(No Model.)

W. H. RODGERS.

WATER-INDICATOR FOR BOILERS.

No. 486,054. Patented Nov. 8, 1892.

Fig. 1.

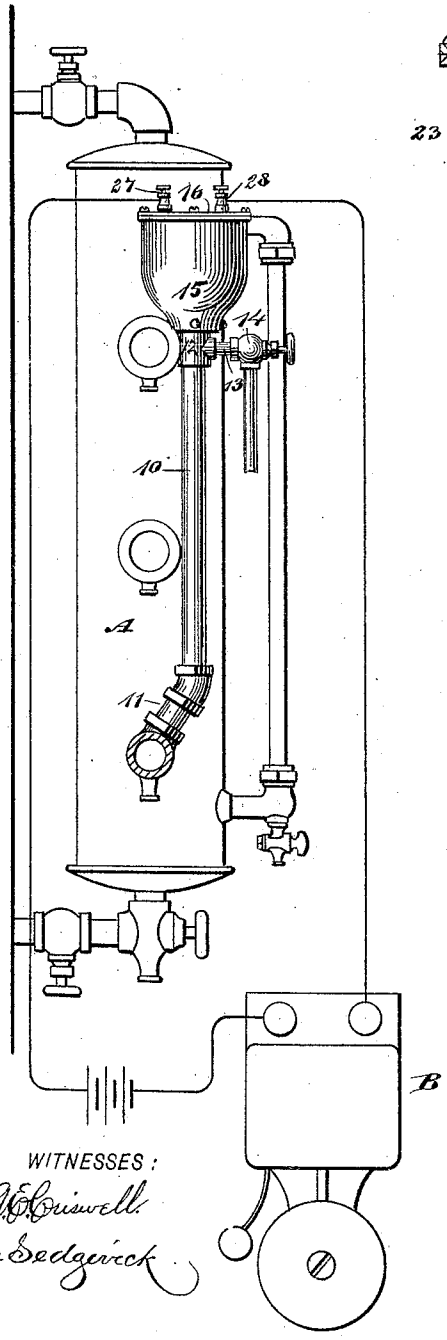
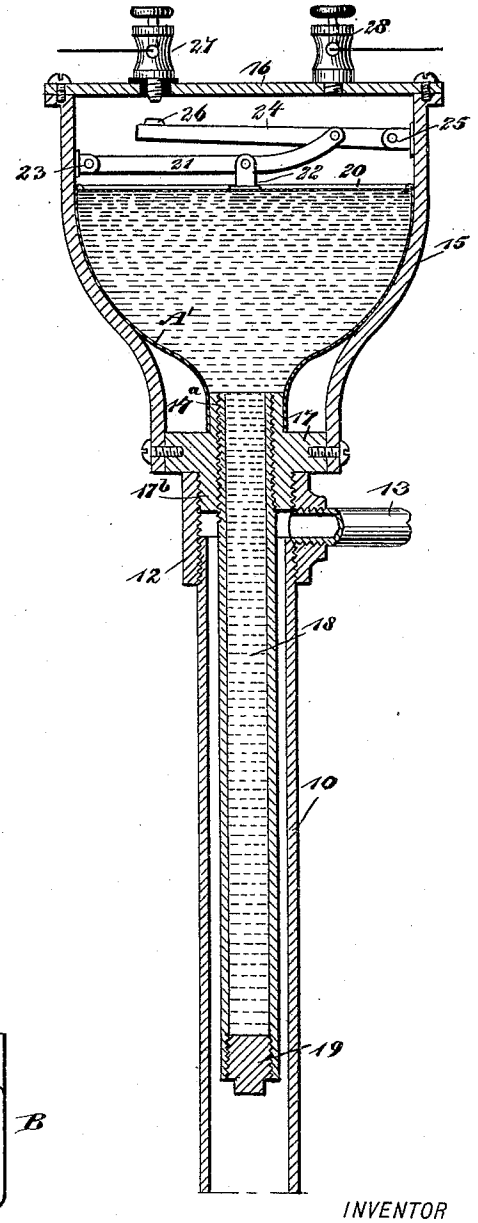


Fig. 2.



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WATER-INDICATOR FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 486,054, dated November 8, 1892.

Application filed May 21, 1892. Serial No. 433,848. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY RODGERS, of Bay Side, in the county of Queens and State of New York, have invented a new and Improved Water-Indicator for Boilers, of which the following is a full, clear, and exact description.

My invention relates to an improvement in water-indicators for boilers, and has for its object to provide a device of exceedingly simple and durable construction, which may be utilized to indicate either high or low water, more particularly the latter, in boilers, and which may also be used as a thermostat.

It is another object of the invention to construct an indicator which will be acted upon by heat or other predetermined agents to expand or to contract a diaphragm and to provide a connection between the diaphragm and an alarm mechanism, the connection to take place when a predetermined quantity of water is in the boiler or when a predetermined degree of temperature is reached.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in both the views.

Figure 1 is a side elevation of the attachment applied to a water-column; and Fig. 2 is a central vertical section through the attachment, illustrating the interior construction thereof.

When the device is to be used in connection with a boiler, it is connected with the water-column A thereof, and it is attached at any point in the height of the column at which it is desired to establish the water line or level. When used as a low-water indicator for a boiler, it is screwed into the water-column at the lower gage-cock, the gage-cock being replaced after the attachment has been made.

What may be termed the "stem" of the device consists of a tube 10, provided with nipples 11 or other form of fittings at its lower end to facilitate the attachment to the water-column, and the attaching mediums are so shaped that the tube 10 will be maintained, preferably, in a vertical position alongside of the gage-cocks of the water-column, so as not to interfere with them. The tube 10 has preferably screwed upon its upper end a sleeve 12, which may be said to properly belong to the shank of the device, as also a discharge-tube 13, which leads into the sleeve and is provided with a valve 14, the said tube being adapted for use to discharge whatever sediment may collect in the shank-tube 10 and the discharge-tube 13, so that it may be led to the ash-pit of the boiler or to any desired point.

The body of the device consists of an outer shell 15, provided with a cover 16 and a base-block 17, the latter being tubular and provided with an upper extension 17^a and a lower extension 17^b, the lower extension being screwed into the sleeve 12, as is best shown in Fig. 2, and into the bore of the base, which extends through it from top to bottom, the upper end of a pipe 18 is screwed or otherwise secured, and this pipe is of less diameter than the shank-tube 10 and is adapted to extend downward within this tube a predetermined distance, and the lower end of the pipe 18 is closed in any suitable or approved manner. In the drawings the plug 19 is utilized for this purpose.

The lower end of a hollow vessel A′ is attached to the upper extension 17^a of the base-block 17, the attachment being made in any manner whereby a secure joint may be made. The receptacle A′ is made of an expansible material—as, for instance, copper—and is closed at the top by a diaphragm 20. The receptacle A′ is preferably hemispherical, as shown in Fig. 2, and the major portion of its side surface rests upon and is supported by the shell 15. A lever 21 is fulcrumed at or near its center upon a post 22, attached to the diaphragm 20, ordinarily at or near the center of the latter. The outer end of the lever 21 is likewise fulcrumed upon the inner surface of the shell 15, as shown at 23 in Fig. 2, while the inner end of the lever 21 is ordinarily given a slight upward curve and is pivotally connected with a second lever 24 between the outer end of this lever and its center, the lever 24 at its outer end being pivotally connected with the casing or shell 15, as shown at 25 in Fig. 2, and the inner end of the upper lever 24 is free and carries a contact-point 26, whereby this upper lever may be termed a "contact lever," as its point 26,

when the diaphragm is expanded or forced outward and upward, is to engage with a binding-post 27, two of which posts 27 and 28 are shown as connected with the cover 16 of the casing, and these binding-posts are in battery connection with an alarm mechanism B, located at any desired point. Any mechanism capable of being electrically or mechanically operated may be employed.

The pipe 18 is in direct communication with the expansible vessel A′, and the vessel and the pipe are adapted to be filled with any liquid capable of having its bulk increased or decreased by the action of heat or cold—as, for instance, water may be used, and oil, alcohol, ether, and numerous other materials might be named.

When the water is at the proper level in the boiler, it will circulate around the pipe 18, located in the shank-tube 10, and will keep that pipe cool. The moment, however, that the water falls below the lower gage-cock steam will enter the tube 10 and heat the pipe 18, and consequently the liquid contained in the expansible vessel A′ and the pipe 18, and as the liquid therein is heated the diaphragm 20 of the vessel will be forced upward, thus elevating the lower lever 21, which in its turn will carry up the contact-lever 24, and when the liquid has increased in bulk sufficiently to cause a contact between the binding-post 27 and the lever 24 the circuit between the binding-post and the alarm device B will be closed and an alarm will be sounded.

Instead of an alarm-bell being used, as shown in the drawings, the expansion of the diaphragm 20 may be employed to release clockwork, springs, weights, &c., or to open a valve and blow a whistle or to start a steam-pump.

When the device is to be used to indicate high water, the shank-tube 10 is secured to the water-column at the upper gage-cock. The device will in this case be kept constantly heated by the incoming or circulating steam when the water is not at its high level, and therefore the device will be kept heated until the water has reached its predetermined level, when it will enter the tube 10 and cool the interior or body portion of the device. In this case the alarm is to be sounded when the diaphragm 20 contracts, and therefore by the time that the water has reached the level desired the liquid contained in the vessel A will have become cool and will contract or decrease in bulk, thus permitting the diaphragm to fall, and suitable connections are provided in this case to sound at that time an alarm, electrically or otherwise.

It is evident that the device without the inclosing tube 10 may be used as a thermostat. The pipe 18 is thus exposed, and this pipe is ordinarily made of brass, and when the predetermined degree of temperature has been reached the liquid in the vessel and in the pipe 18 will be acted upon in such a manner as to sound an alarm wherever it may be desired. As a thermostat the device may be used in factories, hotels, greenhouses, mines, vessels, &c.

This device is not only exceedingly simple, but it is durable and economic and may be readily applied to any boiler or be fitted up for use as a thermostat in any required place by any artisan.

When the valve 14 and the discharge-pipe 13 are brought into requisition, more or less pressure is brought to bear on the water in the boiler—sufficient to flush said pipe.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A device of the character described, consisting of a shell, a receptacle provided with a diaphragm supported by the shell and having an extension projected beyond the shell, the receptacle and its extension being adapted to contain an expansible liquid or a gas, a lever fulcrumed upon the diaphragm, and a second lever fulcrumed upon the support of the vessel and actuated by the lever carried by the diaphragm, as and for the purpose specified.

2. A water-level indicator for boilers or a device adapted for use as a thermostat, the same consisting of a shell, a vessel contained within the shell and provided with an extension projecting beyond the shell, the vessel and its extension being adapted to contain a contractible and expansible substance, a diaphragm constituting a portion of the receptacle, a lever fulcrumed upon the diaphragm, a contact-lever actuated by the diaphragm lever and pivoted to the casing near one end, and an alarm mechanism in battery connection with the shell, the circuit being opened and closed by the contact-lever, as and for the purpose specified.

3. In a high and low water indicator for boilers, the combination, with a shell and a tube connected with said shell and adapted for attachment to the water-column of a boiler, of a vessel supported by the shell and provided with an extension projected downward within the tube attached to the water-column, the vessel and its extension containing an expansible and contractible material, a diaphragm constituting a portion of the vessel, a lever fulcrumed upon the diaphragm, a second lever pivoted to an adjacent support, independent of the diaphragm and actuated by the diaphragm lever, an alarm mechanism, and a connection, substantially as shown and described, between the levers and the alarm mechanism, whereby upon the expansion and contraction of the diaphragm, as predetermined, an alarm will be sounded, as and for the purpose set forth.

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Witnesses:
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