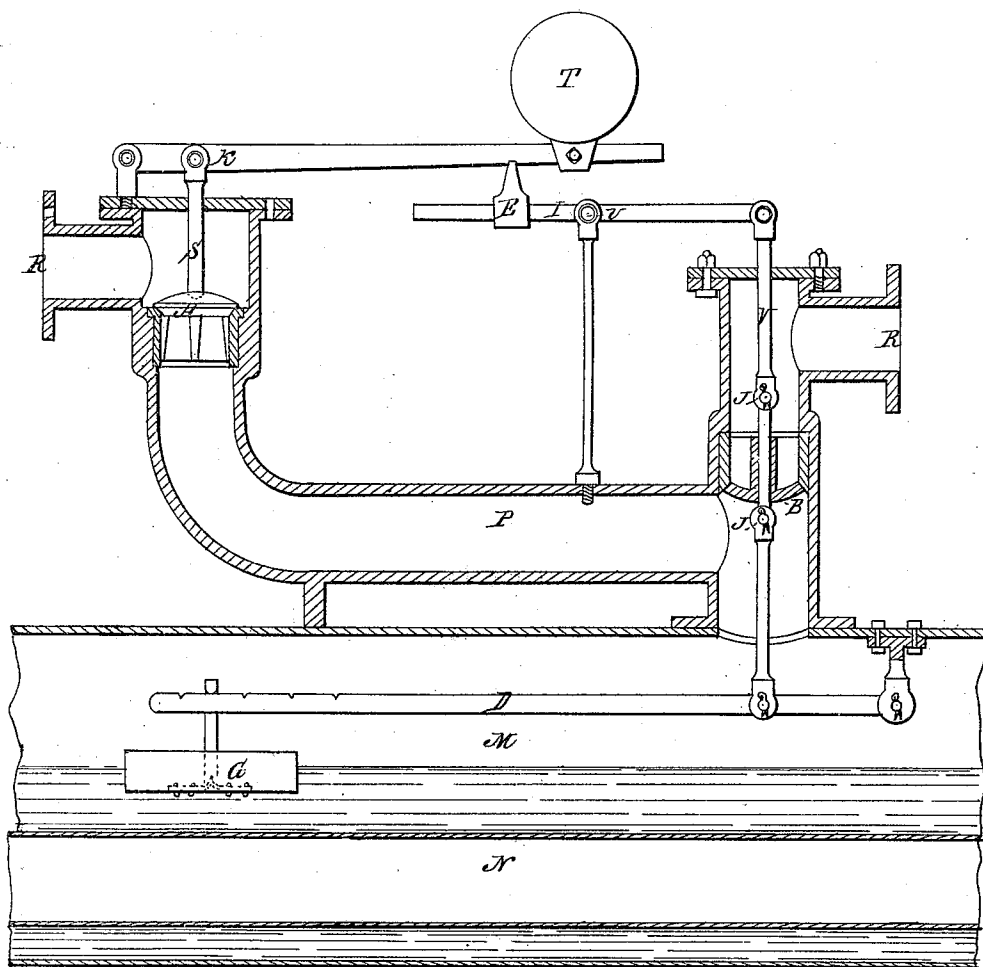


*D. Burns,*  
*Steam-Boiler Indicator.*  
*No 77,451.      Patented May 5, 1868.*



*Witnesses;*  
*J. H. Swartmont*  
*Samuel Wells*

*Inventor;*  
*Daniel Burns*  
*Per a Henry*  
*Thos. S. Sprague*

# United States Patent Office.

DANIEL BURNS, OF BAY CITY, MICHIGAN.

*Letters Patent No. 77,451, dated May 5, 1868.*

## IMPROVEMENT IN COMBINED LOW-WATER DETECTORS AND SAFETY-VALVES.

*The Schedule referred to in these Letters Patent and making part of the same.*

Know all men that I, DANIEL BURNS, of Bay City, in the county of Bay, and State of Michigan, have invented a new and useful Improvement in a Low-Water Gauge and Safety-Valve; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and being a part of this specification.

The object of this invention is to so construct a safety-valve, that, in addition to its ordinary use as a safety-valve, it will also act as an alarm, to indicate low water in the boiler. This is a desideratum which has long been sought, and I am aware that various patents have been issued upon inventions claiming to accomplish the object; but all these have proved failures, and, in this invention, it has been my study and aim to construct an apparatus, upon scientific principles, that will accomplish the desired end.

To reach this point, I have invented an apparatus, which I will now proceed to describe, so that those skilled in the art can construct it.

M represents a cylinder-boiler, of the ordinary construction, provided with flue N. Upon the appropriate spot, on top of the boiler, I place the safety-valve P, provided with two openings, R R, for the escape of steam. Through proper stuffing-boxes runs the valve-stem S, to which the valve A is attached, and ground into a proper seat. Upon the top of the cap is attached the valve-lever K, by any suitable device, and a proper connection made with it of the valve-stem S. T is a ball or proper weight, and attached to the lever K by a suitable slide. This lever K rests upon a crotched slide, E, which plays upon the lever I, which has its fulcrum as shown at U. To the outer extremity of the lever I is attached the valve-stem V, provided with the valve B, which is ground into a proper seat, and upon the under side thereof. This valve-stem V is provided with suitable joints, J J, which assist in making the valve B retain its proper position relative to its seat. To the bottom of the valve-stem V (which passes through the centre of the valve B) is attached the lever D, with proper fulcrum at W. To the outer end of this lever D is hung the metal box G, provided with sufficient openings in the cover thereof to admit of the free passage of water. This box should be filled with sand or fine gravel, or any like substance that will allow of sufficient water to be secreted among the interstices of the sand or gravel to accomplish the end sought to be attained.

To use my invention, we will suppose that my apparatus is already attached to a suitable boiler, filled with sufficient water, and with steam up, and ready for work. We will further suppose that the apparatus is correctly adjusted by means of the adjustable ball or weight T and crotched slide E. Now, as the water lowers in the boiler, the weighted box G falls with it, by which means the valve B is drawn down, and the valve A raised, when the escaping steam, through the openings R R, gives notice that there is a lack of water. Well-known scientific principles, which it is needless to explain, govern the rise and fall of the box G, and a little experience will teach any competent engineer how to adjust the ball T and the crotched slide E.

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

The arrangement of the within-described box G, filled as specified, with the levers D-I K, the valves A B, the weight T, and the crotched slide E, substantially as and for the purpose set forth.

DANIEL BURNS.

Witnesses:

J. H. SWARTWOUT,  
SAMUEL WELLS.