W. B. Le VAN.

DAMPER-REGULATOR FOR STEAM-BOILERS.

No. 182,372. Patented Sept. 19, 1876.

Fig. 1.

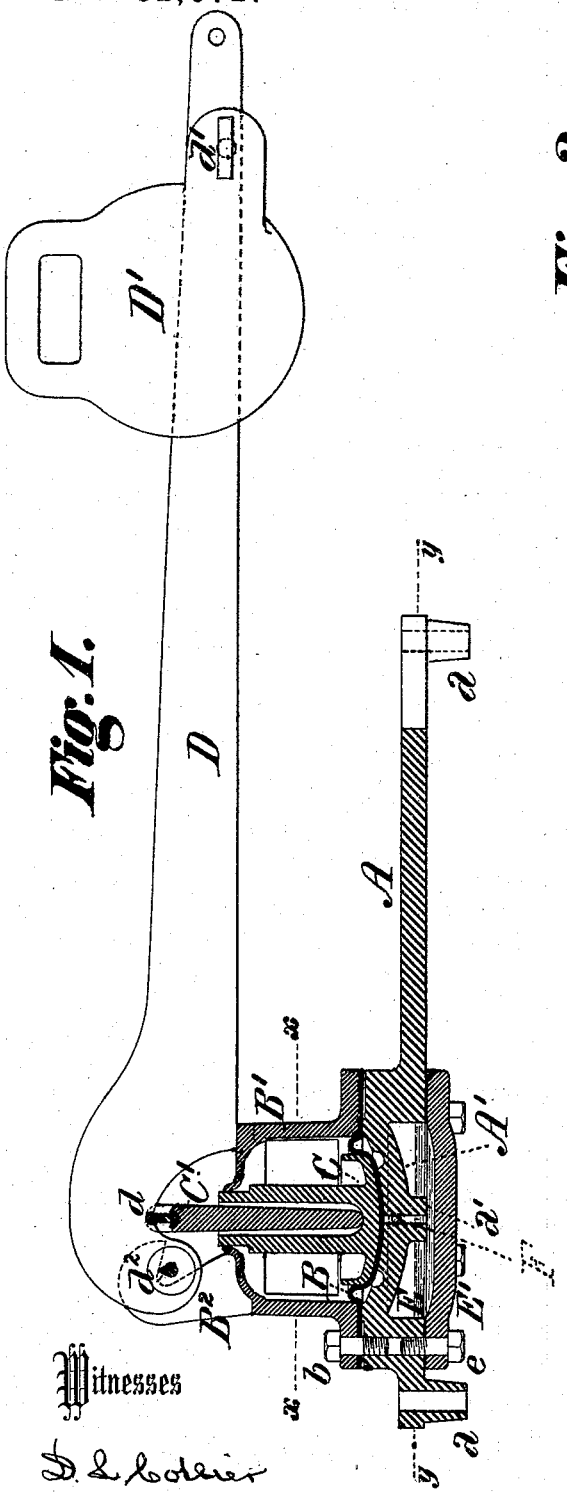


Fig. 3.

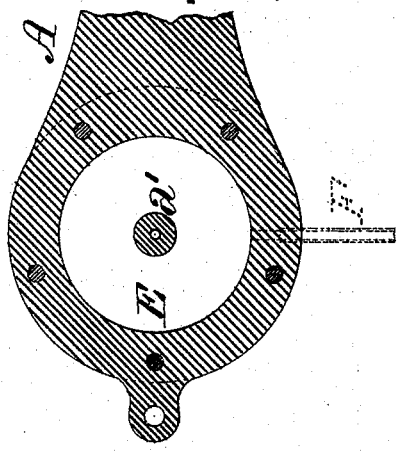
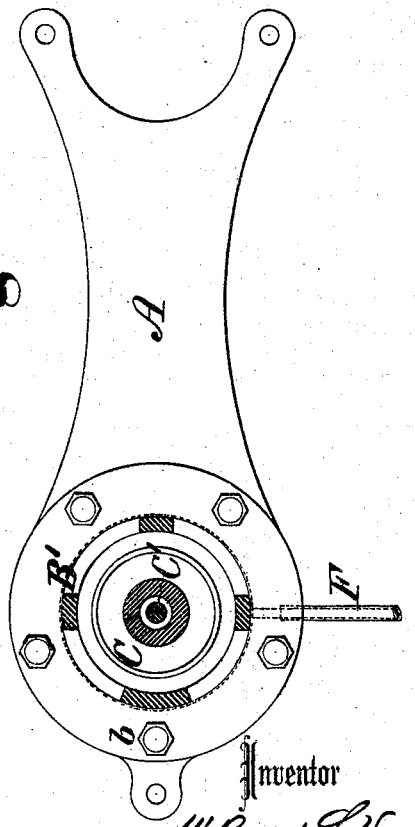


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM BARNET LE VAN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN DAMPER-REGULATORS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **182,372**, dated September 19, 1876; application filed July 12, 1876.

To all whom it may concern:

Be it known that I, WILLIAM BARNET LE VAN, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Damper-Regulators for Steam-Boilers, of which the following is a specification:

My invention relates to that class of damper-regulators in which the pressure of the steam in the boiler, acting upon a flexible diaphragm, operates a damper in the smoke-stack or exit-flue, to regulate the draft, and thereby the combustion of the fuel, and is an improvement upon the regulator for which Letters Patent of the United States, numbered 10,387, were granted and issued to one Patrick Clark, under date of January 3, 1854.

My invention is designed to protect the flexible diaphragm from the injury which it sustains by the direct contact of the steam; and my improvements consist in combining, with the cylinder or pressure-chamber of the diaphragm, a water-chamber, a steam-supply pipe connected thereto near its top, and a water-pipe extending from the lower surface of the diaphragm to the interior of the water-chamber at a point below the opening of the steam-supply pipe, all as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section of a damper-regulator embodying my improvements; Fig. 2, a horizontal section of the same at the line *x x* of Fig. 1; and Fig. 3, a similar section at the line *y y* of Fig. 1.

To carry out the object of my invention, I provide a base, A, supported upon feet *a*, and having a circular dished plate, A′, near one of its ends, upon which plate a flexible diaphragm, B, rests, being confined toward its periphery betweeen the plate A′ and a superposed cylindrical cage, B^1, by bolts *b*. A piston, C, rests on the diaphragm B, its stem projecting through a guide in the top of the cage B^1, and a pin, C′, rests in a central recess in the piston C.

A lever, D, having a weight, D′, near one of its ends, which weight may be adjusted by a set-screw, d^1, proportionately to the pressure of steam which it is desired to maintain, is supported on the top of the pin C′ by knife-edged bearings *d*, and is articulated to lugs B^2 on the cage by similar bearings d^2, near one of its ends. An attachment is made from the opposite end by a rod to a damper located in the smoke-stack of a steam-boiler, so that by the rising and falling of the diaphragm, by variations in the pressure in the boiler, the damper will be correspondingly closed and opened.

In damper-regulators of the above general construction, as heretofore made, so far as my knowledge and information extend, the steam has acted directly upon the diaphragm, and exerts a deteriorating effect thereon, which necessitates frequent renewal. To obviate this difficulty I form a cylindrical water-chamber, E, in the base A, immediately below and concentric with the plate A′. This chamber is closed at bottom by a bonnet, E′, secured by bolts *e*.

A steam-supply pipe, F, leading from the boiler, is connected to one side of the water-chamber E, near the upper part thereof, and a water-pipe, *a′*, formed upon the plate A′, which constitutes the upper boundary of the water-chamber, extends downward from said plate, having a clear opening from the diaphragm B to a point below the opening of the steam-supply pipe F, and as near as convenient to the bottom of the chamber.

In the operation of the device, it will be obvious that the chamber E forms a receptacle for the water of condensation from the supply-pipe F, and that said water will be forced up into the pipe *a′* and against the diaphragm B by the steam-pressure, effectually preventing the direct contact of the steam with the diaphragm, as it is, under all circumstances, interposed between the diaphragm and the steam.

I claim as my invention and desire to secure by Letters Patent—

The combination, in a damper-regulator, of a flexible diaphragm, a subjacent water-chamber, a steam-supply pipe connected to the water-chamber at or near its top, and a water-pipe leading from the diaphragm to a point in the water-chamber below the opening of the steam-supply pipe, substantially as set forth.

WILLIAM BARNET LE VAN.

Witnesses:

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