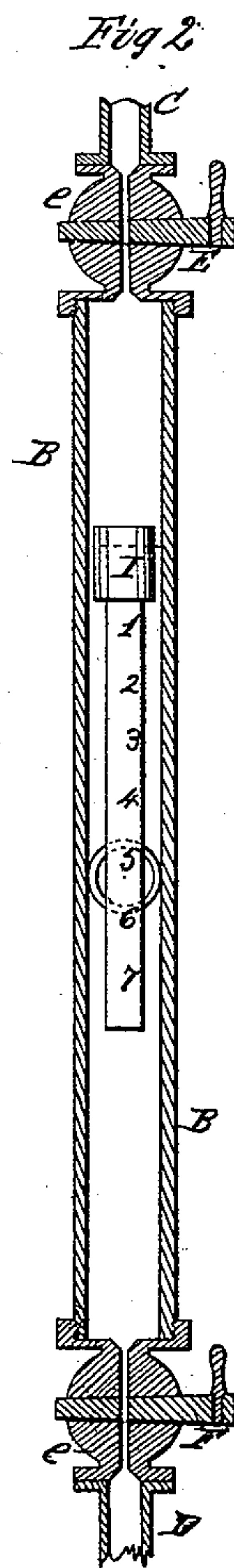
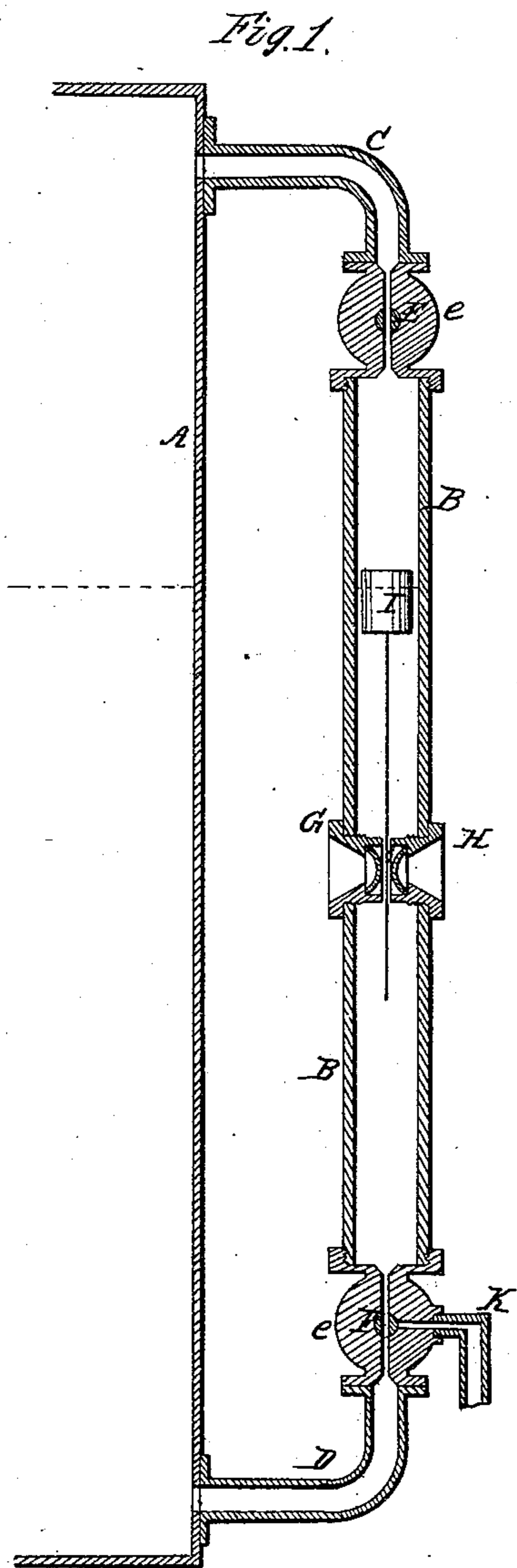


J. ECHOLS.
Water Gage.

No. 13,903.

Patented Dec. 11, 1855.



Witnesses
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JOSEPHUS ECHOLS, OF COLUMBUS, GEORGIA.

WATER-GAGE FOR STEAM-BOILERS.

Specification of Letters Patent No. 13,903, dated December 11, 1855.

To all whom it may concern:

Be it known that I, JOSEPHUS ECHOLS, of Columbus, in the State of Georgia, have invented certain new and useful Improvements in Water-Gages for Ascertaining the Height of Water in Steam-Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a vertical section of my improved gage taken in a plane parallel with the plane of the axis of the boiler, and Fig. 2, another vertical section taken in a plane at right angles to the plane of Fig. 1.

The same letters indicate like parts in both figures.

My said invention relates to improvements in that class of water gages for steam boilers which consists of a vertical tube communicating at the upper end with the steam in the upper part of the boiler, and at the lower end with the water in the lower part of the boiler, so that by this double communication the water shall stand at the same level in the tube as in the boiler and be visible through the glass tube; but this class of gages has been used to a very limited extent on account of the liability of the glass to be broken by the pressure of the steam, the transparency of the glass becoming obstructed by incrustation on the inner surface, and also by deposits obstructing the passages between the glass tube and the boiler.

The object of my invention is to avoid the defects above indicated, and my said invention consists in making the tube of such gage of metal with apertures provided with concavo convexo glasses presenting the convex surface inward to resist the pressure of the steam, and so connected with the metallic tube that they can be readily taken out to wipe off the matter which lodges on the inner surface, and which if not removed will prevent the level of the water in the tube from being seen.

In the accompanying drawings A represents the head of a steam boiler, and B, B, a metallic tube of about $2\frac{1}{2}$ inches diameter, connected at the upper end with the upper part or steam chamber of the boiler by a bent tube C, and at the lower end with the lower part or water compartment of the boiler by a similar bent tube D, the tubes C, and D, being of less bore if desired. The tube B, is connected to the bent tubes by

coupling pieces *e, e*, having screw or flanch joints, or in any other suitable manner to insure steam tight joints. The bore in the two coupling pieces I prefer to make of less diameter than the bore of the bent tubes; but this is at the discretion of the constructor. And the upper coupling piece is provided with a single way stop cock E, that the engineer may at pleasure establish or cut off the communication between the tube B, and the steam in the upper part of the boiler. And the lower coupling piece is in like manner provided with a three way cock F, to establish or cut off, at pleasure, the communication between the tube and the water in the lower part of the boiler, and also to open or close the connection between the bent tube D, leading to the water in the boiler and a discharge pipe K, or between the gage tube B, and the discharge pipe K. The gage tube B, is pierced with two apertures one on each side to which are fitted hollow nuts G, H. The hollow of these nuts is bell shaped and to the smaller or inner end of each is fitted a concavo convexo glass with the convex surface inward. The edge of these glasses should be well secured in any suitable manner to sockets in the nuts to enable them by the arch form to resist the pressure inside the gage tube. A float I, works freely within the gage tube and carries a strip of metal or other suitable material with numbers marked on the surface to indicate the level of the water in the tube.

When the stop cocks are turned as represented in the drawings the gage tube communicates freely with the water and with the steam in the boiler so that the water will stand in the tube at the same level as in the boiler, and this level will be indicated by seeing through the glasses the figures on the strip attached to the float. And if at any time the transparency of the glass should become obstructed by matter lodging on the inner surface the stop cocks can be turned to shut off the communications with the boiler and then the nuts can be unscrewed to wipe the glass or glasses. And if either of the passages from the gage tube to the boiler should be stopped up by sediment &c. by turning the three way stop cock F so as to open either of the communications between the bottom or the top of the boiler and the discharge pipe K, the obstructions may be blown out with the full pressure in the boiler. And by turning the stop cock F, so

as to close the passage leading from the bottom of the boiler to the gage tube and opening the communication between the gage tube and the discharge pipe to discharge the
5 water contained at the time in the gage tube, and measuring this water the exact level of the water can be determined. Instead of two glasses, one on opposite sides, a series of them may be used in which case the float
10 may be dispensed with as the level of the water may be seen through some one of the glasses.

Instead of using the series of glasses in the form of segments of hollow spheres, one
15 single glass may be used on each side of the required length and in the form of the segment of a cylinder properly embedded in a metallic frame capable of being secured to, and removed from the gage tube for the pur-
20 pose of cleaning. And although I have described the glasses on each side as being attached to nuts or frames which can be re-

moved, I do not wish to limit myself to this as the glasses on one side may be secured directly to the gage tube and be got at for the
25 purpose of cleaning when the glass or glasses are removed on the other side. Nor do I wish to be understood as limiting myself to the special mode of construction herein specified as other equivalent modes may be
30 substituted.

What I claim as my invention and desire to secure by Letters Patent is—

Making gage tubes for indicating the height of water in steam boilers with an ap-
35 erture or apertures provided with convex glass presenting the convex or arched surface to the pressure in the tube, substantially as and for the purpose specified.

JOSEPHUS ECHOLS.

Witnesses:

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