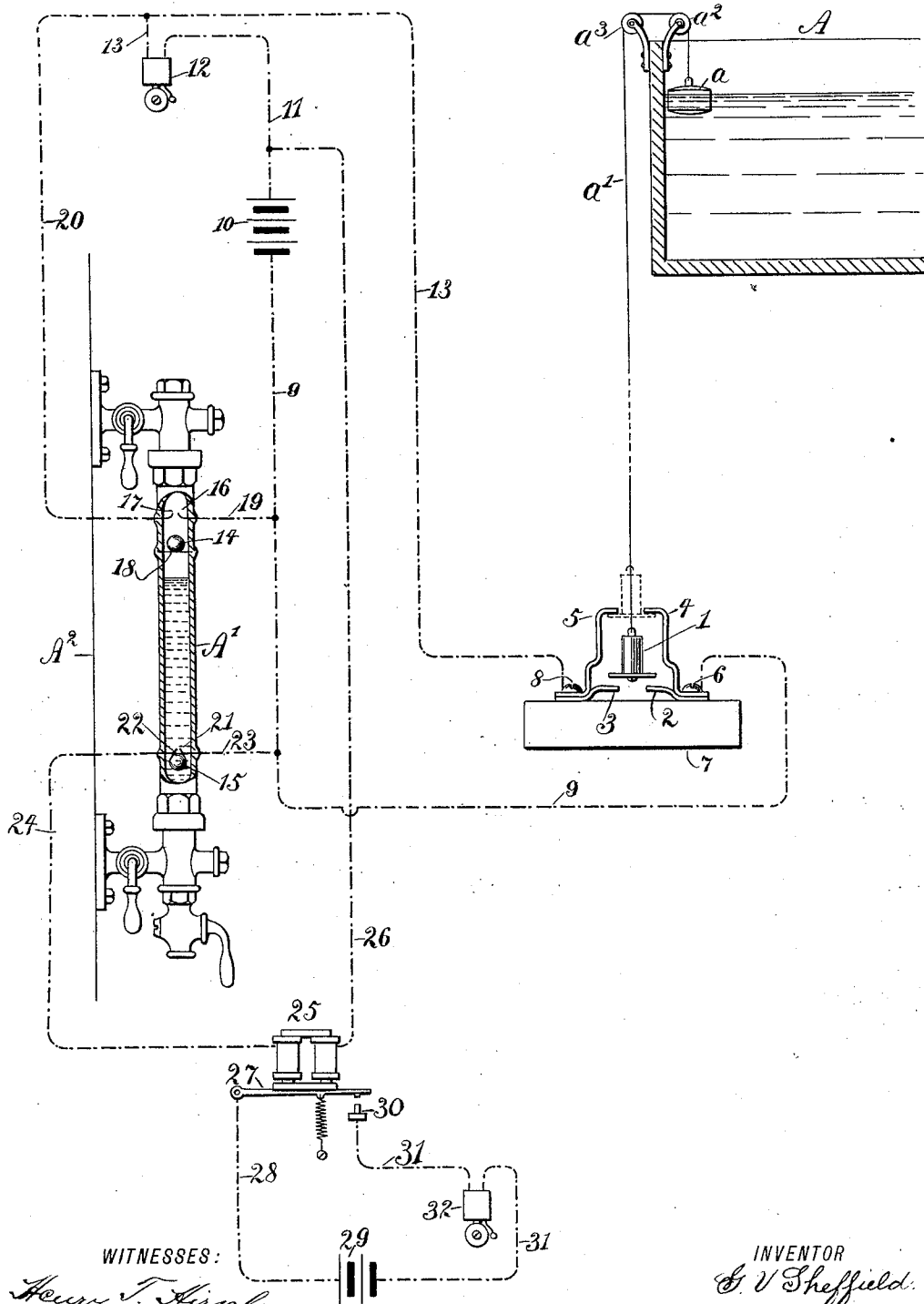


(No Model.)

G. V. SHEFFIELD.
WATER ALARM FOR TANKS OR BOILERS.

No. 566,235.

Patented Aug. 18, 1896.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE V. SHEFFIELD, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
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WATER-ALARM FOR TANKS OR BOILERS.

SPECIFICATION forming part of Letters Patent No. 566,235, dated August 18, 1896.

Application filed April 10, 1896. Serial No. 586,996. (No model.)

To all whom it may concern:

Be it known that I, GEORGE V. SHEFFIELD, of New York, in the county and State of New York, have invented certain new and useful
5 Improvements in High and Low Water Alarms for Boilers or Tanks, of which the following is a full, clear, and exact description.

This invention relates to devices for automatically sounding an alarm for both high
10 and low water in a steam-boiler or in a feed-water tank or in both, and the object is to provide a simple device for this purpose, comprising an electric circuit and sounding devices whereby an engineer or attendant may
15 be instantly notified when the water in a boiler or tank shall have reached the low-water line, so that he may set the pump in operation, and further to notify him when sufficient water shall have been pumped in.

20 I will describe an alarm embodying my invention, and then point out the novel features in the appended claims.

The drawing is a diagrammatic view of a device embodying my invention.

25 Referring to the drawing, A designates a feed-water tank, within which is a float a , having a flexible connection a' , extended over pulleys a^2 a^3 , mounted on arms secured to the tank, and the lower end of said flexible
30 connection is secured to a circuit-closer 1, here shown in the form of a weight free to move both laterally and vertically. The circuit-closer 1 has a broadened or flanged lower end adapted to engage, when in its lowermost
35 position, with contact-fingers 2 3, and, when in its uppermost position, with contact-fingers 4 5, arranged directly over and in line with the contact-fingers 2 3. It is designed to sound an alarm for high water when the circuit is closed through the fingers 2 3, and to
40 sound a low-water alarm when the circuit is closed through the fingers 4 5. Therefore I will term the fingers 2 3 "high-water" contacts and the fingers 4 5 "low-water" contacts.

45 The fingers 2 4 are secured by means of a binding-screw 6 to a suitable base 7, of insulating material, and the fingers 3 5 are secured by means of a binding-screw 8 to said base. From the fingers 2 4 a wire 9 leads to
50 one pole of a battery 10, from the other pole of which a wire 11 leads to a bell-magnet 12,

and from this bell-magnet a wire 13 leads to the binding-screw 8. The alarm and circuit mechanism above described is adapted to
55 sound an alarm as to the level of the water in the feed-water tank, but it is also the purpose of my invention to sound an alarm for high and low water in a boiler having connection with the feed-water tank, and the connections therefor I will now describe. 60

A' indicates a glass water-gage secured to a boiler A² in the usual manner. Within the gage A' is a circuit-closing float 14 and a circuit-breaking float 15. These floats are
65 here shown in the form of hollow balls of any suitable light metal. The float 14 is designed to close a circuit to sound an alarm upon the water reaching the high-water line in the boiler, and the float 15 is designed to break a
70 circuit to cause the sounding of an alarm when the water in the boiler shall have reached its low mark.

Contact-wires 16 17 extend through the upper portion of the glass gage A', and the float 14 is supported adjacent the wires 16 17, but
75 out of contact therewith, by means of a wire 18, extended across the interior of the gage. From the contact-wire 16 a wire 19 extends to the wire 9, and from the contact-wire 17 a wire 20 leads to the wire 13. It will be seen
80 from this construction that the contact-wires 16 17 are in a circuit comprising the battery 10 and the bell-magnet 12. Therefore when the circuit is closed by means of the rising water in the gage forcing the float 14 into engagement
85 with the contacts 16 17 the boiler high-water alarm will be sounded.

Within the lower portion of the gage A', and designed to coact with the float 15, are
90 contact-wires 21 22. From the contact-wire 21 a wire 23 leads to the wire 9, and from the contact-wire 22 a wire 24 leads to one pole of an electromagnet 25, from the other pole of which a wire 26 leads to the wire 11. The
95 battery 10 is comprised in the circuit of the electromagnet 25 and contact-wires 21 22, but as this circuit is normally closed it is obvious that the bell-magnet 12 should not be included therein, and in lieu thereof I provide an independent alarm under the control of the elec-
100 tromagnet 25, which I will now describe.

Coacting with the electromagnet 25 is an

armature-lever 27, having a wire 28 extended from its pivoted end to one pole of a battery 29, and the free end of said armature is adapted to engage with a contact-pin 30, having a wire connection 31 with the battery 29, and in this circuit is located a bell-magnet 32. This circuit comprising the bell-magnet 32 and the armature 27 I will term, for convenience, a "normally open local circuit," as the armature-lever is held out of engagement with the pin 30 by means of the electromagnet 25, which is in a normally closed circuit.

The operation of the first-described part of my invention is as follows: Assuming that water is being pumped into the tank A, the float *a* will rise therewith, and when a sufficient height of water shall have been reached the circuit-closer will engage with and close the circuit through the fingers 2 3 to sound the alarm, and then the pump must be stopped. To stop the alarm, when in this condition, the engineer or attendant must break the connection by moving the circuit-closer 1 laterally out of contact with either one of the fingers 2 3. This may be done by moving the circuit-closer and resting it on one of the fingers. As the level of the water in the tank falls the circuit-closer 1 will be raised and automatically swing clear of the contact-finger and to its central position, to be moved into engagement with the contact-fingers 4 5 and sound the alarm when the water in the tank shall have reached the low-water line.

The operation of the second-described part of my invention is as follows: In filling the boiler the water will rise in the gage A', and when sufficiently full will lift the float 14 into engagement with the contact-wires 16 17, thus closing the circuit and sounding the alarm. As the water falls in the gage the float will lower and break the contact. The float will continue to lower until it reaches the support 18, where it will be suspended and prevented from closing the circuit through the wires 21 22 when the level of the water reaches the same. The water in the gage will hold the float 15 in engagement with the wires 21 22 until the level of the water is below the same, when the float will fall and open the circuit, thus deenergizing the electromagnet 25, and allow the armature-lever 27 to close the local circuit and sound the low-water alarm.

It may be here stated that the wires 18 and the contact-wires are permanently fixed in the glass gage by fusing the glass around them.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A high and low water alarm, comprising a float in a tank, a swinging circuit-closer supported by said float, high-water contact-fingers, low-water contact-fingers arranged above and in line with the high-water contact-fingers, the high-water contact-fingers and the low-water contact-fingers being secured together on a base, and the said low-water contact-fingers being so arranged that the circuit-closer may be swung laterally to break the connection through the high-water contact-fingers, and an electric circuit engaging with the contact-fingers and comprising an alarm, substantially as specified.

2. A high and low water alarm for a boiler, comprising an electric circuit having an alarm therein, a circuit-closing float in a water-gage on the boiler and controlled by the water therein, a circuit-breaking float also in said gage, an electric circuit held normally closed by said circuit-breaker, an electromagnet in said normally-closed circuit, and a normally open local circuit, having an alarm, and controlled by said electromagnet, substantially as specified.

3. In an electric alarm system for indicating the level of water in a boiler, the combination with electric circuits and a water-gage on the boiler, of a circuit-closing float in said gage, contact-wires therefor secured in the gage, a support for said float rigidly fixed in the gage, a circuit-breaking float in said gage, contact-wires therefor secured in the gage, and an alarm-controlling circuit held normally closed by said circuit-breaking float, substantially as specified.

4. A high and low water alarm system for a feed-water tank and a boiler connected therewith, comprising an electric circuit having an alarm therein, a circuit-closer controlled by the rising and falling of the water in the tank, a circuit-closer operated by the rising of the water in the boiler, a circuit-breaker controlled by the water in the boiler, a normally-closed circuit under control of said circuit-breaker and having connection with a battery in the first-named circuit, and a normally open local circuit, having an alarm, and controlled by said normally-closed circuit, substantially as specified.

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Witnesses:

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