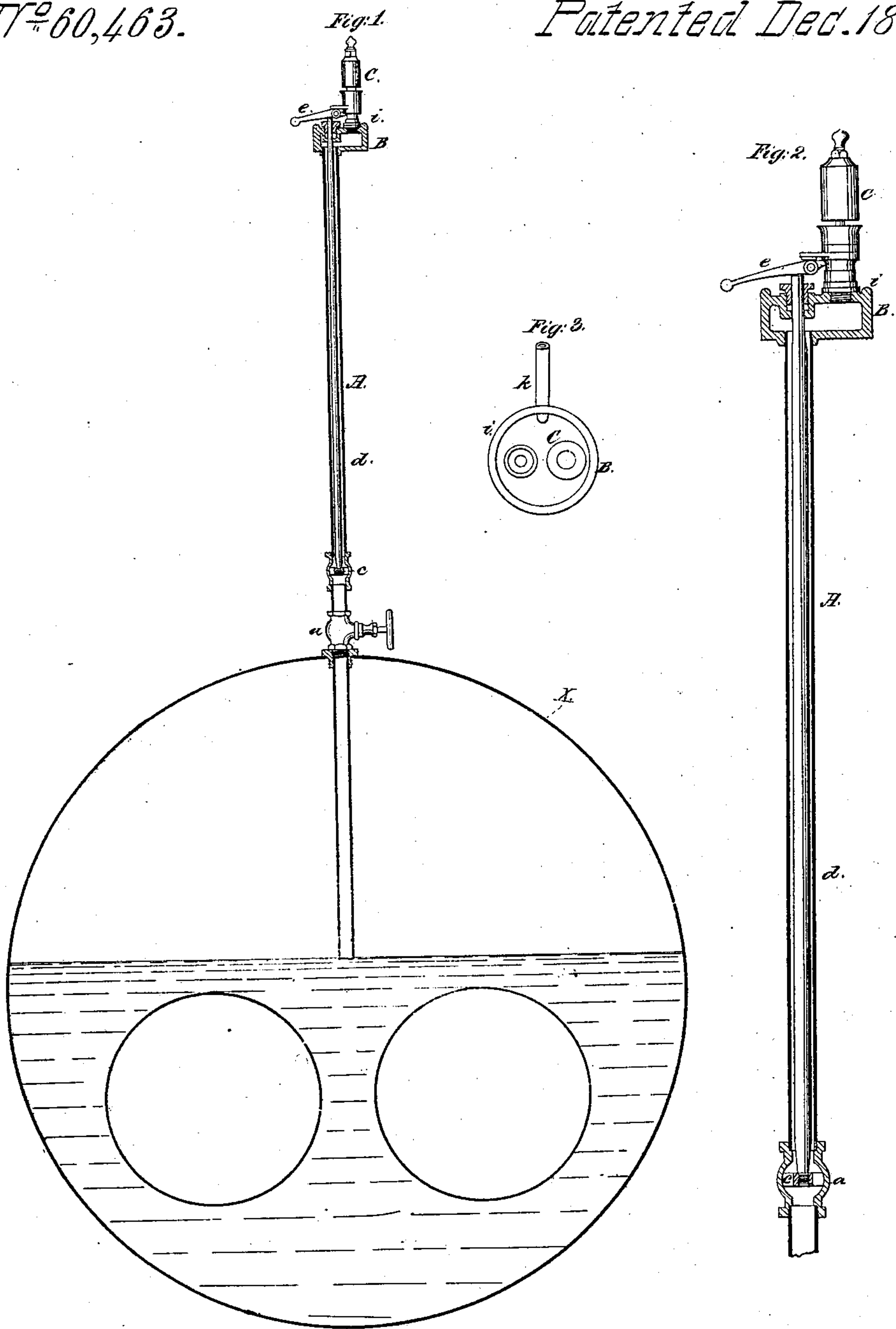


*B. H. Bartol,*  
*Steam-Boiler Indicator.*

*N<sup>o</sup> 60,463.*

*Patented Dec. 18, 1866.*



*Witnesses*  
*Wm. Albert Smith*  
*John Parker*

*Inventor:*  
*B. H. Bartol*  
*By His Atty*  
*H. H. Howden*

# United States Patent Office.

## IMPROVEMENT IN LOW-WATER DETECTORS.

B. H. BARTOL, OF PHILADELPHIA, PENNSYLVANIA.

*Letters Patent No. 60,463, dated December 18, 1866.*

*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, B. H. BARTOL, of Philadelphia, Pennsylvania, have invented an Improvement in Steam Boilers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention consists of a bar of metal arranged in respect to the proper water line in a steam-boiler, and having a communication with a steam-whistle or other alarm, as fully described hereafter, so that the difference in temperature between the water and the steam in the boiler may cause the rod to give an alarm when the water is too low.

In order to enable others skilled in the art to make and apply my invention, I will now proceed to describe its construction and operation. On reference to the accompanying drawing which forms a part of this specification—

Figure 1 is a sectional elevation of my improved low-water detector, showing the same applied to a steam-boiler.

Figure 2, a sectional elevation drawn to an enlarged scale; and

Figure 3, a plan view of fig. 2.

A is a metal tube which projects through and is secured to the shell of a steam-boiler, X, the lower end of the tube extending to a point below which it would be unsafe for the level of the water to remain. In the tube above the boiler is a valve-chest, *a*, in which is an ordinary stop-valve, and at the upper end of the tube is a box, B, to which is secured a steam-whistle, C. The tube A is enlarged in diameter a short distance above the valve-chest *a*, and across this enlarged portion extends a cross-piece, *c*, to which is secured the lower end of a zinc rod, *d*, the upper end of the latter projecting through a stuffing-box in the top of the box B; and over the end of the rod projects the outer arm of a lever, *e*, which is hung to a projection on the whistle C. The inner end of the lever is so connected to the valve which closes the communication between the whistle and the box B, that when the outer end of the lever is raised the said valve will be opened. At the upper edge of the box B is an annular rib, *i*, forming a cup or reservoir with which communicates a pipe, *k*, the latter extending over and beyond the side of the boiler, for a purpose described hereafter. So long as the surface of the water in the boiler is above the lower end of the tube A, and the latter is filled with water or with air, the parts will remain in the position shown in the drawing; when, however, the surface of the water in the boiler is below the end of the tube, the steam will gain access to the same, and being at a higher temperature than the water or air which previously filled the tube, will heat and expand the rod to such an extent that its upper end will elevate the lever *e*, and cause the whistle to give an alarm. When the boiler is replenished with water, and the surface of the latter rises above the end of the tube, it will be forced up the same, and in consequence of its low temperature compared with that of steam, will instantly cause the bar *d* to contract to such an extent that its end will pass from contact with the lever *e*, the latter and the valve being thus brought to their first positions, and the further escape of steam to the whistle being prevented. The condensed steam which drips from the whistle into the cup or reservoir at the top of the box B, is conducted by the pipe *k* to any desired point, the dripping of the water on to the surface of the boiler being thus prevented. In place of a rod, *d*, of zinc, a rod or bar of other metal or alloy may be used. The tube A and the rod *d* also may be arranged in a different manner from that described; for instance, they may be placed horizontally within a boiler in such a position as to be covered by the water, except when the latter descends below the low-water line.

It will be seen that the above-described apparatus is simple in its construction, compact, strong, and not liable to get out of order or to be injured by rough treatment.

I do not desire to claim broadly the combination of a rod and a steam-boiler, so that the difference in the temperature between the water and steam may cause the rod to give an alarm when the water is low; but I claim as my invention, and desire to secure by Letters Patent—

The pipe A, rod *d*, and steam-whistle C, constructed and arranged in respect to each other and to a steam-boiler, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

B. H. BARTOL.

Witnesses:

GARRET F. FLOOD,  
CHAS. H. FULLAWAY.