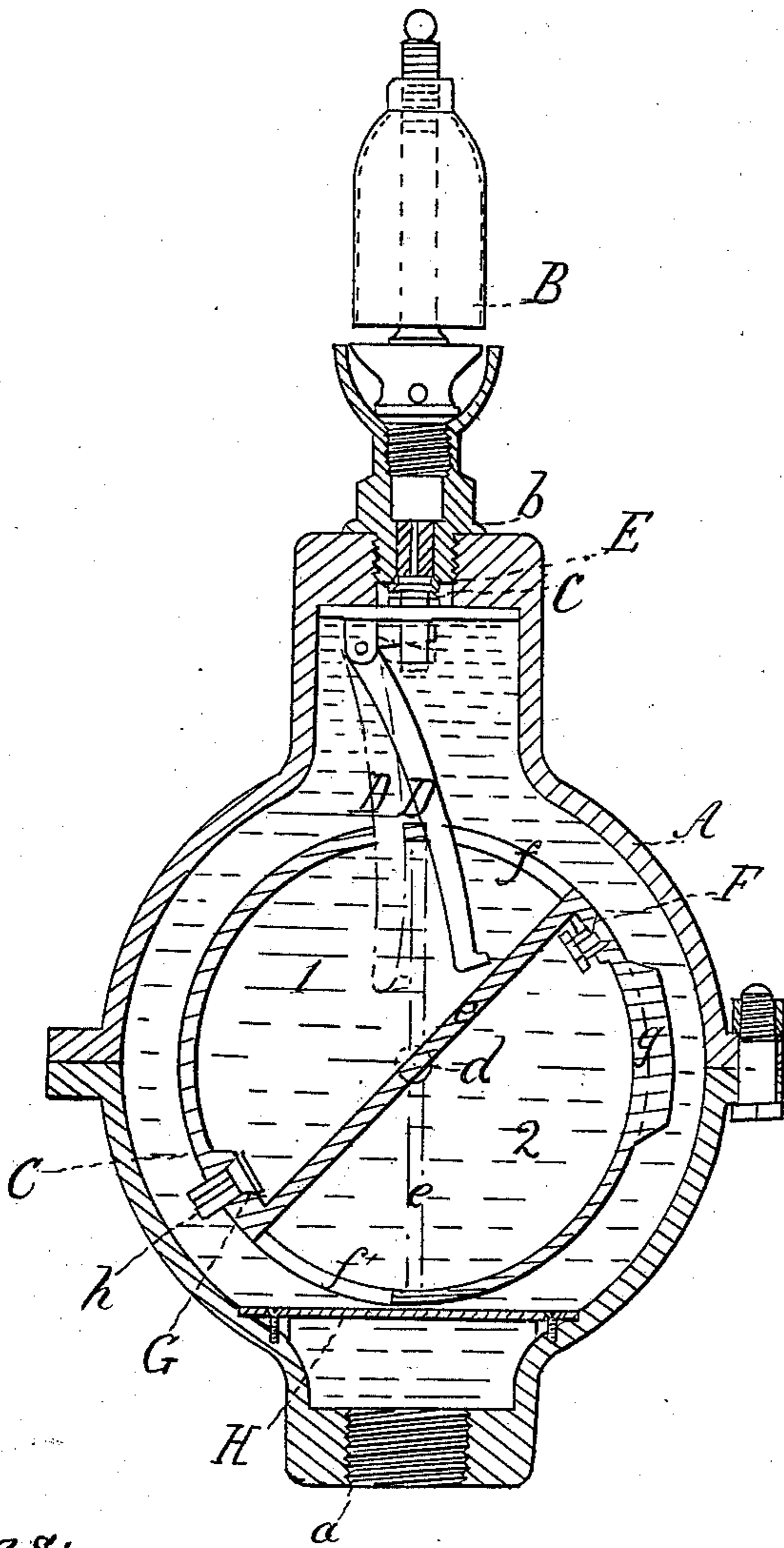


C. S. Watson,
Steam-Boiler Indicator,
No 79,708, Patented July 7, 1868.



Witnesses;
Stephen Alcock
Saml. Oliver.

Inventor
Chas. S. Watson
W

United States Patent Office.

CHARLES S. WATSON, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 79,708, dated July 7, 1868.

IMPROVEMENT IN LOW-WATER INDICATOR.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHARLES S. WATSON, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Low-Water Indicators; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the combination of an oscillating vessel, which is divided into two parts by a central partition, with a stationary receiver, that is provided with a whistle, and has an open communication with the water in the boiler by means of a vertical pipe, the lower end of which is placed at a point where the alarm should be given, so that the water runs out of the pipe and the receiver, and steam takes its place when the water in the boiler descends below the end of the pipe.

One part of the said oscillating vessel has an open communication with the receiver at top, so as to be always weighted with water, and the other part has its communication with the receiver at its lower side, and is so weighted, by the addition of metal, as to bring the central partition on an angle when both parts of the vessel are filled with water. When the water in the receiver has descended to the opening in the lower side of the latter-described part, the water in it descends with the water in the receiver to the boiler, and steam takes its place, so that said part has been so lightened as to give preponderance of weight to the other side of the oscillating vessel, and the central partition coming into a perpendicular position thereby, bears against the handle of a lever which protrudes through the opening in the upper side of the vessel, and opens a valve, whereby steam, which has by this time filled the receiver, rushes into the whistle and gives the alarm.

The peculiar construction of the apparatus will be understood by the following description.

The accompanying drawing represents a vertical section of the indicator.

A is a spherical receiver, which has communication with the boiler by means of a vertical pipe, the upper end of which is screwed into the opening *a* of the receiver, and the lower end extends into the boiler, to the point where the water has descended when the alarm should be given. The base, *b*, of the whistle B is screwed into the opening *c* of the receiver.

C is a vessel, which oscillates on its journals, *d*, in openings in the opposite sides of the receiver. The said vessel is divided into two equal parts, 1 2, by the central partition *e*. The part 1 has an open communication with the receiver by means of the opening *f* in its upper side, so as to receive water therefrom, and be nearly full when the water is discharged from the part 2 through the opening *f'* in the lower part thereof, as hereinafter described.

The part 2 is weighted by means of the lug *g*, or in any other convenient manner, so as to cause the vessel C to turn partly around when both parts are full of water and bring the central partition *e* on an angle, as represented in the drawings.

When the water in the boiler descends to the lower end of the pipe which communicates with the receiver, the steam ascends the same and takes the place of the water in the receiver A. When the water in the latter has descended as far as the opening *f'* in the part 2 of the vessel C, the communication being thereby made with the steam in the receiver, steam rushes into said part and takes the place of the water, which descends into the boiler with the water in the lower part of the receiver. This gives preponderance to the part 1 of the vessel C, which causes it to turn partly around, so that the central partition *e* shall assume a perpendicular position, indicated by red lines. When the partition has nearly reached this position, it bears against the handle of the lever D, so as to open the valve E, and let steam from the receiver A into the whistle, and give the alarm indicating low water in the boiler.

The lever may be dispensed with, and the valve raised by the direct action of the vessel C by means of a cam, or otherwise.

When the boiler is again supplied with water, the receiver is refilled with the same through the communicating pipe, and the water being thereby caused to pass through the opening *f'* of the part 2 of the vessel C,

and fill said part, it again becomes heavier than the part 1, whereby the vessel is caused to turn back into its former position, represented in the drawings.

I provide for the escape of the air in the part 2, to admit of its being filled with water, by means of the valve F, which is borne up by the pressure of the air in said part, and held in its upward position until the air is expelled by the ascent of the water, and the part is filled with the latter. The valve is then brought back by its own weight upon its seat.

As the vessel C comes into the position it assumes in the drawings, the rear edge of the opening *f* bears against the handle of the lever D, in time to reverse its motion and close the valve E. The vessel remains in this position before the giving of each alarm, in the manner above described, until the water in the receiver A has descended to the opening *f'*, and the upper part of the receiver is filled with steam, whereby the alarm is given by means of dry steam.

There is a valve, G, in the lower side of the part 1 of the vessel C, which is opened upwards by the end of its stem, *h*, bearing on the bridge H, as the partition *e* comes into its vertical position, to allow of the escape of the water from said part 1, and give a preponderance to the part 2 of the vessel, so that it may regain its former position when the alarm has been sounded a sufficient length of time by the whistle B, and close the valve E, and thus get rid of the extension of the noise beyond the time required. If desired, a lever may be connected with the stem *h*, to bear upon the bridge H, instead of having the action direct with the stem.

In the drawings, the receiver A and oscillating vessel C are represented of spherical form, but I do not confine myself to this construction, as other forms may answer as well.

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

1. The combination of the oscillating vessel C, constructed substantially as described, with the receiver A, lever D, and valve E, substantially in the manner above set forth, and for the purpose specified.
2. The construction of the part 2 of the oscillating vessel C with the valve F, to provide for the escape of air from the same, so that water may ascend into and fill it, as above described.
3. The combination and arrangement of the valve G with the part 1 of the vessel C and the bar H, substantially as and for the purpose set forth.

In testimony that the above is my invention, I have hereunto set my hand and affixed my seal, this 7th day of May, 1868.

CHAS. S. WATSON. [L. S.]

Witnesses:

STEPHEN USTICK,
JOHN WHITE.