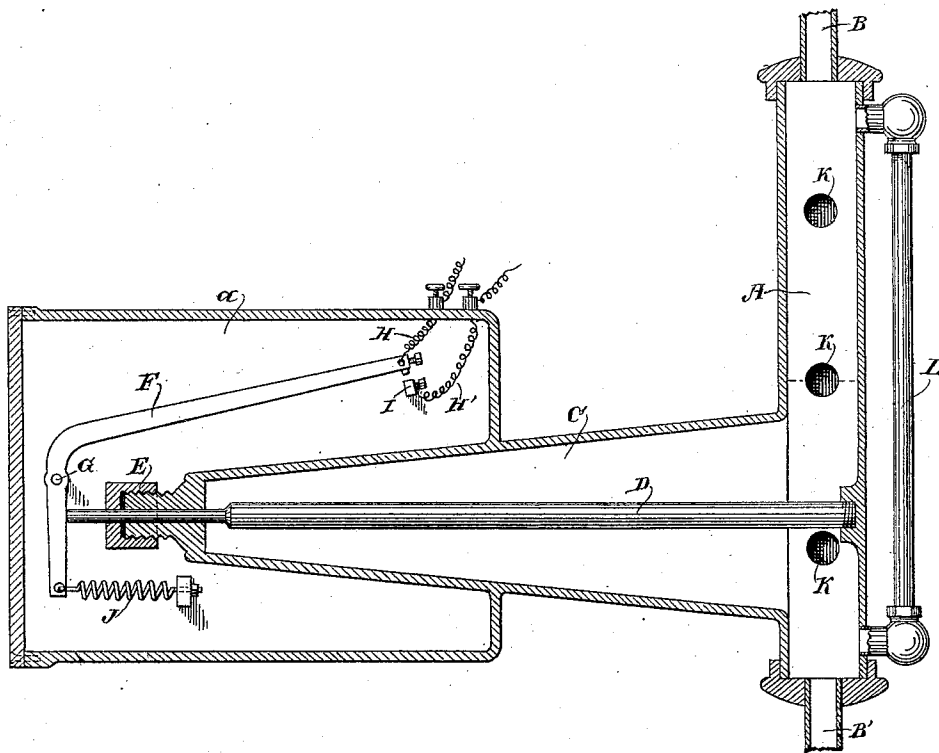


(No Model.)

O. J. BACKUS.
LOW WATER ALARM.

No. 553,636.

Patented Jan. 28, 1896.



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UNITED STATES PATENT OFFICE.

OSCAR J. BACKUS, OF SAN FRANCISCO, CALIFORNIA.

LOW-WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 553,636, dated January 28, 1896.

Application filed May 9, 1895. Serial No. 548,728. (No model.)

To all whom it may concern.

Be it known that I, OSCAR J. BACKUS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Low-Water Alarms; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device for indicating and signaling when the water in a steam-boiler has become too low for safety.

It consists in certain details of construction which will be more fully explained by reference to the accompanying drawing, in which the figure is a vertical section of my apparatus.

The operation of the apparatus depends upon the variation in the temperature between the hot water and the steam within the boiler.

A is a chamber of any suitable size or dimensions standing vertically in convenient relation with the boiler and having pipes B and B' connecting the upper and lower ends with the boiler above and below the water-line therein. This chamber has an extension C projecting outwardly at essentially right angles therewith, and within the chamber is fixed a brass or other metal rod D, which is capable of considerable expansion by heat. This rod extends outwardly through a suitable cap and stuffing-box E, and may be reduced in diameter at this point, as shown, so as to make less frictional surface where it passes through the stuffing-box. The inner end is firmly screwed or otherwise secured to the interior of the chamber A, and the rod may by this means or otherwise be made adjustable in the amount of its projection exterior to the stuffing-box.

Exterior to the chamber C and in line with the end of the rod D, which extends outwardly through the stuffing-box is a lever-arm F, fulcrumed as shown at G. This lever may be of any suitable length and extend in any desired direction. In the present case I have shown it bent into the form known as a "bell-crank," so as to retain all parts of the device in as small a compass as possible. The shorter arm of the lever below the fulcrum G is connected with the spring J, the tendency of

which is to draw this arm against the end of the expansion-rod D, and the longer arm extending to a considerable distance from the fulcrum stands normally at a short distance from a contact-point I. This contact-point is connected through wires H' with a suitable source of electric energy, and the corresponding end of the lever F is similarly connected by means of a wire H.

K K K are openings corresponding with the gage-cocks, and L is a visible water-gage of the usual pattern.

It will be noted that the lowermost of the gage-cock openings is slightly below the expansion-bar D.

The operation of the device will then be as follows: The bar D is adjusted by screwing or otherwise, so that when it is submerged in the water in the boiler, which has free access to the chamber A, and the temperature of this water is raised as it will be when the steam-pressure is sufficient for the ordinary operations of the boiler, the rod D will be expanded until its outer end forms contact approximately with the lower end of the lever-arm F. As the longer arm of the lever-arm F is slightly out of contact with the contact-point I, no electrical circuit will be completed while this condition of affairs remains. If, however, by accident or carelessness the water in the boiler should decrease until it was approaching the danger-point at or below the lower gage-cock, the bar D would then be exposed to the heat of the steam within the boiler, which, being considerably greater than that of the water, would tend to increase the expansion of the bar D, and thus, pressing upon the lower arm of the lever F, it would move the upper and longer arm until it was brought into contact with the point I. An electrical circuit would thus be induced through the wires H H' and the battery or other source of electrical energy, and in connection with this would be any bell, whistle or signal of any desired form which would sound an alarm and thus indicate to the engineer or person in charge that the boiler needed attention. As soon as the water is again supplied to the boiler and rises to cover the expansion-bar D, the heat from the latter being reduced, it will contract and allow the

spring J to again draw the lever-arm out of contact with the point I when the alarm would cease.

For convenience and protection from dust and other injury I have shown a casing *a* fitting around the outer end of the extension C and inclosing within it the lever F and the contact-point. This casing may have a removable cap fitted to its outer end, as shown, through which access is easily obtained to the interior if any repairs or inspection is necessary.

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

1. A low water alarm for boilers consisting of an expansible bar fixed within a chamber of, or connected with the boiler, to which both steam and water from the boiler have free access and within which said bar is normally covered by water, and a mechanism comprising a lever fulcrumed between its ends having its long arm provided with a contact and its short arm connected with a spring the tendency of which is to normally maintain the short arm of the lever against the outer exposed end of the expansible rod whereby when said rod is exposed to live steam from the boiler by the lowering of the water, the bar is subjected to greater expansion and the lever moved against the power of its spring and a second contact contiguous to the long arm of the lever through which an electrical circuit is completed and an alarm sounded.

2. A low water alarm for boilers consisting of a vertical casing connected at its opposite ends with the boiler above and below the water line whereby both steam and water have free access thereto, and having projecting from one of its sides a right-angled extension, a bar fixed at one end to one of the inner walls of the vertical casing and lying horizontally within said extension at a point

where it is normally covered by water when the latter is above the danger point, said bar having its outer end unconnected and slidable through the end of the extension, a lever fulcrumed between its ends and having one of its arms contiguous to the free end of the rod, electrical wires, one of which is connected with a second arm of the lever and the other with a contact-point in the line of motion of said lever, and a spring connected with the lever at a point below its fulcrum for normally holding this end of the lever against the end of the expansible rod, and the contacts separated, said spring yielding under an increased expansion of the rod to cause the contacts to meet and establish an electrical circuit, and sound an alarm.

3. A low water alarm for boilers consisting of a vertically disposed casing connected at its ends with the boiler above and below the water line, said casing having projecting from one of its sides only a right angled extension, and having openings formed in it corresponding with the gage-cocks, and a visible water-gage, an expansible bar secured at one end only to one of the inner walls of the vertical casing, and lying within the extension of the casing, with its outer end slidable through the outer end of said casing, a lever fulcrumed between its ends, with its short arm connected with a spring which maintains it in contact with the outer free end of the bar, a contact point on the long arm of the lever and a second contact and wires through which a circuit is established, and an alarm sounded when the bar is subjected to its greater expansion.

In witness whereof I have hereunto set my hand.

OSCAR J. BACKUS.

Witnesses:

G. A. BURNS,
M. D. MERRITT.