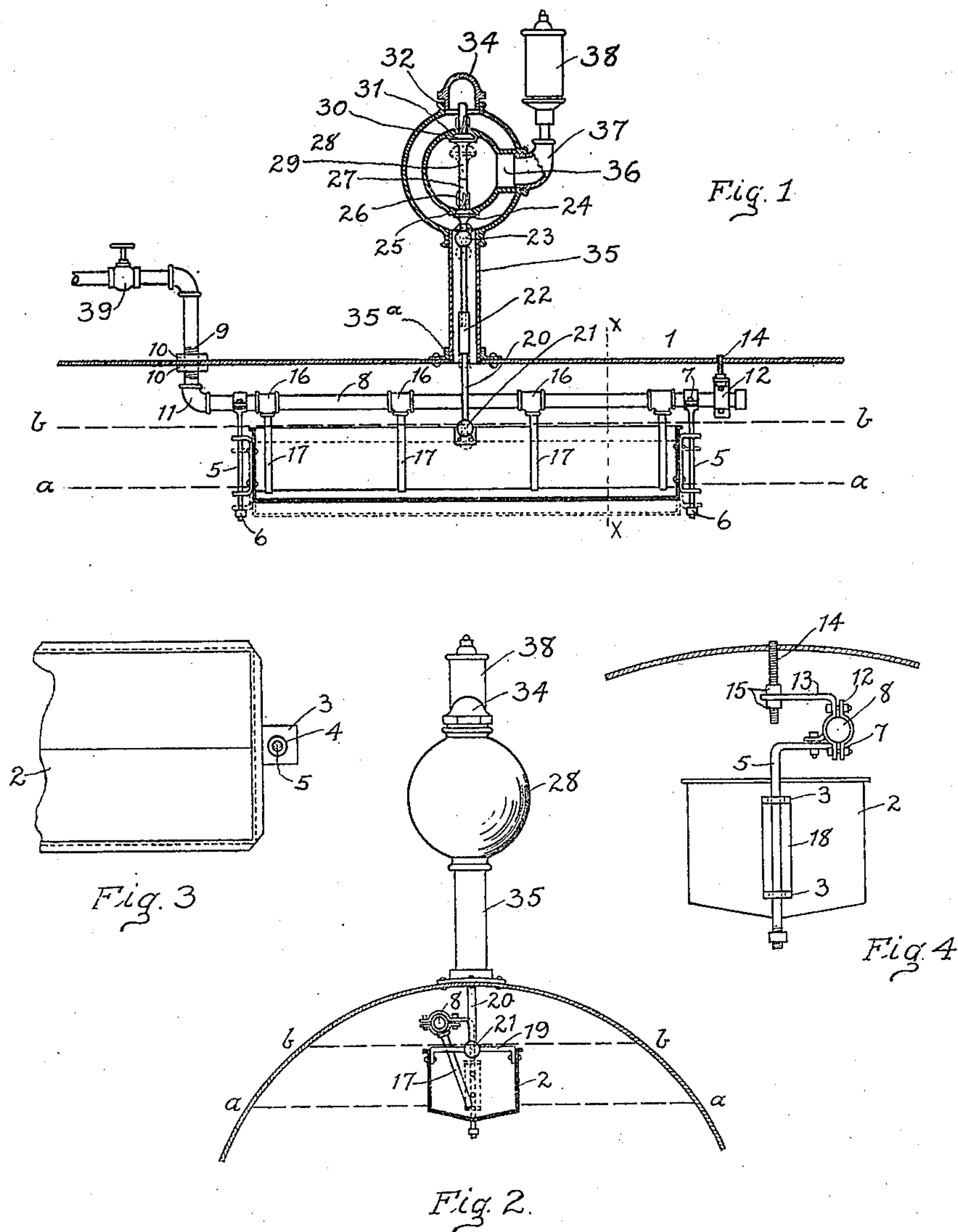


A. J. ADERHOLD.  
BOILER ALARM.  
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Patented July 5, 1910.



Inventor  
Alexander J. Aderhold.

Witnesses  
Jno. D. Suller  
Norris F. Felt.

By

Ralph. Johnston, Jr.  
Attorney



# UNITED STATES PATENT OFFICE.

ALEXANDER J. ADERHOLD, OF BIRMINGHAM, ALABAMA.

## BOILER-ALARM.

963,028.

Specification of Letters Patent.

Patented July 5, 1910.

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*To all whom it may concern:*

Be it known that I, ALEXANDER J. ADERHOLD, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in Boiler-Alarms, of which the following is a specification.

My invention relates to an improved high and low water boiler alarm which has the additional important advantage of effectively cleaning the boiler by skimming and blowing off the scum and other impurities which tend to rise to the surface of the water.

More particularly my invention consists in the novel use of an open float which operates an alarm as it reaches its lowered position either by descending in a buoyant condition with the water level, or being submerged and sinking under high water conditions. As the water level rises above the float, the latter skims the surface of the water drawing into it the impurities forced to the surface. To eject these impurities and empty the float to restore its buoyancy after the water level has been lowered, I provide a steam ejector or blow-out pipe by which the float is effectively cleaned.

My invention further comprises the details of construction and arrangement of parts hereinafter more particularly described, reference being had to the accompanying drawings, in which:—

Figure 1 is a vertical section through a portion of the boiler and the open topped float. Fig. 2 is a transverse sectional view along the line  $x-x$  of Fig. 1. Fig. 3 is a detail plan view showing one end of the open float. Fig. 4 is an enlarged end view of the float.

Similar reference characters refer to similar parts throughout the drawings.

I provide the boiler 1 with an elongated float 2 open at the top and provided at each end with a pair of lugs 3 having openings 4 therein disposed in vertical alinement and adapted to receive the supporting guide rods 5. These rods have nuts 6 screwed on their lower ends to serve as stops to limit the fall of the float, and at their upper are bent and connected to clips 7, which are bolted around a horizontal pipe 8. This pipe 8 is threaded at 9 where it passes out of the boiler and has a pair of nuts 10 screwed on said threaded

portion and disposed one on each side of the boiler casing. The threaded section 9 of the pipe is preferably passed upwardly through the boiler, being connected by an elbow 11 with the horizontal portion 8 of the pipe. The nuts 10 serve to support one end of the pipe, the other end being supported by a clip 12 bolted around the pipe and having an angled end 13 which has an opening by means of which it is slipped over the lower end of a threaded plug 14 and adjustably secured in position thereon by the nuts 15. The plug 14 is screwed into a threaded opening in the boiler so as to make a steam tight fit, and suitable packing may be interposed between the nuts 10 to prevent leakage of pressure around the pipe 8 where it passes out of the boiler. At intervals along the length of the pipe 8 above the float 2, I provide couplings 16 having downwardly extending pipe sections 17 which connect with the pipe 8 and lead downwardly to a point near the bottom of the float, which bottom, it will be noted, slopes to the center. The lugs 3 are preferably formed by bending outwardly the ends of a plate 18 suitably secured to each end of the float, and the openings 4 in the lugs are of sufficient size to leave a clearance around the supporting rods 5 which will permit slight or angular play of the float.

Across the center of the float at the top, I provide a cross bar 19, at the center of which a valve stem 20 is connected by a ball and socket joint 21, the stem being adjustable in length by means of a turn-buckle 22, which engages the threaded ends of the upper and lower portions of the valve stem. At its upper end the valve stem connects by a ball and socket joint 23 with a double puppet valve. The lower valve 24 engages the valve seat 25 and is provided with spirally disposed guide wings 26 mounted on an extension of the valve stem 27, which projects into the center of the globe valve casing 28. The extension 27 is connected to a stem 29 of the upper valve 30 which engages a seat 31 and has an extension 32, similar to 27, which extends beyond the opening in the valve seat into the annular steam space of the globe valve. A cap 34 closes the opening at the top of the globe valve, which, at its lower end, is threaded onto a pipe 35 which is in turn threaded into a joint 35<sup>a</sup> in the boiler casing immediately above the cen-



ter of the float. The pipe 35 is of sufficient width to leave ample clearance and prevent the valve stem 20 binding. To slightly unbalance the double puppet valve so that it presses the valve stem 20 in a downward direction against the float, I make the valve 30 slightly larger than the valve 24, and to insert it into the globe valve I provide an enlarged opening 36 through which the valve 30 is adapted to be inserted and connected to the extension 27 of the lower valve. The opening 36 forms an outlet for the steam admitted from the steam space to the center of the globe valve through the valve ports, which steam is conducted through a coupling 37 to an alarm or whistle 38. A valve 39 controls the pipe 8 which has its open ends 17 disposed near the bottom of the float. The arrangement of the valve stem in the center of the float permits of the latter to have angular play to the extent permitted by the openings 4 in any direction, without disturbing the action of the valves. The pipe 8 is disposed slightly to one side to avoid interference with the valve stem 20, as will be more clearly seen by reference to Fig. 2.

In practice, assuming the water to stand at the level of the line *a—*a**, the float will float thereon and stand in the full line position shown, when the signal valve will be closed. The length of the stem 20 and the position of the lower stop nuts 6 are first adjusted to determine and limit the vertical play of the float. As the water level falls below the line *a—*a**, the float will descend with the water to the position shown in dotted lines, *i. e.*, when its lugs engage the lower stops 6, and will draw down with it the valve stem 20 and open the valves so that steam flows through pipe 35, the globe valve, and coupling 36 to the whistle 38, and sounds the alarm. Likewise, should the water rise too high and reach the level *b—*b**, the valve stem will hold the float against rising farther than its position shown in full lines, and as a result the water will skim itself into the open float, causing the scum and particles of impurities, which are forced to the top by the ebullition of the water, to accumulate in the open float. As the float fills its buoyancy is lost and it will sink quickly to the position shown in dotted lines, its falling action being facilitated by the slightly unbalanced condition of the valves it controls. This will again open the valves to sound the alarm and as soon as the water can be brought down to a proper level, either by shutting off the pump or other suitable means, the float can be cleaned of all water and sediment and made buoyant again by opening the valve 38, the steam acting to force all solid matter and water in the float out of the boiler through the pipes 17 and 8 and leave it ready to function as heretofore described.

Since the skimming action of the float will function with considerable advantage as a means for cleaning the boiler and preventing the incrustation thereof, I have found it an advisable practice to flush the float a number of times each day, the time intervals depending upon the percentage of impurities in the feed water. This flushing can be readily accomplished by arbitrarily increasing the feed water supply to the boiler until the float becomes submerged and then blowing it out.

Other methods of signaling may be employed and the shape and dimensions of the float may be variously modified to meet different conditions.

Without limiting myself to the details of construction, what I claim as new and desire to secure by Letters Patent, is:—

1. An alarm for boilers comprising a float disposed within the boiler and having an opening through which the water from the boiler overflows into said float, signaling devices controlled by the position of said float, and means to empty the float and restore its buoyancy after the same has been submerged by high water conditions in the boiler.

2. An apparatus of the character described comprising an open top float normally buoyant disposed within the boiler, means to destroy the buoyancy of the float under high water conditions, indicating means operated by the float as it descends, and means to restore the buoyancy of the float.

3. An apparatus of the character described comprising in combination with a boiler, a float disposed within the boiler and having an opening through which water can overflow into the float, a valve controlled pipe leading from within the float to a point outside of the boiler, and indicating means operated by the float, substantially as described.

4. A high and low water alarm for boilers comprising an adjustable float having an opening at the top, means to limit the vertical play of the float so that in high water conditions the float will become submerged and filled, signaling means which are brought into operation when the float falls to its lowered position, and means to draw off the water from the float after the same has been submerged to restore its buoyancy.

5. The combination with a boiler, of a means for skimming and giving an alarm for high and low water conditions, said means comprising an open top float, guide means to direct and limit the rise and fall of the float, means controlled by the float to give a signal when the float falls to a predetermined lowered position, said float being adapted under high water conditions to skim the surface of the water in the boiler



until it loses its buoyancy, and means to force the water and sediment by steam pressure out of the float after the water level falls below the top of the float in its submerged position.

6. The combination with a boiler, of an open top float therein, guide means to direct and limit the play of the float, a valve controlled pipe which enters the boiler and has its inner end opening into the float near the bottom thereof, a valve controlled by said float which is opened as the float falls, and an alarm sounded by the steam which escapes past said latter valve when opened, substantially as described.

7. The combination with a boiler, of an elongated open top float disposed within the boiler lengthwise thereof, a valve controlled pipe entering said boiler, a number of branch pipes leading from said pipe to points near the bottom of said float, means to guide and limit the rise and fall of the float, said float being adapted to be submerged under high water conditions, a valve having a stem connected to said float and which is opened when the float reaches its lowered position, and a whistle alarm sounded by the steam escaping past said valve when opened.

8. The combination with a boiler, of an elongated trough shaped float disposed therein lengthwise of the boiler, means to guide and limit the vertical movements of the float, a signal for abnormal water conditions in the boiler, means controlled by said float for operating said signal and ejector means to clear the float of water and foreign

matter that may accumulate therein, substantially as described.

9. The combination with a boiler, of an elongated trough shaped float disposed therein lengthwise of the boiler, means to guide and limit the vertical movements of the float, ejector means to clear the float of water and foreign matter that may accumulate therein, and a signaling device controlled by said float and caused to sound an alarm when the float is in one or the other of its extreme positions, substantially as described.

10. In combination, a boiler, a horizontal pipe disposed near the top of the boiler and passing out of the boiler, a valve for said pipe without the boiler, a float suspended from said pipe and which is open at the top, a series of branch pipes leading from said horizontal pipe to points near the bottom of the float, a valve stem connected by a ball and socket joint to the float, means to adjust the length of the valve stem, a valve connected by a ball and socket joint to the stem, a valve casing communicating with the boiler and having a seat normally closed by said valve, an exhaust passage for the steam escaping past said valve when opened by the falling of the float, and an alarm sounded by said escaping steam, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALEXANDER J. ADERHOLD.

Witnesses:

TROMIL WELSH,  
ANNIE L. PEACE.