

(No Model.)

J. H. WEITMYER.

DAMPER REGULATOR.

No. 377,657.

Patented Feb. 7, 1888.

Fig. 1.

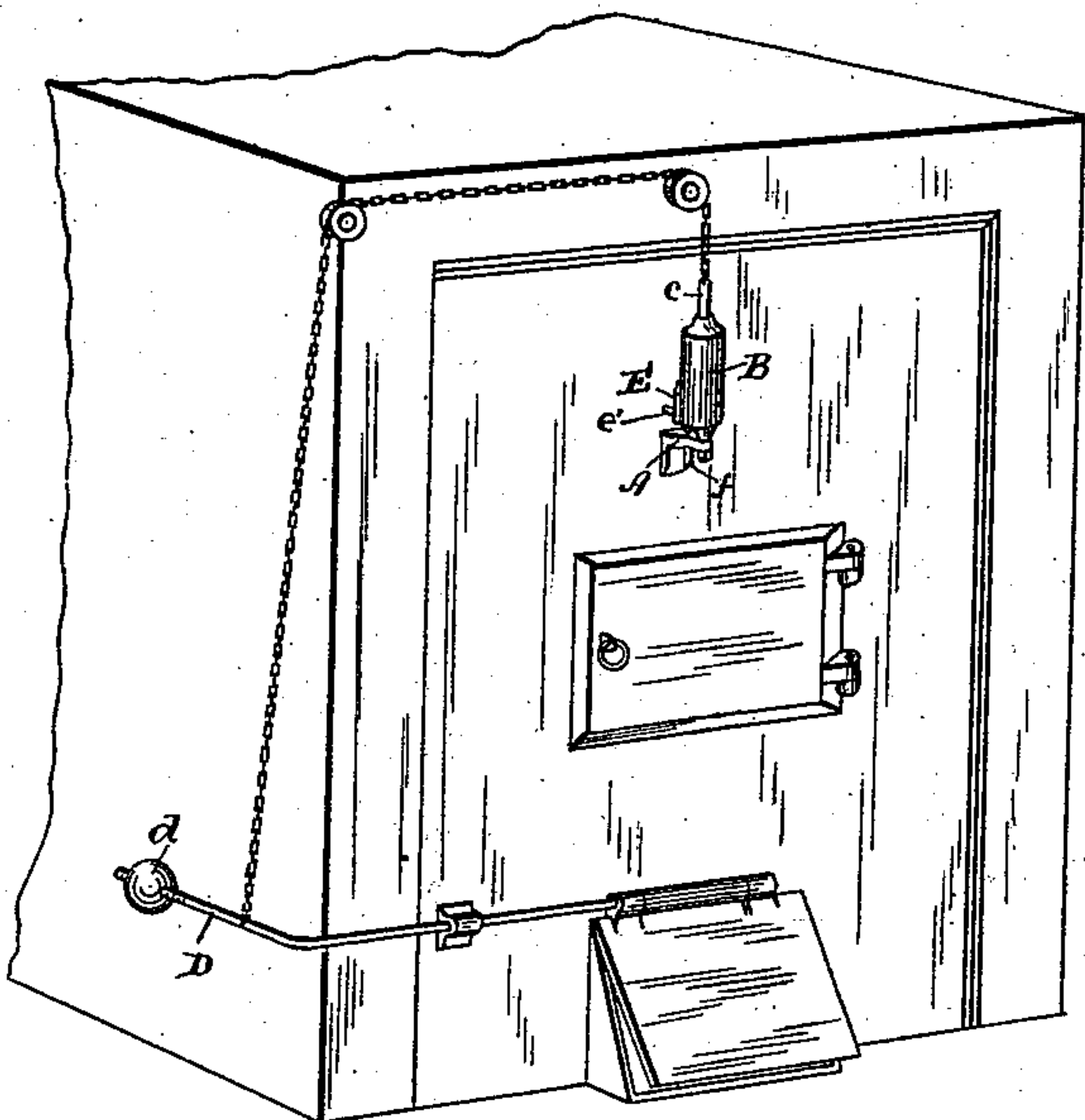
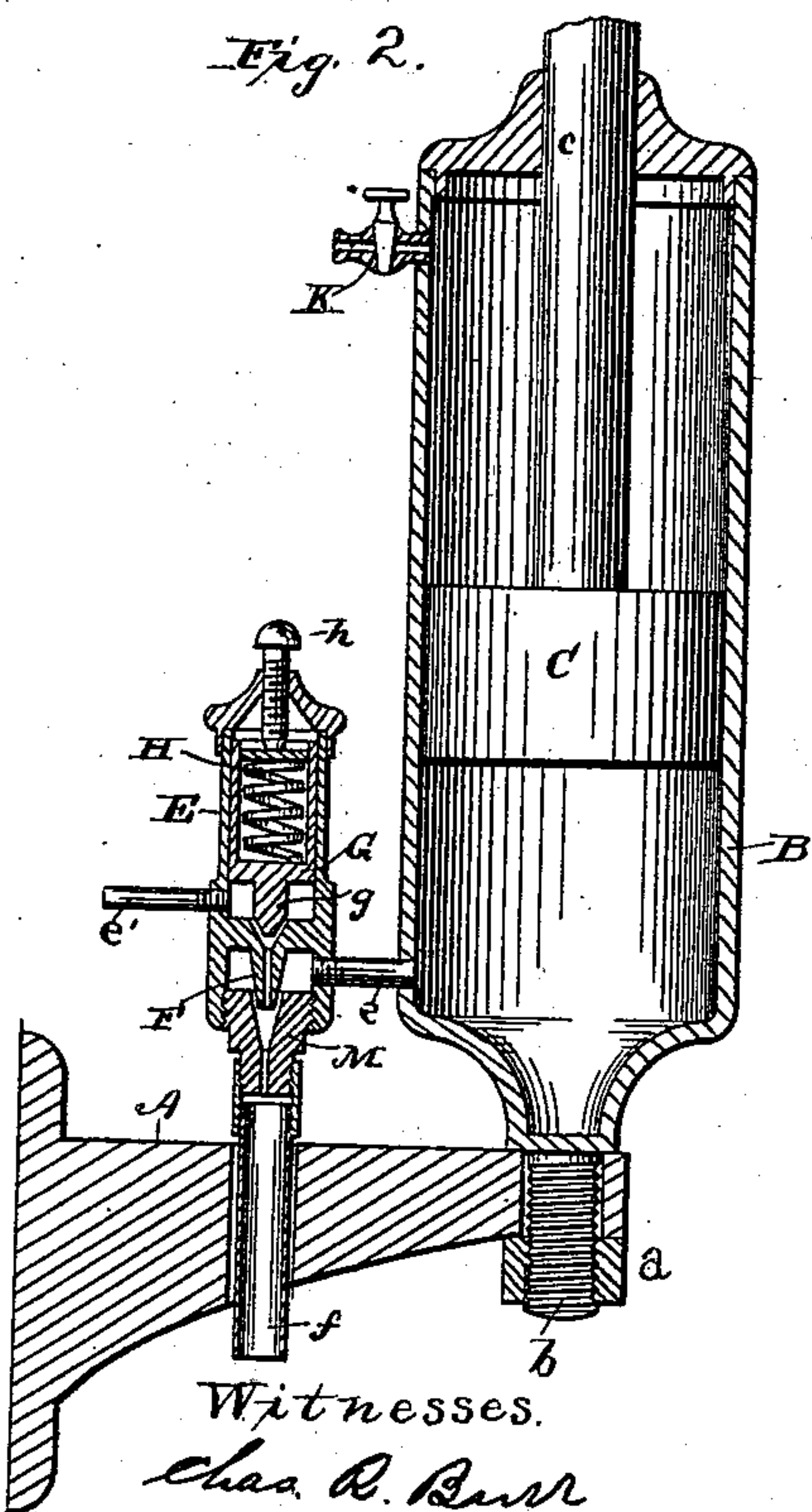


Fig. 2.

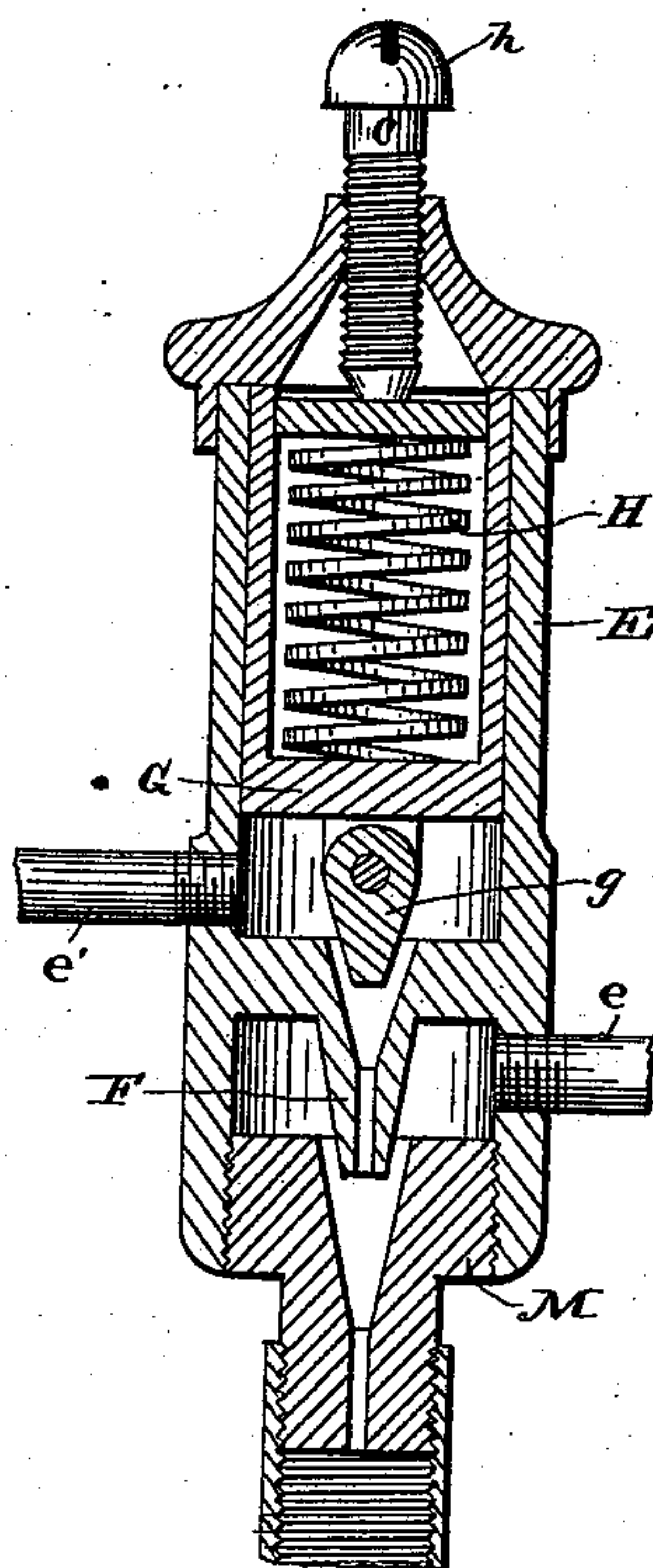


Witnesses.

Chas. R. Burr

A. J. Stewart

Fig. 3.



Inventor

J. H. Weitmyer  
By Church & Church  
His Attorneys.



# UNITED STATES PATENT OFFICE.

JOHN H. WEITMYER, OF HARRISBURG, PENNSYLVANIA.

## DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 377,657, dated February 7, 1888.

Application filed November 3, 1887. Serial No. 254,201. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. WEITMYER, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain  
5 new and useful Improvements in Damper-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification,  
10 and to the figures and letters of reference marked thereon.

Heretofore damper-regulators designed to control the area of the furnace air-supply passage by means of the steam-pressure in the  
15 boiler have employed a flexible diaphragm, piston, or similar device, on one side of which the steam-pressure was exerted either directly or through the medium of some liquid against which the said pressure was exerted, the dia-  
20 phragm or analogous device, as the case may be, being in turn connected to the damper.

My invention is a wide departure from these forms of regulators; and it consists, generally stated, in operating the damper by atmos-  
25 pheric pressure, the air being exhausted from one side of the piston or diaphragm connected to the damper by means of an ejector or other air-exhausting apparatus, the power of which is governed by the steam-pressure in the boiler;  
30 and the invention further consists in certain novel details of construction and arrangement of parts, to be hereinafter described, and pointed out particularly in the claims at the end of this specification.

35 In the accompanying drawings I have shown a convenient and practical form of apparatus for utilizing my invention, in which—

Figure 1 is a perspective view of a regulator and its connection with the damper. Fig. 2  
40 is a sectional view of the regulator. Fig. 3 is an enlarged view of the ejector.

Similar letters of reference in the several figures indicate the same parts.

The letter A represents a bracket or other  
45 support fastened on the boiler-front or any convenient place in the boiler or engine room, the bracket preferably having two holes therein, through the outer one of which passes the projection *b* on the bottom of the cylinder B,  
50 a nut, *a*, being screwed on the end of the projection to hold the cylinder in upright position.

Fitting snugly within the cylinder B is a piston, C, the piston-rod *c* of which passes out through the top and is connected to the damper 55 by mechanism whereby the piston is kept normally at its highest point and the damper wide open, as shown in Fig. 1, wherein the damper is provided with an arm, D, connected to the piston-rod by a chain or other flexible 60 connection, an adjustable weight, *d*, for balancing the weight of the piston and damper, being located on said arm, as will be readily understood.

The space in the cylinder B below the pis- 65 ton is in communication through pipe *e* with an ejector, E, the latter in turn being in communication with the steam-boiler through pipe *e'*. The ejector proper, consisting of the nozzle F and conical aperture below the same, is 70 of the usual or any preferred construction, the exhaust being through one of the holes in the bracket hereinbefore mentioned, and may be conveyed away through a suitable pipe, *f*, if desired. Pipe *e* from the cylinder of course 75 communicates with the open space around the nozzle F.

In order, now, that the ejector may not be in constant operation, no matter how low the pressure in the boiler may be, causing an un- 80 necessary waste of steam, I arrange inside the ejector-casing, but behind the nozzle F, a valve, *g*, secured to a piston, G, beneath which is the entrance-port for the live steam from the boiler. The piston is held down and the valve 85 closed when the pressure in the boiler is below normal by a spring, H, located within the piston, the latter being made hollow to accommodate it, the tension of the spring being adjusted by a set-screw, *h*, bearing on its up- 90 per end.

The construction of valve which I prefer is that shown in Fig. 3, a long conical recess being formed in the ejector-nozzle with a correspondingly-shaped valve or plug on the piston, 95 which, in order to insure its being properly seated in the recess, is connected to the piston by a loose or pivotal connection.

From the above description the operation of the device will be readily understood. The 100 piston C, as before stated, being connected with the damper and so adjusted by means of the weight on the latter as to stand normally at its highest point and the damper open, it is



obvious that when the fire is started and the steam-pressure raised to the point where it will overcome the tension of the spring on the ejector-valve the latter will be opened and the steam allowed to pass off through the ejector, carrying with it, in accordance with a well-known principle, a portion of the air beneath the piston C, and as a consequence causing the latter to descend, and partially or, if the steam-pressure be very great, wholly closing the damper.

If desired, the top of the cylinder B may be air-tight and a small cock, K, Fig. 2, provided for the admission of the air above the piston, which constitutes a ready and efficient means for regulating the speed at which the piston shall descend.

It is obvious that other forms of ejectors or exhaust apparatus may be employed for reducing the air-pressure below the piston or diaphragm, or other forms of ejector-valves or pistons may be substituted for those shown in the drawings, and that the various arrangements and locations of the parts may be changed without at all departing from the spirit of my invention. The arrangement shown, however, has been found to be very effective in practical operation.

For the purpose of regulating the amount of air drawn out of the cylinder during a given time, I make the base M of the ejector-cylinder having the conical aperture therein screw-threaded and adjustable and the ejector-nozzle of a shape to fit therein. The base M may then be screwed up and the size of the aperture around the nozzle through which the air passes reduced, or vice versa.

I do not wish to be limited to the form of connection between the piston and damper shown in the drawings, as other forms of connecting devices will readily suggest themselves to those skilled in the art; nor do I wish to be limited to the described form of piston, as a flexible diaphragm may be used in its stead.

Having thus described my invention, what I claim as new is—

1. In a damper-regulator, the combination, with a damper-controlling piston or diaphragm, of an exhaust apparatus operated by the pressure of the steam in the boiler to exhaust the air on one side of said piston or diaphragm and cause the movement of said damper, substantially as described.

2. In a damper-regulator, the combination, with a damper-controlling piston or diaphragm, of an ejector operated by steam from the boiler for exhausting the air on one side of said piston or diaphragm and causing the damper to be operated, substantially as described.

3. In a damper-regulator, the combina-

tion, with a damper-controlling piston or diaphragm, of an exhaust mechanism operated by steam from the boiler for exhausting the air upon one side of said piston or diaphragm and a valve for determining the pressure at which said exhaust mechanism shall become operative, substantially as described.

4. In a damper-regulator, the combination, with a damper-controlling piston or diaphragm, of an exhaust mechanism operated by steam from the boiler for exhausting the air on one side of said piston or diaphragm and an adjustable valve between said exhaust mechanism and the boiler, whereby the same may be rendered operative at a greater or less degree of pressure.

5. In a damper-regulator, the combination, with a damper-controlling piston or diaphragm, of an exhaust mechanism operated by steam from the boiler for exhausting air from one side of said piston or diaphragm, a valve between said exhaust mechanism and the boiler, and a spring for holding said valve to its seat, provided with a set-screw for adjusting the tension of the spring and the pressure at which the valve shall be opened and the exhaust mechanism rendered operative, substantially as described.

6. In a damper-regulator, the combination, with a damper-controlling piston or diaphragm, of an exhaust mechanism operated by steam from the boiler for exhausting from one side of said piston or diaphragm, and a spring-pressed piston carrying a valve located between the exhaust mechanism and the boiler, whereby said piston is raised and the valve operated by the pressure of the steam before the exhaust mechanism becomes operative, substantially as described.

7. In a damper-regulator, and in combination with the exhaust mechanism for operating the damper-controlling mechanism, a conical valve hung loosely on its piston or support for determining the pressure at which the exhaust mechanism shall become operative, substantially as described.

8. In a damper-regulator, the combination, with the piston or diaphragm for controlling the damper, of an ejector for withdrawing air from one side of said piston or diaphragm, consisting of a conical stationary nozzle and a block beneath the same, having the conical aperture therein adjustable with relation to said nozzle, whereby the size of the aperture for the admission of air around said nozzle may be regulated, substantially as described.

JOHN H. WEITMYER.

Witnesses:

SAMUEL POOLE,  
GEO. K. KING.