(No Model.)

T. JAMES.

HIGH AND LOW WATER ALARM FOR STEAM BOILERS.

No. 261,721. Patented July 25, 1882.

Fig. 1.

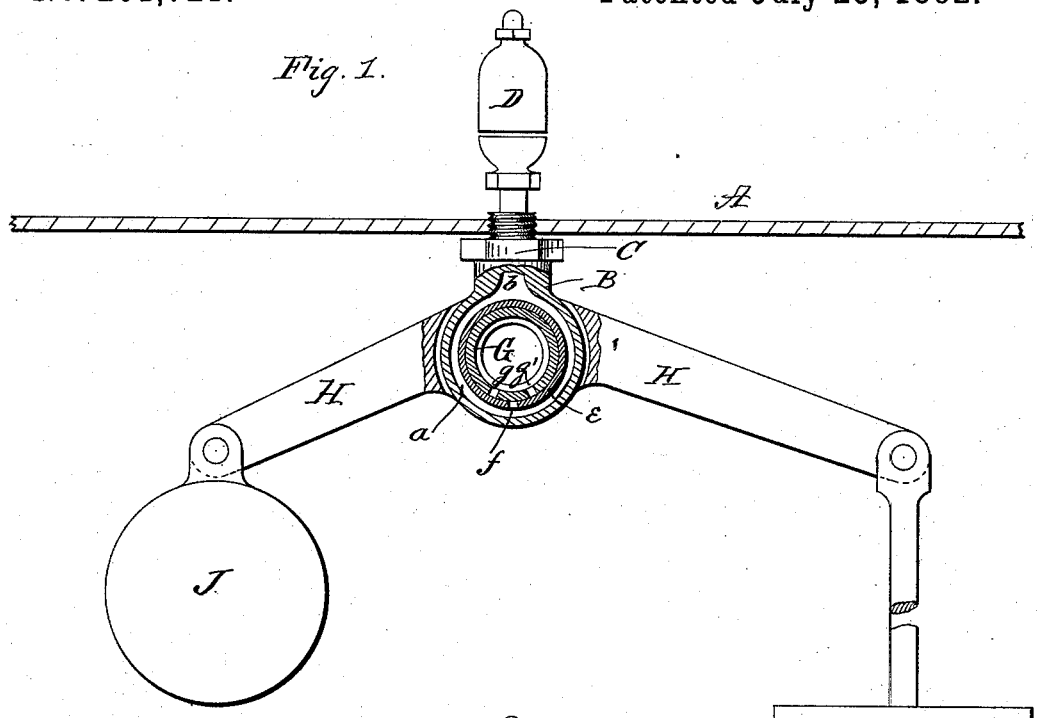
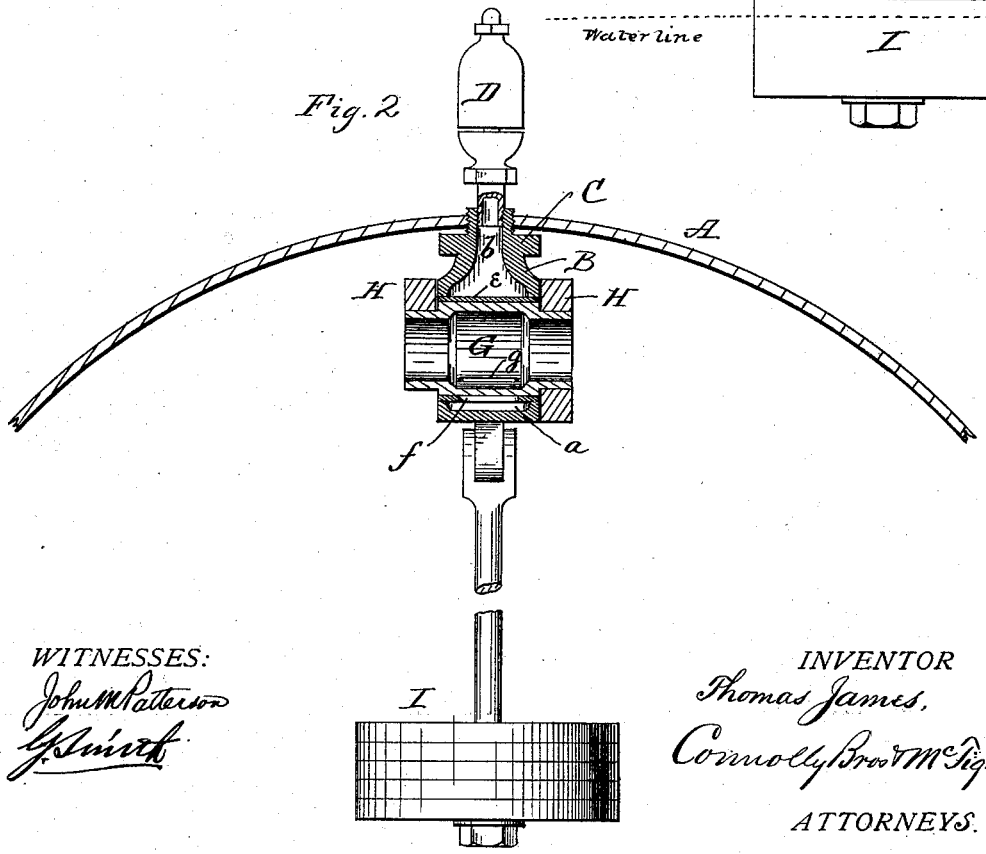


Fig. 2



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UNITED STATES PATENT OFFICE.

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HIGH AND LOW WATER ALARM FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 261,721, dated July 25, 1882.

Application filed March 25, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS JAMES, of Braddock, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in High and Low Water Alarms for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a section longitudinally of a portion of a boiler, showing my improvement partly in section. Fig. 2 is a vertical transverse section of Fig. 1.

The object of this invention is to construct an alarm for steam-boilers without the use of hollow "floats," which are difficult to make and apt to admit water, and thereby become defective or unreliable.

A further object of the invention is to simplify the construction and operation of the valve which permits the passage of steam to the whistle.

The invention consists in a rotary valve oscillating by the motion of a lever whose center of vibration is the axis of the valve, and which lever extends on both sides of said axis, and is provided with two solid masses of metal or other material of different weights, the difference being about equal to the weight of water displaced by submerging the larger mass, which hangs lower than the other, so that the operation is effected by the preponderance of weight on one side or the other, due to the rise or fall of the water-level; and the invention further consists in the construction and combination of parts, as hereinafter fully described and claimed.

In the drawings, A designates the top of a boiler, which may be of any description.

B is a ring-shaped body of metal, having the annular recess *a* in its interior communicating with the passage *b* in the nipple C, which extends upwardly from the body or chest B, and is threaded for attachment to the boiler-top A, as shown.

A whistle, D, is attached to nipple C and communicates with passage *b* at all times.

A piece of cylindrical tubing, *e*, is fitted to the cylindrical opening in body B, and may be most readily secured by expanding its ends or upsetting. Piece *e* at its bottom has the longitudinal port *f*, opening into the recess *a*, as shown.

A cylindrical valve, G, having the ports *g g'*, is set loosely inside the tube *e*, and by oscillating or rotating partially will cause the ports *g g'* to in turn register with the port *f*.

Valve G is hollow throughout, and communicates at all times directly with the steam-space of the boiler A, and its ends project beyond the body B, and are formed square or other suitable shape to be rotated by the lever which operates the valve. This lever H is slotted to receive the body B, and has square openings transversely to catch on the ends of valve G, the lower half at one side being cut away to permit the insertion of the valve G into body B, the lever being tilted slightly for the purpose while embracing the body B.

At one end of the lever H is pivotally suspended a mass of metal, I, of considerable weight, and at the other end is similarly suspended a lesser mass, J. Mass I hangs low enough to reach and be nearly submerged in the water normally, while the weight J remains up in the steam-space. Weight I exceeds weight J by about the weight of water displaced by the former when partly submerged. By this arrangement the partial submerging of weight I effects an equilibrium, and valve G is held down strongly to its seat over the port *f* by the combined gravity of the two weights I J.

As the water rises in the boiler the weight J preponderates and the lever H oscillates or rotates the valve G until "high water" is reached. When port *g* registers with port *f* steam passes through and by recess *a* to passage *b* and the whistle announces the fact. On the other hand, when the water falls in the boiler weight I preponderates and rotates the valve G until port *g'* registers with port *f*, when the whistle again sounds the alarm. The weights thus not only serve to keep the valve to its seat, but also afford a powerful grinding action to keep the valve and seat clean, and their weight is sufficient to force the valve to move, even if scale should have formed thereon. Thus leakage is absolutely guarded against. There are no hollow floats to become leaky and unrelia-

ble, and the device is very sensitive to the slightest fluctuation of the water-level.

The construction of the valve and seat is exceedingly cheap and simple, requiring no boring or finish, except on the face of the valve and that of the seat.

It is obvious that if the arm of lever H carrying weight J be shortened sufficiently the weight J would, in order to establish the desired equilibrium, have to be heavier than the weight I; but that would not alter my principle, because in any such case the weight I would, if out of the water, overcome the weight J, owing to the proportions of the lever-arms.

The valve and all working parts are inside the boiler and cannot be tampered with, and are out of the reach of scum.

I claim as my invention—

1. In a steam-boiler alarm, a cylindrical valve and valve-seat arranged horizontally and having the steam-ports on the bottom, in combination with weights attached to the valve, substantially as described, whereby the valve is held to its seat by the downward pull of the weight.

2. The combination, in a steam-boiler alarm, of the body B, having recess *a* and passage *b*, tube *e*, having port *f*, and a loose open-ended cylindrical valve, G, having ports *g*, substantially as described.

3. The combination of the body B, having recess *a* and passage *b*, tube *e*, having port *f*, valve G, having ports *g g'*, lever H, carrying at its ends respectively the weights I J, related as described, and whistle D or other audible alarm, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

THOMAS JAMES.

Witnesses:
T. J. McTIGHE,
THOMAS J. PATTERSON.