

No. 826,895.

PATENTED JULY 24, 1906.

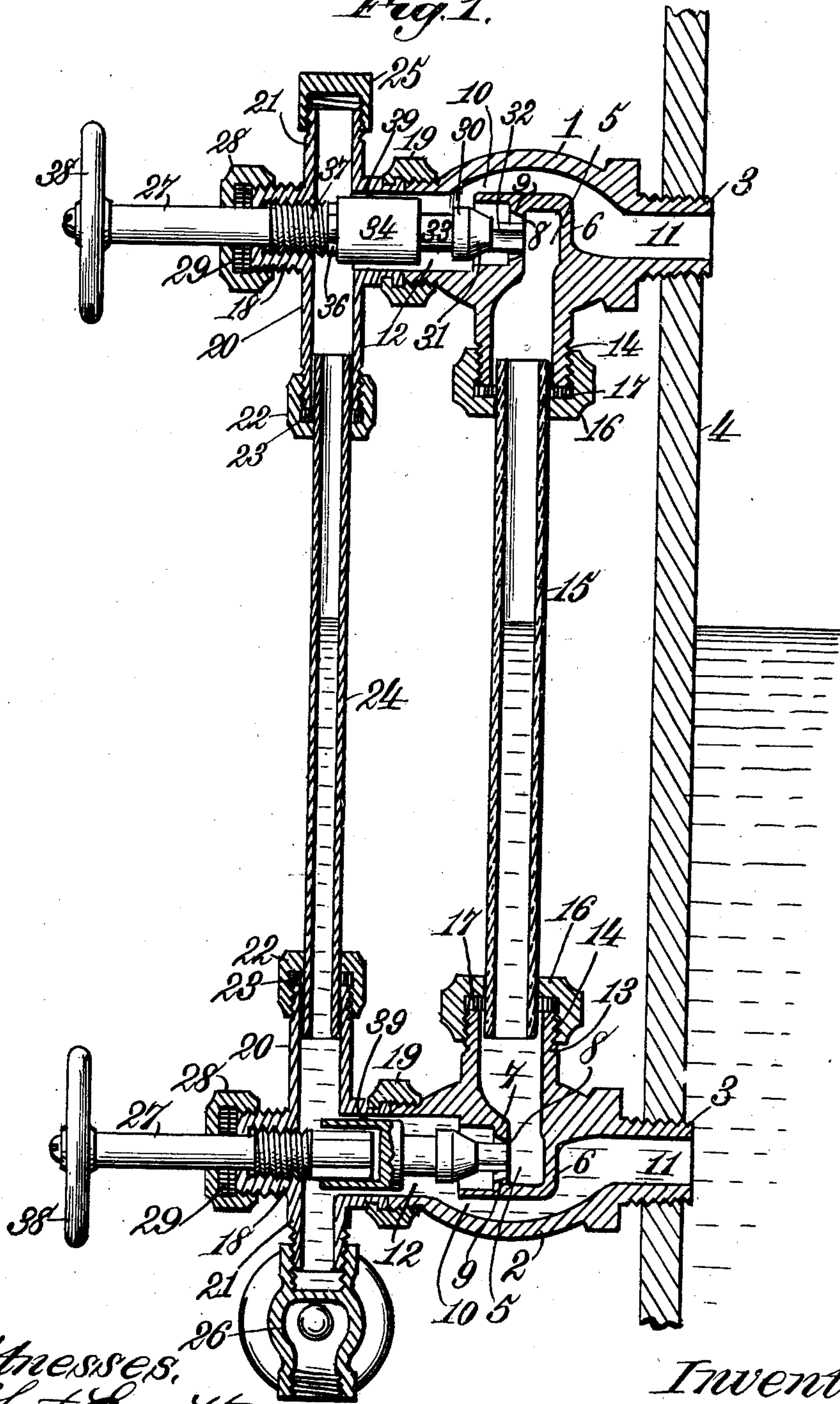
E. F. SHALLOW.

WATER GAGE.

APPLICATION FILED NOV. 18, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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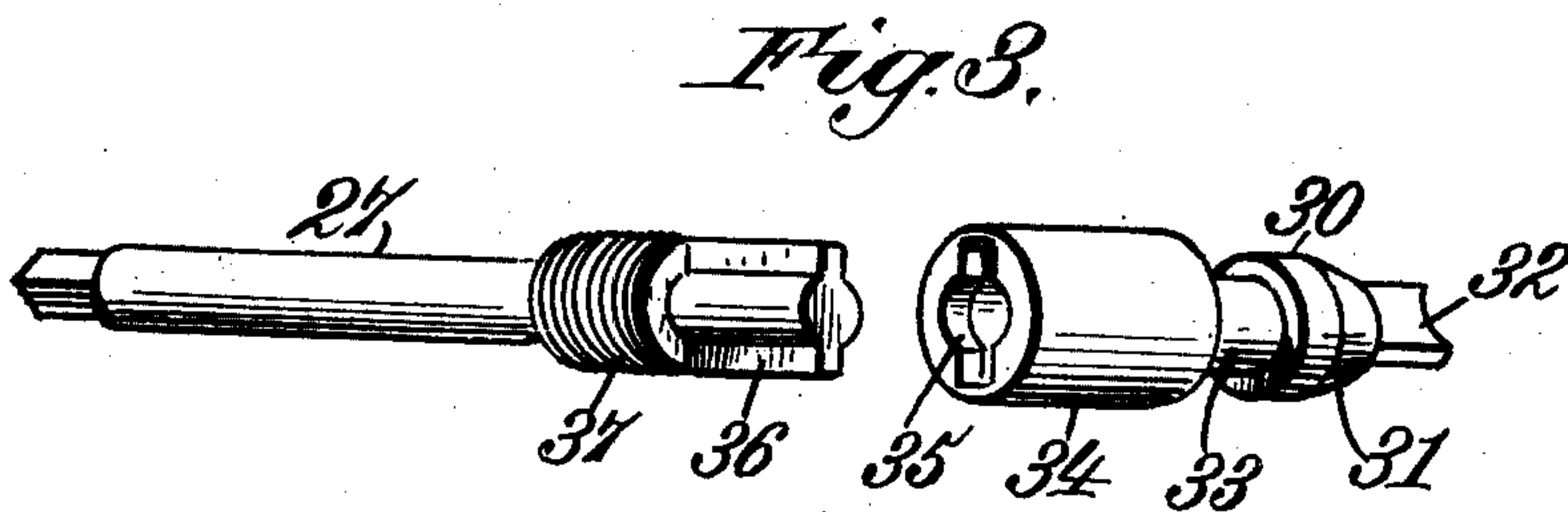
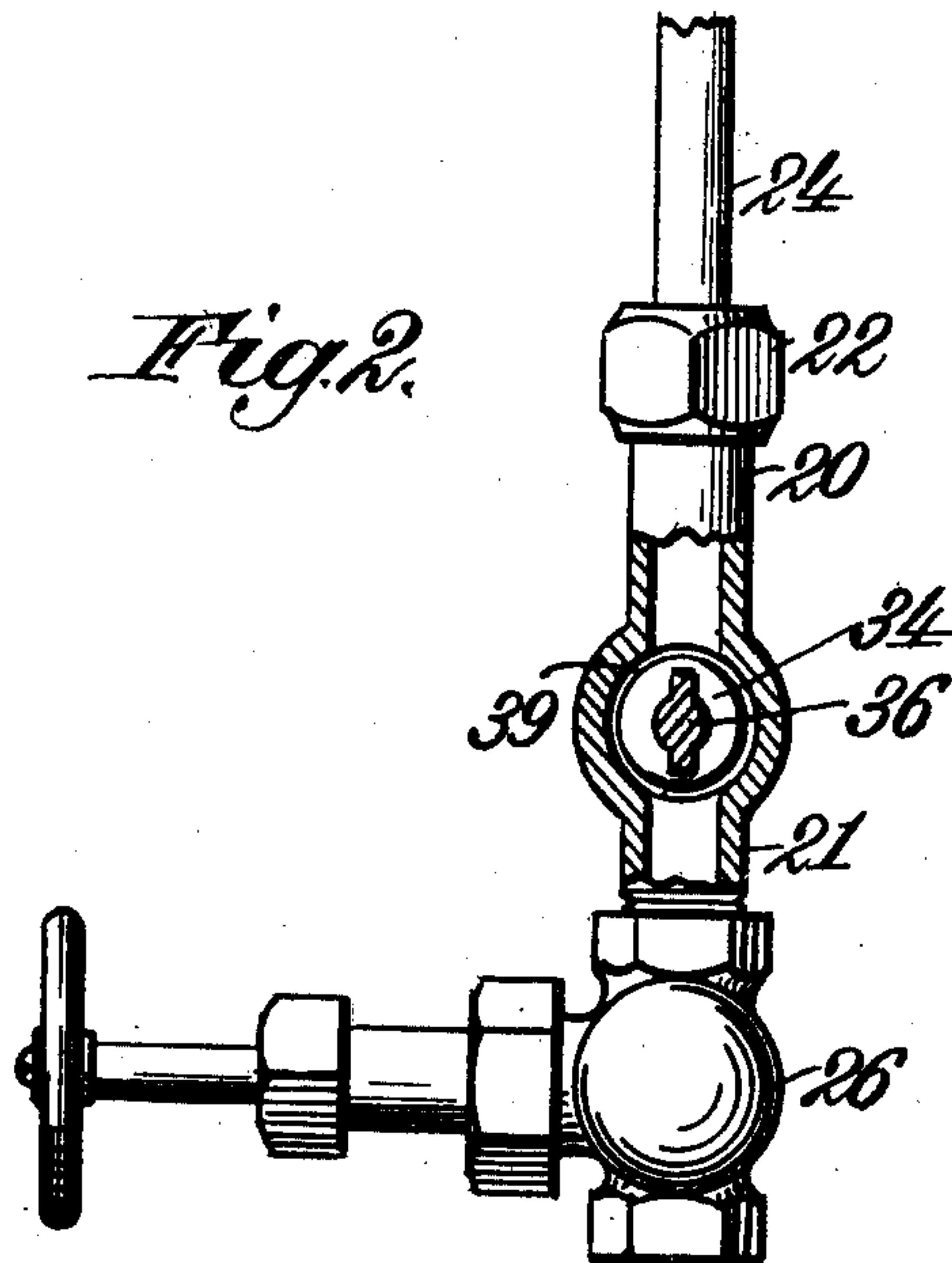
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E. F. SHALLOW.

WATER GAGE.

APPLICATION FILED NOV. 18, 1905.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

EDWARD FRANCIS SHALLOW, OF PHILADELPHIA, PENNSYLVANIA.

WATER-GAGE.

No. 826,895.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed November 18, 1905. Serial No. 287,965.

To all whom it may concern:

Be it known that I, EDWARD FRANCIS SHALLOW, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Water-Gages, of which the following is a specification.

This invention relates to water-gages, and aims to provide a gage of such class in a manner as hereinafter set forth whereby greater efficiency is obtained in the working of the gage not only when the glass tube breaks, but at other times—such, for instance, as when blowing through the thoroughfares to clean them and for removing scum from the valves when the gage-glass is intact or when a new glass has been inserted and it is desired to put the gage under working conditions again.

The invention further aims to provide a gage of the class referred to which shall be simple in its construction, strong, durable, automatic in its operation when the gage-glass is broken, efficient in its use, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel construction, combination, and arrangement of parts hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention; but it is to be understood that changes, variations, and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, wherein like reference characters denote corresponding parts throughout the several views, Figure 1 is a longitudinal sectional view of a water-gage in accordance with this invention. Fig. 2 is a sectional detail, and Fig. 3 is a disassembled view of the valve and its stem.

Referring to the drawings by reference characters, 1 denotes the steam-valve casing or steam-arm, and 2 the water-valve casing or water-arm. As each of the casings 1 and 2 is of the same construction, but one will be described, the same reference characters being applied thereto. Each of the valve-casings is provided with a hollow screw-threaded plug 3 for the purpose of connecting its respective casing to the wall 4 of the boiler, (only a portion of said wall being shown.)

Each of the valve-casings is, furthermore, provided with a valve-chamber 5, formed by an internal depending extension 6, which is

substantially L-shaped in longitudinal section, and the said chamber 5 is divided through the medium of a diaphragm 7, provided with an opening, as at 8, with the wall of said opening beveled, as at 9, said wall constituting a seat for the balance-valve, to be hereinafter referred to. The opening 8 in the diaphragm forms a means for establishing communication between the divisions of the valve-chamber 5 when the valve, to be hereinafter referred to, is moved off its seat. The extension 6 depends within the valve-casing to such an extent as to form a by-pass 10, communicating at one end with the inlet of the valve-casing and at its other end with the valve-casing outlet 12. Said by-pass 10 also acts as a means for establishing communication between the inlet 11 and the valve-chamber 5. Each of the valve-casings is furthermore provided with an external nipple 13, communicating with the valve-chamber 5. The nipple is screw-threaded, as at 14. When the valve-casings 1 2 are set up in operative relation with respect to each other, the nipples 13 oppose each other, and to the nipples 13 is connected the water-glass 15, through the medium of the screw-threaded glands 16, having interposed therebetween and the nipples 13 packing-rings 17.

Each of the valve-casings 1 2 has connected therewith a laterally-extending housing 18, the said housing 18 being connected with its respective valve-casing through the medium of the screw-threaded coupling-collars 19, engaging the housing and also engaging screw-threads upon the valve-casing. Each of the housings 18 is provided with a pair of external nipples 20 21, extending in an opposite direction with respect to each other, and when the valve-casings 1 2 are set up in operative position and with the respective housings connected thereto the nipples 20 are adapted to oppose each other, and to the said nipples 20 is connected, through the medium of the screw-threaded glands 22 and packing-ring 23, the back tube 24. To the nipple 21 of the valve-casing 1 a closure-cap 25 is secured.

The nipple 21 of the valve-casing 1 can be dispensed with, if desired; but in some instances it is found to be advantageous, as it will enable a wire or other instrument to be inserted, so as to remove an obstacle from the back tube 24 if occasion so requires. The nipple 21 of the valve-casing 2 when the latter is in its operative position extends down-

wardly from said casing and has connected to its lower end a petcock 26. The function of said cock will be hereinafter referred to.

Within each of the housings 18 extends a valve-stem 27, the construction of which will be hereinafter referred to. Surrounding each of the valve-stems 27 is a gland 28 and packing-ring 29, the glands 28 being screw-threaded and engage with external screw-threads upon the housing 18. Each of the housings 18 is at its outer end provided with internal screw-threads, the function of which will be hereinafter referred to.

In each of the valve-casings 1 and 2 is mounted a balance-valve 30, having a beveled working face 31, which terminates in a skiving extension 32. Extending rearwardly from the valve 30 and forming a part of said valve 30 is a projection 33, which terminates in an enlarged cylindrical portion 34, having a keyhole-shaped recess or socket 35, into which slidably engages a key-shaped extension 36, projecting from a screw-threaded cylindrical portion 37, formed on the valve-stem 27. Said stem 27 at its outer end carries a hand-wheel 38. The balance-valve 30 is slidably as well as rotatably mounted within the valve-casing and is suspended through the medium of the key-shaped extension 36. The cylindrical portion 34 of the balance-valve is of such diameter as to form a passage 39 between the inner face of the housing and said portion 34, thereby establishing communication between the outlet of the valve-casing and the nipples 20 and 21. The screw-threaded portion 37 of the valve-stem is adapted to engage with the internal screw-threads of the housing. Slidably mounting the balance-valve in the valve-casing in such a manner permits of the same being moved to and from its seat by pressure of water or steam, and the connecting of the balance-valve in the manner as set forth to the valve-stem 27 enables the balance-valve to be moved to its seat manually—that is to say, when the valve-stem 27 is rotated in a direction so that the stem will move toward the valve-casing this operation causes the key-shaped extension 36 to abut against the cylindrical portion 34 and cause the balance-valve to seat itself, as the valve will be carried with the stem. When the valve is carried by the stem, it will be rotated therewith, and this arrangement also permits of the beveled face 31 of the valve grinding the valve-seat 9, so as to secure a proper fit.

The manner in which a water-gage in accordance with this invention operates is as follows: It will be assumed that the position of the balance-valves is that as shown in Fig. 1, the valves being normally held away from their seats through the medium of the pressure of the steam and water; but when the water-glass is broken the outrushing steam and water will cause the valves to move to

their seats and close the opening 8, which action shuts off communication between the nipples 13 and the interior of the valve-casings. When a new water-glass has been inserted and it is desired to open the valves to permit of the passage of steam and water to the water-glass and back tube, the petcock 26 is opened and the steam and water will then have a tendency to pass through the back tube and petcock, and therefore move the valves away from their seats. In case it be desired to remove the scum from the balance-valve or from within the valve-casings and housings the petcock is opened, and owing to the passage of steam and water the scum will be removed and discharged from the water-gage.

Owing to the manner of connecting the valves with the valve-stems and owing to the threaded connections between the valve-stems and the housings, the valves can be moved to their seats and held in position. This operation can be had by turning the valve-stems, and, furthermore, owing to the connection between the valves and the valve-stems the valves are enabled to be automatically shifted to and from their seats by pressure and are also rotatably movable to their seats and held there through the medium of the valve-stems.

Although the valves are shown in the valve-casings as being shiftable in a longitudinal direction, yet, if desired, the casings can be so arranged and positioned that the valves can move in a vertical direction, such arrangement being obvious.

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

1. A water-gage comprising the combination with a gage-glass, a back tube, a valve-casing communicating with each end of the glass and a housing communicating with each of the casings and with each end of the tube, of a valve-seat in each of said casings, a balance-valve automatically shiftable to and from each of said seats by pressure, means engaging each of said valves for moving them to and retaining them against their seats, and means for exhausting pressure from one of said casings, thereby automatically unseating the valves and cleaning the casings and tube.

2. In a water-gage, the combination with a pair of valve-casings, a pair of housings opening into the casings, a gage-glass opening into the casings and a tube connected to the said housings, of a valve-seat in each of said casings, a valve in each of said casings adapted to engage said seat, thereby closing communication between the gage-glass and the casings, each of said valves provided with a cylindrical extension of less diameter than the casing so as to form a passage between said extension and the casings for establish-

ing communication between the casings and the tube, said valve automatically shiftable to and from said seat by pressure, and rotatable means engaging in said extension and adapted when operated to shift said valve to and retain it in closed position.

3. In a water-gage, the combination with a pair of valve-casings, a pair of housings opening into the casings, a gage-glass opening into the casings and a tube connected to the said housings, of a valve-seat in each of said casings, a valve in each of said casings adapted to engage said seat, thereby closing communication between the gage-glass and the casings, each of said valves provided with a cylindrical extension of less diameter than the casings so as to form a passage between said extension and the casings for establishing communication between the casings and the tube, said valve automatically shiftable to and from said seat by pressure, rotatable means engaging in said extension and adapted when operated to shift said valve to and retain it in closed position, and means for exhausting pressure from one of said casings, thereby unseating said valve and cleaning out the said casings and tube.

4. In a water-gage, the combination with a pair of valve-casings, a pair of housings opening into the casings, a gage-glass opening into the casings and a tube connected to said housings, of a valve-seat in each of said casings, and a valve in each of the casings adapted to engage said seats, thereby closing communication between the gage-glass and the casings, each of said valves provided with a cylindrical extension of less diameter than the casing so as to form a passage between said extension and the casing for establishing communication between the casings and the tube, said valves automatically shiftable to and from said seats by pressure.

5. In a water-gage, the combination with a pair of valve-casings, a water-glass connected to said casings, a pair of housings opening into the casings, and a tube connected to the housings, of a valve-seat in each of said casings, a valve in each of said casings adapted to engage said seat, thereby closing communication between the water-glass and the housings, each of said valves provided with a cylindrical extension of greater diameter than the valves, said extensions forming a passage between them and the casings for establishing communication between the casings and the tube, said valves automatically shiftable to and from said seats by pressure, and rotatable means engaging said valve extensions and with said housings and adapted when operated to shift said valves to and retain them in closed position.

6. In a water-gage, the combination with a pair of valve-casings, a water-glass connected to said casings, a pair of housings opening into the casings, and a tube connected to the

housings, of a valve-seat in each of said casings, a valve in each of said casings adapted to engage said seat, thereby closing communication between the water-glass and the housings, each of said valves provided with a cylindrical extension of greater diameter than the valves, said extensions forming a passage between them and the casings for establishing communication between the casings and the tube, said valves automatically shiftable to and from said seats by pressure, and rotatable means engaging said valve extensions and with said housings and adapted when operated to shift said valves to and retain them in closed position, and means for exhausting pressure from one of said casings, thereby unseating the valves in said casings and cleaning out the casings and tube.

7. In a water-gage a valvular device comprising a valve having a beveled working face, a projection formed integral with the valve, a cylindrical pressure-resisting extension connected with the projection and of greater diameter than the valve, said extension having a socket, a valve-stem embodying a screw-threaded cylindrical portion and an extension projecting from the screw-threaded portion which corresponds in contour to the shape of the socket, combined with a casing provided with a seat for said valve, said cylindrical extension positioned in said casing and of such diameter as to form a passage between it and the wall of the casing, and a housing connected with the casing and provided with screw-threads with which engage the screw-threads on said cylindrical portion.

8. In a water-gage a valvular device, said device comprising a valve having a beveled working face, a projection formed integral with the valve, a cylindrical pressure-resisting extension connected with the projection and of greater diameter than the valve, said extension having a socket, a valve-stem embodying a screw-threaded cylindrical portion and an extension projecting from the screw-threaded portion which corresponds in contour to the shape of the socket, combined with a casing provided with a seat for said valve, said cylindrical extension positioned in said casing and of such diameter as to form a passage between it and the wall of the casing, a housing connected with the casing and provided with screw-threads with which engage the screw-threads on said cylindrical portion, said valve balanced within the casing and automatically moved against its seat when the pressure upon one side exceeds the pressure upon the other side of said valve, and means for exhausting pressure from said casing causing thereby the automatic moving of the valve from its seat owing to the action of pressure upon said cylindrical extension.

9. In a water-gage a valvular device, said device comprising a valve having a beveled

working face, a projection formed integral with the valve, a cylindrical pressure-resisting extension connected with the projection and of greater diameter than the valve, said
 5 extension having a socket, a valve-stem embodying a screw-threaded cylindrical portion and an extension projecting from the screw-threaded portion which corresponds in contour to the shape of the socket, combined
 10 with a casing provided with a seat for said valve, said cylindrical extension positioned in said casing and of such diameter as to form a passage between it and the wall of the casing, a housing connected with the casing and
 15 provided with screw-threads with which engage the screw-threads on said cylindrical portion, said valve balanced within the casing and automatically moved against its seat when the pressure upon one side exceeds the
 20 pressure upon the other side of said valve, means for exhausting pressure from said casing causing thereby the automatic moving of the valve from its seat owing to the action of pressure upon said cylindrical extension, and
 25 a hand-wheel upon said valve-stem to enable the rotating of said valve-stem causing thereby the moving of the valve to and retaining it against its seat.

10. A water-gage comprising a casing adapted to communicate with a source of fluid under pressure, a second casing adapted to communicate with a source of pressure, each of said casings provided with a valve-seat, a water-glass opening into said casing, a longitudinally-extending balance-valve mounted in each of said casings and automatically movable against its seat when the water-glass breaks, each of said valves provided with a pressure-resisting extension, means for opening one of said casings to the atmosphere causing thereby the exhausting of pressure from both of said casings, and the impacting of fluid under pressure, the pressure-resisting extension on the valves causing the valves to automatically move from their seats, and manually-operated means engaging with said pressure-resisting extensions and adapted when operated to shift said valves to and retain them against their seats.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD FRANCIS SHALLOW.

Witnesses:

JOHN L. BURNS,
 HERMAN A. DICK.