C. HEISLER.

Electrical Water-Gages, Alarms, and Registers.

No. 144,540. Patented Nov. 11, 1873.

Fig. 1.

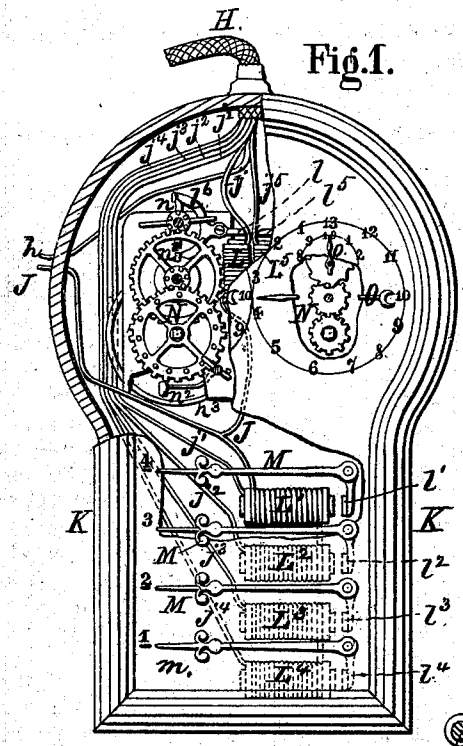
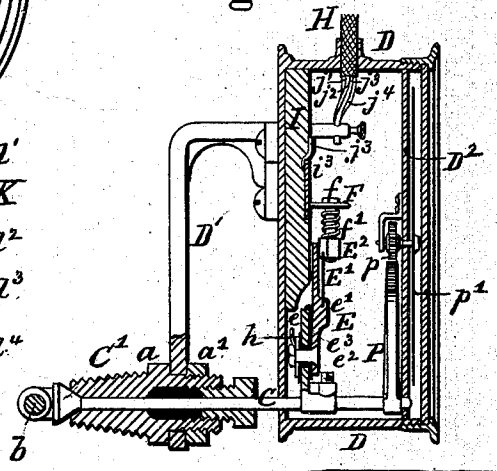
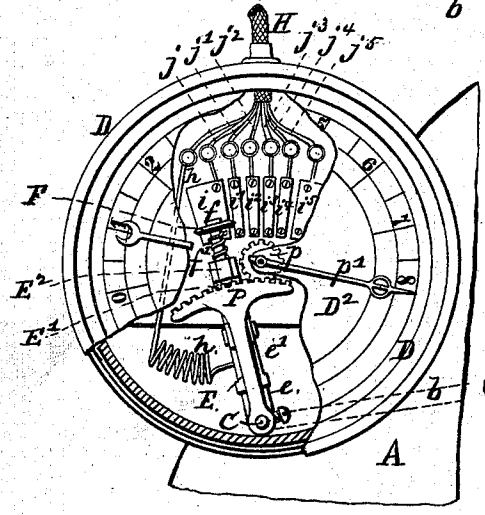
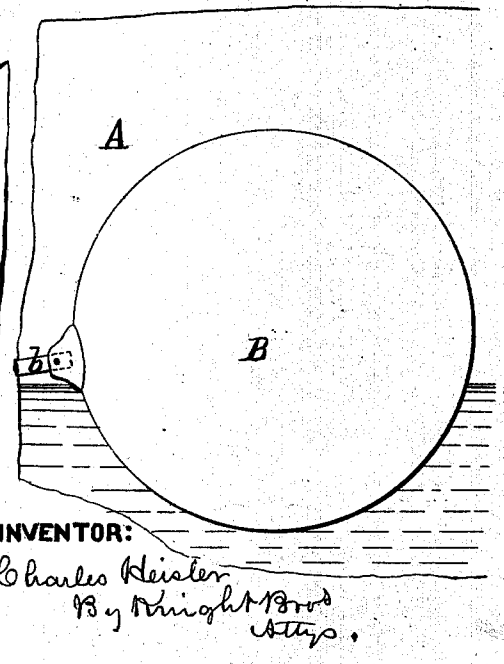


Fig. 2.







ATTEST:

Robert Burns.

Walter Allen

INVENTOR:

Charles Heisler

By Knight Bros

Attys.

UNITED STATES PATENT OFFICE.

CHARLES HEISLER, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN ELECTRICAL WATER-GAGES, ALARMS, AND REGISTERS.

Specification forming part of Letters Patent No. **144,540**, dated November 11, 1873; application filed June 24, 1873.

To all whom it may concern:

Be it known that I, CHARLES HEISLER, of the city and county of St. Louis and State of Missouri, have invented certain Improvements in Electro-Magnetic High and Low Water Indicator, Alarm, and Recorder, of which the following is a specification:

This invention consists in providing the arm of a float arranged inside the boiler with a stem passing through a stuffing-box in the front end of the boiler. Said stem carries, within a suitable case, an oscillating arm, properly insulated, and connected to one pole of the battery. The outer end of said arm carries a small metallic roller, which moves over a series of insulated circuit-breaking plates, and the oscillation of the lever, caused by the rise and fall of the water in the boiler, makes and breaks the electric circuit with said metallic plates, which are connected by separate wires to electro-magnets arranged in a proper case, which may be placed in any part of the building desired. The electro-magnets of the two outer plates, which indicate, respectively, high and low water, operate (when the circuit is open to them) their armatures to disengage a catch or detent of clock-work gearing, and allow the same to move, and its movement ring an alarm-bell, and at the same time record, by index-hands moved by the alarm-gearing, the length of time the water has been allowed to remain too high or low, as the case may be. The electro-magnets of the other circuit-breaking plates, of which there may be any required number, operate index-hands which are secured to the pivoted armatures of the said electro-magnets. The said hands are arranged in front of a suitably-numbered dial-plate, so that when the circuit is complete to any of the electro-magnets the index-hand of said electro-magnet will be raised above its number on the dial, so as to indicate the stage of water, and when the circuit is broken the hand will drop back to its number, and, by its weight, carry the armature away from its electro-magnet. This invention also consists in providing the pivot-stem which is secured to and operated by the float with a segmental rack, which operates a small pinion, the shaft of which carries an index-hand, which moves over the face of a proper dial-plate to indicate the height of water in the boiler. Said stem is provided with a tapering boss, which fits into the tapering end of the packing-box of said stem, to assist in forming a steam-tight joint.

Figure 1 is a front view of my improved device with parts removed. Fig. 2 is a transverse section of the case containing the circuit-breaking mechanism and the float attachment. Parts of the cases are broken away in both figures to show the inside.

A is the boiler, in which is arranged the float B, the arm *b* of which is connected to the stem C, which passes through the stuffing-box *a* in front of the boiler. The stem C has a tapering boss or collar, C′, which fits into the tapering inner end of the stuffing-box *a*. D is a case, supported in position by its bracket extension D^1, which passes over the stuffing-box *a*, and is secured in place by the nut *a*′. The stem C passes through the case D near its edge, so as to allow the gage to be used in confined places—*i. e.*, in boilers having a large breeching in front, which prevents the use of a gage having the stem passing centrally through it, except by placing said gage outside of the breeching, which would be inadmissible, or at least objectionable. E is an oscillating arm, secured to the stem C. Said arm consists of the parts *e* e^1, secured together by bolt e^2. The part *e* is insulated from that of e^1 by a non-conduction piece, e^3, arranged between the parts. The part e^1 has secured to it a spring, E^1, to which is secured the lug E^2, carrying the shaft of the roller F. The roller F is held against the collar *f* of the shaft by the spring *f*′, the purpose of the springs E^1 and *f*′ being to keep the bearings clean and in good conducting order, and at the same time take up any wear of the parts. The part e^1 of the arm E is connected to one pole of the battery through an insulated wire, *h*, passing through the cable H into the indicator-case K, from which it passes to one pole of the battery. This course of the wire *h* through the cable H is not a matter of necessity, as it might pass directly to the battery. I is a wooden or other non-conducting base, to which are secured a number of metallic plates, *i* i^1 i^2 i^3 i^4 i^5, which are insulated from each other, and each of which has separate connection,

to separate electro-magnets L L^1 L^2 L^3 L^4 L^5 by wires j j^1 j^2 j^3 j^4 j^5 in the indicator-case; and these magnets all communicate at the other end of the coils by a common wire, J, to the opposite pole of the battery to that in communication with the wire h, so that when the roller F is in communication with either of the plates i i^1, &c., the electro-magnet L L^1, &c., (in the case K,) to which said plate is connected, is acted upon, and its armature drawn to said magnet. In case of the plate i, wire j, and magnet L, to set in motion the high-water alarm, and with those, i^1, j^1, and L^1, to raise that finger, M, pointing to number 4 to indicate a height of water almost up to the alarm point. The armatures l^1 l^2, &c., of the magnets L^1 L^2, &c., are pivoted, and carry the index-hands M, and when either of them is operated by its electro-magnet it is lifted up from its respective number on the dial-plate m. The armatures l and l^5 of the magnets L and L^5 are connected to the pivoted detents l^6, which engage stops n n^1 of the alarm-clock movements N, so that when the armature is attracted to the magnet the clock-work is disengaged and moves by means of a spring or weight to operate the striker n^2 of the bell n^3. O o are two index-hands for recording the time the water has been allowed to remain either too high or too low, the said hands being moved by the clock-work N. Each electro-magnet L and L^5 has its separate clock-work N, so as to act independently, the one, L, indicating the water-level to be too high, and the other, L^5, indicating it to be too low. The case K, containing the "indicating, recording, and alarming devices," may be placed in any part of the building, and the different wires may be formed into a cable, H, as shown, or may be separate.

P is a segmental rack, secured to the stem C. Said rack operates a pinion, p, arranged in proper bearings at the center of the dial-plate D^2 of the case D. The shaft of said pinion p carries an index-hand, p', which indicates on the dial-plate D^2 the stage of water in the boiler. This case D is, of course, in the engine-room, and its indications are read by the engineer.

The operation of the apparatus is as follows: The float B is sustained at the surface of the water in the boiler A, and, supposing it to be in the position shown, (see Fig. 2,) the level of the water is too high, and the high-water alarm is sounded by the following means: The conducting-wire h, extending from one pole of the battery, is in communication with the part e^1 of the arm E, and consequently the electric current passes, through springs E^1 and f', roller F, plate i, wire j, helix of magnet L, and wire J, to the opposite pole of the battery. This draws down the armature l and releases the detent, which allows the alarm clock-work N to run, and the time which it continues to run is registered by the hands O o. As soon as the water is reduced to the proper level, the arm E is carried over, and the roller F brought in contact with the plate i^1, and then the current is established through the wires j^1, magnet L^1, and wire J, as before, and the armature l^1 raises the hand M of Fig. 4, as the said armature is attracted by the magnet L^1. The low-water alarm is arranged in a similar manner to the high-water alarm, and the current passes through plate i^5, wire j^5, magnet L^5, and wire J. So the level of the water within certain limits is indicated by the hands of figures 1, 2, 3, 4, and the extremes by the alarms.

I claim—

1. The float B, operating a circuit-breaking device, substantially as herein shown, in combination with a recording device, to indicate the length of time the water has been at its high or low stage, as set forth.

2. The combination and arrangement of the float B, arm b, stem C, oscillating arm E, roller F, circuit-breaking plates i^1 i^2 i^3 i^4, wires J h j^1 j^2 j^3 j^4, arranged in the case D, with the electro-magnets L^1 L^2 L^3 L^4, armatures l^1 l^2 l^3 l^4, index-hands M, and dial-plate m, arranged in case E, as and for the purpose set forth.

3. The combination and arrangement of the float B, arm b, stem C, oscillating arm E, roller F, circuit-breaking plates i i^5, and wire J h j j^5, with electro-magnets L L^5, armatures l l^5, pivoted detents l^6, stops n n^1, clock-work N, striker n^2, bell n^3, and index-hands O o, as and for the purpose set forth.

4. The oscillating arm E e e^1, bolt e^2, non-conductor piece e^3, spring E^1, lug E^2, roller F, collar f, and spring f', in combination with the stem C, arm b, float B, and circuit-breaking plates i i^1 i^2, &c., connected to suitable indicating, alarm, and recording devices, as and for the purpose set forth.

CHARLES HEISLER.

Witnesses:
SAML. KNIGHT,
ROBERT BURNS.