

(No Model.)

E. W. VANDUZEN.
Water Gage.

No. 229,571.

Patented July 6, 1880.

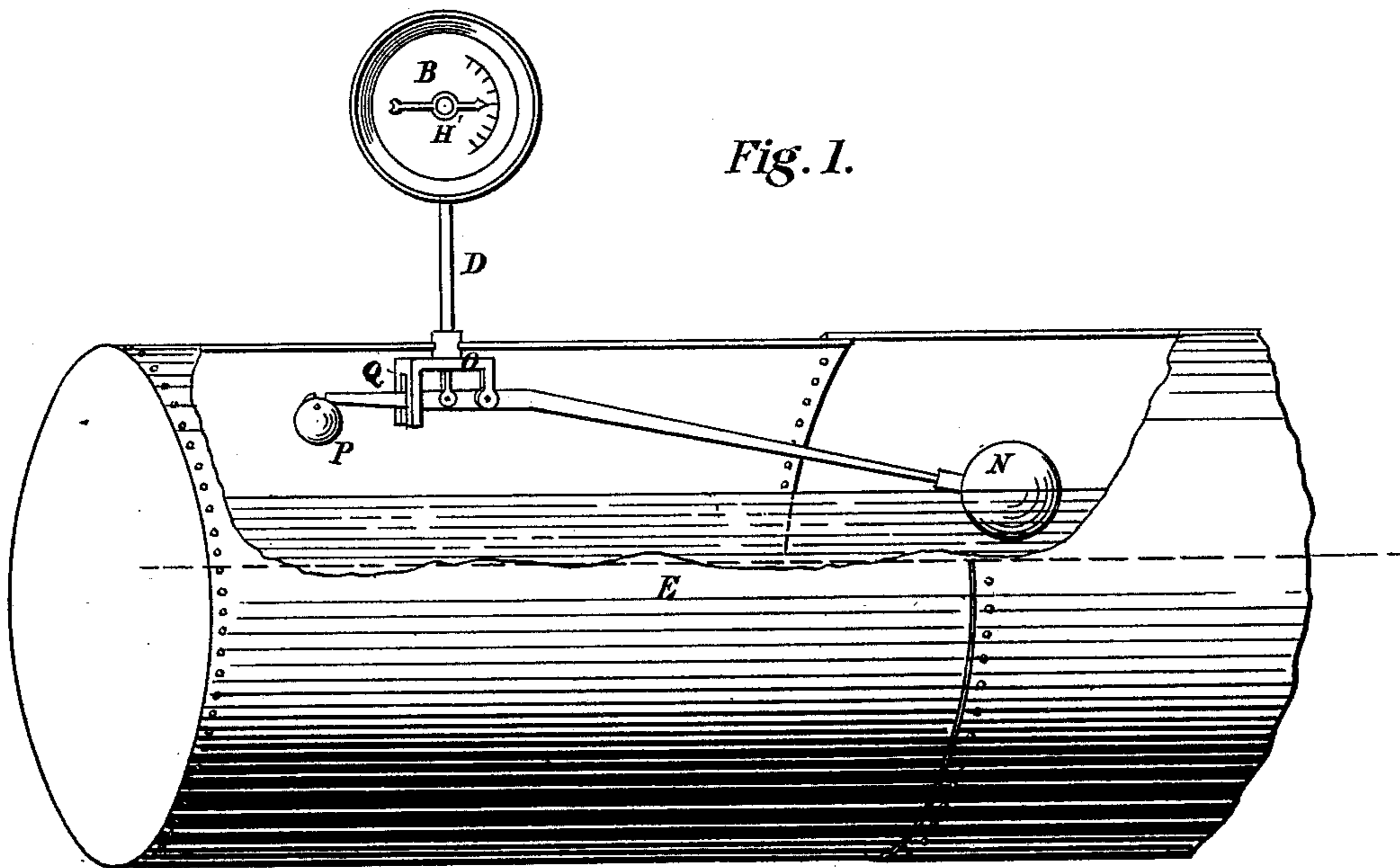


Fig. 1.

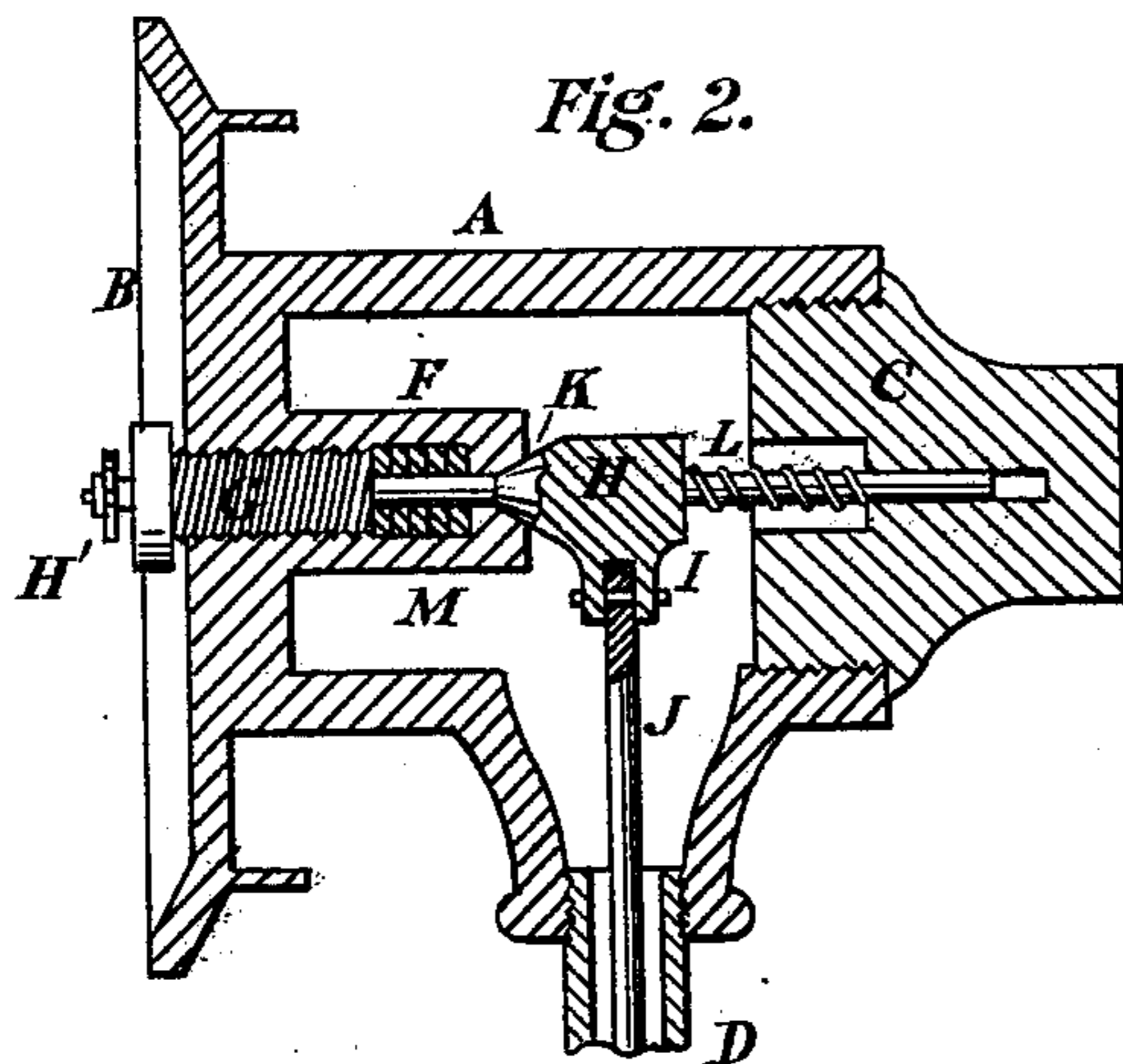


Fig. 2.

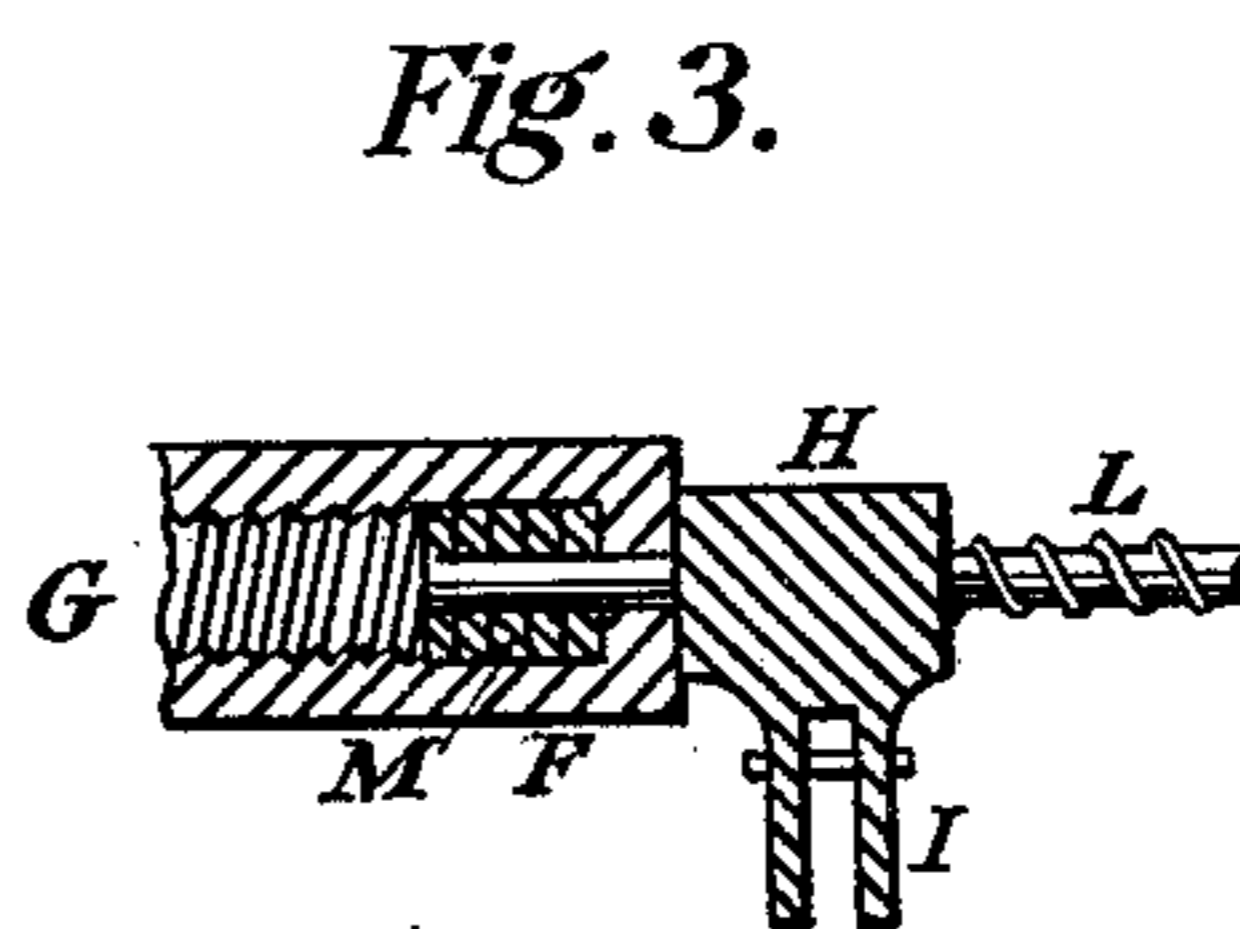


Fig. 3.

Witnesses :

J. H. Cady
H. V. Ellsworth

Inventor :

Ezra W. Vanduzen
By *E. H. Ellsworth*
Attorney.

UNITED STATES PATENT OFFICE.

EZRA W. VANDUZEN, OF NEWPORT, KENTUCKY.

WATER-GAGE.

SPECIFICATION forming part of Letters Patent No. 229,571, dated July 6, 1880.

Application filed April 12, 1880. (No model.)

To all whom it may concern :

Be it known that I, EZRA W. VANDUZEN, a citizen of the United States, residing at Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Water-Gages for Steam-Boilers; and I do hereby declare the following to be a full, clear, concise, and exact description of the same, sufficient to enable others skilled in the art to which my invention appertains to make and use it, reference being had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a front elevation of the water-gage applied to a steam-boiler, which is partly broken away to show the water-line and the float of the gage. Fig. 2 is a transverse section of the gage, and Fig. 3 shows a modification in the form of the valve-joint.

Similar letters of reference in the several figures of the drawings indicate the same parts.

My invention has for its object to improve the construction and operation of the water-gage for steam-boilers for which Letters Patent of the United States No. 37,534 were granted to me, dated January 27, 1863. The essential features of the gage shown in said patent are a metal tube secured to the top of the boiler, a steam-chamber attached to the top of the tube and provided with a dial, an index-finger for the dial mounted upon the end of a crank-shaft or spindle which passes through the steam-chamber, and a stem extending down through the tube to connect the crank-shaft with a float in the boiler. The crank-shaft is provided with a collar within the steam-chamber, to fit against the back of the dial and form a valve to prevent the escape of steam around the shaft, and its rear end enters a recess in a screw-cap at the back of the steam-chamber, and there bears against the end of an adjusting-screw inserted through the back of the screw-cap.

By this construction of the gage the collar is inadequate to form a tight steam-joint, for the reason that it must fit tightly against the dial in order to prevent the steam from passing in front of it and escaping around the spindle, and it cannot be made sufficiently tight for this purpose without so binding the shaft between the dial and adjusting-screw that it

cannot turn freely in its bearings. The shaft must therefore have a slight end play, which allows the steam to enter between the collar and dial, and thus escape.

My improvements to overcome this objection consist, principally, in combining with the shaft and its collar or valve a stuffing-box and an elastic packing placed at the front end of the shaft outside the steam-chamber, and a spiral spring placed around the rear end of the shaft, within the chamber, to hold the valve or collar up to its seat. The stuffing-box and packing, added to the bearing of the valve, form a tight joint, which the tension of the spring constantly preserves, and thereby prevents the passage of steam in front of the valve or collar.

My invention also consists in the method of constructing and applying the float to properly and accurately follow the changes of the water-level in the boiler and properly transmit its movements to the gage.

In the accompanying drawings, A represents the steam-chamber of the gage, made of cast metal in the form of a short cylinder, with its front end secured to the dial B and its rear end closed by a screw-cap, C. It is fastened in any suitable manner to the end of a short tube, D, which is screwed into or otherwise adapted for attachment to the top of a boiler, E, and communicates with the interior of both the boiler and chamber.

The front end of the steam-chamber is cast with a hollow central boss, F, extending into the steam-space, to receive the stuffing-box G.

H is the spindle or shaft, having its front bearing in the boss and stuffing-box and its rear bearing in the screw-cap C. Its front end carries the index-finger H', to move over the face of the dial, and within the steam-chamber it is provided with a lateral arm or crank, I, to which the stem J is pivoted, so as to extend down through the tube D and connect with the float in the boiler.

As shown in Fig. 1, the spindle is made with an enlargement within the chamber, the front end of which is beveled to form a conical valve, K, and this valve fits into a corresponding seat in the end of the boss around the spindle, both seat and valve being ground to form a tight joint.

In Fig. 3 the valve is shown in the form of

a collar around the spindle, to bear against the end of the boss, which in this case is made flat. The joint between them may be ground, for the purpose already stated.

5 L is the spiral spring surrounding the spindle between the valve and end of the recess in the screw-cap, so as to exert its tension lengthwise of the spindle, and thus hold the valve or collar up to its seat against the boss.

10 M is an elastic packing placed within the boss, and held in place around the spindle with greater or less pressure by means of the stuffing-box. This provision is made to effectually prevent the escape of steam from the steam-chamber, if for any reason the ground joint between the valves and seat should leak.

15 N is the float attached to the end of a tapering arm, and suspended within the boiler by pivoting the arm to an angle-iron, O, fastened to the top of the boiler in any secure manner.

20 This class of boiler-floats are constructed of hollow copper spheres, and if made large enough to possess the proper buoyancy they are too large to pass down between the boiler-flues, and therefore if the water falls low enough for the float to touch the flues it will be supported by them and fail to show the condition of the water. For example, most floats are submerged in the water about three-fourths of their diameter, and if too large to pass between the flues will be supported by them when the water above the flues is equal in depth to the distance the float is sunk; therefore the fall of the water from this point does not affect the float, and cannot be recorded. If to overcome this serious defect the float is made small enough to pass down between the flues it does not possess the requisite buoyancy under the usual deposit of sediment from the water, because too heavy to operate.

40 My invention with respect to the float consists in making it small enough to pass between the flues—say about five and one-half inches in diameter—and counterbalance it to a certain extent by a weight, P, applied to its short arm, as shown in Fig. 1.

The angle-iron to which the arm is pivoted is formed with a slotted guide, Q, for the short portion of the float-arm, and the gage-stem is pivoted to said arm between the two projecting parts of the angle-iron, and therefore its weight also assists somewhat in counterbalancing the float. 50

The weight P is preferably cast with a recess and cross-bar in its upper end to catch upon the end of the float-arm, although it may be attached in any other convenient and secure way. 55

By this means of applying the float it possesses and maintains the requisite buoyancy, and readily follows the changing level of the water. 60

Having thus described my invention, what I claim is— 65

1. The steam-chamber, cast with a hollow central boss, F, receiving the stuffing-box through the dial, and projecting into the steam-space to form a seat for the spring valve or collar, substantially as described, for the purpose specified. 70

2. The combination of the elastic packing, with the hollow central boss, F, the stuffing-box, the spindle, and the joint between the boss and the valve or collar, substantially as described, for the purpose specified. 75

3. The combination, with the steam-chamber and index-spindle, of the hollow central boss, F, the elastic packing and stuffing box within the boss, and the valve or collar on the spindle, held to its seat in or against the end of the boss by the spring L on the spindle, substantially as described, for the purpose specified. 80

4. The counterbalanced float combined with the boiler and water-gage, substantially as described, for the purpose specified. 85

In testimony of which invention I have hereto set my hand this 1st day of April, A. D. 1880.

EZRA W. VANDUZEN.

Witnesses:

E. A. ELLSWORTH,
J. K. CADY.