

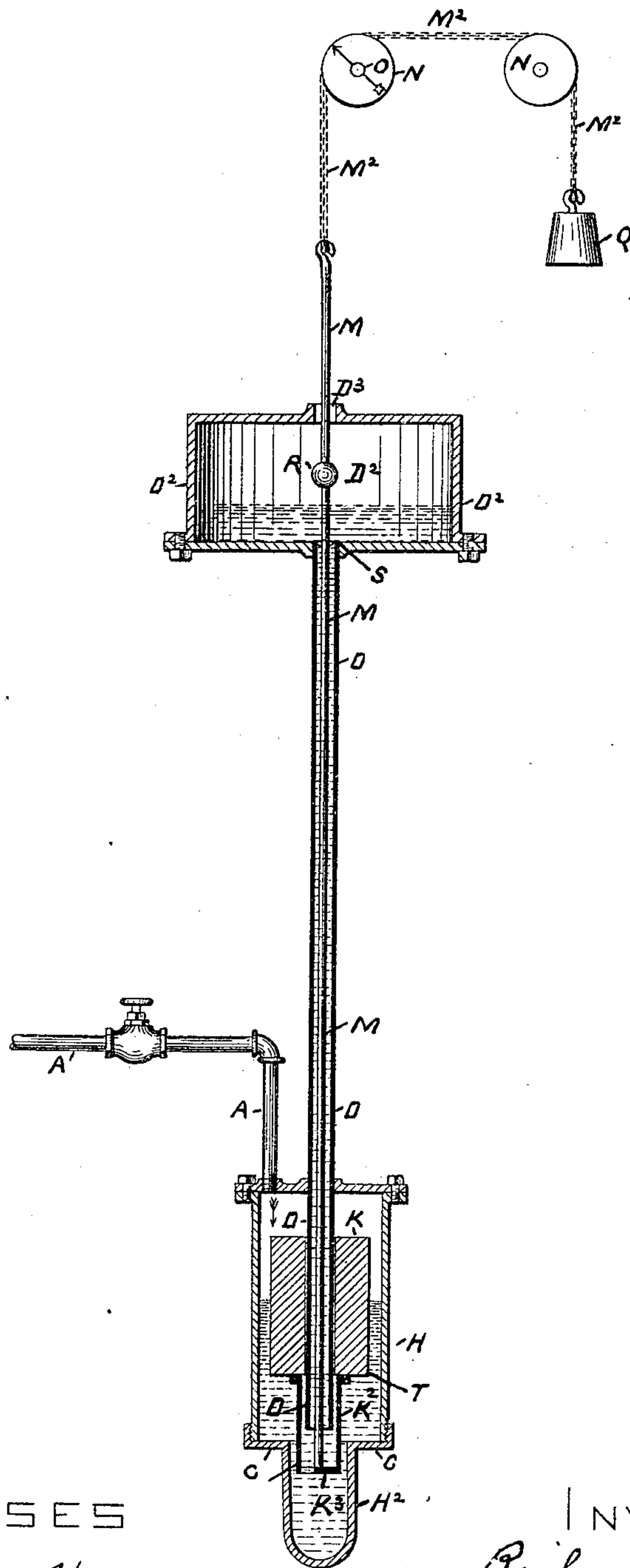
(No Model.)

R. J. FLINN.

MERCURIAL REGULATOR FOR DAMPERS, &c.

No. 354,121.

Patented Dec. 14, 1886.



WITNESSES

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UNITED STATES PATENT OFFICE.

RICHARD J. FLINN, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE FLINN MERCURIAL REGULATOR COMPANY, OF PORTLAND, MAINE.

MERCURIAL REGULATOR FOR DAMPERS, &c.

SPECIFICATION forming part of Letters Patent No. 354,121, dated December 14, 1886.

Application filed April 17, 1886. Serial No. 199,246. (No model.)

To all whom it may concern:

Be it known that I, RICHARD J. FLINN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and
5 useful Improvements in Mercurial Regulators for Dampers, Valves, &c., of which the following is a full, clear, and exact description.

This invention relates to apparatuses for the regulation of steam and other fluid pressures
10 and vacuums, by the use of a mercurial column in communication therewith and a float floating in the mercury of the mercurial column and connected with the damper of the furnace of the steam-boiler, or a valve or such like, to
15 operate from the rise and fall of the float.

The apparatus of this invention, in substance, is composed of a stand-pipe to contain the mercury, a vessel or chamber into which
20 said pipe is vertically entered, terminating at its lower and open end, near the bottom or floor of said chamber, and which chamber at its upper portion is in communication with the steam, air, water, gas, or other fluid the pressure of which is to be regulated, a float lo-
25 cated in said vessel or chamber and loosely surrounding the stand-pipe therein, and a connection—such as a wire, rod, chain, or such like—which is attached to the lower end of said float and passes therefrom, entering at the
30 lower open end of the stand-pipe, upward through the stand-pipe, and at its upper end is connected to the part, such as the damper of the furnace of a steam-boiler, a steam, air, gas, water, or other valve and such like, a
35 movement or operation of which is to be secured from the vertical movement of the float in the float-chamber from the rise and fall of the mercury therein, all substantially as hereinafter described.

40 Again, the apparatus of this invention, in combination with the above, is provided with a mercury reservoir or tank at the upper end of the stand-pipe, having a superficial area greater than that of the float-chamber, and a
45 cubic capacity for mercury greater than the cubic capacity for mercury of the stand-pipe and float-chamber with the float in it, all substantially as hereinafter described.

50 Again, in the apparatus of this invention, the float and the portion of the apparatus con-

taining the mercury are constructed for the closing of the apparatus to the travel of the mercury therein, all substantially as hereinafter described.

In the drawing forming a part of this specification, the figure is a central vertical section
55 of the improved apparatus of this invention.

In the drawing, A is a pipe for the passage of the fluid the pressure of which is to be regulated, or of a fluid acted upon by the pressure
60 of such fluid, to the apparatus of this invention. For illustration, if it is the pressure of steam in a boiler which is to be regulated, the pipe A may lead either from the steam or from the water space of the boiler. This pipe A
65 enters at the upper portion, and there opens to a closed shell or vessel, H, having a downward extension or well, H², leading from its bottom or floor C, and receiving the downward
70 tubular extension at the lower end of a float, K, to float in the mercury which may be in said shell H in the operation of the apparatus, as hereinafter described. This float K is made
75 of metal or other suitable material, and with the fall of the mercury in the shell H, and in which it floats, it will secure an operation of the mechanism connected with it, all as hereinafter described.

D is a stand pipe leading from the inside of the shell H, and near the bottom thereof, and
80 up and through the top of said reservoir. This stand-pipe D, at its upper end, is made with an enlargement, D². This stand-pipe D passes loosely through and from end to end of the float proper, terminating at its lower and open
85 end in the tubular extension K² of the float, said tubular extension of the float being also open to the mercury in the shell.

M is a vertical rod secured at its lower end to a cross-piece, K³, at the lower open end of
90 the tubular extension K² of the float, and passing therefrom upward through the length or height of the stand-pipe and the enlargement D² at its upper end, and through an opening, D³, in the top of said enlargement, where
95 it is to be connected in any suitable manner to the damper, valve, or such like, which it is desired shall be operated by the rise and fall of the float in the shell H, produced by the rise and fall in the pressure of the steam, air, 100

gas, water, or other fluid the pressure of which it is desired to regulate or maintain at a stated or given amount.

As shown in the drawings, the rod M, at its upper end, is connected to the lower end of a belt, chain, or other flexible line, M², which passes upward and over two vertical grooved pulley-wheels, N, in the same horizontal plane. Each pulley-wheel turns in suitable bearings, and the shaft O of either may be the damper-rod of the damper to the furnace of a steam-boiler, or the stem of a steam, water, gas, or other fluid-valve, and such like, but for the purposes of this specification will be assumed to be the damper-rod of the damper of the furnace of a steam-boiler, and hereinafter so called.

The damper-rod O is weighted with a weight, Q, applied to it on the side opposite to that at which the chain M² of the float K enters upon the grooved pulleys N. The weight Q may be either suspended from the opposite end of the chain M² to that from which the float is suspended from the pulley-wheel or from the shaft or damper-rod O direct, and if from either the pulley-wheel or damper-rod, the chain M² requires to be fastened to it. This weight Q is sufficient, as the float rises in its chamber from the rise of the mercury and releases the weight, to secure a turning of the damper-rod O and its damper, so that a fall of the float will secure an opening of said damper, and a rise of the float will secure a closing of said damper.

The damper, furnace, and steam-boiler are not shown, as it is not deemed necessary, being so well-known, and as they of themselves form no part of this invention.

The float-containing shell H and the stand-pipe are of different superficial areas, the shell having the greater area. The shell H, containing float K, and the stand-pipe and its enlargement are charged with the necessary quantity of mercury to secure in the operation of the apparatus the desired regulation of the pressure of the steam in the steam-boiler. In the operation of the apparatus, the steam from the boiler presses upon the mercury in the shell, and should it pass above the amount of pressure desired the level of the mercury in the shell is lowered and the height of the mercurial column in the stand-pipe and its enlargement increased, and should it pass below the amount or pressure desired the level of the mercury in the shell is raised and the height of the mercurial column in the stand-pipe and its enlargement is decreased, in the first instance securing a fall and in the second instance a rise of the float, and through such movement of the float connected, as described, to the damper of the furnace in the first case, a close, and in the second case an opening, of said damper, and thus regulating the pressure of the steam in the boiler.

The operating-rod M of the float is provided with a valve, R, to seat on the upper open end, S, of the stand-pipe, and thus close the same

in the fall of the float, as above described, preventing the then escape of mercury, as is obvious; but this valve and seating thereof may be dispensed with, and the lower end, T, of the float and bottom of shell made to constitute the valve and seat.

The portion of the stand-pipe between its upper enlargement and the shell may be constructed in telescoping sections, thus adapting it to be lengthened and shortened, as it were, according to the height of mercurial column desired, and if so telescoped they may be also arranged with a graduated scale to render their said adjustment definite and certain.

Although the apparatus has been particularly shown and described for securing the opening and closing of a damper to the furnace of a steam-boiler as the pressure of the steam in the boiler falls from or rises to the pressure desired, the same apparatus, and without substantial or material changes in the construction, arrangement, and operation of its parts, may be usefully, advantageously, and practically employed for other purposes—as, for instance, to the opening and closing of valves in apparatuses of various kinds using steam, air, gas, and other fluids, and to the end of maintaining such fluids at a given or stated pressure—and therefore it is not intended to limit the invention in this regard. A few illustrations of its uses above referred to are valves of steam, hot-water, and hot-air heating and drying apparatuses, feed-water and air-pressure apparatuses, safety and reducing valves, valves for regulating pressure of steam, water, or gas, and the vacuum in a vacuum-pan, or in the condenser of a steam-engine through regulating the speed of the pump or other apparatus producing the vacuum, or the flow of the injection-water to the condenser, &c.

In the operation of the apparatus as herein described it is plain that the rod connecting the float to the mechanism to be operated in the up and down movement of the float passes through the column of mercury in the stand-pipe, which thus acts in the nature of a stuffing-box or packing thereto; but such arrangement and the resulting stuffing-box, as it were, to the rod forms no part of this invention, except in the particular combination described—that is, in its combination with a float floating in mercury—and as the same is capable of various useful purposes outside of the special purposes of this invention it is to be made the subject of a separate application for Letters Patent of the United States, all rights being hereby reserved therefor.

The apparatus herein described and shown in the drawings in some respects resembles the apparatus described and shown and claimed in my application for Letters Patent of the United States, Serial No. 184,319, filed November 30, 1885, and as the same fully appears on examination and comparison, and for such purpose reference is hereby had thereto. All such resemblances, separately and combined, are hereby disclaimed as forming any part of

this invention, except in so far as they become a part by combination or by arrangement, and all as fully and clearly set forth in this specification and the claims thereto.

5 Having thus described my invention, I claim—

1. In combination, a shell, H, and a float located therein, a stand-pipe entering into said shell and passing loosely through the float, and
10 the shell and float separately connected, substantially as described, for the purpose specified.

2. In combination, a shell, H, and a float located therein, a stand-pipe entering into said
15 shell and passing through the float and having an enlargement, D², at its upper end, and the shell and float separately connected, sub-

stantially as described, for the purpose specified.

3. In combination, a shell, H, and a float located therein, a stand pipe entering into said shell and passing loosely through the float, and a valve and seat therefor, opened and closed by the vertical movement of the float, and which float and the shell are separately connected,
20 25 substantially as described, for the purposes specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

RICHARD J. FLINN.

Witnesses:

ALBERT W. BROWN,
KATE E. BELLOWS.