

(No Model.)

T. HAMILTON.

LOW WATER ALARM FOR STEAM BOILERS.

No. 246,007.

Patented Aug. 23, 1881.

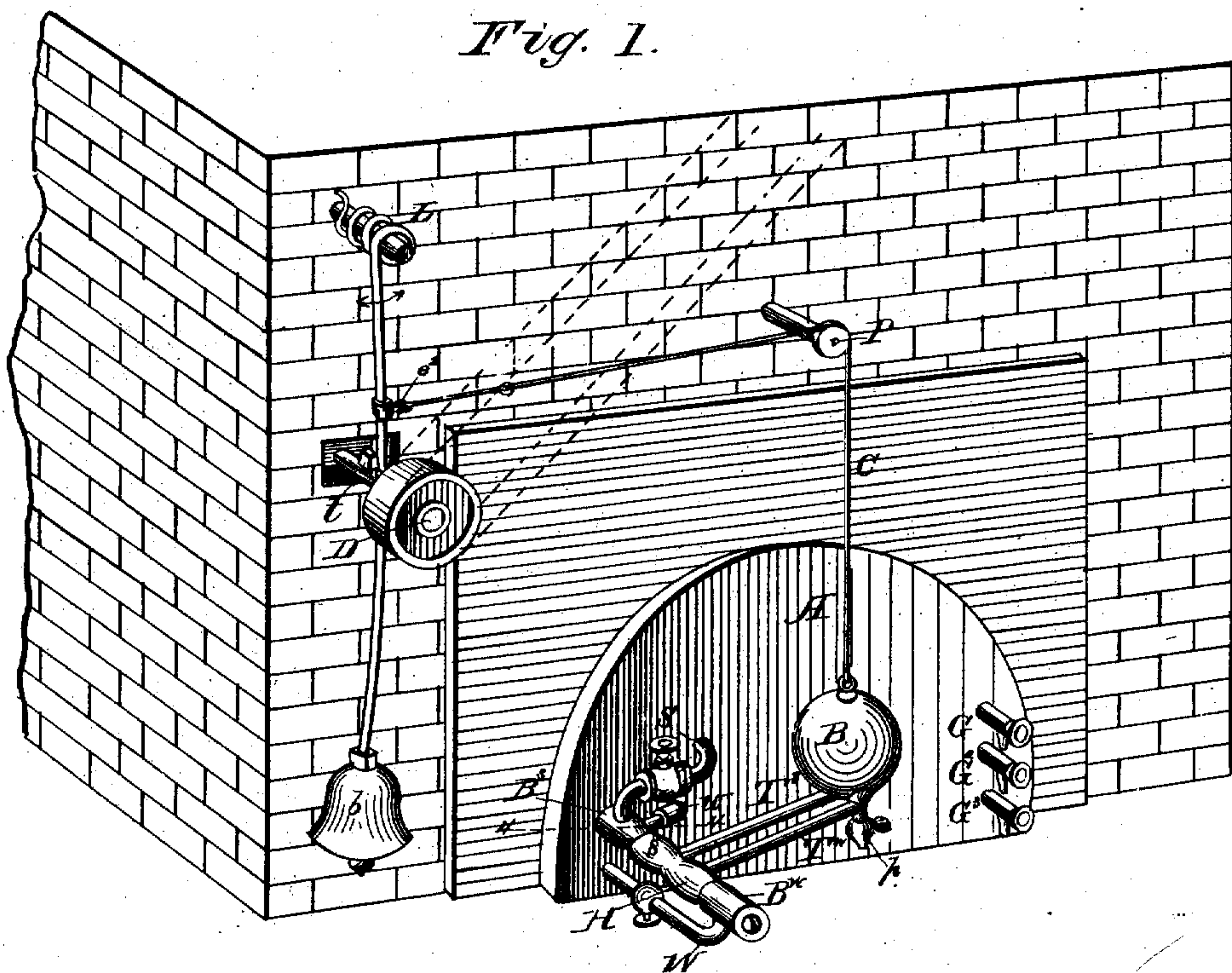
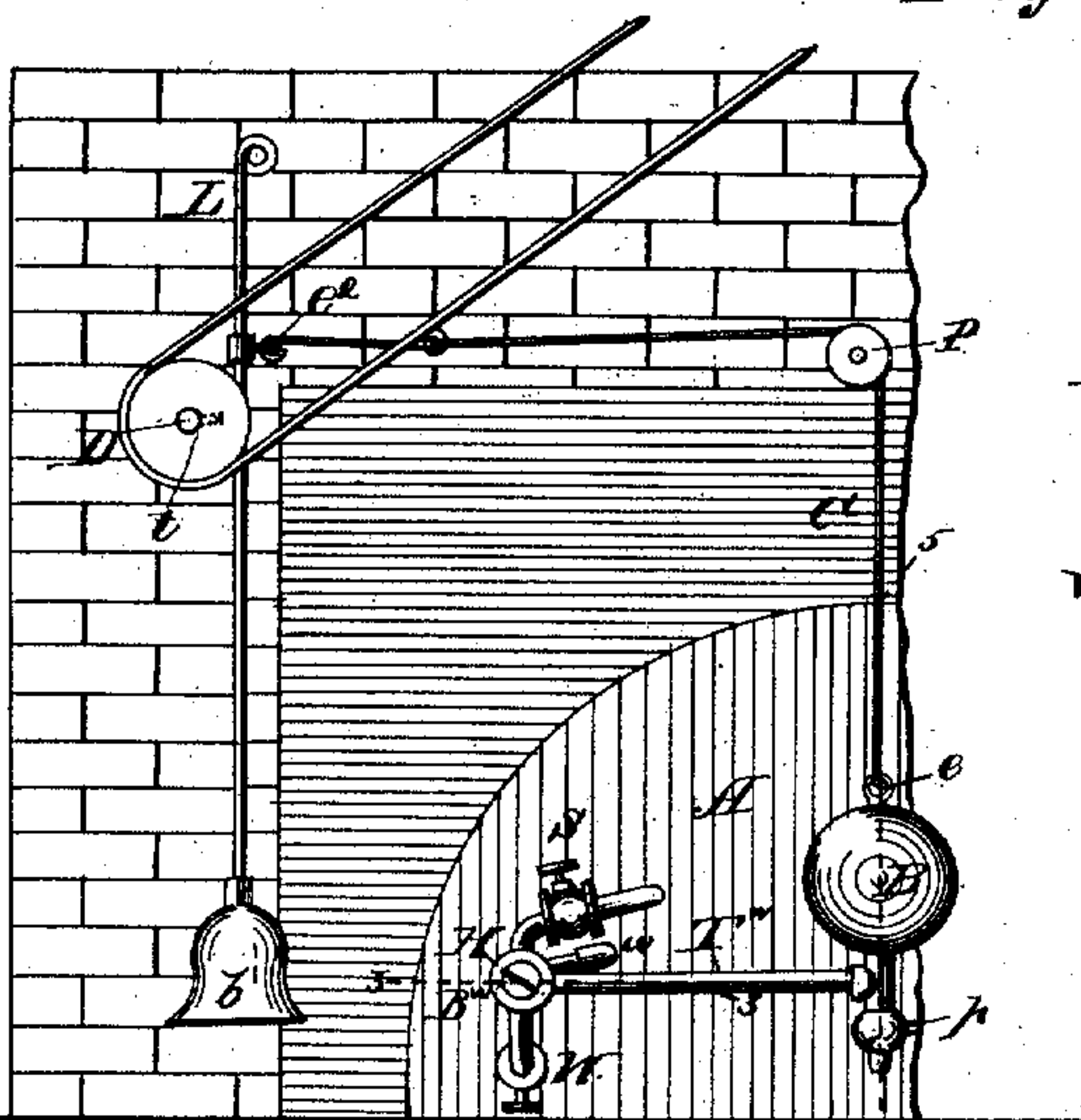


Fig. 2



WITNESSES

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Fig. 3

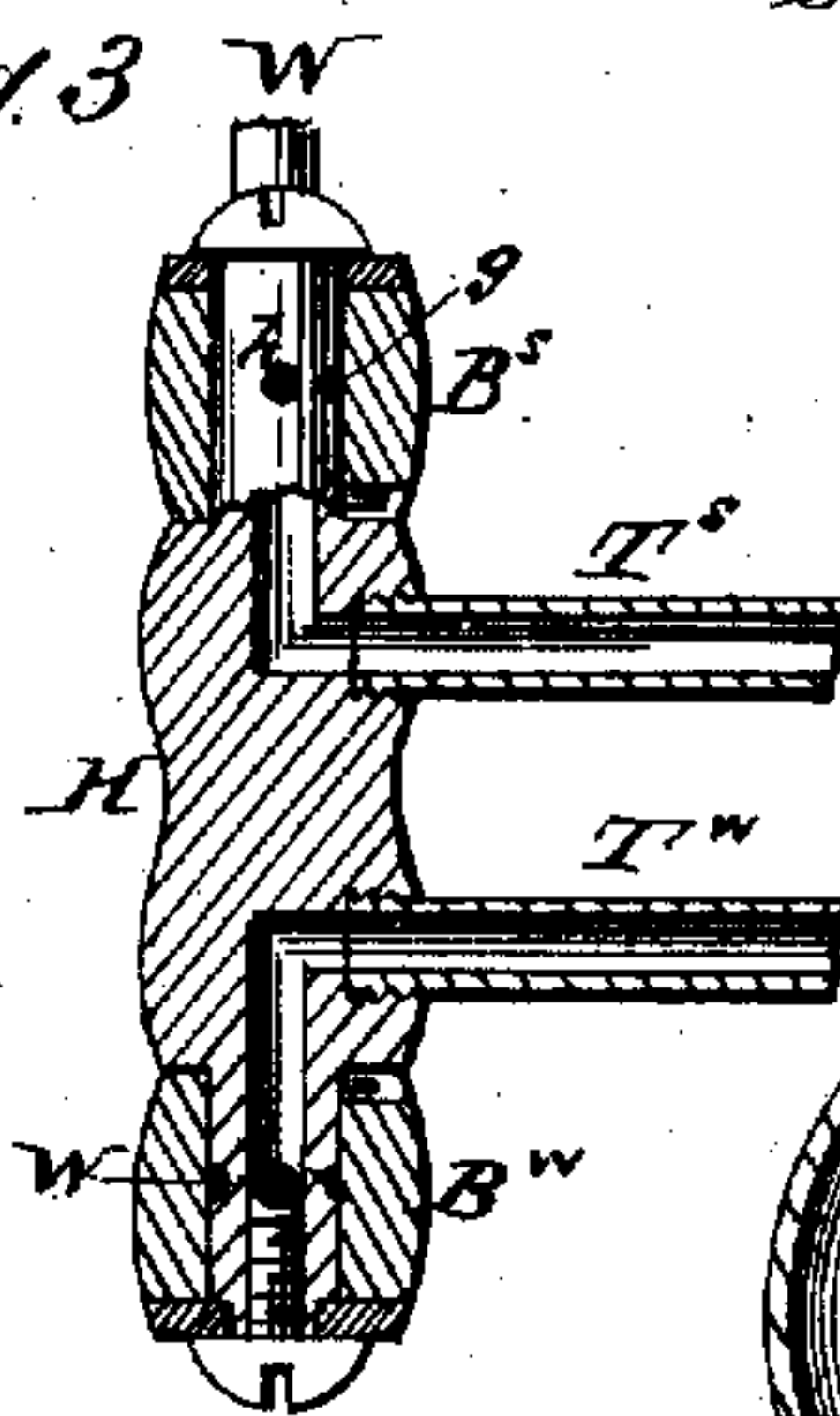


Fig. 4

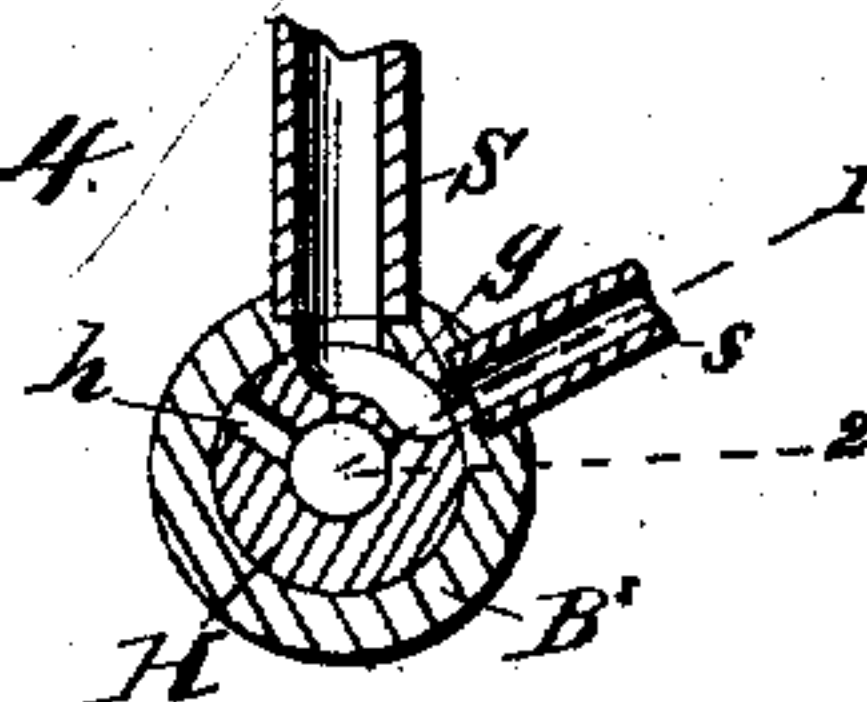
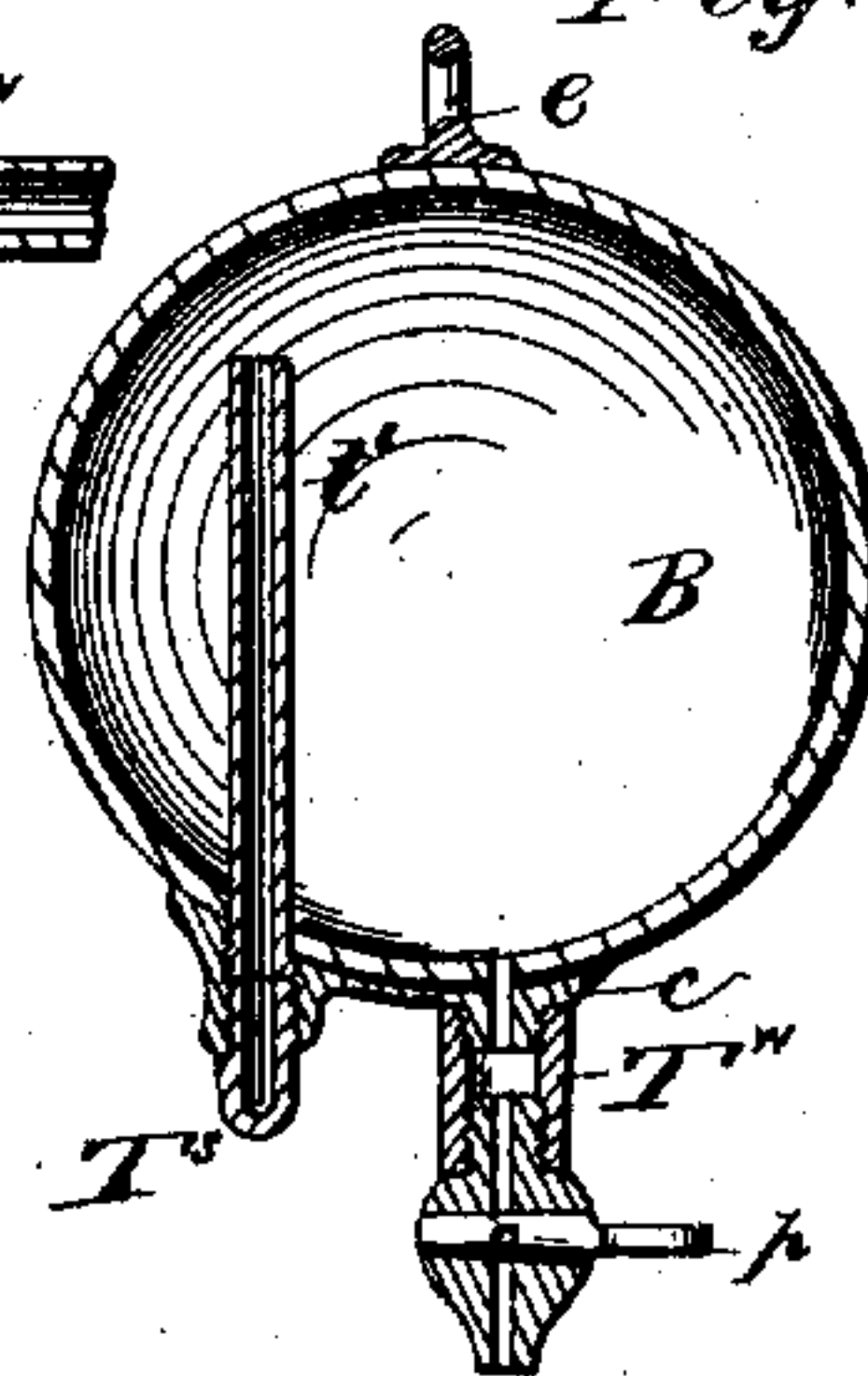


Fig. 5



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LOW-WATER ALARM FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 246,007, dated August 23, 1881.

Application filed June 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HAMILTON, a citizen of the United States, residing at New Brunswick, in the State of New Jersey, have
5 invented a new and useful Improvement in Low-Water Alarms for Steam-Boilers, of which the following is a specification.

This invention relates to that class of water-alarms in which the movement of an external
10 alarm-starter in the form of a hollow ball, or a like vessel of any shape adapted to contain steam and water, is controlled by the level of the water in the boiler through the agency simply of pipe-connections with the water and
15 steam-space above and below the mean water-line.

The present invention consists, first, in the combination, in a water-alarm of this description, of a pair of stationary bearings supported
20 by the respective pipe-connections with the boiler, a horizontal double-ended spigot or recessed hub, working water and steam tight in said bearings, and a pair of tubes forming, with said hub, a lever, and connected therethrough
25 with the water and steam spaces, respectively, as means for connecting a hollow ball or the like both with the water-space and with the steam-space in a simple and efficient way, so that it may instantaneously empty itself and
30 rise and start the alarm when the water falls below a given level without the aid of flexible tubes.

This invention consists, secondly, in the aforesaid combination of parts in connection
35 with a steam-whistle attached to the said bearing, which communicates with the steam-space, the steam end of the said spigot being constructed so as to turn the steam into the whistle when the emptied ball rises.

This invention consists, thirdly, in a combined lifting-spring and bell support, in connection with a rising and falling ball or the like adapted to empty itself as aforesaid, and
40 with a tappet on a power-driven shaft for lifting the emptied ball or its equivalent, and ringing the bell to call attention to the condition of the boiler without complication of parts, as hereinafter more fully set forth.

Figure 1 of the accompanying drawings is

a perspective view of the upper part of the
50 front of a steam-boiler provided with my low-water alarm, showing the latter as in the act of sounding an alarm. Fig. 2 is a half-elevation of the same, showing the parts at rest with the ball down. Fig. 3 represents a horizontal
55 section on the line 3 3, Fig. 2; Fig. 4, a vertical section at 4 4, Fig. 1; and Fig. 5 a vertical section on the line 5 5, Fig. 2.

Like letters of reference indicate corresponding parts in the several figures.

A represents an illustrative steam-boiler set in brick-work, and B an alarm-starter in the form of a hollow copper ball, for which I may substitute a like vessel of any shape and material, containing a chamber of a capacity of
60 four quarts, more or less, and adapted to sustain alternately steam and atmospheric pressure.

S and W represent steam and water pipe connections of five-eighths inch iron or brass tubing, screwed into the front of the boiler A,
70 above and below the mean water-line respectively, and provided with stop-cocks.

B^s and B^w represent sleeve-bearings, supported respectively by the steam and water
75 connections; H, a double-ended spigot or recessed hub working water and steam tight in said bearings; and T^s T^w, a pair of rigid pipes or tubes screwed into said hub, so as to communicate with the recesses in its respective
80 ends, and connected therethrough respectively with the steam and water spaces of the boiler, said tubes T^s T^w forming, with said hub H, a lever or swinging arm, to the outer end of which the ball B is coupled, as illustrated more particularly by Fig. 5. As shown in this figure,
85 the bottom of the ball is provided with a cast saddle or coupling-piece, c, which may be soldered thereto, and which has a pair of necks to receive respectively the extremity of the
90 steam-tube T^s, and a suitable union at the extremity of the water-tube T^w, providing for the attachment of a pet-cock, p. An extension, t^s, of the steam-tube is screwed into the top of the coupling-piece c and reaches to the top of
95 the chamber within the ball. When the ball B is down, as illustrated by Figs. 2 and 3, and by the line 2, Fig. 4, the steam-space of the

boiler A communicates with the upper part of the ball-chamber through the pipe-connection S, bearing B^s, hub H, and tubes T^s t^s, by means of a radial hole, h, in the hub. When the ball is up, as illustrated by Fig. 1, and by the line 1, Fig. 4, steam is cut off from the interior of the hub, which communicates with the ball, as shown in Fig. 4.

The water-space of the boiler communicates at all times with the ball-chamber through the pipe-connection W, bearing B^w, hub H, and tube T^w, and the said cutting off of the steam may consequently be utilized, if desired, for automatically relowering the ball, a sufficient vacuum in the ball-chamber being created in a short time by the condensation of the confined steam to cause the ball to be refilled or partially refilled with water, through the open water-way, by the steam-pressure within the boiler.

The pipe s of a steam-whistle, w, is screwed into one side of the bearing B^s, and the hub H is provided with a matching-groove, g, Fig. 4, which, when the ball B is up, connects the interior of said pipe s with that of the pipe-connection S, so that the steam escapes through the whistle, sounding an effective alarm when the ball rises.

L represents a combined lifting-spring and bell-support, having a suitable bell, b, attached to its extended free end, which is its lower end, while its upper end is coiled, and the coil supported by an internal pin, as clearly shown in Fig. 1.

P represents a loose grooved pulley at the extremity, a stud projecting over the ball B; C, a connecting-cord passing over said pulley from an eye, e, on the former to an eye, e², attached to the spring L; and D represents a power-driven shaft, provided with a tappet, t, which said spring L engages with for ringing the bell after lifting the emptied ball, as illustrated by Fig. 1.

G G² G³ represent the ordinary gage-cocks of the boiler.

In the example the shaft D is a special shaft mounted in bearings within the setting of the boiler. In practice it may be any conveniently-located line-shaft, and the ball may, if desired, be connected with two or more bells in different parts of the works to which the boiler belongs.

The whistle is designed, primarily, as a night-alarm, and its pipe may be provided with a stop-cock to shut off the steam therefrom during the day; or it may be used for the purposes of an ordinary steam-whistle by lifting the ball

B, so as to place it in communication with the boiler at any time, and regulating the escape of steam by the cock in the pipe-connection S.

By closing the cock in the pipe-connection W and opening the pet-cock p the ball B may be emptied at will, so as to cleanse it, or to test the condition of the apparatus.

When an alarm is sounded automatically to indicate low water, as illustrated by Fig. 1, I prefer that it shall continue until the engineer arrives to stop it, and this is readily insured by making the strength of the spring L, plus the resistance of the joints, exceed the gravity of the filled ball. The apparatus may, however, be adapted to stop itself when the ball is refilled, as aforesaid, and it may be adapted additionally to start the boiler-feeder should any maker so prefer.

The parts for which no materials have been named may all be made of iron or brass or well-known substitutes, in obvious forms.

I do not claim, broadly, the combination, in a low-water alarm, of a hollow ball or like vessel adapted to receive and discharge water from the boiler, a lifting-spring or counterweight, and a steam-whistle, as this is very old. Neither do I limit myself to details of my improved apparatus, which are not essential to the respective combinations hereinafter claimed.

I claim as new and desire to protect by Letters Patent—

1. The combination, in a low-water alarm for steam-boilers, of the pipe-connections S W, bearings B^s B^w, double spigot-hub H, and tubes T^s T^w with a hollow ball, substantially as herein described, for the purpose set forth.

2. The combination, in a low-water alarm for steam-boilers, of the pipe-connections S W, bearings B^s B^w, double spigot-hub H, and tubes T^s T^w with a hollow ball attached to the outer ends of said tubes T^s T^w, and a steam-whistle attached to said bearings B^s, substantially as herein specified, for the purpose set forth.

3. The combined lifting-spring and bell-support L, provided with an alarm-bell, in combination with the power-driven shaft D, carrying a tappet, the hollow ball B, adapted to receive water from a steam-boiler, and to empty itself and to rise when emptied, and the cord C, connecting said lifting spring and ball, substantially as herein described, for the purpose specified.

THOMAS HAMILTON.

Witnesses:

JAMES T. KILPATRICK,
J. B. HAMILTON.