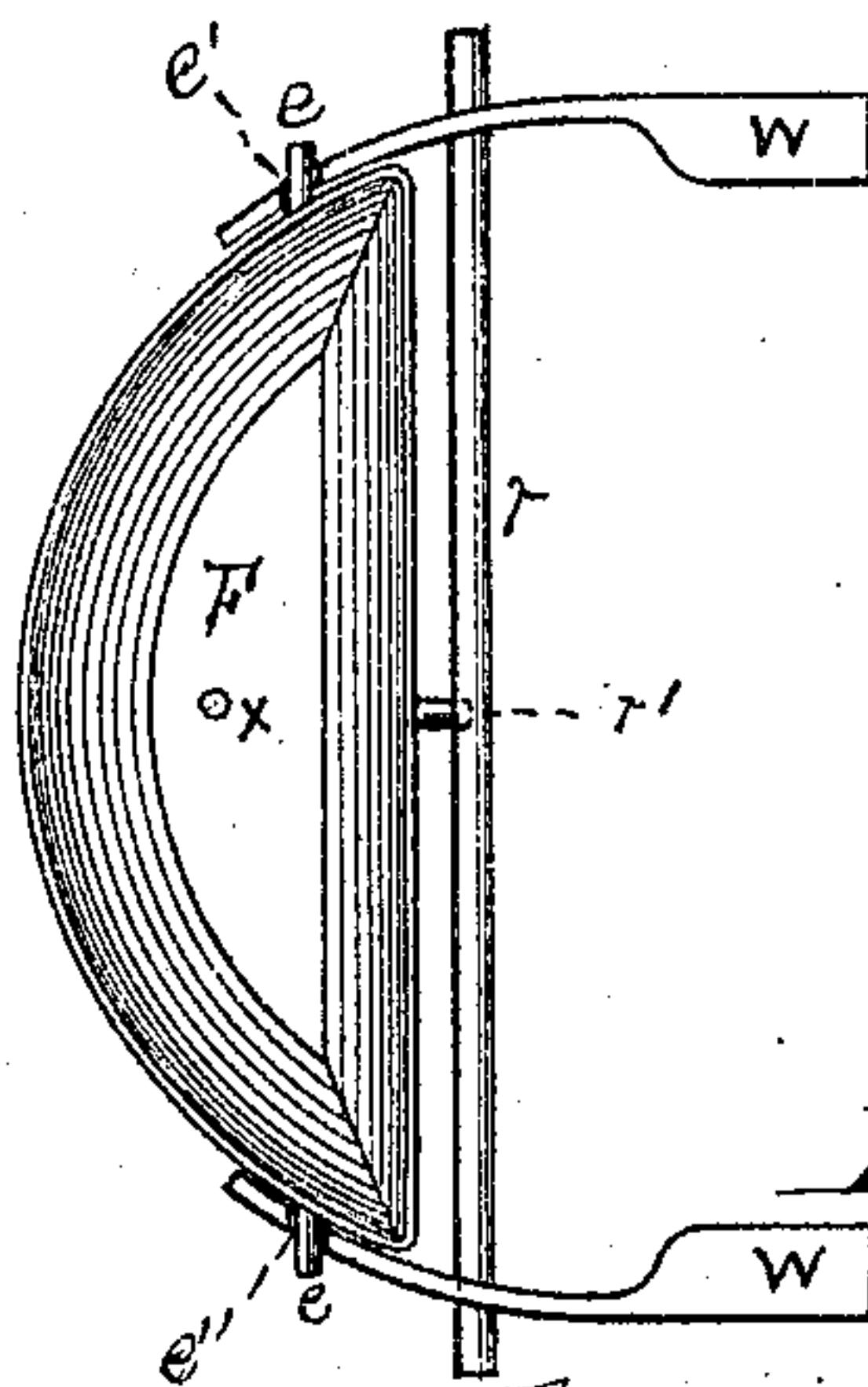


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS MCGHAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN WATER-CLOSETS.

Specification forming part of Letters Patent No. 124,003, dated February 27, 1872; antedated February 10, 1871.

To all whom it may concern:

Be it known that I, FRANCIS MCGHAN, of Washington city and District of Columbia, have invented certain new and useful Improvements in Water-Closets; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing and the letters of reference marked thereon making part of this specification, in which—

Figure 1 is a top view. Fig. 2 is a horizontal sectional or top view with the lid or covering of the reservoir removed. Fig. 3 is a vertical sectional view through the air-chamber, valve, and reservoir. Fig. 4 is a horizontal sectional view of the valve-pan and its levers. This drawing is made on a scale of three inches to the foot.

My invention relates to improvements in water-closets; and, chiefly, consists in securing in the hopper or receiver, at the rear of the ordinary swinging pan, and in such relative position thereto as to receive its overflow, a rocking pan. This rocking pan is to be provided with a center opening or aperture for the discharge of the waste water, and is otherwise to be so constructed and secured in its bearings or supports that while the water required to fill the same shall be allowed to freely pass from the swinging pan, as hereinafter described, the ordinary construction and working of the swinging pan as now in general use shall in no manner be changed. The great superiority of my closet, and in this particular, which is due entirely to the employment of this rocking pan, is that the waste water is so utilized in its overflow from the swinging pan into the rocking pan as to cause the same, by its own gravity, to so depress the rocking pan at the desired moment as to cause the valve-rod to drop and the valve to fall into its seat, and which movement cuts off from the pipe that connects the chamber and basin all further supply of water. Thus it will be seen that in my improvement springs and all other features of a complicated mechanism which have been heretofore employed in all closets of this class, and which, as is well known by all who have used them, to keep in proper condition and in working order require the frequent attention of the plumber, are entirely dispensed with. I use simply a rocking

pan in the rear of the ordinary swinging pan, which, when raised, opens the valve, and, elevating its rod, permits the water to flow to the basin and swinging pan. This continues until the latter is filled, when the waste water overflowing passes to the rocking pan, and by its own gravity so depresses the same as to automatically close the valve. My improvement also consists in casting the upper plate of the hopper, air-chamber—which is also the water-passage—and valve-seat all in one piece. The chamber and plate have a vertical opening through them, and in which works the valve-rod. The upper opening is sufficiently large to allow of the introduction of the valve-rod and head, and is closed after the same are introduced by means of a thumb-screw and valve-nut. The lower section of this opening terminates in a tube or nozzle, the upper face of which forms the valve-seat. To this tube or nozzle is connected the pipe that supplies water to the basin and swinging pan.

The great advantage of this arrangement, independent of its cheapness and simplicity, is that a perfectly air-tight and durable joint is necessarily formed between the chamber and hopper, and this, too, without the aid of packing or any other equivalent device; and, besides, owing to the form of the chamber in its upper section, there is always a stratum of air, which prevents all violence of concussion when the valve is closed.

To enable those skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

A represents the metallic hopper or container, and is cast with the usual bulge to allow of the free movement of the swinging pan. B is an opening at the bottom of the hopper, and is surrounded by a flange, to which is secured the soil-pipe. E is the lid or cover of the hopper or container, and, like the latter, is cast with four or more ears, *a' a'*. These ears are each provided with an opening, and are cast at such relative position to each other that when the lid is placed in proper position on the hopper or container the openings of the one shall be coincident with those of the other, and which permits of their being firmly connected by means of bolts and nuts, as clearly shown in Fig. 1. At or near the center of the lid is an opening, C'. Through this opening

passes the ordinary basin or bowl, and which is of the common form, and attached to the seat in the usual manner. C is the swinging pan; D, its axial shaft; and *b* the slotted crank-arm, attached to the end of the shaft, and which works outside of the hopper A. In the slot of the crank-arm *b* works the stud of the weighted lever. To this lever is pivoted a vertical shaft, which terminates in a knob that falls into a hand-cup on the seat. These latter features are not shown on the drawing, as their form and operation are well understood by all familiar with this class of inventions.

It will be observed that thus far I have described a water-closet in every respect similar to those now in general use. I will now more particularly describe the features that constitute my improvement.

Immediately in the rear of the shaft D, working in suitable recessed bearings in the inner face of the wall of the hopper or container A, is a shaft, *r*. To this shaft are attached two horizontal arms, *d d*. The forward ends of these arms are parallel to each other, and terminate in weighted heads *w w*. The rear ends of these arms are slightly curved so as to conform to the contour of the hopper, and are so recessed as to leave hook-shaped socket-bearings *e e*, for the axial pins of the rocking pan F to rest and work in. This rocking pan F—which in reality is a valve-pan, as through its movement the rod that opens and closes the valve is operated—is of metal, and in general outline is of the form shown in Figs. 2 and 4; its rear section and sides being composed of a continuous curved plate, and its front straight, but not vertical, as it continually recedes from its upper to its lower face. This permits of its being placed in close proximity to the swinging pan, and still in no manner interrupt its free movement. But I desire it distinctly understood that there is nothing arbitrary about this form, as any other which is suited to the purpose and which will accomplish the end aimed to be attained may be employed. *x* is an opening in the center of the pan F, through which is discharged the waste water. *e e* are two lateral pins on the ends of the pan F, which furnish the axial bearings for the pan. These pins fit loosely in the hooked or socket-bearings *e' e'*, and allow of the necessary rocking and depressing of the pan. On the front and at the center of the pan F is a pin, *r'*, which, engaging with the shaft *r*, prevents the pan from tilting, and which insures the discharge of all the waste water through the center opening *x*. Through the rear wall of the swinging pan C is cut an opening, *m*, which communicates with a chute, *n*, secured in the recessed face of the axle-shaft D. Through this opening *m*, and by means of the chute *n*, the overflow of the pan C is conveyed to the pan F, and it is the gravity of this waste water thus received that so depresses the latter as to automatically close the valve, and which shuts off all further supply. On the shaft D are two projections, *o o*,

which are secured at such relative positions thereon that when the pan C falls they shall press or bear on the weighted arms *w w*. A' is the air-chamber, and is cast in one piece with the lid E. This not only saves expense in the manufacture of the article, but also secures a perfectly air-tight joint between the lid and chamber, which is necessary, and this, too, without employing packing or any other equivalent device. The form of this chamber is clearly shown in the drawing, and has for its object not only to provide a receptacle for water but is also so formed as to provide always a stratum of air above the water, which acts as a cushion for the water to press against when the valve is closed, and which avoids all concussion, and renders the action of the valve in closing noiseless. The upper face of this chamber is cast with a countersunk recess, S, through which is an opening that communicates with the opening in the lid E, in which is secured the tube or nozzle *q*. This opening S is of such dimensions as to allow of the introduction of the valve *v* and rod *c*, and is closed by means of a valve-nut, *s'*. The thread of the nut, engaging with the female thread of the opening S, forms a perfectly tight joint. In the center of this nut *s'* is a vertical slot or recess, in which rests the head of the valve-rod *c*. This opening must be sufficiently deep to allow of such of the rod as is necessary to open and close the valve. *q* is a metal tube or nozzle, and is permanently secured to or cast with the lid E. The upper face of this tube is open, and forms the valve-seat, as clearly shown in Fig. 3, and in which figure is also shown the form of the valve, and which consists of a flat head and an angular-shaped plug. The lower section of this tube is closed, except at its center, where there is left a small opening, and which is only sufficiently large to allow of the free movement of the valve-rod through the same. To an opening in the side of this tube *q* is attached an elbow-pipe, and which is connected with the pipe that supplies the basin with water when the valve is opened. *z* is an inlet-pipe, and is connected with the water-main or other source of supply. Through this pipe the chamber A' is kept constantly filled, and the pressure of its water on the valve-head assists in keeping the same down and the valve closed.

From the foregoing description, the operation will be readily understood. The various features of the mechanism are all constructed and arranged, in connection with the hopper or container, as hereinbefore distinctly described. The seat is provided with the usual open bottom, basin, or bowl, and is placed on the lid E of the container in the usual manner, the pipe *y* communicating with the basin through a lateral opening in the ordinary way. I will presume the closet to be in its normal condition—that is, the swinging pan C drawn up, as shown in Fig. 2, its upper face being on a horizontal line with the lid E, and filled with water to the height of the lower edge of its

opening *m*. The air-chamber *A'*, being supplied with water through the inlet-pipe *z*, is kept constantly partially filled with water, say, to such depth as is indicated in dotted lines on Fig. 3. Above this line, and filling the angular recesses of the chamber *A'*, is a stratum or bed of air. The relative proportions of water and air in this chamber will, of course, vary, the same being controlled by the degree of pressure with which the water is supplied. The rocking or valve pan *F* is, through the weighted heads *w w*, so held and counterpoised on its bearings that while its bottom is in immediate contact with the valve-rod *c* it shall still exert no pressure on the same, the pressure of the water in the chamber acting as a weight on the head of the valve *v*, assisting in retaining the same closed. This, as I have said, is the normal condition of the various features of the mechanism. When the closet is to be used, the hand is inserted in the cup, and through the knob the vertical rod is drawn up. This causes the stud of the weighted lever to so travel in the slot of the crank-arm *b* that through the movement of the latter a partial revolution of the axial shaft *D* is secured. This partial revolution of the shaft not only so swings down the pan *C* that its contents shall be emptied, but the same movement of the shaft *D* causes the projecting lips *o o* to so depress the weighted heads *w w* of the arms *d d* as to elevate the bearings of the pan *F*. This elevation of the pan *F*, as the end of the valve-rod *c* is in direct contact with its bottom plate, of course necessitates its elevation also. This opens the valve *v*, and causes the water in a continuous stream to be supplied to the basin or bowl.

At pleasure, the valve *v* is automatically closed in the following manner: Through the knob, the vertical rod that controls the movement of its weighted lever, the slotted crank-arm *b* and axial shaft *D* are depressed. This returns the swinging pan *C* to its former position—that is, its upper face is on a horizontal line with the lid *E*. The water fed by the pipe *y* now passes from the basin directly to this pan.

It will be observed that, although the valve-pan *F* was elevated by the direct pressure of the projections *o o* on the weighted heads *w w* of the arms *d d*, yet when this pressure is removed, as it is when the pan *C* is swung back, the valve-pan does not return, its counterpois-

ing-weights so acting as to cause it to still retain such a position as to prevent the falling of the rod *c*, and, consequently, the closing of the valve. The water, however, passing through the basin to the swinging pan *C*, soon fills it. When it reaches the opening *m* through the chute *n*, the overflow is discharged into the pan *F*. The gravity of this waste water in the pan *F* soon becomes sufficiently great to overcome the resistance of the counterpoising-weights *w w*; and it is the gravity of this waste water alone that so depresses the pan as to free the rod *c* of its support, and which causes the same to drop and close the valve *v*. When the valve closes, the pressure of water, acting against the air in the chamber as against a cushion, meets with a resistance sufficiently yielding to prevent all violence of concussion, and, consequently, noise. The waste water that has filled the pan *F*, and thus automatically closed the valve, is discharged through the opening *x*.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent of the United States, is—

1. The pan *F*, having an opening, *x*, so arranged in the container of a water-closet that it shall receive the overflow of the ordinary swinging pan and through the gravity of the waste water be so operated as to automatically close a valve, for the purpose specified.

2. The pan *F*, secured on arms having weighted heads, swinging pan *C*, shaft *D*, and projections or lips *o o*, when the same are so combined and arranged as to automatically open and close a valve, substantially as described.

3. The air-chamber *A'* with the lid *E*, rod *c*, valve *v*, and nozzle or tube *q*, when the same are so constructed, combined, and arranged as to secure the noiselessly closing of the valve, substantially as described.

4. The pan *F* and its operating mechanism, air-chamber *A'*, rod *c*, valve *v*, and tube or nozzle *q*, when the same are combined and arranged so as to operate substantially as described.

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

FRANCIS MCGHAN.

Witnesses:

EDWIN JAMES,
WILLIAM JONES.