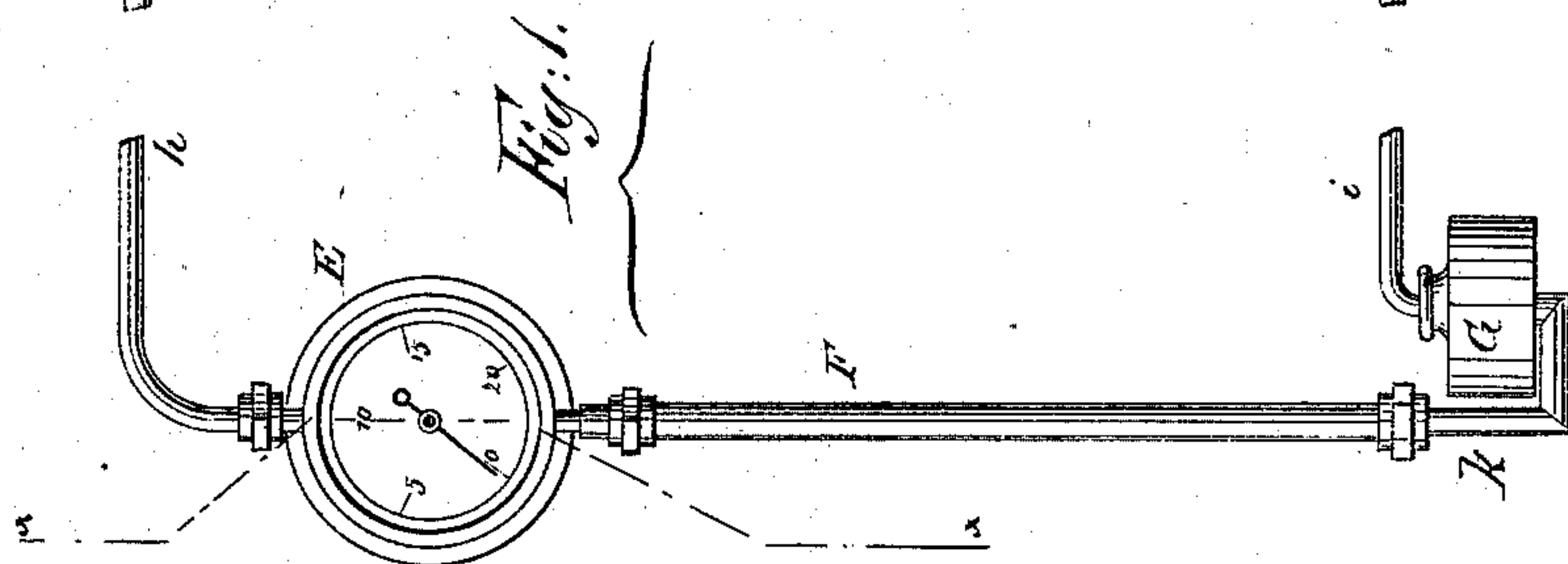
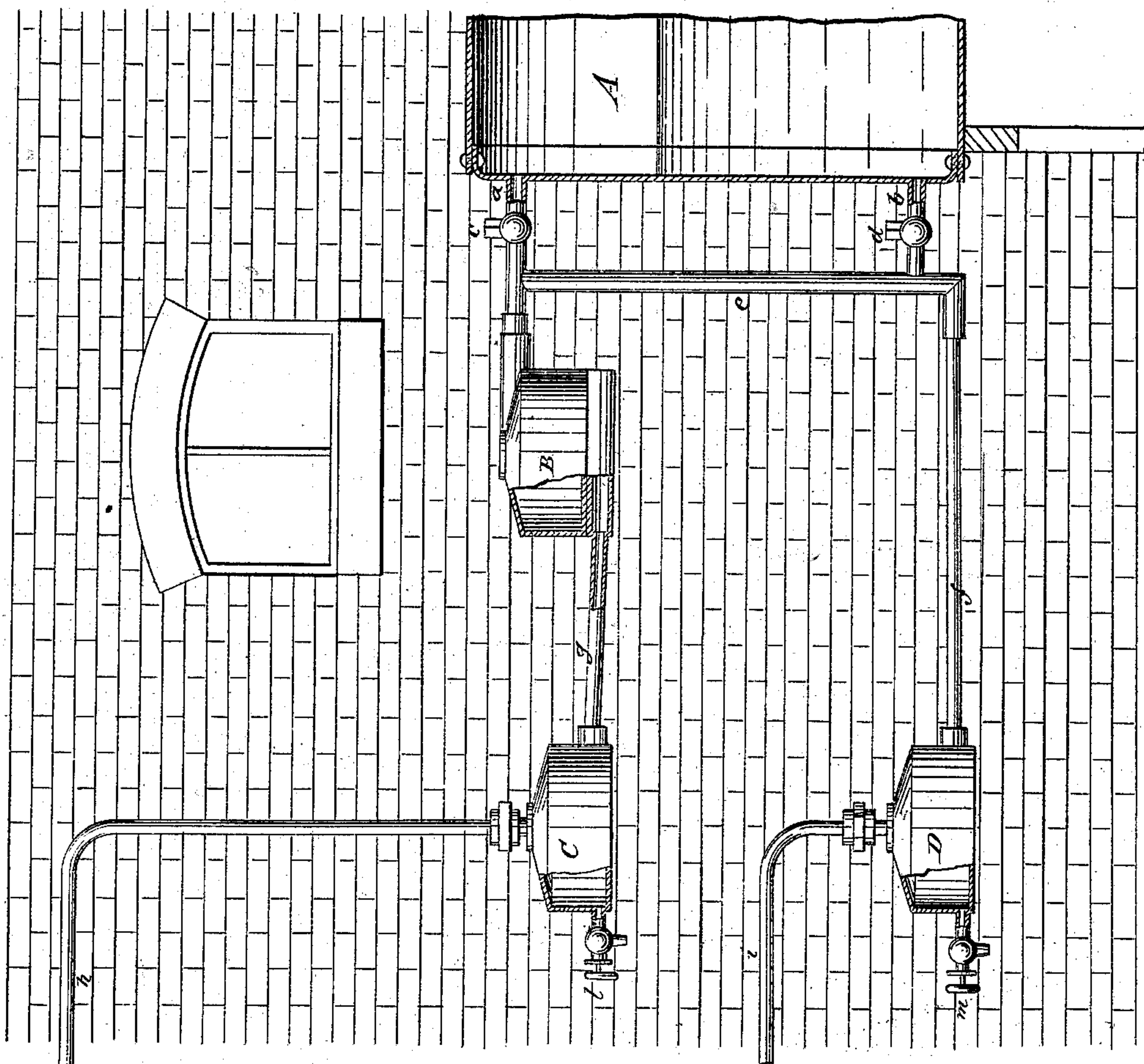
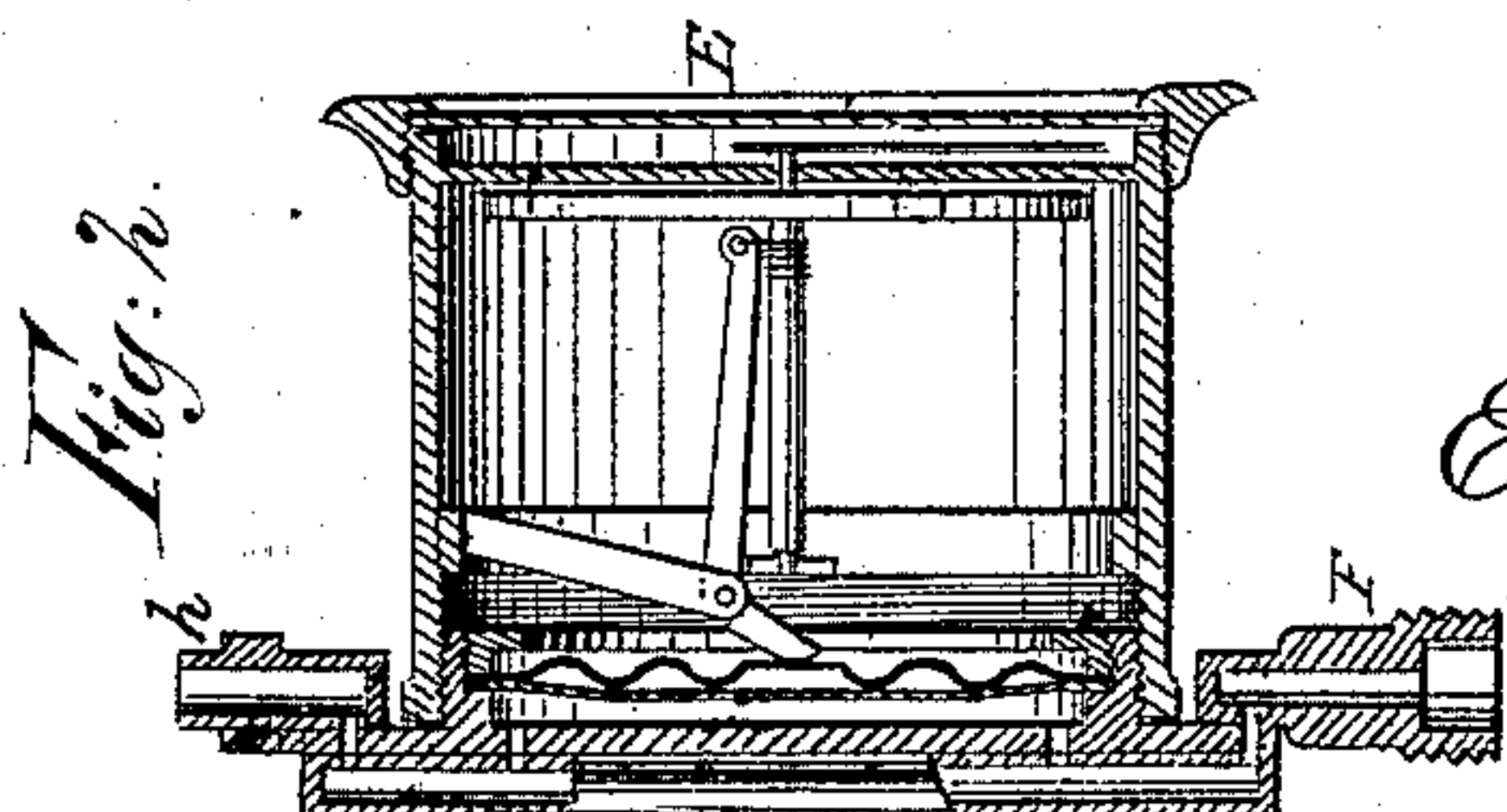


**E. JEROME.**  
**Steam Pressure and Water Gage.**  
**No. 235,774.**                      **Patented Dec. 21, 1880.**



*Witnesses:*  
*Chas. Nida.*  
*J. H. Wattenberg*



*Inventor:*  
*Edgar Jerome*  
*per J. W. Symington,*  
*att'y*



# UNITED STATES PATENT OFFICE.

EDGAR JEROME, OF ALBANY, NEW YORK.

## STEAM-PRESSURE AND WATER GAGE.

SPECIFICATION forming part of Letters Patent No. 235,774, dated December 21, 1880.

Application filed November 6, 1879.

*To all whom it may concern:*

Be it known that I, EDGAR JEROME, of Albany, in the county of Albany and State of New York, have invented a new and useful Improvement in Steam-Pressure and Water-Level Indicators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification.

This invention is in the nature of an improvement in steam-pressure and water-level indicators; and the invention consists in a steam-pressure and water-level indicator constructed with water and air reservoirs, whereby the indicators are operated by columns of air within tubes which are free from steam or liquid, as is hereinafter more particularly described.

In the accompanying sheet of drawings, Figure 1 is a front elevation of my invention applied to a steam-boiler; and Fig. 2, a section of the gage in line *x x*, Fig. 1.

Similar letters of reference indicate like parts in the two figures.

This invention relates more particularly to that class of indicators wherein the pressure from the initial point to the gage is conveyed to points remote from the boiler. In this device the force from the boiler is conveyed to the indicating devices by columns of air which occupy the tubes leading to the indicators, and these tubes are filled with air alone, and contain neither liquid nor steam to be frozen and condensed, so that false indications of the water-level and steam-pressure in the boiler are impossible under any conditions of atmosphere, and derangement of the device by freezing or otherwise is obviated.

In my invention, A represents an ordinary steam-boiler, which may be of any desired construction and size. From the steam-space of the boiler, or from the steam-drum or steam-pipe thereof, issues a pipe, *a*, with a cock, *c*, fitted therein, and from the water-space of the boiler issues a pipe, *b*, provided with a cock, *d*. The outer end of the pipe *a* is received into a reservoir, B, at or near the top of the same, and the outer end of the pipe *b* is received into a pipe, *e*, one end of which last-mentioned pipe passes into the pipe *a*, and its other end is received into a reservoir, D, at

or near its bottom. From the bottom of the reservoir B extends a pipe, *g*, terminating at or near the bottom of a reservoir, C. From the top of this reservoir passes a pipe, *h*, terminating in a pressure-gage, E, and from the top of the reservoir D extends a pipe, *i*, which passes into the top of a reservoir, G, and from the bottom of this last-named reservoir a pipe, *k*, extends and terminates in a glass tube, F, or water-glass. The reservoirs C and D may, if desired, be each provided with drain-cocks *l* and *m*. This being substantially the construction and arrangement of my device, its operation is as follows:

The cock *c* in the pipe *a* being closed, the cock *d* in the pipe *b* is opened, when the water from the boiler A at once enters into the pipe *e* and reservoir B, driving out the air as the water is admitted therein. The cock *c* in the pipe *a* is next opened, admitting steam, when at once the pressure of water in the reservoir B is made equal to the pressure within the boiler A, and the water forced through the pipe *f* into the reservoir D at or near its bottom. Now, the water being admitted into this last-named reservoir D at or near its bottom, it can only fill the reservoir up to a point where the pressure of the air within the reservoir will counterbalance the pressure of the water, or until the pressure of the incoming water is equalized by the pressure of the air (which the incoming water has condensed) within the reservoir, so that there is at all times an elastic cushion of air interposed between the surface of the water in the reservoir and the top of the reservoir, beyond which the water cannot pass and get into the tubes *h* and *i*. The pressure of this air is imparted to the air within the pipe *i*, thence to the surface of the water with which the reservoir G is filled, (other than by water from the boiler.) The air-pressure so extended forces the water in the reservoir G through the pipe *k* into the glass tube F, where it becomes visible, indicating the true height of the water in the boiler under all circumstances. From the bottom of the reservoir B the water, which has been admitted therein in the manner before described, passes to the bottom of the reservoir C, into which it is forced until its pressure is equalized by the pressure of the air within the reservoir in precisely the same manner as in the



reservoir D, before described. The steam then from the pipe *a* and through the reservoir B maintains this pressure, and the air within the reservoir C imparts it to the air within the pipe *h*, thence to the steam-gage E, where its pressure is recorded by suitable indicator and dial.

That the level of the water shown in the tube F may truly indicate the exact level of the water in the boiler it is necessary that it should be in the tube under the same conditions as to pressure as is the water in the boiler. Therefore the air-pressure from the reservoir C, (representing the steam-pressure in the boiler,) after making its record on the gage E, is allowed to pass into the upper end of the tube F and exert its pressure above the water in the tube. It might seem as though, the pressure of the steam being in this way admitted, that the pressure in the tube would be equalized, and therefore the water from the reservoir G would not be forced up and into the tube F; but the pressure due to the weight of water in the boiler (represented by the column of water in the tube *e*) makes a pressure sufficiently in excess of the steam-pressure alone to cause the water from the reservoir G to freely flow through the bottom of the tube F, notwithstanding steam-pressure on the air above it.

From the foregoing it will be seen that not only does my device accurately indicate the pressure of the steam and level of the water in the boiler, but that this indication is had through the medium of an air-pressure to which the initial pressure has been imparted.

The great advantage to be derived from this invention lies in the fact that the steam-gage and water-glass may be located at any reasonable distance from the boiler, out of doors or indoors, and at any level, and yet the steam-pressure of the boiler and the level of its water will be accurately indicated by the gage

and glass, for the reason that no condensation or freezing can take place within the tubes *h* and *i*, which connect directly with the indicators, to affect either the indication of pressure or of water-level. The other tubes, *a*, *b*, *e*, *f*, and *g*, and reservoirs B C D being contiguous to the boiler, the water within them is prevented from freezing, and in cold weather, when the boiler is not in use, they may be drained by the drain-cocks *l m*.

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

1. A device for indicating the steam-pressure and water-level in a boiler, with a reservoir, B, constructed to receive steam and water at or near its upper surface, in combination with reservoirs C and D, constructed to receive the pressure of steam and water at or near their bottom or lower surface, substantially as and for the purpose described.

2. In a device for indicating the steam-pressure and the water-level in a boiler, a vertical pipe, *e*, connecting the outlet-pipes from the steam and water spaces of a boiler, in combination with a reservoir, B, constructed and arranged to receive steam and water at or near its upper surface, and reservoirs C and D, constructed and arranged to receive the pressure of steam and water at or near their under sides, substantially as and for the purpose described.

3. In a device for indicating the steam-pressure and the water-level in a boiler, the reservoirs B, C, D, and G, and pressure-tubes *g*, *h*, *i*, and *f*, in combination with pressure-gage E and water-glass F, substantially as and for the purpose described.

EDGAR JEROME.

Witnesses:

ROBT. M. HAMILTON,  
E. J. WHEELER.