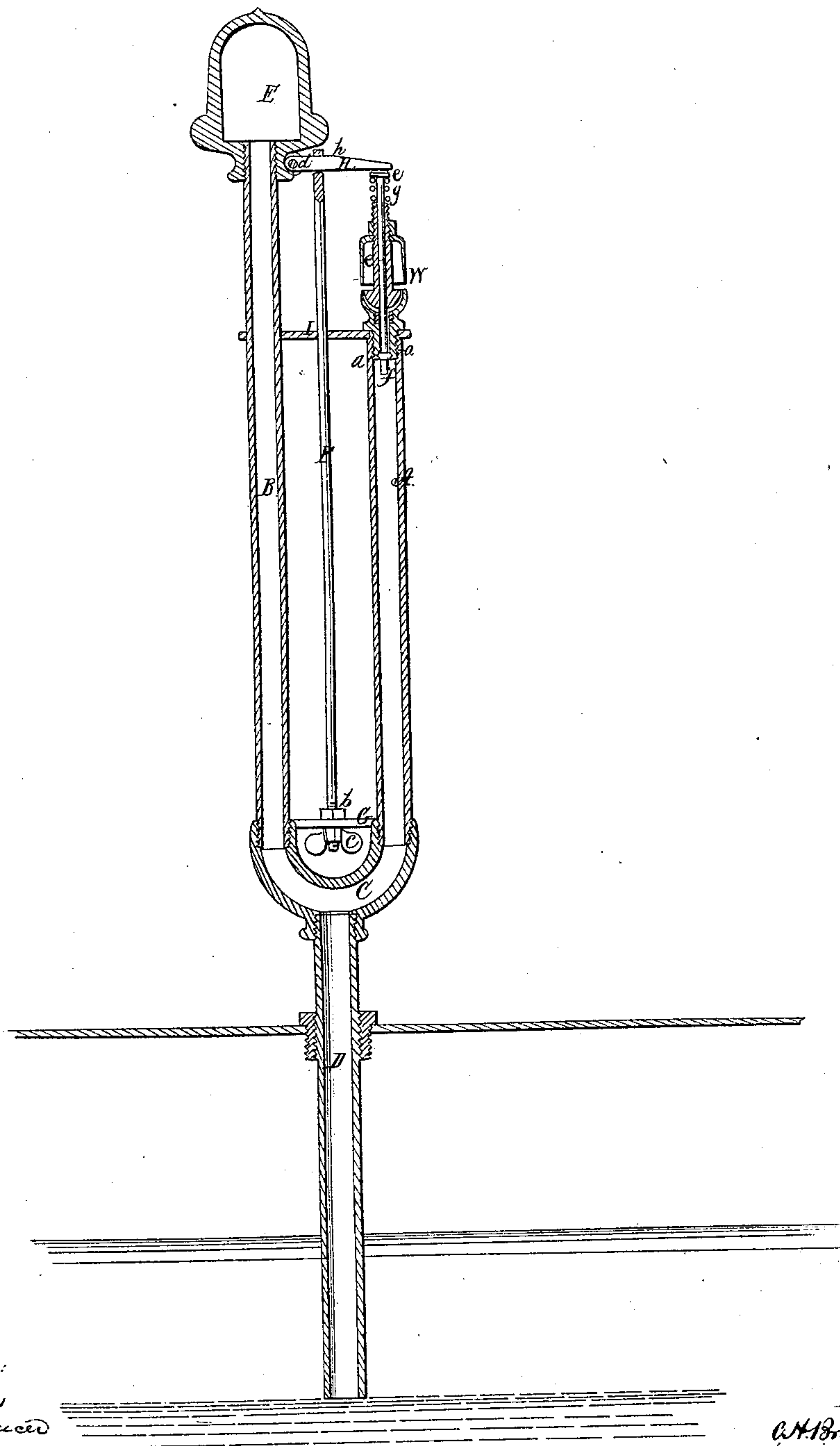


C. H. Brown,

Steam-Boiler Indicator.

N^o 29,455.

Patented Aug. 7, 1860.



Witnesses:

*J. W. Connelley
R. S. Spencer*

Inventor:

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UNITED STATES PATENT OFFICE.

CHARLES H. BROWN, OF FITCHBURG, MASSACHUSETTS.

LOW-WATER-ALARM APPARATUS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. 29,455, dated August 7, 1860; Reissued May 19, 1863, No. 1,473.

To all whom it may concern:

Be it known that I, CHARLES H. BROWN, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and Improved Low-Water-Alarm Apparatus for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, said drawing representing a central vertical section of the apparatus.

My invention consists in a novel system or arrangement of pipes and a rod for attaching to a steam boiler a steam whistle or its equivalent and a lever for operating the valve of the said whistle or equivalent whereby when the water in the boiler falls below a certain level, the expansion of the said pipes by the admission of steam thereinto is caused not only to move the valve from its seat but at the same time to move the seat away from the valve, thereby as it were producing a double action of the whistle valve or its equivalent and insuring a prompt and certain opening of the valve to sound the alarm.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation—

A, and B, are two upright pipes, of brass or other metal having a suitable capability of expansion by heat connected together at their lower ends by a bend C, like an inverted siphon. The said bend which is intended to stand some distance above or away from the boiler has attached to it a single pipe D, which serves to connect it with the boiler, the said pipe being so arranged that its mouth opens into the boiler at a level below which it is desired that the water in the boiler shall never fall. At the top of the pipe A, which is shorter than the pipe B, there is secured a steam whistle W, the seat *a*, of whose valve is rigidly secured to the said pipe A. At the top of the pipe B, which extends some distance above A, there is an air chamber E.

Between the two pipes A, and B, there is arranged an upright iron rod F, the lower part of which is secured to a fixed cross piece G, arranged within the bend C, by means of two nuts *b*, and *c*, fitted to a screw thread cut on the rod, one of the said nuts being above and the other below the said

cross-piece and the rod passing through the said cross-piece. The upper part of the said rod is slotted to receive the lever H, which operates the valve of the whistle, one end of the said lever being attached by a pin joint *d*, to the air chamber E, or to the upper part of the pipe B, and the other end extending across the head *e'*, of the stem *e*, of the whistle valve *f*. This valve is of the puppet kind and closes with an upward movement. It has a spiral spring *g*, applied to its stem *e*, between the head *e'*, thereof, and the top of the whistle, for the purpose of keeping it closed when there is no pressure of steam in the boiler. When the pressure in the boiler is slightly above that of the atmosphere it is sufficient to close the valve without the spring. The slot *h*, provided in the rod F, for the lever H, is deep enough to allow a slight amount of play upward and downward to the said lever. Some distance below the said lever there is secured between the pipes A, B, a fixed guide I, to keep the rod F, upright.

The operation of the apparatus is as follows: So long as the level of the water in the boiler is above the mouth of the pipe D, and there is any considerable pressure of steam, the pipes A, and B, are kept filled with water which being out of reach of the circulation of the water within the boiler does not get heated nearly so hot as the steam in the boiler and while this is the case the pipes A, and B, do not expand sufficiently to open the valve *f*, but as soon as the water in the boiler gets below the mouth of the pipe D, the water falls from within the pipes A, B, C, D, by gravitation and its place is supplied with steam which fills the said pipes and heats the pipes A, B, to such a degree as to produce almost instantaneously such an increase of length by expansion that the valve *f*, is opened to permit the escape of steam to the whistle to give the alarm, by the upward movement of the valve seat *a*, away from the valve and the simultaneous downward movement of the valve away from the seat, such movement of the seat being produced directly by the expansion lengthwise of the pipe A, and the movement of the valve by the expansion of the pipe B, which raises the end of the lever which is attached to it and causes the other end to be depressed upon the head of the valve stem, the rod F, which is never

perceptibly expanded constituting the fulcrum of the lever. As soon as the water has risen above the level of the mouth of the pipe D, it is forced up into the pipes A, and
5 B, again as fast as the steam can be condensed therein and the pipes becoming cool and contracting the valve closes by the downward movement of the seat due to the contraction of A, and upward movement of
10 the valve under the influence of the steam pressure, permitted by the action of the lever produced by the contraction of B.

The air chamber E, is for the reception of the air, which will get into the pipe B, and which without the air vessel or a very
15 greatly extended length of pipe would prevent the steam filling the whole or as much of the said pipe as is desirable to produce the requisite degree of expansion. The outlet provided by the whistle obviates the
20 necessity of an air chamber on the pipe A, as the air can be let out by depressing and opening the valve. The play allowed to the

lever H, in the slot *h*, permits the expansion which is due to the heat of the water in the
25 pipes to take place without opening the valve. The nuts *b*, *c*, serve to adjust the rod so that the valve may open the instant a certain degree of expansion of the pipes is
30 arrived at.

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

The arrangement of the connected pipes A, and B, the slotted rod F, or other fixed fulcrum, the lever H, and the whistle W, or
35 its equivalent whereby the expansion of the pipes not only causes the operating valve of the whistle or equivalent to move from its seat, but the seat to move simultaneously from the valve substantially as and for the
40 purpose herein specified.

CHARLES H. BROWN.

Witnesses:

W. J. MERRIAM,
DANL. CROSS.