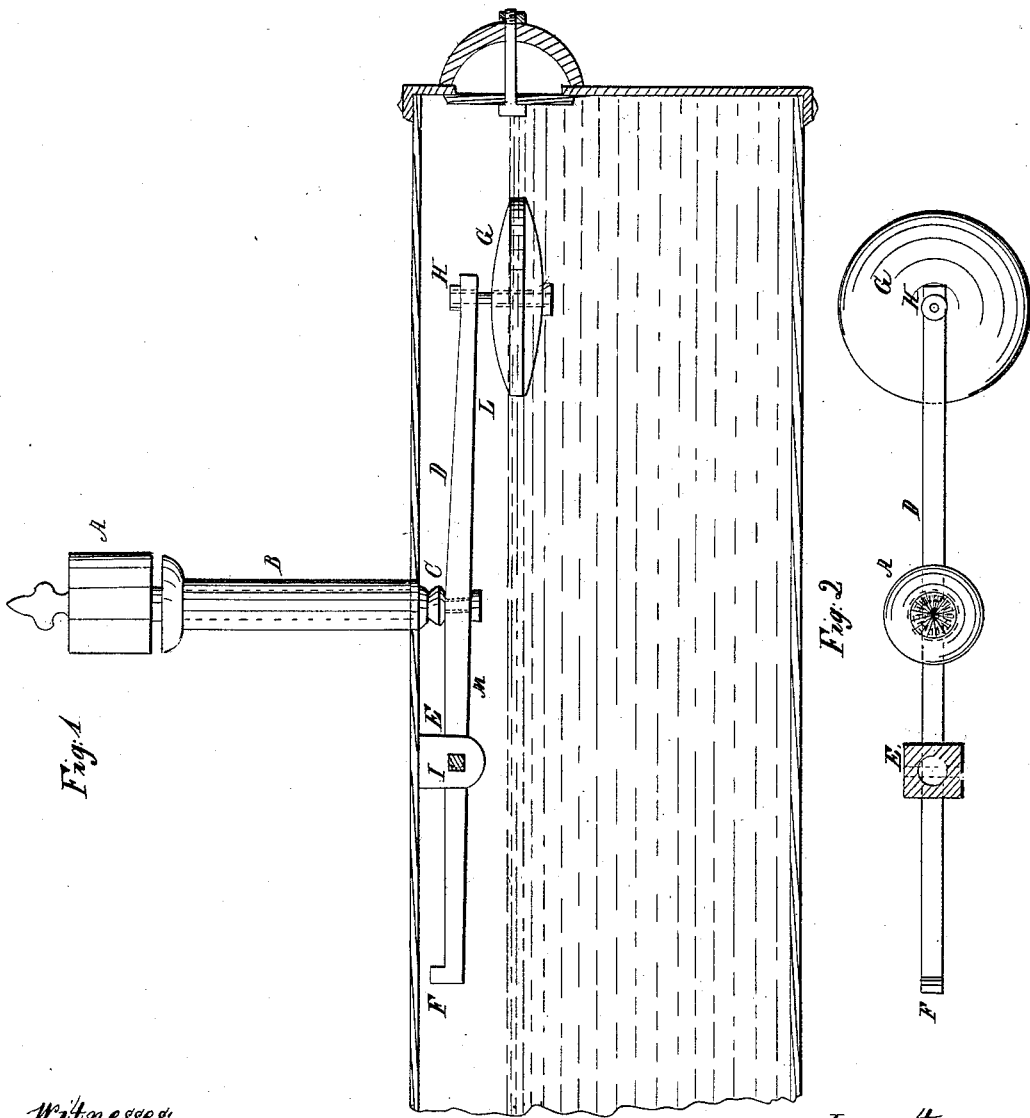


J. D. Hall,
Steam-Boiler Indicator.
N^o 45,203. *Patented Nov, 22, 1864.*



Witnesses:
C. Prager
W. H. Young

Inventor:
John D. Hall,

UNITED STATES PATENT OFFICE.

JOHN D. HALL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND OSBORN CONRAD, OF SAME PLACE.

IMPROVEMENT IN WATER-ALARM GAGE.

Specification forming part of Letters Patent No. 45,203, dated November 22, 1864.

To all whom it may concern:

Be it known that I, JOHN D. HALL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Water-Alarm Gage, the purpose of which is to sound an alarm when the water in a steam-boiler to which it is applied sinks to or below a certain line; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal elevation of my invention, together with a sectional view of a portion of a steam-boiler shell; and Fig. 2 is a plan view of the same.

Corresponding parts in the different figures are indicated by the same letter.

This invention consists in attaching a steam-whistle or other sounding device to the upper part of a steam-boiler, and of applying to the interior of the boiler, by any suitable mechanism, a suitable float and valve in such a manner that when the surface of the water sinks to or below a certain line the gravity of the said float opens the said valve, thus admitting steam to the said whistle or other sounding apparatus, thereby giving the engineer or other person or persons on or near the premises on which the boiler is located sufficient warning to enable him to prevent the explosion or bursting of the boiler through scarcity of water therein.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation, with reference to the drawings.

I construct my steam-boilers in any of the known forms, and apply thereto gage-cocks, a safety-valve, and the other appendages of such boilers; but in order to obviate the danger arising from careless or inattentive engineers and from other causes, I apply to the top part of the boiler the steam-whistle A, or any other suitable sounding device, by means of a suitable tube or pipe, B, the lower end of which pipe projects a short distance within the boiler, and thus forms the valve-seat for the valve C. This valve I usually attach to any suitable lever, D, the said lever being attached to the boiler-shell by means of a suit-

able piece, E, and being capable of turning on the pin or bolt I. To this said lever, at or near one end, I attach, by means of a suitable bolt, H, or other connection, a suitable float, G, whose specific gravity is nearly but not quite equal to that of water. This float should possess sufficient strength to resist the collapsing force of the maximum of steam-pressure which the boiler is intended or expected to sustain, and should be made of such material as will resist the penetrating or saturating property of the steam or water and as will not rapidly corrode. In general, I make this float of cast-iron, the same being "cored out," or cast hollow, so as to give it the proper air or vacant space to render it of the desired specific gravity. It may also be made of sheet-iron, sheet-brass, or other sheet metal. The form shown in the drawings, or that of the ellipsoid, is a convenient and desirable one.

The bolt H, I usually fit loosely into both the lever D and the float G, in order that the float may rise up against the lever, and that the bolt may always hang in a vertical position, notwithstanding the varying inclination of the lever D.

The two arms L and M of the lever D, I make of such relative lengths as will insure a sufficiency of power in the float G to open the valve C against the greatest amount of pressure the boiler is expected ever to sustain, and notwithstanding the greatest amount of adhesion that may ever from any causes occur between the valve and its seat. The end F of the said lever I so adjust that it comes in contact with the boiler-shell when the valve is sufficiently open, and thus sustains the float, thereby preventing any derangement of the different parts of the device when the water is drawn or blown out of the boiler, or, from any cause, becomes very low.

The valve C, I usually make of brass or any other suitable metal, and of any of the known or suitable forms for valves used for other or similar purposes, and so connect it to the lever D that when the latter is depressed the valve is also depressed or opened, and when it is elevated to a certain position the valve is closed "steam-tight." This valve may also be located at any section in the

length of the pipe or tube B, it being attached to the lever D by means of any suitable rod or wire.

The tube or pipe B, I make wholly of brass, or partly of iron and partly of brass, or any other suitable metal or metals, it being important that the lower end thereof, into which is formed the valve-seat, should be of some non-corrosive, or, at least, comparatively non-corrosive, material. The tube may be quite small, yet it should be of sufficient caliber to discharge enough steam to sound a whistle or other sounding apparatus which can certainly be heard by one or more workmen or employes besides the engineer on or about the premises on which the boiler is located. The lower end of the said pipe I usually "bevel off," as shown in the drawings, (the form thus given to it being that of the convex surface of the inverted frustum of a cone,) in order to reduce as much as possible the contact-surface of the valve-seat, and thereby reduce the adhesion-surface of the same as well as the steam-pressure tending to close the valve. This tube or pipe, as well as the steam-whistle A, may be dispensed with and a simple orifice in the boiler-shell, over which is placed a simple reed or a fan or a small wind-wheel, so arranged that the force of the steam rushing through the orifice will ring a small bell or operate some other sounding apparatus, substituted in lieu thereof.

The operation of this invention is as follows: When the boiler is filled with water up to the ordinary "working-line," the float G presses upward against the lever D, and thus closes the valve C, or, when "steam is up," the pressure of the same holds the valve closed, and when the water "runs down," or sinks to or below a certain line, (which line should be considerably—say at least twenty minutes or half an hour—above that one to which the water cannot sink without danger or doing injury to the boiler,) the gravity of the float G, acting on the lever D, opens the valve C, thus admitting steam to the whistle A, or other sounding apparatus, thereby warning the engineer or other persons of the danger consequent upon low water in the boiler in time for him or them to obviate the same.

In applying this invention to use, I usually attach the same to that portion of the boiler which will locate the float where there is the least ebullition of the water.

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

The arrangement of the float G, the lever D, the valve C, and steam-whistle A, substantially in the manner and for the purpose specified.

JOHN D. HALL.

Witnesses:

C. BRAZER,

H. H. YOUNG.