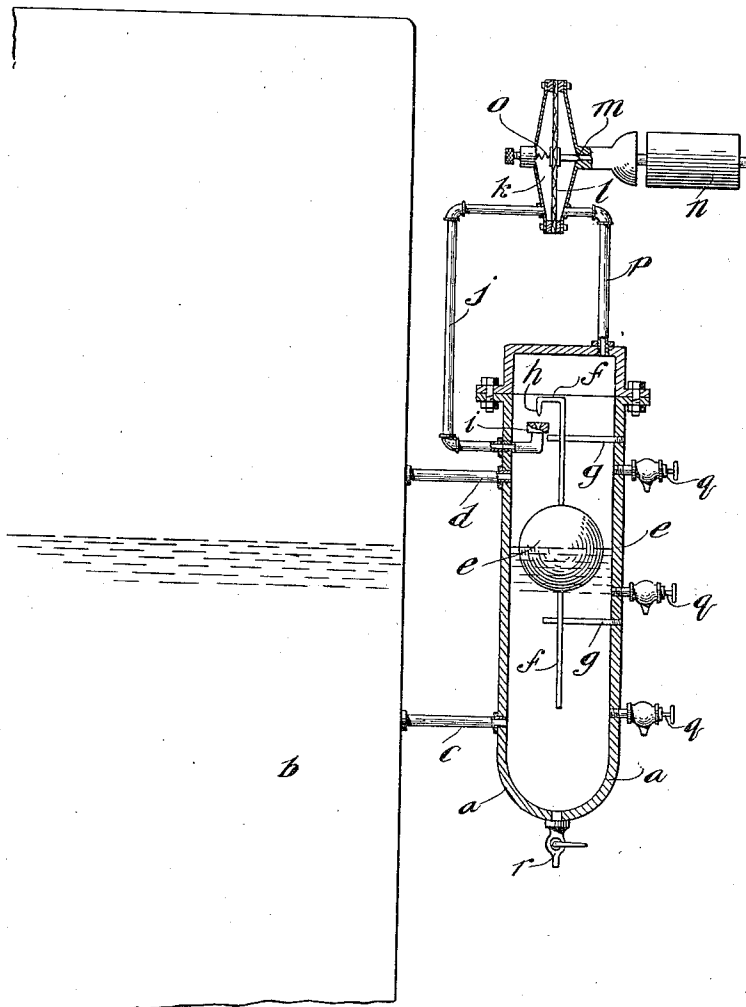


L. S. WATRES.
 LOW WATER ALARM FOR STEAM BOILERS.
 APPLICATION FILED SEPT. 17, 1910.

1,045,484.

Patented Nov. 26, 1912.



WITNESSES

C. S. Ashley
L. F. Browning

Lewis S. Watres INVENTOR

Edward C. Davidson
 ATTORNEY

UNITED STATES PATENT OFFICE

LEWIS S. WATRES, OF SCRANTON, PENNSYLVANIA, ASSIGNOR TO HULL MANUFACTURING COMPANY, OF SCRANTON, PENNSYLVANIA, A CORPORATION.

LOW-WATER ALARM FOR STEAM-BOILERS.

1,045,484.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed September 17, 1910. Serial No. 582,435.

To all whom it may concern:

Be it known that I, LEWIS S. WATRES, a citizen of the United States of America, residing at Scranton, in the county of Lackawanna, State of Pennsylvania, have invented a new and useful Low-Water Alarm for Steam-Boilers, of which the following is a specification.

The water level alarm for steam boilers forming the subject of this invention comprises an ordinary steam whistle, means, as a diaphragm in an inclosed chamber, for actuating a valve in the steam passage of the whistle, a pipe connection from the chamber at each side of the diaphragm extending from the steam space of a water column casing secured to a boiler, a valve seat in one of the pipes in the steam space, a float in the water column and a valve carried directly by the float to close the valve in the pipe extending from the steam space to one side of the diaphragm. All of the operating parts are direct in their actions, and when in normal condition steam acts on both sides of the diaphragm, which at such times holds the valve to the whistle closed. When the water falls below normal level the float falls with it and, by means of the valve carried directly by it, closes the valve in the steam pipe to one side of the diaphragm leaving the steam acting, through the medium of the other pipe, on the other side of the diaphragm. The counteracting forces on the diaphragm thus being disturbed the valve in the whistle passage is opened, the steam passes to the whistle and the alarm is given. The whistle will continue sounding until the water in the boiler is again raised to normal level, whereupon the float will rise sufficiently to raise the valve from its seat in the steam pipe to allow steam to pass to the side of the diaphragm from which it has been cut off and so counteract the pressure of the steam on the other side of the diaphragm, causing the steam whistle valve to be closed.

The accompanying drawing illustrates an apparatus having the above characteristics, to which reference will now be had to more fully describe this invention.

The water column *a* is connected in the usual manner to a steam boiler *b* by a water

connection *c* and a steam connection *d*. In it is located a float *e* having a stem *f* by which it is held and caused to move vertically between the guides *g*. The upper end of the stem has a return bend, at the lower end of which is a valve *h*; this valve is arranged in line with a seat *i* provided at the end of a pipe *j* in the steam space of the water column, the other end of said pipe opening into one side of a chamber *k* in which is held the diaphragm *l*. Attached to this diaphragm is a valve *m* arranged to seat in the end of and close the passage of a steam whistle *n*, and to insure that it be so seated, with the diaphragm in normal condition, an adjustable spring *o* may be applied to the side of the diaphragm opposite to that on which is located the valve *m*. The side of the chamber holding the valve *m* is also connected to the steam space of the water column by a pipe *p*. *q* indicates gage cocks of ordinary construction and arrangement and *r* a cleaning valve or cock for the water column casing.

With the apparatus in normal condition, as shown in the drawing, steam from the upper part of the water column counterbalances the diaphragm *l* by acting on both of its sides, the valve *m* of the steam whistle being then held closed. When the water level in the boiler and water column falls the float *e* will fall with it and the valve *h* will close the valve opening of the pipe *j* and cut off the steam supply from the rear side of the diaphragm *l*, leaving the diaphragm under the influence of live steam on its valve side, thus causing said valve to be opened, as the dead steam on the other side of the diaphragm quickly condenses, and an alarm to be given by the steam whistle, calling attention to a low water condition in the boiler. The whistle will continue to sound until water is supplied to the boiler to raise it to a level to cause the valve *h* to again be lifted from the seat *i*; whereupon live steam again acts on the rear side of the diaphragm, counterbalancing the same and closing the steam passage to the whistle.

I wish it understood that I do not confine this invention to the particular construction and arrangement of the parts as herein described and shown in the drawing, it being evident that changes may be made in the

construction and arrangement of the parts without departing from the operation of the same.

I claim—

- 5 1. A low water alarm, comprising a water
column provided with connections for at-
tachment to the steam space and water space
of a boiler, a vertically moving float in the
water column, a downwardly extending
10 valve directly connected to the float, a steam
pipe extending from the steam space of the
water column, a valve seat in the inner end
of this steam pipe into which seats the valve
carried by the float when the float descends,
15 a diaphragm in a closed chamber to one side
of which the outer end of the steam pipe is
connected, another steam pipe extending
from the steam space of the water column
to the other side of the diaphragm chamber,
20 a valve carried by the diaphragm, and a
steam whistle, the steam passage of which is
normally closed by the diaphragm valve.
25 2. A low water alarm, comprising a water
column provided with connections for at-
tachment to the steam space and water space

of a boiler, a vertically moving float in the
water column, a downwardly extending
valve directly connected to the float, a steam
pipe extending from the steam space of the
water column, a valve seat in the inner end
of this steam pipe into which seats the valve
carried by the float when the float descends,
a diaphragm in a closed chamber to one side
of which the outer end of the steam pipe
is connected, another steam pipe extending
35 from the steam space of the water column
to the other side of the diaphragm chamber
whereby the diaphragm is counterbalanced
by steam from the steam space of the water
column, a valve carried by the diaphragm,
40 an adjustable spring acting on the other side
of the diaphragm, and a steam whistle, the
steam passage of which is normally closed
by the diaphragm valve.

In testimony whereof, I have hereunto
45 subscribed my name.

LEWIS S. WATRES.

Witnesses:

J. E. LOUIS,

WILLIAM M. CURRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."