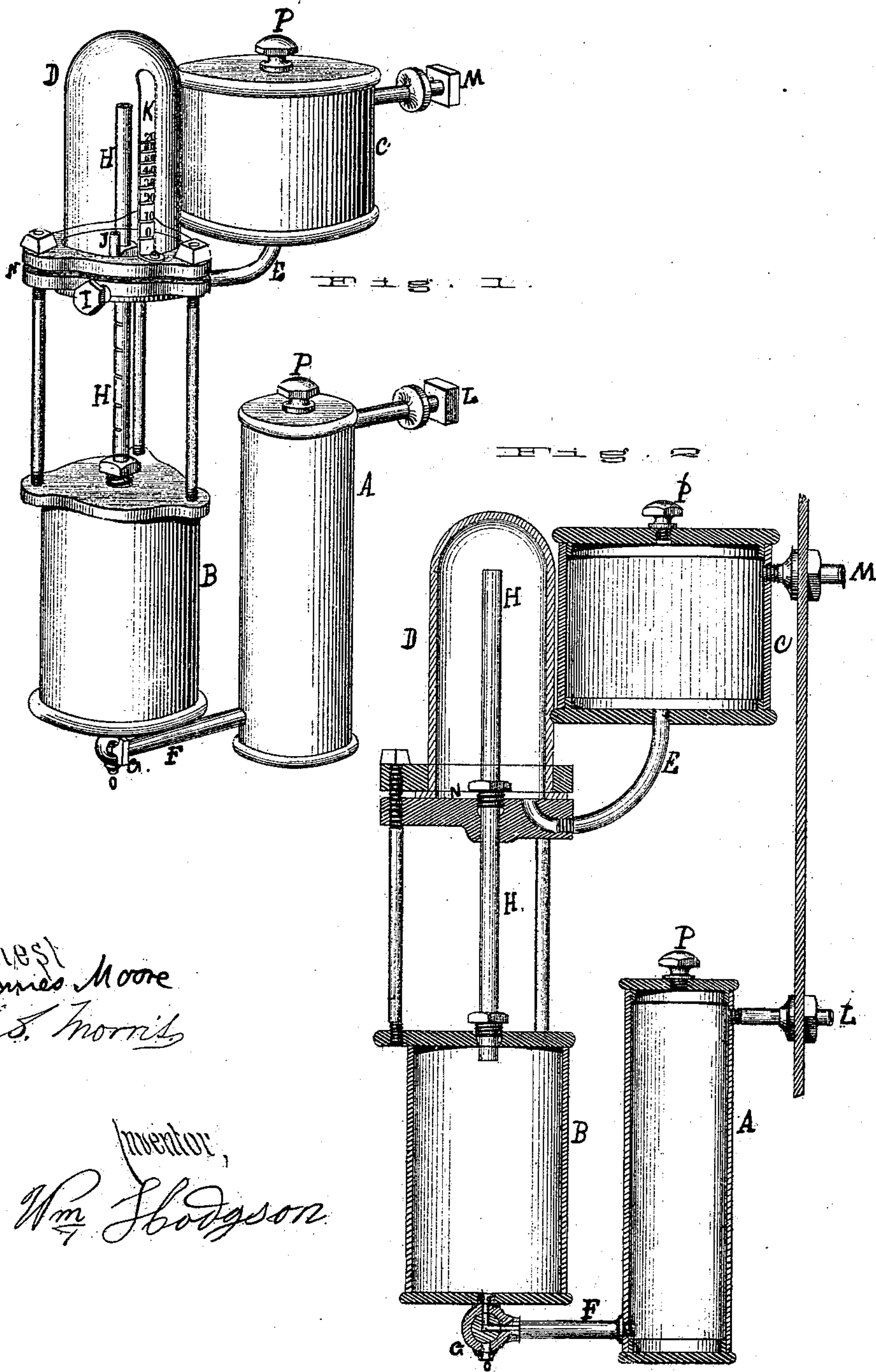


W. Hodgson,

Water Gage.

No. 93884.

Patented Aug 17. 1869.



*Witness
James Moore
S. S. Morris*

*Inventor,
Wm Hodgson*

United States Patent Office.

WILLIAM HODGSON, OF CINCINNATI, OHIO.

Letters Patent No. 93,884, dated August 17, 1869.

IMPROVED STEAM WATER-GAUGE INDICATOR FOR BOILERS.

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, WILLIAM HODGSON, of Cincinnati, in the county of Hamilton, and State of Ohio, have invented a certain new and useful Improved Steam and Water-Gauge; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a perspective view of my improved steam and water-gauge.

Figure 2 is a vertical section through fig. 2.

Similar letters refer to similar parts in both figures.

A, B, and C are metallic cylinders.

D is a glass air-chamber, made steam-tight at the bottom with the packing N.

E is a pipe, connecting the interior of the cylinder C with the interior of the air-chamber D. It does not protrude above the bottom of the said air-chamber.

F is a pipe, which gives similar communication between the cylinders A and B.

G is a right-angled stop-cock, by means of which communication between the cylinders A and B is regulated. When it is turned, as shown in fig. 2, there is communication between them. When turned a quarter circle to the left, the communication ceases. When turned from the position shown a quarter circle to the right, there is communication between the cylinder A and the outer orifice O.

L is a pipe, entering the boiler at a point below which the water should never be permitted to go.

M is a pipe, entering the boiler at a point above "high-water mark."

H is a glass tube, opening into the cylinders B and D, and has a scale attached to or cut upon it, fig. 1.

K is a scale, attached to or cut upon the glass air-chamber D.

J is a pipe, opening into the air-chamber D, and rising to such height as may be necessary, for the purpose hereinafter explained. Said pipe extends out through the frame-work, and is covered by the screw-cap I, fig. 1.

P and P' are screw-caps, attached to the tops of cylinders A and C, respectively, and through which water is poured into the said cylinders.

The operation of my improved water and steam-gauges is as follows:

The screw-cap P being first removed, and the angle-cock G being arranged in such manner that there is free intercommunication between the cylinders A and B, water is poured into the cylinder A, until it is full. This will press the air out of the cylinders A and B, and a part of the tube H. The screw-cap I is then removed, so that the interior of the air-chamber communicates, through the pipe J, with the atmosphere.

Filtered, or otherwise clear water is then poured into the cylinder C, its screw-cap P' being first removed, which empties, through pipe E, into the air-chamber D, until the water rises to the top of the pipe J. The cap I is then put on, as shown, fig. 1. The cylinder C is then filled with clear water, and its screw-cap fastened on. Air is now trapped in the upper portion of the air-chamber D, the quantity of which has been measured in the process just described, and, the bottom of the air-chamber and the pipe J being filled with water, and the pipe H partly with air, and partly with water, it has no means of escape.

As the steam is raised in the boiler, it presses the water from the cylinder C into the air-chamber D, and compresses the air in a ratio to the power of the steam.

The pressure of the steam on the water in the cylinder C, and consequent pressure of the water against the compressed air in the air-chamber, tends to force the air down the pipe H, and would force it all down said pipe, were it not for the fact, that the pressure of the steam upon the water in the boiler is equal to its pressure upon the water in the cylinder C, and, pressing against the water in the cylinder A, and immediately against the water and air in the pipe H, the pressure from the cylinder C is just balanced.

The reverse of this proposition is equally true: that is, that the pressure of the steam upon the water in the boiler would, if not balanced by its pressure upon the water in cylinder C, force the water up the pipe H, until it filled the air-chamber D; and, owing to the equal pressure thus described, the water in the cylinders is quiet, with the exception of a slight oscillation.

From this cause, two valuable results follow:—first, that the water in the cylinders remains comparatively cool; and, second, that the mud and deposit that may pass from the boiler into the water in cylinder A, do not go into cylinder B, but settle in the bottom of cylinder A, from whence they can be drawn out by the angled cock G, by turning it in the manner hereinbefore described.

I have, for greater clearness and simplicity, above described the pressure, which is given by the compressed air in the air-chamber or cylinder D to the water in pipe H, to be equal to the pressure given by the water in pipe H to the said compressed air; but a closer inspection will show that this is not true, and that the pressure given by the said compressed air will be greater than that given by the water in pipe H by the amount or weight of a column of water the height of the water in the cylinder C above the highest point of the water in the air-chamber D. This, I think, is evident; and this, it is believed, will be a further security against the explosion of the boiler.

It is to be remarked that no stress is laid upon the

relative positions of the above-described devices, as their positions may be greatly varied without injury to the invention.

Having thus described my invention,

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

1. The combination of the air-chamber D and pipe J, substantially as described.

2. The combination of the cylinder B and air-chamber D, when connected by the pipe H, substantially as described.

3. The combination of the cylinder C and air-chamber D, when connected by the pipe E, substantially as described.

4. The combination of the cylinders A and B, when connected by the pipe F, substantially as described.

WILLIAM HODGSON.

Witnesses:

JAMES MOORE,
S. S. MORRIS.