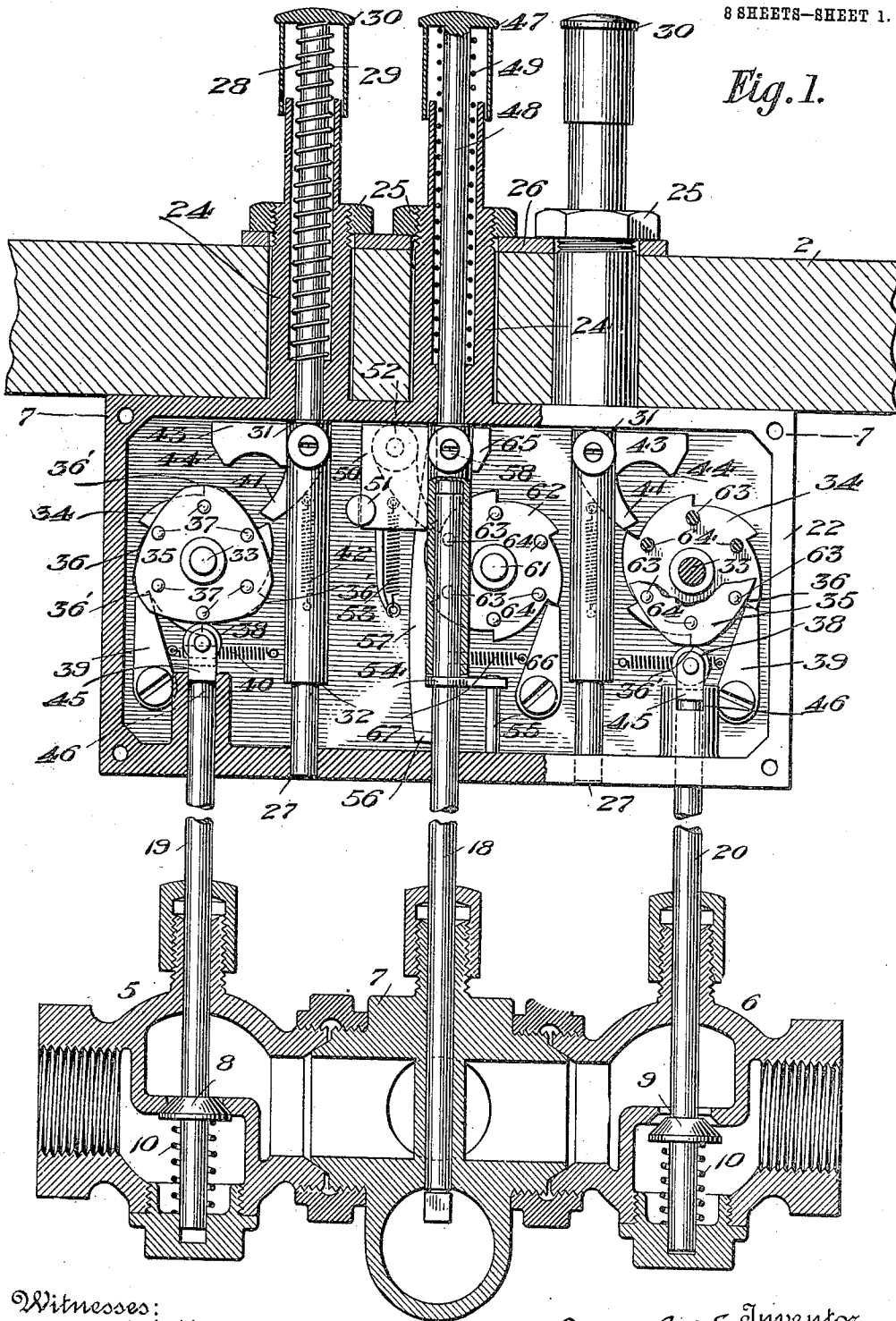


I. G. WATERMAN.
MECHANICAL PUSH BUTTON VALVE.
APPLICATION FILED MAR. 18, 1909.

951,862.

Patented Mar. 15, 1910.

8 SHEETS—SHEET 1.



Witnesses:
Raphael Ketter
Charles Rabut

Inventor
Isaac G. Waterman
By Attorney
L. H. H. H.

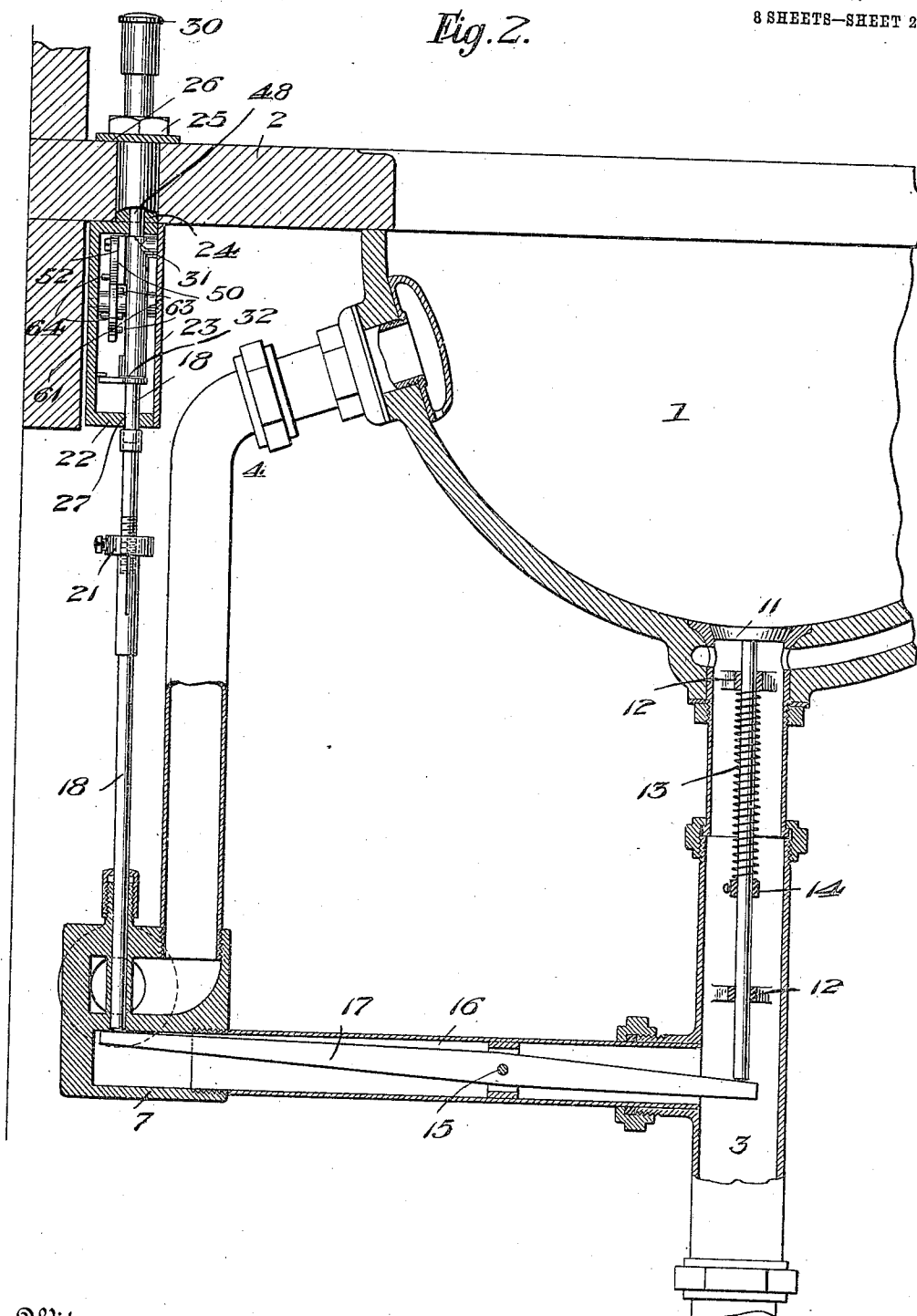
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8 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Raphael Heller
Charles Rabut

Inventor
Isaac G. Waterman
By Attorney
Geo. H. Shanklin

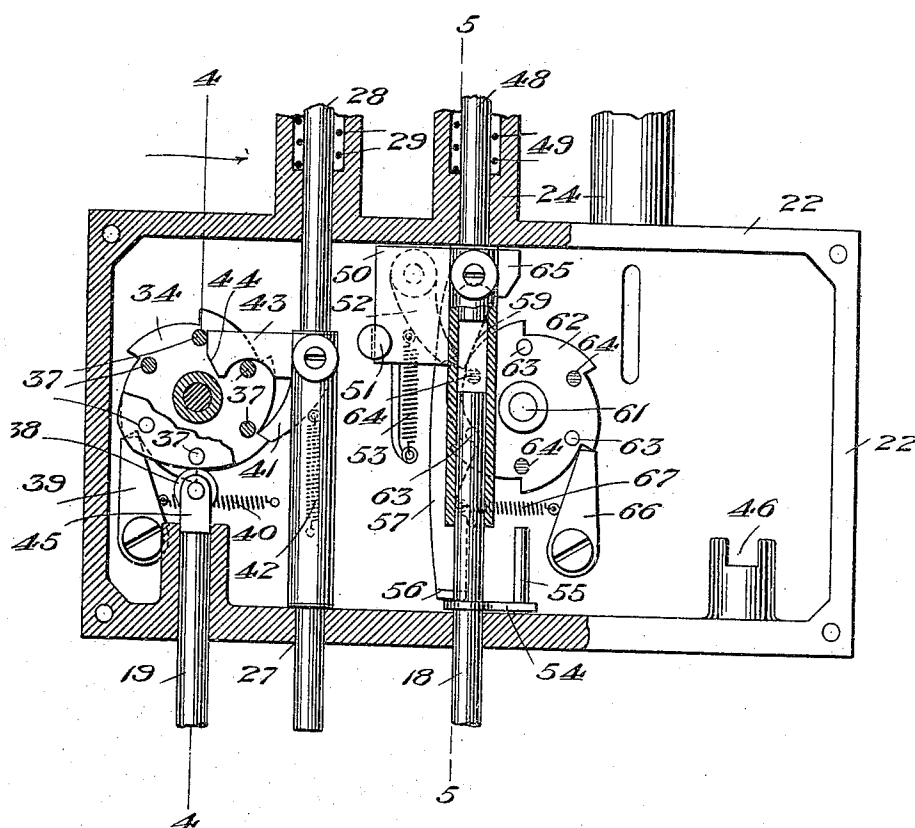
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8 SHEETS—SHEET 3.

Fig. 3.



Witnesses:
Raphaël Ketter
Charles Rabut

Isaac I. Waterman Inventor
By Attorney
Geo. W. Shubert

I. G. WATERMAN.
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8 SHEETS—SHEET 4.

Fig. 4.

Fig. 5.

Fig. 6.

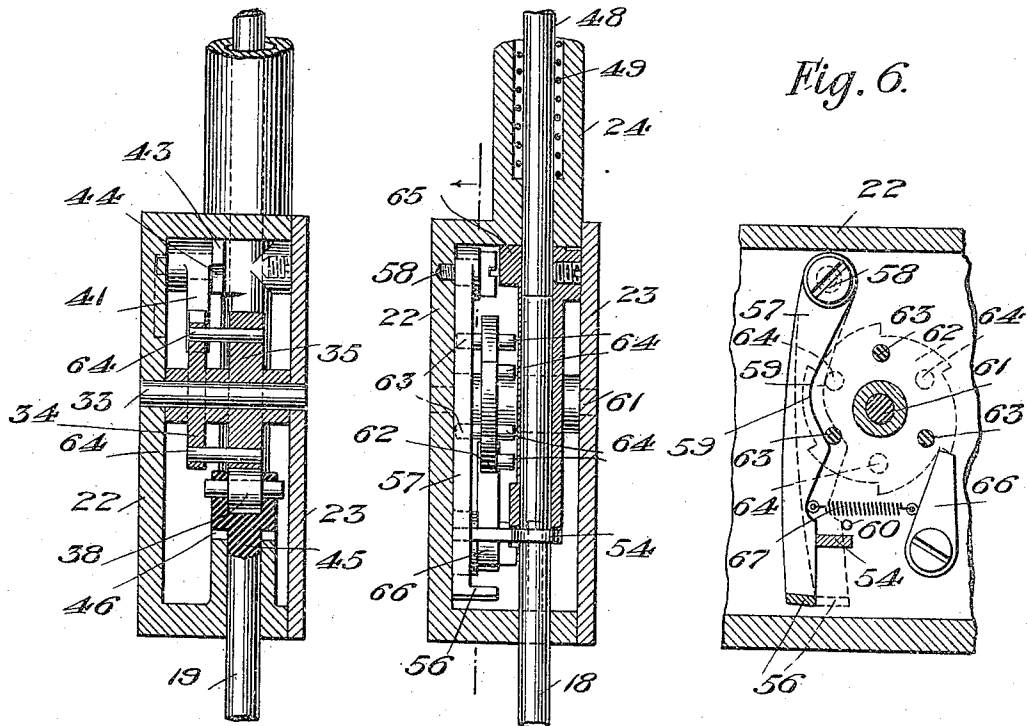
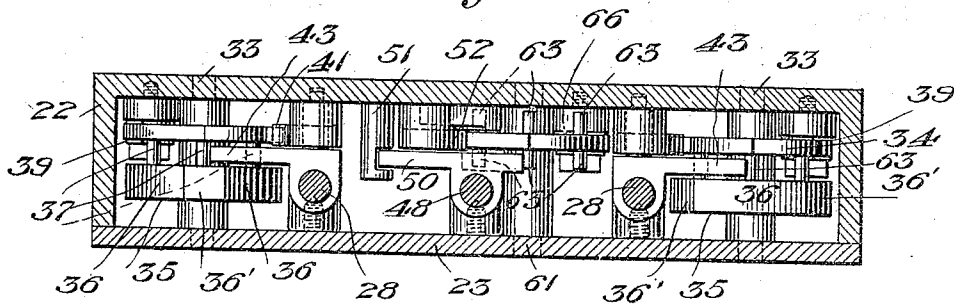


Fig. 7.



Witnesses:
Raphael Heller
Charles Roberts

Inventor
I. G. Waterman
By Attorney
G. H. H. H.

I. G. WATERMAN.
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8 SHEETS—SHEET 5.

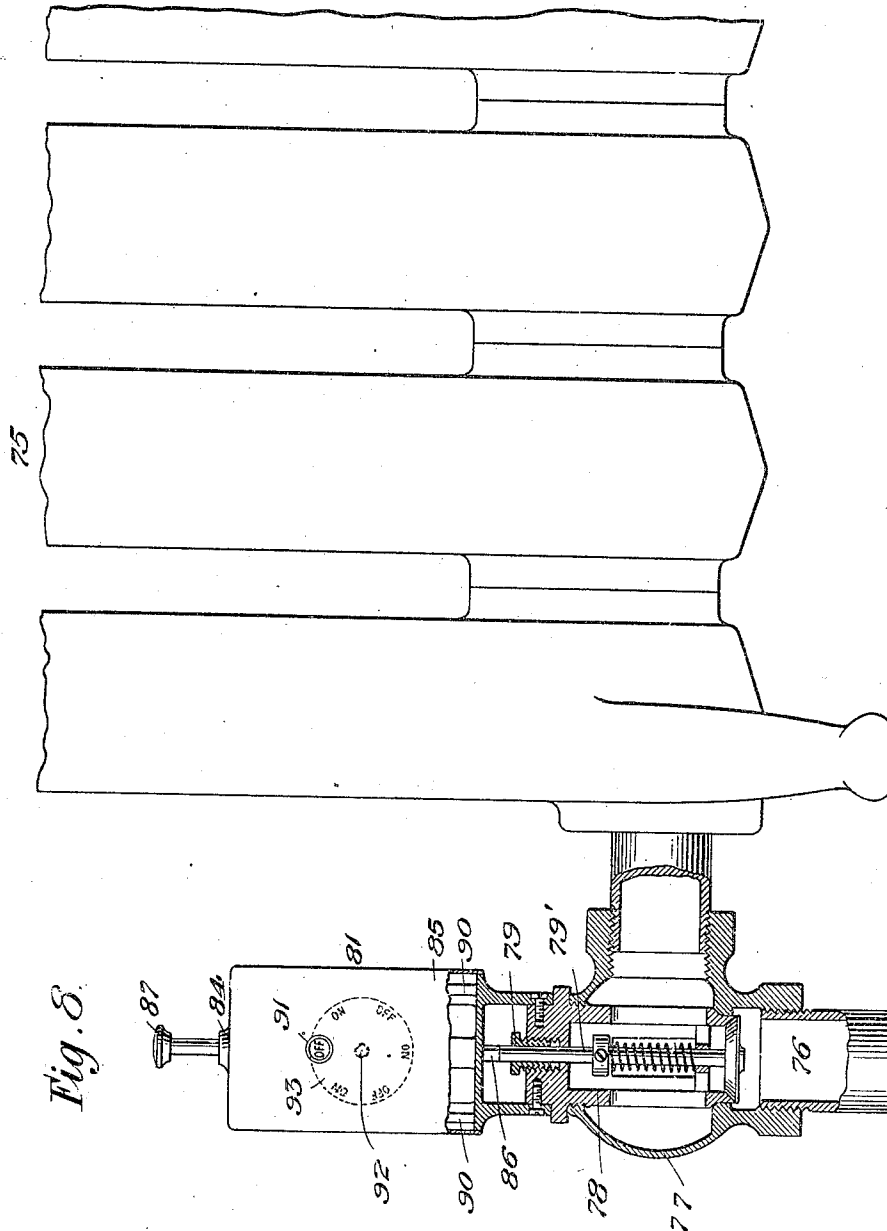


Fig. 8.

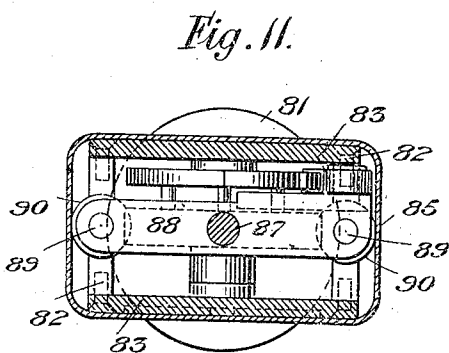
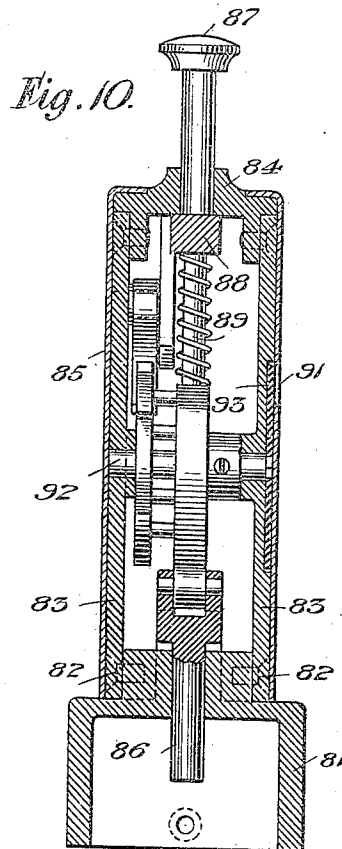
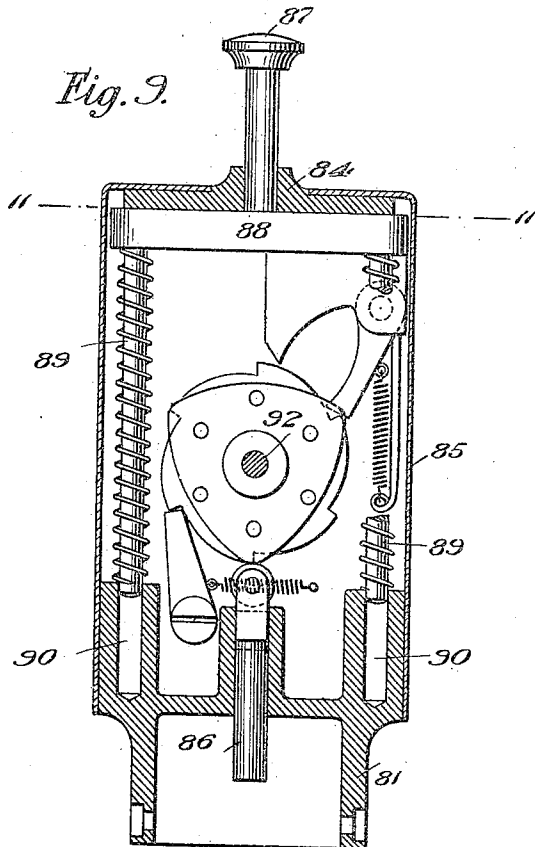
Witnesses:
Raphael Ketter
Charles Robert

Isaac G. Waterman Inventor
By *Attorney* *Lord & Hanks*

I. G. WATERMAN.
MECHANICAL PUSH BUTTON VALVE.
APPLICATION FILED MAR. 18, 1909.

951,862.

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8 SHEETS—SHEET 6.



Witnesses:
Raphaël Ketter
Charles Rabut

Inventor
Isaac G. Waterman
By Attorney
Lo. J. Shanks

I. G. WATERMAN.
MECHANICAL PUSH BUTTON VALVE.
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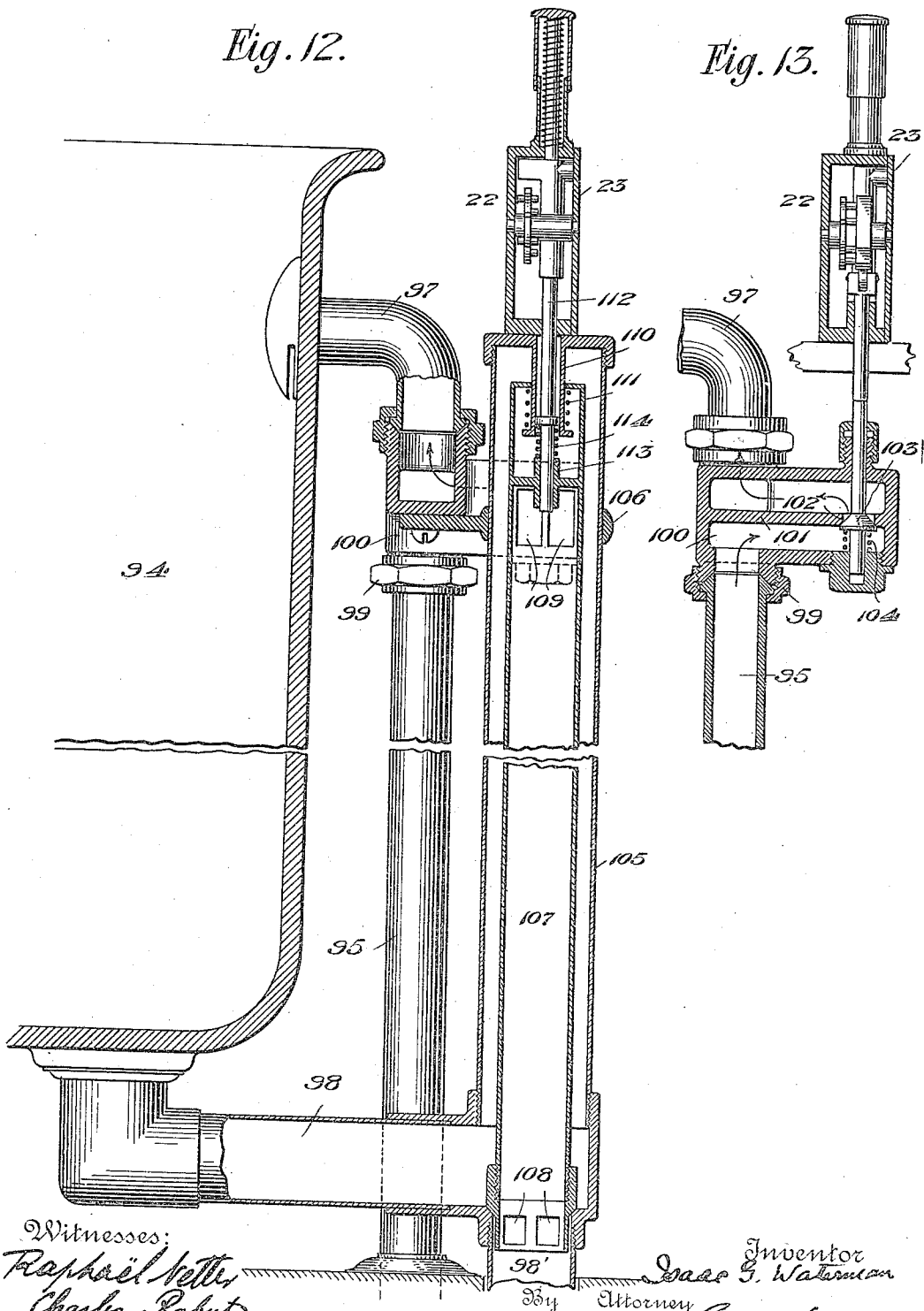
951,862.

Patented Mar. 15, 1910.

8 SHEETS—SHEET 7.

Fig. 12.

Fig. 13.



Witnesses:
Raphaël Vetter
Charles Rabut

Inventor
I. G. Waterman
Attorney
G. H. Schuler

I. G. WATERMAN.
MECHANICAL PUSH BUTTON VALVE.
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8 SHEETS—SHEET 8.

Fig. 14.

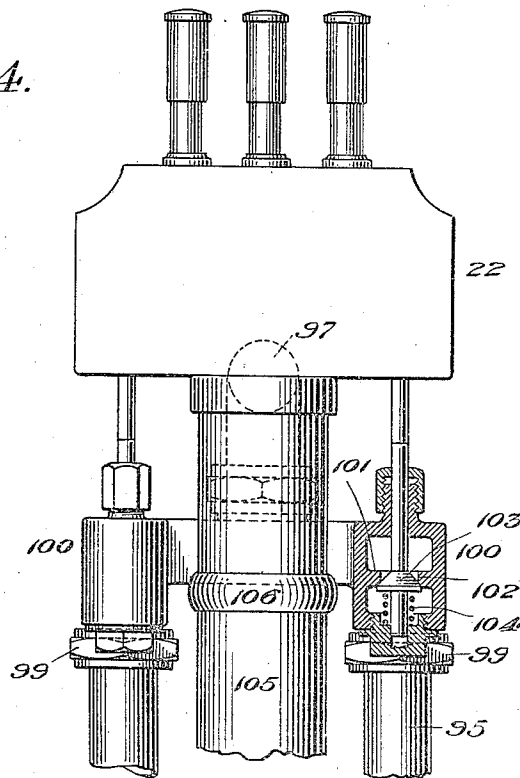
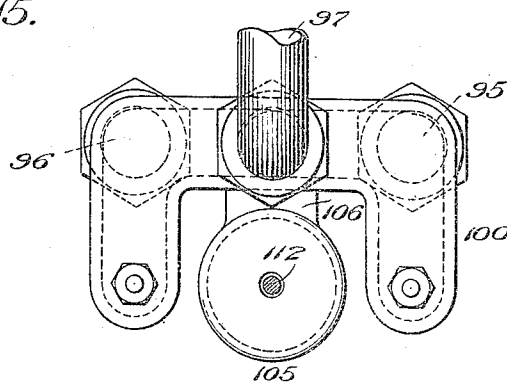


Fig. 15.



Witnesses:
Raphaël Heller
Charles Rabut

Isaac I. Waterman
By Attorney
H. W. Shulze

UNITED STATES PATENT OFFICE.

ISAAC GEORGE WATERMAN, OF NEW YORK, N. Y.

MECHANICAL PUSH-BUTTON VALVE.

951,862.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed March 18, 1909. Serial No. 484,308.

To all whom it may concern:

Be it known that I, ISAAC G. WATERMAN, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Mechanical Push-Button Valves, of which the following is a specification.

The present invention relates to mechanical push button valves.

The present invention has for its object the provision of simple, comparatively inexpensive, and durable mechanical push button mechanisms of novel construction and operation adapted for the operation of valves which will operate positively to alternately open and close the valve on alternate operations of the push button by hand, being especially designed for use in connection with the hot and cold supply valves and the waste valve of lavatories and bath tubs and to operate the valves of steam and hot water radiators, although susceptible of use in connection with any valve.

One object of the invention is the provision of a simple, neat and small mechanical push button valve of novel construction adapted for use on steam, hot water and other radiators, which can be rapidly and easily operated by the hand or foot and, if desired, provided with an indicator showing the condition of the valve.

Another object of the invention is to provide novel mechanical push button mechanism adapted for use in controlling the hot, cold and waste valves of lavatories and bath tubs, which will be arranged in a single casing with novel fittings and push buttons, whereby the complete mechanism may be readily installed, will occupy small space, the push buttons present a neat appearance and be arranged so that no interference will be had with the use of the lavatory or bath tub, and be readily positioned to suit the valve mechanism to be operated thereby, so that an ordinary plumber will be able to install the device without difficulty.

To whatever use the invention may be put, and regardless of the pressure to which the valve is subjected, the construction is such that the pressure exerted by the operator's hand is easy and uniform from the beginning to the conclusion of the movement of the push button, the mechanism interposed between the push button and valve being so constructed that the movement of the push

button transmits to the valve initially a short and progressing movement, which at first is relatively slow and remains so until the valve has received its initial opening movement and the full fluid pressure has thus been overcome, the rate of movement of the valve progressively increasing in the ratio of decrease of the fluid pressure on the valve as the latter opens wider.

The invention is set forth hereinafter and the novel features are recited in the appended claims.

In the accompanying drawings:—Figure 1 is an enlarged view, largely in section, showing the complete push button operating mechanism for the hot, cold and waste valves of a bath tub or lavatory, the hot and cold water valves being shown and a part of the operating mechanism for the waste valve disclosed; Fig. 2, a view showing the invention as used in connection with a lavatory bowl, certain parts being in section, and the waste valve mechanism which is not shown complete in Fig. 1, being disclosed; Fig. 3, a sectional detail of one of the supply valve operating mechanisms and the waste valve operating mechanism of Fig. 1, when the waste valve is open and the supply valve closed; Fig. 4, a vertical section of Fig. 3 on line 4—4; Fig. 5, a similar view on line 5—5 of Fig. 3; Fig. 6, an enlarged detail showing the positions of certain parts of the waste valve operating mechanism when the waste valve is closed; Fig. 7, a horizontal section on line 7—7 of Fig. 1; Fig. 8, a partially sectional view of the invention as applied to a radiator; Fig. 9, an enlarged vertical section of the radiator valve of Fig. 8; Fig. 10, a vertical section of Fig. 9; Fig. 11, a cross-section on line 11—11 of Fig. 9; Fig. 12, a vertical section of the invention as applied to a bath tub; Fig. 13, a detail vertical section through one of the supply valves and pipes of Fig. 12; Fig. 14, a detail elevation, partly in section, of the valve mechanism of Fig. 12; and Fig. 15, a plan view of Fig. 14.

In Figs. 1 and 2, I have shown the invention applied to a lavatory bowl 1, the top of which is shown at 2, the waste pipe at 3, and the supply pipe at 4. The valve casings 5 and 6 are for the supply of hot and cold water from suitable feed pipes into the central fitting 7, from which the pipe 4 leads. The hot and cold water valves are shown at 8 and 9, said valves being made self-

seating by the springs 10. The waste valve 11 has its stem sliding in suitable guides 12 and is made self-seating by a spring 13 interposed between the uppermost guide 12 and a collar 14. Pivoted at 15 in a pipe 16, which is secured into the fitting 7 and into the waste pipe 3, is a lever 17, by which the waste valve is opened and is permitted to close by the action of spring 13. As with the waste valve operating rod 18, so with the hot and cold valve operating rods 19 and 20, a suitable coupling 21 (Fig. 2) may be employed to connect them with the push button operating mechanism, so that the valves may be installed separately from the push button valve operating mechanism and then coupled.

The operating mechanism is contained within a casing 22 having a detachable cover 23 to permit ready access to the parts, the casing being provided with tubular extensions 24, which are adapted to pass through openings in the top 2, and the entire mechanism is secured in position by nuts 25 on the tubular extensions 24, which preferably bear upon a plate 26 in order that they may be screwed down tightly without injury to the top 2. With this arrangement, as seen in Fig. 2, the push button mechanisms are arranged in a row back from the lavatory bowl 1 and occupy small space, beside having a neat appearance, the operating mechanisms being disposed below the top 2.

The hot and cold water supply valves 8 and 9 being operated by identically the same mechanisms, a description of one only will be given. Slidable centrally through the outermost tubular extension 24 and likewise having a slidable bearing at 27, is a slidable rod 28, which is normally held drawn upwardly by a spring 29 seated against a shoulder in the extension 24 and against the push button 30, which telescopes over the upper end of the part 24. A shoulder 31 limits the upward movement of the rod and a shoulder 32 its downward movement.

Journaled in the back and in the movable front 23 of the casing 22 is a shaft 33, to which are secured a six-point ratchet wheel 34 and a three-sided cam 35 whose sides 36 are on relatively flat arcs and having intermediate dwells 36' which are substantially flat. The cam and the ratchet wheel are connected together by six pins 37. It will be understood that the exact number of teeth on the ratchet wheel and the number of sides and dwells of the cam may be changed as found desirable. The upper ends of the stems 19 and 20 carry friction rollers 38 which bear against the respective cams 35. A pivoted pawl 39 is made to engage the teeth of the ratchet wheel 34 by a spring 40. The rod 28 has pivoted thereto a pawl 41, which is thrown toward the ratchet wheel

by a spring 42 secured to the rod 28. The rod 28 carries a stop 43 which has an inclined face 44, the purpose of the stop being to enter between two of the pins 37 and lock the cam and ratchet wheel against further turning when the push button has been moved a sufficient distance to turn the ratchet wheel and cam a suitable distance to open or close the valve (8 or 9) according to the former position of the valve, so that it will be impossible for the valve to be opened and closed on the same operation of the push button (Fig. 3), the inclined part 44 permitting ready entry of the stop 43 between the pins 37 and yet insuring that the said stop be firmly blocked or chocked in between two of said pins. The parts are so timed that when the pins are thus chocked by the stop 43, the pawl 41 will be still in engagement with the ratchet wheel and the pawl 39 will have just dropped back of a tooth of said ratchet wheel.

Assuming that the parts are in the position shown in Fig. 1, the valve 8 is shown closed and the valve 9 open, but in both instances the push buttons for operating said valves are in raised position. The next operation of each push button will change the condition of the valves, the valve 8 opening and the valve 9 closing, but each valve is independently operated, one valve being shown open and the other closed for the purpose of illustration. On depressing the push button controlling valve 8, the pawl 41 engages ratchet wheel 34 and the shape of the cam surfaces is such that the movement of the valve stem 19 is first gradual and after the valve has opened, it becomes more rapid until the anti-friction roller 38 finally rests against the dwell 36'. I have found that this shape of cam is advantageous in this connection, because the valve is opened against the pressure of the water, which is sometimes very high, and by having the movement slight at the outset, the operation of the push button is rendered easy. The configuration of the surfaces 36 is such that on rotation of the cam 35, the pressure exerted by the surface 36 on the valve stem initially imparts a relatively slow opening movement to the valve which becomes more rapid as the cam turns further. If the fluid pressure on the valve be high, it is at first gradually overcome and then, by reason of the opening of the valve, said fluid pressure having diminished, the valve meets with less resistance and hence the configuration of the surface 36 is such that the movement of the valve increases in speed in proportion to the decrease in the fluid pressure. During this movement of the valve, the pressure exerted by the operator's hand on the push button is easy and uniform. When the roller 38 reaches the dwell 36', the pawl 39 drops back of a tooth of the ratchet wheel and the stop 43

is then chocked between two of the pins 37, as shown in Fig. 3, although Fig. 3 shows the valve in its closed position at the end of the downward stroke of the rod 28. A succeeding operation of the push button 30 results in a similar operation of the parts, except that the rise of the rod 19 on passing from the dwell 36' is comparatively rapid.

Alternate operations of the push button cause alternate opening and closing of the valve, but a complete cycle of operation of the push button, that is down and then up, is necessary before the valve can be again operated, the valve remaining where positioned by the cam. To prevent turning of the valve stem, it may be provided with a squared part 45 to slide in a notch 46 on the casing. The central tubular extension 24 has telescoped thereover a push button 47 connected to a rod 48 operated by a spring 49, as previously described. This rod carries a plate 50 which slides in a guide 51 and carries a pivoted pawl 52 which is operated by a spring 53 secured to an extension on the plate 50. At its lower end the rod 48 is tubular and loosely receives the rod 18 which operates the lever 17. The rod 18 carries a keeper 54 which straddles a pin 55 on case 22, thus guiding the rod 18 in its movements, but the keeper is adapted to be engaged by the lower end 56 of a latch 57 (Fig. 6) which is pivoted to the case 22 at 58, being provided with a cam surface 59 and limited in its play by a pin 60. The keeper 54 is adapted to be held under the foot 56, as shown in Fig. 3, and thus keep the waste valve 11 open against the tension of its spring 13, or to assume the position shown in Figs. 1 and 6 when the waste valve is released and closes.

Journalled in the sides of the case 22 is a shaft 61 which carries a ratchet wheel 62, which is provided with a plurality of pins, six in number in the present instance, three of which 63 extend out from both sides from the ratchet wheel (Fig. 5), while the remaining pins 64 merely extend outwardly from one face of the ratchet wheel, and with the pins 63 on that face of the ratchet wheel, afford means to be engaged by a stop 65 carried by the rod 48 to chock the rotation of the ratchet wheel in the manner previously described. A pivoted pawl 66 coöperates with the ratchet wheel in the manner previously described in connection with pawl 39, this pawl and the latch 57 being connected by a coil spring 67 so that both will be drawn toward the ratchet wheel. Obviously, the pawl could have its own spring and the latch its own spring.

When the mechanism for operating the waste valve is in the position shown in Figs. 1, 2 and 6, the waste valve 11 is closed. At this time, one of the pins 63 is in engagement with the crest of the cam 59, and conse-

quently, the latch 57 cannot engage the keeper 54, but upon pushing down the push button 47, the pawl 52 will turn the ratchet wheel 62 and the pin 63, which previously engaged the cam 59, will pass from said cam, and further movement of the rod 48 will finally bring the keeper 54 below the foot 56, whereupon the spring 67 will draw the latch 57 to the rod and position the parts as shown in Fig. 3, this being permitted because the succeeding pin 63 then lies in the hollow or depression of the cam 59. When the parts have assumed this position, the stop 65 has chocked between pins 63 and 64. When the push button is released the parts remain in the stated position and the waste valve 11 remains open. On a succeeding depression of the push button 47, the ratchet wheel is again turned and the pin 63, which has previously lain in the depression of the cam 59, rides against the crest of the cam and pushes the latch 59 to the left so that the foot 56 releases the keeper 54, and the spring 13 then asserts itself, closes valve 11, and raises the rod 18 to the position shown in Fig. 1.

Each valve can be operated independently or any two or all three may be operated simultaneously.

Referring now to Figs. 8, 9, 10, 11, where a form of the valve especially adapted for use on radiators is shown, the radiator 75 has a supply pipe 76 and valve casing 77 in which is screwed an open frame 78 having a valve seat 79 and suitable guides for the valve stem 79' which is so actuated by a spring 80 that the valve has a tendency to close. Detachably secured to the upper end of the frame 78 is a casing section 81 to which is secured at 82 (Fig. 10) uprights 83 connected at their upper ends by a head 84. A shell 85 incloses the parts. Slidable through the casing section 81 is a rod 86 corresponding to the rods 18, 19 and 20 and carrying a roller at its end, said rod resting upon the stem 79'. By this construction, the parts of the structure are rendered easily separable to facilitate installation, removal or repairs. The operating mechanism is substantially the same as heretofore set forth except that the push button 87, which slides through the member 84, is connected to a cross-head 88 having spring actuated guiding rods 89, which are received in sockets 90 in the section 81. The pipe 76 may be extended up to the upper part of the radiator so that the push button may be readily operated without requiring stooping on the part of the user, or, it may be disposed as shown in Fig. 8 and the push button operated by the foot.

The present valve mechanism is particularly adapted for use on radiators, as it affords means for quickly and easily completely opening or closing the valve.

In order that the position of the valve may be readily known, I prefer to provide a sight opening 91 in the shell 85 and to secure to the axle or shaft 92 of the cam, a circular indicator disk 93 which will alternately display "On" or "Off" or similar indicia.

In Figs. 12 to 15 inclusive, the adaptation of the invention to a bath tub is shown. Here the tub is designated by the numeral 94 which is provided with the hot and cold supply pipes 95 and 96 communicating with the pipe 97 which discharges into the tub and with the waste pipe 98.

Referring to Fig. 13, the arrangement of the hot and cold water pipes 95 and 96 and their valves is shown. The upper end of the pipe is connected by a coupling 99 to a U-shaped fitting 100, the two legs of which are each provided with a partition 101 having a valve seat 102 for the valve 103 which is seated by spring 104 in the manner set forth in connection with the other forms of the invention.

Rising between the legs of the fitting 100 and screwed into the waste pipe 98, is the overflow pipe 105 which is secured to the fitting 100 by a bracket 106. The waste valve 107 is hollow and tubular, having at its lower end ports 108 so that when it is raised the water may flow from the pipe 98 into the drain pipe 98', and provided at its upper part with ports 109 to receive the water rising in the pipe 105 and thus maintain the level in the bath tub at the height desired. Depending from the cap of the pipe 105 is a tubular section 110 which is surrounded by a catch spring 111 which bears against the upper end of waste valve 107 and tends to unseat said waste valve. The stem 112 of the operating mechanism extends within the part 110 and loosely into the guide 113 which is carried by the valve 107, said stem 112 having a collar between which and the guide 113 is a spring 114. The spring 114, supplemented by the gravitational action of the waste valve 107 is sufficient, when the spring 114 is compressed, as for instance, when the cam has forced down the valve stem in the manner shown at the right of Fig. 1, to seat the waste valve against the upward lift of the spring 111, but upon the operation of the mechanism so that the valve stem is released, as shown at the left of Fig. 1, the force of the spring 111 is such that the valve is automatically opened.

The operating mechanism for the hot and cold water valves and the waste valve is the same as shown in Fig. 1, and is mounted in any suitable manner upon the upper end of the pipe 105 and the stem 112 is made separate from the valve operating part thereof in the manner shown in Figs. 13 and 14, so that the said operating mechanism may be conveniently installed.

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

1. In a mechanical push button valve, the combination with a valve, of a ratchet wheel, a push button, means actuated by the ratchet wheel for operating the valve, means for operating the ratchet wheel by the push button, and means for locking the ratchet wheel against rotation in either direction when the valve is in a predetermined position.

2. In a mechanical push button valve, the combination with a valve, of a ratchet wheel, a push button, means actuated by the ratchet wheel for operating the valve, means for operating the ratchet wheel by the push button, and a device carried by the push button adapted to cooperate with the ratchet wheel and lock it against rotation in either direction when the valve is in a predetermined position.

3. In a mechanical push button valve, the combination with a valve, of a ratchet wheel, a push button, means actuated by the ratchet wheel for operating the valve, means for operating the ratchet wheel by the push button, a plurality of members on the ratchet wheel, and a stop carried by the push button which is adapted to chock between certain of said members and lock the ratchet wheel against rotation in either direction when the valve is in a predetermined position.

4. In a mechanical push button valve, the combination with a valve, of a stem for operating the valve, a push button, a ratchet wheel, means for turning the ratchet wheel by the operation of the push button, and a latch operated by the ratchet wheel adapted to alternately lock and release the stem on alternate operations of the push button.

5. In a mechanical push button valve, the combination with a valve, of a stem for operating the valve, a push button, a ratchet wheel, means for turning the ratchet wheel by the operation of the push button, pins on the ratchet wheel, a latch adapted to be operated by one of said pins on alternate complete operations of the push button and to alternately engage and release the stem aforesaid, and a spring cooperating with said latch, whereby alternate complete operations of the push button alternately open and close the valve.

6. In a mechanical push button valve, the combination with a valve, of a stem for operating the valve, a push button, a ratchet wheel, means for turning the ratchet wheel by the operation of the push button, pins on the ratchet wheel, a latch adapted to be operated by one of said pins on alternate complete operations of the push button and to alternately engage and release the stem aforesaid, a spring cooperating with said latch, whereby alternate complete operations of the push button alternately open and

close the valve, and means operated by the push button adapted to cooperate with the ratchet wheel on each operation of said push button to lock said ratchet wheel against rotation in either direction when the parts are in a predetermined position.

7. In a mechanically operated valve, the combination with a valve, of a movable hand-operated device, and means interposed between the valve and the hand-operated device cooperating with them, by means of which there is imparted to the valve an opening movement which increases in speed as the pressure on the valve is relieved by reason of the opening movement thereof with a uniform movement of the hand-operated device.

8. In a mechanically operated valve, the combination with a valve, of a hand-operated device, and a cam cooperating with the valve and with the hand-operated device and being of a configuration by means of which there is imparted to the valve an opening movement which increases in speed as the pressure on the valve is relieved by reason of the opening movement thereof with a uniform movement of the hand-operated device.

In testimony whereof, I hereunto affix my signature in presence of two witnesses.

ISAAC GEORGE WATERMAN.

Witnesses:

CHARLES ROBERT,
EDWARD A. DAHLKE.