

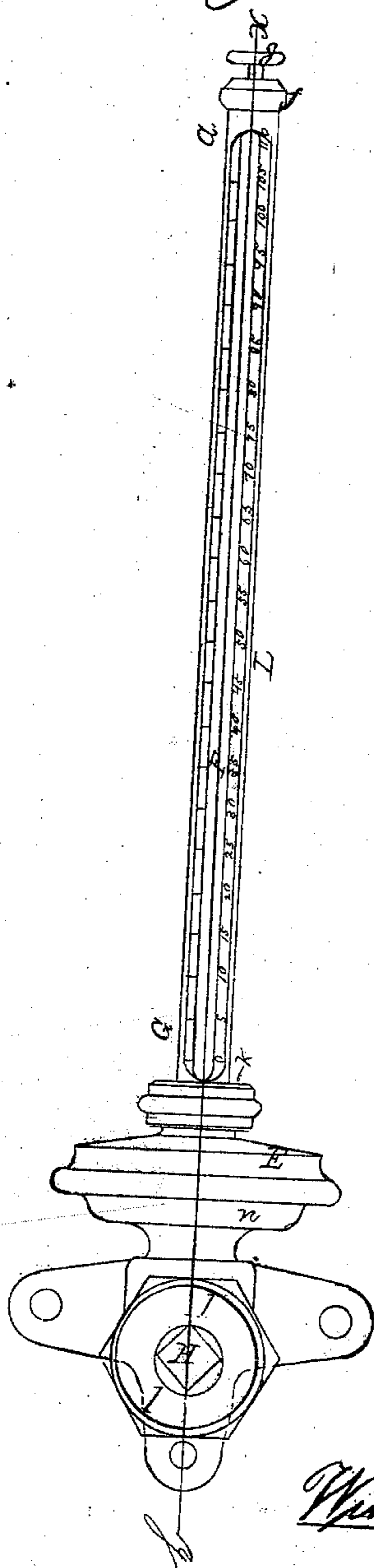
Albert S. Greene
Imp't in Steam-Gasges.

PATENTED

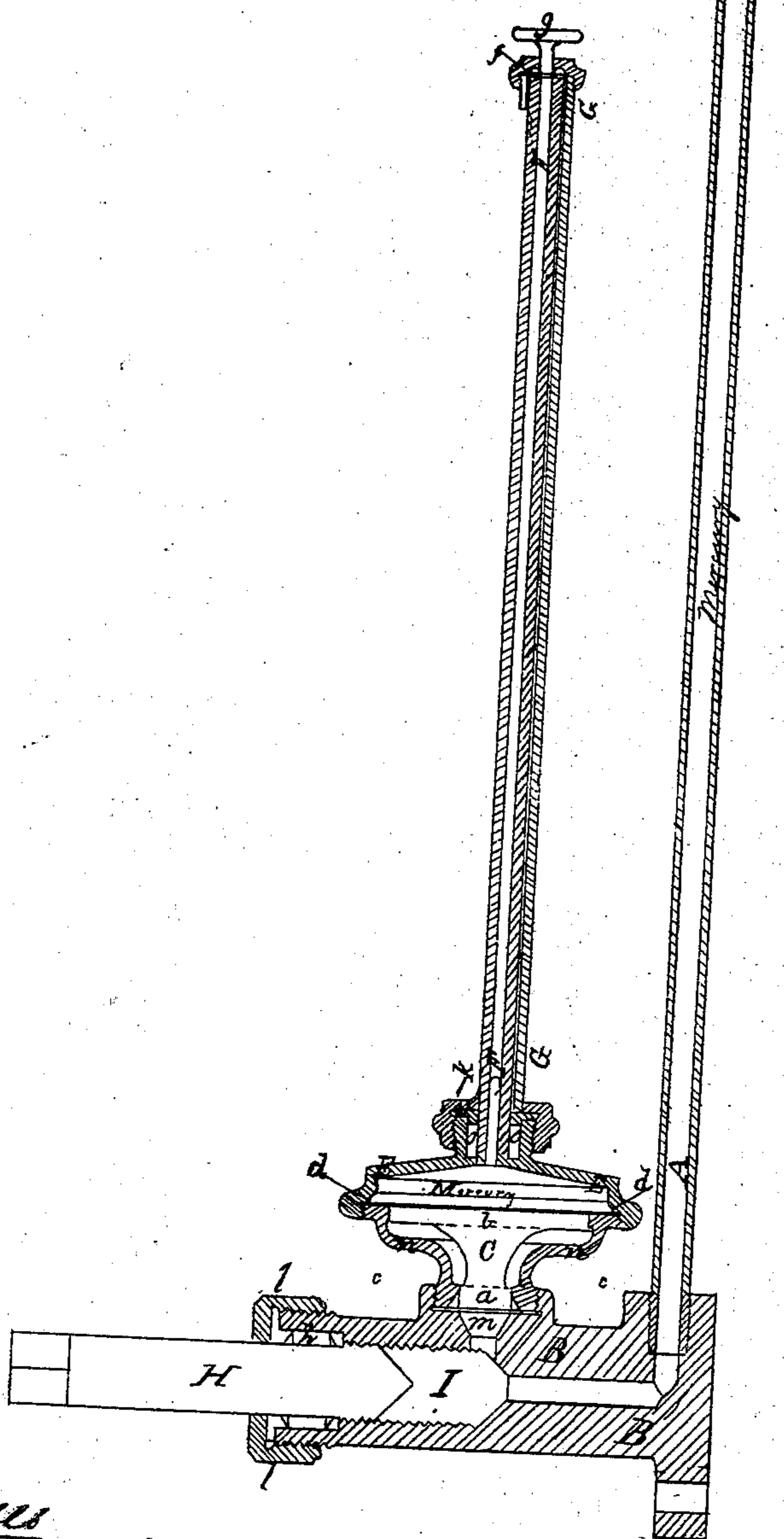
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Fig 1



Ex 2



Witnesses

Haller Kilbourn

W. J. Burns

Inventor

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United States Patent Office.

ALBERT S. GREENE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
TO JOHN F. OLMSTEAD, OF THE SAME PLACE.

Letters Patent No. 72,023, dated December 10, 1867.

IMPROVEMENT IN STEAM-GAUGES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ALBERT S. GREENE, of the city of Washington, and District of Columbia, have invented a new and useful Improvement in Steam-Gauges; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front view of my improved steam-gauge.

Figure 2, a vertical section, as indicated by the line taken in the plane xy of fig. 1.

Like letters in both figures of the drawings indicate like parts.

My improvement is intended to apply particularly to steam-gauges for measuring high pressures, but is equally applicable for low pressures, and for measuring pressures of any gases or liquids.

It consists, first, of two separate and essential columns of mercury, communicating with each other at their lower extremities by two flexible diaphragms of different areas, the motion from the smaller one being transmitted to the larger by means of a solid double-headed lifter—the smaller diaphragm forming the top of a reservoir for the mercury in the primary column, the larger forming the bottom of a wide and shallow cistern for the mercury in the secondary column, the motion of mercury in which indicating the pressure on the scale; second, providing the primary reservoir with a screw-plunger for diminishing or increasing its capacity, so that the mercury in the secondary column may be adjusted with nicety to the zero (0) point of the scale when varying therefrom, by reason of different temperatures of the surrounding atmosphere.

To enable any one skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the primary column, which is to receive the pressure of steam to be measured through a pipe which will connect with its upper end. B is a casting, containing the primary reservoir I, which communicates with the primary column through a passage running horizontally, and thence vertically in the casting to the column, which is screwed into the casting. H is the screw-plunger; h is a recess for packing, which will surround the plunger to prevent the mercury working out of the reservoir, and will be secured therein by the screw-nut l , with a metallic washer on the inside, fitting in the recess against the packing. $c c$ are the smaller diaphragm, set in a recess of the casting over a small passage, m , communicating with the primary reservoir. The recess is provided with screw-threads on the inside, into which is screwed the smaller end of the box n , containing the lifter C, the smaller head a of which rests on the smaller diaphragm $c c$. $d d$ are the larger diaphragm, which rests on the larger head b of the lifter. E E are a cap, which is screwed on to the larger end of the box n , forming the secondary reservoir. F is a glass tube for secondary column, which communicates with the reservoir, and is made tight to the cap by packing being placed around it in a recess, o , of the cap; the packing being secured by a screw-nut, k , with a metallic washer on the inside of it, fitting in the recess against the packing. G is a brass case for protecting the glass tube; it is secured to the screw-nut k , and is made open on one side for the scale of the instrument. (See L of fig. 1.) f is a small piece of rubber, which, with the thumb-screw g , closes the top of the tube F, to secure the mercury during handling or transportation of the instrument.

The novelty of the primary column consists in its affording a protection for the flexible diaphragm $c c$ from the heat of steam of high pressures, which, without this protection, would soon destroy the gum and prevent the proper action of the instrument, and also in balancing the weight of the lifter C, and the pressure of the mercury on its larger head, due to the height of mercury in the secondary column up to the zero (0) point of the scale, thereby making the gauge a perfect measure for low as well as high pressures.

The novelty of the screw-plunger consists in its furnishing a delicate means of adjustment for the level of mercury in the secondary column to the zero (0) point of the scale, as it may vary from expansion due to different temperatures of the medium surrounding the instrument, which adjustment does not act directly on the secondary column, but by varying the head of mercury in the primary column, and thus the pressure on the diaphragm $c c$.

It will be seen that in the operation of the instrument, the mercury in the primary column, from a pressure

of steam, will press on the smaller diaphragm *c c*, and thus through the lifter *C* transmit motion to the larger diaphragm *d d*, which, pressing on the mercury in the reservoir, will cause it to rise or fall in the secondary column in proportion to the degree of pressure which will be indicated on the scale of the instrument.

With my instrument I am enabled to measure pressures by the height of a column of mercury without particular reference to its diameter, (except that it must be small in comparison with the area of the larger diaphragm,) so that in case of the glass tube breaking, (the only part liable to break,) which constitutes the secondary mercury column for measuring the pressure; it may be readily replaced by another tube of nearly the same calibre, thus preserving the same scale and all other parts of the instrument perfect. The glass tube must be of small calibre compared with the area of the larger diaphragm, (as above stated,) for the purpose of keeping the motion of the diaphragms necessary for the proper action of the instrument within narrow limits.

In the use of other steam-gauges for measuring high pressures, the height of tube or column of mercury necessary is found to be very inconvenient and sometimes difficult in fixing them properly aboard of a ship or vessel, and besides being frequently injured in the transportation of them. My instrument can be made to occupy but little space, and at a considerably less cost, comparatively speaking, and, consequently, will be found to be particularly a desirable and perfect measure for high pressures.

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

1. The construction of a steam-gauge, with two columns of mercury, *A* and *F*, communicating with each other at their lower extremities by means of the flexible diaphragms *c* and *d*, and the solid double-headed lifter *C*, substantially in the manner and for the purpose as herein set forth.
2. The solid double-headed lifter *C*, in combination with the flexible diaphragms *c* and *d* and the primary and secondary reservoirs, substantially in the manner and for the purpose as herein set forth.
3. The transmission of the pressure of steam from one column to the other by means of a solid double-headed lifter, in combination with the flexible diaphragms *c* and *d*, substantially in the manner and for the purpose as herein set forth.
4. Providing the primary reservoir *I* with the screw-plunger *H*, substantially in the manner and for the purpose as herein set forth.

A. S. GREENE.

Witnesses:

Hallet Kilbourn,
W. Burris.