

P. N. J. MACABIES.

WATER-FEEDER FOR STEAM-BOILERS.

No. 171,149.

Patented Dec. 14, 1875.

Fig. 2

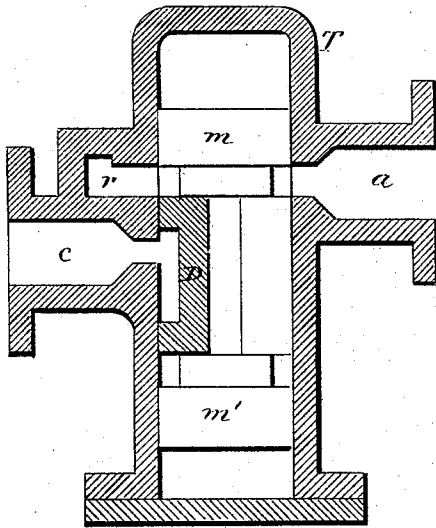


Fig. 3

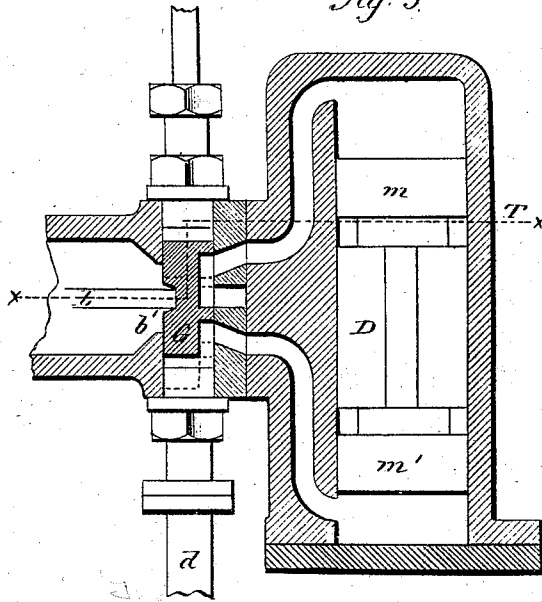


Fig. 4

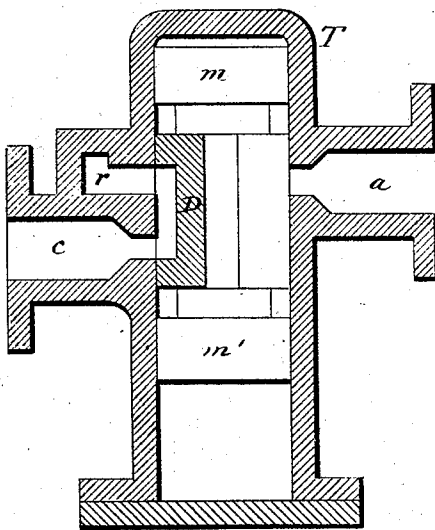
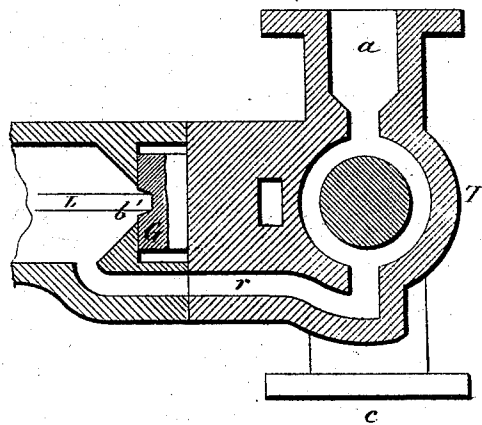


Fig. 5



Witnesses.

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PAUL NARCISSE JOSEPH MACABIES, OF PARIS, FRANCE.

IMPROVEMENT IN WATER-FEEDERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **171,149**, dated December 14, 1875; application filed April 20, 1875.

To all whom it may concern:

Be it known that I, PAUL NARCISSE JOSEPH MACABIES, of Paris, in the Republic of France, have invented a new Improvement in Water-Meter and Feeder for Boilers; and I do hereby declare the following, when taken in connection with the accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, vertical central section; Fig. 2, vertical section through the steam-cylinder, transverse to that shown in Fig. 1; Fig. 3, the same section as that shown in Fig. 1; Fig. 4, the same as Fig. 3, with the valve on the exhaust; Fig. 5, a horizontal section through xx of Fig. 3, these four sections being enlarged.

This invention relates to a device for automatically feeding steam-boilers, and which may at the same time measure the volume of water supplied; and the invention consists in the arrangement of a float within a receiver, which is alternately filled with water and steam, combined with a valve arrangement for the inlet and outlet of water, and with a mechanism actuated by the said float, whereby the inflowing water raises the float to a certain defined point, and then steam admitted to the said receiver to force that quantity of water contained in the receiver into the boiler, all as more fully hereinafter described.

R is the water receiver or chamber, within which a float, F, is arranged, supported on a vertical rod, t , and so as to work freely up and down on the said rod. A collar, e , is arranged at the top of the rod, and a similar collar, f , at the bottom, so that the float in its ascent, striking the collar e , will raise the rod, and, returning, will strike the collar f and depress the rod.

A pipe, I, leads the water from the reservoir through a valve, I', to the receiver R, and the water flowing through the bottom of the receiver passes out through a valve, V, to the boiler, the pressure of the boiler tending to hold the valve V closed, excepting when that pressure is counterbalanced or overcome, and the valve I' free to open toward the receiver until the pressure of the inflowing water is overcome, as hereinafter described.

In connection with the upper part of the receiver R is a steam-cylinder, T, of which G is the slide-valve, (see Fig. 3,) the passages and ports for the cylinder and the exhaust being substantially the same as for the common steam-engines, and the valve also of the same construction.

Steam is admitted to the steam-chamber, within which the valve G works directly from the boiler through a tube, d . The valve G is actuated by a lever, L, one end of which is hinged to the upper end of the rod t , and the other in a seat, b' , in the valve; hence, as the float F rises so as to raise the rod, the valve G will be thrown down, as indicated in broken lines, Fig. 3. Returning, the float draws down the rod and raises the valve to the condition of Fig. 3. In these movements of the valve G steam is alternately admitted and exhausted from opposite ends of the cylinder, in the usual manner for steam-cylinders.

Within the steam-cylinder are two connected pistons, $m m'$, attached to a slide-valve, D, (see Figs. 2 and 4,) and so that as the steam is admitted through the upper part, the pistons, with the valve D, will be driven downward, as indicated in Fig. 2, and as the valve G is changed, the pistons and valve D will be driven upward, as seen in Fig. 4.

Steam is admitted through the passage a to the cylinder between the two pistons and around the valve D, the space between the pistons forming practically the steam-chamber for the valve D. From the space or steam-chamber between the two pistons there is a passage, r , which leads into the receiver above the float—here represented as into the same space within which the lever L is hung, and as seen in Fig. 5.

When the float rises to its extreme height it throws the valve G down. Then the pistons, with the valve D, will be forced downward, by means of the steam admitted through the port opened by the valve G, into the position as seen in Fig. 2, which leaves the passage r open in direct connection with the boiler through the passage a , and so that steam will flow directly from the boiler through the passage r into the receiver above the float. Therefore, supposing the receiver to have been filled with water, flowing or forced in until the float

has risen to move the valve G, as described, this inflowing steam will produce a pressure upon the water corresponding to the pressure in the boiler, thus producing an equilibrium between the boiler and the receiver, and causing the water to flow from the receiver through the valve V into the boiler, it being understood that the receiver is arranged above the water-level.

As the last of the water passes from the receiver the float strikes the collar *f* and throws the valve G up to admit steam below the pistons, and allow that above to escape. This raises the pistons and the valve D, as seen in Fig. 4, cutting off the passage *r* from the direct steam and opening it to the exhaust *c*, so that the steam in the receiver will escape, and water again flow in to raise the float, until it again changes the valve G, as before, and so continuing as long as the direct steam is admitted to actuate the pistons; or if the receiver be arranged relatively to the boiler, so that the bottom of the receiver be on the water-line, then it will only operate as the water in the boiler falls below that line, and hence will maintain the constant water-line.

The capacity of the receiver being known, and the number of times it is filled registered by any suitable automatic mechanism, the

quantity supplied to the boiler is easily ascertained.

I do not wish to be understood as broadly claiming a device for feeding steam-boilers, in which pressure upon the water is counter-balanced by the pressure of the boiler to cause it to flow into the boiler, as such, I am aware, is not new.

I claim—

The combination, in a water-feeder for steam-boilers, of the receiver R, inlet-valve I', outlet-valve V, the vertical rod *t*, provided with collars *e f*, the float F working freely up and down said rod, the steam-cylinder T, its valve G connected with the said rod *t*, a double piston, *m m'*, and slide-valve D, actuated by said pistons, and the passage *r* from the space between the pistons to the receiver, and alternately opened and closed to admit steam to and exhaust it from the said receiver, substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

P. N. J. MACABIES.

Witnesses:

DAVID T. S. FULLER,
ALBERT CAHEN.