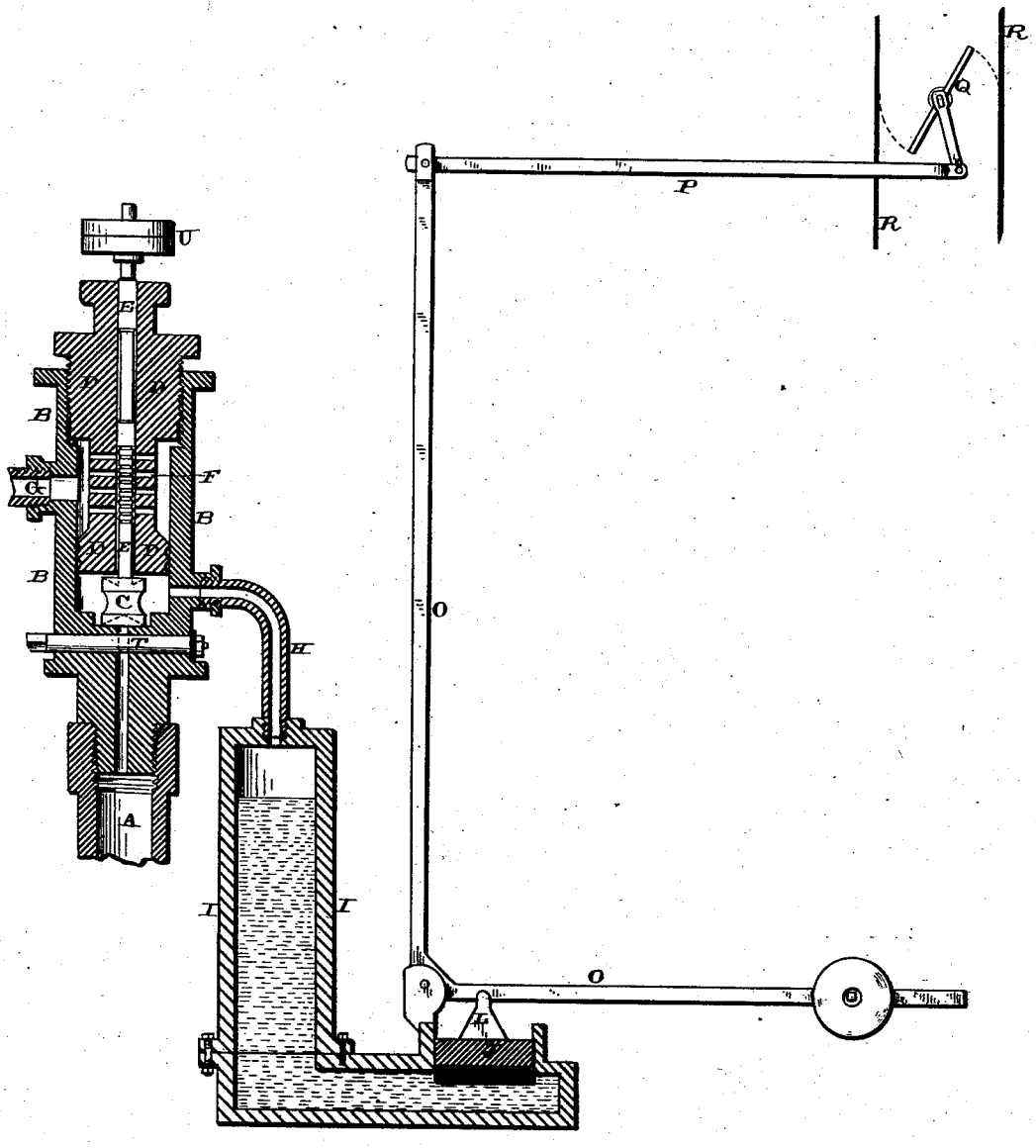
(No Model.)

T. COOKE.

REGULATOR FOR DAMPERS.

No. 302,109. Patented July 15, 1884.



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UNITED STATES PATENT OFFICE.

THOMAS COOKE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WASHINGTON YATES, OF SAME PLACE.

REGULATOR FOR DAMPERS.

SPECIFICATION forming part of Letters Patent No. 302,109, dated July 15, 1884.

Application filed October 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS COOKE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Regulators for Dampers, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to an improvement in regulators for dampers; and it consists in the combination of a chamber in which is placed a vertically-moving weighted valve, against the under side of which the steam presses, a water-chamber, a float, and a fulcrumed lever which is connected with the damper, whereby when the weight exceeds the regulated pressure the valve is raised from its seat and the steam causes the float to operate the fulcrumed lever for the purpose of closing the damper until the pressure of the steam is decreased, when the damper automatically opens, as will be more fully described hereinafter.

The object of my invention is to provide an apparatus in which the pressure of the steam is made to raise a weighted valve, and then to bear upon a column of water which will operate a mechanism which is connected to the damper, and thus cause the steam, whenever it exceeds the regulated pressure, to close the chamber and shut off the draft, and when the steam falls below the desired pressure will open the damper so as to cause a full draft.

The accompanying drawing represents a vertical section of an apparatus embodying my invention.

A represents the pipe, which is connected directly with the boiler, and through which the steam passes to the regulating apparatus. Upon the top of this pipe is placed a chamber, B, into which is placed the vertically-moving weighted valve C, which valve closes the steam-opening in the bottom of the chamber, and prevents the steam from passing into the chamber when its pressure is below the regulated amount. Screwed into the top of this chamber is the plug D, which has a vertical opening through its center for the stem E of the valve to pass through, and which plug has a series of horizontal perforations, F, for the steam to pass through to the escape-pipe G. Connected to the chamber B below the lower end of the plug is the steam-pipe H, which connects with the top of the water-chamber I, which chamber I may either be of the form here shown or any other that may be preferred. By making one portion higher than the other, as here shown, a water column is formed which exerts a constant and even pressure upon the float J, which is placed in an opening made in the top of the lower portion of the water-chamber. Upon the top of this float is placed a suitable bearing, L, upon the top of which rests the weighted and fulcrumed lever O. This lever is made preferably of the shape here shown, and has the weight placed upon the lower and shorter arm for the purpose of causing the lever to open the damper as soon as it is left free to move. To the upper end of this lever is connected the rod P, which has its other end connected to an arm, which is secured to the damper Q, placed in the stack R. This stack of course is connected directly with the furnace or fire, and when the damper is closed to a greater or less degree the draft is correspondingly decreased, and the generation of steam in the boiler checked to a corresponding degree. The lower end of the plug D fits the chamber above the valve sufficiently tight to prevent any upward escape of the steam when the steam is passing into or through the lower part of the chamber. This plug is contracted in size above the lower end, so as to form a steam-space or chamber to communicate with the exhaust-pipe G, while the plug is made screw-threaded at its upper end, so as to be vertically adjustable for the purpose of regulating the distance the valve shall be raised. The stem of the valve is also made somewhat smaller than the opening through the plug, so as to allow the steam to pass up around it when the valve is closed to the horizontal openings F through the plug. The stem of the valve just opposite these horizontal openings is made grooved, so as to allow the steam to pass freely around it, as shown. Above this grooved portion the stem of the valve fits the

bore of the plug sufficiently tight to prevent any upward escape of the steam above this point.

Passing horizontally through the lower part of the chamber B below the weighted valve is a stop-cock, T, by means of which the steam can be prevented from communicating with the chamber B when so desired.

The operation of my invention is as follows: Any desired weight U is placed upon or attached to the upper valve-stem, according to the pressure of steam that is desired. As the valve closes the opening in the bottom of the chamber B, it is evident that no steam can pass from the pipe A into the chamber until its pressure has raised its valve upward. As soon as the valve is raised up against the underside of the plug, all upward escape through the plug is cut off, and the steam then passes through the pipe into the top of the water-chamber and bears upon the column of water. The downward pressure of the steam upon the top of the water causes the float to rise and to raise the shorter end of the operating-lever. The upper end of this lever, in being forced backward, moves the damper so as to close it to a greater or less degree, as shown in dotted lines, and thus check the draft through the chimney or stack. The draft being checked, the generation of the steam is checked accordingly, and the pressure of the steam in the boiler soon begins to fall. As soon as the pressure has fallen the valve drops downward in the chamber B and closes the entrance for the steam. All that steam which remains in the chamber and in the top of the water-chamber then passes up around the stem of the valve and out through the horizontal openings in the plug, and from thence through the discharge-pipe. When the pressure falls, the float is caused to sink by the weight upon the shorter arm of the lever, and the upper end of the lever, being drawn or forced forward, opens the chamber, so as to allow a free combustion to again take place in the furnace. In this way a perfect and even control is kept upon the pressure in the boiler, and the pressure of the steam is made to control the damper.

Having thus described my invention, I claim—

1. The combination of the steam-pipe A, the chamber which is connected thereto, the weighted valve, the steam-chamber which is connected with the chamber B by means of a steam-pipe, a float, and a lever which is connected to the chamber, substantially as shown.

2. The combination of the steam-pipe A, the chamber B, connected thereto, the perforated plug, and the weighted valve, the stem of which valve passes up through the plug, substantially as set forth.

3. The combination of the steam-chamber, the vertically-movable weighted valve placed therein, and the adjustable plug having a vertical opening through its center for the valve to pass through, and provided with the horizontal openings, through which the steam passes through the exhaust-pipe, substantially as described.

4. The combination of a water-chamber having a vertical portion, so as to form a water column, and a horizontal portion having an opening through its top, with a regulating device for controlling the admission of the steam into the top of the water-chamber, and a float for moving the lever which controls the damper, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS COOKE.

Witnesses:
WASHINGTON YATES,
THACKAM S. TUFT.