

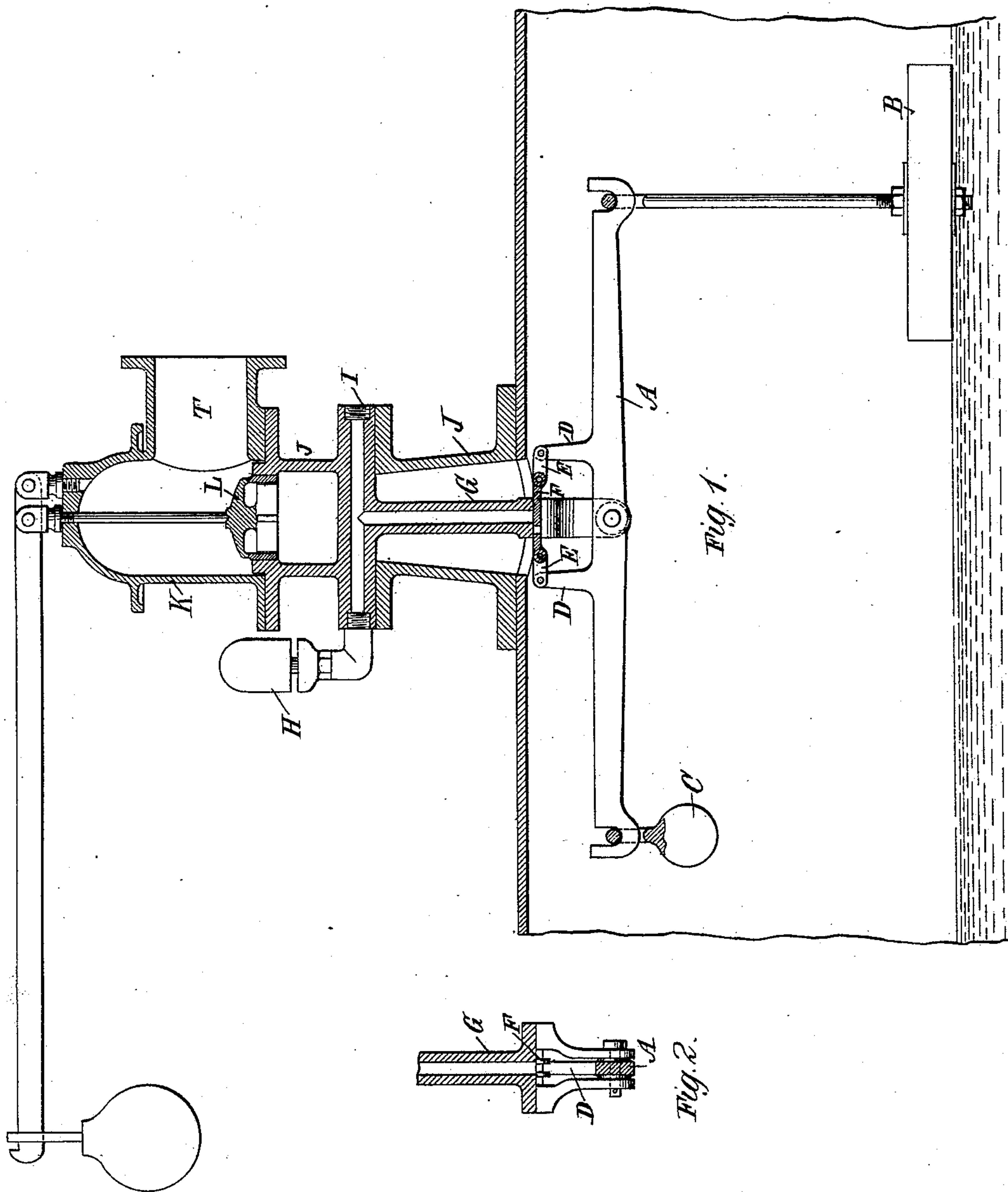
(No Model.)

2 Sheets—Sheet 1.

G. SPENCER.
SAFETY VALVE.

No. 424,031.

Patented Mar. 25, 1890.



Witnesses.

hA. Clark

Jos. C. Ringwald, Jr.

Inventor.

George Spencer.

By Whittney & Wright,
Attys.

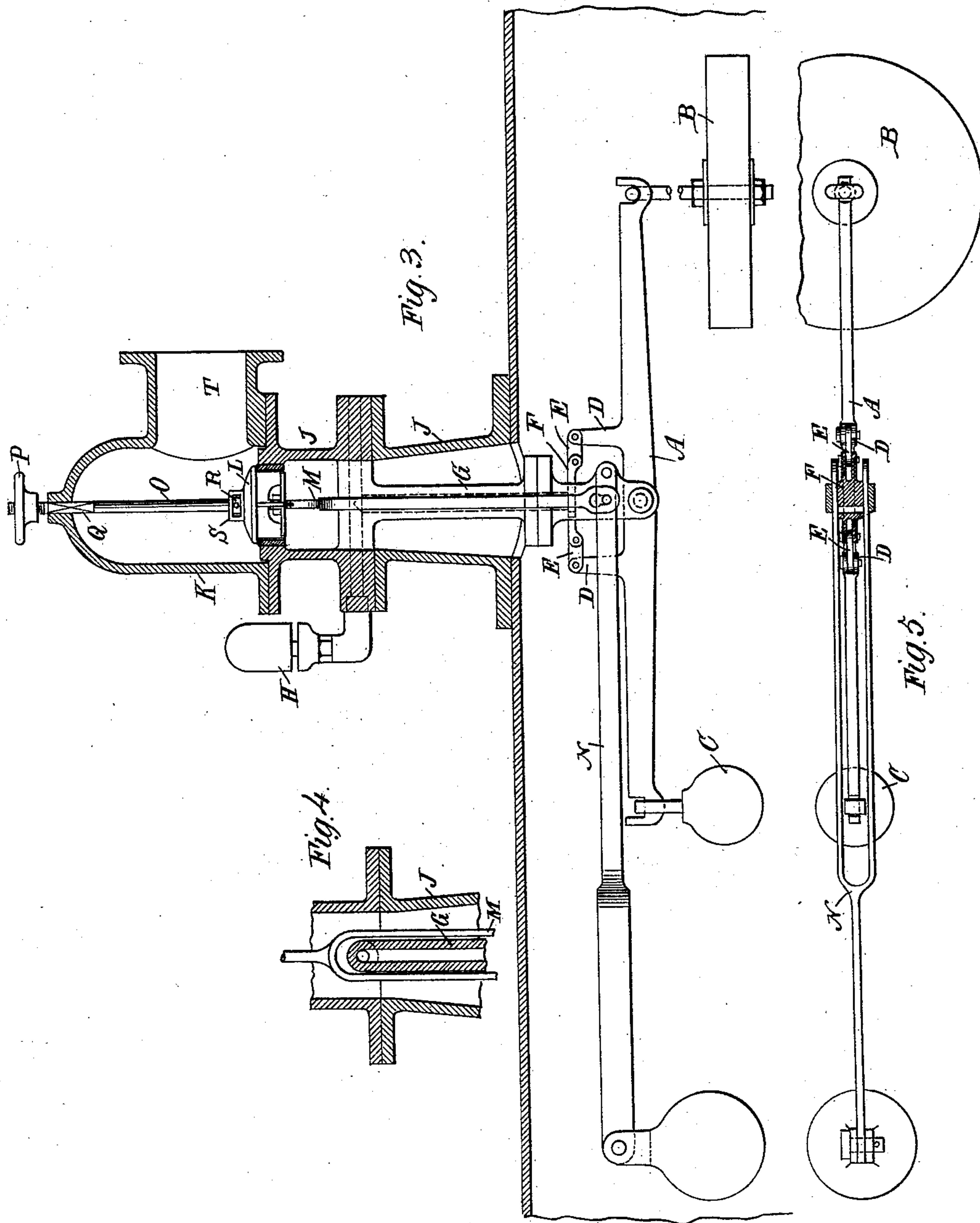
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UNITED STATES PATENT OFFICE.

GEORGE SPENCER, OF HYDE, COUNTY OF CHESTER, ASSIGNOR OF ONE-HALF
TO WILLIAM JOWETT, OF MELLOR, ENGLAND.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 424,031, dated March 25, 1890.

Application filed May 20, 1889. Serial No. 311,374. (No model.) Patented in England July 11, 1888, No. 10,074.

To all whom it may concern:

Be it known that I, GEORGE SPENCER, a citizen of the United Kingdom of Great Britain and Ireland, and a resident of Hyde, in the
5 county of Chester, England, have invented new and useful Improvements in High-Steam and Low-Water Safety-Alarms, (patented in Great Britain July 11, 1888, No. 10,074,) of which the following is a specification.

10 This invention relates to apparatus for indicating and relieving an excessive pressure of steam, and for indicating, preferably by means of an audible alarm, the existence of low water in a steam-generator.

15 According to these improvements there is suspended within the boiler a beam having a float and a balance-weight suspended from its opposite ends. Upon each side of the center of oscillation or of the fulcrum of the
20 beam there are formed or fixed a vertical arm or projection connected to a valve or cock which controls the inlet from the boiler steam-space to a whistle or outlet in the external atmosphere. In the event of the water-level
25 falling too low, the descent of the float and consequent descent of the float end of the beam operates the valve or cock to open the passage of the steam to the whistle or outlet, thus producing an audible signal or a visible
30 escape of steam until the water is restored to its safe level. Above the opening in the boiler, through which a pipe connecting the whistle or outlet with the valve or cock passes, there is a safety-valve of comparatively large di-
35 ameter weighted to blow off at a pressure of steam a little above the normal working-pressure.

40 I will more particularly describe my invention with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the apparatus and of that part of the shell of the boiler to which it is fixed. Fig. 2 is a partial vertical cross-section through the fulcrum of
45 the beam and the valve. In Fig. 1 the safety-valve is represented as being externally weighted. In Fig. 3 the safety-valve is shown internally weighted. In other respects Fig. 3 is identical with Fig. 1. Fig. 4 is a vertical
50 cross-section of part of the apparatus, show-

ing the connecting-rod from the safety-valve to the weighted lever as arranged in Fig. 3; and Fig. 5 is a plan of the weighted lever and beam according to the modification shown in Fig. 3.

55 In each of the figures A is a beam or lever carrying a float B at one end and a balance-weight C at the other end. Upon the beam A there are formed or fixed two vertical arms D D, which are connected by two links E E
60 to the slide-valve F, which controls the opening into a pipe G, which forms a means of communication between the steam-space of the boiler and whistle H or the opening I, or with both the whistle and the opening. This
65 pipe is preferably constructed in the T form represented in the drawings, in which case the vertical part of the pipe is employed as a means for the suspension of the beam, while the horizontal part of the pipe com-
70 municates at one end with the whistle H and at the other end with the opening I. It will be found advantageous to insert a steam-pipe into the opening I. Branches of this pipe may then be taken to any desired
75 spots—such, for example, as to the office of the manager, to the watchman's lodge, or to an indicator. I prefer to cast the pipe G in one piece with the tubular casing J, which
80 has a flange at its lower end, by means of which it may be secured to the boiler-shell, and another flange at its upper end, upon which the dome K is secured. The safety-valve, of comparatively large area, is mounted
85 at the upper part of the tube J, and is weighted to blow off at a little above the normal working-pressure. As represented in Fig. 1, the safety-valve is weighted outside the boiler in the usual manner. It may, however, be
90 preferred to weight this valve in such a manner that the position of the weight on the lever cannot be varied or tampered with while the boiler is in work. In this case the safety-valve may be normally held down by the rod M, which is forked and connected by the
95 lower ends of its fork to the forked weighted lever N inside the boiler. The connecting-rod M is forked, in order that it may pass down each side of the pipe G, and thus keep the apparatus symmetrical; but it is obvious 100

that the pipe G may be placed to one side, when a plain connecting-rod might be used and the beam and the weighted lever would be in parallel planes.

5 The described and illustrated arrangement of the forked connecting-rod M involves the forking or division of the weighted lever N, as represented, in order that the beam A and the projecting arm D thereon may be free to
10 move vertically without touching or interfering with the weighted lever.

When the internally weighted lever is used, as shown in Fig. 3, there may be used an apparatus for lifting the valve when required.
15 This apparatus consists of the rod O and the hand-wheel P. The upper part of the rod is screwed to fit and engage with an internal screw formed through the hub of the hand-wheel, so that by the rotation of the hand-
20 wheel the rod will be lifted or lowered according to the direction of the rotation. To prevent the rotation of the rod with the hand-wheel, which would prevent the vertical motion of the rod, a square part Q may be
25 formed upon the rod in such a position as to pass through a corresponding square hole or bearing, or a key or feather may be fixed in the rod so as to engage in a corresponding slot in the bearing. The lower end of the rod
30 is connected to the safety-valve by means of a pin R, fixed in the lower end of the rod, from which it projects into a slot S, or two composed slots similar to S, so that the safety-valve may be free to lift under the steam-
35 pressure while the rod is in its lowest position, and so, also, that the valve may be lifted by the rod. The safety-valve may be inclosed in a dome K, having a suitable outlet T, or it may be open to the air.

40 It will be in all cases desirable to fix a valve between the pipe G and the whistle, in order to prevent an excessive escape of steam or an excessive sound; alternatively, the passage to the whistle may be contracted. For similar
45 reasons the pipe which may be connected to the outlet I and each of its branches may be provided with valves, which are usually

kept only slightly open, but which may be opened wide when it is desired to enable the steam to escape quickly from the boiler in
50 the event of low water. The pressure of the steam upon the under side of the valve F will keep it firmly upon its seating, while the constant motion imparted to it by the ebullition of the water will keep the faces in good and
55 clean position.

I desire it to be understood that I do not limit myself to the precise details and arrangements of parts represented by the accompanying drawings, as it is evident that
60 these may be varied in many ways other than those herein described without departing from my invention.

Having thus particularly described my invention, I declare that what I claim is— 65

1. A casing for a high-steam and low-water alarm apparatus, consisting of the tube J, provided with a flange for attaching it to the shell of the boiler and having at its upper
70 end a seat for a safety-valve, and the open-ended T-shaped pipe G, formed integral with the tube J, having its vertical leg depending within the tube J and provided at its low
75 end with a seat for a sliding valve F, substantially as described.

2. The combination, with a boiler, of the tube J attached thereto, having a safety-valve seat at its upper end and an open-ended
80 T-shaped pipe G, the vertical leg of which depends into the boiler, a safety-valve L, a hanger M, connected therewith and forked to straddle the pipe G, and a weighted lever N, fulcrumed on the lower end of the pipe G
85 and connected with the hanger M, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 18th day of March, 1889.

GEORGE SPENCER.

Witnesses:

ROBT. MATHIESON,
WM. E. KEYS.