

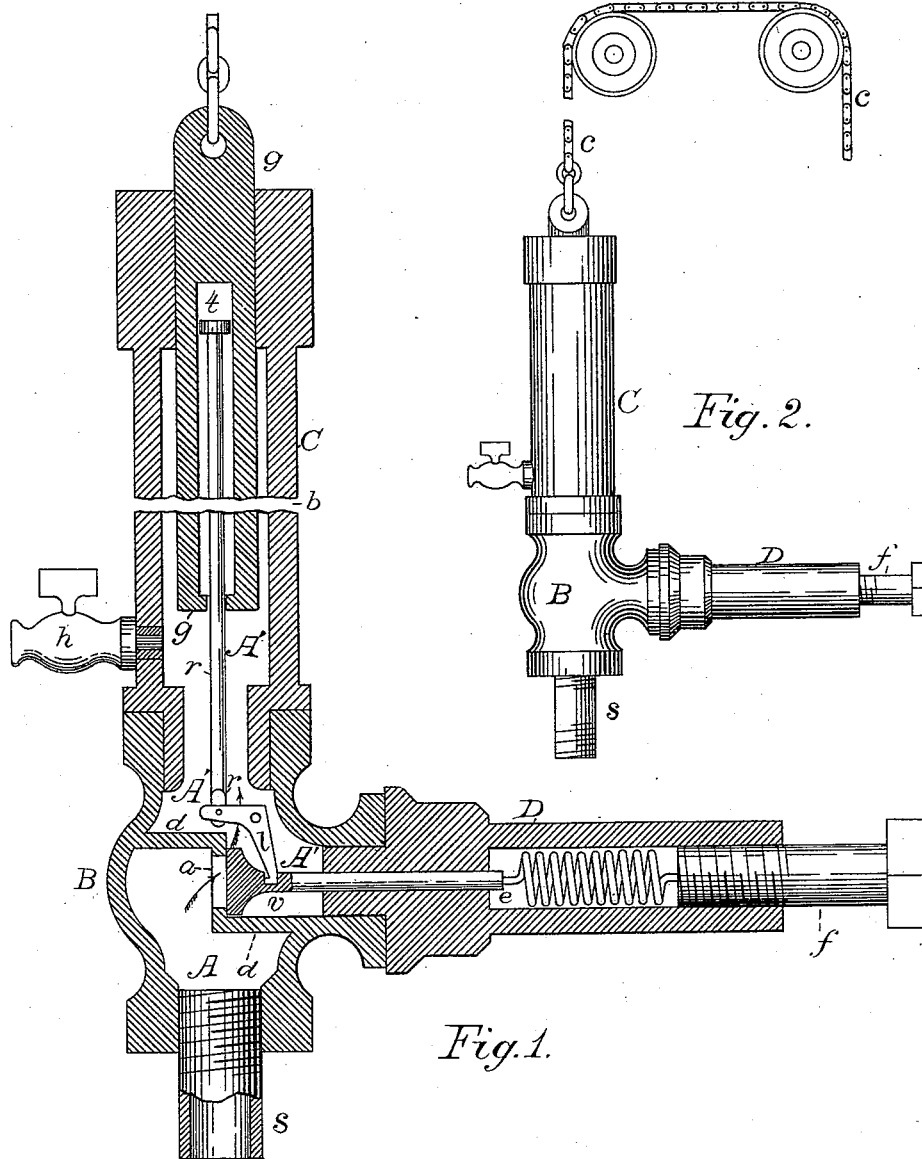
(No Model.)

R. J. HOFFMAN.

STEAM ACTUATED DAMPER REGULATOR.

No. 347,799.

Patented Aug. 24, 1886.



Witnesses
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STEAM-ACTUATED DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 347,799, dated August 24, 1886.

Application filed June 14, 1886. Serial No. 205,061. (No model.)

To all whom it may concern:

Be it known that I, ROSS J. HOFFMAN, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Steam-Actuated Damper-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts throughout the several views.

My invention is that of an improved form of steam-actuated damper-regulator for controlling the fire under steam-boilers, and has for its object to furnish a damper-regulator which will readily respond to any material change of pressure of steam, and also allow of ready adjustment to adapt it to any amount of pressure which may be required.

The automatic damper-regulators heretofore in use have been too slow to respond to the changes of pressure in the boiler, while my improved regulator, less expensive to make, if properly balanced, will change the damper before the ordinary steam-gage will indicate any difference in the pressure of steam. So, with the damper properly balanced, when the door is opened to add fresh fuel, the damper will open almost immediately, thus anticipating the check to the fire, furnishing a full draft at once, and does not wait until the steam has run down before the change takes place.

In the accompanying drawings, Figure 1 is a vertical section of the regulator, in which the vertical cylinder and its accompanying parts are broken at *b*. Fig. 2 is an elevation of the regulator, showing the chain which passes from the piston *g* to the damper.

The regulator is made, preferably, in three sections—the globe B, vertical cylinder C, and horizontal arm D, the last two parts screwing into the globe B, as shown in Fig. 1.

The regulator is seated on the top of the boiler, at any convenient point, and connected with it by means of the tube *s*, threaded into the boiler and globe. The lower part of the

globe is occupied by the steam-chamber A, connected, by means of the tube *s*, directly with the interior of the boiler, and therefore maintaining substantially the same pressure of steam as the boiler. Across the globe is a partition-wall, *d*, having a perpendicular section, as shown in Fig. 1. This perpendicular section is pierced at *a* for the passage of steam, and this orifice is covered by the puppet-valve *v*. The stem of this valve works through the head of the arm D, and should be fitted substantially steam-tight, but at the same time allow of free action. The arm has a cylindrical recess, within which is a coiled spring, *e*, having each end centered, so that the spring shall work freely under pressure. One end of the spring rests in a countersink in the end of the stem of the puppet-valve, the other end in a like countersink in the end of the screw-pin *f*, which is threaded into the end of the arm. It will be readily seen that the pressure of the valve *v* is readily controlled by means of this spring and pin.

Above the dividing-wall *d* of the globe is the steam-chamber A', extending into the vertical cylinder C of the regulator. This cylinder C is chambered nearly to its head, and through its head has a piston, *g*, smaller than the chamber, extending above the head, and also down in the chamber nearly to the upper end of the globe, so that when the steam is out it may rest on the shoulder in the cylinder. At the upper end of the piston *g* the chain *c* is attached, and from there is carried over pulleys to the damper in any desired form. This is a matter of mere mechanical arrangement, which any mechanic familiar with such work will have no difficulty in arranging.

A small cock, *h*, is inserted in the cylinder, to permit the escape of a small amount of steam, so that it may not fill with dead steam, and also to allow the escape of any water which may condense in the chamber A'.

To guard against displacement of the piston *g*, or injury to any part of the regulator by any of those freaks of pressure familiar to every engineer, the piston is made tubular, with a gland or cap at the lower end, through which the rod *r* passes, and the rod has a cap, *t*, on its upper end, within the tube of the piston. These do not need to be steam-joints, as the

operation of this part of the device is not dependent upon the direct action of the steam upon it. The rod is attached, by a rivet or other joint, at its lower end to a swinging dog, *l*, pivoted at the turn, and the lower end of which engages with a small notch in the upper side of the valve *v*.

The operation of the regulator is as follows: Whenever the pressure of steam goes above the desired point, the puppet-valve *v* is forced back and the steam rushes into the upper steam-chamber, *A'*, filling this at substantially the same pressure as the boiler. This will force the piston *g* up, thus lengthening the chain and letting down the damper, which should be so nearly balanced that the weight of chain on the regulator controls its action. Whenever the fire slackens so that the steam runs down below the desired point, the valve *v* closes, the pressure of steam in the upper chamber, *A'*, ceases, and the piston *g* descends in the chamber and opens the damper. It will be seen that the pressure under which the puppet-valve will open, can be easily regulated by means of the screw-pin *f* and coiled spring *e*.

The safety-rod *r* and valve-closer *l* operate as follows: If, by reason of any extraordinary pressure, the piston *g* is forced up farther than is necessary to close the damper, the collar at the lower end of the piston catches the head *t* on the rod, and thus lifts the rod up. This throws the dog forward and closes the valve, shutting the steam off the upper chamber, *A'*. Whenever the extraordinary pressure is removed, the piston will descend and release the valve again. This safety-rod must of course be made long enough, so as not to act under ordinary conditions, but only to protect the regulator against accident, in case of any unusual pressure brought to bear upon it, and prevent the piston from being forced out of the head of the cylinder.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-actuated damper-regulator, a globe in direct connection with the boiler, containing steam-chambers *A* and *A'*, separated by dividing-wall *d*, having orifice *a*, with puppet-valve *v*, in combination with the arm *D*, having through its head the stem of the valve *v*, and a cylindrical recess in which is a coiled spring, *e*, the pressure of which is regulated by the screw-pin *f*, all constructed and arranged substantially as shown and described.

2. In a steam-actuated damper-regulator, a globe, *B*, containing steam-chambers *A* and *A'*, separated by a dividing-wall, *d*, with orifice *a* through its perpendicular part, in combination with vertical cylinder *C*, the recess of which is the continuation of the steam-chamber *A'*, and piston *g*, working through the head of the cylinder *C*, said piston *g* having a chain or connection at its top for connecting with the damper, all constructed and arranged substantially as shown and described.

3. In a steam-actuated damper-regulator, a globe or bulb, *B*, containing steam-chambers *A* and *A'*, separated by a dividing-wall, *d*, with orifice *a* through its perpendicular part, in combination with vertical cylinder *C*, the recess of which is the continuation of the steam-chamber *A'*, and piston *g*, working through the head of the cylinder *C*, said piston also being chambered and carrying safety-rod *r*, attached to swinging dog *l*, for closing valve *v*, all as shown and described.

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

ROSS J. HOFFMAN.

Witnesses:

A. L. PINE,
S. A. BELL.