

(No Model.)

2 Sheets—Sheet 1.

B. McCABE.

ELECTRICAL HIGH OR LOW WATER ALARM.

No. 543,965.

Patented Aug. 6, 1895.

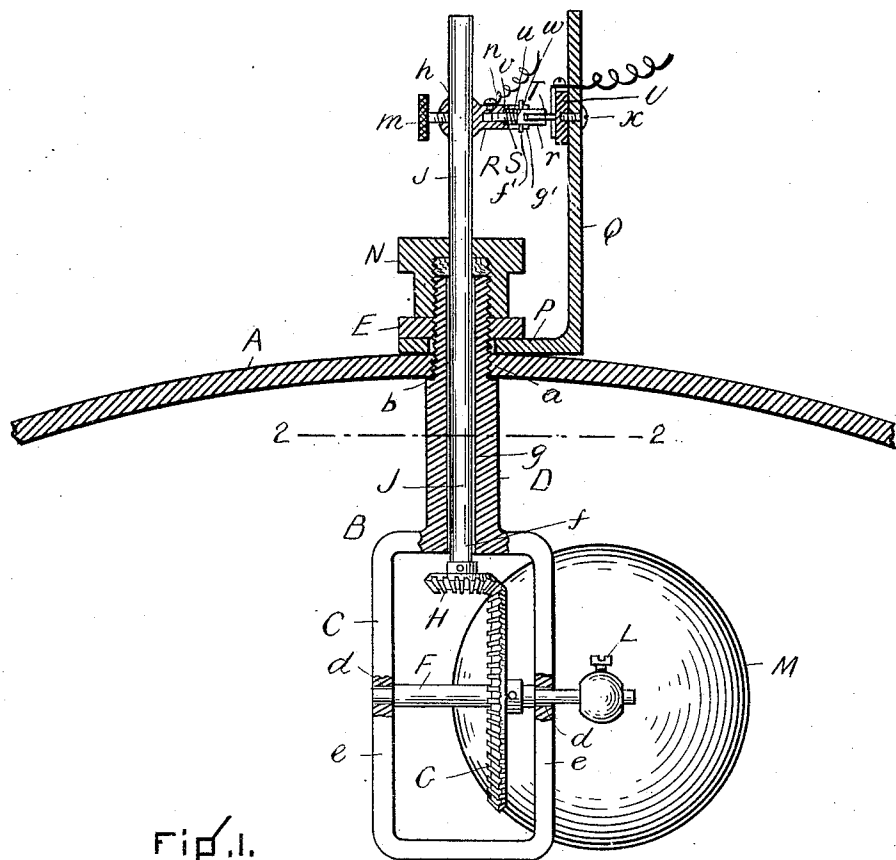


Fig. 1.

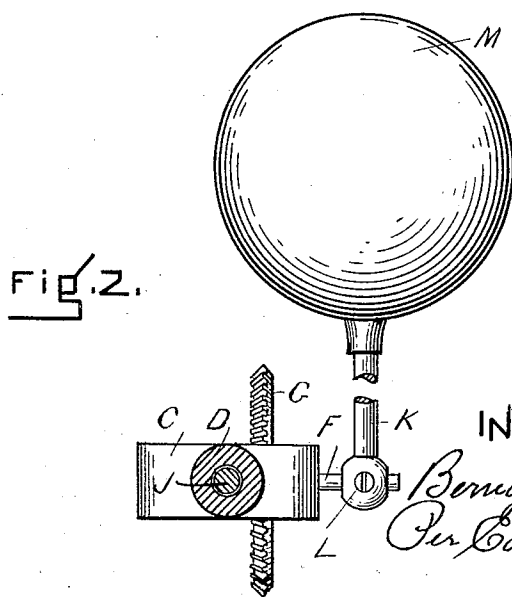


Fig. 2.

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2 Sheets—Sheet 2.

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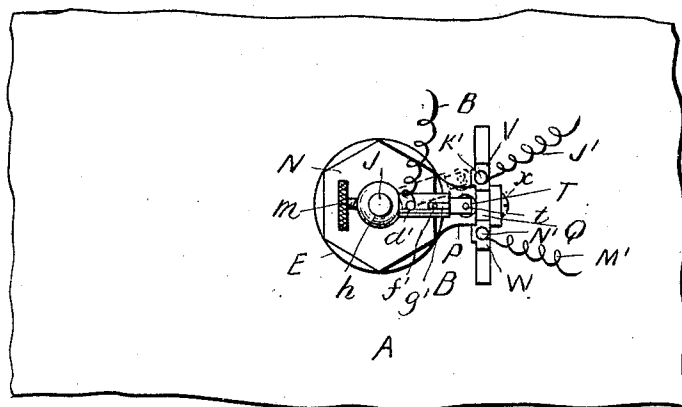


Fig. 3.

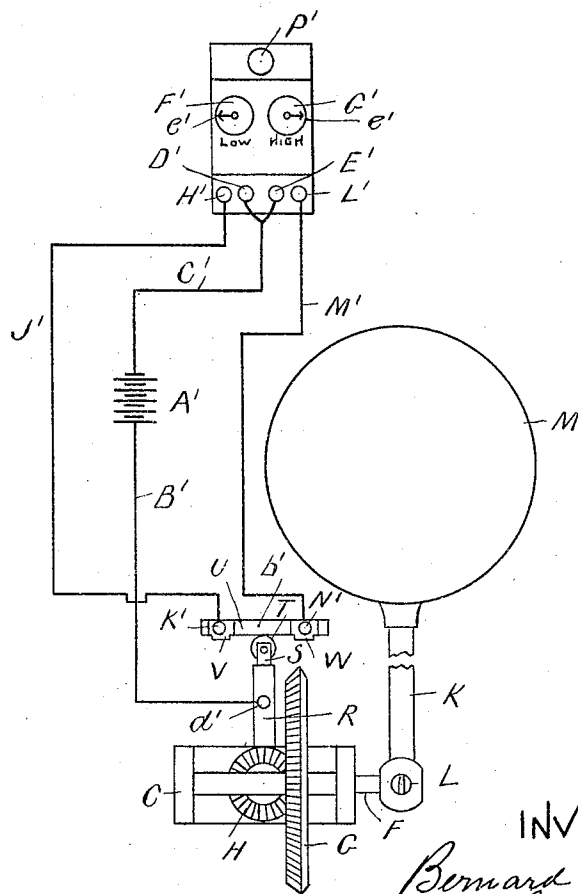


Fig. 4.

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UNITED STATES PATENT OFFICE.

BERNARD MCCABE, OF BOSTON, MASSACHUSETTS.

ELECTRICAL HIGH OR LOW WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 543,965, dated August 6, 1895.

Application filed December 15, 1894. Serial No. 531,969. (No model.)

To all whom it may concern:

Be it known that I, BERNARD MCCABE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electrical High or Low Water Alarms, of which the following is a full, clear, and exact description.

This invention has for its object to provide an alarm operated by electricity for steam-boilers or other steam-generators to indicate when the water is "high" or "low" from a given point; and the invention consists in combination with a steam-boiler or other steam-generator of a device constructed and arranged for operation by the height of the water in the boiler to sound an alarm, and to show by an indicator or annunciator by electricity as the water in the boiler becomes high or low from a given or standard point, all substantially as hereinafter fully described, reference being had to the accompanying sheets of drawings, in which is illustrated the present invention as applied to a steam-boiler.

Figure 1 shows in cross-section in detail the upper side of a steam-boiler with this alarm device in vertical section and part side view, as attached thereto. Fig. 2 is a detail plan view below section-line 2 2, Fig. 1. Fig. 3 is a detail plan view of the upper parts, and Fig. 4 is a diagram representing the manner of connecting the device with the sounder or alarm mechanism and indicator by means of the electric current.

In the drawings, A represents in detail section the upper side of a steam-boiler, and B the alarm device of the present invention connected thereto.

C is an oblong vertical frame having a centrally-extending arm D, on which is a screw-thread *a*, which screws into the upper side A of the boiler against a shoulder *b* and secured by a screw-nut E for the frame to be within the boiler and the arm D to extend through and above the side.

Arranged to turn in bearings *d* in the sides *e* of the frame is a horizontal rock-shaft F, having secured to it within the frame a vertical miter-gear G, which engages with a small miter-gear H, secured to the lower end *f* of an upright rod or shaft J, arranged to freely turn in a vertical central opening *g* in the

frame-arm D and extending out through and above the arm, as shown in Fig. 1.

The rock-shaft F projects through and beyond one side of the frame and has on its outer end an arm K adapted to slide back and forth and along the arm and to be secured in position by a set-screw L.

Secured to the outer end of this arm K is a large air-tight globe or float M, such as is generally used for ball-cocks in water-tanks, &c. Above the screw-nut E, and screwing onto the upper end of the frame-arm, is a stuffing-box N, made in any suitable manner, to prevent the escape of steam from the boiler through the rod-opening *g*.

Between the screw-nut E and side of the boiler and held firmly in place by the screw-nut is a small plate P, loosely fitting over the screw end of the arm and having a vertical arm Q extending up a short distance above the top of the boiler, as shown, alongside of the rod J.

Connected to the upper end of the rod J is an arm R, which has an opening *h*, through which the rod extends, and so the arm can be moved up and down thereon to adjust it at any desired height, and to be secured to the rod when at such height by a set-screw *m*. The end of this arm R has a central longitudinal open socket *n*, in which is arranged to slide back and forth a pin S, having an elongated forked end *r*, between which is arranged to rotate a small wheel T, its journals *t* being in bearings in the forked arms. The pin has a spiral spring *u* encircling it in the opening *h*, bearing against a shoulder *v* in the opening and the shoulder *w* made by the enlarged end of the pin to force the pin forward at all times.

Secured to the inner side of the vertical arm Q opposite to the pin S by a screw *x* is a cross-block U, of any suitable insulated material, and the arm R is adjusted as to its height on the rod J for the wheel of the pin S to bear against the side of the insulated block U.

V W are two plates of metal secured by screws *a'* to the arm Q, as shown, which lie on the front and upper side of the insulated block. These plates are separate from each other, leaving a space *b'* between the two, so that they are insulated from each other.

In Fig. 4 is shown in diagram the manner of connecting the parts electrically, and in such view A' is an electric battery, and from one pole of this battery extends a wire B', which is connected to a post d' on the arm R, and from the other pole of the battery extends a wire C', which connects by two wire portions with posts D' E', which are respectively electrically connected to two annunciators F' G', constructed as usual, each having an index-finger e' and marked "Low" and "High," respectively.

The annunciator F', marked "Low," is connected electrically with a post H', from which extends a wire J', connected by its other end to a post K', secured to the plate V of the insulated block U, and the annunciator G', marked "High," is electrically connected to a post L', from which extends a wire M', connected by its other end with a post N', secured to the other plate W on the insulated block, by which electrical communication is made between the two annunciators "Low" and "High," respectively, with the two plates V W and the battery, and between the battery and the rod-arm R when the arm is moved into proper position therefor.

A bell P' is connected electrically with both annunciators. The arm R, through its pin S, forms one electrode and the two plates V W each an electrode, the movements of the arm onto one or the other of the plates making the electric circuit correspondingly.

These annunciators and bell are constructed in the usual manner for operation by electricity, and it is not deemed necessary to herein describe their construction and operation as such are well known.

The operation of this device is substantially as follows: The device is set in the boiler and so arranged that with the water at its proper height in the boiler the float M, with its arm K, will be substantially horizontal, as shown in Fig. 1, and in such position the arm R will be in the position shown in Fig. 3—that is, its wheel T will bear upon the portion b' of the insulated block between the two metal plates V W therefor, not touching either plate—and consequently the electric circuit in each case is open or broken. As the water becomes higher or lower in the boiler than the desired level, the float is correspondingly raised or lowered, and in such movements it turns the gear C, secured to its shaft, which in turn revolves the upright rod or shaft J and moves the arm R to the left or right correspondingly, and if the water is raised or lowered sufficiently for what would be "danger" the rod J is turned sufficiently to move the arm R for its wheel T to bear upon one of the plates V W, secured to the insulated block, and make or close the electric circuit accordingly. For instance, as the water in the boiler becomes too high the float M is accordingly raised, which causes the arm R, as described, to swing toward and bear by its

wheel T on the plate W, making the electric circuit with the "high" annunciator, which causes the bell P' to sound and its indicator to drop, calling the attention of the engineer to the annunciator, who, noticing the indicator is down, is thus notified the water is too high in the boiler and regulates the same accordingly, and if the water becomes low in the boiler the float falls, which reverses the movements of the arm, causing it to swing from, toward, and bear its wheel on the other plate V, making the electric circuit with the "low" annunciator, causing, again, the bell to sound, dropping the indicator to such annunciator, by which the engineer is warned of the low state of the water in the boiler and governs himself accordingly. Thus whether the water becomes too high or too low in the boiler the alarm is given correspondingly.

The two indicators are restored to their normal positions (shown in Fig. 4) in the usual manner of annunciators.

The arm R is arranged for its wheel to bear upon the insulated block between the two plates V W when the water is at a safe height in the boiler, and in such case both electric circuits are broken, so that there is no operation of the alarm.

The spring u in the arm R forces or presses out the wheel-pin S at all times, so the wheel shall bear properly at all times upon the insulated block or electric plates as the arm swings to the right or left to make the proper electric connection for operation of the device.

The float can be arranged by a stop or rest in any suitable manner, so it shall not fall too low or be raised too high to interfere with its proper movements; but as generally used the device is placed so that the boiler-tubes and the upper side of the boiler serve as such rests or stops.

The wire C' is the return-wire for each electric circuit.

The pin S has a cross-pin f', which projects into longitudinal slots g' in each side of the arm R, preventing the pin turning in its socket n, but allowing of its free longitudinal movement.

Having thus described my invention, what I claim is—

1. In a steam boiler, in combination, a float, a rock shaft secured thereto, a gear on said shaft, a vertical rod arranged to turn in suitable bearings and extending outside of the boiler, a gear on its lower end engaging with said rock shaft gear, and an arm on its outer end making one electrode, and a plate on a suitable support making the other electrode of an electric circuit and electrically connected with a sounding device and annunciator for the purpose specified.

2. In a steam boiler, in combination, a float, a rock shaft secured thereto, a gear on said shaft, a vertical rod arranged to turn in suitable bearings and extending outside of the boiler, a gear on its lower end engaging with

said rock shaft gear, and an arm on its outer
end making one electrode, and two plates on
a suitable support making two independent
electrodes of an electric circuit and electri-
cally connected with a sounding device, and
5 each electrically connected with an independ-
ent annunciator for the purpose specified.

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

BERNARD McCABE.

Witnesses:

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LEONA C. ARNO.