

R. R. Carpenter,

Indicator.

No. 105422.

Patented July 19, 1870.

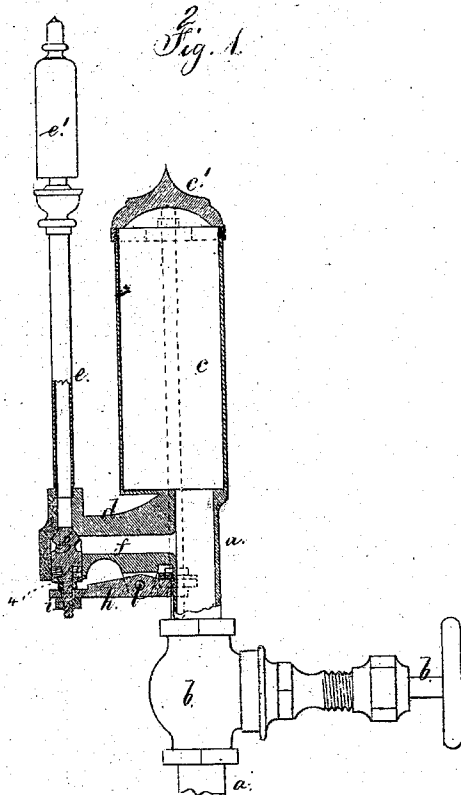
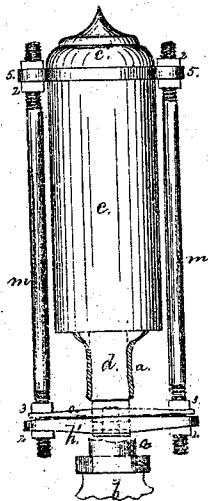


Fig. 2.



Witnesses

Chas. H. Smith

Geo. D. Waller

Ralph R. Carpenter

Lemuel W. Serrell  
Atty.

# United States Patent Office.

RALPH R. CARPENTER, OF TIPPECANOE, OHIO.

Letters Patent No. 105,422, dated July 19, 1870.

## IMPROVEMENT IN LOW-WATER INDICATORS.

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, RALPH R. CARPENTER, of Tippecanoe, in the county of Miami and State of Ohio, have invented a new and useful Improvement in Low-water Indicators for Steam-Boilers; and the following is declared to be a full and complete description thereof.

This invention relates to that class of indicators in which the heat of the steam is made use of to expand a tube, the expansion acting to open a valve to an alarm when the water falls below a certain point.

I make use of a tube or barrel, and place the same above a steam-boiler, a pipe from the barrel running down into the boiler to the low-water line; an arm from the side of this pipe sustains a T-shaped lever, which is hung upon a fulcrum, the longer arm of which lever is connected with a valve, and the short arms connect by tie-rods with the expanding-tube or barrel, so that expansion of the barrel will act upon the lever through the tie-rods to open the alarm-valve and blow a whistle.

The pipe from the expanding-tube opens into a passage to the alarm-whistle below the valve, so that when the water falls below the safety point, the steam will enter the tube, and the expansion of the barrel will open the valve and blow the whistle.

In the drawing—

Figure 1 is a vertical section of my apparatus, and

Figure 2 is a side elevation, partly in section, to show the head of the T-shaped lever.

*a* is a vertical pipe from the steam generator, running down to the low-water line.

The globe-valve *b* in this pipe may be used to cut off the indicator, if it becomes necessary.

The pipe *a* sustains upon its upper end the expansion-tube *c*, which is closed by the cap *c'* at the upper end.

The arm *d*, from the side of the pipe *a*, sustains at its outer end the vertical pipe *e* to the whistle *e'*, and an opening, *f*, through the arm *d* connects the pipes *a* and *e* to admit steam.

The angle of this opening *f* is formed as a valve-seat for the valve *g*, which valve *g* extends through the arm *d* in a vertical direction, and is sustained below the arm *d* by the longer end of the cross or T-headed lever *h*.

The end of the valve is formed as a screw-pin, and a nut, *i*, secures it to the arm *h*.

The cross-headed lever *h* is upon a fulcrum-pin, *l*, in lugs upon the lower side of the arm *d*, and, being T-shape, the cross-head portion *h'* extends at right angles to the longer arm, and the cross-head is of a length that allows for receiving the suspending-rods *m* clear of the sides of the tube *c*.

The tie-rods *m* pass from lugs *o* upon the cap *c'* of the barrel *c* to this cross-head *h'*, and the screw-nuts *2* upon tie-rods, *m*, allow for adjustment.

The spring *o* is placed upon the cross-head *h'*, its forked ends being around the tie-rods *m*, and the nuts *3* serve to tighten the spring *o* upon the cross-head *h'*, to give the pressure necessary to keep the valve *g* up to its seat and allow for the effect of the slight expansion by the heat from the contiguous boiler.

The valve *g* is provided with a tightening-nut, *4*, and elastic packing, to keep the parts steam-tight.

This construction gives easy access to the valve for renewing the packing or grinding in the valve.

When the water in the boiler falls below the end of pipe *a*, the water in the barrel *c* runs down and steam passes into the pipe *a*, barrel *c*, and opening *f*, the heat expands the barrel lengthwise, and this expansion acts through the tie-rods *m* and cross-headed lever *h h'* to open the valve *g* and admit steam to the whistle.

The tie-rods being upon the short end of the lever *h*, the motion is multiplied at the valve; thus a small amount of expansion will open the valve *g* sufficiently to blow the whistle.

This construction of parts makes a compact and reliable indicator for steam-generators, not liable to get out of order, and gives easy access for repairs.

I claim as my invention—

1. The T-shaped lever *h h'*, and spring *o*, combined with the rods *m*, nuts *3*, expansion-tube *a*, and valve *g*, substantially as and for the purposes specified.

2. The valve *g*, accessible from the outside of the steam-passage of an alarm-whistle, substantially as and for the purposes set forth.

Dated this 20th day of May, A. D. 1870.

Witnesses: RALPH R. CARPENTER.

CHAS. H. SMITH,  
GEO. T. PINCKNEY.