

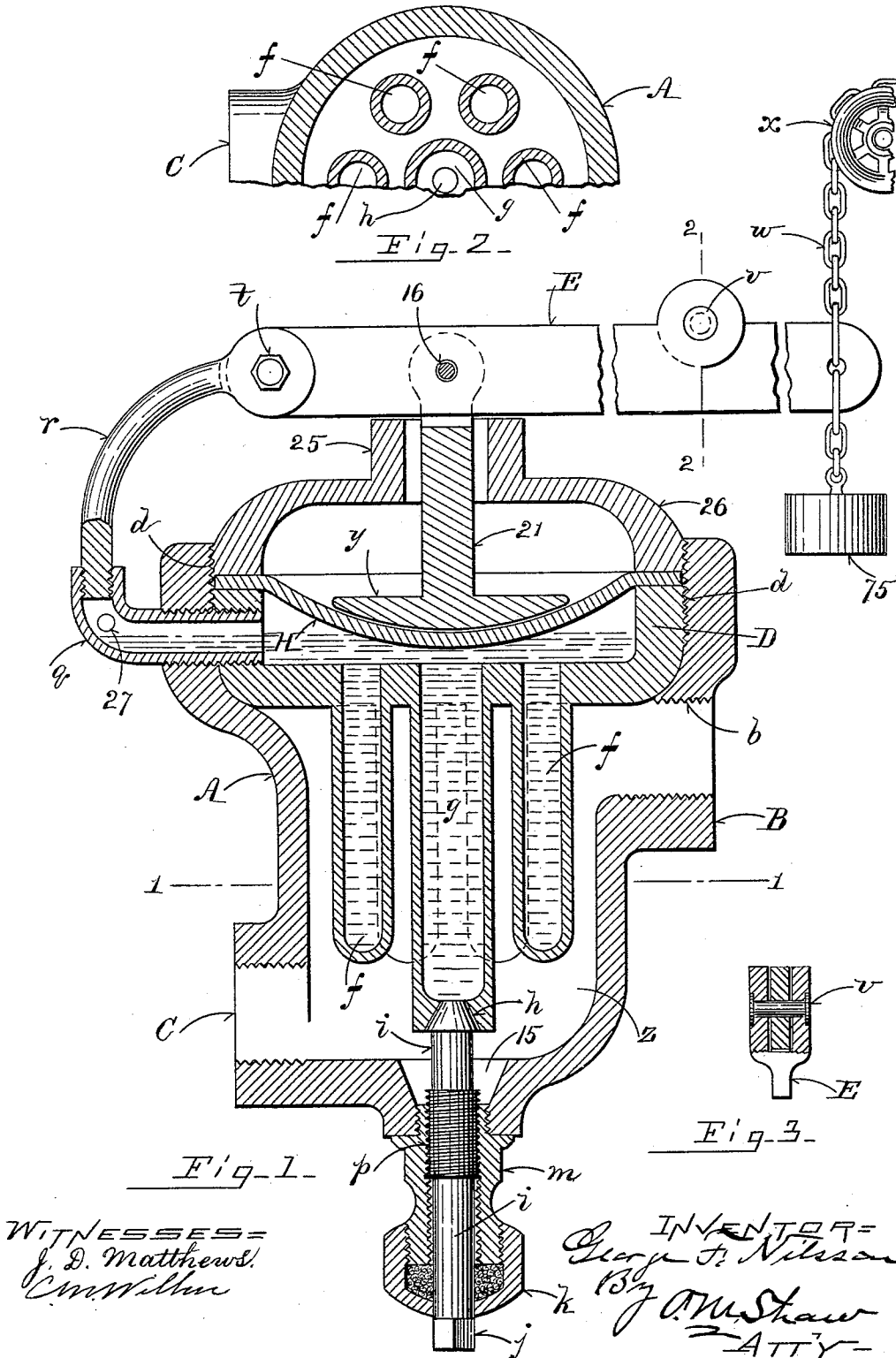
(No Model.)

2 Sheets—Sheet 1.

G. F. NILSSON.
DAMPER REGULATOR.

No. 569,513.

Patented Oct. 13, 1896.



(No Model.)

2 Sheets—Sheet 2.

G. F. NILSSON.
DAMPER REGULATOR.

No. 569,513.

Patented Oct. 13, 1896.

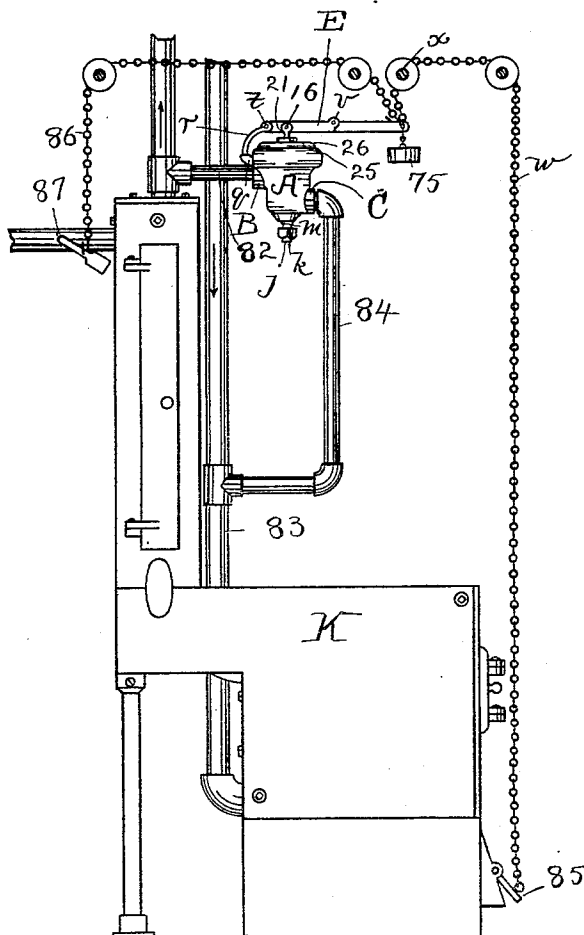


Fig. 4.

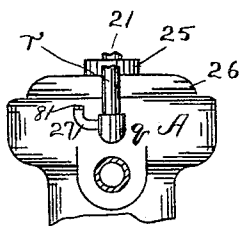


Fig. 5.

WITNESSES.

Matthew M. Blunt.
Chas. Wilbur.

INVENTOR.

George F. Nilsson,

By J. M. Shaw,

ATT'Y.

UNITED STATES PATENT OFFICE.

GEORGE F. NILSSON, OF WHITINSVILLE, MASSACHUSETTS.

DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 569,513, dated October 13, 1896.

Application filed October 7, 1895. Serial No. 564,943. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. NILSSON, of Whitinsville, in the county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Damper-Regulators, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of the expansion-chamber and adjacent parts of my improved regulator; Fig. 2, a horizontal section on line 1 1 in Fig. 1; Fig. 3, a section on line 2 2 in Fig. 1; Fig. 4, an elevation showing the regulator connected with a boiler, and Fig. 5 a detail view.

Like letters and figures of reference indicate corresponding parts in the different views of the drawings.

My invention relates especially to mechanism for automatically regulating the dampers of generators for hot water and steam, said mechanism being operated by the expansion and contraction of a liquid body; and it consists in certain novel features hereinafter set forth and claimed, the object being to produce a simple, cheap, and effective device of this character.

In the drawings, A represents the body of the regulator, which is provided with an inlet B, interiorly screw-threaded at *b* to receive a pipe 82 for attachment to the flow of a steam or hot-water generator K, (see Fig. 4,) and with the return 84 of said generator by a pipe 83. The form of generator shown is that described in my application, Serial No. 564,942, filed October 7, 1895, for improvements in steam-boilers; but it will be understood that it is equally as well adapted for use with other forms and with a similar outlet or return port C.

The upper end or mouth of the body is cylindrical and interiorly screw-threaded at *d*. The bottom section of the expansion-chamber D is turned into this mouth. In this section are formed a series of drop tubes or depressions *f*, open at their tops and closed at their lower ends. In the center there is a longer tube *g*, provided with a valve-seat *h*,

opening into the chamber *z* of the body, in which all said tubes are pendent.

There is an opening 15 in the bottom of the chamber *z*, and a plug *m* is turned therein. This plug is interiorly tapped and screw-threaded, and a valve-stem *i*, threaded at *p*, works therein. Said stem bears a cone-valve at its upper end in position to engage and close the seat *h*. A packing-box *k* is turned onto the plug *m*, and the outer end of the stem *i* is squared at *j* to receive a wrench.

The upper member or cap 26 of the expansion-chamber D is turned into the mouth of the body, and a disk H, of leather or other suitable flexible material, is held between said members.

A tube *q* opens through the body into the expansion-chamber below the diaphragm or disk H and has a nipple 27, closed by a plug 81. By means of this nipple sufficient water may be poured in from any suitable utensil to fill the drop-tubes and a portion of the chamber under the diaphragm. A curved rod *r* is turned into the outer end of the tube *q*, and a rocking lever E is pivoted by an end at *t* to the upper end of said rod or standard.

The member or cap 26 has an open neck 25 in its top. Through this neck a plunger 21 slides loosely and is provided with a head *y*, which rests on the upper face of the diaphragm H. The plunger is pivotally connected with the lever E at 16. Said lever is formed in sections hinged together at *v*, so that it may be folded for packing. A chain *w*, passing over pulley *x*, connects said lever with the damper of the generator. A counterbalance 75 is pendent from the outer end of the lever. This chain connects with a damper 85 under the fire-box of the generator, and a similar chain 86 from the lever, passing over suitable pulleys, operates the damper 87 in the flue.

In the use of my invention when employed for hot water the valve *i* is closed. Sufficient water is discharged from any suitable source into the expansion-chamber through the nipple 27 and pipe *q* to fill the drop-tubes *f* and center tube *g*. This nipple may be omitted entirely, if desired, as when the valve *i* is opened and the regulator is employed in a hot-water system the pressure of the water will fill the drop-tubes and sufficient of the

chamber under the diaphragm for my purpose. The valve is then closed. The hot water from the generator circulating through the chamber *z* rapidly heats the water in said tubes, and at a determined degree the expansion thereof will force the diaphragm *H* upward, driving the plunger 21 in like direction and actuating the lever *E* to close the damper. As the temperature of the water reduces, and the pressure on the diaphragm is thereby relieved, the counterbalance 75 will return said lever and open the dampers in the ordinary manner of mechanisms of this class.

When employed for steam, the valve *i* is turned out by means of a wrench or other suitable implement, opening the seat *h*. Steam in the main chamber *z* will pass into the expansion-chamber *D* through the tube *g* and, acting under a determined pressure on the diaphragm, will operate the lever to close the damper in a manner which will be understood by those conversant with such matters without a more explicit description.

It will be seen that by use of the drop-tubes and valve, a very simple construction, my device is readily applied to use with either hot water or steam. The cost of construction is much less than in many devices for this purpose, the number of parts being small and it being possible from the peculiarity of arrangement to cast the main parts. The tubes are cast integral with the lower section of the expansion-chamber. Said sections being threaded and turned into the body or casing, it is particularly easy to detach the

same from said body for the purpose of renewing the diaphragm or removing water of condensation, if desired. The tubes by my arrangement are directly in the flow and their contents much more quickly heated than in many of the ordinary forms of regulator. By this arrangement, moreover, with the inlet above the outlet and at opposite sides of the body, there are no "cold" spaces in the chamber and no part of said body around the tubes where the flow is not equal. This renders the action of the regulator immediate. The series of drop-tubes are essential in producing this result and rendering the device applicable for use with both steam and hot water, while the apparatus is much smaller than many of the forms of regulators adapted for use only with steam.

Having thus explained my invention, what I claim is—

In a damper-regulator a body for connection with the flow of the generator; an expansion-chamber; a tube projecting therefrom into the body and having a port forming a valve-seat; a series of closed tubes opening into the expansion-chamber and pendent into the flow in said body; a valve in the body for closing said seat; a flexible diaphragm in said chamber; and mechanism actuated by the diaphragm for operating a damper substantially as specified.

GEORGE F. NILSSON.

Witnesses:

O. M. SHAW,
C. M. WILBUR.