

G. STEELE.
DAMPER REGULATOR.

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931,095.

Patented Aug. 17, 1909.

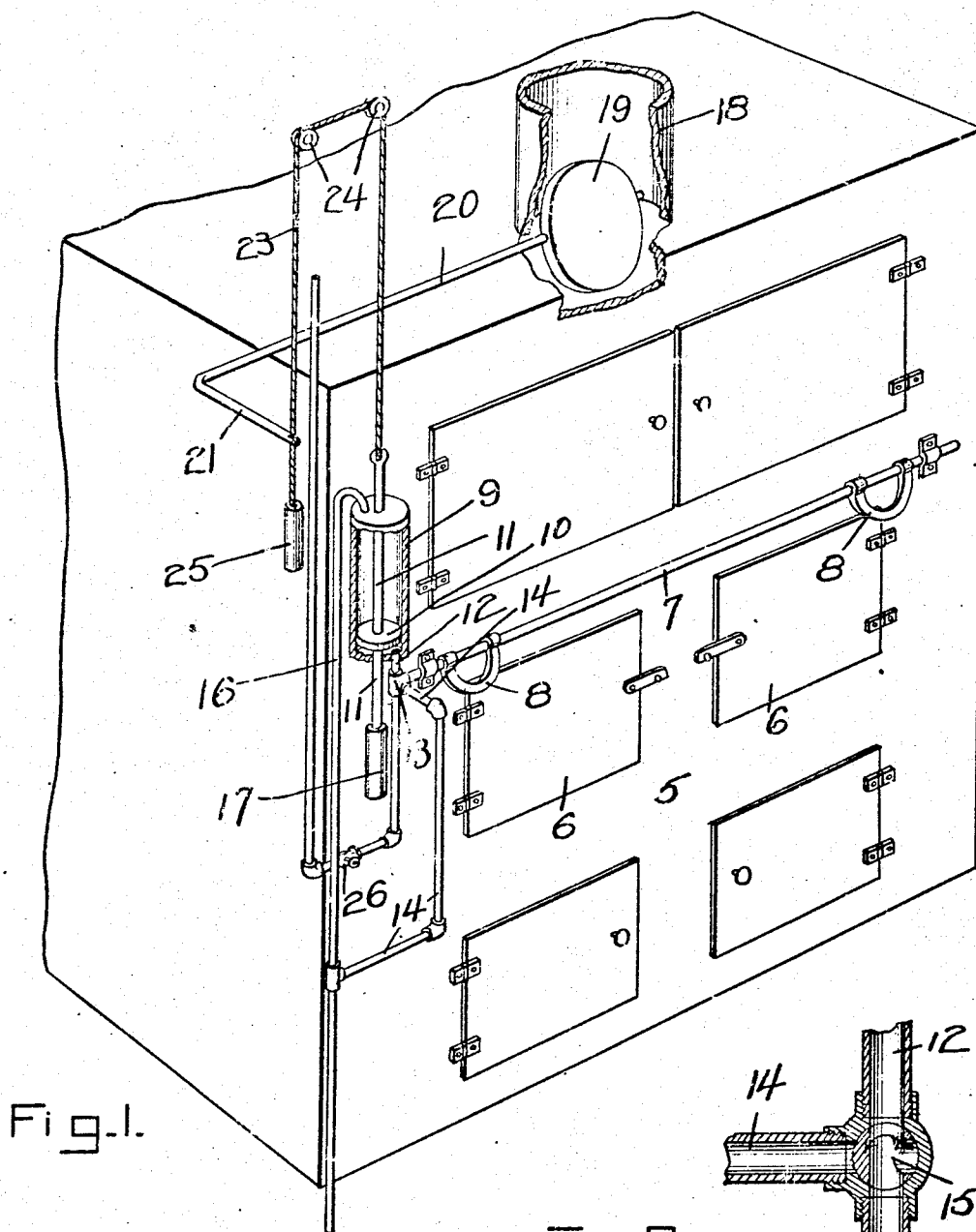


Fig. 1.

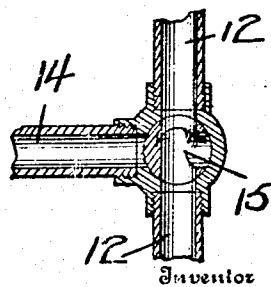


Fig. 2.

Witnesses

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DAMPER-REGULATOR.

No. 931,095.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GABRIEL STEELE, a citizen of the United States, residing at Sioux City, in the county of Woodbury, State of Iowa, have invented certain new and useful Improvements in 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.

This invention relates to damper operating devices for steam boiler furnaces and has for its object to provide means arranged for automatic operation to close the damper of the flue of the furnace when the fire box doors are opened for the introduction of fuel or other purposes.

The primary object of the invention is to provide a mechanism of the class described of compact structure and of such nature that it may be applied to any boiler furnace now in use and may hence be sold by itself for the purpose of such application.

Broadly stated the mechanism comprises a cylinder which is arranged preferably upon the front wall of the furnace and with which communicates a fluid supply pipe and an overflow pipe. An exhaust pipe leads from a valve casing which is interposed in the supply pipe and the valve within this casing is of the class known as three-way valves and is automatically operated, when the fire box doors are opened, to admit the fluid through the supply pipe and into the cylinder, the passage to the exhaust pipe being closed. A piston is arranged within this cylinder and has extending above and below it piston rods, the lower rod having a weight secured thereto and the upper rod having connection with a cable which connects with the damper rod of the furnace. The admission of the fluid under pressure to the cylinder beneath the piston serves to raise the same and in so doing the cable is slackened to permit movement of the damper rod this movement being insured by a weight which is connected with the extreme end of the cable beneath the rod and is of sufficient weight to move the damper rod. The exhaust pipe is connected with the overflow pipe and when the fire box doors are again closed, and the three-way valve turned so as to permit of the exhaust of the steam from the cylinder through the exhaust pipe, it

will be understood that this exhausted steam will flow rapidly through the overflow pipe and into the cylinder above the piston thus equalizing pressure above and below the piston.

In mechanisms of this class in use at the present time, and where a construction somewhat similar to mine is employed, it is necessary for the weight for controlling the piston, to act against the steam within the cylinder below the piston at the time of its exhaust and hence by the provision of this overflow pipe and the connection of the exhaust pipe therewith, I have, in my mechanism, overcome this disadvantage.

In the accompanying drawings, Figure 1 is a perspective view of a boiler furnace showing the application of the invention thereto, and, Fig. 2 is a detail vertical sectional view through the three-way valve, the valve being shown in position to admit steam to the cylinder.

In the drawings there is shown a simple boiler furnace 5 which is provided with fire box doors 6, and journaled upon the front of the furnace above the fire box doors is a horizontally extending valve rod or bar 7 which is designed for rocking movement and is provided with hangers 8 which extend downwardly over the doors for engagement by these doors when the latter are opened. This will result in a rocking movement of the valve rod as will be readily understood and the function of this movement will be presently explained. A cylinder 9 is disposed in a vertical plane upon the front of the furnace and is closed at its ends and disposed within the cylinder for reciprocatory movement therein is a piston 10. Piston rods 11 extend axially from the piston above and below the same and through the corresponding ends of the cylinder.

A fluid supply or feed pipe 12 bent U-shaped has communication with the cylinder at the lower end thereof and is designed to admit steam or other fluid under pressure into the cylinder beneath the piston and interposed in this supply pipe is a valve casing 13 with which casing an exhaust pipe 14 has communication. Arranged within the valve casing 13 is a three-way valve 15 with which the valve rod 7 is directly connected, the arrangement being such that when the doors are opened the movement of the rod 7 revolves the valve 15 to establish

communication between the portions of the supply pipe 12 which lie above and below the valve for the purpose of admitting steam into the cylinder as above stated.

5 An overflow pipe 16 leads from the upper end of the cylinder and forms a junction with the exhaust pipe 14 and the function of this overflow pipe will be presently stated. A weight 17 is connected with the
10 piston rod 11 below the cylinder and serves to return the piston to the downward limit of its movement when the doors are closed and the three-way valve turned to permit the steam to exhaust from the cylinder by
15 way of the exhaust pipe 14.

The furnace is provided with a smoke flue 18 in which is mounted a damper 19, this damper being arranged upon a horizontal shaft 20 having a lever 21 at one end and
20 extending at right angles thereto. A cable 23 is secured to this lever and is passed over pulleys 24 above the same and is connected at its opposite end to the upper end of the piston rod 11 above the piston. A weight
25 25 which is somewhat lighter than the weight 17 is secured to the cable 23 below the lever 21 and exerts a tendency to hold the shaft 20 with the damper yieldably in closed position but the weight 17 being
30 heavier than the weight 25 this tendency is overcome and the damper normally held open.

The operation of the system is as follows: When the fire box doors are open, the valve
35 rod 7 is rocked through the instrumentality of the members 8 and the three-way valve 15 is turned in such a manner that communication will be established between the portions of the supply pipe 12 lying above
40 and below this valve. Steam is therefore admitted into the cylinder below the piston 10 and serves to raise the said piston to the limit of its upward movement. This movement of the piston results in a slackening of
45 the cable 23 and the weight 25 then acts to rock the damper shaft 20 and turn the damper in position to close the flue 18. Now

when the fire box doors are closed, the three-way valve will be turned to cut off the supply of steam to the cylinder and to
50 open communication between the cylinder and the exhaust pipe and the exhausted steam will pass through this pipe up through the overflow pipe 16 into the cylinder above the piston to equalize pressure
55 above and below the same and thereby render it only necessary for the weight 17 to overcome the weight 25 and the resistance offered by the turning of the damper shaft 20. A globe valve 26 is located in the
60 feed pipe 12 and by means of this valve the supply of steam to the cylinder may be cut off or regulated.

What is claimed is—

The combination with a steam boiler and
65 furnace, of a rock bar, a hanger pendent from said rock bar and held against the door of said furnace, a vertically disposed cylinder secured to said furnace, a piston within said cylinder, a rod extending from
70 said piston in opposite direction through the ends of said cylinder, a feed pipe extending from said boiler and entering the lower end of said cylinder, a three way
75 valve within said feed pipe connected to said rock bar, an exhaust pipe extending from said valve, an over flow pipe leading from the upper end of said cylinder and connected to said exhaust pipe, a waste pipe
80 extending from the union of said two pipes, a weighted crank provided with a damper within the smoke flue of said furnace, a pliable connection extending from said upwardly projecting piston rod and secured to
85 said crank, and a weight secured to the downwardly projecting end of said piston rod said weight being in excess of the weight upon said damper for the purpose specified.

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

GABRIEL STEELE.

Witnesses:

BLANCHE P. WATSON,
JESSE W. HUBBARD.