

J. L. GISH.
 REGULATED AUTOMATIC CLOSING VALVE.
 APPLICATION FILED OCT. 11, 1911.

1,042,546.

Patented Oct. 29, 1912.
 2 SHEETS—SHEET 1.

Fig. 1.

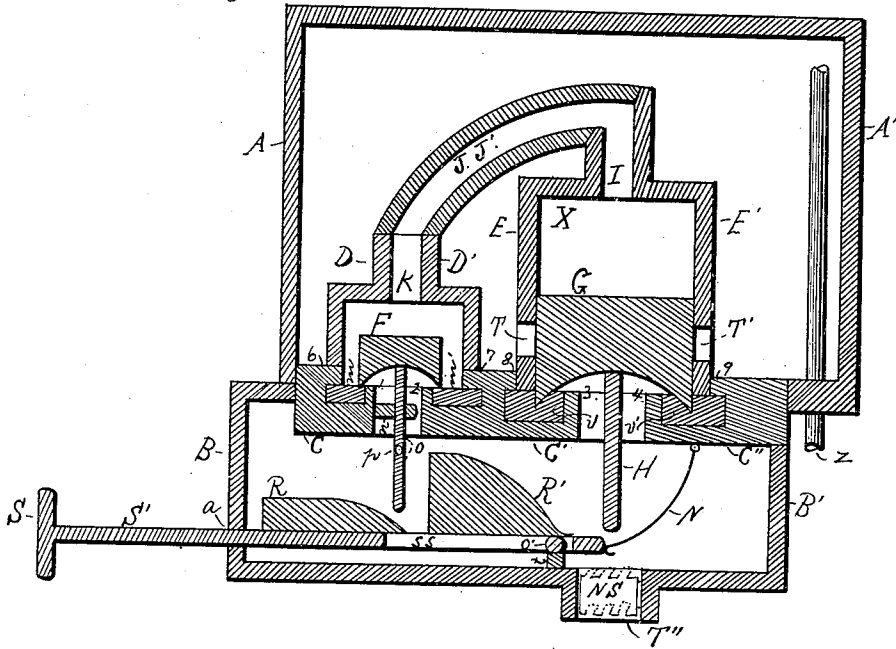
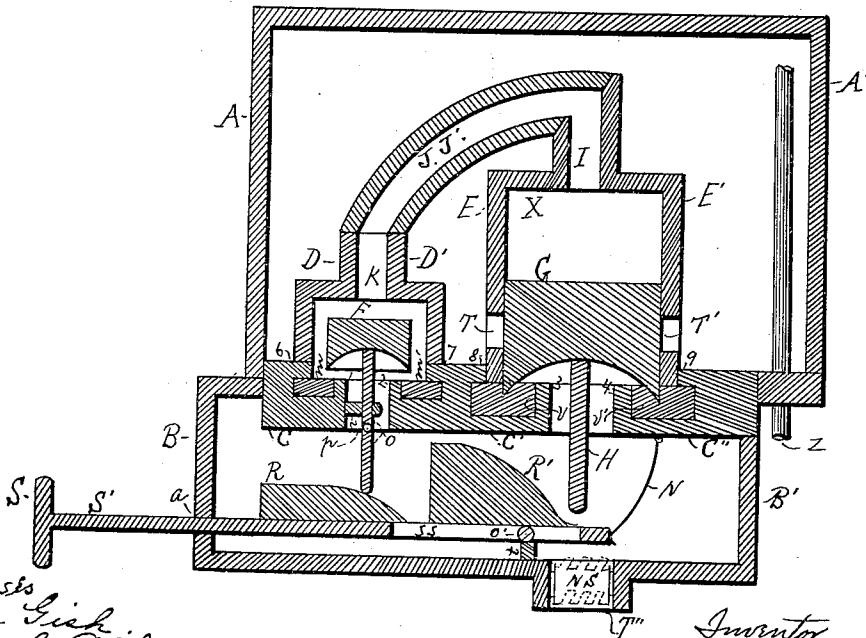


Fig. 2.



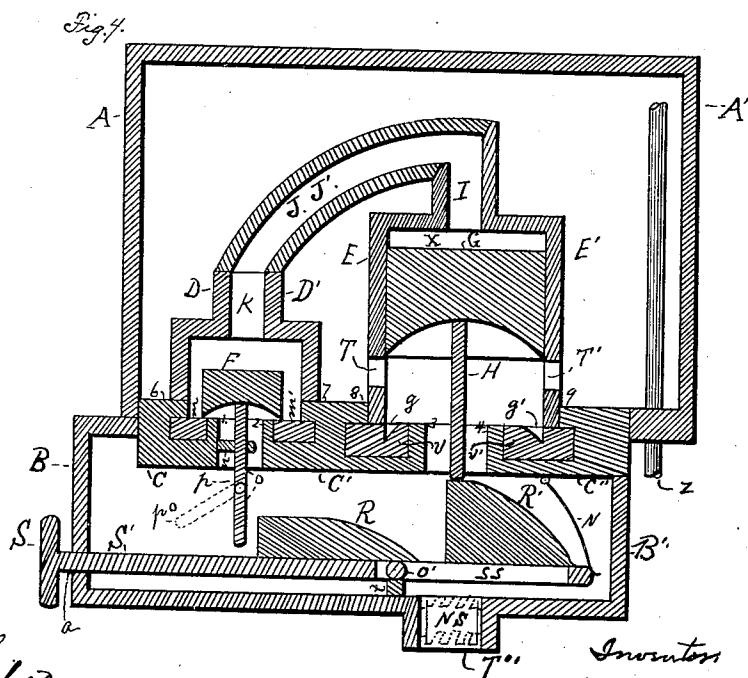
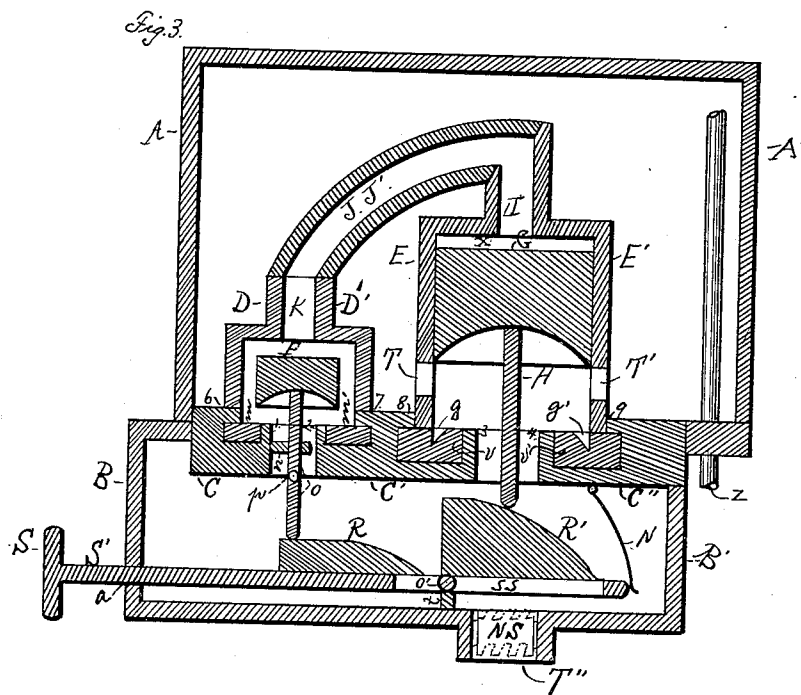
Witnesses
 Anna Lish
 John C. Bishop

Inventor
 John L. Gish

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UNITED STATES PATENT OFFICE.

JOHN LINCOLN GISH, OF SOUTH BEND, INDIANA.

REGULATED AUTOMATIC-CLOSING VALVE.

1,042,546.

Specification of Letters Patent.

Patented Oct. 29, 1912.

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To all whom it may concern:

Be it known that I, JOHN LINCOLN GISH, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented a new and useful Regulated Automatic-Closing Valve, of which the following is a specification.

The object of my present invention is to construct a regulated automatic closing valve, in such a manner, firstly, that the water in the tank will be retained under direct pressure, until the said water, will be required for flushing; secondly, that the water in the tank will be discharged in a large volume, under direct pressure, into and through the valve-casing; thirdly, that the flushing stream, after passing the outlet in the valve-casing, perform no other work or function, but that of flushing; and fourthly, after the flushing has been completed, for the regulated automatic closing valve, to be closed automatically, the apparatus, be ready to repeat its work, as herein-after described.

Figure 1., is a vertical section of my improved apparatus, showing the valves F., and G., in the closed position. Fig. 2., is a vertical section thereof, showing the valve F., open, and the valve G., in the closed position. Fig. 3., is a vertical section thereof, showing the valves F., and G., in the open position. Fig. 4., is a vertical section thereof, showing the valve F., closed, and the valve G., in the open position, with the push-rod S., S', pushed inward, to its full extent.

In the drawings, self closing valves, of the reciprocating type, are shown.

Like letters, and like figures of reference, refer to like parts, in the several figures.

In Fig. 1., A., A', is the tank, fastened fluid-tight, to the removable valve-casing. B., B'; C., C'; C''; D., D'; and E., E', form the valve-casing; each part, is removable, and fastened fluid-tight, to each other. F., is the relief or vent valve, inclosed within the D., D', part, of the valve-casing. m., m', is the valve-seat, to the vent valve F. 1., and 2.; 6., and 7., are the binders, to the valve-seat material m., m'. o., is the valve-stem, to the relief or vent valve F. p., is a rule joint, in the valve-stem o. n., is a supporting arm, to assure proper alinement, of the valve-stem o. G., is the main valve, inclosed within the E., E', part, of the valve-casing. v., v', is the valve-seat, to the main

valve G. 3., and 4.; 8., and 9., are the binders, to the valve-seat material v., v'. g., g', is the impress or counter-die, in the valve-seat v., v', made by the cutting edge, on the valve G. H., is the valve-stem, to the main valve G. T., T', are openings, into the E., E', part, of the valve-casing, from the tank A., A'. X., is a confined chamber, above the main valve G., within the E., E', part, of the valve-casing. I., is an opening, from the confined chamber X. K., is an opening, into the D., D', part of the valve-casing. J., J', is a passage-way or conduit, joining the opening I., with the opening K. S., S', is a push-rod, passing into the valve-casing, part B., B', at a. R., is a lug or finger, firmly fixed, to the push-rod S., S'. R', is a lug or finger firmly fixed, to the push-rod S., S'. s s., is a slot, in the push-rod S., S'. t., is a supporting arm. o', is a screw, engaging the slot s s., and joining the arm t., to assure proper alinement, of the push-rod S., S'. N., is a spring operating, upon the push-rod S., S'. z., is the inlet, to the tank A., A'. T'', is the outlet, to the valve-casing. N S., is the non-splasher, placed in the outlet T''. The usual connections, with the service pipe and the discharge pipe, are made at z., and T'', respectively. In my device the main valve G., is a heavy, self closing reciprocating valve, housed within the valve-casing-part E., E', and forming a confined chamber X., therein, above said main valve G. Said main valve G., is adapted to offer great resistance, to either air or water, that tries to pass between the outer wall of the said valve G., and the inner wall of the valve-casing-part E., E'; said main valve G., is provided, with plain perpendicular walls, and a concave bottom of such a degree, that a thin cutting edge is formed on the bottom, thereof; said cutting edge contacting with the valve-seat v., v'. The said main valve G., is also provided, with its respective valve-stem H. The relief or vent-valve F., is housed within the valve-casing-part D., D', with free space on all sides of the said valve F.; the said valve F., is provided with a concave bottom of such a degree, that a thin cutting edge, is formed on the bottom, thereof; said cutting edge contacting the valve-seat m., m'. The said vent valve F., is also provided, with its respective, valve-stem o., which is assured of its proper alinement, by means of the supporting arm n. The said valve F., is a

heavy valve, assuring a quick and positive reseating, of the said valve F., after the means, for opening the said valve F., has broken contact with its valve-stem *o*. After the valve F., has been reseated, by the action of its own weight, the said valve F., holds firmly to its valve-seat *m*., *m'*., thereby offering great resistance, to the air, which is trying to reënter the chamber X., by way of the opening, at the valve-seat *m*., *m'*.; the opening K.; the conduit J., *J'*.; and the opening I., as the main valve G., descends to its valve-seat *v*., *v'*. The valve-seats, *m*., *m'*.; and *v*., *v'*., occupy respective channels or grooves, within the valve-casing, part C., *C'*., *C''*.; and the said valve-seats *m*., *m'*.; *v*., *v'*., are held into place, by binders; namely, the supporting walls 1., and 2.; 3., and 4.; and the rims 6., and 7.; 8., and 9., of the valve-casing part C., *C'*., *C''*.; thereby preventing the valve-seat material, from buckling or rolling away, from the contact surface, of their respective valves, during the closure, of their respective valves. The said valve-seat material may be a soft metal, or any other suitable material, which will allow the cutting edge, to the respective valves, to be impressed, forced, or swaged therein; and thereby form a die and a counter-die, assuring a positive closure, of the valves, with their respective valve-seats.

With such relation and construction of parts, as described above, in order to open the main valve G., it is necessary to ventilate the chamber X., as follows:—In the valve-casing, part E., *E'*., above the top, of the said valve G., there is an opening I. In the valve-casing, part D., *D'*., there is an opening K. Said opening I., and said opening K., are joined together, by a passage-way or conduit, as J., *J'*.; thereby establishing a direct passage-way or conduit, from the chamber X., within the valve-casing, part E., *E'*., to the inside of valve-casing, part D., *D'*., which contains the said relief or vent valve F. By a prearranged assembling of the parts, E., *E'*.; G.; I.; J., *J'*.; K.; D., *D'*.; and F., we govern the balancing of the force of gravity, which acts upon the valves, and the pressure beneath said valves, and thereby regulate, the self closing, of the said main valve G. When the main valve G., begins to close, the tank A., *A'*., is practically empty of water, and the valve G., being so far, removed from its valve-seat *v*., *v'*., there is nothing but air, to find its way, into the chamber X., as the valve G., is closed. And also by way of reference, would say, that the device is so formed, that the contents of the tank A., *A'*., is expelled, at some little time, before the valve G., is closed; thereby allowing for an extra amount of water, to flow from the inlet *z*., into the tank A., *A'*., and to pass directly, to and through the openings T.,

T', and on through the valve-seat *v*., *v'*.; and thus serve, as the quantity of water needed, to refill the closet bowl, after the closet bowl has been flushed, and before the main valve G., is closed.

The push-rod S., *S'*., with its firmly fixed lugs, R., and R', coöperating with the respective valve-stems, *o*., and H., and operating the said vent-valve F., and the said main valve G., respectively, and adapted to allow, the closing of the said vent valve F., by its own weight, and the return of the said push-rod S., *S'*., to its starting position, before the said main valve G., is allowed, to close, forms a special feature.

My device performs its work, as follows:—In Fig. 1., the valves F., and G., are in the closed position. Water is allowed to enter the tank A., *A'*., through the inlet *z*. Into the said tank A., *A'*., water will flow, until the air, within the tank A., *A'*., has been compressed, to an equal degree, with the water pressure, from the service pipe. As the tank A., *A'*., is filled with water and compressing the air therein, as soon as the air and water pressure, within the tank A., *A'*., has become of a sufficient pressure, to overcome the resistance, that is offered, to either air or water, by the close co-adaptation of the outer wall of the valve G., and the inner wall of the valve-casing, part E., *E'*., then and not before, water passing through the openings T., T', will be forced or filtered, between the two said surfaces, of the valve G., and the valve-casing, part E., *E'*.; and this forced filtration, between the outer wall of the valve G., and the inner wall of the valve-casing, part E., *E'*., will be continued, until the air within the chamber X., will be of the same compression, as the air, within the tank A., *A'*. This compression of air and water, within the chamber X.; and also within the conduit J., *J'*., and the valve-casing, part D., *D'*., will force the said valves F., and G., downward, upon their respective valve-seats, *m*., *m'*., and *v*., *v'*.; and assure a positive closure, of said valves F., and G. In Fig. 2., the push-rod S., *S'*., is pushed inward, bringing the lug R., under the valve-stem *o*., and opening the valve F.; and thereby relieving the chamber X., from its pressure of confined air and water; said air and water having been discharged through the opening I.; the conduit J., *J'*., the opening K., the valve-casing part D., *D'*., and downward through the valve-seat *m*., *m'*. The quantity of water that has been confined, within the chamber X., is so small, that it is not considered of a flushing nature. Now, with the pressure removed from the chamber X., by the opening of the valve F., a further inward movement, see Fig. 3., of the push-rod S., *S'*., will still hold the valve F., open, by means of the lug R., and the valve-stem *o*.; and will also, bring the

lug R', under the valve-stem H., which will easily push the main valve G., upward into the chamber X., and away from the valve-seat *v*., *v'*., Fig. 3., and allow the contents of the tank A., A', to pass into the openings T., T', Fig. 3., and directly through the valve-seat *v*., *v'*., Fig. 3., into the discharge or flushing pipe at T''. In this act of discharging,—the water in the tank A., A', is forced into the flushing pipe, under the heavy compression of air, aforesaid, that has been confined, within the tank A., A'. In Fig. 4., the push-rod S., S', is pushed inward, to its full extent, thereby, making the lug R., clear, of the valve-stem *o*., and allowing the valve F., to close, by its own weight; while the valve G., is held open, by the lug R'. With such relation of parts, Fig. 4., in order to have the lug R., repass the valve-stem *o*., without disturbing the valve F., as the push-rod S., S', is returned to its starting position, it is necessary to have the lower part of the valve-stem *o*., with its rule joint at *p*., to take the position as shown by the dotted line *p o*., Fig. 4. As soon as the push-rod S., S', is released, it will be returned to its starting position, by the spring N., and the main valve G., will descend slower or faster, in proportion, to the prearranged assembling of the above mentioned parts, and thereby return the parts, to their respective positions, as shown in Fig. 1., and leaves the device ready, to repeat its work.

From the above description it will be noticed, that the first, second, third, and fourth objects, as above mentioned, are fully accomplished.

What I do claim as my invention, and desire to secure by Letters Patent is,—

1. In a device of the class described, a flush valve comprising an apertured main valve casing, containing a gravity actuated main valve tightly fitting in said casing, said valve being provided with a depending valve stem, a relief valve casing on substantially the same level as the lower portion of said main valve casing, a relief valve in the relief valve casing and having a depending stem, and a guide therefor, a vent conduit connected to the auxiliary valve casing and the upper portion of the main valve casing, a housing below said valves receiving the lower portion of said valve stems and an operating means for said valves adapted to engage the valve stems for raising the valves, the auxiliary valve stem being provided with a rule joint, thereby permitting the return of the operating means to its normal position.

2. A valve having a depending valve stem, a guide for said stem, said stem being provided with a rule joint, permitting a portion of said stem to swing in one direction, a reciprocating lifting means having a cam supported in position to contact with said stem, to lift said valve when moved in one direction and swing the pivoted portion on the return movement of said lifting means.

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

JOHN LINCOLN GISH.

Witnesses:

ANNA GISH,
JOHN C. BISHOP.