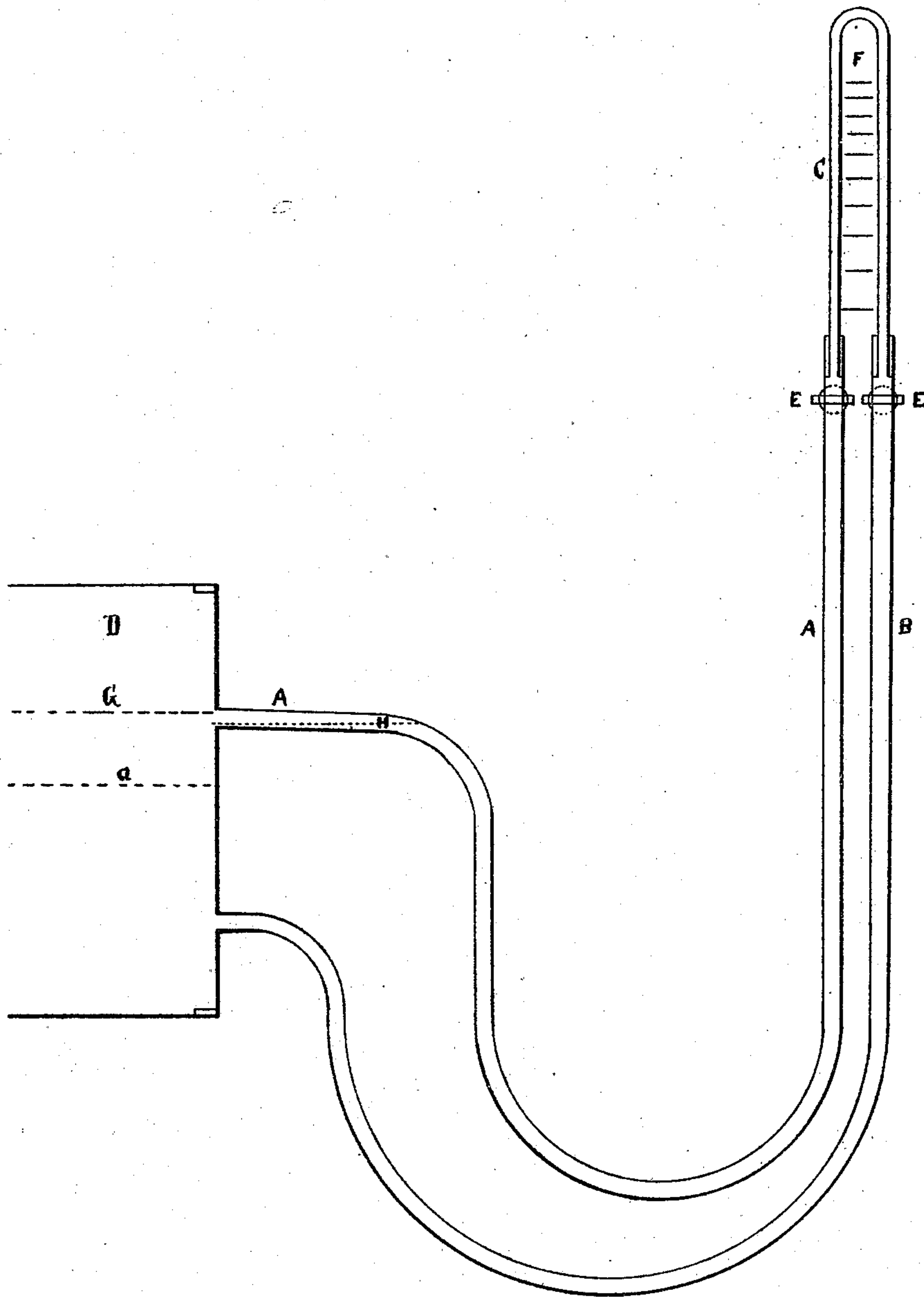


*W. C. Grimes.*

*Steam Gauge*

*No 8629.*

*Patented Jan 6. 1852.*





# UNITED STATES PATENT OFFICE.

WM. C. GRIMES, OF SPRING GARDEN, PENNSYLVANIA.

## STEAM AND WATER GAGE.

Specification of Letters Patent No. 8,629, dated January 6, 1852; Antedated July 6, 1851.

*To all whom it may concern:*

Be it known that I, WM. C. GRIMES, of Spring Garden, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Mode of Showing or Indicating the Height of the Water and Also the Pressure of the Steam in Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention, which is intended to show or indicate the height of the water, and also the pressure of the steam, in steam boilers, at an elevation above, or the required distance therefrom, consists, in giving to a glass and two metallic tubes, such as form and combination, that when filled with the requisite quantities of air and water (and the tubes being united and properly attached to a boiler) they produce the result above named. The glass tube C is in form a siphon with the legs parallel, and of equal length. To these are joined in any well known or convenient manner the metallic tubes A and B, which form but an elongation of the legs of the siphon, and are inserted, the one into the steam space and the other into the lower part of the water space of the boiler D. The tube A connected with the steam space, enters the boiler at the water line (or a little above) and runs for some yards horizontally, or a little inclined downward, when it again bends more directly downward, forming a deep bend or curve, and then runs in any convenient direction to the glass siphon. The object of this arrangement is to allow the steam to condense in the horizontal part of the tube, and thus to keep it filled with water from the glass to the boiler, except a portion of the horizontal part next the boiler, which is filled with steam. The tube B connected with the water space of the boiler, bends downward more or less soon after leaving the boiler and then runs with the other tube to the siphon.

Each of the metallic tubes is provided with a two way cock or screw plug E, near its upper end or immediately beneath the glass, for the purpose of opening when desirable a communication with the external atmosphere, to allow any surplus air to escape, or any deficiency thereof to be supplied to the siphon.

To put the instrument in operation the boiler is filled to a little above the proper water line, so as to flow into the upper tube A. It will then stand in both branches of the siphon on a level with that in the boiler, provided the cocks at E have been turned, so as to allow the air to escape from the tubes. Steam is then raised, upon which, the water will rise, and equally in both legs of the siphon, with the increasing pressure, until it flows from the lateral apertures at E. All the air being now expelled from the tubes below the cocks, or the lateral apertures, the cocks are then turned, or the plugs screwed in so as to close the lateral apertures and open a communication into the glass above. Any further ascent of the water in the siphon will now be resisted by having the air to compress above it, hence the degree of pressure in pounds per square inch may be read upon a properly graduated scale placed beside it. The two columns of water having ascended into the glass, will now stand at the same height or level therein, until the water in the boiler falls below the mouth of the upper tube, when a change of level in the ends of the fluid columns, just equal to the fall of water in the boiler,—below the mouth of the tube—takes place; the column connected with the lower part of the boiler having descended and the other ascended, each in an equal degree if the caliber of each leg of the siphon is the same. The ascend of one column of liquid upon the descent of the other, is due to the necessity of the air retaining its bulk under the same pressure while therefore, the difference in the height of the fluid columns, indicates an equal fall of water in the boiler below its adjusted level; their mean elevation will indicate the pressure of the steam.

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

The combination of the elevated glass siphon, containing a portion of air above, with the metallic tubes containing water below, arranged with respect to each other, and the index as herein described, for the purpose of showing or indicating the height of the water, and also the pressure of the steam, in steam boilers, at an elevation above, or at the desired distance therefrom.

WM. C. GRIMES.

Witnesses:

HENRY SIMPSON,  
GEO. H. SPRINGER.