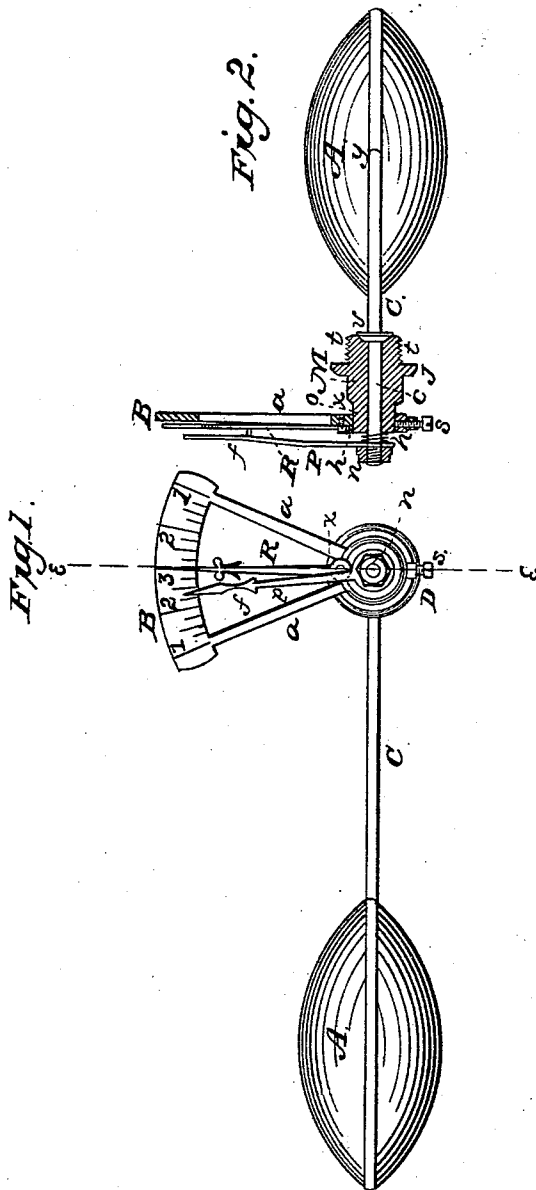


H. P. & H. H. STAFFORD.

Water Gage.

No. 82,762.

Patented Oct. 6, 1868.



Witnesses

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H. P. STAFFORD AND H. H. STAFFORD, OF DECATUR, ILLINOIS.

Letters Patent No. 82,762, dated October 6, 1868.

IMPROVEMENT IN WATER-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 we, H. P. STAFFORD and H. H. STAFFORD, of Decatur, in the county of Macon, and State of Illinois, have invented a new and improved Water-Gauge; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 is a front-elevation of the gauge.

Figure 2 is a section through the line *e-e'*.

Similar letters of reference indicate corresponding parts.

The object of our improvement in water-gauges is to indicate the height of water on a steam-boiler, so that the attendant can see, by the position of a pointer on a graduated limb or index, just where the solid water stands, though the water may be foaming to such an extent that this important knowledge cannot be arrived at by means of the ordinary gauge-cocks, or any other device heretofore used.

It consists of the usual float, A, attached to a shank, C, which is bent at a right angle at *y*, fig. 2. This shank passes through a sleeve or plug-box, M, which is provided with a thread, cut on its inner extremity, for screwing into the boiler-plate or front. It has also a flange or shoulder, J, to assist in thus securing it steam-tight in the plate. The outer end of the box M is further provided with a reduced shoulder, *o*, for holding a metallic sector, *a a*, D B, having its arc B graduated, to exhibit certain vertical distances within the boiler, as will be more fully shown.

Attached to this sector is a pointer, R, which is pivoted to the former, at *x*; with sufficient firmness to keep it stationary when untouched, though not attached so rigidly but that it can be moved with moderate force. The shank C, after passing through its box, M, is fitted to receive upon the end, just outside the sector, a pointer, P, which is secured firmly on said end by a nut, *n*, said pointer having a short pin, *f*, standing out horizontally from its inner face, and which strikes or impinges upon the smaller pointer R, when the pointer P vibrates by the motion of the float.

The function of this improved water-gauge is to indicate, upon the graduated arc B, the height or surface of the water within the boiler, and depends for its action upon the hollow metallic float A, which must be made tight enough to be buoyant, but strong enough to resist the pressure of the steam upon it.

This float rises or falls as the water upon which it rests rises or falls, and if caused to move up and down in a variable and unstable manner, by the foaming or violent ebullition of the water, as frequently happens in boilers, the motion is communicated to the pointer P, which vibrates across the face of the sector, thus exhibiting the variable or foaming condition of the water. Now, when properly set in position to be used, the box M is screwed into the boiler-front, at that height above the top of the flues which would bring the float A in a horizontal position on the water when the latter is at the usual height. The pointer P is then vertical, and is midway on the arc, when the water in the boiler is at its mean height, or the height at which it is generally carried for effective working, as shown in fig. 1.

The registering-pointer R must be placed on the right or left of the float-pointer pin *f*, according as the float is right or left of said pointer, so that the downward motion only of the float will cause the pin *f* on the pointer P to press against and move the registering-pointer along with the float-pointer. The opposite or upward motion of the float will not affect it, but leave the registering-pointer stationary, and denoting on the graduated arc the lowest descent of the float, which will be the true height of the solid water, for no matter how high up the float may be raised by very violent foaming, it will not sink below the true level of the solid water, as the abatement of the ebullition in the boiler, which would permit the float to descend, would at the same time allow the water to regain its normal density. Thus the registering-pointer R will always indicate the height of the water when not foaming, and enable the attendant to see at once how much water there is at any time.

When the water is not foaming, the position of the float-pointer P will indicate, in the graduated arc, the

height of the water, and the difference of arc between the two pointers will show any change that takes place in the previous water-level, as, for instance, the increase of the water since the feed-pumps were put on. The registering-pointer then should be moved up to the float-pointer; and if the water should fall, both would move to the left and indicate, or if it should rise, the float-pointer would move to the right and indicate the same; and if foaming should suddenly set in when no particular attention had been directed for some time preceding to the pointers, the attendant would be able to see at a glance the lowest point to which the water had fallen during the time elapsed, and would therefore know at what point the water was at or above. The doubt would be upon the safe side.

The graduated arc B, fig. 1, may be so divided as to show the number of inches above the flue-surface with the figures, as shown in the drawing, where the central figure indicates the best height of the water, and those to the left or right a corresponding departure from the same.

This gauge is constructed of metal. The registering-pointer R can be attached by a washer, fitting around and upon the end, *o*, of the box M, thus making it concentric with the arc B, over which it travels, and thereby obviating the slight parallax or gain perceivable when attached, as shown in the drawing.

This deviation, however, is slight, and on the safe side, as it would indicate the water slightly lower than it really is. A small spring, *h h*, acting against the nut *n* and the box M, thereby closes the valve *v* with a slight tension, thus keeping it in its seat. A set-screw, *s*, passes through the bottom of the collar D of the sector, and serves to hold the same in its place firmly.

The valve *v* on the shank *c*, just inside of and seated into the box M, serves to prevent the escape of steam or water through the plug-box M by the pressure within the boiler, which keeps it firm in its place.

The partial rotation of this valve in its seat, produced by the variable change of level in the water; or by foaming or otherwise, tends to keep the valve always tight, as the pressure against it, and the before-mentioned movement of the valve, grind it continually in its seat, thus obviating the use of a stuffing-box, or any other form of packing.

Should the water be kept at a particular height in the boiler, and, for any reason, not given to much movement or ebullition, the valve will nevertheless receive a slight motion with each escape of steam from the boiler, so that a small vibration of the valve will take place at each stroke of the piston, and consequently be kept always ground tight in its seat.

The sector bearing an arc, being superior to the circular dial-face, with its box and glass, which is used in the magnetic water-gauge, is adopted as a new and preferable device, it being free from any liability to get out of order, is easier to construct, cheaper, and in smaller compass than those used or known heretofore.

The advantages of the improvements hereinbefore shown render this instrument, as improved by my inventions, a safe, economical gauge, not liable to get out of order, or to be deranged by accident—qualities that do not belong to the float-water gauges as heretofore made.

We claim as new, and desire to secure by Letters Patent—

1. The employment of an independent registering-pointer, R, in combination with the float-pointer P, substantially as and for the objects herein described.
2. Operating the registering-pointer R by means of the float-pointer P, substantially as and for the purposes shown and described.
3. Having the registering-pointer R pivoted upon the sector, substantially as and for the purpose hereinbefore shown and described.

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Witnesses:

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