

(No Model.)

W. J. KASSLER.

LOW WATER ALARM FOR STEAM BOILERS.

No. 364,940.

Patented June 14, 1887.

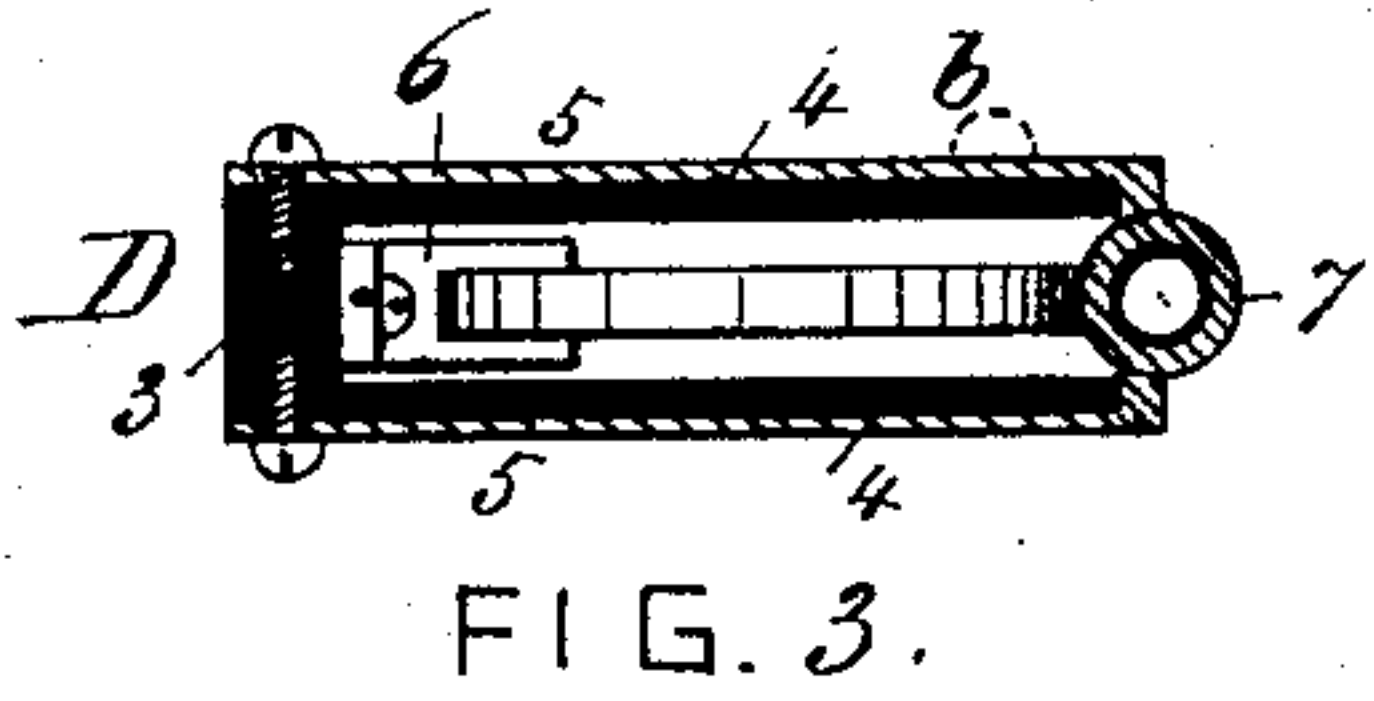
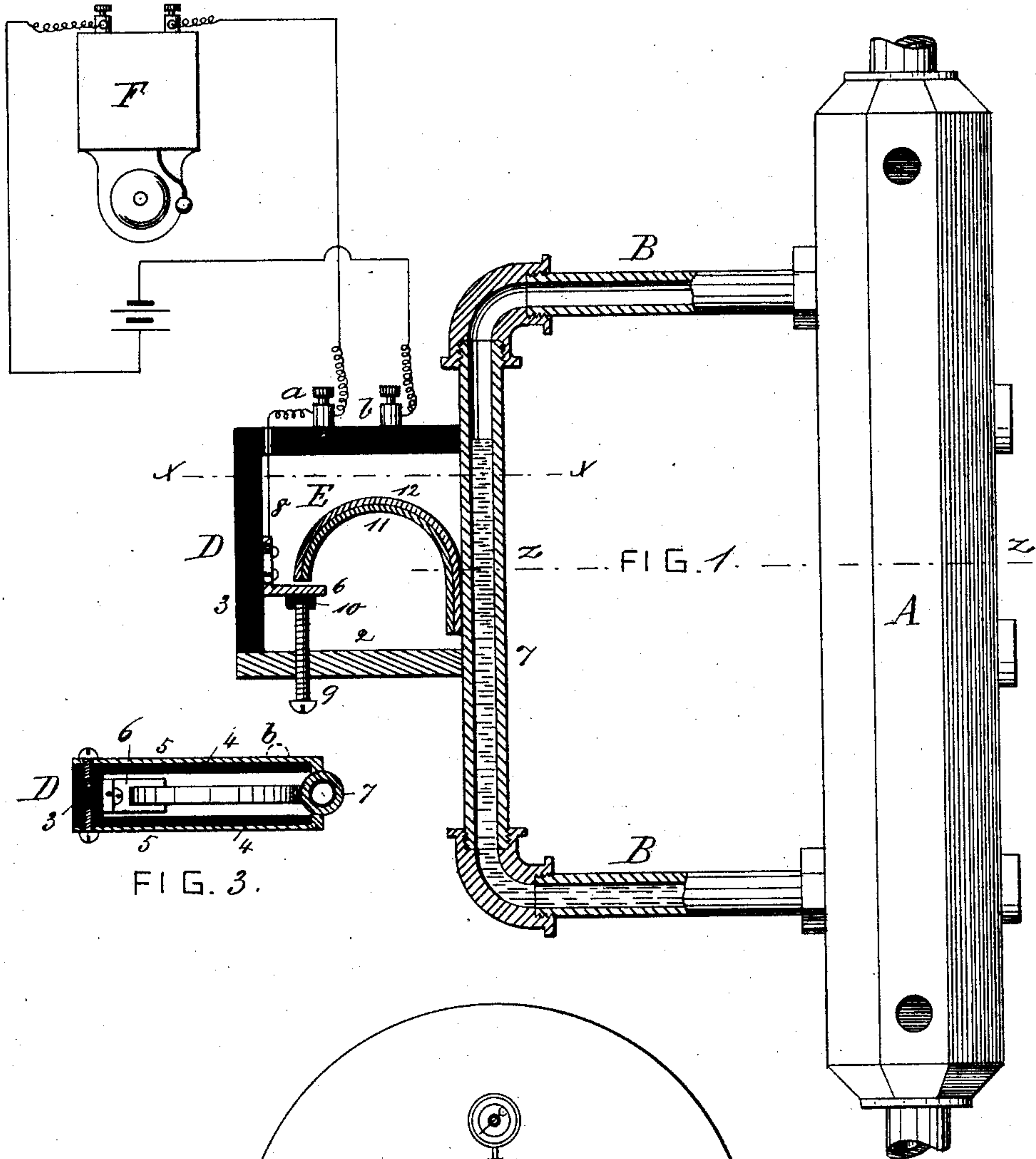
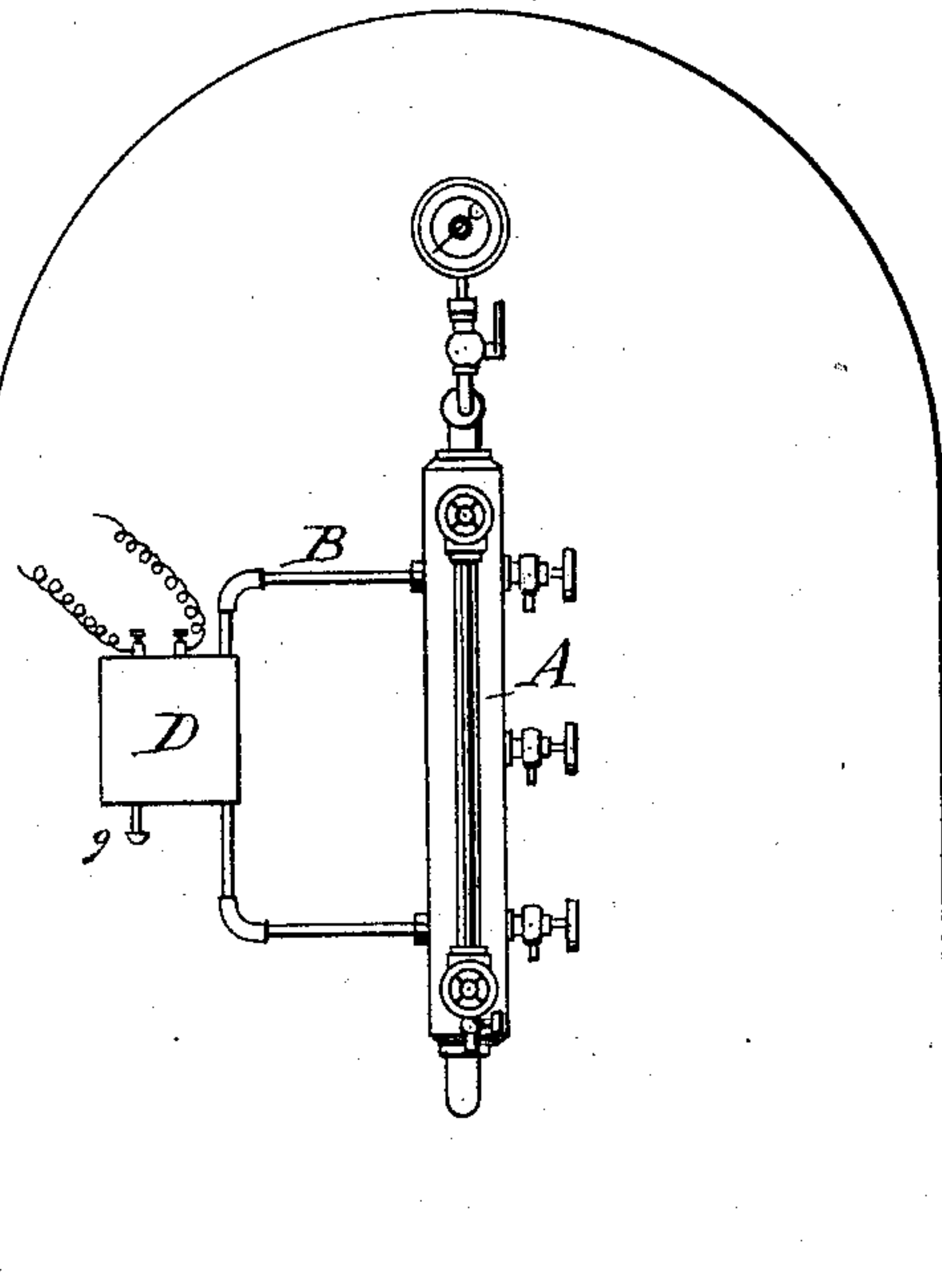


FIG. 2.



WITNESSES:

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WILLIAM J. KASSLER, OF BROOKLYN, NEW YORK.

LOW-WATER ALARM FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 364,940, dated June 14, 1887.

Application filed November 6, 1886. Serial No. 218,223. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. KASSLER, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Thermo-Electric Low-Water Alarm for Steam-Boilers, of which the following is a specification.

This invention relates to means for utilizing the heat from the steam and an electric current for the purpose of giving notice of the condition of the water in steam-boilers; and the object of the invention is, first, to employ the heat from the steam, after the water has sunk below a certain point, for the purpose of closing an electric circuit, and thereby sounding an alarm; second, to apply a low-water alarm to steam-boilers and operate the same without direct contact of the water or steam with the mechanism of the alarm.

In the accompanying drawings, Figure 1 represents a sectional side elevation of my thermo-electric low-water alarm applied to the water-column of a boiler; Fig. 2, an elevation of a boiler, showing a water-column with its attachments, including my low-water alarm; Fig. 3, a horizontal section of the alarm, taken in line *xx* of Fig. 1.

Referring to the drawings, A represents the water-column, which is connected with the boiler in the usual manner and provided with gage-cocks, glass gage, and steam-gage, as shown in Fig. 2. A branch pipe, B, of a U shape, is attached to the water-column on the side opposite the gage-cocks, its lower end connecting with the water-column at a point below the low-water line and its upper end with the steam-space, so that the water stands at the same height in the branch pipe as in the water-column. That part of the alarm which is actuated by the heat is connected with the branch pipe. It is placed in a box or case, D, made of a combination of metal—brass, for example—and a material which is a non-conductor of electricity—as, for example, hard rubber.

The two materials may be put together in the following manner: The bottom 2 of the box or case is made of metal, the front 3 of hard rubber, the sides 4 4 of hard rubber, and an outer casing, 5 5, of metal, the whole being fastened together by screws, so that the bot-

tom shall be insulated from the metal side casing. The case has no back, the upright pipe 7 of branch pipe B being placed between the sides at this point, so as to close the case, the case being connected with the pipe by soldering the metal parts thereto, or in any other suitable manner. Inside the case an adjustable contact-piece, 6, is attached to the hard-rubber front 3 by set-screws, and from this contact-piece a rod, 8, extends through the top of the case and connects with a binding-post, *a*, inserted in the rubber and connected with one pole of a battery. The contact-piece is adjusted by means of a set-screw, 9, passed up through the bottom of the case and insulated from the contact-piece by a rubber cap, 10. Within the case is an expansible metal arched plate, E, having one end fixed by solder or other suitable means to the pipe 7 at about the low-water line *z z* and projecting over but not in contact with the contact-piece 6. The arched plate is preferably composed of two metals, in the form of thin plates soldered together, one plate, 11, being of steel, and the other, 12, of copper, the copper being outside or above the steel, and at its fixed end immediately in contact with pipe 7, the object of this construction being to bend the arch downward by the expansion of the metal. The upper plate being of copper, expands much more quickly than the steel; hence when expansion takes place the arch bends downward and its end comes in contact with contact-piece 6. In this way a very slight change in temperature results in giving enough movement to the arch to carry its end against the contact-piece. The electric circuit is completed by connecting the pipe 7 with the binding-post *b*, which connects with one pole of the battery. In the circuit is placed an electric bell, F. The binding-post *a* is entered into the hard-rubber top, so as to avoid contact with the metal side casing, being thus perfectly insulated; but the binding-post *b* connects with either one or both of the casings 5 5. The circuit will thus be through the metal sides 5, pipe 7, arched plate E, to the contact-piece 6, and thence to the battery.

The operation of the invention is as follows: The contact-piece 6 is adjusted for temperature, and so long as the water in the boiler is above the low-water line, thus covering the part of

tube 7 to which the arch E is attached, the end of the arch is out of contact with piece 6, and there is no current; but when the water sinks so low in the boiler as to uncover and expose to the steam the surface of the pipe 7 immediately opposite the attached end of the arch the greater heat of the steam instantly acts upon the copper plate, expands it, and, the end being thereby thrown against the contact-piece, the circuit is closed, and an alarm sounded by the bell. The bell continues to ring until the water is turned on and rises high enough to cover the surface of pipe 7 opposite the end of the arch, whereupon the metal contracts, and the circuit is broken by the end of the arch separating from the contact-piece.

The operating parts of the alarm, as will be seen from the above description, have no connection with the interior of the boiler; hence the alarm can be applied to any kind of steam-boiler, and as neither the water nor steam comes in contact with the mechanism there is no liability of its becoming injured by rust, incrustation, or other causes, or its operation or delicacy of adjustment interfered with in any way, either by the pressure of steam or chemical or mechanical action of the water. The main purpose, so far as the expansion-arch E is concerned, is to make it sufficiently sensitive to act promptly as soon as the temperature rises by the contact of the steam with the surface of the pipe opposite the fixed end. Therefore it is evident that the shape and position of the arch may be varied, and also the kinds of metal employed in its construction, without departing from my invention.

The apparatus is shown applied to a branch pipe connected with the water-column; but it is obvious that it may be applied directly to the water-column, or directly to the boiler, if preferred.

I claim—

1. A thermo-electric alarm for steam-boilers, consisting of an expansible contact-plate connected at one end with the steam-boiler directly or indirectly and by suitable connections with one pole of a battery, and a contact-piece insulated from the contact-plate and connected with the other pole of the battery, and an electric bell in circuit with the said contact-plate and contact-piece, substantially as described.

2. The combination of the expansible contact-plate connected with the boiler directly or indirectly at the low-water line, a contact-piece, an electric battery the poles of which are connected, respectively, with the expansible plate and the contact-piece, and an electric bell, substantially as specified. 55

3. The combination, with the steam-boiler and the water-column, of the branch pipe D, the expansible plate E, having one end attached to the branch pipe at the low-water line and connected with one pole of an electric battery, and the insulated contact-piece 6, connected with the other pole of the battery, and an electric bell, substantially as specified. 65

4. The combination, with the branch pipe B and suitable electric connections, of the expansible arched plate E, composed of steel and copper, substantially as specified. 70

5. In a low-water alarm, the combination of the expansible arched plate E, the adjustable contact-piece 6, and set-screw 9, provided with an insulating-cap, 10, substantially as specified.

6. The combination, with the expansible arched plate E, contact-piece 6, and the electric connections, of a case or box composed of a metal bottom, non-conducting sides, front, and top, and metal side casing, substantially as specified. 80

7. In low-water alarms for steam-boilers, the combination, with the boiler and water-column, of the branch pipe B, case D, connected by its metal sides and bottom with the branch pipe, the expansible arched plate E, connected with one pole of a battery, the contact-piece 6, connected with the opposite pole of the battery and insulated from the plate E, an electric circuit formed of the contact-piece 6 and the wires which connect it with one pole of the battery and the expansible plate E, pipe 7 of branch pipe B, the metal sides of the case and the wires which connect said sides with the other pole of the battery, and an electric bell placed in said circuit, substantially as specified. 95

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Witnesses:

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