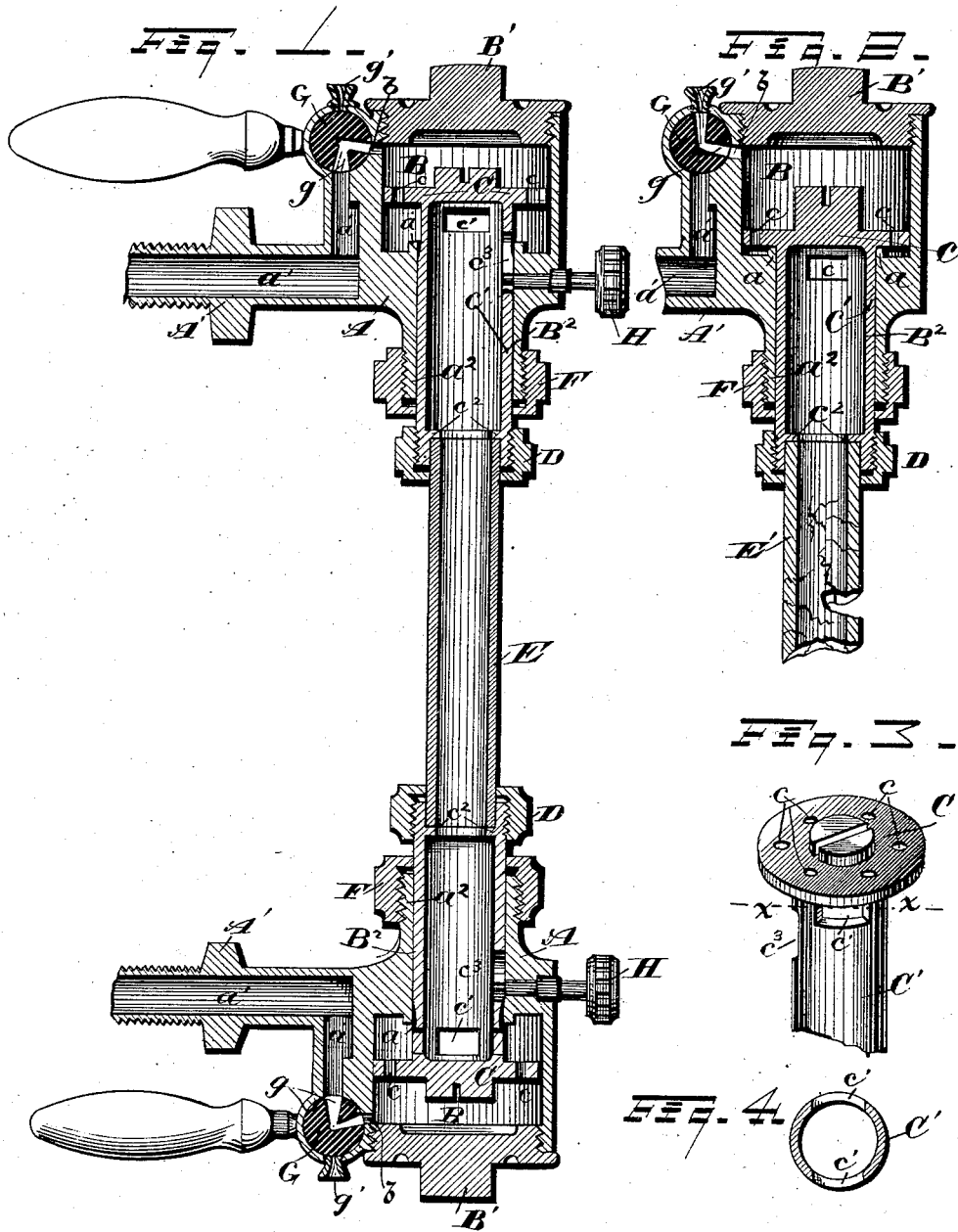


(No Model.)

F. HARDIE.
SAFETY WATER GAGE.

No. 307,298.

Patented Oct. 28, 1884.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK HARDIE, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-THIRD TO
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SAFETY WATER-GAGE.

SPECIFICATION forming part of Letters Patent No. 307,298, dated October 28, 1884.

Application filed June 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANK HARDIE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Water Columns or Gages for Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in water-columns or water-gages for steam-boilers, the object being to provide valves at either end of the column so arranged that in case the glass tube is broken the valve will be closed by the boiler-pressure, and thereby prevent the escape of steam or water.

With this object in view my invention consists in certain features of construction and in combination of parts, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section through the center of my improved water-column. Fig. 2 is a vertical section of the upper portion of the water-column with the valve closed. Fig. 3 is a view in perspective of one portion of the valve. Fig. 4 is a transverse section through the valve-tube on the line of *xx*, Fig. 3.

A A represent the heads of the column, which are located one above the other and a proper distance apart to accommodate the glass tube, and are provided with the parts A', that screw into the boiler or into tubes leading to the boiler, as the case may be. The heads are adjusted so that the parts that hold the glass tube face each other, and the heads and attachments are intended to be alike, so that a description of one will apply to both. The head A is circular in cross-section, except where the part A' and the casing for the plug-valve are joined.

B is a cylindrical chamber, closed at the outer end by the plug B', and is in open relation and concentric with the smaller chamber B², that extends through the remaining portion of the part A. The walls of these chambers are bored and fitted accurately.

C is a disk that fits the bore of the chamber B, and is provided with several holes, *c*, near the periphery, to admit the passage of steam

through the disk. The disk C is integral with the hollow cylinder C', that fits the bore of the chamber B². The part C' is provided with openings *c'* of considerable size, located next to the disk C. The part C' extends out of the chamber B² and projects some distance beyond the part A, and this projecting end is threaded and provided with the gland D, that forms a stuffing-box around the glass tube E. The part C' has an inside annular flange, *c*², against which the end of the tube E abuts. The part A at *a*² is threaded on the outside and provided with the gland F, that forms a stuffing-box around the cylinder C'. The chamber *a'*, that leads through the part A', turns at a right angle and leads to the plug-valve G. The opening *g* through the plug is angular, and forms what is known as a "three-way" valve. When the valves are in the position shown in Fig. 1, steam or water may pass through the valve from the passage-way *a'* and through the opening *b* into the chamber B. When the valve G is turned in the position shown in Fig. 2, communication between the passage *a'* and the chamber B is cut off, and steam or water from the chamber B may pass off through the opening *g'*.

H H are thumb-screws that pass through the part A at the point shown, and pass also through the slots *c*³ in the cylinder C, and hold this part from turning when the gland D is turned in tightening the packing. The slot *c*³ is of such length that the disk or valve C may come in contact with the seat *a*. The parts C and C' form a sliding valve, and when in the position shown in Fig. 2 the disk C rests upon the raised seat *a*, and forms a tight joint that cuts off the communication between the boiler and glass tube. The slotted hub shown on the disk C is only for convenience in grinding the disk and valve-seat.

The operation of the device is as follows: The tube E is placed in the position shown in Fig. 1. The ends of the tube enter, respectively, the parts C' and abut against the ribs *c*². The tube is of such length that the disks C are removed some distance from the respective seats *a*. Packing is placed under the gland D and a tight joint formed between the tube and the part C'. Packing may also be added under the gland F, when necessary, to form a

tight joint between the parts A and C'; but this joint should be left as free as possible, so that the part C' may be moved endwise quite easily. The valves G are turned in the position shown in Fig. 1, and steam or water may freely enter the chamber B and pass through the holes *c*, and from thence through the opening *c'* into the tube C, and from thence into the glass tube, where the height of water will be seen, as in ordinary water-gages. In case the glass tube should be broken, the pressure of steam or water on the disks C would instantly close them upon the respective seats *a* and prevent the escape of steam or water. The valves G are then turned to the position shown in Fig. 2, by means of which the communication from the passage-way *a'* is closed, and the steam or water confined in the chambers B may pass off, leaving the apparatus in condition to receive another glass tube.

What I claim is—

1. In a water-gage, the combination, with suitable heads in communication with a boiler and having valve-seats therein, of valves located in the heads, and a glass tube connecting the valves and holding them out of contact with their respective seats, substantially as set forth.

2. In a water-gage, the combination, with suitable heads having valve-seats therein, of movable cylinders located in said heads and provided with valves, and a glass tube the ends of which are secured to said cylinders, substantially as set forth.

3. In a water-gage, the combination, with suitable heads having valve-seats therein, of movable cylinders located in said heads and provided or formed on their outer ends with a disk or valve, and a glass tube secured to the inner ends of said movable cylinders, substantially as set forth.

4. In a water-gage, the combination, with the heads adapted to be connected to a boiler and the glass tube, of the slotted cylinders, each of which is provided with a valve, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 16th day of June, 1884.

FRANK HARDIE.

Witnesses:

CHAS. H. DORER,
ALBERT E. LYNCH.