No. 654,631. Patented July 31, 1900.

E. D. HAYS.

HIGH OR LOW WATER ALARM FOR BOILERS.

(Application filed Dec. 15, 1899.)

(No Model.)

FIG. 1.

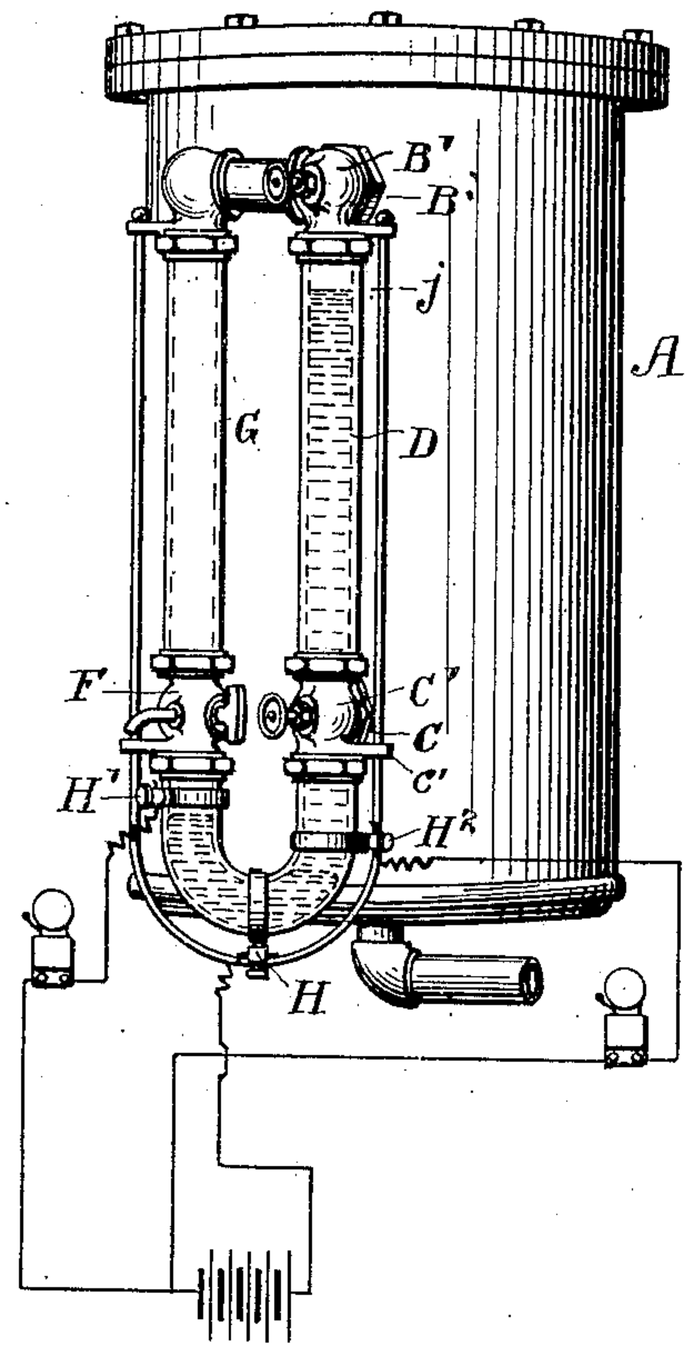


FIG. 2.

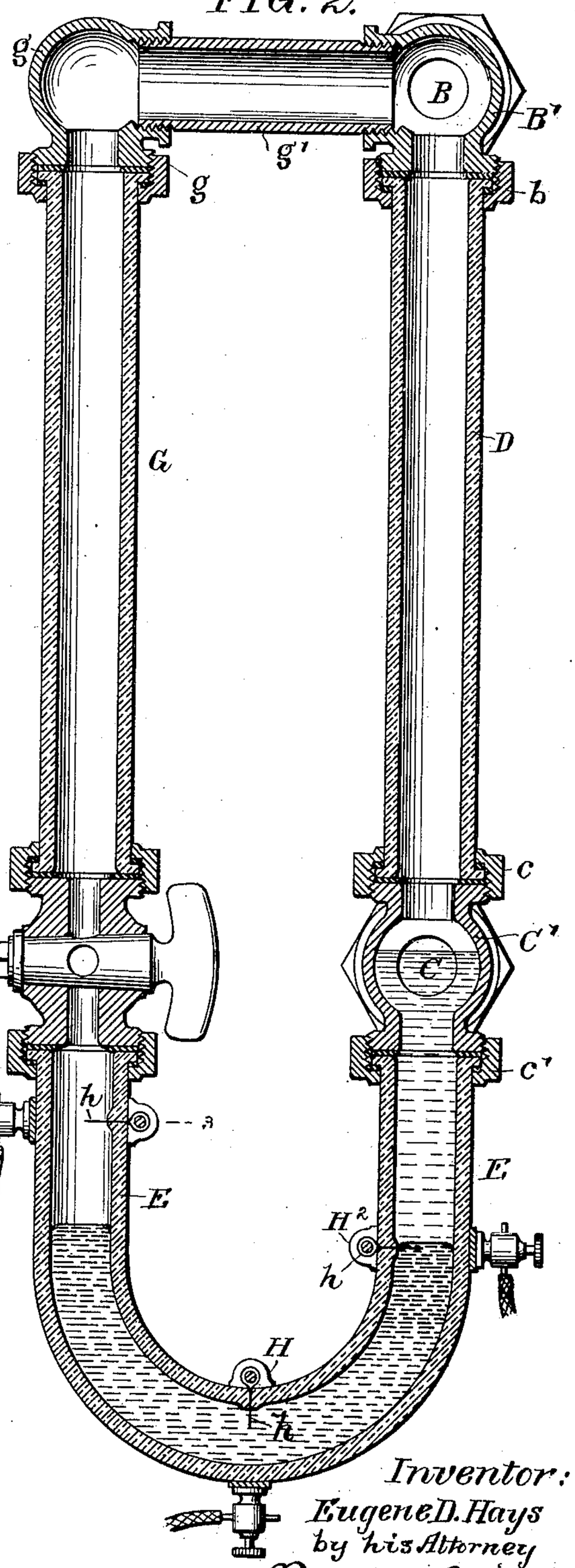
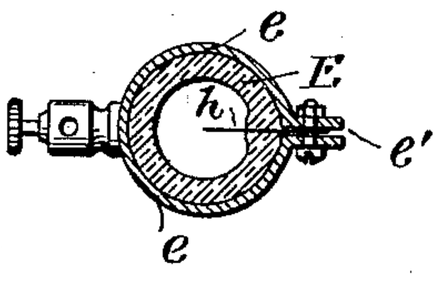


FIG. 3.



Witnesses:
Wm F. Donnelly
Joseph Mellon, -

Inventor:
Eugene D. Hays
by his Attorney
A. DeWitt Goodwin

UNITED STATES PATENT OFFICE.

EUGENE D. HAYS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO JOHN W. GRIFFENBERG, FRED. DE WITT GOODWIN, AND WILLIAM C. HAYS, OF SAME PLACE.

HIGH OR LOW WATER ALARM FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 654,631, dated July 31, 1900.

Application filed December 15, 1899. Serial No. 740,461. (No model.)

To all whom it may concern:

Be it known that I, EUGENE D. HAYS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in High or Low Water Alarms for Boilers or Tanks, of which the following is a specification.

This invention consists of improvements in high and low water alarms for boilers or tanks.

One object of the said invention is to construct a water-gage for boilers or tanks in such a manner that an alarm will be given when the water rises or falls above or below certain given points, a further object being to avoid the complicated mechanical construction usually used in such devices, which are impractical and costly.

The invention is more fully described hereinafter, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view of my invention applied to the ordinary water-column of a steam-boiler. Fig. 2 is a vertical sectional view; and Fig. 3 is a cross-sectional view on line 3 3, Fig. 2.

Referring to the drawings, A represents a water-column of a steam-boiler, with which connection is made with the gage or alarm at B and C, each connection being provided with valves B′ and C′, said valves having couplings *b* and *c*, and between said couplings is interposed a glass column D.

The device so far as above described corresponds with the ordinary water-glass of steam-boilers. The connections B and C being open, the water will appear in the glass at a level corresponding to that in the boiler.

The valve C′ is provided with a coupling *c′*, by which is secured to the said valve a glass tube E. Said tube is curved, and its opposite end secured to a stop-cock F, from which connection is made with the boiler by means of the tube G, the elbow *g*, the pipe *g′*, and the valve B′. The curved tube E is provided with electrical termini H, H′, and H^2, each having a contact-point *h* projecting through to the center of the tube. The glass tube E is partially filled with mercury, the water in column D being allowed to rest upon it, sufficient mercury being placed in the tube E to balance the weight of the water. When the water in the column D is low, as shown in Fig. 2, the mercury will seek its own level, and in so doing will come in contact with the electrical terminal H^2 and make a connection between the terminal H, with which the mercury is always in contact, and the terminal H′, thereby ringing a bell. When the water in the boiler and in the column D rises, the additional weight of water will depress the mercury and break the circuit between termini H and H^2; and if the water rises beyond a point *j*, Fig. 1, the mercury will be forced around the curved portion of the tube E until it reaches the terminal H′, when connection will be made with the terminal H and an alarm given.

Fig. 3 shows the construction of the electrical terminal. A binding-post is secured to a band *e*, which encircles the glass tube E, the said band having projections *e′*, between which is clamped the platinum contact-point, which is embedded inside of the glass tube and extends through the center of the same.

The stop-cock F is used for drawing off the water that may collect from the condensation of the steam in the column G. Normally the stop-cock is turned, so that there will be a free passage between the mercury and the boiler, thus allowing the steam-pressure to act equally on the surface of the mercury and the surface of the water; but when used for drawing off the water the stop-cock is arranged so as to prevent the mercury from being forced into the tube G or carried off with the escaping water.

In place of ringing a bell it may be desirable to operate a pump or injector by starting or stopping the same with the electrical current, any of which devices may readily be operated by my invention.

The tube D between the valves B′ and C′ could be omitted, as the weight of the water in the boiler would still have the same effect

on the mercury, and the stop-cock F could likewise be omitted when the device is used on tanks where provision does not have to be made for the condensation of steam.

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

1. The combination, in a high and low water alarm for boilers or tanks, of a vertical tube or gage-glass, a vertical tube extending parallel with said gage-glass and connected therewith at the top and bottom, a dependent curved connection having electrical termini inserted therein, electrical contacts, mercury in said curved connection to complete or break an electrical circuit between said termini thereby giving an alarm, and a stop-cock F having couplings thereon to receive the tubes, substantially as described.

2. The combination, in a high and low water alarm for boilers or tanks, of a vertical tube D, a tube G, a dependent curved tube having electrical termini inserted therein, mercury in said curved tube to complete or break an electrical circuit, electrical contacts, binding-posts provided with bands for attaching the same, an electrical terminal H continuously in contact with the mercury, termini H′ and H² arranged so that the mercury may come in contact with either and complete an electrical circuit, a suitable electrical device for giving an alarm, a stop-cock F, fittings thereon to receive the tubes and fittings *c* and *c′* on the valve C′ substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

EUGENE D. HAYS.

Witnesses:
JOHN E. MCCULLY,
THOMAS G. HAWKES.