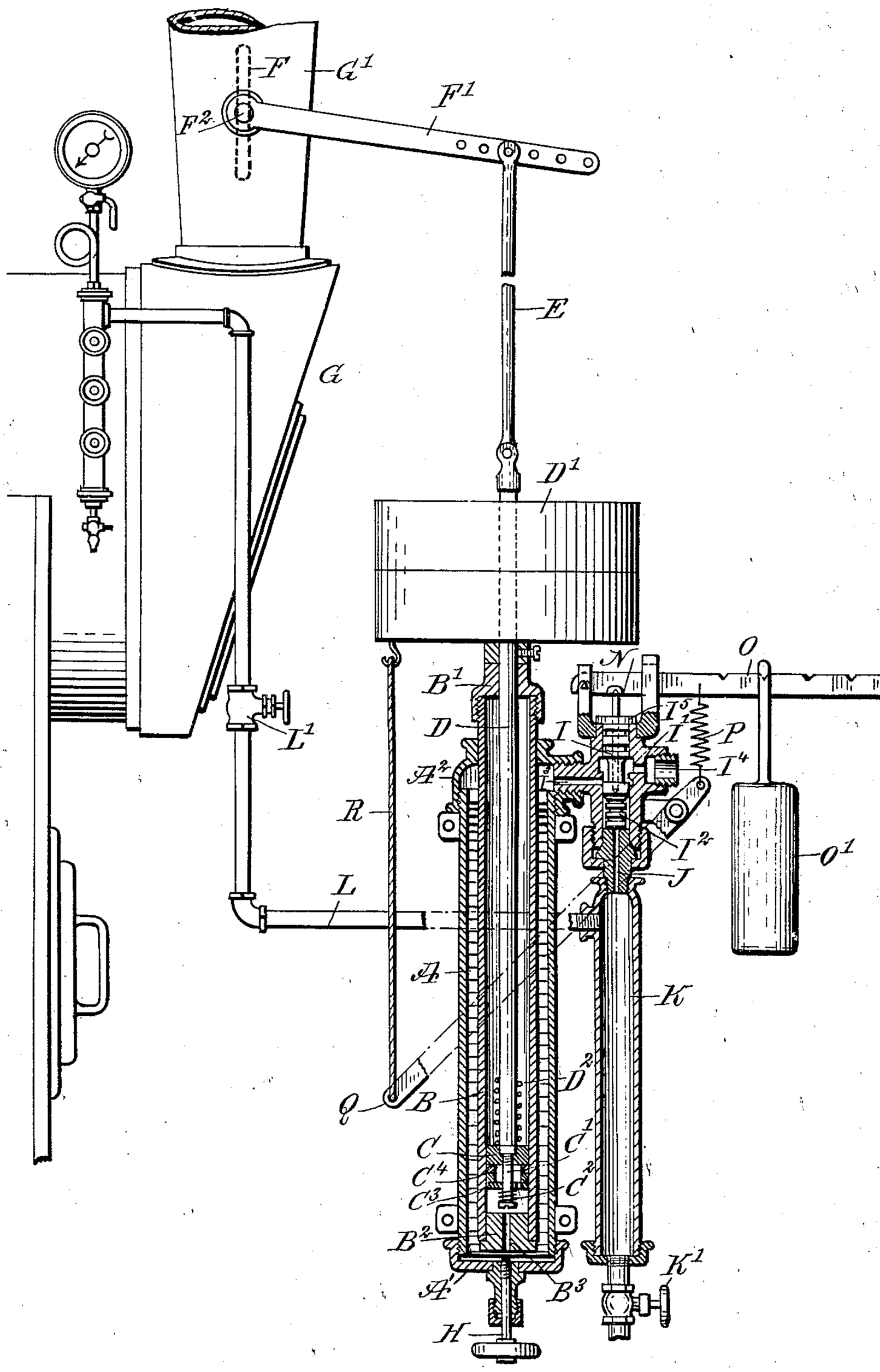
No. 886,988. PATENTED MAY 5, 1908.

C. C. KOSTER.

DAMPER REGULATOR.

APPLICATION FILED SEPT. 24, 1907.



WITNESSES

John H. Lynch.

Theo. L. Hoster Jr.

INVENTOR

Charles C. Koster

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES C. KOSTER, OF NEW YORK, N. Y.

DAMPER-REGULATOR.

No. 886,988. Specification of Letters Patent. Patented May 5, 1908.

Application filed September 24, 1907. Serial No. 394,265.

To all whom it may concern:

Be it known that I, CHARLES C. KOSTER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Damper-Regulator, of which the following is a full, clear, and exact description.

The invention relates to damper regulators, such as shown and described in the Letters Patent of the United States No. 486,345, granted to me November 15, 1892.

The object of the present invention is to provide a new and improved damper regulator for use on steam boilers, furnaces, heaters and the like, and arranged to accurately and automatically adjust the damper with a view to control the burning of the fuel and the generation of the steam in the boiler.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawing forming a part of this specification, in which the figure is a sectional side elevation of the improvement as applied to the damper in the smoke stack of a boiler.

In the casing A of the damper regulator is arranged concentrically a vertically disposed cylinder B, in which reciprocates a piston C having its piston rod D extending upwardly through the upper head B′ of the cylinder B, the outer end of the said piston rod D being connected by a link E with an arm F′ held on the pivot F^2 of the damper F, shown applied in the smoke stack G′ of a boiler G of any approved construction.

The cylinder B has its lower head B^2 provided with an aperture B^3, controlled by a needle valve H, screwing in the lower head A′ of the casing A, to control the amount of water passing from the casing A through the opening B^3 into the cylinder B, to act on the piston C therein.

In order to render the piston C as tight as possible in the cylinder B, the bottom of the piston is provided with a rod C′ carrying a spring C^2 pressing against the under side of an apertured disk C^3, resting on rubber rings C^4, interposed between the disk C^3 and the under side of the piston C. Now water entering the lower end of the cylinder B can pass by way of the apertures in the disk C into the space surrounded by the rubber rings C^4, so that the latter are expanded, that is, are pressed firmly in contact with the inner surface of the cylinder B, to render the piston C as tight as possible. Now the water under pressure in the casing A exerts its force against the piston C, so as to push the same upward, and in doing so the damper F is more or less closed, according to the amount of travel given to the piston C by the pressure of the water. The water in the casing A is pressed on by steam from the boiler G, and when the pressure on the water falls then the piston C is returned by a weight D′ secured to the outer upper end of the piston rod D. A spring D^2 is coiled on the lower end of the piston rod D and rests on the piston C, to form a cushion when the piston C moves into an uppermost position, as the spring D^2 then abuts or strikes the head B′.

In order to control the steam passing from the boiler G into the upper end of the casing A, a valve I is provided, having its valve casing I′ secured to the upper end A^2 of the casing A. The valve casing I′ is connected by a nipple J with a separating tube K, provided at its bottom with a drain valve K′, the said tube being connected to a pipe L having a valve L′, and connected with the steam compartment of the boiler G. Now steam from the steam compartment of the boiler G can pass by way of the pipe L into the tube K, in which any impurities carried along by the steam are separated from the same and settle in the bottom of the tube, to be drained therefrom by the operator opening the valve K′ whenever it is deemed necessary. The steam from the tube K passes by way of the nipple J and the valve I into the upper end A^2 of the casing A, to condense therein and to form a permanent body of water for use in actuating the piston C whenever the steam pressure in the boiler G rises above a normal pressure. The valve I is preferably in the form of a cylinder having its lower portion I^2 reduced to allow the steam to pass to a port I^3 leading into the upper end A^2 of the casing A, the reduced portion I^2 being grooved, to prevent dirt from passing to the valve seat. The valve body I′ is also provided with an exhaust I^4 normally in register with the port I^3, so as to allow steam to escape from the casing A when the valve I is in a closed or lowermost position. Normally the valve I is held in a closed position by the action of a stem N, pressed on by a lever O, carrying a

weight O′, the head I⁵ of the valve then resting on top of the valve body I′.

A spring P connects the lever O with a lever Q, connected by a chain R with the weight D′, so that when the valve I is raised by excess of pressure and admits steam to the upper end of the casing A, raising the piston C and the weight D′, then a downward pull is exerted on the lever O through the chain R, lever Q and spring P, closing the valve I gradually, so as to prevent too sudden closing of the damper F when steam is admitted by the valve I to the upper end of the casing A.

From the foregoing, it will be seen that the damper F is normally held in open position, and when the pressure of the steam in the boiler exceeds a normal pressure, then the valve I is lifted and steam is gradually fed into the upper end of the casing A, for the steam to press on the body of water contained therein, the pressure of the water being exerted against the under side of the piston C, to raise the same and to cause closing of the damper F, as previously explained.

The equalizing device, consisting of the members P, Q and R, and connecting the lever O with the weight D′, acts to prevent too sudden closing of the damper F, as it is essential that the damper F should be closed gradually to insure proper burning of the fuel in the fire box of the boiler.

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

1. A damper regulator, comprising a casing containing water and connected with boiler pressure, to exert pressure on the water in the said casing, a cylinder within the said casing and having an opening at its lower end communicating with the said casing, a valve at the lower end of the casing and extending into the same for controlling said opening, a piston movable in the said cylinder in one direction by the pressure of the water, and a connection between the piston and the damper to actuate the latter.

2. A damper regulator, comprising a casing containing water and connected with boiler pressure, to exert pressure on the water in the said casing, a cylinder within the said casing and in communication at its lower end with the said casing, a piston movable in the said cylinder in one direction, cushioning means on the lower part of the piston rod within the casing, a connection between the piston rod and the damper to actuate the latter, and a weight on the piston rod of the said piston for returning the latter on a decrease of the pressure on the piston by the water.

3. A damper regulator, comprising a casing containing water, a pressure valve connected with the upper end of the said casing and connected with boiler pressure to exert pressure on the water in the said casing, a cylinder within the casing and having its lower end located adjacent to the lower end of the casing and provided at said end with an opening communicating with the casing, a valve in the lower end of the casing for controlling said opening in the cylinder, a piston movable in the said cylinder in one direction by the pressure of the water, and a connection between the piston and the damper to actuate the latter.

4. A damper regulator, comprising a casing filled with water, a valved connection between the said casing and the steam compartment of the boiler, a cylinder within the said casing and having its lower end provided with a valve seat opening into the casing, a needle valve screwing in the lower head of the casing for controlling the said valve seat, a piston movable in the cylinder, a weight held on the piston rod of the said piston, a connection between the piston rod and the damper to be regulated, and a connection between the said weight and the valve in the said valved connection.

5. A damper regulator, comprising a casing, a cylinder in the casing, a piston movable in the said cylinder and connected with the damper to be regulated, and a controlling valve having a valve and a valve body connected with the said casing and with the steam compartment of the boiler, the said valve having a reduced lower portion provided with annular grooves.

6. A damper regulator, comprising a casing, a cylinder in the casing, a piston movable in the said cylinder and connected with the damper to be regulated, and a controlling valve having a valve and a valve body connected with the said casing and with the steam compartment of the boiler, the said valve having a reduced lower portion provided with annular grooves, and the said valve body having an outlet adapted to be connected with the said casing to allow escape of the steam from the casing when the valve is seated.

7. A damper regulator provided with a casing, a cylinder therein and opening at its lower end into the said casing, a piston in the said cylinder and connected with the damper, the piston being provided with a bolt projecting from its under face, an apertured disk through which said bolt extends, a spring carried by said bolt and pressing against the under side of said apertured disk, and rubber rings interposed between the apertured disk and the under side of the piston.

8. A damper regulator, comprising a casing, a cylinder in the casing, a piston movable in the said cylinder and connected with the damper to be regulated, a vertical tube connected with a steam supply pipe, a controlling valve having a valve body communicating with the upper part of said casing, the

valve body also communicating with the upper part of said tube, and a valve in said valve body and controlling the communication between the said tube and the upper part of said casing.

9. A damper regulator, comprising a casing, a cylinder in the casing having an opening in its lower end communicating with the casing, a piston movable in the said cylinder, and connected with the damper to be regulated, a vertically arranged tube connected with a steam supply, a controlling valve having a valve body communicating with the upper end of said casing, the lower portion of said valve body communicating with the said tube, a valve in said valve body and controlling the communication between the said tube and the upper end of said casing, the said valve having its lower portion reduced and provided with grooves, and a valve for controlling the opening in the lower end of said cylinder.

10. A damper regulator, comprising a casing, a cylinder in the casing and having an opening at the lower end communicating with the casing, a valve for controlling said opening, a piston movable in the said cylinder and connected with the damper to be regulated, and a controlling valve having a valve body communicating with the upper part of said casing and also communicating with a steam supply pipe, and a valve in said valve body for controlling the passage of steam to the upper end of said casing.

11. A damper regulator for steam boilers and the like, comprising a cylindrical casing, a cylinder in the casing and having an opening at the lower end thereof communicating with the casing, a valve for controlling said opening, a piston movable in the cylinder and connected with the damper to be regulated, a vertically arranged tube having a drain valve in its bottom, the said tube being connected near its upper end with a valve controlled pipe leading from the steam compartment of the boiler, a controlling valve having a valve body connected to the upper part of said cylindrical casing and having a port leading into the said casing, a nipple connecting said valve body with the upper end of said tube, a valve in said valve body for controlling the communication between the said tube and the casing, the said valve having its lower end reduced and provided with grooves, and means for normally holding the said valve in a closed position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES C. KOSTER.

Witnesses:
J. W. NEWTON,
JAMES F. BRECKWELL.