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W. D. McLAUCHLIN.

LOW WATER ALARM.

(Application filed Dec. 15, 1899.)

(No Model.)

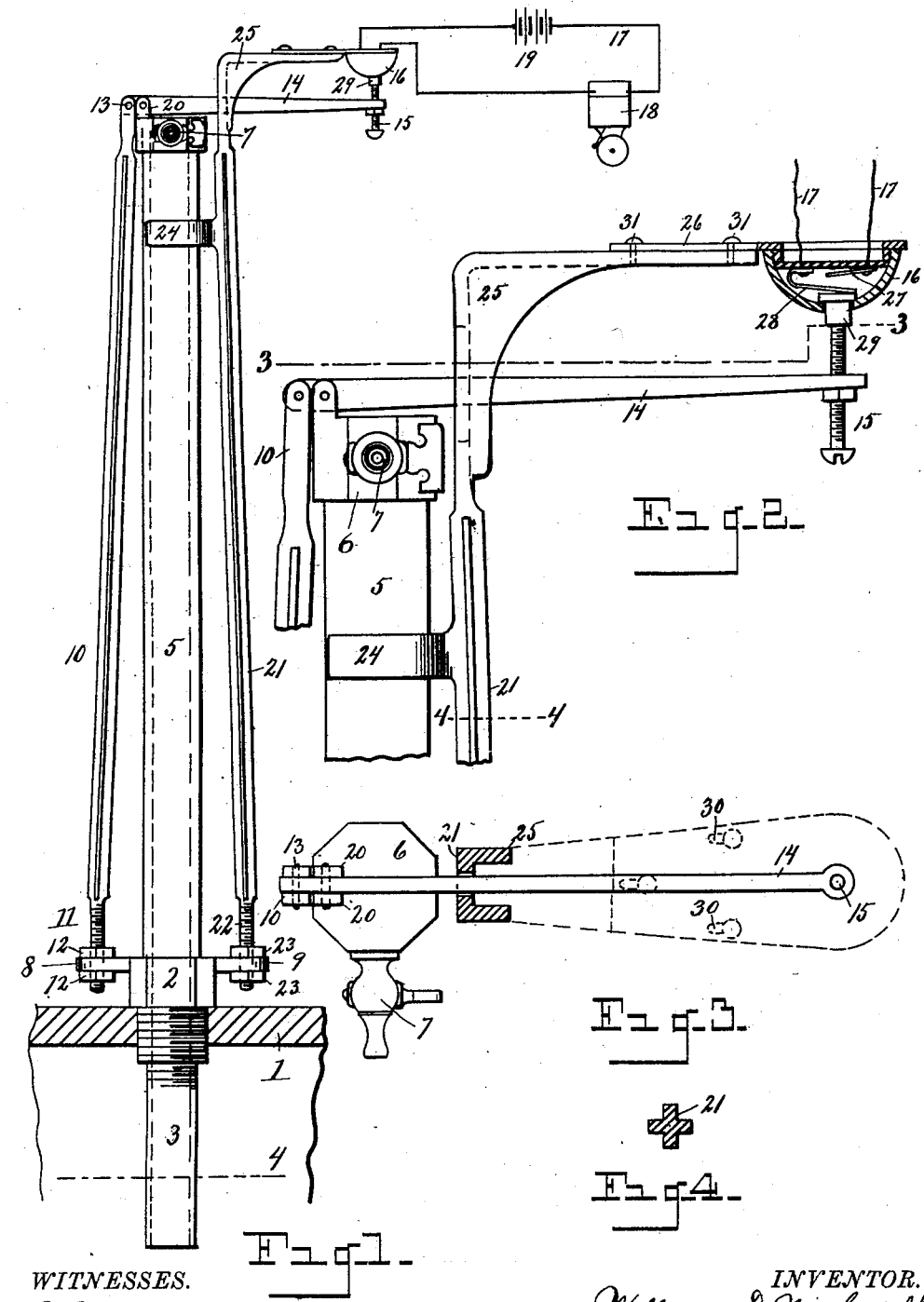

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES.

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WILLIAM D. McLAUCHLIN, OF CORUNNA, MICHIGAN.

LOW-WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 645,736, dated March 20, 1900.

Application filed December 16, 1899. Serial No. 740,407. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. McLAUCHLIN, a citizen of the United States, residing at Corunna, in the county of Shiawassee, State of Michigan, have invented certain new and useful Improvements in Low-Water Alarms; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to low-water alarms for steam-boilers; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The object of the invention is to produce by a simple and inexpensive arrangement of parts a low-water alarm of such construction as to cause the steam in the boiler, when the water falls to a point below a safe level, to enter an expansion-tube and by the elongation of said tube actuate a lever to close an electrical circuit and sound an alarm to notify the engineer or attendant of the condition of the water in the boiler.

The above object is attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of my alarm attached to a boiler, which appears in section, also showing an electric circuit and signal-bell therein. Fig. 2 is an enlarged detail in elevation of the operating-lever and push-button or circuit-closer actuated thereby to close the signal or alarm circuit. Fig. 3 is a horizontal section on line 3 3 of Fig. 2. Fig. 4 is a transverse section through one of the stay-rods, as on line 4 4 of Fig. 2.

Referring to the characters of reference, 1 designates the boiler, into which a coupling 2 is screwed, the upper end of said coupling being octagonal to enable the application of a wrench thereto.

Screwed into the coupling 2 and depending within the boiler is a pipe-section 3, the lower end of which extends below the normal water-level of the boiler in proximity to the flues, the water-level being indicated by dotted line 4.

Projecting upwardly from the coupling 2 is a tube 5, which may be of any suitable length and which is formed of a metal susceptible to longitudinal expansion under the application of heat. The upper end of the expansion-tube 5 is closed by a cap 6, provided with a blow-off cock 7.

Projecting laterally from the coupling 2 on opposite sides are the horizontal brackets 8 and 9, respectively. Leading from the bracket 8 is a rod 10, whose lower end is threaded at 11 and screwed into said bracket, being adapted to be secured therein by the jam-nuts 12, which screw onto said rod on opposite sides of said bracket. The upper end of the rod 10 terminates at a point slightly above the top of the expansion-tube and is pivoted at 13 to one end of a horizontal lever 14, the opposite end of said lever carrying a set-screw 15, which passes therethrough and is adapted to actuate a circuit-closer 16 in an electric circuit 17, having therein a bell or signal 18 and including a battery or other source of electricity 19.

Projecting from the top of the cap 6 of the expansion-tube is a slotted post 20, between the sides of which said lever 14 is pivoted adjacent to the fulcrum 13 of said lever.

Extending from the bracket 9 of the coupling 2 is a rod 21, whose lower end is threaded at 22 and screwed through said bracket, said threaded portion carrying the jam-nuts 23, which engage the opposite faces of said bracket. Said rod 21, near its upper end, is provided with a curved finger 24, which embraces the expansion-tube and maintains said rod in proper position. The upper end of the rod 21 is provided with a right-angle bracket 25, to the horizontal portion of which is attached a plate 26, carrying a push-button or circuit-closer 16, in which are located the spring-terminals 27 and 28 of the electric circuit 17. Lying against the terminal 28 is a movable button 29, which is engaged by the screw 15 and which is adapted to carry the spring-terminal 28 into contact with the terminal 27 to close said circuit.

In the operation of this device under normal conditions while the lower end of the

pipe-section 3 remains submerged in the water of the boiler the parts are in the position shown in Fig. 3, in which the circuit 17 is open. Should the water in the boiler fall below the lower end of the pipe-section 3, the steam within the boiler will flow upward through said pipe-section into the expansion-tube 5 and by its presence within said tube heat it to such a degree as to cause it to expand longitudinally. The rods 10 and 21 are practically non-expansible, so that the fulcrum 13 of the lever 20 remains stationary, while the point of the pivot 20, between the expansion-tube and said lever, is carried upward, thereby swinging the outer end of the lever 14 upward and causing the screw 15 therein to engage the button 19 and carry the spring 28 against spring 27, closing the electric circuit 17 and sounding an alarm upon the bell 18, which may be located at any convenient point and which notifies the engineer or attendant that the water in the boiler has fallen below a safe level. When the water in the boiler has been replenished until it again covers the lower end of the pipe 3, the steam will be excluded therefrom, when the steam which fills the expansion-tube will condense therein, allowing said tube to cool and contract, thereby carrying the outer end of the lever 14 downward and opening the circuit 17.

The rods 10 and 21 describe in cross-section a cross, as shown in Fig. 4, forming on said rods laterally-projecting wings which present an increased surface to the action of the atmosphere, thereby enabling said rods to quickly return to their normal condition when subject to the action of heat, insuring a positive and instantaneous action of the device. By reason of the threaded lower ends of the rods 10 and 21, respectively, said rods are made longitudinally adjustable, so that their length may be increased or decreased to effect a proper throw of the lever 14 and to place the circuit-closer on the rod 21 in proper relation to the actuating-screw 15, carried by said lever. After a proper adjustment of said rods they are securely locked in position by their respective jam-nuts 12 and 23.

The plate 26 is made adjustable upon the bracket 25 by reason of the slotted opening 30 therein, (see Fig. 3,) through which the screws 31 are adapted to pass, thereby enabling the circuit-closer 16 to be adjusted and to assist in bringing it into proper relation with the screw 15, carried by the lever 14.

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

1. In a low-water alarm, the combination with a boiler, of an expansible tube mounted upon the boiler and communicating with the interior thereof, a lever pivoted to the top of said expansible tube, a non-expansible rod standing adjacent to said tube and having said lever fulcrumed in its upper end, said rod being adjustable longitudinally, a second non-expansible rod standing adjacent to said tube and carrying a circuit-closer adapted to be actuated by the free end of said lever, and an electric circuit, including a signal, and said circuit-closer.

2. In a low-water alarm, the combination with a boiler, of a coupling mounted thereon, a pipe screwed into said coupling and depending within the boiler, an expansible tube mounted in said coupling and communicating with said pipe, a lever pivoted to the upper end of said expansible tube and a bracket projecting from said coupling, a non-expansible rod standing adjacent to said expansible tube, its lower end attached to said bracket and its upper end fulcrumed to said lever, a circuit-closer in the path of the free end of said lever and an electric circuit, including a signal and said circuit-closer.

3. In a low-water alarm, the combination of a boiler, a coupling therein, communicating with the interior of the boiler, an expansible tube, mounted in said coupling, having a lever pivoted to its upper end, a circuit-closer in the path of and adapted to be actuated by the free end of said lever, a longitudinally-adjustable rod carrying said circuit-closer, an electric circuit, including a signal and said circuit-closer, a non-expansible rod, having said lever fulcrumed in its upper end, the lower end of said rod being adjustably attached to said coupling.

4. In a low-water alarm, the combination with the boiler, of a coupling mounted therein communicating with the interior of the boiler, an expansible tube mounted in said coupling, a lever pivoted to the upper end of said expansible tube, an electric circuit, including a signal and a circuit-closer, said circuit-closer adapted to be actuated by the free end of said lever, a rod standing adjacent to said expansible tube, carrying said circuit-closer at its upper end and having its lower end adjustably connected to said coupling, a second rod, also adjustably attached to said coupling at its lower end and having said lever fulcrumed in the upper end thereof.

In testimony whereof I sign this specification in the presence of two witnesses.

WILLIAM D. McLAUCHLIN.

Witnesses:
E. S. WHEELER,
C. EDNA JOSLIN.