C. BRENT.

HIGH AND LOW WATER ALARM.

APPLICATION FILED JAN. 2, 1907.

978,983. Patented Dec. 20, 1910.

Fig. 1.

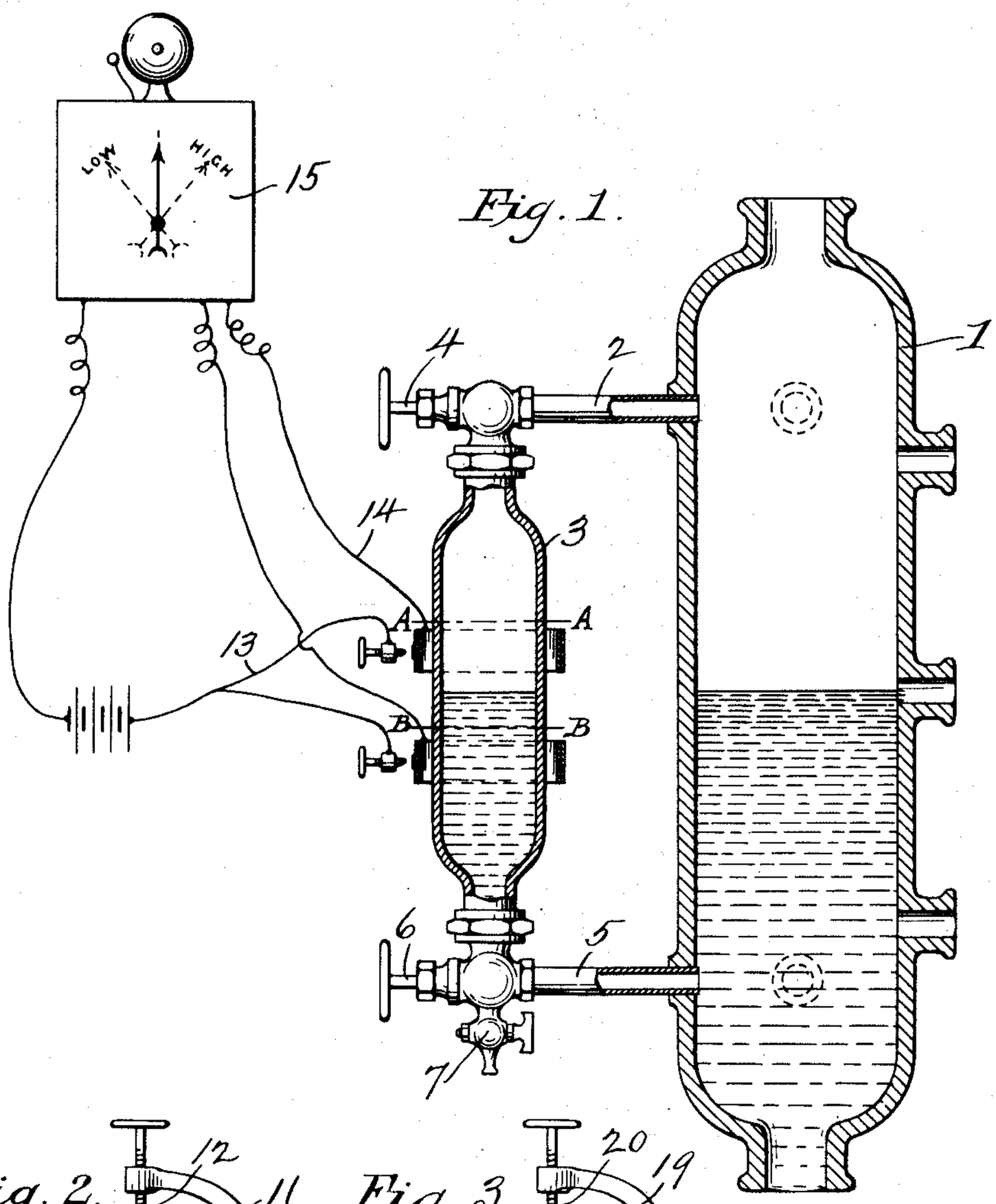


Fig. 2.

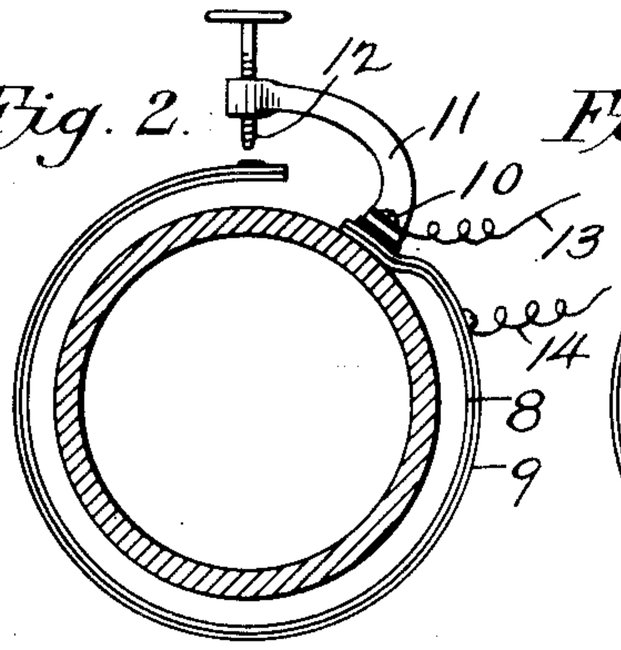
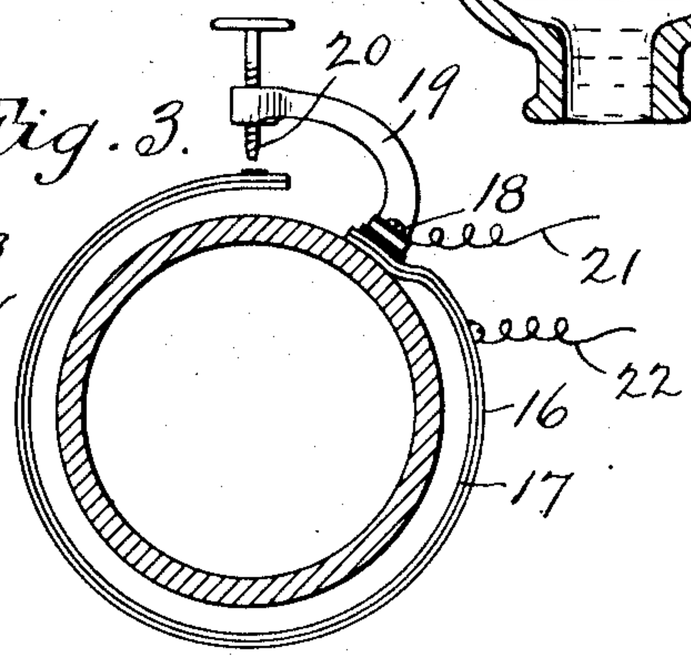


Fig. 3.



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HIGH AND LOW WATER ALARM.

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To all whom it may concern:

Be it known that I, CHARLES BRENT, residing at Brandon, in the Province of Manitoba and Dominion of Canada, have invented certain new and useful Improvements in High and Low Water Alarms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to high and low water alarm for steam boilers and is particularly designed as an improvement over my prior application for low water alarm for steam boilers filed the 5th day of November, 1906, Ser. No. 342,015, wherein a head which is normally filled with water and which is automatically converted into a steam head when the water in the boiler reaches a certain low water mark is provided with a thermally operated contact of a construction such that upon the conversion of the head into a steam head the circuit will be closed through an alarm system and the engineer will be notified that the water has become too low in the boiler.

More specifically the invention comprises a head which is used in connection with a water column connected to a boiler and is provided with suitable means for supplying it with steam and water from the water column. This head has thermally controlled contacts which are arranged in a manner such that when the water reaches low water mark one of these devices will complete an alarm circuit and sound the alarm, while the other device in a somewhat similar manner will be actuated to complete an independent alarm circuit to sound the high water alarm, or, as shown in the drawings, an indicator may be used in connection with the alarm to show just what the condition of the water is in the boiler.

The invention may be further briefly summarized as consisting in the construction and combination of parts hereinafter set forth in the following drawings, description and claims.

Referring to the drawings Figure 1 shows my device in section applied to a water column also in section and also connected to an alarm and indicator system; Fig. 2 is a section upon the line A—A of Fig. 1; and Fig. 3 is a section upon the line B—B of Fig. 1.

Any preferred form and construction of boiler and water column may be provided with my device, but I have shown in the drawing one embodiment wherein the boiler water column 1 is provided with a steam pipe 2 leading to the top of an alarm head 3 provided with a valve 4. The boiler water column is further provided with a water pipe 5 leading to the lower end of the head 3 and it is provided with a valve 6 and petcock 7. The connections between the boiler water column 1 and the head 3 are such that the level of water in the boiler water column is maintained in the head 3 so that any variation in the level of the water in column 1 is brought about in the column 3. Thermally operated contacts are provided upon the regulator column 3 and while they are quite similar in appearance they are very different in construction and will therefore be described independently.

The high water contact device comprises a compound thermostatic bar made up of a strip of steel 8 secured throughout its length, preferably by soldering, to a strip 9 of zinc. This bar is formed in a loop of a size such that when it is secured to the head 3 it will surround the same and be in close proximity to it so that heat may readily act upon the metals and bring about the thermostatic action. The bar is secured to the head above the water line by means of a screw 10 passing through the foot of a bracket 11 which is insulated from the bar and carries a contact 12. A suitable lead 13 is connected to the bracket 11 and forms one portion of the circuit while another lead 14 is secured to the bar. This compound bar and its contact screw 12 are arranged in a manner such that the free end of the bar is normally out of engagement with the screw, but when the water rises and there is a change in temperature, the action of the bar is to cause its free end to move out into engagement with the contact screw and to thereby complete the alarm circuit for the high water alarm.

The compound bar is arranged with the zinc strip outside on account of the fact that this strip has a greater co-efficient of expansion than steel, and hence when the upper part of the head 3 is filled with steam it contracts the loop and therefore holds it out of engagement with the contact screw 12, but upon the water rising to a point where the steam is excluded from this part of the head, the temperature about this bar is low-

ered whereby the zinc strip 9 contracts with the result that the loop is expanded and the contact screw 12 is engaged thereby.

The low water alarm, shown as the lower contact device in Fig. 1 and more fully shown in Fig. 3, consists of a compound bar made up of a strip 16 of steel on the outside and a strip 17 of zinc on the inside and both secured together and fastened at one end to the head 3 by means of a screw 18 passing through a bracket 19 insulated from the head and carrying upon its outer end a contact screw 20.

The low water contact device just described operates in the following manner. When the head 3 is filled with water to a normal water level point above this device the bar remains out of engagement with its contact screw, but upon the water sinking below it the head is converted into a steam head at this point with the result that the increase in temperature due to the presence of the steam causes the bar to expand and complete the circuit through the low water alarm side of the system.

Having described my invention, I claim:

1. In a high and low water alarm for steam boilers, a head in open communication with the boiler and having a steam and water space, a thermostatic bar and contact mounted upon the normal steam portion of said head and adapted to be brought into engagement when the water rises in said steam portion, another thermostatic bar and contact upon the water portion of said head and adapted to be brought into engagement upon the sinking of the water in the head and due to change of temperature caused by the presence of steam in that portion of the head, and an alarm system operated by said contacts.

2. In a high and low water alarm for steam boilers, a head in open communication with the boiler and having a steam and water space therein, a contact mounted on said head above the normal water line, a thermostatic loop secured to the head, surrounding the same, and having its free end out of engagement with said contact when steam is present in that portion of the head, said loop being adapted to engage its contact by a change in temperature due to the presence of water in that portion of the head, another contact carried by said head and below the normal water level line, another thermostatic loop coöperating therewith and secured to the head and having its free end normally out of engagement with but upon movement adapted to engage its contact, such movement being caused by a change in temperature due to the presence of steam in that portion of the head, and an alarm circuit adapted to be completed to sound the alarm by the high and low water contact devices.

3. In a high and low water alarm for steam boilers, a head in communication with the boiler whereby the water level in the latter is maintained in the former, a contact mounted upon said head, a thermostatic loop coöperating therewith and secured to the head and comprising an outer strip of zinc and an inner strip of steel, said contact and loop being arranged in a manner such that the zinc is acted upon by the heat from steam in that portion of the head so that it contracts the loop and holds the free end thereof out of engagement with its contact, another contact carried by said head below the normal water line, another thermostatic loop coöperating therewith and secured to the head and comprising an outer strip of steel and an inner strip of zinc and arranged in a manner such that when water is present in that portion of the head, the free end of the loop is out of engagement with its contact, but upon the presence of steam in that portion of the head, the zinc is expanded and the free end of such loop is brought into engagement with such contact, and an alarm system adapted to be set into operation by the contacting of all of said loops with their contacts.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES BRENT.

Witnesses:
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