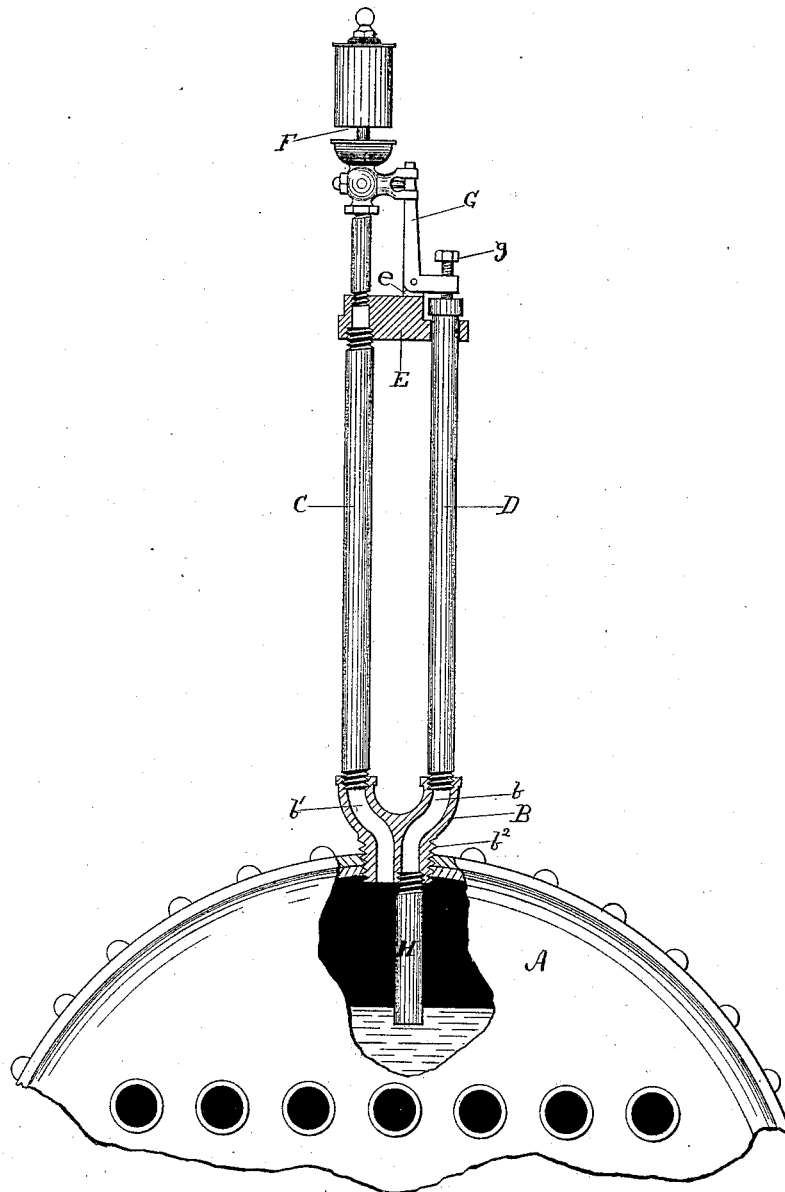


(No Model.)

W. HARDWICK.
LOW WATER ALARM.

No. 418,020.

Patented Dec. 24, 1889.



Witnesses

S. M. Dobbins.
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UNITED STATES PATENT OFFICE.

WILLIAM HARDWICK, OF ERIE, PENNSYLVANIA.

LOW-WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 418,020, dated December 24, 1889.

Application filed October 25, 1888. Serial No. 289,112. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HARDWICK, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Low-Water Alarms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to low-water alarms for steam-boilers; and it consists in certain improvements in the construction of the same, as will be hereinafter fully set forth, and pointed out in the claim.

My invention is illustrated in the accompanying drawing by an elevation view showing the end of a steam-boiler having my device connected therewith, the castings B and E being in vertical section and the end of the boiler being broken away to show construction.

The construction and operation of my device are as follows:

B is a Y-shaped casting having a screw-threaded stem b^3 , by which it is screwed into an opening through the top of the boiler, like a plug, and having also two passages b b' through its body and out at each of its branches. Both of these passages at their upper ends are screw-threaded to receive the pipe-sections C and D, and one of them b is screw-threaded at its lower end to receive the pipe-section H.

E is an arm which is secured to the pipe C and loosely embraces the pipe D. On the arm E is a lug e , in which is pivoted an L-lever G, the short arm of which lies over the capped end of the pipe D, and the long arm extends up to and connects with the valve of a steam-whistle F, which has its service-pipe connected with the pipe C at the arm E. The pipe C is of iron, while the pipe D is of brass or copper or other metal having greater expansive properties than iron. The pipe D is connected through the passage b with the pipe H, which extends down into the boiler below the water-line. The pipe C is con-

nected through the passage b' with the steam-space of the boiler, and hence it is at all times filled with steam, while the pipe D is only filled with steam when the water in the boiler falls below the ends of the pipe H, which should be at the low-water limit-line. When the water falls below the lower end of the pipe H and the pipe D becomes filled with steam, it will be heated by the steam much above its normal temperature and will thus be expanded longitudinally. The longitudinal expansion of the pipe D, which is free to move in the arm E, will lift the short arm of the lever G, and this will open the valve of the steam-whistle and allow the steam to rush up through the pipe C and out of the whistle and sound an alarm.

In the short arm of the lever G there is an adjusting-screw, the use of which is obvious to a mechanic.

It will be observed that the arm E firmly holds the pipes C and D from spreading when pressure is applied by the lever G to the whistle-valve stem, and that it also affords a firm support for the fulcrum of the lever G. These features, together with the adjusting-screw in the lever G, insure perfect action of the parts. If the pipes C and D were not held against spreading, there would have to be considerable movement of the lever G before the valve-stem of the whistle would be moved, particularly if the valve-stem did not work easily, and as it is at all times liable to stick more or less it is essential that the two pipes be firmly bound together.

The adjusting-screw enables the device to be so adjusted that there can be no lost motion in the action of the lever, and hence, as the pipes cannot spread apart by the action of the lever, the slightest expansion of the pipe D will be felt by the valve of the whistle.

I am aware of the construction shown in patents of the United States Nos. 1,473, (re-issued,) 107,114, and 206,773, and I do not claim as my invention such matters as are common to the several constructions.

What I claim as new is—

In a low-water alarm for steam-boilers, the

combination, with the pipes C and D and cross-arm E, which is firmly fixed to the pipe C and loosely embraces the pipe D, of the lever G, mounted on said cross-arm and having its long arm in contact with the stem of whistle F and its short arm in contact with the pipe D, and being provided with an adjusting-screw *g*, substantially as and for the purposes set forth.

In testimony whereof I affix my signature to in presence of two witnesses.

WM. HARDWICK.

Witnesses:

JNO. K. HALLOCK,
WM. P. HAYES.