

W. R. ENGLAND.

2 Sheets—Sheet 1.

Water Gage.

No. 66,694.

Patented July 16, 1867.

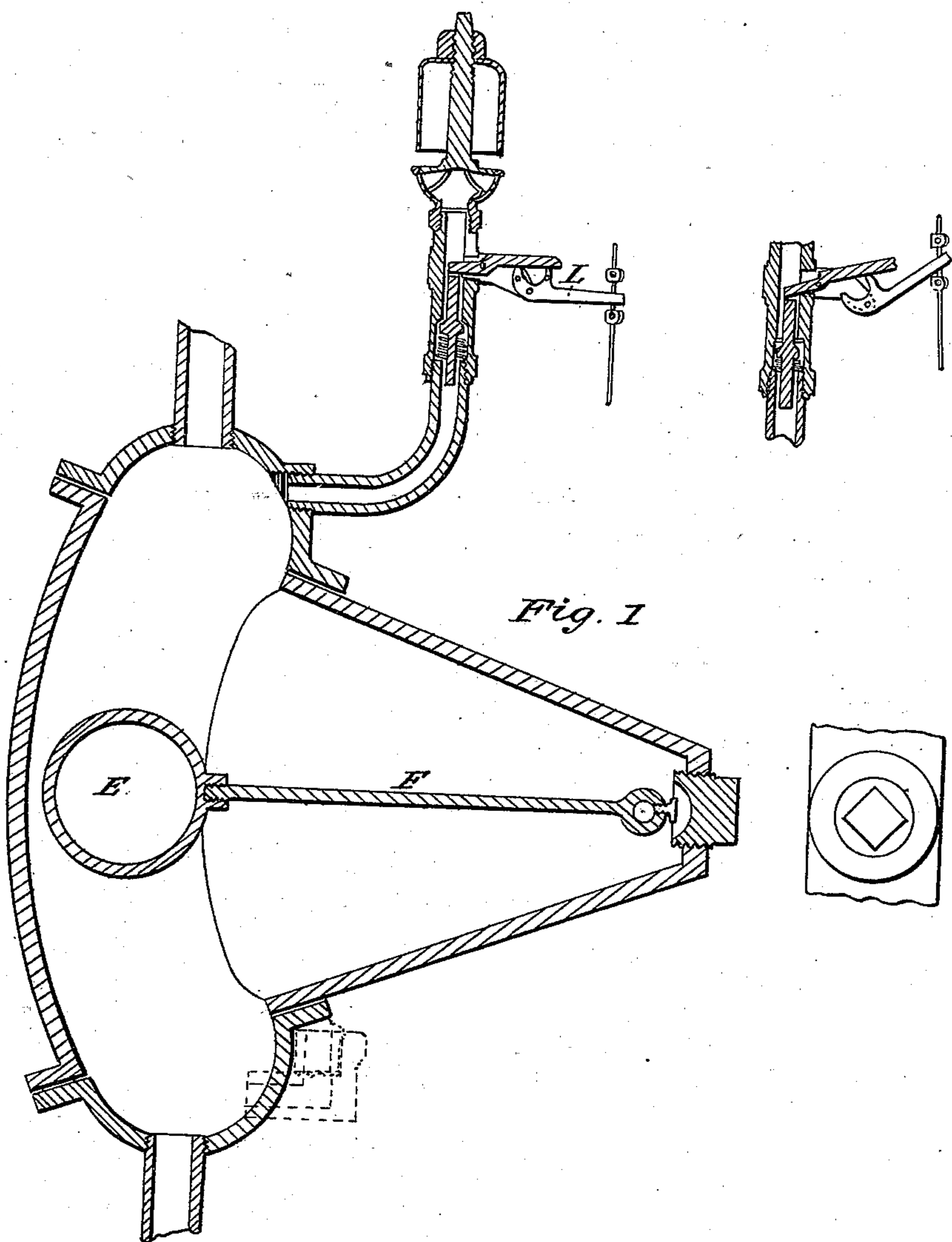


Fig. 1

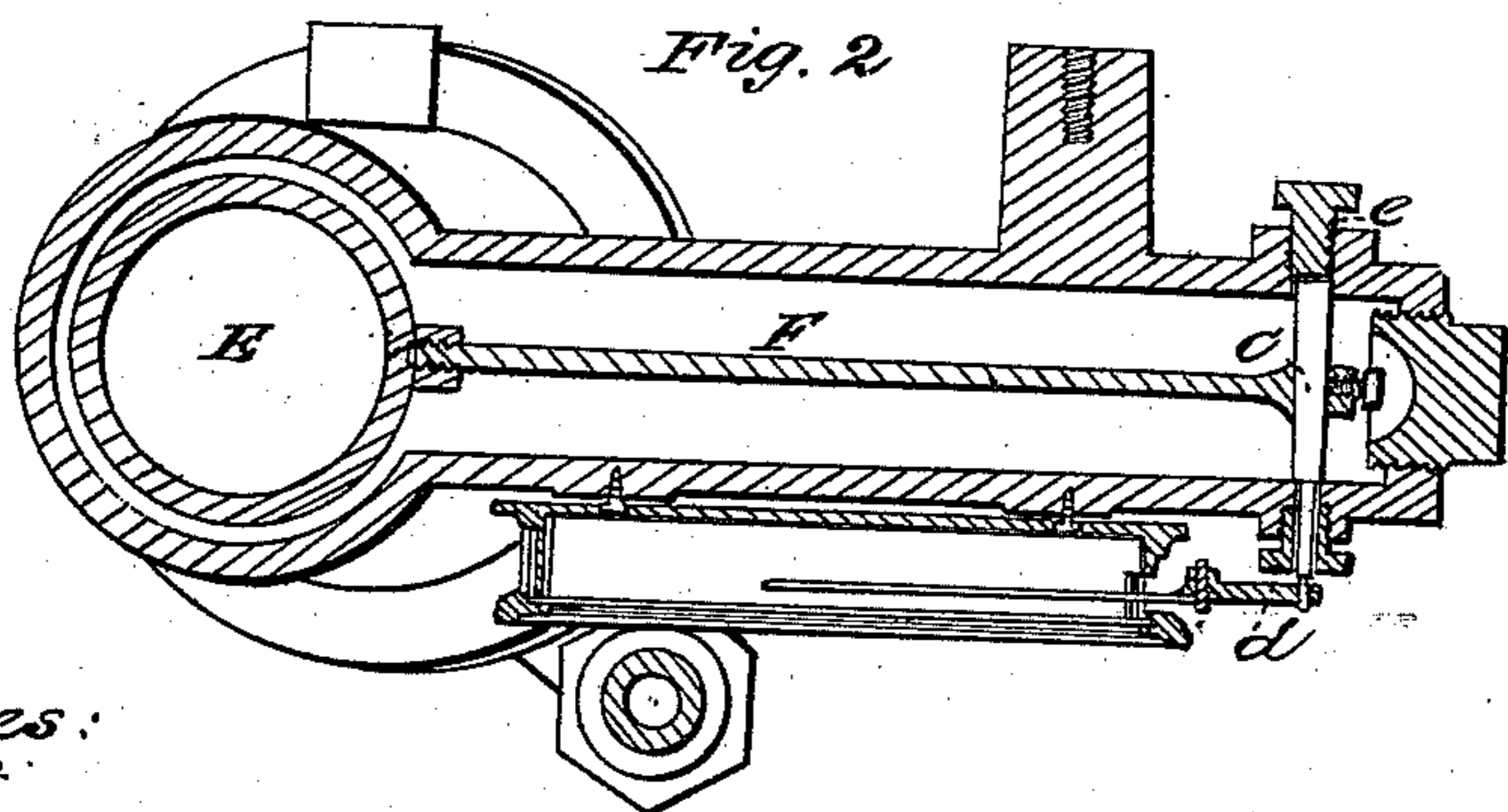


Fig. 2

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L. E. Jones.

Inventor:  
Wm R. England  
by atty T. T. Everett

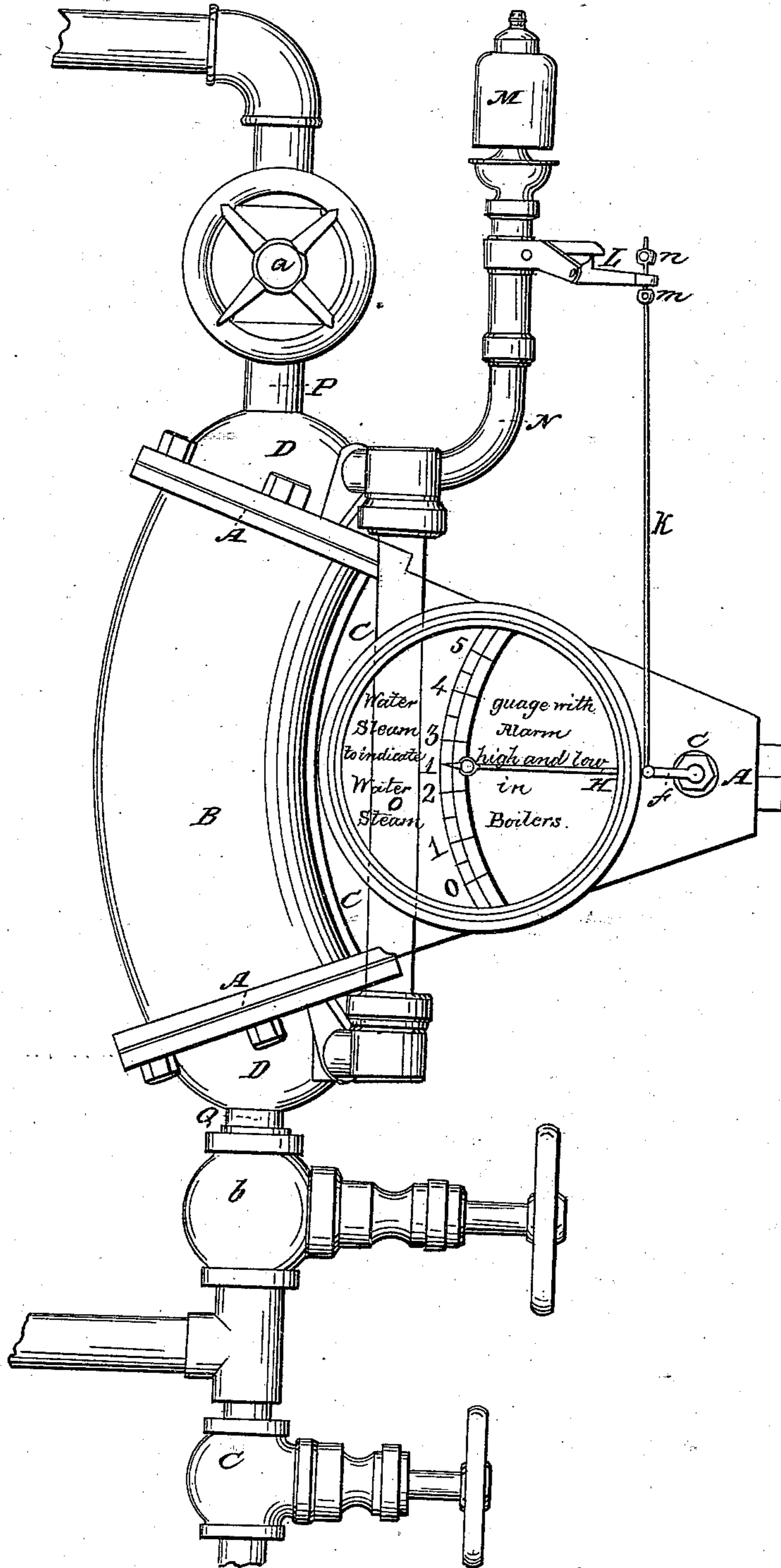
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# United States Patent Office.

WILLIAM R. ENGLAND, OF MILWAUKEE, WISCONSIN.

*Letters Patent No. 66,694, dated July 16, 1867.*

## IMPROVEMENT IN WATER-INDICATORS FOR BOILERS.

*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, WILLIAM R. ENGLAND, of the city and county of Milwaukee, and State of Wisconsin, have invented a new and useful Improvement on Water-Gauges, to indicate high and low water in steam-boilers; 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, forming a part of this specification, of which—

Plate 1 is a perspective view.

Figure 1, Plate 2, is a longitudinal section; and

Figure 2, Plate 2, is a cross-section.

A A A of plate 1 is a hollow casting, composed of a bent cylinder, B, opening on the concave side through its whole length into the triangular member C C C. D D are caps covering the ends of cylinder B. E, in plate 2, figs. 1 and 2, is a copper ball, movable through the whole length of the cylinder B, connected by a lever, F, with a dial-shaft, G. H, in plate 1, is an index-hand pointing to dial-plate I. K, in plate 1, is an adjustable connecting-rod between index-hand H and a steam-whistle lever, L. M is a steam-whistle, connected by tube N with the upper end of cylinder B. O, in plate 1, is a glass tube, connected by brass or other unions with both ends of cylinder B, and opening into the same. P and Q are pipes, with stop-cocks *a* and *b* connecting each end of the cylinder with the boiler. *c* is a waste stop-cock attached to pipe Q. *d*, in plate 2, fig. 2, is a stuffing-box for dial-shaft G, and *e* is an adjustable bearing of opposite end of shaft G.

The materials of which the different parts are constructed may be varied. The hollow casting A A A may be made of brass or of iron; the ball E may be made of hardened copper; the lever F and the dial-shaft G may each be made of steel, galvanized iron, iron, brass, or of copper; and the lever F may be hollow or solid—the use of different materials in the construction of the foregoing parts being to adapt the water-gauge to fresh or salt water.

To operate this water-gauge it must be placed in an upright position, or nearly so, and at such an elevation that the low-water point in the boiler determined on shall be on a horizontal line with the centre of the bottom of the cylinder, at its connection with the cap D, at which point the ball begins to float. Water from the boiler has access to the gauge through pipe Q, and steam through pipe P. As the water rises in the boiler it also rises in the gauge, causing the ball to float on its surface, one-third of its diameter submerged, and governing by the simple lever F and dial-shaft G, the index-hand H, which points at all times to the point of submergence of the ball E, thus indicating the height of solid water in the boiler. The glass tube O, by means of its openings at each end into the cylinder B, receives water and steam, and serves as a second water-gauge, whereby the height of the water is visible to the eye; and should the buoyancy of the ball E become impaired by accretion, leakage, or any other cause, the glass tube would enable one to instantly detect any such fault. Should the water at any time foam so as to deceive the eye, the ball E would still sink beneath the foam and rest on the solid water, which point would be shown by the index-hand H. Thus each member serves as a distinct gauge to detect any fault in the other. The index-hand is attached at *f* to the adjustable connecting-rod K; and on the upper end of the connecting-rod K, which passes through the end of the steam-whistle lever L, are two movable collars, *n* and *m*, one above and the other below the lever L. These collars are secured at such points on the rod K as to raise or depress the whistle-lever L, and thus open the steam-valve and give the alarm at any desired point of high or low water.

The benefits of this gauge are:

I. Its simplicity of construction. Its construction with one simple lever connected directly with the shaft of the dial-plate, without any combination of levers, joints, knuckles, gearing, or other mechanism, which would increase friction on the inside of the machine, or which would be liable to become foul by any introduction of foreign substances with the water or steam. All the friction or weight to be overcome by the float E is the friction of the dial-shaft G in the stuffing-box *d*, and the pressure on the steam-whistle valve when the alarm is given. Therefore there is nothing in the inside of the gauge to get out of order, or that needs repair, so long as the buoyancy of the float remains intact; and hence little care is necessary to insure the successful operation of the gauge. The collars *n* and *m* on the rod K are readily adjustable without disturbing any other part of the gauge, and they can be at any moment so adjusted as to give the alarm precisely at the point desired.

II. Its efficiency. The immense leverage connected with the ball E is such that its submergence of one-sixteenth of an inch, after sustaining its own weight, will open the steam-whistle valve under a pressure of seventy-five pounds of steam. Hence, by a slight submergence of the ball E, the power obtained through the lever connections effects the entire result desired of the gauge, and leaves a large amount of power unused. The simple structure of the inside of this gauge renders its working easy; and should it by any means get out of a perpendicular position, its operation is not impeded. In this respect it is of great utility on marine engines, where a perfect and constant position is not always expected. The efficiency of this gauge arises, also, from the simple combinations of the various parts into one whole, each part performing its work and assisting each other part without in any manner causing any impediment to the working of the gauge.

Of this water and steam-alarm gauge I do not claim as new the ball-float, the glass-tube gauge, the index-pointer, nor the dial-plate. Nor do I claim the invention of a steam-alarm by a combination of levers; but what I do claim is—

1. The arrangement of the whistle-lever L, connecting-rod K, index-hand H, lever F, and float E, substantially as herein set forth.

2. I claim the arrangement, with reference to the first clause of claim, of the glass tube O and whistle M, substantially as herein set forth.

3. I claim the arrangement of the adjustable collars *m* and *n* with the whistle-lever L, substantially as herein set forth.

WM. R. ENGLAND.

Witnesses:

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GEO. H. WILBUR.