F. H. CYRENIUS.

STEAM BOILER DAMPER REGULATOR.

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Witnesses:
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STEAM-BOILER DAMPER-REGULATOR.

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To all whom it may concern:

Be it known that I, FREDERICK H. CYRENIUS, a citizen of the United States, residing at Oswego, in the county of Oswego, State of New York, have invented a new and useful Improvement in Steam-Boiler Damper-Regulators, of which the following is a specification.

My invention relates to improvements in steam-boiler damper-regulators, as more fully set forth below.

The objects of my improvements are, first, to produce an automatic regulator that will control the draft of a steam-boiler; second, to produce a regulator that is cheap and simple in its construction that will maintain an even pressure without undue waste of steam or energy. I attain these objects by the mechanism illustrated in the accompanying drawing, which is a vertical section of the entire machine.

A is a metal cylinder connected at h to the boiler H by the pipe I. A and b are diaphragms secured by caps T and X. E, a valve-stem centrally located in and attached to diaphragm a, extends to a valve opening into the chamber adjoining diaphragm b at f. The head of said valve-stem rests against the horizontal arm C and raises the arm C as the diaphragm a is forced upward by the pressure from within the boiler. In the lower part of the valve-stem E is loosely mounted the valve m and the spring e, which yieldingly resists the relative upward motion of the valve m, thereby permitting the valve o to be opened slightly in advance of the valve m.

Horizontal arm C is secured to the iron post (indicated at N.) Attached to one end of arm C are weights by which the pressure and motion of arm C are regulated or controlled. The opposite end of arm C passes through valve-stem F at the elongated slot g. The slot g allows arm C to raise beyond the point where valve-stem F closes the valve at o, thus allowing arm C additional motion, which results in the opening of the valve at f. The raising of arm C opens valve f and closes valve o. The lowering of arm C closes valve f and opens valve o.

Attached to the diaphragm b is the rod P, which rests against horizontal arm D. Attached to arm D are the adjusting-weights. The end of arm D is connected directly with the damper L of the steam boiler at J.

This machine operates as follows: Connections being made to the boiler through h, the weights upon arm C are adjusted to the pressure that is desired to be maintained within the boiler. Arm C remains stationary as long as the pressure within the boiler remains at the point at which the weights are adjusted. If this pressure within the boiler increases, the increased pressure forces diaphragm a upward, thus raising the valve-stem E, which in turn raises arm C. Arm C moving upward allows valve-stem F to lower, thus closing the valve at o. Valve-stem E being raised opens the valve at f, which allows the pressure within A to act against diaphragm b. The pressure against diaphragm b forces diaphragm b downward, which causes an upward motion of arm D, which upward motion of arm D through attachment at J closes the damper of the boiler. As the steam-pressure within the boiler decreases the weighted arm C forces valve-stem E downward, thus seating the valve m at f and also lifting the valve-stem F, opening the valve o. The opening of valve o allows the water and steam confined within the chamber between diaphragm b and valve f to escape through valve e, thus releasing the pressure against the upper side of diaphragm b. The weight on arm D forces diaphragm b back to its original position. Arm D moves downward, and this movement of arm D opens the damper of the boiler.

I am aware that prior to my invention steam boiler damper-regulators have been made with various kinds of valves. I therefore do not make a claim covering the machine broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a damper-regulator, the combination with a steam-boiler, of a casing divided into upper and lower compartments having a passage therebetween, said lower compartment having an exhaust-port therein, a valve normally closing the passage between the compartments, means whereby increase of steam-pressure above a predetermined limit will unseat the valve, a weighted arm above the
upper chamber adapted to be lifted when said valve is unseated, a second valve adapted to close the exhaust-port in the lower compartment and having a stem engaging said arm, a pivoted lever below the lower compartment, and means whereby the unseating of the passage-way valve and the seating of the exhaust-port valve will actuate said lever.

2. In a damper-regulator, the combination with a steam-boiler, of a casing divided into upper and lower compartments having a passage therebetween, said lower compartment having an exhaust-port therein; a valve closing the passage between the compartments and an oppositely-acting valve controlling the exhaust-port valve in the lower compartment, means whereby an increase of steam-pressure above a predetermined limit will actuate said valves, a lever pivoted below the lower compartment and connected with a damper, and means whereby the admission of steam into the lower compartment will actuate said lever.

3. In a damper-regulator, a casing divided into two compartments having a passage therebetween, said lower compartment having an exhaust-port therein; a pipe connecting the upper compartment with a steam-boiler, a valve normally closing the passage between the compartments, a flexible diaphragm located in the upper compartment and rigidly secured to the stem of said valve, a weighted arm pivoted above the upper compartment and adapted to be actuated by upward movement of said diaphragm, a valve closing the exhaust-port in the lower compartment and loosely connected to said arm, a second diaphragm in the lower compartment, a weighted lever pivoted beneath said compartment and having its weighted end connected to a damper, said lever adapted to be actuated by downward movement of the last-named diaphragm.

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Witnesses:

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