(No Model.)

# W. I. PAGE.

## LOW WATER INDICATOR.

No. 423,879. Patented Mar. 18, 1890.

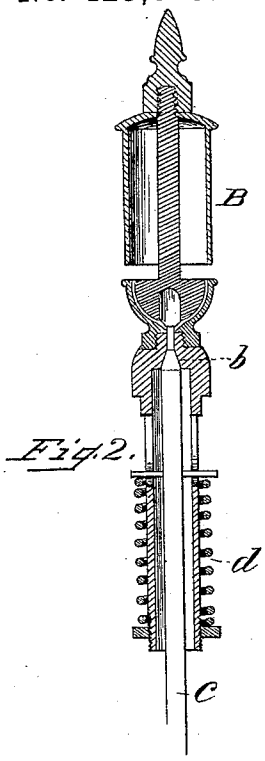



Fig. 2.

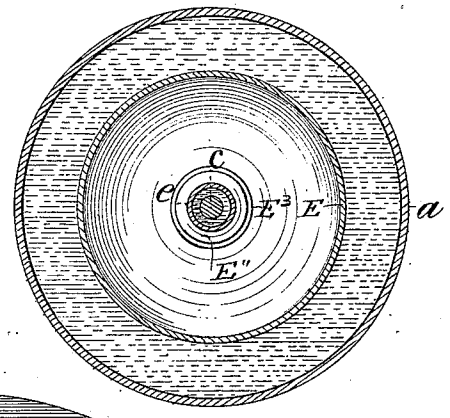



Fig. 3.




Fig. 1.

Witnesses
Geo. W. White
Martha J. Jackson

Inventor
William I. Page
by
Wm. Andrew
his atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

# UNITED STATES PATENT OFFICE.

WILLIAM I. PAGE, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF FORTY-NINE ONE-HUNDREDTHS TO FRED M. WHITE, OF SAME PLACE.

## LOW-WATER INDICATOR.

SPECIFICATION forming part of Letters Patent No. 423,879, dated March 18, 1890.

Application filed November 29, 1889. Serial No. 331,917. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM I. PAGE, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Low-Water Alarms or Detectors, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in low-water alarms or detectors for steam-boilers; and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the device, showing the inverted cup-float and a part of the tank or case in section. Fig. 2 represents a vertical section of the alarm or whistle, and Fig. 3 represents a cross-section on the line X X, shown in Fig. 1.

Similar letters refer to similar parts wherever they occur on the differents parts of the drawings.

*a* is the tank or case, as usual, connected with the steam and water spaces by means of the respective pipes *a'* and *a''*, as is common in devices of this kind.

$a^3$ is the cover, preferably screwed to the upper end of the case *a*, as shown in Fig. 1. To the said cover $a^3$ is secured in a suitable manner the alarm or whistle B, having a valve-seat *b*, normally closed by the upper end of the stem *c*, which is held upward by the influence of a coiled spring *d* in the usual manner. In connection with said whistle or alarm and tank I use an improved float, which is constructed as follows: The said float is made in the form of an inverted cup E, having attached to its upper closed end in a suitable manner the pipe *e*, which is open from end to end, and through it passes loosely the valve-rod *c*, as shown in Fig. 1, the said pipe serving as a guide for the cup-float as it is moved up and down around the valve-stem *c* during the rise and fall of the liquid contents of the case *a*.

*f* is a suitable amount of solder, alloy, or metal, soldered or otherwise attached to the inverted cup E, for the purpose of loading or weighting it sufficiently to pull downward the valve-stem *c* when the lower end of the pipe *e* comes in contact with the pin, collar, or projection *c'* on said stem *c* during the descent of the float E, caused by the fall of the liquid in the holder *a* beyond the safe normal one. The float E being made open at the bottom and the pressure therefore being equalized externally and internally, it will be seen that it is non-collapsible, no matter how great the pressure in the case or holder *a* is. The inverted cup E rests upon a cushion of compressed air, as shown in Fig. 1, which causes the said cup to float in the liquid contents of the case *a*. Should the liquid in the case *a* fall below the normal safety one, the lower end of the pipe *e* will come in contact with the pin or projection *c'* on the valve-rod *c*, by which the latter is depressed against the influence of its spring *d*, causing the steam to escape through the whistle and thus causing an alarm to be given, notifying the person in charge that the water in the boiler is too low for safety. The rise of the water in the boiler and case *a* causes the float E to rise and the valve-rod to close the escape of the steam through the whistle.

In practice I prefer to secure to the lower end of the inverted cup E an annular diaphragm E', secured in a suitable manner to the interior of the lower open end of the cup E, as shown in Fig. 1. The central part of said diaphragm has a perforation E'' somewhat larger than the exterior diameter of the pipe *e*, for the purpose of establishing a connection and equalizing the pressure between the exterior and interior portions of the said float. I prefer to provide the central open part of said diaphragm E' with an upwardly-projecting annular lip or flange $E^3$, for the purpose of strengthening it at this part and to enable the upper part of said diaphragm to be used as a receptacle for shots or weights, by which the float may be loaded, if so desired.

The diaphragm E' serves for the purpose of strengthening the lower end of the inverted cup E, and it also serves as an additional resisting medium against the liquid in the case *a*, on which it is made to rest or float, thus increasing the buoyancy of the said cup-shaped float.

Having thus fully described the nature, con-

struction, and operation of my invention, I wish to secure by Letters Patent, and claim—

1. The low-water detector or alarm, as described, consisting of a case connected by means of steam and water pipes to the boiler, and having an alarm or sounder B, and a valve-stem adapted to close the escape to such sounder, combined with the inverted cup-shaped float E, adapted to float on the liquid contents of said case, and having a central guide-pipe surrounding the valve-stem, and a pin or projection $c'$ on said valve-stem, substantially as and for the purpose set forth.

2. In a low-water detector or alarm, the herein-described float, consisting of an inverted cup E, having a central guide-tube $e$ and an annular diaphragm E′ at its lower end, substantially as and for the purpose set forth.

3. In a low-water detector or alarm, the herein-described float, consisting of an inverted cup E, having a central guide-tube $e$ and an annular diaphragm E′, provided with an annular and upwardly-projecting lip or flange $E^3$, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 27th day of November, A. D. 1889.

WILLIAM I. PAGE.

Witnesses:
ALBAN ANDRÉN,
MARTHA J. JACKSON.