

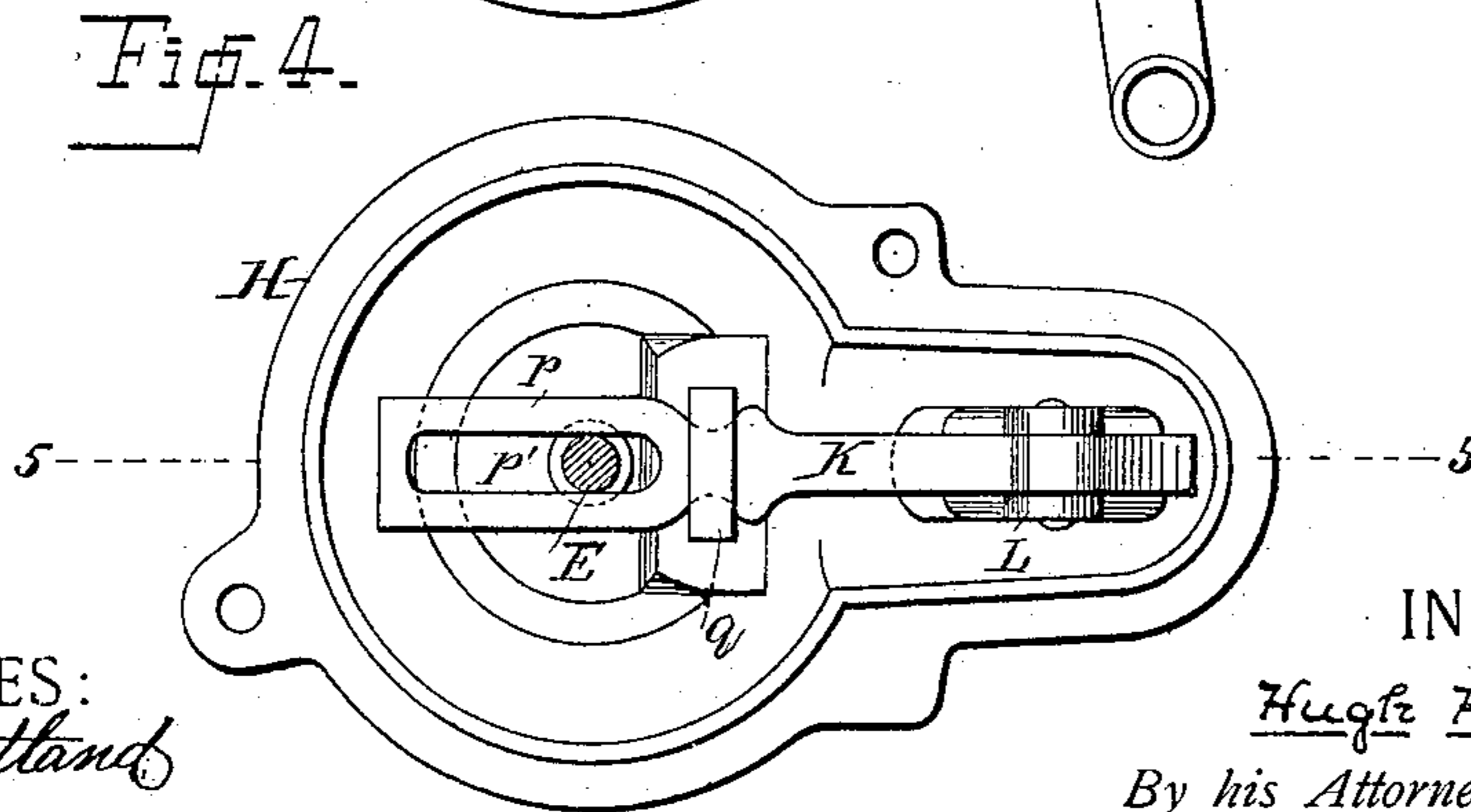
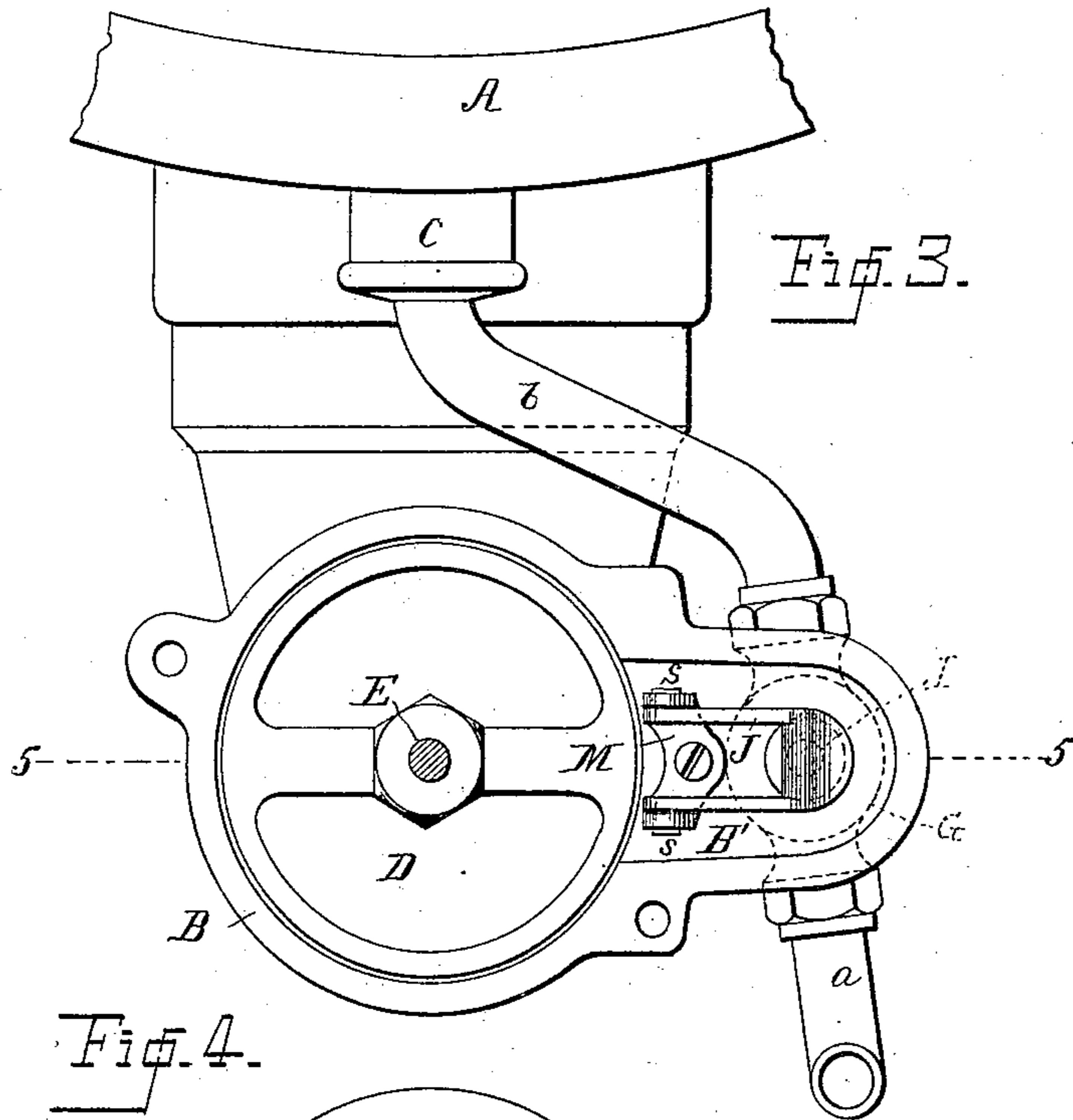
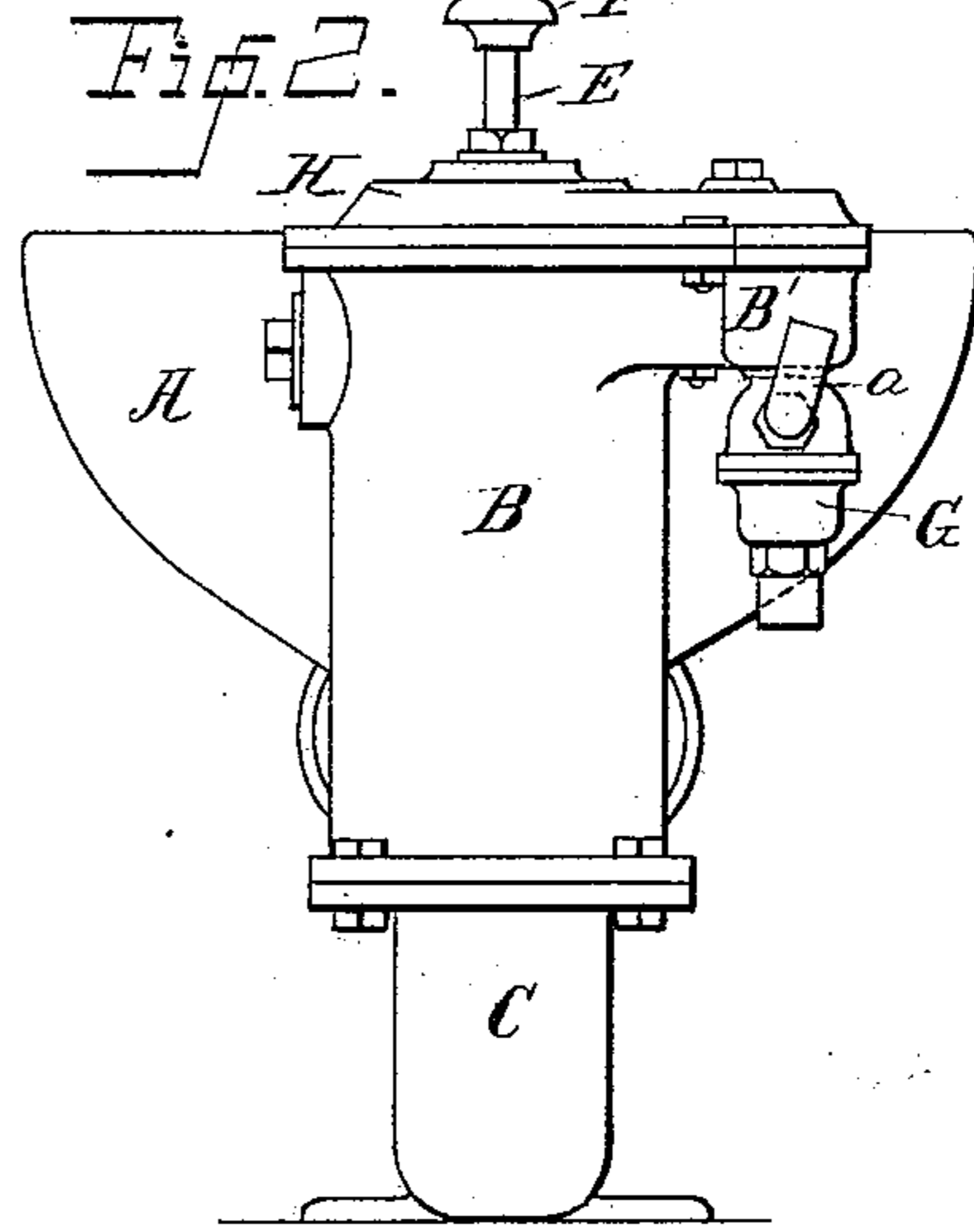
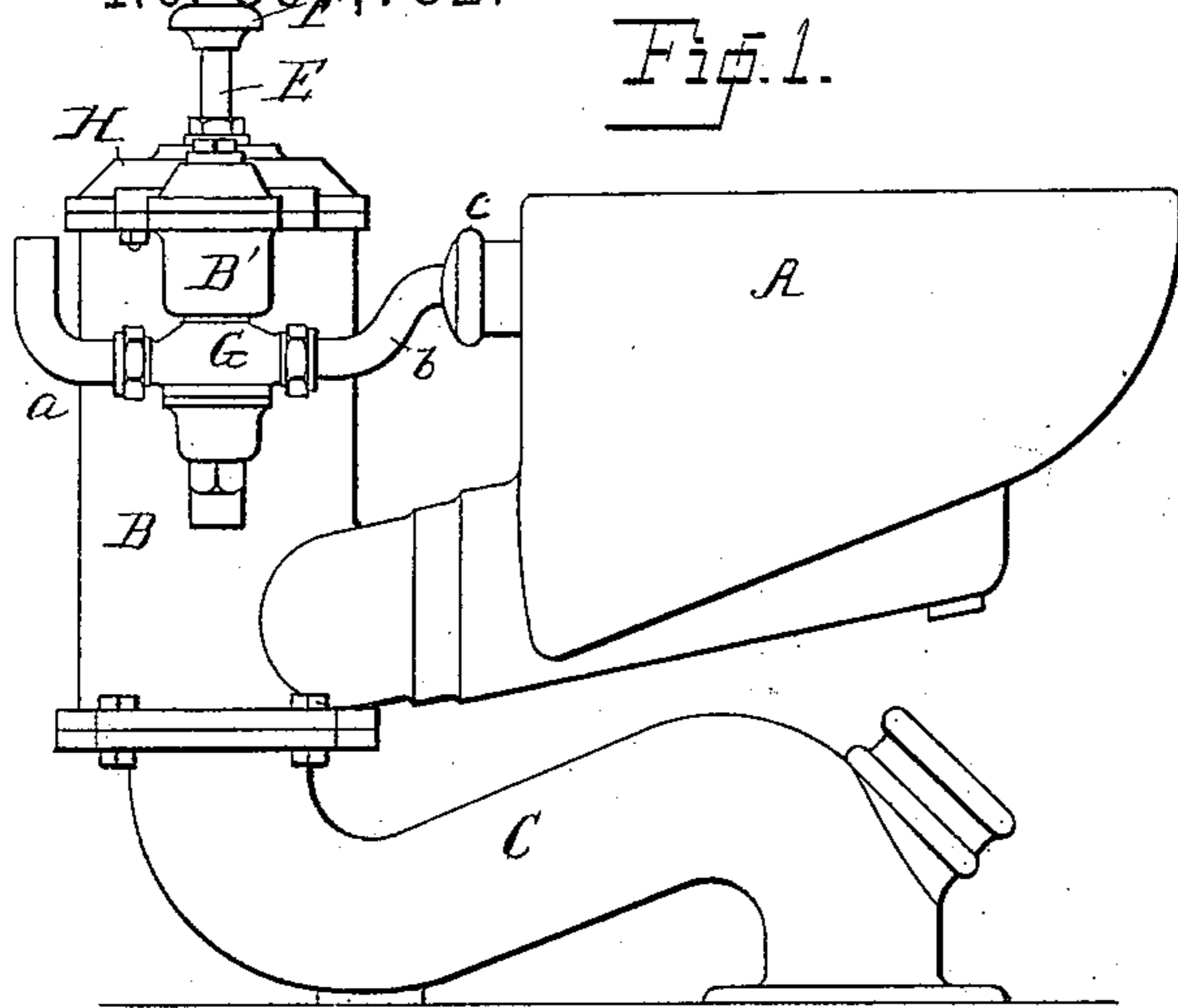
(No Model.)

2 Sheets—Sheet 1.

H. H. CRAIGIE.  
PLUNGER WATER CLOSET.

No. 397,782.

Patented Feb. 12, 1889.



WITNESSES:  
*W. A. Gaultland*  
*Geo. C. Gawn*

INVENTOR:  
*Hugh H. Craigie*  
By his Attorneys,  
*Arthur C. Brown & Co.*

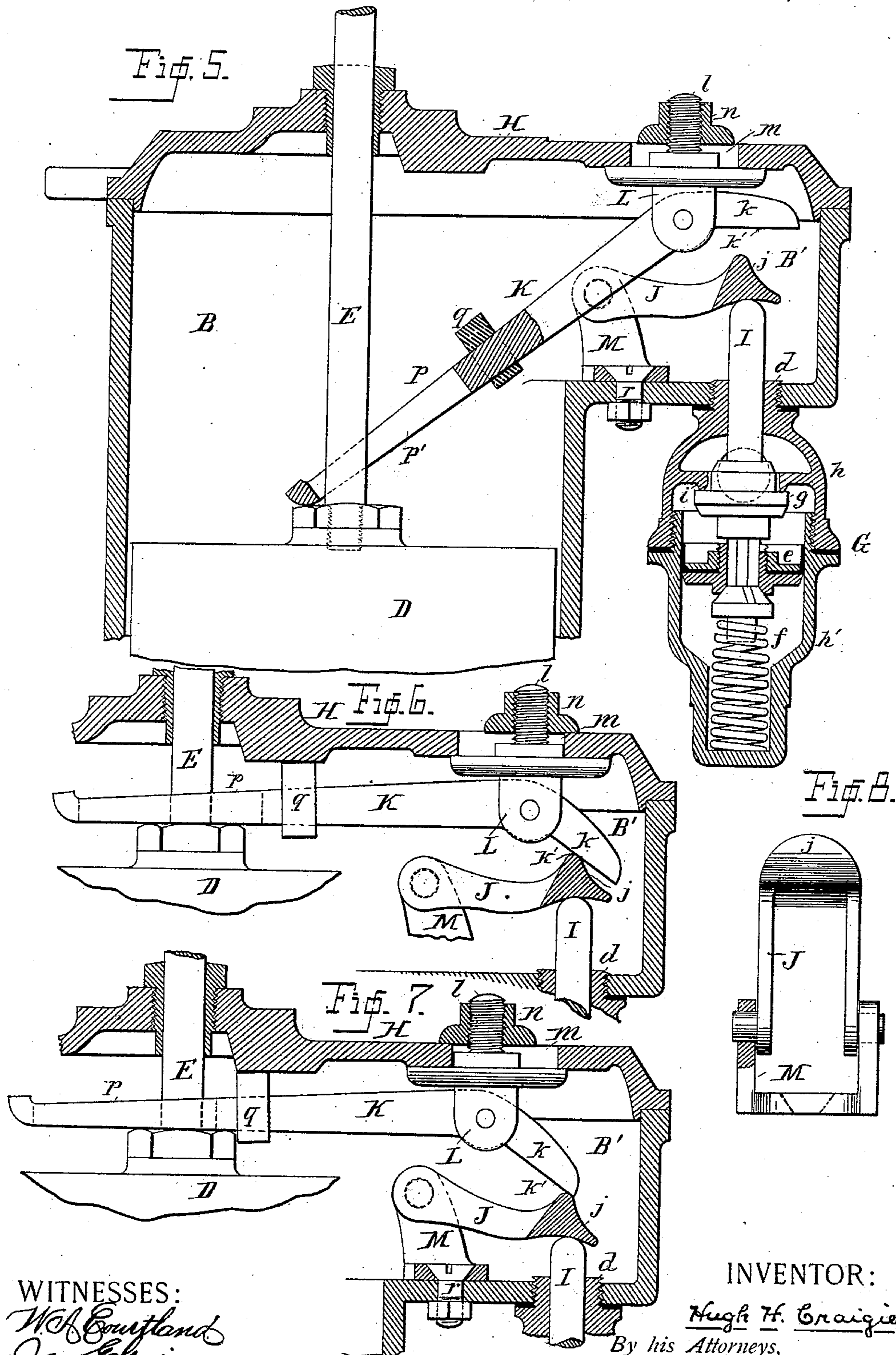
(No Model.)

2 Sheets—Sheet 2.

H. H. CRAIGIE.  
PLUNGER WATER CLOSET.

No. 397,782.

Patented Feb. 12, 1889.



WITNESSES:  
*W. H. Crawford*  
*J. C. Quinn*

INVENTOR:  
*Hugh H. Craigie*  
By his Attorneys,  
*Arthur G. Brasher & Co.*

# UNITED STATES PATENT OFFICE.

HUGH H. CRAIGIE, OF STAMFORD, CONNECTICUT.

## PLUNGER WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 397,782, dated February 12, 1889.

Application filed March 17, 1888. Serial No. 267,564. (No model.)

*To all whom it may concern:*

Be it known that I, HUGH H. CRAIGIE, of Stamford, Fairfield county, Connecticut, have invented certain new and useful Improvements in Plunger Water-Closets, of which the following is a specification.

This invention relates to water-closets to which water is admitted directly from the service-pipe through the medium of a self-closing valve of the type known to the trade as "variable chamber-valves," or other suitable valve, which, when its stem is pressed, is opened, and which closes slowly of itself, thereby admitting the flow of flushing-water for a certain duration.

My invention is especially applicable to plunger-closets or other closets of analogous construction which are flushed through such a valve.

Plunger-closets have heretofore been made with a lever arranged to be vibrated by the lifting of the plunger and when so vibrated to press in the stem of a self-closing flushing-valve in order to start the flow of water to flush the closet. According to my invention this valve-operating lever is arranged wholly within the plunger-chamber, and is fulcrumed to the cover of said chamber, so that by the removal of the cover the lever is removed and the plunger may be freely lifted out. My invention provides also a novel means of varying the length of the flush by an adjustment of the fulcrum of the valve-operating lever, and this adjustment may be made with great facility to any length of flush between the extreme limits. By one feature of my invention this adjustment is effected wholly from the exterior.

In the preferred embodiment of my invention I form the plunger-chamber with a pocket or wing projecting to one side—preferably to the front—and I connect the self-closing or variable chamber-valve to the under side of this pocket with its stem projecting into the cavity thereof, and in the pocket I mount a pivoted dog or lever-arm with its free end resting on the end of the stem. The operating-lever is fulcrumed in a standard fastened to the under side of the cover of the plunger-chamber, and is arranged with its long arm normally projecting downward and resting on the plunger and

with its short arm standing over the pivoted dog, so that when the plunger is lifted the consequent tilting of the lever causes its short arm to press down the dog, and consequently to press down the valve-stem, so that the valve is opened. The lever and dog are so constructed that by the adjustment of one or the other in longitudinal direction the duration of the flush may be altered at will.

The accompanying drawings show my invention as applied to a plunger water-closet of a well-known type.

Figure 1 is a front elevation of the closet. Fig. 2 is a side elevation thereof. Fig. 3 is a fragmentary plan thereof, the cover of the plunger-chamber being removed. Fig. 4 is an inverted plan of the cover of the plunger-chamber on the same scale as Fig. 3. Fig. 5 is a vertical section, cut on the lines 5 5 in Figs. 3 and 4, of the upper part of the plunger-chamber and the valve and its operating devices, the plunger being depressed. Fig. 6 is a fragmentary view of a portion of Fig. 5, showing the operating-lever tilted by the elevation of the plunger and with the parts adjusted for a short wash. Fig. 7 is a similar view to Fig. 6, but showing the parts adjusted for a long wash. Fig. 8 is a rear elevation of the standard M, partly in section, showing the dog J turned into an upright position.

Referring to the drawings, let A designate the bowl of the closet; B, the plunger-chamber; C, the outlet or soil pipe; D, the plunger; E, the rod or spindle thereof, and F the pull-handle or knob. These parts are all in general of the usual construction, and, except in the particulars hereinafter referred to, will need no description.

G is a self-closing flushing-valve of a well-known type, being of the kind known to plumbers as a "variable chamber-valve." The service-pipe *a* is connected to this valve, and a pipe, *b*, leads from the valve to the flushing-connection *c* of the bowl, which communicates with the flushing-rim thereof in the usual manner.

The plunger-chamber B is formed on one side—preferably its front side—and at or close to its top with a lateral projection or pocket, B', the bottom of which is preferably level and the interior of which communicates freely

with the interior of the plunger-chamber. The cover H of the plunger-chamber is formed with a corresponding extension on one side adapted to cover over and close this pocket.

5 Referring to Fig. 5, the variable chamber or self-closing valve G is supported by screwing a threaded neck, *d*, formed at the upper end of its shell *h*, into a threaded hole formed in the flat bottom or floor of the pocket B'.  
 10 The valve G is formed with two shells, *h* and *h'*, screwed together, the lower shell having the cylinder in which works the usual cup-leather piston *e* and the socket beneath for holding the closing-spring *f*. The piston  
 15 *e* is mounted at the lower end of the valve-stem I, which passes up through the neck *d*, and the upper end of which projects into the pocket B'. This stem carries the valve-disk *g*, which closes against the seat *i* in the diaphragm crossing the shell *h*, and which diaphragm separates the inlet-port beneath it, communicating with the service-pipe *a*, from  
 20 the outlet-port above it, communicating with the flushing-pipe *b*, all as usual in valves of this character. The operation of such valves is well known. When the stem I is pressed down, it carries down the valve-disk *g* with it, thereby opening the water-way, and also presses down the piston *e*, which allows the  
 25 water to escape from the chamber beneath it by flowing past its collapsible leather packing. When the valve is released, the spring *f*, which has been compressed, presses upward on the valve-stem I and tends to close the  
 30 valve-disk *g*, its action being resisted by the suction of the piston *e*, which is held down by the atmospheric pressure and can rise only as fast as the water from the space above it can escape down through a minute orifice into the  
 35 chamber beneath it, so that the valve closes slowly to its seat, and the time consumed in reseating itself is proportional to the extent to which the stem I was pressed down.

By the connection of the shell of the valve G to the pocket B' in the manner shown any leakage which may occur from the valve around the valve-stem will escape into the pocket B', and thence into the plunger-chamber, and will do no harm, so that it is unnecessary to pack the neck *d* through which the valve-stem passes. Within the pocket B' is arranged a pivoted dog or a lever-arm, J, the free end of which rests loosely on the head of the stem I, its upper side being beveled at *j*,  
 55 as shown in Figs. 5 to 7.

K is the operating-lever, which is fulcrumed to a standard, L, which is fastened to the under side of the cover H by means of a screw, *l*, passing through a slot, *m*, in the cover, engaged by a nut, *n*, on the top of the cover. The standard L, when the cover is applied, comes into the upper part of the pocket B', and the short arm *k* of the lever K stands directly over the inclined end *j* of the dog J.  
 65 The long arm *p* of the lever K projects into the plunger-chamber B, and its outer portion is forked or slotted at *p'*, so that it passes on

opposite sides of the plunger-rod E. When the plunger D is elevated by pulling up the handle F, the lever K is tilted up, as shown in Figs. 6 and 7, thereby moving its short arm *k* downwardly against the dog J and pressing the latter down, and consequently pressing down the stem I of the flushing-valve G. It will be observed that when the lever K is thus tilted the under side of its arm *k* stands at an incline, as shown in Figs. 6 and 7. It is hence obvious that the extent to which the dog J shall be depressed by a given movement of the lever K depends upon relative positions of the lever and dog, so that the free end of the dog comes nearer to or farther from the fulcrum of the lever K. The nearer the part of the dog which is acted on by the lever comes to the end of the arm *k* the lower will it be depressed, and consequently the wider will the valve G be opened and the longer will be the flush. Conversely, the closer this part of the dog is to the fulcrum of the arm *k* the less distance it will be pressed down and the shorter will be the flush. A means is thus provided for readily determining the length of the flush by effecting a suitable adjustment of the lever K and dog J relatively to one another. This is accomplished in the construction shown by an adjustment of the fulcrum of the lever K. This lever is shown in Fig. 5 in its intermediate position. This adjustment is effected by moving the standard L farther forward or rearward in the slot *m* in the cover H.

Fig. 6 shows the lever adjusted to its extreme forward position, so that it gives the shortest possible flush. This adjustment is made entirely from the exterior, and without necessitating the removal of the cover H, simply by partially screwing the nut *n*, sliding the standard L forward or back as far as may be necessary to give the desired result, and then retightening the nut *n*.

In the construction shown it is the upper edge of the incline *j* on the dog J that is acted upon by the arm *k*. It is obvious, however, that the arm *k* may be made to act upon any part of the dog J to substantially the same effect by properly shaping the parts relatively to one another. The lower side or face, *k'*, of the arm *k* constitutes in effect a cam-surface, and may be straight or curved, as preferred; or the inclined face *j* on the dog may be employed as a cam-surface and the arm *k* be made to make contact with it in its movement without in any way altering the operation; or the dog J may be made adjustable, instead of the lever K, it being immaterial to my invention which of these parts is adjustable so long as the proper relative adjustment is obtained.

The lever K is provided with a buffer, *q*, of soft india-rubber or other suitable material, the function of which is to suppress noise in case the lever K should get into contact with the cover H by the lifting of the plunger too high.

The dog J is preferably constructed of U shape, as shown in Fig. 3, in order to admit the lever K between its legs when the lever is in the position shown in Fig. 5. The dog J is pivoted to a standard, M, which is fastened by a bolt or screw, r, to the floor of the pocket B', and which also is of U shape, having vertical arms or standards projecting from its base-plate and perforated to receive pivotal lugs s s, projecting outwardly from the legs of the dog. The dog and its standard M are pivotally connected by squeezing together the legs of the dog far enough to enable its lugs s s to be entered between the upright arms of the standard M, after which the legs of the dog are pried apart to their normal position, the lugs being simultaneously entered into the bearing-holes in the standard. This makes a cheap and simple construction, which will endure indefinitely. The parts may be put together before the standard M is fastened in place, since the open form of dog enables a screw-driver to be thrust between its legs for turning the screw r.

Fig. 8 is a rear elevation of the standard M, partly in section, showing the dog J turned into an upright position.

The principle function of the dog J is to transmit the downward pressure of the lever K to the valve-stem I, it being so arranged relatively to the valve-stem that its motion, which occurs, of course, in the arc of a circle, is but slightly divergent from a vertical line, and consequently practically all tendency to tilt the stem I or thrust it sidewise is averted. The stem I might be acted upon directly by the lever-arm k, except for the disadvantage of the side thrust of this arm, which would tend to bend the stem sidewise. Such an arrangement would also render the adjustment of the length of the flush by shifting the fulcrum of the lever practically difficult or impossible of accomplishment.

My invention is not necessarily confined in its application to plunger-closets, but may be applied to any closet flushed by a valve of the self-closing order controlling the passage of water from the service-pipe, and which has a lifting handle or knob and its rod through which motion may be communicated to the lever K in the act of flushing the closet in analogous manner to the action of the plunger D.

I claim as my invention the following-defined improvements in valve-flushed water-closets, substantially as hereinbefore specified, viz:

1. In a plunger-closet, the combination, with the plunger-chamber and its cover and the plunger and its lifting-rod, of a self-closing flushing-valve and an operating-lever for transmitting movement to said valve, arranged within the plunger-chamber with its long arm over the plunger to be vibrated by the lifting thereof and pivoted to the under side of the cover, whereby it is removable therewith.

2. In a plunger-closet, the combination, with the plunger-chamber and its cover and the plunger and its lifting-rod, of a self-closing flushing-valve and an operating-lever for transmitting movement to said valve, arranged within the plunger-chamber with its long arm over the plunger to be vibrated by the lifting thereof, and a fulcrum-support to which the lever is pivoted, fastened to the under side of the cover and adjustable thereon in a direction longitudinal of the lever.

3. In a plunger-closet, the combination of a plunger-chamber formed with an open-topped lateral branch or pocket at its top, the cover thereof formed to close said pocket, the plunger and its lifting-rod, a self-closing flushing-valve attached to said plunger-chamber with its stem projecting into the pocket thereof, and an operating-lever arranged within the plunger-chamber with its long arm over the plunger to be vibrated by the lifting thereof and its short arm in said pocket arranged to transmit motion to said valve-stem.

4. In a water-closet, the combination, with a self-closing flushing-valve in the supply-pipe, with a plunger-chamber formed with a lateral branch or pocket into which the stem of said valve projects, and with the lifting handle and rod, of an operating-lever in said plunger-chamber arranged with its long arm over the plunger to be vibrated by the lifting thereof and its short arm in said pocket arranged to transmit movement to the stem of said valve, substantially as set forth.

5. In a water-closet, the combination, with the plunger-chamber, a self-closing flushing-valve in the supply-pipe, the plunger, and its lifting-rod, of an operating-lever having its long arm over the plunger to be vibrated by the lifting thereof and its short arm arranged to transmit movement to the stem of said flushing-valve, and a fulcrum-support to which said lever is fulcrumed, and which support is adjustable in a direction longitudinal of the lever, whereby, by the adjustment of said support, said lever is moved bodily, and the leverage with which and extent to which it acts upon the valve are correspondingly varied, and whereby any desired adjustment of the length of the flush between its extreme limits may be effected.

6. In a water-closet, the combination, with a self-closing flushing-valve in the supply-pipe, with a plunger-chamber into which the stem of said valve projects, and with the lifting handle and rod, of an operating-lever in said chamber arranged to be vibrated by the lifting of the handle, and when so vibrated to transmit motion to the stem of said valve, and a longitudinally-adjustable support for the fulcrum of the lever, whereby, by moving said support, the lever is moved bodily endwise, so that the movement for pressing in said valve-stem is derived from a point closer to or farther from its fulcrum, so that the extent to which the stem shall be pressed in by a given vibration of the lever may be varied.

7. In a water-closet, the combination, with a self-closing flushing-valve in the supply-pipe, and with the lifting handle and rod, of an operating-lever arranged to be vibrated by the lifting of the handle, a pivoted dog arranged to bear on the valve-stem and to receive motion from said lever, and the lever and dog constructed to be adjustable relatively to each other, so that a given vibration of the lever can be made to impart more or less movement to the dog, whereby the duration of the wash can be varied.

8. In a water-closet, the combination, with a self-closing flushing-valve in the supply-pipe, and with the lifting handle and rod, of an operating-lever arranged to be vibrated by the lifting of the handle, and having its shorter arm constructed when thus vibrated to stand at an incline, a pivoted dog arranged to be depressed by said shorter arm and to transmit the motion thereof to the valve-stem, and the lever and dog constructed to be adjustable relatively to each other to bring a higher or lower point on the inclined face of said arm into engagement with the dog, and thereby to impart less or more movement to the valve-stem.

9. In a water-closet, the combination, with a plunger-chamber and its cover and the lifting handle and rod, of a self-closing flushing-valve in the supply-pipe arranged with its stem entering said chamber, an operating-lever within said chamber arranged to be vibrated by the lifting of the handle, and a pivoted dog within said chamber arranged to be depressed by the vibration of said lever to transmit the motion thereof to the valve-stem.

10. In a water-closet, the combination, with the plunger-chamber, the plunger, and its lifting-rod, of a self-closing flushing-valve in the supply-pipe, a pivoted dog or lever arranged to rest against the stem of said valve and approximately perpendicular thereto, whereby the pressure imparted to the stem is always in the same direction, an operating-lever arranged with its long arm extending over the plunger to be tilted by the lifting thereof and its short arm arranged to move in the plane occupied by said dog, and when so tilted to encounter and displace said dog and thereby press in the valve-stem, and an adjustable fulcrum for said operating-lever, whereby the distance between its fulcrum and its point of contact with the dog may be adjusted, thereby correspondingly varying the extent to which the stem is pressed in, and consequently the duration of the flush.

11. The combination, with the plunger-chamber and the self-closing flushing-valve arranged with its stem entering the chamber, of an operating-lever within said chamber arranged, when vibrated, to press in said valve-stem, a fulcrum-support for said lever, and the cover of said chamber having a slot in which said fulcrum-support is adjustably fastened, whereby, by an adjustment of said support in said slot, the position of the lever may be altered and the length of the flush varied.

12. The combination, with the plunger-chamber having a laterally-projecting pocket and the self-closing flushing-valve attached thereto with its stem entering said pocket, of an operating-lever arranged within the chamber and a pivoted dog bearing on the valve-stem and arranged to transmit the movement of the lever thereto and constructed of U shape, whereby the operating-lever is admitted between its legs.

13. In a valve-flushed water-closet, the combination, with the self-closing flushing-valve and its operating-lever, of a pivoted dog bearing on the stem of the valve and arranged to transmit the movement of the lever thereto, constructed of U shape, with pivotal lugs projecting in opposite directions from its legs, and the standard for said dog having perpendicular arms perforated for the reception of said lugs.

14. The combination of the plunger-chamber constructed with a lateral pocket, the self-closing flushing-valve attached to said pocket with its stem projecting into the same, the operating-lever within the chamber having its shorter arm arranged, when vibrated, to transmit motion to said stem, the standard to which said lever is fulcrumed, the cover of the plunger-chamber having a longitudinal slot for the connection of said standard, and a screw accessible from the upper side of the cover for fastening said standard to the cover, whereby, by the adjustment of said standard in said slot, the position of the lever may be altered and the flush varied by an exterior manipulation of the parts.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HUGH H. CRAIGIE.

Witnesses:

ARTHUR C. FRASER,  
JNO. E. GAVIN.