

969,939.

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DAMPER-REGULATOR.

969,939.

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To all whom it may concern:

Be it known that I, JOHN A. COLLINS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Damper-Regulators, of which the following is a specification.

My invention relates to a new and useful improvement in damper-regulators, and has for its object to provide an exceedingly simple and effective arrangement by which a damper of a furnace such as a steam boiler furnace will be regulated to increase or decrease the draft in the stack by the pressure of steam, and a further object of my invention is to so construct the parts that they will operate more accurately than has heretofore been the case, and a further object is to prevent the chocking of the steam by the waters of condensation, and a still further object of my invention is to provide for the adjustment and removal of the regulating valve seat.

With these ends in view, this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claim.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, I will describe its construction in detail, referring by letter to the accompanying drawing forming a part of this specification, in which—

Figure 1 is an elevation of my invention, parts thereof being in section to clearly show the operating parts. Fig. 2, a detail view of the regulating beam and its pivot points. Fig. 3, a detail view of a slightly modified form of the valve plug showing a leather washer around the top.

In carrying out my invention as here embodied, A represents a cylinder, in which is fitted a suitable piston, the rod of which supports the weights B, and to which is attached the damper cord or cable C.

D is a pipe connected with the bottom of the cylinder A and communicating with the lower portion of the condenser tank E, and from the upper portion of this tank passes the pipe F to the double seat valve G, the opposite side of said valve having connected therewith the exhaust pipe H.

I represents a pipe leading from the boiler or source of pressure into the water

pocket J, and from the top of this pocket leads the pipe K to the lower portion of the two seat valve G. The valve G has located therein the valve plug L, adapted to close upon either the seat M to stop the flow of steam from the pipe K or upon the valve seat N to regulate the flow of the exhaust, and this plug is connected by the stem O to the lever P, the latter being pivoted at P', and connected to the scale beam Q at P².

R represents a casing, in which is fitted a diaphragm adapted to raise the cap R' by steam pressure admitted to said casing through the pipe S, which leads from the boiler, and in order that the scale beam may be actuated by the rising and falling of the cap a standard T is interposed between said cap and the scale beam in such manner as to lift the latter when the cap is forced upward.

In order that the scale beam may be prevented from sidewise movement and permitted to operate freely upon its fulcrum, I form or secure to the rear end of this beam the fulcrum bars U, the upper edges of which are in the form of a knife edge adapted to seat within suitable notches formed in the frame V, and this will permit the beam to freely rock upon its fulcrum, preventing it from becoming set or retarded by rust or the accumulation of dust or the like.

In order that the main operating parts of the device may be properly set and conveniently adjusted I provide the brackets W and W' which are secured to the wall or any suitable surface, and upon which the platform W² rests, the brackets W' having an adjusting screw W³ for raising and lowering the one end of the platform to bring the same in proper alinement, and if desired there may be four of such said screws, two carried by each of the brackets W and W' in order that the platform may be adjusted in all directions.

From the foregoing description the operation of my improvement will be as follows:—The weights *a* and *b* being used to determine the boiler pressure at which the damper shall be operated, the steam admitted through the pipe S from the boiler to the casing R will when its pressure is sufficient force up the cap R' and consequently raise the scale beam Q, which in turn will raise the valve plug L through the lever P and stem O. When this valve plug is raised off the seat M, steam will flow from the pipe

I into the water pocket J, and from thence up through the pipe K to the valve, and through the pipe F to the condenser tank E, and as the lower portion of this tank contains water accumulated from condensation of the steam, this water will be forced up through the pipe D into the cylinder A, and in turn force up the weights B to close the damper. When the steam in the boiler has fallen in pressure so that the weights *a* and *b* will be sufficient to force the cap R' downward against this steam pressure, the valve plug L will be closed upon the seat M, thus stopping the flow of steam through the pipe K, but permitting the steam in the condenser tank E to flow backward through the pipe F, through the valve seat N and out through the exhaust, thus relieving the pressure from the water in the cylinder A, causing the weights B to descend and open the damper.

To prevent the disagreeable sound caused by steam coming with force into direct contact with water, I provide two branch pipes F' leading upward from the lower end of the pipe F and terminating in the upper portion of the condenser E so that when the steam is admitted through the pipe F it will flow into this tank in an opposite direction from the water in the lower portion thereof and prevent the gurgling noise which would otherwise be made.

Both the valve seats M and N are threaded in the valve casing in order that they may be removed when occasion requires and others substituted therefor. This is an important feature as these valve seats rapidly wear away and impair the usefulness of the apparatus.

When the regulator is to be operated by

water pressure instead of steam, the annular sharp edge of the valve plug L is omitted and a compressible cap L' substituted, the object of which is to hold the exhaust partially closed when the plug is forced downward, thus retarding the escape of the exhaust water and weights B to descend gradually. This same effect will also be had to an extent when steam is used, as before described, and is of great benefit in this class of regulators.

Having thus fully described my invention, what I claim as new and useful, is—

In a damper regulator, the combination of a cylinder containing a weighted piston, a condenser tank, a pipe connecting the lower portion of the condenser tank with the lower portion of the cylinder, a pipe leading into the upper portion of the condenser tank, two branch pipes leading from the last named pipe and extending upward in the condenser tank, two seats located in said valve, a valve plug adapted to close upon either of said seats, a steam supply pipe leading to the valve, an exhaust pipe leading from the valve, a lever connected to the valve plug, a scale beam to which the lever is connected, knife edges carried by the scale beam upon which the latter rocks and means dependent upon the pressure in the boiler for raising and lowering the scale beam, as and for the purpose set forth.

In testimony whereof, I have hereunto affixed my signature in the presence of two subscribing witnesses.

JOHN A. COLLINS.

Witnesses:

EDW. W. AUSTIN,
S. M. GALLAGHER.