

(No Model.)

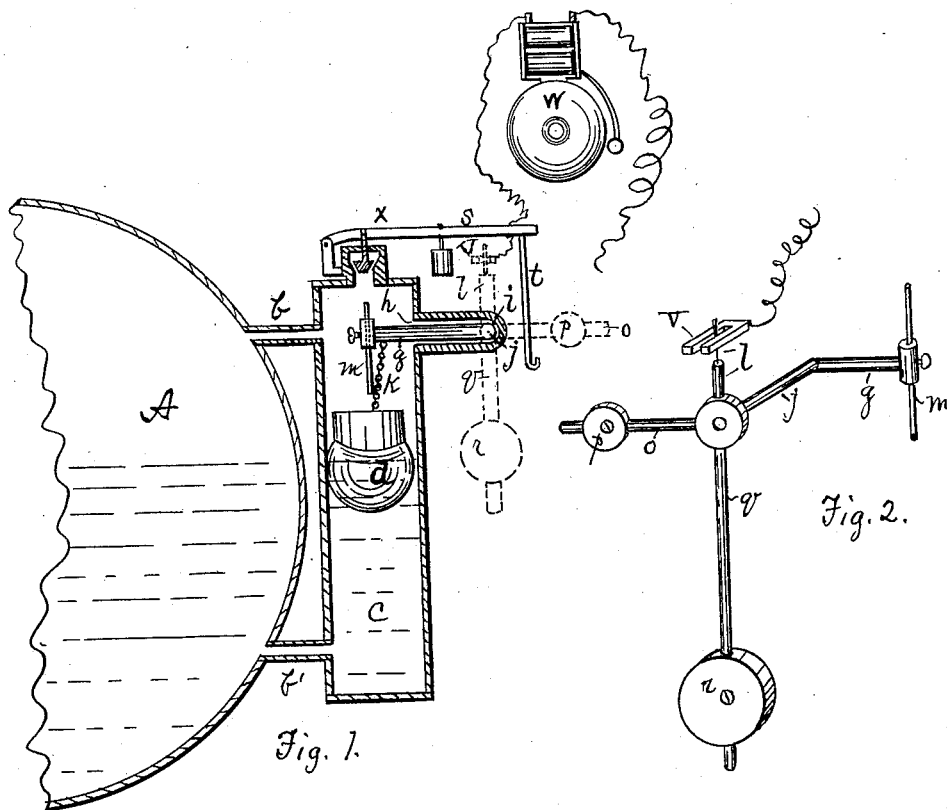
2 Sheets—Sheet 1.

G. W. GETCHELL.

FEED WATER ALARM.

No. 302,245.

Patented July 22, 1884.



Witness  
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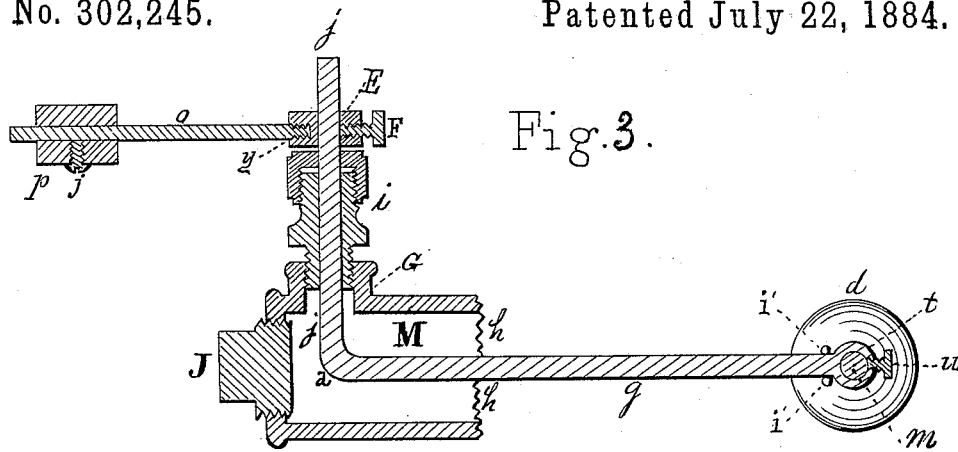


Fig. 3.

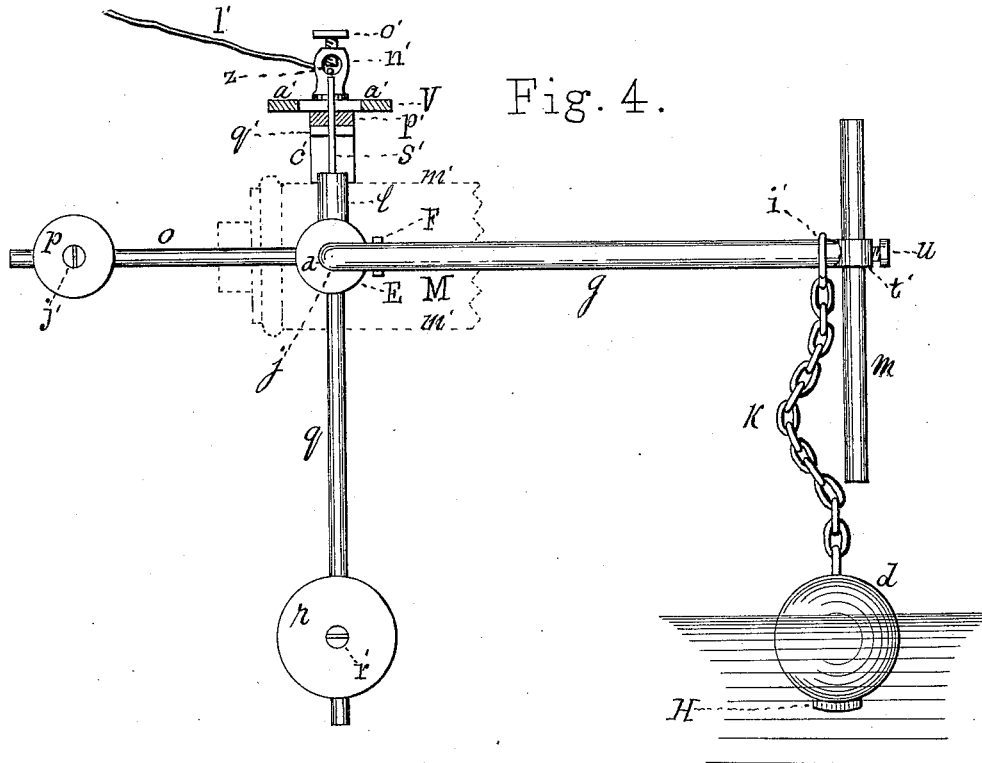


Fig. 4.

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# UNITED STATES PATENT OFFICE.

GEORGE W. GETCHELL, OF BREWER, MAINE.

## FEED-WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 302,245, dated July 22, 1884.

Application filed January 15, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. GETCHELL, of Brewer, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Feed-Water Alarms; and I do hereby declare that the following is a full, clear, and exact description of the invention, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 shows a view of my device partially in section; Fig. 2, a perspective showing arrangement of levers, &c. Fig. 3 is a horizontal longitudinal sectional view through the lever *g*, and showing a part of the recessed chamber *M* and packing-box *i* and the top of the float *d*. Fig. 4 is a side view of the working parts of my invention, indicating by the dotted lines *m' m'* the outlines of part of the recessed chamber *M*.

Similar letters refer to corresponding parts throughout the several figures.

A shows a cross-section of a portion of a boiler, having pipes *b b'* extending from above and below the water-line, respectively, and connecting with a cylinder, *c*. *E* is a collar on the arm *j*. *F* is a set-screw in the collar *E*. *G* is a T-neck on the chamber *M*. *H* is the weighted portion of the float. *J* is a screw-plug in the end of *M*. *M* is a recessed chamber in which the lever *g* moves. *b b'* are pipes. *c* is a cylinder. *d* is a float. *g* is a lever. *h* is an aperture in the cylinder *c*, and continued forms the recessed chamber *M*. *i* is a packing-box. *j* is an arm bent or formed on the lever *g*. *K* is a chain. *l* is a projecting arm on the collar *E*, terminating in the flat elastic extension *s'*. *m* is a spindle. *o* is a rod or lever formed in the longitudinal extension of the lever *g*. *p* is an adjustable weight on *o*. *q* is a pendulum-rod. *r* is an adjustable weight on *q*. *s* is a lever to the safety-valve *x*. *t* is a hooked connecting rod or wire or chain. *u* is a set-screw to adjust the spindle *m*. *V* is a forked or bifurcated circle-closer. *W* is an electric bell. *x* is a safety-valve. *y* is the screw-junction of *o* with the collar *E*. *z* is an orifice for the reception and retention of the electric wire *l'*. *a* is the elbow or bend of the lever *g*, to form the arm *j*. *v'* is a ring or other attachment of the chain *K* to the lever *g*. *j'* is

a set-screw in the balancing-weight *p*. *l'* is an electric wire. *m' m'* are dotted outlines of part of the recessed chamber *M*. *n'* is a stud or standard on *V*, and having the orifice *z* and set-screw *o'* for connecting the electric wire *l'*. *p'* is a strip of wood interposed to interrupt the electric current. *q'* the top, and *o'* the arm, part of the bracket supporting and connecting *V* to *M*. *s'* is the thin elastic extension to *l*, and serving as the contact-point in closing the circuit. *t'* is a collar on the lever *g* to hold the spindle *m*.

The apparent redundancy of lettering in attempting to describe so simple a device is necessitated by the lack of system in the former description of my invention, and the apparent complication of parts incident to that description.

My invention is so simple in its construction and operation that it is impossible to write a correspondingly simple description, or one which can compare in perfection with the actual working tests of the device.

The several parts having been fully referred to by reference-letters, it will be unnecessary to refer minutely to all the details in explaining the construction.

In construction, then, I avail myself of a boiler of any usual form or make, and although my device would operate equally well if applied directly to the boiler itself, still, in order to so locate my device as not to interfere in any way with any functions of the boiler, I provide a common plain cylinder, *c*, and connect it to the boiler by the tubes *b b'* above and below the water-line simply, so that the water and the steam will bear the same respective relations to each other in the cylinder that they do in the boiler. There is no peculiar formation or complication of parts to the cylinder. On the cylinder and projecting from its periphery I have formed or attached a recessed chamber, *M*, opening out of the cylinder by the aperture *h*, the aperture *h* being extended and forming the interior of *M*, and upon one side of *M*, I form the neck *G*, similarly to a T-connection of pipes. Into the neck *G*, I fit the packing-box *i*, fitted to clasp the arm *j* with a steam and water tight joint, but allowing the arm *j* to turn or rotate in conformity with the movements of the lever *g*. I then form the lever *g* with a spindle-collar, *t*, at the end, and bend it at *a*, so as

to form the pivotal arm *j* at right angles to the part *g*, thus leaving the lever *g* and the pivotal arm *j* integral; but it may be formed to answer the same purpose by making the lever *g* and pivotal arm *j* separate and uniting them at the elbow *a* by a suitable joint. When the lever *g* and pivotal arm *j* are made integral, I remove the packing-box *i*, and the arm *j* may then easily be passed out through the neck *G* and the packing-box passed on over the pivotal arm *j*, and screwed into the neck, thus holding the arm *j* in place, while the arm *j* acts as the pivotal part of the lever *g*. I then attach a collar, *E*, to the pivotal arm *j* outside of the packing-box *i*, and secure it rigidly in place by a set-screw, *F*. I provide the collar *E* with the rod *o*, screwed into the collar at *y*, and extending backward in longitudinal extension of the lever *g*, and moving and operating the same as though integral with the lever *g*. Upon the rod *o* is arranged a balance-weight, *p*, adjustable by means of the set-screw *j'*. Upon the same collar *E*, I form or attach an upright radial arm, *l*, of a suitable length, and terminating in a thin, flat, elastic spring, *s'*. The spring *s'*, by yielding plially when pressed against either prong *a'* *a'* of the circuit-closer *V*, compensates for any excess of movement of the arm *l* in either direction, bending or yielding when the arm *l* is pressed too far, and springing back into a straight upright position when released, thus avoiding the necessity for very complicated and elaborate adjustments, and rendering it almost impossible to get out of order. I also attach a radial pendant or pendulum arm or rod, *q*, to the collar *E*, extending downward and fitted and supplied with the pendulous weight *r*, adjustable and fastened on the rod *q* by the set-screw *r'*, thus forming a compensating-pendulum to compensate for any inequality in balance of the lever *g* and the balance-weight *p*, and serving to steady and keep in position the upright arm *l* when at rest. I then provide a pronged or bifurcated circuit-closer, *V*, and attach it to the projecting outside surface of the chamber *M*, or to any convenient part of the cylinder or boiler, by the bracket-arm *c'*. I interpose a piece of wood, *p'*, between the circuit-closing plate *V* and the top plate *q'* of the bracket, to insulate the closer *V* and prevent the electricity passing off through the metal of the cylinder. The circuit-closer *V* is so arranged that when the lever *g* and the straight arm *l* are at rest the flat terminal spring *s'* shall stand upright midway between the prongs *a'* *a'* of *V* and present a flat side to each of the prongs *a'* *a'*, but when moved in either direction shall come in contact with one or the other of the prongs *a'* *a'*, and when the other wire of the battery is attached to it or to any part of the cylinder the contact of *s'* with either prong closes or perfects the circuit and rings an electric bell, *W*, or makes any desirable signal. The closer *V* is provided with a stud or standard, *n*, formed with the orifice *z*

and set-screw *o'*, to attach and fasten the electric wire *l'*, the other electric wire being attached to the cylinder, or the arm *j*, or projection *M*, or any convenient part of the machine. I form the spindle ring or collar *t* on the inside end of the lever *g*, arranged with the set-screw *u* to hold and adjust the spindle *m*. The spindle *m* is of sufficient length to be readily adjusted to the float. I provide a float, *d*, preferably spherical in shape, and loaded at the bottom, as at *H*, to keep it in an upright position to prevent the chain *K* from becoming entangled. The float *d* is attached to the lever *g* at the end *i* by the chain *K*, leaving the chain sufficiently slack to allow the float to fall or settle with the water nearly to the danger-point without drawing upon the lever *g*. Upon the upper end of the cylinder *c*, I fix an ordinary safety-valve, *x*, having the lever *s* to act as any ordinary safety-valve to let off steam at a dangerously high pressure. This safety-valve I connect with my water-alarm in the following manner: From the lever *s* of the safety-valve I arrange a connection, either by a rod, *t*, hooked at its lower end, or by a chain or any suitable adjusting device, so adjusted that whenever the lever *s* of the safety-valve shall rise or move upward the hook *t* shall engage with the arm *o* and raise it, thus sounding the alarm; or, if the connection is made with a chain, the chain of a suitable length shall be connected at the upper end to the lever *s* and at the lower end to the balance-rod *o*, the chain being more or less slack, so that when the lever *s* moves or is raised up by the pressure of the steam the hook or chain immediately draws upon and raises the rod *o* and sounds the alarm in the same manner as when the alarm is caused by the motion of the lever *g*; but the lever *g* may be moved and sound an alarm without in any way interfering with the safety-valve.

Having thus minutely described in detail the construction of my device, it finally may be summed up in the statement that the balance-rod *o*, with its adjusting-weight, the pendulum-rod *q*, with its adjusting-weight, the upright-arm *l*, with its terminal spring *s'*, and pivotal arm *j*, with its collar *E*, are all part and parcel of the lever *g*, as much as though made integral, and are only formed in the manner described for convenience of adjustment and relative arrangement of parts, and whatever movement or rotation occurs or is caused to the lever *g* is shared equally and proportionately by each part.

In operation, the float *d* having been placed in the cylinder and attached by the proper length of chain to the lever *g*, the spindle *m* is fixed at the proper point to indicate high-water danger, and as the water falls in the boiler, and correspondingly in the cylinder, the float *d* settles with the water and draws the end of the lever *g* downward, the balance-rod *o* moves upward, the pendulum-rod *q* swings backward, and the arm *l* moves or tips forward until the terminal spring *s'* is brought in contact

with the forward prong, *a'*, of the circuit-closer V, and the electrical current is completed and causes the bell W to ring. Water is now supplied in the boiler, and as it rises the float *d* rises correspondingly, and the lever and all the connected parts return to place, and the terminal spring *s'* stands upright midway between the prongs *a' a'*; but if water is still further supplied the float rises until it comes in contact with the spindle, *m*, and, continuing to rise, presses the spindle, and consequently the lever *g*, upward, and all the parts moving simultaneously, as before, the arm *l* is tipped backward until it comes in contact with the back or rear prong of V, when the circuit is again completed and the bell W or any electrical alarm is sounded. In each case the alarm continues to sound until the water is restored to its proper level, when the lever *g* and all the connected parts return to their respective positions and continue there until the water again either rises above or falls below the point of safety. Whenever the pressure of the steam becomes excessive, the lever *s* is raised, and being connected or arranged so that the hooked rod *t* will engage with the balance-rod *o*, the rod *o* is raised, the arm *l* and spring *s'* are tipped forward, and the alarm sounded, the same as when it is done for high or low water; but the lever *s* is so connected to the rod *o* that while the rod *o* may rise without in any way affecting the lever *s* the lever *s* cannot rise without carrying the rod *o* and sounding the bell W or any suitable electrical alarm. Should any accident occur to disconnect the lever *s* from the rod *o*, the alarm would still be sounded if the safety-valve opened, for the moment steam began to escape through the valve the water in the cylinder, being immediately relieved of the full pressure of steam, would rise and cause the float to sound the alarm.

There is no complication either of construction or operation, and no complicated electrical apparatus or conditions are necessary. Pure and simple, then, a float placed in a cylinder rises and falls, carrying a lever, which, in moving from a horizontal position, brings a projecting arm in connection with a circuit-closer, and the simple electrical alarm is sounded and continues to sound until the danger is removed, and, additionally, a lever, *s*, of a safety-valve on the same cylinder or any other cylinder near enough to be connected is forced upward, carrying the lever of the water-alarm and forming the electrical connection, and the same alarm is sounded in the same manner; or the lever may be so arranged as to sound separate distinctive alarms.

My device may be used directly in the boiler by arranging suitable guides for the float; but it is more convenient to arrange it with a cylinder. All the operation of my device performed inside the cylinder is the moving the end of the lever *g* by the rise and fall of a simple float; and all the operation performed outside the cylinder is the simple tipping for-

ward or backward of an arm of the lever *g* (consequent upon the rise or fall of the end of the lever) far enough to come in contact with an electrical circuit-closer, thus completing the electrical circuit and sounding an electrical alarm. It is simple, convenient, durable, cheap, and not liable to get out of order, and therefore remarkably reliable. It performs no intricate complicated electrical feats. It requires no extraordinary mechanical skill or knowledge to construct it or to use it. The cylinder is in itself similar to that used by engineers for a water-column cylinder, and is simply connected with a boiler by proper openings above and below the water-line, to insure the same relative conditions of steam and water as exist in the boiler.

I do not claim the cylinder by itself, or the float by itself; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a feed-water alarm, the pivotal lever *g*, formed with the bent or attached arm *j*, and having the balance-rod *o*, pendulum *q*, and arm *l*, rigidly attached by means of the collar E, and formed at the inside end with the spindle collar or socket *t* and adjusting-screw *u*, in connection with the spindle *m*, and attached by the chain K to the float *d*, as shown and described.

2. In a feed-water alarm, the pivotal bent lever *g j*, having the parts *g* and *j* formed integral, and bent at *a*, the part *g* inclosed and operating in a steam boiler or cylinder, and formed with the adjustable spindle *m*, properly attached, and connected by a suitable chain with the float *d*, and actuated by the rise and fall of the float *d*, corresponding to the rise and fall of the water in the boiler or cylinder, the part *j* passing through and rotating in the packing-box *i*, and having rigidly attached the rod and weight *q r*, and balance rod and weight *o p*, and arm and spring *l s'*, arranged and operating in connection with the circuit-closer V and proper electrical wires to ring the electrical bell W or sound any electrical alarm.

3. In a feed-water alarm, the combination of the steam-cylinder *c*, recessed chamber M, float *d*, chain K, spindle or lever *g*, arm *j*, pendulum *q r*, balanced rod *o*, arm and spring *l s'*, circuit-closer V, suitable electric wires, and the electric bell or alarm W, arranged and used and operating as shown and described.

4. In a feed-water alarm operating in a steam cylinder or boiler, the safety-valve *x*, having the lever *s*, connected to or engaging with and operating the balanced rod *o* to sound an electrical alarm, all as shown and described, and substantially as and for the purpose hereinbefore set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of January, 1884.

Witnesses: GEORGE W. GETCHELL.

OTTO F. YOUNGS,

WM. FRANKLIN SEAVEY.