J. A. ANDERSON.

AUTOMATIC DEVICE FOR CONTROLLING WATER SUPPLY.

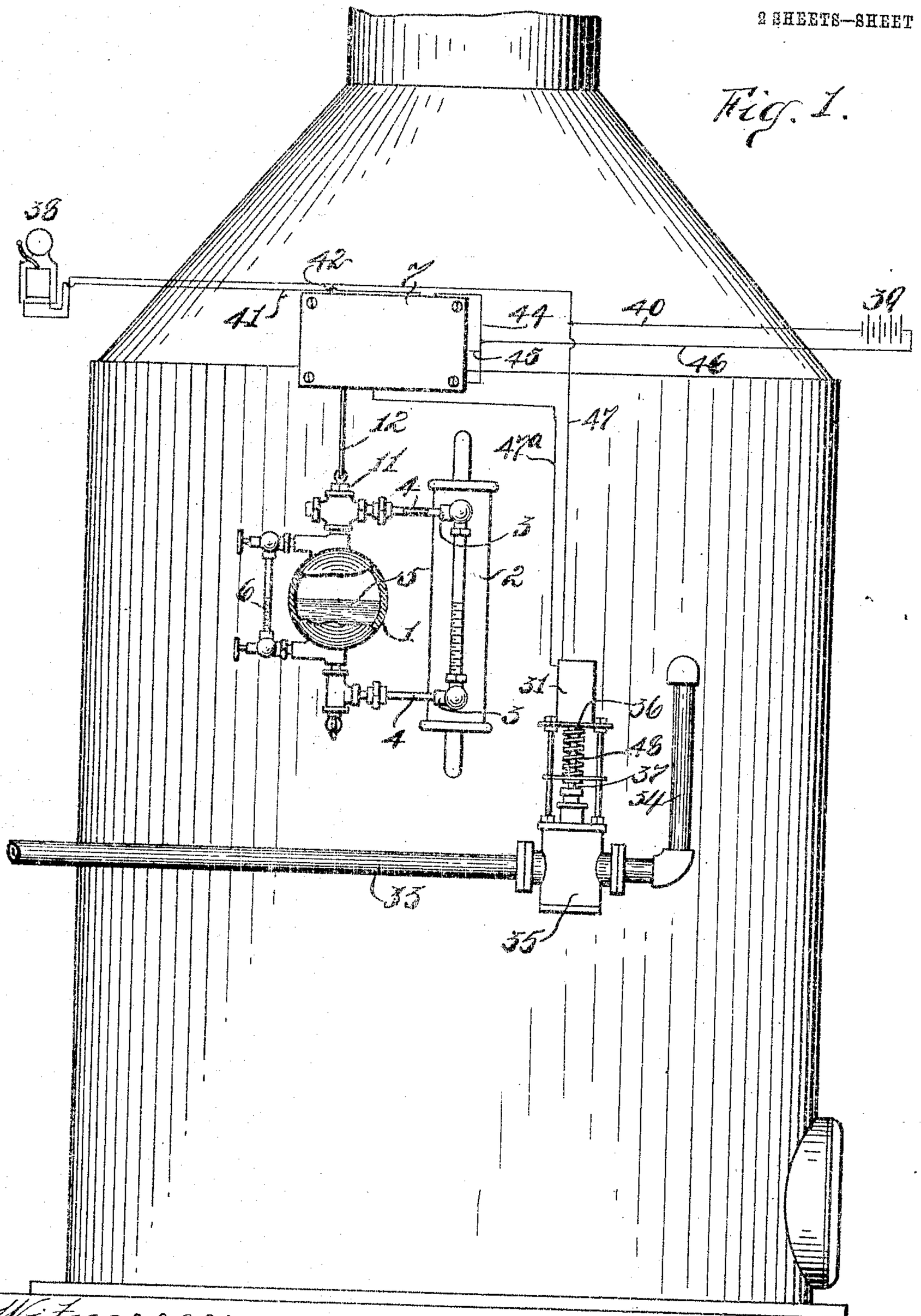
APPLICATION FILED JULY 17, 1908. RENEWED JULY 3, 1909.

948,303.

Patented Feb. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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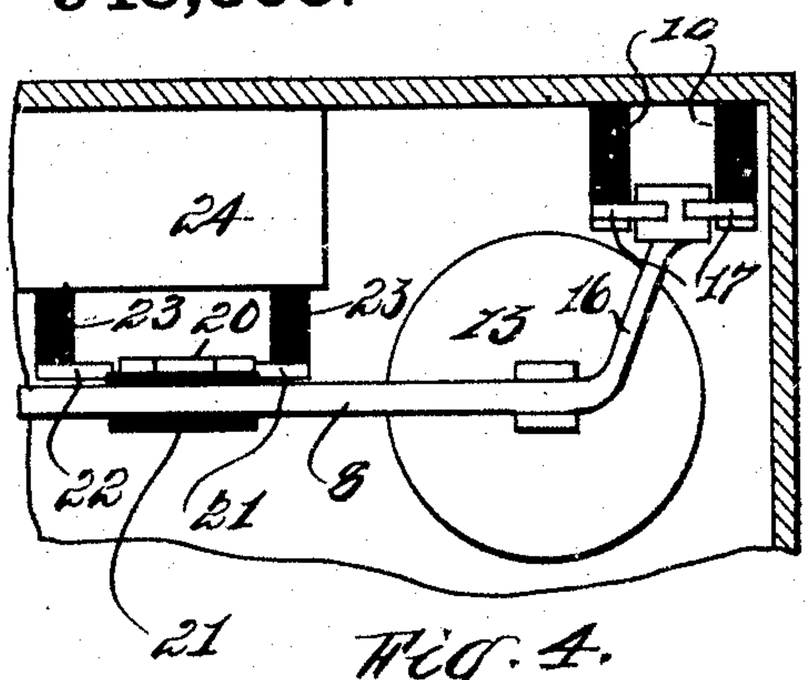

Fig. 4.

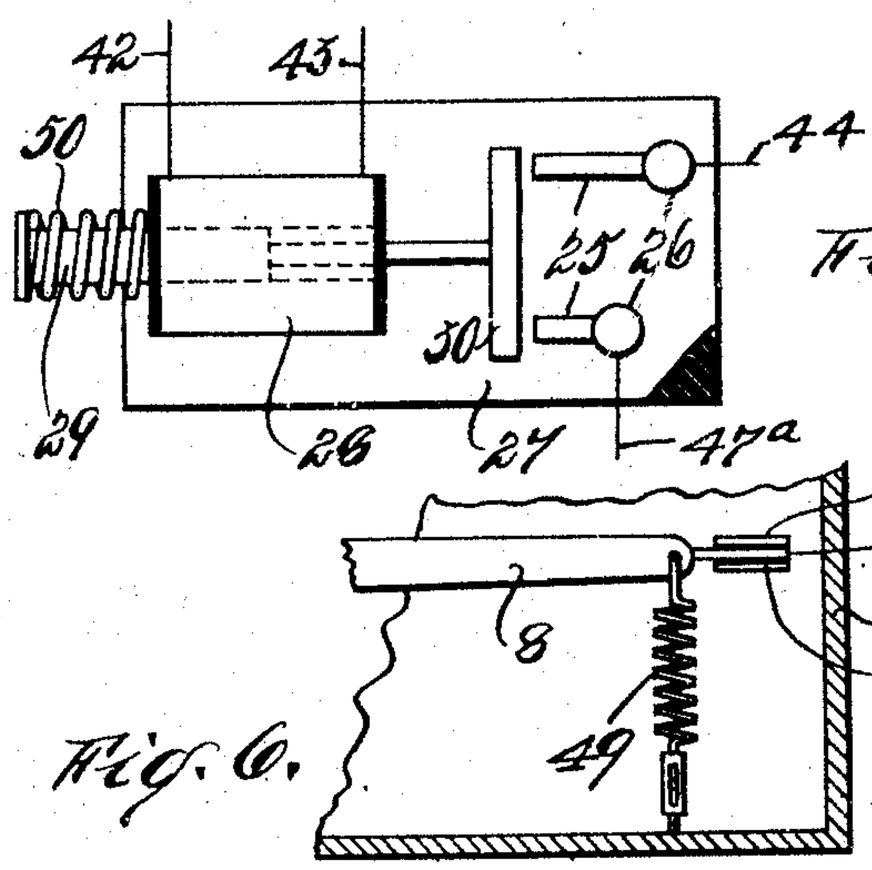

Fig. 5.

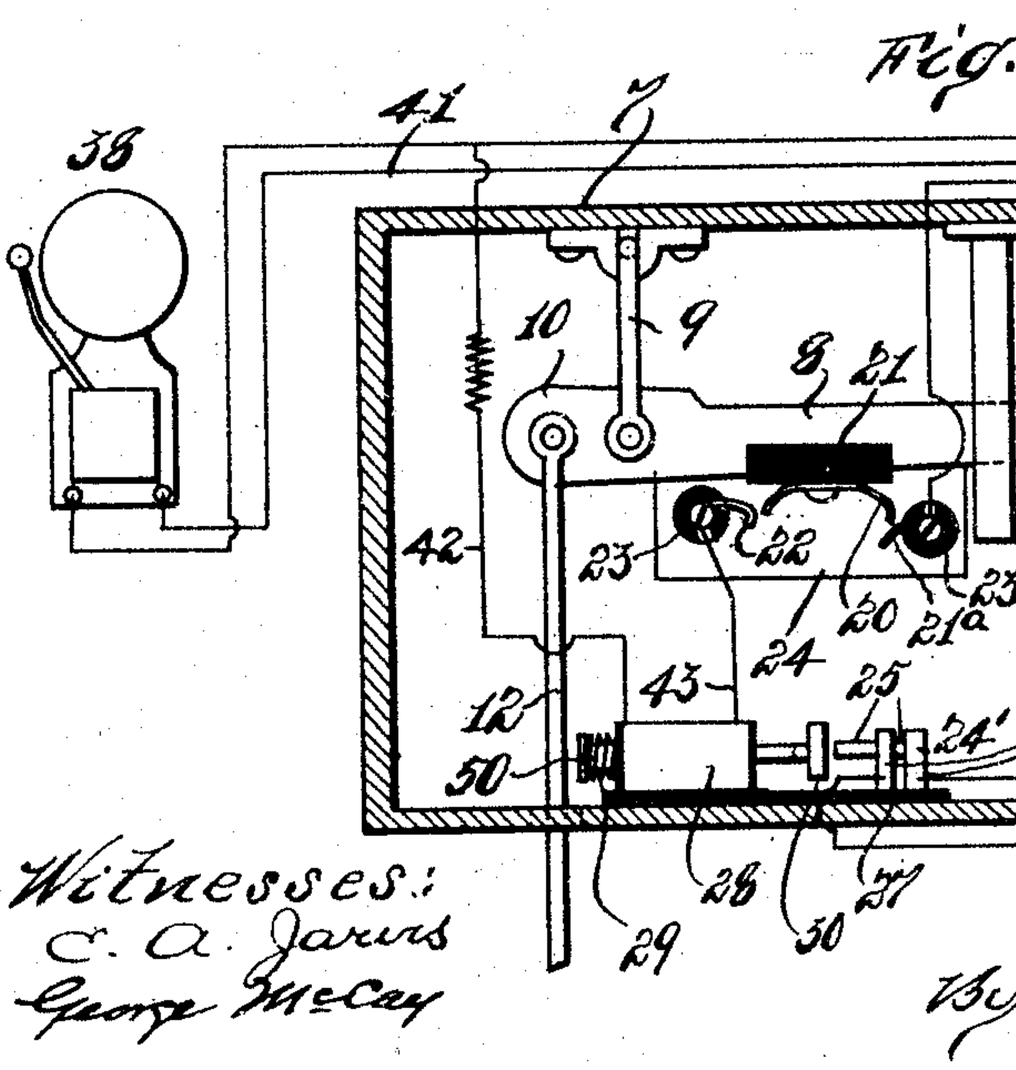

Fig. 6.

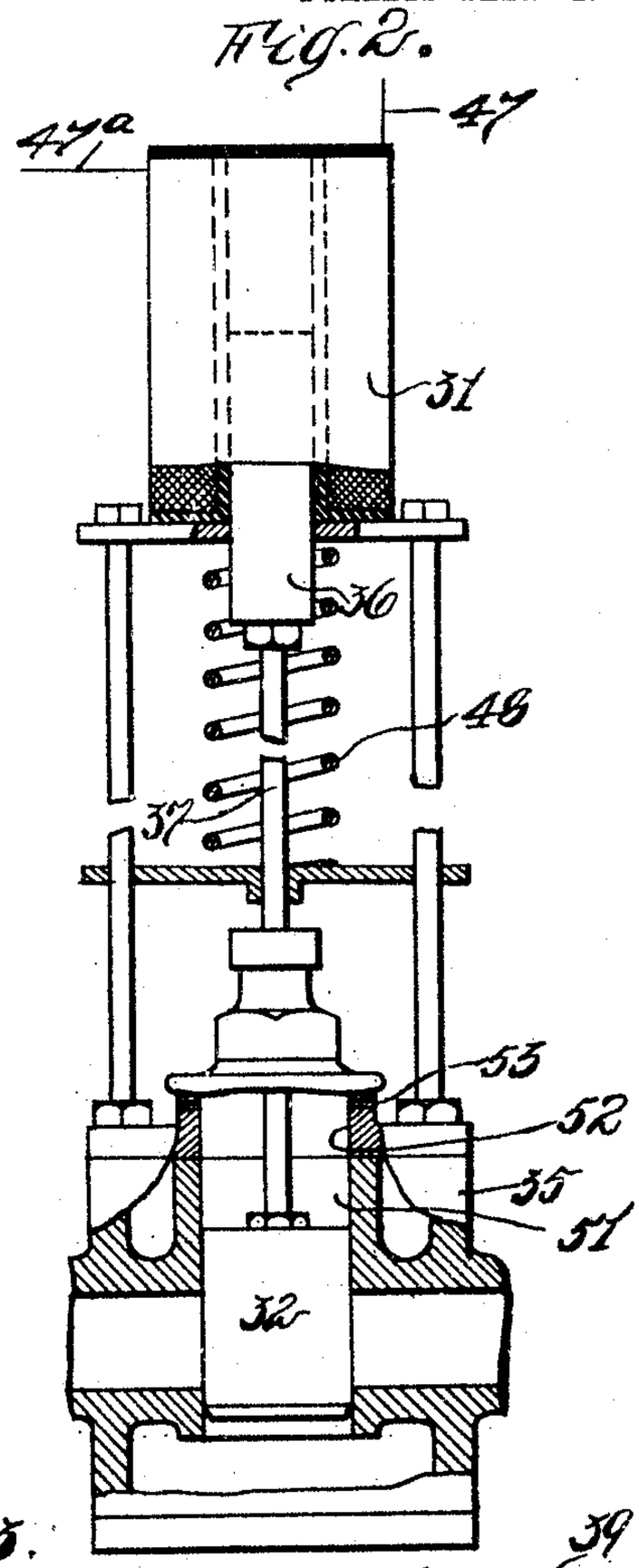

Fig. 2.

Fig. 3.

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AUTOMATIC DEVICE FOR CONTROLLING WATER-SUPPLY.

948,303. Specification of Letters Patent. Patented Feb. 8, 1910.

Application filed July 17, 1908, Serial No. 443,939. Renewed July 3, 1909. Serial No. 505,889.

To all whom it may concern:

Be it known that I, JAMES A. ANDERSON, a citizen of the United States, residing at New York city, Manhattan borough, county and State of New York, have invented certain new and useful Improvements in Automatic Devices for Controlling Water-Supply, of which the following is a clear, full, and exact description.

This invention relates to an electro-mechanical device which is adapted to control the feed, or supply, of water to boilers or other receptacles which contain liquids, the liquid being subject to fluctuation.

My improved device is also adapted for the detection of any defects in the action of the liquid supply, such for instance, as failure to feed, or failure to shut off.

The device is herein illustrated as attached to a boiler, although it may be supplied to any other similar receptacle.

I will now proceed to describe my invention, the special features of which I will finally claim, reference being had to the accompanying drawings, wherein—

Figure 1 illustrates a side view of a boiler having my improved device applied thereto, the chamber of which, as well as one of the tubes which connects the said chamber with the boiler being shown partially in section; Fig. 2 is a vertical sectional view, partly in elevation of the valve which is included in the water supply line, and shows the controlling magnet therefor; Fig. 3 is a sectional face view of the casing which contains the circuit closing devices, the circuits controlled thereby being also shown; Fig. 4 is a top plan sectional view of the right end of the casing and shows the disposition of some of the electrical contacts; Fig. 5 is a top plan view of the circuit closing switch, and magnet therefor, for the valve magnet circuit; and Fig. 6 is a detail fragmentary view, showing a spring counterbalance.

Referring to the drawings, particularly to Fig. 1, 1 indicates the movable chamber which constitutes the controlling element, for the closing of the various circuits, of my improved device. As can be seen in said Fig. 1 the chamber 1 is in this instance shown as a hollow sphere, the said chamber or sphere being connected to the water column 2, as indicated by 3, by flexible tubes 4. The center of the chamber 1 is situated at a height equal to the height of the water in the boiler, consequently the water in the chamber 1, which is indicated by 5 will assume the same height. Water from the boiler will be conveyed to the chamber 1, by means of the lower tube 4; the chamber 1 is provided with a gage glass 6.

At a convenient point above the chamber 1, a casing 7 is placed, and within the casing 7 a beam 8 (see Fig. 3) is pivotally supported, as at 9. One end 10 of the beam 8 is connected with a fitting 11 (see Fig. 1) by means of a link 12, the opposite end of said beam 8, being provided with a weight 13, and a pair of electrical contacts 14 and 15, which are insulated from the projection 16 on the beam 8, as shown. Above the contact 14, contacts 17 are positioned, the said contacts being carried by posts 18, of insulating material as shown in Fig. 4. Below the contact 15, similar contacts 19 are likewise positioned and retained. Intermediate the ends of the beam 8, a contact 20 is placed, the said contact being retained by a block of insulating material 21, as shown. Adjacent the contact 20, other contacts 21ª and 22 are positioned, the said contacts being retained by posts 23, of insulating material, said posts being mounted in this instance upon a block 24 (see Fig. 4).

At a convenient position, within the casing 7, I place a circuit closing device 24′, which in this instance, comprises pins 25, suitably secured to posts 26, the said posts being carried by a block of insulating material 27. Adjacent the circuit closing device 24′, an operating magnet 28 is positioned, the core 29 of which supports a circuit closer 30. The device 24′ controls the circuit for the magnet 31 of the water supply controlling valve 32, (see Fig. 2).

In Fig. 1, the water supply ducts are indicated by 33 and 34, the valve casing 35 which contains the valve 32, being included in the duct 33. As can be seen in Fig. 2, the valve 32 controls the water flow, from the duct 33 to the duct 34, the said valve being actuated by the magnet 31, in which a core 36 is adapted for longitudinal movement, this form of magnet is well known. The core 36 of the magnet 31 is connected to the valve 32, by means of a rod 37.

Another feature of my improved device comprises a tell-tale alarm 38, which in this instance is indicated by an electro magnetic bell. The function of this alarm, which may

be situated at any convenient point within a building, is to notify an attendant when anything happens to the water supply. The alarm 38 is electrically connected to the contacts 17 and 19, (see Fig. 3), and is adapted to give notice when the flow of water ceases by reason of defective supply, or if the water should continue to flow through the failure of the valve 32 to shut off the flow. A source of electrical energy for the circuits for the magnet 31 and alarm 38, is indicated by 39.

One leg of the circuit for the alarm 38 is indicated by 40, which is connected to one pole of the source of energy 39, the other leg of said alarm circuit being indicated by 41. The leg 41 of the alarm circuit includes one of the contacts 17 and 19 (see Fig. 3). The leg 40 of the alarm circuit has connected in parallel therewith one leg 42 of the circuit of the magnet 28. The leg 43 of the circuit for the magnet 28 connects said magnet with the contact 22. The companion contact 21ª, of the contact 22 is connected to one of the posts 26, of the circuit closing device 24, by means of a wire 44; the right hand pair of contacts 17 and 19 are also connected with the wire 44 by the wire 45. The wire 44 is connected to the source of energy 39, by means of a wire 46. A wire 47 connects the valve operating magnet 31 with the opposite pole of the source of energy 39. A wire 47ª connects the magnet 31 with the other post 26.

The device operates as follows: As has been stated, the chamber 1 is so situated that its center, under normal conditions, will be coincident with the level of the water within the boiler. When the water in the boiler is at its predetermined level, the chamber 1 will be half full, and the weight 13 will be heavy enough to counter-balance the weight of the chamber and water therein, whereby the beam 8 will be held substantially in a horizontal position. Should the level of the water in the boiler lower by reason of evaporation or leakage, the level of the water in the chamber 1 will also lower, in this event the weight of the chamber and water will be less than when the water is at its proper level, consequently, the weight 13 will overbalance the weight of the chamber 1 and the water therein thereby causing the beam 8 to drop. As the water in the chamber 1 gradually decreases, the beam 8 will gradually lower until the contact 20 comes in contact with the contacts 21ª and 22, at which time the circuit for the magnet 28 will close, whereby the core 29 will be drawn inwardly, thereby forcing the circuit closer 30 against the contact 25, thus, closing the circuit for the magnet 31. When the magnet 31 is energized, the core 36 will be drawn upwardly thereby pulling the valve 32 upwardly, and allowing the water to flow through the ducts 33 and 34 into the boiler. The water will flow until its level has again reached its proper height, or when the chamber 1 is half full, at which time the beam 8 will go back to its horizontal position thereby opening the circuit for the magnet 31. The valve 32 will then be closed by a spring 48. Should the valve 32 fail to close, the water in the boiler will continue to rise, consequently the water in the chamber 1 will continue to rise also. The additional amount of water now in the chamber 1 will overbalance the weight 13 and throw that end of the beam upwardly, whereby the contact 14 will strike the contact 17 thereby closing the circuit for the alarm 38; the alarm will now ring and the attendant will know that there is something the matter with the water supply. Should the water level in the boiler lower, and the valve 32 fail to open, the said water level will not be restored, due to the failure of the water to flow in, in this event the water level in the boiler will continue to lower, consequently the weight 13 will bring its corresponding end of the beam 8 down until the contact 15 strikes the contacts 19; the circuit for the alarm will now be closed and the attendant will know that there is something wrong with the water supply.

Fig. 6 illustrates a counterbalance for the chamber and contents in the form of a spring 49; the spring counterbalance will be found to be well adapted for marine work, where the movement of a vessel might impair the operation of the weight 13. The core 29 is returned, after the current is cut off, by a spring 50.

It will be of course understood that wherever the term water is used in the foregoing specification and apepnded claim the same is intended to also include liquids other than water.

Referring to Fig. 2, it will be seen that the valve casing 35 is provided with a chamber 51, above the valve 32. That part of the wall 52, above the chamber 51, is provided with openings 53. The chamber 51 acts as a dash-pot for the valve 32, when the said valve is pulled upwardly by the core 36; as the valve 32 rises, the air within the chamber 51 will gradually escape through the openings 53, whereby a cushioning effect is produced. The air cushion within the chamber 51 prevents the valve 32 from being opened suddenly.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

In combination with a receptacle adapted to contain water, a water supply, an electromagnetically controlled valve adapted to control said water supply, an electric circuit for said valve, an electrically controlled circuit-closing device included in said circuit,

a magnet adapted to operate said device, a circuit for said magnet, a normally balanced, pivotally mounted lever, a circuit-closing device carried by said lever adapted to control the circuit for said magnet, a circuit-closing device carried by one end of said lever, contacts adjacent to said circuit-closing device, an electrically controlled telltale alarm in circuit with said contacts, a chamber adapted to contain water, carried by the opposite end of said lever, and means adapted to convey water from said receptacle to said chamber.

Signed at New York city, N. Y., this 10th day of July, 1908.

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Witnesses:
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LEWIS V. HULSE.