

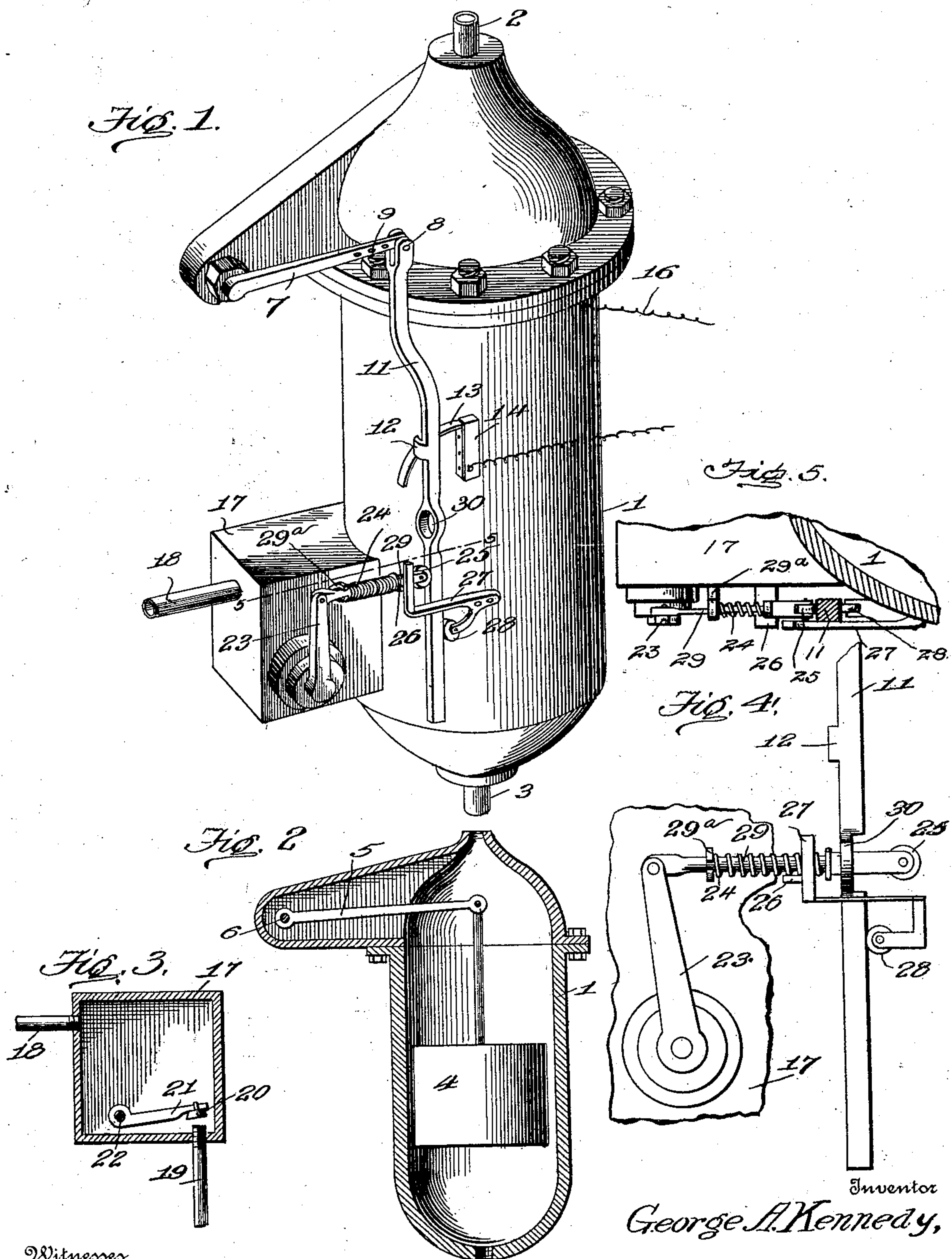
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PATENTED FEB. 10, 1903.

G. A. KENNEDY.
STEAM BOILER.

APPLICATION FILED MAR. 13, 1902.

NO MODEL.



Witnesses
J. H. Walmsley
J. H. Walmsley

By *A. B. Wilson & Co*
Attorneys

Inventor
George A. Kennedy,

UNITED STATES PATENT OFFICE.

GEORGE A. KENNEDY, OF TOLEDO, OHIO.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 720,153, dated February 10, 1903.

Application filed March 13, 1902. Serial No. 98,067. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. KENNEDY, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Safety Appliances for Steam-Boilers; 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.

This invention relates to a low-water alarm and fuel cut-off for steam-boilers heated by hydrocarbon-burners, and has for its object the provision of a safety device by means of which an alarm will be sounded when the water in the boiler descends to a certain low level and the supply of fuel to the burner is cut off if, through negligence or inattention or failure of action of the water-supplying means, the water falls to a still lower level, thereby obviating all liability of injury to the boiler by the continued application of heat.

A further object of the invention is to provide means whereby the flow of fuel remains cut off until the required amount of water is supplied to the boiler.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a low-water alarm and fuel-controller embodying my invention. Fig. 2 is a section through the shell or casing thereof. Fig. 3 is a sectional view of the fuel trap or receptacle. Fig. 4 is a detail perspective view of the lever and parts of the fuel-controller. Fig. 5 is a section on the line 5 5 of Fig. 1.

Referring now more particularly to the drawings, the numeral 1 represents a float casing or shell, which is provided at its upper and lower ends with couplings 2 and 3 for the attachment of pipes connecting said shell with the steam and water spaces of a boiler,

whereby the water in the shell is designed to remain at all times at the level with the water in the boiler.

Arranged within the shell or casing is a float 4, which is jointed, by means of its stem, to an arm 5, mounted to oscillate upon a rock shaft or stem 6, suitably journaled upon the casing. This rock-shaft projects exteriorly and has attached thereto at its upper end an arm 7, which rises and falls with the float and arm 5, and is adjustably connected at its outer end (as by means of a pin or bolt 8, adapted to engage either one of a series of openings 9 therein) with the upper end of a controlling-lever 11, extending vertically on the exterior of the shell. The lever 11 is adapted to move in a vertical plane and is controlled in its movements by the float 4, through the instrumentality of the arm 5, rock-shaft 6, and arm 7, and is provided at a suitable point with a laterally-projecting contact pin or lug 12, cooperating with a strip 13, carried by an insulated block 14, fixed to the shell 1. The strip 13 preferably consists of a curved piece of spring metal and has connected thereto one end of a conducting-wire 15, while attached to the boiler is another conducting-wire 16. These wires are designed in practice to be connected to the poles of a battery or other suitable source of electric supply and to a bell or other suitable signal (not shown) for sounding an alarm when the lug 12 contacts with the strip 13 and completes the circuit. As shown, the conductor 16 is in electrical connection with the shell 1, while the conductor 15 is insulated therefrom by the block 14, so that normally the circuit remains broken, and is completed or established only when the lug 12 contacts with the strip 13, whereupon a current passes through the shell or casing and wires and sounds the alarm.

When in the operation of the device the water falls to a certain low level and it is required that the boiler be replenished with water, the downward movement of the float 4 will cause a corresponding downward swing of the arm 7 and a downward movement of the lever 11, whereby the lug 12 is brought into contact with the strip 13 and the alarm is sounded, thus notifying the engineer or

party in charge that the water has fallen to near the danger-point and a further supply of water to the boiler must be furnished.

Suitably connected to the shell or casing 1 or arranged alongside the same is a fuel receptacle or trap 17, to which are connected pipes 18 and 19, one of which is designed to convey fluid hydrocarbon thereto from a suitable source of supply and the other to conduct the hydrocarbon to a burner, (not shown,) whereby the boiler is heated for the generation of steam. The pipe 19 projects upward into the trap or receptacle and is adapted to be closed by a cup-valve 20, carried by an arm 21, mounted to swing upon a rock shaft or stem 22, which shaft or stem carries at its outer end a rock-arm 23. Pivoted to this rocking arm is a trip-rod 24, which projects through an eye or bearing 29^a, swiveled to the trap 17, and is provided at its free end with a friction-roller 25, which normally bears against the lever 11 and serves to guide the same or hold it against movement in one direction. The rod 24 is held from dropping below the horizontal by a lug 26, fixed to the shell 1, and is held from outward movement by a bracket 27, also fixed to said shell, said bracket having journaled therein a friction-roller 28, which bears against the side of the lever 11 opposite the friction-roller 25, the two rollers thus serving to cause said lever to rise and fall in a substantially vertical plane. A spring 29 surrounds the rod 24 and normally acts to press the same toward the lever 11, which lever prevents the rod from swinging in one direction except when the water falls to the danger-point, thereby normally holding the valve 20 open to allow water to flow from the trap or receptacle 17 to the burner.

The lever 11 is provided with an opening 30, which when the lever falls to the lowest point in its downward movement comes in register with the outer end of the rod 24, whereupon the spring 29 projects or forces the rod through said opening and transfers motion to the arm 23 and from the same to the arm 21 through the medium of the shaft 22 to cause the valve 20 to close down on the pipe 19 to cut off the flow of hydrocarbon to the burner.

In the operation of the device when the water in the boiler falls to a point approximating the danger-point the lug 12 is brought into contact with the strip 13, sounding the alarm to notify the engineer or party in charge of the level of the water, indicating that the pump or other supplying device should be set in action to supply a further quantity of water to the boiler. If from any cause the further supply of water required is not furnished and the water falls to the danger-point, the lever 11 will be allowed to move downward until the opening 30 comes into alinement with the outer or free end of the rod 24, which will be forced through said

opening by the spring 29, by which the fuel-controlling connections will be operated to close the valve 20, cutting off the flow of fuel to the burner. By this means injury to the boiler by the continued application of heat after the water has been exhausted therefrom or has descended to a very low level will be entirely prevented. The lever 11, as will be readily understood, holds the rod 24 retracted against the tension of the spring 29, so as to maintain the valve 20 in a normally open condition. When the valve 20 has been closed in the manner described by reason of the downward movement of the lever 11 through the lowering of the water in the boiler, it will remain in such position until the boiler has been supplied with water to the desired level, as the connection between the lever and rod forms a lock, preventing the retraction of the parts until the upward movement of the float again causes the lever 11 to rise and impart an upward tilting movement to the rod 24, whereby as the lever continues to rise said rod is withdrawn from the opening 30. Upon the withdrawal of the rod from the opening 30 it may be forced down to its normal position, (shown in Fig. 1,) in which it rests upon the lug 26 and bears against the lever 11, which holds it against movement under the pressure of the spring 29, thereby maintaining the valve 30 open to allow hydrocarbon to flow to the burner.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of my improved low-water alarm and fuel cut-off will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In a safety device for boilers, the combination with a casing, of a float therein, suitable electric circuit connections for an alarm device, a fuel-controller regulating the flow of fuel to the burner, and controlling connections actuated by the float for preliminarily closing said circuit connections to operate the alarm and finally operating the fuel-controller to cut off the flow of fuel, substantially as described.

2. In a safety appliance for steam-boilers, the combination with a casing; of a float therein, suitable electric circuit connections for an alarm device, a fuel-controller for regulating the supply of fuel to the burner, a valve for cutting off the flow of fuel, a spring-actuated member for closing the valve, and a controlling member actuated by the float for completing the circuit and sounding the

alarm when the water falls to a certain level and tripping said valve-operating member to close the valve when the water falls to a low level, substantially as specified.

5 3. In a safety device for steam-boilers, the combination with a casing; of a float therein, means for supplying a liquid hydrocarbon fuel to a burner, a valve controlling the flow of fuel to the burner, a movable member op-
10 erated by the rise and fall of the float, a valve-controlling member normally held in position to maintain the valve open by the said movable member, and a spring acting on said valve - controlling member for closing
15 said valve when the movable member is adjusted to a predetermined position by the action of the float, substantially as set forth.

4. In a safety appliance for boilers, the

combination of a float-casing, a float therein, fuel-controlling means including a control- 20 ling-valve, an arm connected with the valve, a rod-operating member attached to the arm, a lever operated by the float and normally holding the rod in a position in which the valve is open and movable to a predetermined 25 position to allow the rod to be projected to close the valve, and a spring for projecting the rod, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set 30 my hand in presence of two subscribing witnesses.

GEORGE A. KENNEDY.

Witnesses:

H. F. WARREN,

H. S. WOODBURY.