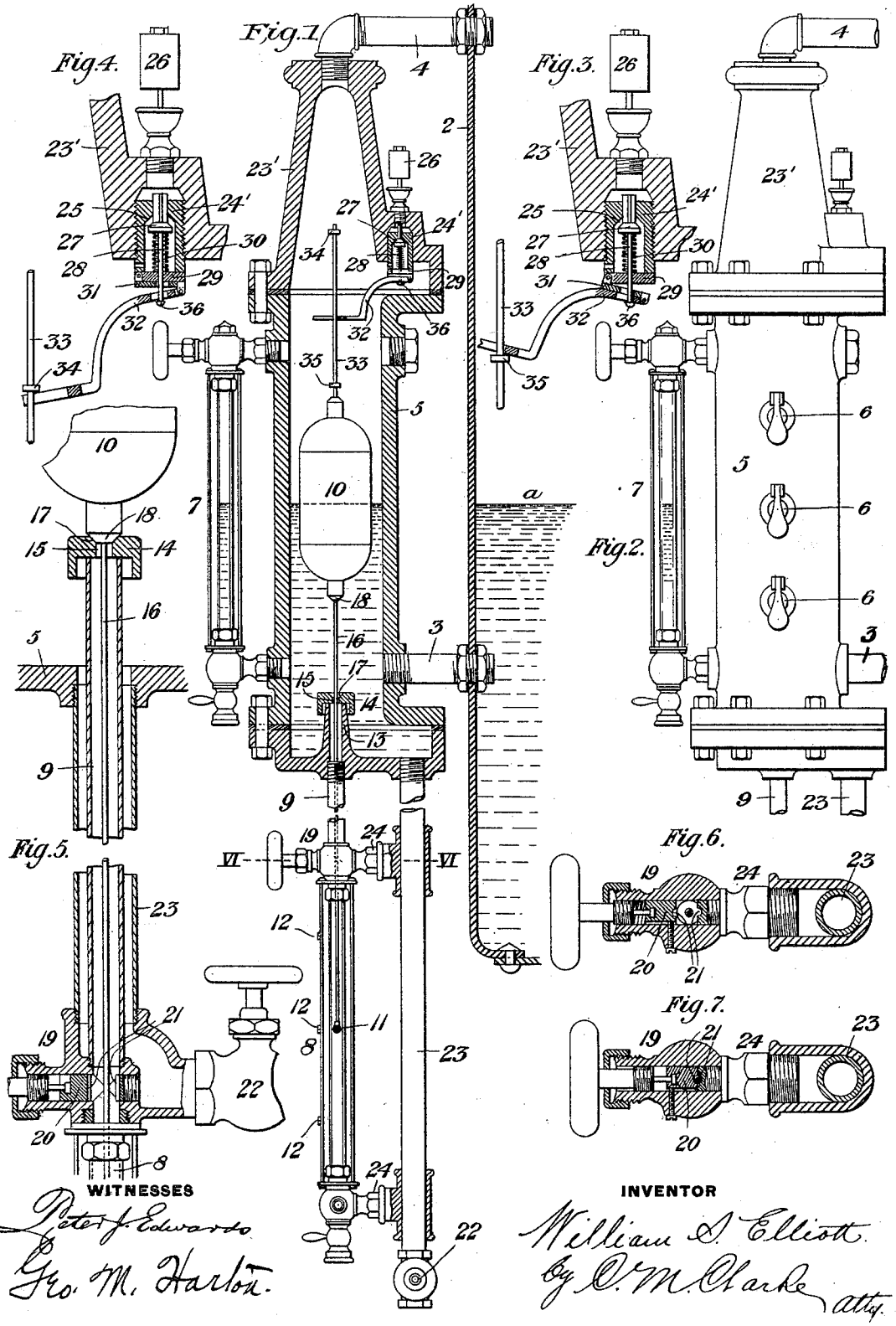
No. 626,226. Patented June 6, 1899.

W. S. ELLIOTT.

WATER COLUMN.

(Application filed Nov. 12, 1896.)

(No Model.)



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UNITED STATES PATENT OFFICE.

WILLIAM S. ELLIOTT, OF PITTSBURG, PENNSYLVANIA.

WATER-COLUMN.

SPECIFICATION forming part of Letters Patent No. 626,226, dated June 6, 1899.

Application filed November 12, 1896. Serial No. 611,915. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. ELLIOTT, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Water-Columns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 is a central vertical section, partially in elevation, of a water column and gage constructed in accordance with my invention. Fig. 2 is an elevation thereof, the lower index-tube and blow-off pipe being broken away. Fig. 3 is a sectional detail view, on an enlarged scale, of the alarm-valve. Fig. 4 is a similar view in a different position. Fig. 5 is a detail sectional view showing an arrangement of blow-off pipe surrounding the connecting-pipe leading to the lower index-tube, the float occupying a lowered position. Fig. 6 is a cross-sectional view of the valve at the top of the lower index-tube, taken on the line VI VI of Fig. 1. Fig. 7 is a similar view showing the valve closed.

My invention consists of a combined water column and gage and the various features and adjuncts thereof, and is designed to be used to indicate the water-level in boilers that are too high to permit the ordinary water-gages to be read from the ground. To the end of obviating such difficulty I employ a secondary water-gage index-tube located at a convenient distance below the water-line of the boiler and within easy reach of the observer, and within such tube is contained the end of a rod which is so connected with a float as to indicate in the lower tube the relative height of the water in conformity with variations of the float.

The invention also consists in other details of construction, as shall be more fully hereinafter set forth.

Referring to the drawings, 2 is the shell of a boiler, connected to which are the lower and upper pipes 3 4, communicating with and supporting the float-chamber 5. This chamber is flanged at the bottom and top alike, so that, if desired, as in the case of locating the gage-cocks on the right or left side, the chamber may be reversed and used in either position equally well. Mounted on one side, at the center (which corresponds to the normal water-line *a*) and equidistant above and below, are the gage-cocks 6. Upon the outside, with the usual connections above and below the water-line, is the customary water-index tube 7, provided with the ordinary valve and pet-cock, the purpose of such gage being to determine the level of the water thereby and verify the action of the secondary gage in setting up the column. If desired, this index-tube 7 may be dispensed with, as it is not essential to the operation of the other parts of the device and is shown simply as a convenient auxiliary.

An index-tube 8 is connected to and suspended from the base of the float-chamber at any desired level within easy reach of observation from the ground, a connecting-pipe 9 of suitable length being employed, although it is obvious that such pipe may be dispensed with and the index-tube connected directly to the base of the float-chamber, if desired.

Within the chamber 5 is a float 10, designed to rise and fall with variations in the height of the water contained in the chamber 5, and suspended from such float by means of a stem, wire, chain, or other suitable connection 16 is an indicating-point 11, so adjusted that it will occupy a position in the index-tube 8 corresponding to the position of the water-level in the float-chamber and by reason of its connection with the float will rise or fall in conformity with the rise or fall of the water therein and accurately indicate such level in the tube 8. Suitable level-indicating points 12 may be attached to the rods of the index-tube to facilitate the reading of the gage.

Seated upon the top of an upwardly-extending hollow sleeve 13 is a cap 14, having a reduced orifice 15, but slightly larger than the connection 16, which passes downwardly therethrough, and a valve-seat 17 on its upper face.

The cap 14 may, if desired, be in the form of a plug, or the top of the sleeve 13 may be similarly constructed. A check-valve 18, secured to the bottom of the float, or, if desired, to the connection 16, is arranged in line with the valve-seat 17, so that in case for any reason—as, for instance, in case of breakage in the index-tube 8—the float should fall suffi-

ciently far the valve will seat itself and close the opening against escape of water or steam. The location of the check-valve 18 may be varied; but it should always occupy a position between the float-chamber and the index-tube.

In Fig. 5 I have shown an arrangement in which the connecting-pipe 9 is surrounded by the blow-off pipe and extends above the base of the float-chamber in place of the sleeve 13, the valve 18 being seated on the face of the cap 14 and closing access to the index-tube. This construction is of advantage in securing compactness and freedom from unequal expansion and contraction. A valve 19 is located at the top of the index-tube 8, having a gate 20, by which communication between the column and the tube may be closed, and I have provided in the fixed and movable parts of such valve grooves 21 for clearance of the connection 16 and by which it may be grasped and held stationary in closing the valve. It will be understood that the valve 19 may be located at any position between the float-chamber and the index-tube. A blow-off valve 22 for the purpose of cleaning sediment from the chamber is attached to the float-chamber, preferably by a pipe 23, and for convenience of construction I have joined such pipe to the index-tube by intervening joints 24, although it will be understood that the blow-off valve may be secured directly to the float-chamber and in any other convenient location. At its top the float-chamber is furnished with a removable extended top portion 23′, in one side of which is mounted an alarm-valve casing 24′, provided with a valve-seat 25, an opening leading to an alarm 26, and a check-valve 27, mounted on a stem 28, projecting downwardly through the casing-bottom 29 and surrounded by a coiled pressure-spring 30. Hinged to one side of the bottom 29 is a gate 31, to the other side of which is similarly hinged a lever 32, a forked extension of which embraces an upwardly-extending stem 33 from the float 10. Upon this stem are adjustably secured the upper and lower stops 34 35, so arranged as to depress or raise the lever 32 when the stops come into contact with it, due to excessive fall or rise of the float 10 on account of low or high water in the boiler. The valve-stem passes downwardly through openings in the gate 31 and lever 32 and is provided with a head or button 36, by which a downward pull will be exerted on the valve-stem by either motion of the lever 32, as clearly shown in Figs. 3 and 4. Under action of the coiled spring 30 the valve will always seat itself, cutting off communication to the alarm 26 and returning the gate and lever to normal position when pressure of the stops is released. Changes may be made in the design and location of the alarm-valve and lever to suit varying circumstances, and such necessary changes are not to be considered as departures from my invention.

I have shown the float-chamber provided with an offset at the top for the alarm-valve and a similar offset at the bottom for the location of the blow-off pipe, as by so constructing the float-chamber its ends are in duplicate, whereby it may be reversed if necessary, according to the desired position of the gage-cocks, right or left.

Changes and modifications may be made in the design and construction of my invention without departing therefrom, as I do not desire to be limited to the exact construction shown and described, but to include any and all desirable equivalents therefor.

Having described my invention and in what manner it is constructed and operated, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a float and stem or the like, an index-tube into which the stem extends, and a holding device for the stem consisting of a horizontally-movable grip adapted to engage the stem and a stationary seat against which the stem is held by such grip, substantially as set forth.

2. The combination of a float and stem or the like, an index-tube below the float into which the stem extends, and a holding device for the stem consisting of a horizontally-movable grip adapted to engage the stem and a stationary seat against which the stem is held by such grip, substantially as set forth.

3. The combination of a float and stem or the like, an index-tube into which the stem extends, and a holding device for the stem consisting of a fixed recessed bearing and a recessed horizontally-movable gate adapted to bear upon the stem and hold it against movement and to close the passage, substantially as set forth.

4. In a water-column provided with a float-chamber and float carrying a valve, and a laterally-movable valve-seat mounted on a pipe-like extension in the base of the float-chamber; an index-tube below the float-chamber and connected therewith, a stem or the like extending from the float into the index-tube and a grip-valve adapted to close the space around the stem and to grip the stem and hold it from longitudinal movement, substantially as set forth.

5. In a water-column provided with a float-chamber and float carrying a valve: an index-tube below the float-chamber and connected therewith, a stem or the like extending from the float into the index-tube and a laterally-movable cap above the index-tube having on its upper face a valve-seat adapted to receive the valve and an upward pipe-like extension on which the cap is set, substantially as set forth.

6. In combination with a float-chamber provided with a float having an upwardly-extending stem, with upper and lower stops thereon; a check-valve and its stem mounted in one side of the float-chamber, an alarm outside of the chamber in communication

with the check-valve, a hinged gate at the base of the check-valve and a lever hinged to the gate and extending into the path of the upper and lower stops, substantially as set forth.

7. In a water-column provided with a float-chamber and float carrying a valve: an index-tube below the float-chamber and connected therewith, a stem or the like extending from the float into the index-tube and an upward pipe-like extension of the base of the float-chamber surrounding the stem and adapted to be closed by the valve of the float, substantially as set forth.

8. The combination of a float-chamber having flanged upper and lower ends, an extended tapering chamber at the top and an extended chamber having a lateral offset at the bottom, secured to the flanges, boiler connections to the lower base of the float-chamber and to the top of the upper extended chamber respectively, an index-tube alongside of the float-chamber having connections therewith at top and bottom inside the flanges, a secondary index-tube located below the float-chamber and connected with the lower extended chamber, a float within the float-chamber, an indicator within the secondary index-tube with an intervening connection, an upwardly-extending reduced passage leading into the float-chamber and a sliding cap covering said passage, having a reduced opening embracing the indicator connection, substantially as set forth.

9. A water-column comprising a float-chamber having flanged upper and lower ends, an extended tapering chamber at the top and an extended chamber having a lateral offset at the bottom, secured to the flanges, boiler connections to the lower base of the float-chamber and to the top of the upper extended chamber respectively, an index-tube alongside of the float-chamber having connections therewith at top and bottom inside the flanges, a secondary index-tube located below the float-chamber and connected with the lower extended chamber, a float within the chamber, an indicator within the secondary index-tube and an intervening connection; a check-valve and its stem mounted in the lateral offset in the upper extended chamber, an alarm outside of such upper chamber in communication with the check-valve, a hinged gate at the base of the check-valve and a lever hinged to the gate and extending into the path of upper and lower stops secured to an upwardly-extending stem attached to the float, substantially as set forth.

10. In combination with a float-chamber having flanged upper and lower ends, an extended chamber at the bottom and an extended chamber with a lateral offset at the top, respectively, secured to the flanges, boiler connections to the lower base of the float-chamber and to the top of the upper extended chamber respectively, an index-tube alongside of the float-chamber having connections therewith at top and bottom inside the flanges, a secondary index-tube located below the float-chamber and connected with the lower extended chamber, a float within the chamber, an indicator within the secondary index-tube and an intervening connection; a check-valve and its stem mounted in the lateral offset in the upper extended chamber, an alarm outside of such upper chamber in communication with the check-valve, a hinged gate at the base of the check-valve and a lever hinged to the gate and extending into the path of upper and lower stops secured to an upwardly-extending stem attached to the float, substantially as set forth.

11. In combination with a float-chamber having flanged upper and lower ends, an extended chamber at the bottom and an extended chamber with a lateral offset at the top respectively, secured to the flanges, boiler connections to the lower base of the float-chamber and to the top of the upper extended chamber respectively, an index-tube alongside of the float-chamber having connections therewith at top and bottom inside the flanges, a secondary index-tube located below the float-chamber and connected with the lower extended chamber, a float within the chamber, an indicator within the secondary index-tube and an intervening connection; a check-valve and its stem mounted in the lateral offset in the upper extended chamber, an alarm outside of such upper chamber in communication with the check-valve, a steam-passage leading from the interior of the upper extended chamber through the check-valve to the alarm, a stem passing through the valve-chamber, a coiled spring surrounding the valve-stem, a hinged gate at the base of the check-valve, a lever hinged to the gate engaging the end of the valve-stem and projecting into the path of upper and lower stops secured to an upwardly-extending stem attached to the float, substantially as set forth.

12. In combination with a float-chamber, boiler connections thereto at top and bottom, a float within the chamber, a secondary index-tube located below the float-chamber and connected therewith, a connection extending downwardly from the float to within the index-tube and provided at its end with an indicator and a blow-off pipe connected to the float-chamber provided with a valve; a valve located between the float-chamber and the secondary index-tube adapted to close the communicating opening and to arrest the connection and provided with a lateral extension embracing the blow-off pipe and a lateral extension from the bottom of the index-tube frame embracing the blow-off pipe loosely so as to provide for expansion and contraction of said pipe, substantially as set forth.

13. The combination of a float-chamber provided with flanged upper and lower ends, upper and lower extended chambers secured thereto provided with lateral offsets conforming to corresponding offsets on the float-chamber flanges, an index-tube located alongside of the float-chamber and having connections

thereto at top and bottom, boiler connections to the base of the float-chamber and top of one of the extended chambers respectively and gage-cocks secured to the float-chamber centrally of its length and equidistant on each side of a centrally-located middle cock, substantially as set forth.

In testimony whereof I have hereunto set my hand this 8th day of October, 1896.

WILLIAM S. ELLIOTT.

Witnesses:
PETER J. EDWARDS,
C. M. CLARKE.