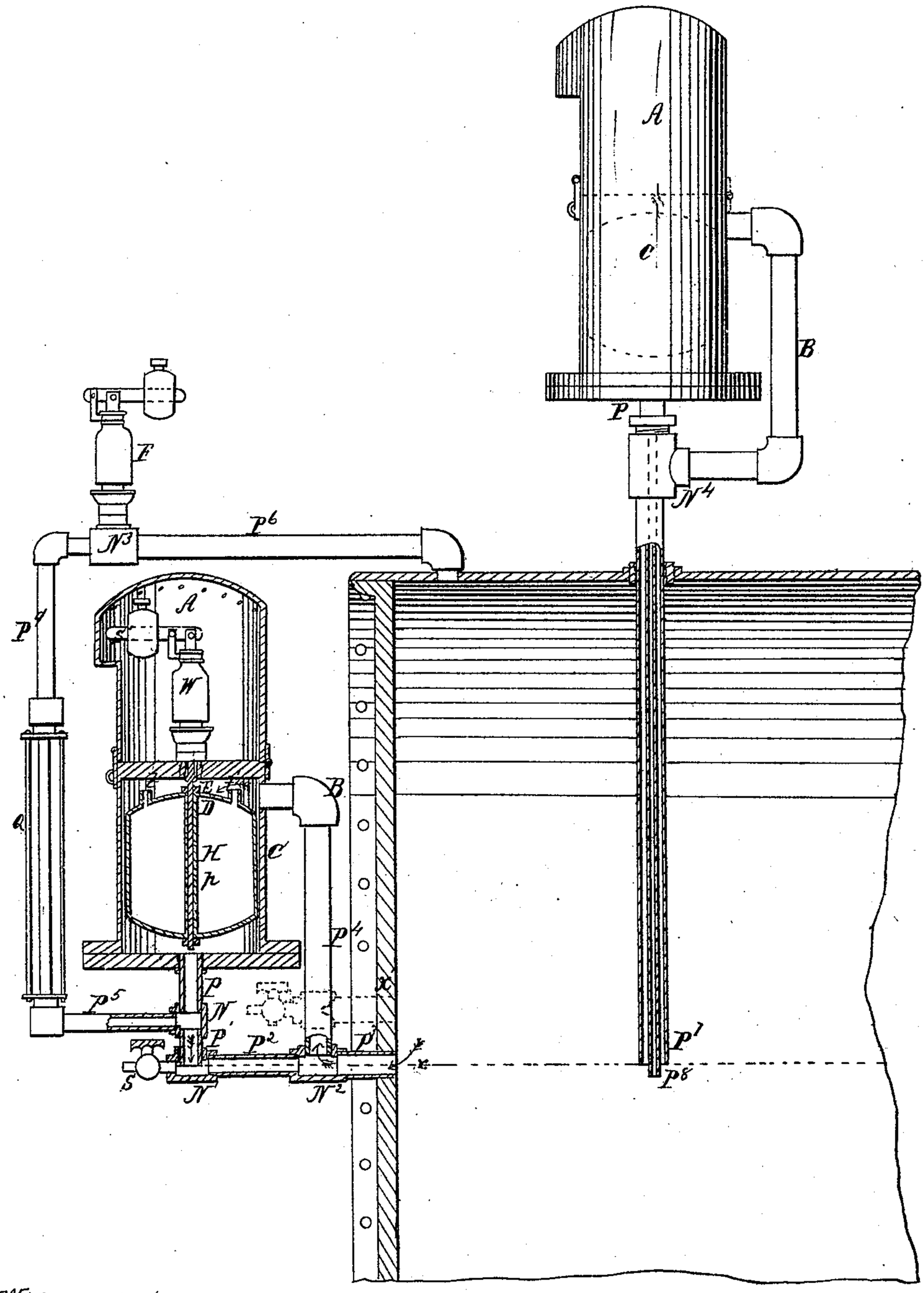
R. Berryman.

Indicator for Steam Generators.

No. 99,996. Patented Feb. 15, 1870.



Witnesses
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ROBERT BERRYMAN, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 99,996, *dated February* 15, 1870; *antedated August* 16, 1869.

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, ROBERT BERRYMAN, of Philadelphia, Pennsylvania, have invented an Improvement in Low-Water Alarms for Steam-Boilers, of which the following is the specification.

Nature and Object of the Invention.

The invention consists of an apparatus, fully described hereafter, whereby an alarm is given when the water in a steam-boiler, to which the apparatus is connected, falls below a given point; and

The invention further consists of a certain arrangement of pipes, whereby the discharge of water from the steam-whistle or other steam alarm is prevented.

Description of the Accompanying Drawing.

The figure in the accompanying drawing is a sectional elevation of my improved apparatus, showing two modes of applying the same to a steam-boiler.

General Description.

With a vessel C communicate two pipes B and P, the former, and larger pipe extending from the upper part of the vessel, and the latter from the bottom of the same, and both pipes are connected by suitable couplings, N^1 N^2, to a horizontal pipe P^3, which is equal in diameter to or is larger than the pipe B, the pipe P extending into the coupling N^1, to a point below the end of the pipe B, for a purpose described hereafter.

The pipe P^3 extends through the head X′ of a steam-boiler, the center of the pipe being on a line with the low-water line *x*, and to the coupling N^1 is connected an ordinary blow-off cock S.

In the center of the top of the vessel C is an opening, to which is fitted a valve E, on a stem or rod *p*, which extends through an opening in the stem of a steam-whistle W, secured to the top of the vessel, the rod being connected at its upper end to a weighted lever *s*′, which tends to retain the valve in contact with its seat.

The valve-stem *p* also passes through and is connected to a cylindrical vessel H, the top of which is curved and perforated, the perforations being surrounded by flanges or tubes *t t*′, for a purpose described hereafter.

The vessel H and the weight on the lever *s*′ are so proportioned that the vessel will hold such a quantity of water as will counterbalance the weight, and withdraw the valve E from its seat.

To the top of the vessel C is hinged a perforated case A, which, when in the position shown in the drawing, incloses the whistle W, and prevents the weighted lever from being tampered with, and the whistle from being injured.

A pipe, P^6, communicates with the boiler, and with a "high-pressure" whistle F, and with the latter also communicates a pipe P^9, which is smaller than the pipe P^6, and, in the present instance, is connected to the upper end of an ordinary glass indicator Q, the latter communicating through a pipe P^5 with the pipe P.

Operation.

So long as the water within the boiler is above the low-water line *x*, the chamber C will retain the water which has been forced into it from the boiler, through the pipes P^3 P and B, and the valve E will remain in contact with its seat.

When, however, the water in the boiler descends to the pipe P^3, the steam will enter the latter, and passing through the pipe B, will force the contents of the vessel C through the pipes P and P^3 back into the boiler, the vessel H, owing to the weight of the water retained within the same, descending and removing the valve E from its seat, so that the steam passes to the whistle W, and sounds an alarm.

Inasmuch as the pipe P extends into the tube P^3, and below the end of the tube B, the descent of the water below the top of the tube will uncover the end of the tube B, and permit the steam to pass into the latter, while the end of the tube P is yet covered, the simultaneous passage of steam into both tubes, P and B, which would interfere with the discharge of the contents of the vessel C, being thus prevented.

It will be apparent that the tubes B and P may communicate in like manner with a casing or chamber, instead of with a tube P^3, as described.

Inasmuch as the tube B is larger in diameter than the tube P the volume of steam admitted to the vessel will be sufficient both to sound the whistle and overcome the pressure of the water, which will be forced rapidly back into the boiler, so that the apparatus will act with greater promptitude than if steam and water-pipes of the same diameter were used.

Another advantage resulting from the use of an enlarged steam-pipe is, that when the latter enters the boiler above the high-water line, the apparatus may be tested at any time without blowing the water in the boiler to the low-water line; as when the cock S is opened, the steam will instantly force all the water from the chamber C, a result which would not ensue if two pipes of the same diameter were used.

Inasmuch as the pipe P^6, which supplies steam to the whistle F, is larger in diameter than the pipe P^9, which conducts to the boiler any water which may be carried up by the pipe P^6, or condensed in the pipes or couplings, such a volume of steam is admitted to the whistle as will both sound the alarm and keep down the water in the pipe P^9, the discharge of water through the whistle being thus prevented.

Instead of employing pipes of different diameters, all the pipes may be of the same diameter if the openings through which they communicate with the vessel C or with the whistle are properly proportioned, or if they are provided with cocks so adjusted as to permit the steam to flow into the chamber with more facility and in greater volume than the water.

Although I have described the chamber C as being placed in front of the boiler-head, it may be placed at a distance from the boiler, and communicate with the same through tubes or channels suitably arranged; for instance, it may be placed above the boiler, and the tube B may communicate with a vertical tube P^7, extending through the shell and to the low-water line, and the tube P may communicate with a small tube P^8, extending through the tube P^7, and below the end of the latter, the necessity of perforating the boiler shell at two points being thus avoided.

It has heretofore been customary, when water-vessels H were used for operating the whistle-valve, to employ cup-shaped vessels, without any covers or tops, but I have found that such vessels are liable to become filled with dirt and sediment, and to continually increase in weight, objections which I effectually obviate by placing an inclined or curved top on the vessel, and perforating this top so that the water will enter freely, while any particles of matter will tend to slide down the inclined top and pass to the bottom of the vessel C.

To render the entrance of particles still more difficult, the perforations may be inclosed by flanges or tubes *t t'*, as shown in the drawing.

Claims.

1. A vessel or chamber C, in combination with devices for indicating the presence of water in and its absence from the vessel, and with pipes or openings for the passage of steam and water from the boiler, when the steam-passage or channel is larger than the other passage, for the purpose described.

2. A steam-whistle, gong, or other steam-alarm, in combination with pipes or openings for the passage of steam and water from a boiler, when the steam-passage or opening is larger than the water-passage, for the purpose specified.

3. The combination of a vessel, a pipe extending from the upper part thereof to the low-water line, and a second pipe extending from the lower part of the vessel through the larger pipe, and to a point below the end of the latter, for the purpose set forth.

4. A vessel communicating with a tube P^3, or its equivalent, through pipes B P, when the pipe P projects below the end of the pipe B, and when the pipe P^3 communicates with and is arranged in respect to a boiler, substantially as set forth.

5. A vessel H, operating in a casing C, substantially as described, and perforated at the top, for the purpose set forth.

6. The tubes *t t'*, in combination with the perforations in the vessel H, as specified.

7. The combination of a vessel C, communicating with the boiler through pipes of different diameters, and a blow-off cock S, substantially as and for the purpose described.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

ROBT. BERRYMAN.

Witnesses:

CHARLES H. EVANS,

ISAAC R. OAKFORD.