

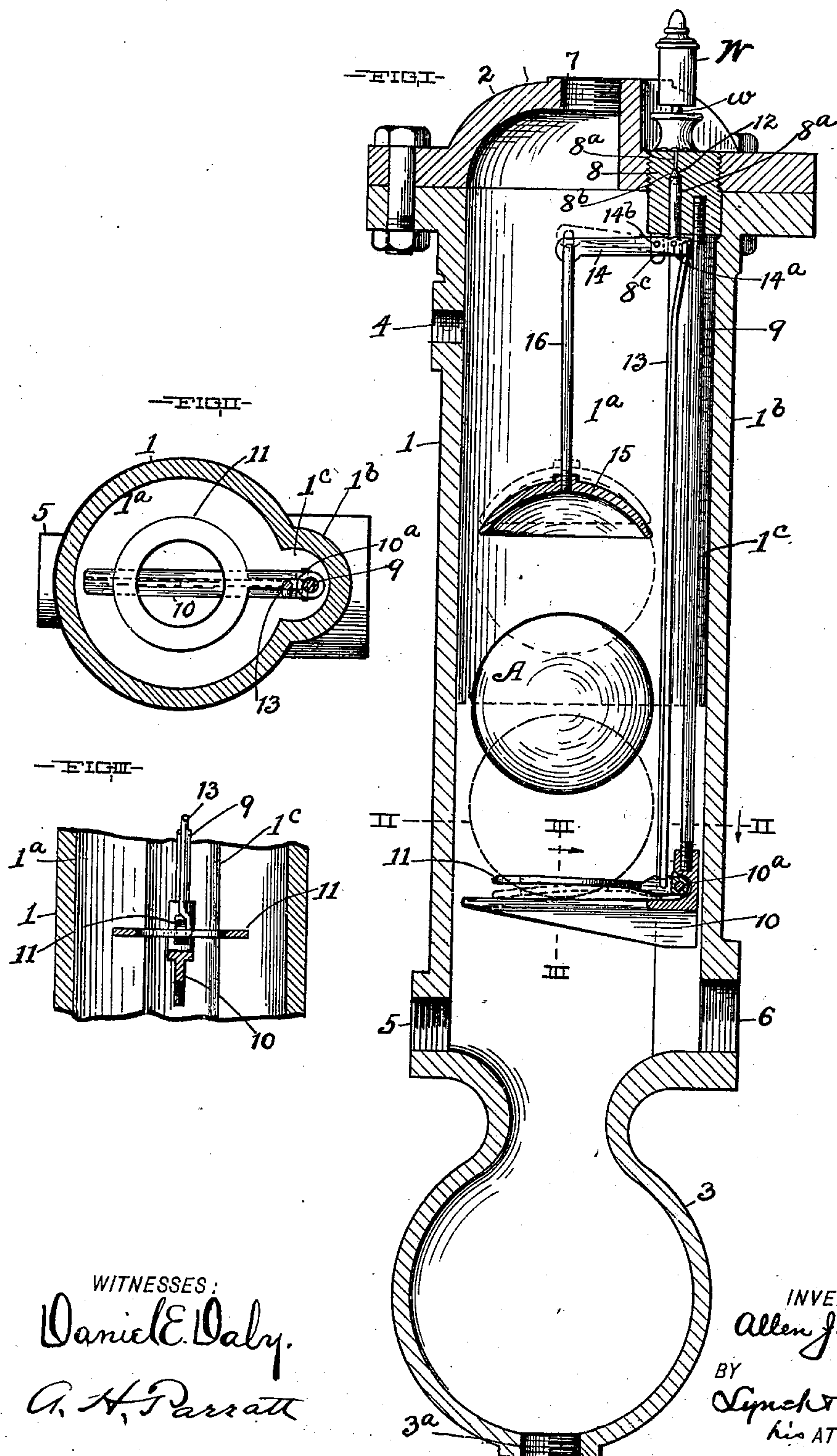
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Patented Feb. 5, 1901.

A. J. WRIGHT.
SAFETY WATER COLUMN.

(Application filed June 23, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

ALLEN J. WRIGHT, OF CLEVELAND, OHIO, ASSIGNOR TO THE WRIGHT MANUFACTURING COMPANY, OF SAME PLACE.

SAFETY WATER-COLUMN.

SPECIFICATION forming part of Letters Patent No. 667,417, dated February 5, 1901.

Application filed June 23, 1899. Serial No. 721,621. (No model.)

To all whom it may concern:

Be it known that I, ALLEN J. WRIGHT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Safety Water-Columns, of which the following, with the accompanying drawings, is a full, clear, and exact specification.

10 My invention relates to the mechanism by which the valve of a safety water-column is operated to give an alarm for low water or for high water, or for both, in a boiler to which the water-column may be attached.

15 The objects of my invention are such improvements in the construction and combination of the parts of the mechanism that operates the valve of a safety water-column as will simplify the same, facilitate assembling the parts thereof and taking them apart, increase the life of such mechanism, give a greater leverage to the operating-lever than is had in any of the water-columns heretofore in use, and make the water-column 20 more effective by reducing to a minimum the possibility of its becoming inoperative or of its not working for any reason.

My invention consists in the several improvements defined in the claims, to which 30 reference is here made for a definition thereof.

In the accompanying drawings, Figure I is a side elevation, mostly in central vertical section, of a water-column embodying the preferred form of my improvements. Fig. II 35 is a horizontal section on line II II, Fig. I. Fig. III is a vertical section on line III III, Fig. I, looking in the direction of the arrow.

Referring to the drawings, 1 represents a vertical cylindrical metallic shell forming a hollow chamber 1^a. The shell 1 has a lateral 40 projection or enlargement 1^b vertically along one side of the shell. The projection 1^b forms a groove or recess 1^c in the surrounding wall of the chamber 1^a. The recess 1^c extends up 45 and down the said wall and opens throughout its length into the chamber 1^a. The cylindrical shell 1 has its upper end closed by a cap 2, that is secured to the shell 1 in any approved manner. A sediment-chamber 3 is 50 preferably formed at the lower end of the water-column. The said sediment-chamber

is in open relation with the chamber 1^a. The shell 1 and the cap 2 constitute the casing of the water-column.

Upon one side of the column are two con- 55 nections 4 and 5 for the water-gage, (not shown,) and preferably upon the side opposite the water-gage connections is a water connection 6. A steam connection 7 is provided and preferably placed in the center of 60 the cap 2. The water connection 6 is connected with the water-space of a boiler and the steam connection 7 is connected with the steam-space of the boiler. The steam connection is preferably connected near the 65 highest point of the steam-space in the boiler and the water connection is preferably connected near but high enough above the bottom of the boiler to avoid the possibility of the pipe being stopped with sediment in the 70 boiler. The water-column should be so located that the mean water-line in the boiler will fall in a plane about midway between the desired high and low water limits.

3^a designates a valve or plug connection 75 and provides for blowing sediment out of the sediment-chamber.

The plug 8 is screwed into a threaded opening in the cap 2. Said plug has a hole 8^a vertically through it, which hole is enlarged to- 80 ward its lower end to form a valve-seat 8^b. Screwed into or otherwise secured to the under side of the plug 8 is a hanger-rod 9, that depends from the plug 8 and has its lower end provided with a foot 10. Pivoted hori- 85 zontally to the foot 10 by means of the pin 10^a is a lower float-operated lever 11, that is preferably an open ring, as illustrated in Fig. II, to cause the float A to center itself upon the said lever 11 when the water in the water-col- 90 umn falls low enough to allow the float to strike the said lever. The lower float-operated lever 11 being pivoted upon a pin 10^a at one end and being connected with the upper float-operated lever, hereinafter described, by 95 means of a rod 13, that is connected with the lower float-operated lever 11 between its fulcrum and its free end, is properly referred to as a lever of the "second class." A valve 12 is placed within and capable of vertical move- 100 ment in the opening 8^a of the plug 8. The valve 12 is connected with the whistle W by a

valve-stem *w*. Projecting from the lower side of the plug 8 is a lug or hanger 8^c, to which an upper float-operated lever 14 is pivoted horizontally, as at 14^b. The lever 14 is
 5 pivoted off its center, so that it has a long arm and a short arm at opposite sides, respectively, of its fulcrum. The rod 13 is connected with the short arm of the upper float-operated lever 14 and extends downwardly,
 10 having its lower end connected with the lower float-operated lever 11 near its pivot 10^a. The valve 12 is pivotally connected with the upper float-operated lever 14 by a pivot 14^a between its fulcrum 14^b and the point of con-
 15 nection between the said upper float-operated lever 14 and the rod 13. From the long arm of the upper float-operated lever 14 is preferably suspended a float-engageable member 15 by means of a rod 16. The member 15
 20 may be made a part of the upper float-lever 14, if desired, or the long arm of said lever may be arranged to render it capable of being engaged directly by the float; but the construction illustrated is preferable. The up-
 25 per float-operated lever 14, having its fulcrum-point between the ends of the lever, is properly referred to as a lever of the "first class." It will be seen that the valve 12 is connected with the upper float-operated lever 14
 30 between the fulcrum of said lever and the point on its short arm at which the rod 13 is connected.

A detached float A has unobstructed movement by the action of the water in the column between the upper and lower float-operated levers or the float-engageable member
 35 or members carried by either or both of said levers.

The hanger-rod 9 and the rod 13 are preferably placed within the groove or recess 1^c, that opens into the chamber 1^a of the water-column. The purpose of the projection 1^b and the groove or recess formed therein is to provide sufficient leverage and room for the parts
 40 of the mechanism hereinbefore described without unduly enlarging the casing of the water-column, which lessens the weight of the water-column and cheapens its construction without interfering with the effective-
 45 ness of the device.

As the lower end of the hanger-rod 9 and the foot 10 are left without lateral support, the said foot 10 projects almost across the chamber of the water-column, leaving but
 50 small play between the ends of the foot and the sides of the column. The purpose of having said foot extend nearly across the column is to have it engage the sides of the column when the column is being handled in ship-
 55 ment or at other times, and thus prevent the foot and its attached float-operated lever from moving so far as to unduly bend the rods 9 and 13. This saves the mechanism described from damage in packing, shipping, and other
 60 handling and keeps the mechanism always in place.

In the operation of my improved mechan-

ism, when the water in the column (which is always on a level with the water in the boiler) falls far enough to allow the float to
 70 strike the lower float-operated lever the depression of said lever by the float opens the valve and sounds the alarm, and when the water rises high enough to force the float against the upper float-operated lever the
 75 long arm of the said upper lever is raised and the valve is opened and the alarm sounded.

It will be seen that my improved mechanism is very simple and effective; that as the valve is placed vertically in the top of the
 80 column it cannot become clogged with sediment; that as the float is free and detached it is allowed to turn when in action and that the wear of the float is distributed over its surface instead of being confined or limited
 85 to places on its surface; that connecting the valve 12 with the lever 14 between its fulcrum and the point on the lever at which the rod 13 is attached gives a greater leverage to the device when the lower float-operated lever is
 90 operated than has been attained in any other construction heretofore known, and that this is accomplished without materially enlarging the size of the casing of the water-column; that the said construction and arrangement
 95 and combination of float-operated levers greatly increase the effectiveness of the mechanism without adding to its initial cost, and that as the whole mechanism is suspended from the cap of the column the said mechanism
 100 may be easily and quickly removed by loosening the cap and lifting the parts described out of the casing of the column.

I would remark that I do not wish to be understood as limiting my invention to the de-
 105 tails of construction hereinbefore described, because my invention embraces, broadly, an upright water-column provided with an alarm or signaling device—such, for instance, as a whistle W—a detached float within the col-
 110 umn and having a limited range of movement vertically, and mechanism instrumental in the operation of the alarm or signaling device and arranged to be operated by the float when the water-level becomes sufficiently ab-
 115 normal.

Of course it will be understood that the aggregate weight of the long arm of the lever 14, the float-engageable and float-centering device 15, and the rod 16, employed in sus-
 120 pending the said float-engageable device from the aforesaid lever-arm, should be sufficient to normally retain the alarm-valve in its closed position. It will be observed also that the foot 10 forms a stop to limit the downward
 125 movement of the lower float-operated lever 11, and the arrangement of parts is such that the said lever upon the operation by the float of either of the float-operated levers will have its downward movement arrested by the foot
 130 10, so as to limit the operation of either of the said levers by the float, and consequently prevent straining of the valve-operating mechanism.

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

1. In a water-column, an alarm or signaling device, a float within the column and having a limited range of movement vertically, a float-operated lever instrumental in the operation of the signaling device and fulcrumed at the upper end of the aforesaid range of movement, another float-operated lever fulcrumed at the lower end of the said range of movement and instrumental in the operation of the signaling device.

2. In a water-column, an alarm or signaling device, a float within the column and having a limited range of movement vertically, a vertically-tiltable float-operated lever instrumental in the operation of the signaling device and arranged and supported at the upper end of the aforesaid range of movement, another vertically-tiltable float-operated lever arranged and supported at the lower end of the said range of movement and instrumental in the operation of the signaling device, and an operative connection between the said levers.

3. In a water-column, an alarm or signaling device, a float arranged within the column and having a limited range of movement vertically, a vertically-tiltable float-operated lever instrumental in the operation of the signaling device and arranged and supported at the upper end of the aforesaid range of movement, a lower vertically-tiltable float-operated lever instrumental in the operation of the signaling device and arranged and supported at the lower end of the aforesaid range of movement, a rod establishing operative connection between the said levers, and a stationary stop-forming member arranged to limit the downward movement of the float.

4. In a water-column, an alarm or signaling device, an upper lever of the first class instrumental in the operation of the signaling device and having one of its arms longer than the other, an upright rod having its upper end connected with the short arm of the said lever, a lever of the second class operatively connected with the lower end of the aforesaid rod, and a float between the levers.

5. In a water-column, the combination of a lever of the first class having a long arm and a short arm, a lever of the second class, an alarm or signaling device connected with the short arm of the first-mentioned lever between the lever's fulcrum and the free end of the lever's short arm, a rod establishing operative connection between the aforesaid lever of the second class and the free end of the short arm of the aforesaid lever of the first class, and the float between the said levers.

6. In a water-column, a casing provided with a removable cap, an alarm or signaling device supported from the cap, a hanger-rod depending from the cap, a lever supported from the cap and instrumental in the operation of the signaling device, a float arranged below the said lever, and a stop-forming mem-

ber arranged to limit the downward movement of the float and formed upon or supported by the aforesaid rod, substantially as and for the purpose set forth.

7. In a water-column, the combination of a lower float-operated lever, an alarm or signaling device, an operative connection between the signaling device and the aforesaid lever, a hanger-rod having its lower end provided with a foot extending in under the lever and forming a stop for limiting the movement of the said lever by the float, and a float arranged over the said lever.

8. In a water-column, the combination of a lever of the first class having a long arm and a short arm, an alarm or signaling device connected with the lever's short arm, a hanger-rod, a stop-forming foot attached to the lower end of the hanger-rod, a lever of the second class, a rod connecting the last-mentioned lever with the short arm of the first-mentioned lever, and a float between the levers.

9. In a water-column, an alarm or signaling device, upper and lower float-operated levers, operative connections between the levers and the signaling device, a float-engageable member suspended from the upper lever, and a detached float between the said float-engageable member and the lower float-operated lever, substantially as and for the purpose set forth.

10. In a water-column, the combination of a casing provided with a cap, a valve in the cap, a hanger-rod depending from the cap, a lever supported from the cap and operatively connected with the valve, a lower float-operated lever supported from the hanger-rod, an operative connection between the said lower lever and the aforesaid valve, and a float between the levers, substantially as and for the purpose set forth.

11. In a water-column, the combination of a casing provided with a cap, a valve within the cap, a hanger-rod depending from the cap, a lever of the first class supported from the cap and having a long arm and a short arm and having its short arm operatively connected with the valve, a lever of the second class supported from the hanger-rod, a rod operatively connecting the last-mentioned lever with the short arm of the first-mentioned lever, and a float between the levers.

12. In a water-column, the combination of a casing 1 having a lateral enlargement 1^b extending up and down the casing and forming a recess 1^c in open relation with the main or float containing chamber of the column, a lever of the first class arranged within and supported from the upper portion of the casing and having a long arm and a short arm, an alarm or signaling device operatively connected with the short arm of the said lever between the lever's fulcrum and the free end of the lever's short arm, a lever of the second class suitably supported within the lower portion of the casing, a rod establishing operative connection between the last-mentioned

lever and the free end of the short arm of the first-mentioned lever and arranged within the aforesaid recess, and a float between the levers, substantially as and for the purpose set forth.

13. In a water-column, the combination of a casing 1 provided with a valve and having a lateral enlargement 1^b so as to form a recess 1^c extending up and down the said enlargement and in open relation with the main or float-containing chamber of the casing, an alarm-valve in the said cap, a hanger-rod depending from the cap within the aforesaid recess, a lever of the first class supported by the said cap and having a long arm and a short arm, and having the short arm operatively connected with the valve, a lever of the second class supported from the hanger-rod, a rod establishing operative connection between the last-mentioned lever and the free end of the short arm of the first-mentioned lever, and a float between the levers.

14. In a water-column, the combination of a casing provided with a cap, a valve in the

cap, a foot suspended from the cap, a float-operated lever fulcrumed to the foot, a rod operatively connecting the lever with the valve, and a float arranged as required to render it capable of descending upon and thereupon operating the said lever, substantially as and for the purpose set forth.

15. In a water-column, the combination of a casing provided with a cap, a valve in the cap, a foot suspended from the cap, and a float-operated lever supported from the foot and normally arranged to tilt downwardly against the foot and shaped as required to form a ring, and a float arranged as required to render it capable of descending upon and thereupon operating the said lever, substantially as and for the purpose set forth.

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

ALLEN J. WRIGHT.

Witnesses:

L. F. GRISWOLD,
LULU BRADY.