(No Model.) 2 Sheets—Sheet 1.

J. RICHTER.

HIGH AND LOW STEAM AND WATER ALARM.

No. 265,870. Patented Oct. 10, 1882.

Fig. 1.

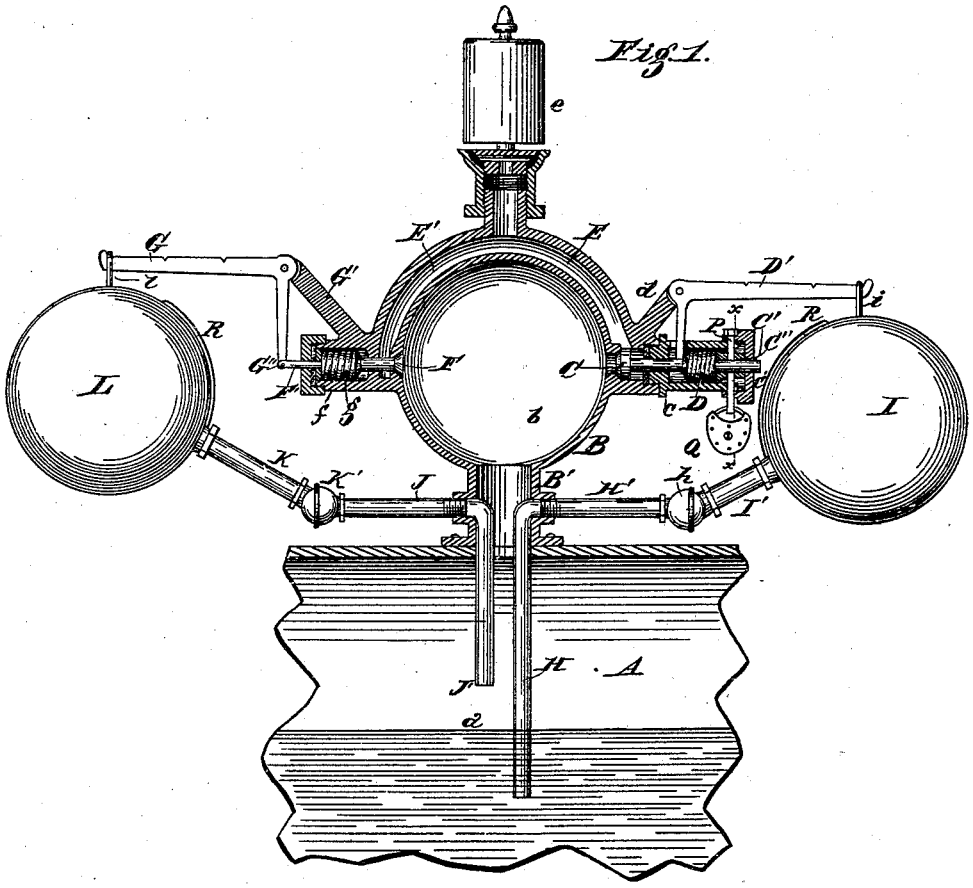


Fig. 4.

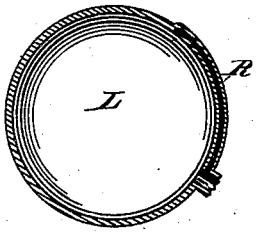
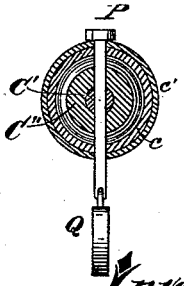


Fig. 5.



Witnesses,
Jno. E. Wilde.
Adolph Schuchowsky.

Inventor,
Joseph Richter,
by Wood & Boyd
his Attorneys &c.

(No Model.) 2 Sheets—Sheet 2.

J. RICHTER.

HIGH AND LOW STEAM AND WATER ALARM.

No. 265,870. Patented Oct. 10, 1882.

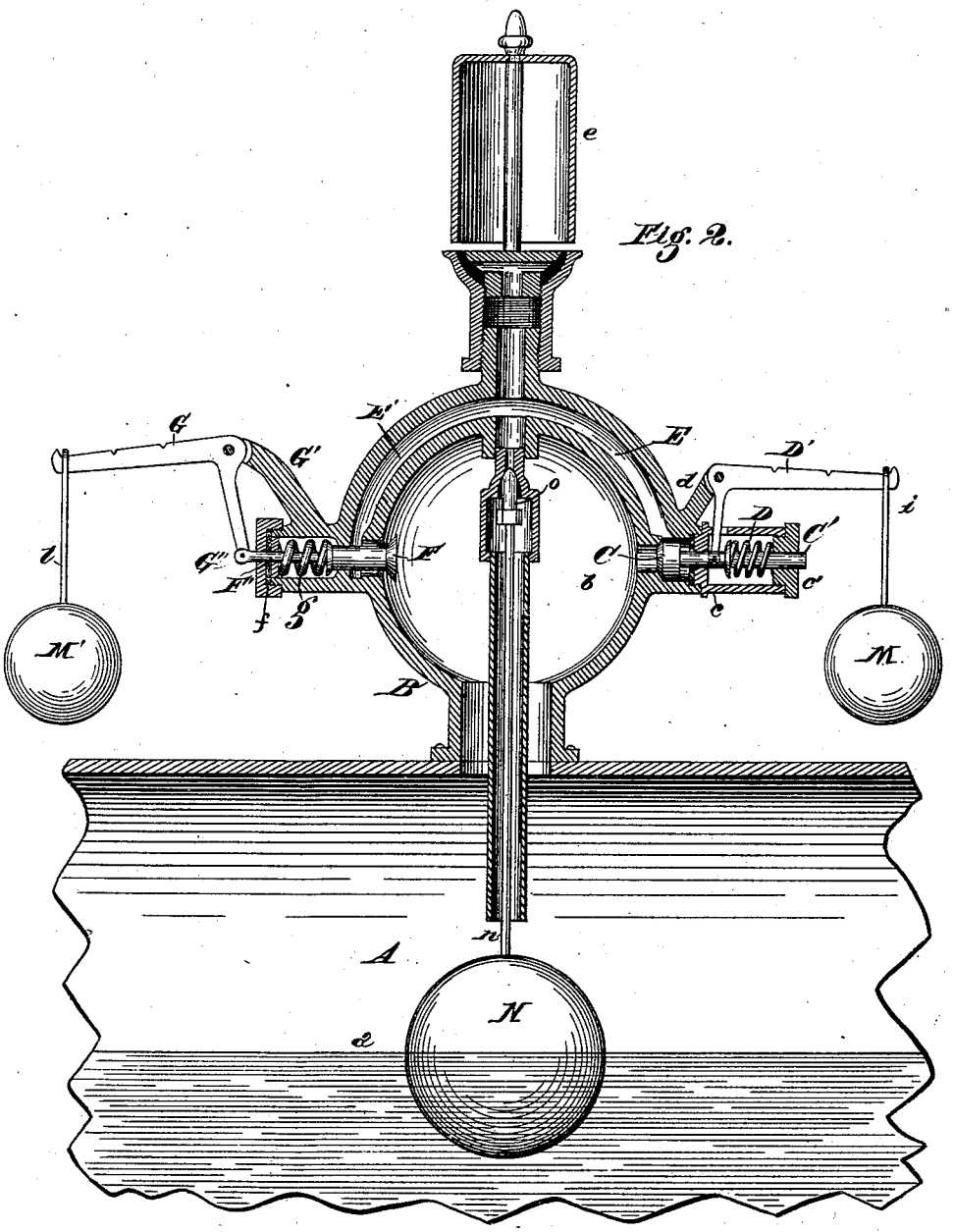
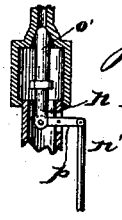


Fig. 2.

Fig. 3.



Attest,
Jno. E. Wiles.
Adolph Glichowsky.

Inventor;
Joseph Richter,
by Wood & Boyd
his Attorneys &c.

UNITED STATES PATENT OFFICE.

JOSEPH RICHTER, OF CINCINNATI, OHIO.

HIGH AND LOW STEAM AND WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 265,870, dated October 10, 1882.

Application filed July 31, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH RICHTER, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in High and Low Steam and Water Alarms, of which the following is a specification.

My invention relates to a high and low steam indicator, which is also adapted to be used as a high and low water indicator for steam-boilers.

The various features of my invention will be fully explained in the description of the accompanying drawings, in which—

Figure 1 is an elevation partly in section, showing my invention applied to an ordinary boiler. Fig. 2 is a modification of the mode of operating the valves of the indicators. Fig. 3 is a broken section, showing the mode of suspending a high-water float in the device shown in Fig. 2. Fig. 4 is a central cross-section of one of the hollow weights, showing the hollow rib formed thereon and the passage through which steam passes to expel the water therein at the proper time. Fig. 5 is a vertical cross-section of the locking device on line *x x*, Fig. 1.

A represents the ordinary boiler; B, the indicator, mounted upon and communicating with the interior of boiler A; C, a combined high-steam and low-water valve. It is provided with valve-stem C′, *c* representing a stuffing-box for valve-stem C′, journaling therein; and *c′*, a journal-cap on end of box *c*.

D represents a retractile spring for assisting in holding the valve to its seat when the valve is adjusted to seat against the required boiler-pressure.

D′ is a bell crank lever pivoted to bracket-arm *d*, one end of which passes through a slot in the shell of stuffing-box *c* and connects with the valve-stem C′.

E represents a passage leading from the port of valve *c* to a scape or whistle, *e*. E′ is a similar passage on opposite side of the indicator, connecting with port of low-steam and high-water valve F.

F′ is a valve-stem journaling in stuffing-box *f* at one end and in the shell *f′* of the indicator B.

g represents a retractile spring wound up-on the stem of valve F to assist in holding it to its seat.

G is a bell-crank lever pivoted to and supported upon arm G′ on the indicator-shell B, and connected at one end to the valve-stem F.

Fig. 1 represents the preferred form of operating both sets of indicator-valves, which is as follows:

H H′ represent an elbow-pipe tapping through neck B′ of indicator B, the lower end of which pipe terminates below the desired water-line *a* in boiler A.

h represents a jointed union pipe-coupling on outer end of pipe H H′.

I is a hollow weight provided with pipe-stem I′, the outer end of which assists in forming the union-joint *h*. *i* is a staple or hook for suspending the hollow weight I upon lever D′.

J J′ represent an elbow-pipe communicating with the interior of the boiler through neck B′ of indicator B.

L is a hollow weight, provided with pipe-stem K and union-coupling K′ for connecting the weight L with pipe J J′; *l*, a hook for suspending weight L upon lever G.

R represents a hollow segmental rib formed on the outside of hollow balls I and L, the passage or opening *r* through which connects with the steam from the boiler, which assists in driving the water out of said balls at the proper time for sounding the alarm.

Valve C is operated as follows: The steam-pressure in the boiler will force water, whenever it is above the lower end of pipe H, up through H H′ I′ into hollow weight I, thereby holding lever D′ down and valve C to its seat. Valve C is, however, adjusted by means of screw-cap C′, follower C″, and spring D, so as to resist any given degree of steam-pressure exerted upon the inner face of valve C through chamber *b*. Any increase of steam-pressure above this point forces valve C from its seat and opens passage E, thus sounding the alarm-whistle *e*. Whenever water in the boiler descends below the mouth of the pipe H the water in hollow weight I will run back into the boiler, thus relieving the weight on lever D, causing valve C to move under the pressure, as before described. By this means the same valve operates under steam-pressure

to indicate both high steam and low water whenever either or both conditions exist.

Valve F operates as follows: It is adjusted, by means of spring *g* and screw-cap *f*, to open or move inward under less than any given amount of steam-boiler pressure—say forty pounds to the square inch. When the steam-pressure is less than that to which the valve is adjusted the weight and spring will force valve F from its seat and allow the steam to escape or sound the alarm *e*. The weight L, acting on lever G, assists spring *g* to hold valve F open. Whenever the water in boiler A rises above the mouth of the pipe J J′ the steam-pressure will force the water up into weight L, increasing the weight on lever G and causing valve F to open, and allowing steam to escape through passage E′. The engineer will determine by the steam-gage and position of weights I and L the exact condition of the water and steam in the boiler at all times.

In the modification shown in Fig. 2 the same arrangement of indicator-shell, valves, ports, valve-stems, and adjustments, scale-beams, or levers is shown as in Fig. 1; but they are arranged to operate only as high and low steam indicators.

The ordinary high and low water indicator made of floats and steam-valves operated upon the inside of the boiler may be used, if desired, in connection with my improved valves F and C, N representing the ordinary low-water float, *u* the stem, and *d* the valve for preventing the escape of steam when float N is supported by the required level of water.

o u, Fig. 3, represent a valve and stem; *p*, a pivoted arm connecting stem *u* and float-rod *u′* for reversing the operation of valve *r* and sounding the alarm for high water instead of low water.

P represents a lock-pin passing through slots in parts *c* C′ to prevent the change of adjustment.

Q is a padlock for securing the same to prevent the unauthorized moving of the same.

It will be seen that but one opening in the boiler is necessary for the attachment and operation of the combined devices herein set forth, and which forms an important feature of my invention. Supply-steam for the purpose desired can also be taken from the same opening by attaching the valve and pipe connections to the shell of the indicator.

I claim—

1. The high and low steam indicator consisting of chamber *b*, adjustable weighted spring-valves C and F, and escape-passage E E′, substantially as herein set forth.

2. The combination of the indicator B, having an escape-passage, E, and a single point of communication with the boiler, with the stuffing-box *c*, projecting from the indicator, the valve C, seated in one side of the indicator, the spring-impelled valve-stem C′, extending through the stuffing-box, and the weighted bell-crank lever D′, pivoted at its angle to a bracket on the indicator, and having one end projecting through the stuffing-box and connected with the valve-stem, substantially as described.

3. The combination of the indicator B, having an escape-passage, E′, and a single point of communication with the boiler, with the stuffing-box *f*, projecting from the indicator, the valve F, seated in one side of the indicator, the valve-stem F′, projecting through the stuffing-box, and the weighted bell-crank lever G, pivoted at its angle to a bracket on the indicator, and having an end connected with the valve-stem, substantially as described.

4. A combined high-steam and low-water indicator, consisting essentially of the adjustable spring-valve C, lever D′, and hollow weight I, with jointed pipe-connection H H′ *h*, substantially as herein set forth.

5. A combined low-steam and high-water indicator, consisting essentially of the adjustable spring-valve F, lever G, and hollow and jointed pipe-connection K K′ J J′, substantially as herein set forth.

6. A combined high and low steam indicator, consisting of hollow chamber *b*, adjustable spring-valves C F, ports or passages E E′, and weighted levers D′ G, connected respectively to the valve-stems, substantially as herein set forth.

7. A combined high and low steam and high and low water indicator, composed of chamber *b*, adjustable valves C F, levers D′ G, and hollow weights I L, with jointed pipe-connections, and pipes communicating with the interior of the boiler by but a single opening made in the shell thereof, substantially as herein set forth.

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

JOSEPH RICHTER. [L. S.]

Witnesses:
JNO. E. JONES,
A. GLUCHOWSKY.