

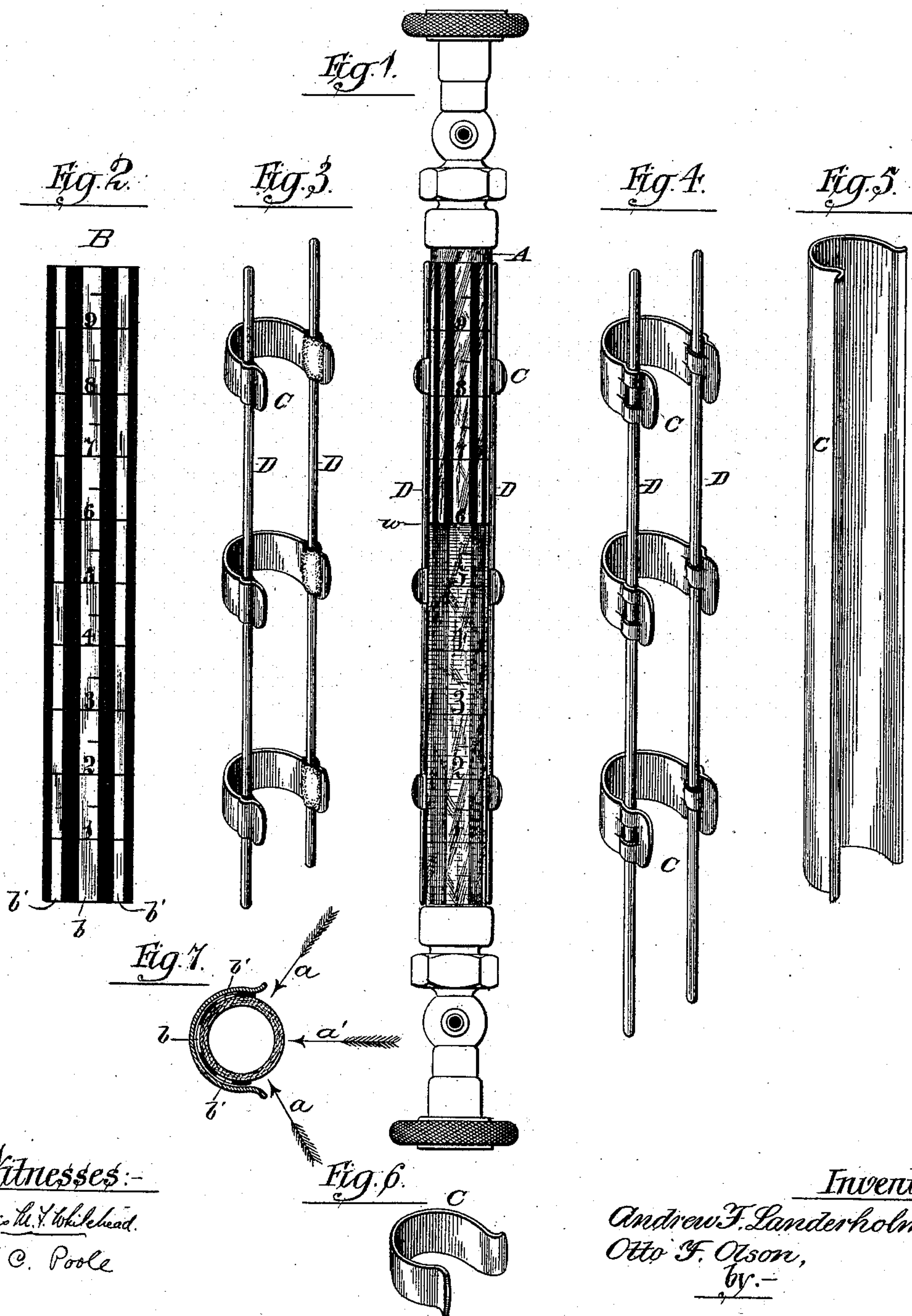
(No Model.)

A. F. LANDERHOLM & O. F. OLSON.

WATER GAGE INDICATOR.

No. 382,044.

Patented May 1, 1888.



Witnesses:-
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UNITED STATES PATENT OFFICE.

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WATER-GAGE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 382,044, dated May 1, 1888.

Application filed December 5, 1885. Serial No. 184,863. (No model.)

To all whom it may concern:

Be it known that we, ANDREW F. LAUDERHOLM and OTTO F. OLSON, both of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Gage Indicators; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

A primary object of this invention is to provide an indicator for glass water-gages having one or more longitudinal light or dark stripes or lines and adapted to be placed behind the gage-tube, so that the line or lines as seen through the tube will show clearly to the eye the water-level within the tube by reason of the unequal apparent width of the line or stripe when seen through the tube above and below the said water-level, together with means whereby said indicator may be removed and replaced without objectionable cost or inconvenience.

Another object of the invention is to produce a construction in such indicators whereby the water-level may be noted from other positions than that in front of the gage.

A principal feature of novelty embraced in our invention is embodied in a construction in which an indicator-strip is removably attached to the gage-tube by means of a clamp or holding device made separate from the strip and adapted to be readily secured upon or detached from the tube, whereby the strip may be easily removed and replaced when desired.

The invention embraces, also, an indicator made to partially embrace the gage-tube and provided with a central longitudinal line and other lines parallel with the central line, whereby the water-level will be indicated in viewing the tube obliquely as well as from the front; and it also embraces an indicator-strip made of paper, cloth, or other flexible material and having vertical lines in contrasting colors, whereby the reflector may be cheaply made of inexpensive material, and may be replaced at little expense when defaced or soiled.

In the accompanying drawings, Figure 1 is a front elevation of a water-gage having our improved indicator-strip applied thereto by

means of a detachable clamp, which is also embraced in our invention. Fig. 2 is a front view representing a paper or cloth indicator-strip adapted to be clamped about the tube, as shown in Fig. 1, and provided with three white lines separated and margined by contrasting lines of black or other color. Figs. 3, 4, 5, and 6 are perspective views of clamps by which the flexible indicator sheet of Fig. 2 may be removably secured to the tube, as shown in Fig. 1. Fig. 7 is a horizontal section of the glass tube, the indicator applied thereto and partially encircling the same, and the clamp also applied to hold the indicator-strip in place.

A represents the glass tube of a water-gage.

B is an indicator-sheet.

C C are clamps for holding the indicator-sheet about the tube.

Various forms of the clamp are shown in the drawings, a characteristic feature of said clamps being, however, in all cases that the clamp partially encircles the tube and is adapted to retain the indicator-sheet between it and the tube. As shown in the drawings, the clamps are constructed to extend somewhat more than half around the gage-tube, and are intended to be flexible and elastic to admit of their being placed upon the tube; but obviously a suitable clamp may be otherwise constructed to open and close, or, having the proper curve, may be otherwise held in place.

In Fig. 6 of the drawings is shown a clasp which consists of a narrow strip of tin, steel, or other elastic metal or material bent to suitable size to closely hug the glass tube, for which it is intended, and of length to embrace a little more than one-half of the circumference of said tube. For convenience in applying the clasp to the tube, the ends of the clasp are bent outwardly, as shown. A number of separate clasps of the form shown in Fig. 6 may be applied at suitable intervals along the tube to hold the indicator sheet or strip in place thereon, as indicated in Figs. 1 and 7. We prefer, however, that the requisite series of short clasps C shall be connected by marginal wires or strips of metal, D, as shown in Figs. 1, 3, and 4, because this enables all the clasps to be simultaneously applied, and thus facilitates the operation of attaching the indicator sheet or strip to the tube, and, besides, the said

marginal strips D serve to hold the edges of the said sheet in close contact with the tube between the clasps. Of course a single clasp of the full length of the tube or sheet—such as is shown in Fig. 5—may be used, and will be even more convenient of application; but though this falls within our invention it will be regarded by some as objectionable, for the reason that it excludes the light from behind the indicator, and thus in some situations renders the latter less clear and effective to the eye.

When the marginal strips D are used, they may be soldered to the series of short clasps C, as shown in Fig. 3; but we prefer to apply the clasps, or one or more of the clasps, to the strips movably, as indicated in Fig. 4, and to make the marginal wires of the greatest length that will commonly be called for, so that in fitting the clamp to a tube of shorter length the clasp-sections or individual clasps may be slipped along the marginal strips to the desired positions relative to each other and the strips then cut off to the proper length for the tube.

A feature of improvement in the indicator consists in providing, in addition to the central light line, *b*, two laterally-placed or marginal light lines, *b'*, one at each side of the central line, *b*, so that the attendant looking in the direction of either of the arrows *a*, Fig. 7, may see the water-level by aid of the indicator as well as when looking directly from the front or in the direction of the arrow *a'*.

Another feature of improvement in the indicator consists in the application of the graduated scale or series of figures representing inches or other suitable units of measurement, whereby, particularly in locomotives and in steamboats, not only the normal level of the water may be indicated, but also its range of movement above and below such normal level.

A main feature of invention consists in making said indicator strip or sheet of paper, cloth, or other suitable cheap material, which is flexible and adapted to be bent about the tube, by which it is made possible to frequently change or replace the indicator-strip when it becomes dim or soiled from use, with the advantage of always insuring a clean sheet, which will promptly and clearly indicate the state of the water in the boiler. It is, therefore, the intention in putting the invention into practice to furnish any desired number of sheets to the user of the boiler at a trifling cost, so that he may change them at pleasure.

It will be understood by all users of water-gage indicators that Fig. 1 represents the water as standing at the level of *w*, and that the

light and dark lines on the indicator appear in fact, as shown in said Fig. 1, narrower above the water-level than below it, owing to unequal refraction of the rays of light.

We claim as our invention—

1. The combination, with a gage-tube, of an indicator provided with a longitudinal line or lines and comprising a sheet or strip, and a separate clamp or holding device adapted to receive said strip and to sustain the latter adjacent to the tube, whereby the said strip may be removed and replaced when desired, substantially as described.

2. The combination, with a gage-tube, of an indicator partially embracing the tube and marked with a central longitudinal line and other lines parallel with the central line, substantially as described.

3. The combination, with a water-gage tube, of an indicator consisting of a strip of paper, cloth, or other similar material provided with longitudinal lines of contrasting shade or color, substantially as described.

4. The combination, with a water-gage tube, of an indicator consisting of a strip of paper, cloth, or similar material having thereon a central longitudinal light line and one or more light lines parallel with the central line and separated therefrom by lines of contrasting color, substantially as described.

5. The combination, with a water-gage tube, of an indicator consisting of a strip of paper, cloth, or similar material provided with longitudinal lines of contrasting color, and having a graduated scale upon one or more of the light lines, substantially as described.

6. The combination, with a flexible indicator-sheet and a water-gage tube, of a clasp or clamp adapted to detachably hold the sheet to the tube, substantially as described.

7. The combination, with a water-gage tube and a flexible indicator-sheet, of a clamp consisting of a series of clasps connected by strips, substantially as described.

8. The combination, in a clamp for holding indicator-sheets to water-gage tubes, of strips D, and a series of clasps attached to said strips, one or more of said clasps being movable on the strips, substantially as described.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of two witnesses.

ANDREW F. LAUDERHOLM.
OTTO F. OLSON.

Witnesses:

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