W. C. BAKER.

Electric Boiler-Alarm and Register.

No 165,700. Patented July 20, 1875.

Fig. 2.

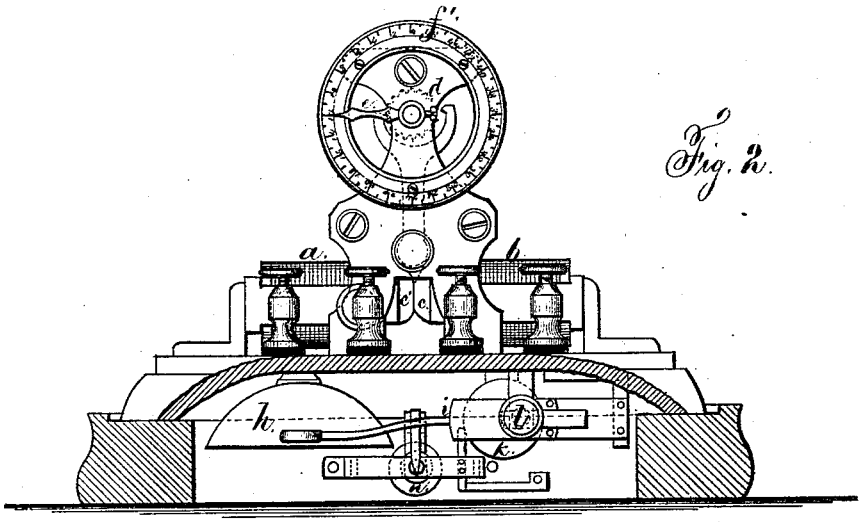
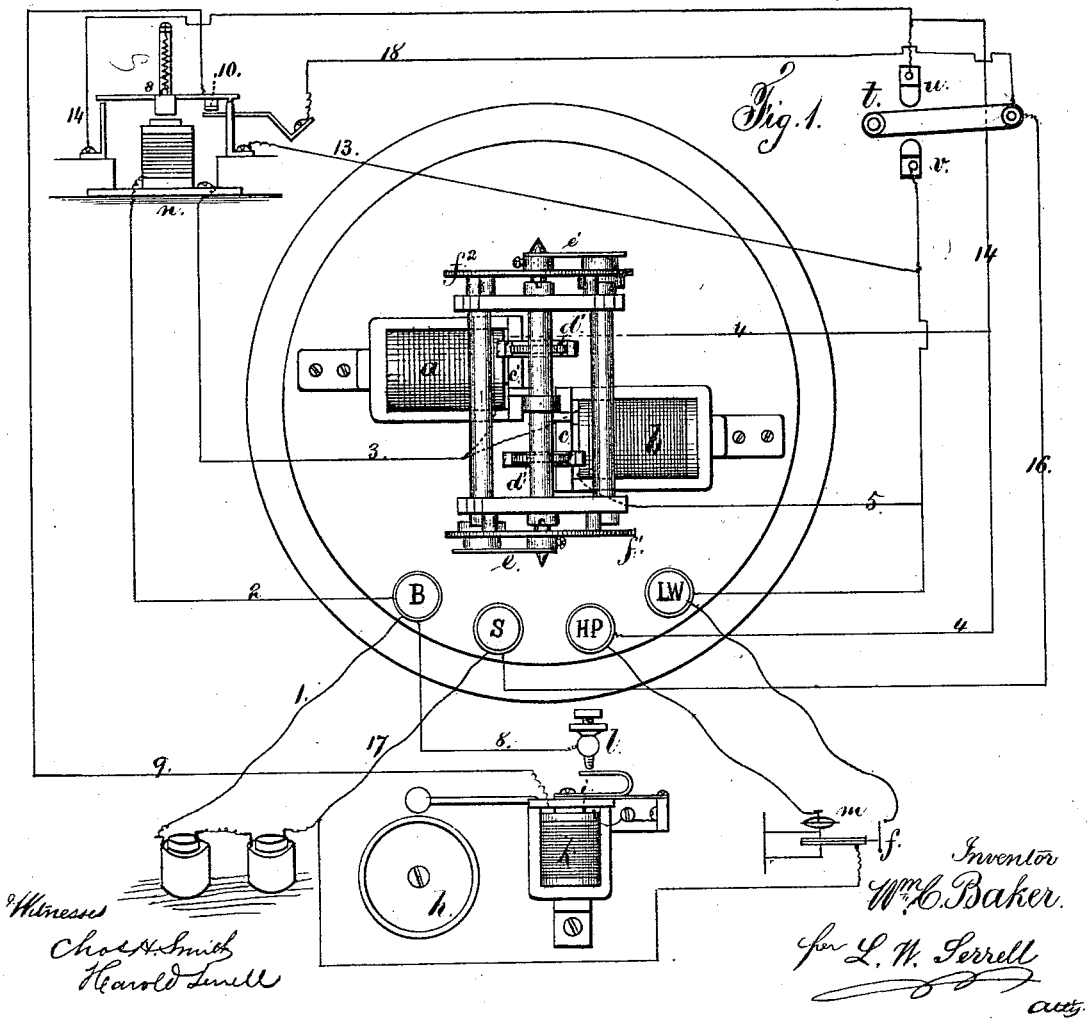


Fig. 1.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM C. BAKER, OF NEW YORK, N. Y.

IMPROVEMENT IN ELECTRIC BOILER ALARMS AND REGISTERS.

Specification forming part of Letters Patent No. **165,700**, dated July 20, 1875; application filed June 23, 1875.

To all whom it may concern:

Be it known that I, WILLIAM C. BAKER, of the city and State of New York, have invented an Improvement in Electric Boiler-Alarms, of which the following is a specification:

In Letters Patent No. 149,907 granted to me a device is set forth for denoting by electricity when the water in the boiler descends below a given level, and also when the pressure exceeds a certain maximum standard.

My present invention is an improvement upon the said invention, and relates to an apparatus that keeps an account or tally of the number of times the water has been too low or the pressure too high, thus enabling the employer or the inspector to ascertain the character of the engineer for faithfulness or negligence.

I make use of a diaphragm to close the circuit of a battery to a magnet when the pressure is too high, as shown in aforesaid patent; also a tube that ordinarily is filled with water, but which, when the water is too low, fills with steam, and the expansion closes a circuit.

My present invention relates to electro-magnets, armatures, and step-by-step movements connected to indicating-hands, and a dial or dials that keep account of the number of occasions when the boiler has been neglected, either as to the pressure or the water-supply, and I arrange the circuits so that when the boiler is neglected the alarm will be rung without moving the hand more than one space for each such neglect, and the ringing of the alarm does not move the hand.

In the drawing, Figure 1 is a plan of the alarm instrument with surrounding diagrams, representing the switch, the bell, and the circuit-changer, which are in the hollow base of the instrument, together with the circuit connections to the battery and boiler alarms. Fig. 2 is an elevation of the dial and section of the base.

The electro-magnet *a* is energized by the excess of boiler-pressure, closing an electric circuit by a diaphragm at *m*, as in aforesaid patent. The electro-magnet *b* is energized by the expansion of a tube closing an electric circuit at *f* when the water is below a given point, as in aforesaid patent. When the electro-magnet *b* is energized, the armature *c* is attracted, and the step-by-step pallets and ratchet-wheel *d* are moved to turn the hand *e* one space on the dial f^1 to keep count or tally, as aforesaid, of the number of times that the water has been too low. When the electro-magnet *a* is energized the armature *c'* is actuated to move the pallets and wheel *d'*, and turn the hand *e'* of the dial f^2. Instead of two separate dials, there may be but one dial with the two hands, one of which is upon a tubular arbor around the arbor of the other hand. The bell *h* is rung by an electro-magnet, *k*, spring-armature *i*, and hammer, and the circuit passes through the adjusting-screw *l*, so that the movement of the armature breaks the circuit to the magnet *k*, and allows the hammer to fly back, as well known in electric alarms. If this was placed in the main circuit the magnets *a* or *b* would respond, and the hands be moved falsely. I, therefore, arrange the circuits of the instruments, as seen in Fig. 1. The wire 1 from the battery leads to B, thence, by wire 2, through the magnet *n* and wire 3, to magnets *a b*, and here the current will pass through *a* or *b*, and, by the wire 4 or 5, to the binders L W or H P, according to whether the circuit has been closed by the low-water apparatus or the high-pressure apparatus. This circuit will remain closed so long as the water is low or the pressure high, and after this defect has been rectified the circuit will be broken, and the magnets *a* or *b* and *n* will demagnetize and the parts assume their normal position; but so long as the circuit through *n* remains closed a branch circuit through the armature *s* of *n* will also remain closed to the alarm-bell, which branch circuit passes from B, by wire 8, through bell-magnet *k*, wire 9, to 10, and through armature *s*, wire 13, to the low-water binding-screw L W, if the circuit has been closed by the low-water detector; but if the circuit has been closed through H P, then the branch through the bell-alarm is closed by *s*, and 14 to 4 and H P. The switch *t* should be upon the instrument or contiguous, so that it can be ascertained whether the circuits and battery and connections are in order. The normal position of the switch is central between the studs *u* and *v*. If the switch is turned to *u* the circuit will be closed

from battery by 1 B 2 *n* 3 *a* 4 14 *u t* 16, binder *s*, and wire 17 to battery. The bell-circuit will be closed by *n*, through 8, *k*, 9, *s*, 18 to 16, and *s*, and hence the bell will indicate that the circuits and battery are in order. If the switch is closed to *v*, the circuit will pass from B, by 2 *n* 3 *b* 5 *v t* 16, to *s* 17 and battery, and the branch to the bell-magnet *k* will be closed by *s*, via 8, *k*, 9, 10, 18, 16, *s*, and 17, to battery. It will generally be preferable to place the magnet *n* and automatic alarm-bell *h k* in the base of the instrument, as seen in Fig. 2; but they may be upon the same base, or form separate instruments, if desired.

The apparatus may be arranged to operate by the circuits remaining closed in a normal position and broken by the excess of pressure, or by the fall of the water level; but this will increase the expense of the battery.

I claim as my invention—

1. The combination, with a low water or pressure alarm and an electric circuit-closing apparatus, of an electro-magnet, step-by-step movement, and dial, to indicate the number of times the boiler has been neglected, substantially as set forth.

2. The combination, with a boiler-alarm and electric circuits, substantially as specified, of a branch circuit, electro-magnet, alarm-bell, and automatic circuit-breaker, operated by the hammer, substantially as and for the purposes set forth.

Dated June 22d, 1875.

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Witnesses:
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