2 Sheets--Sheet 1.

LEWIS BOORE.

Damper Regulator for Stoves.

No. 124,931. Patented March 26, 1872.

Fig. I.

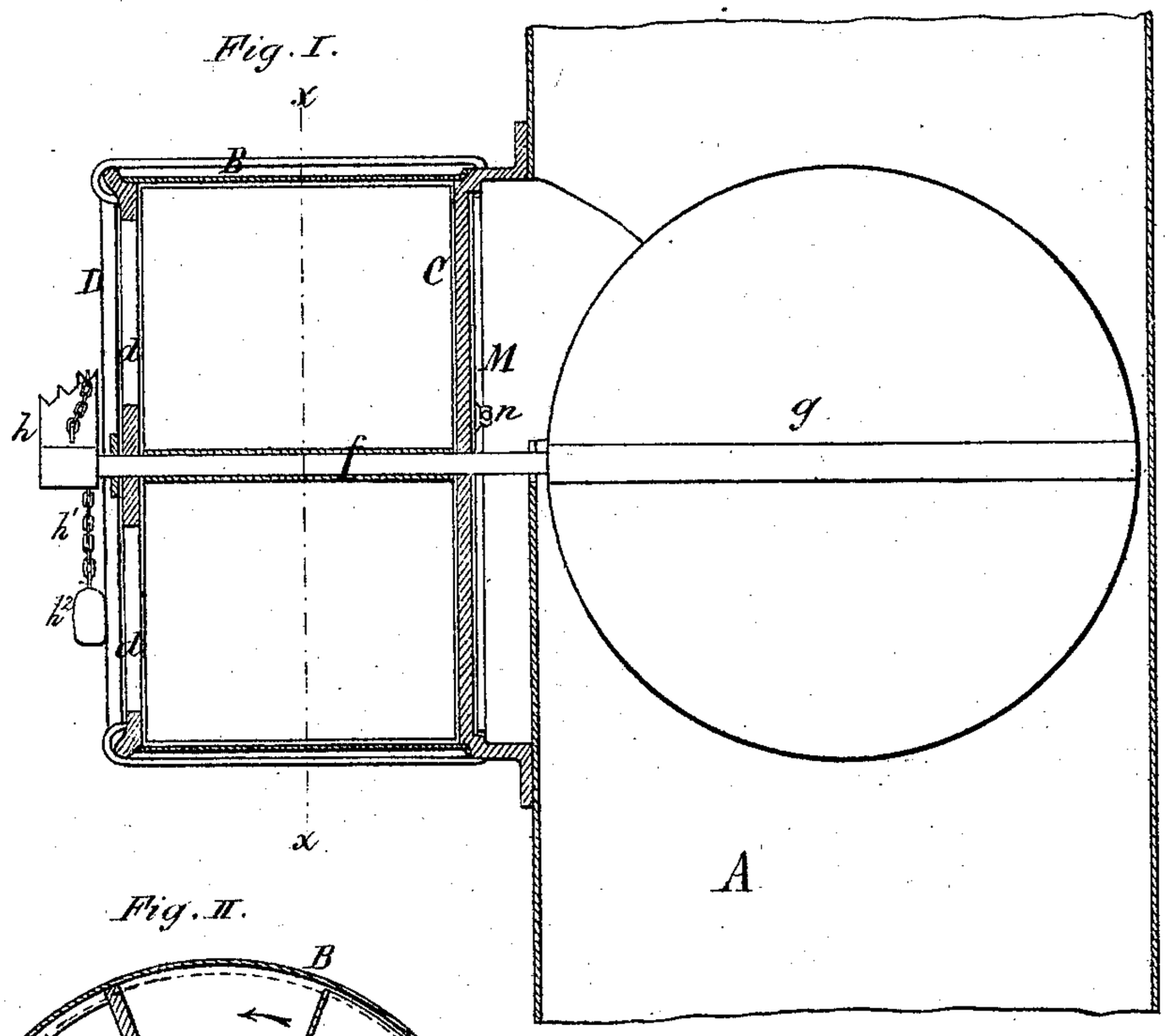


Fig. II.

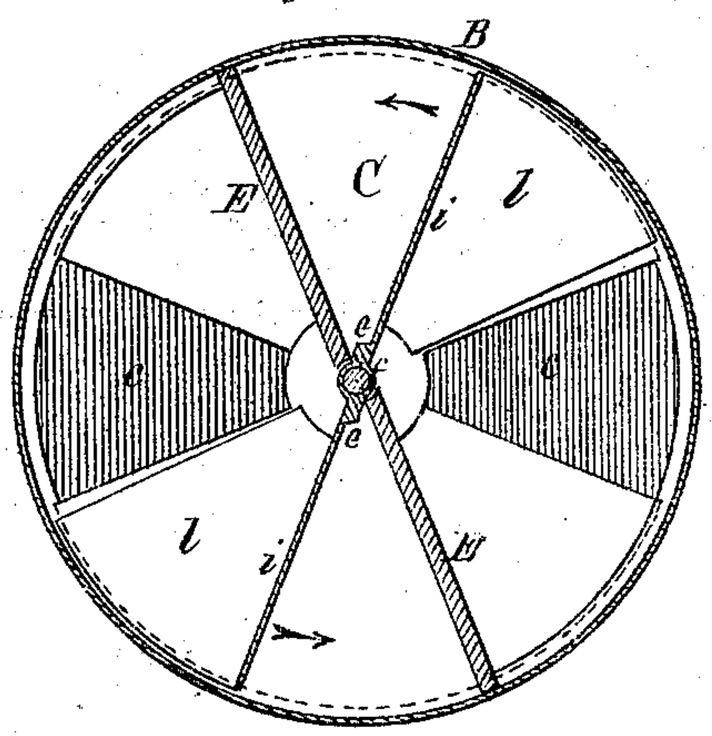


Fig. III.

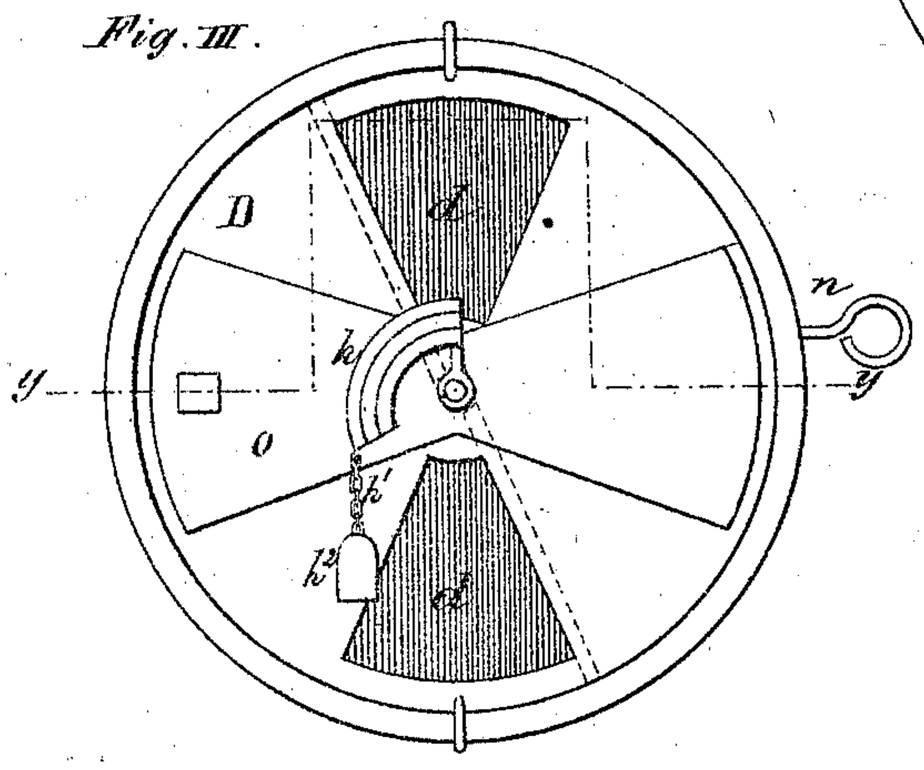
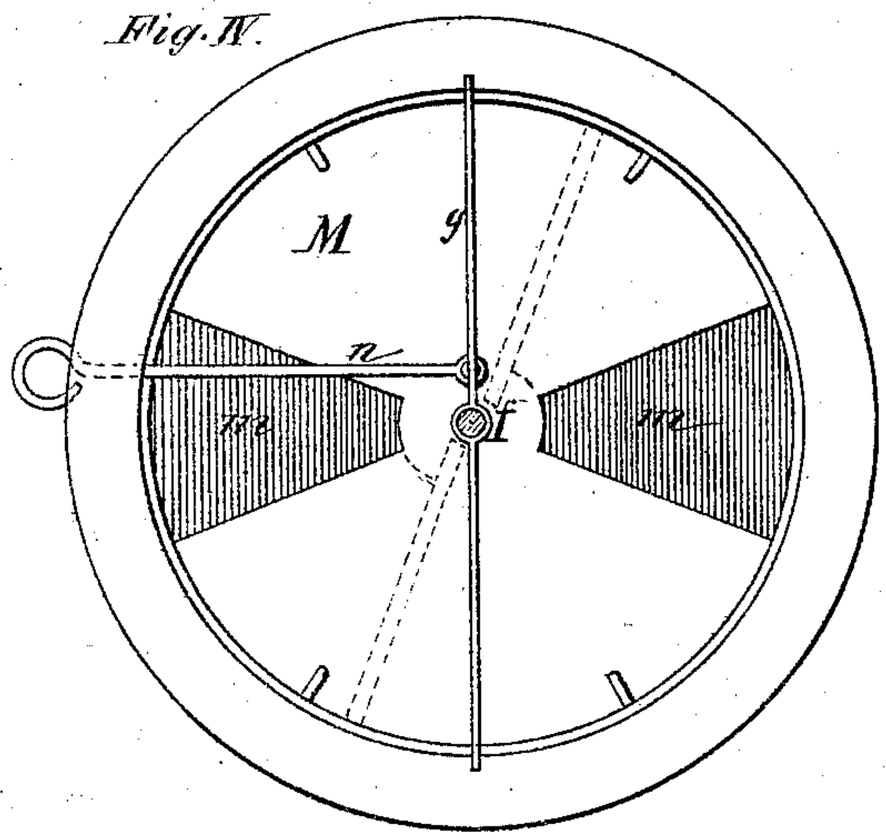


Fig. IV.



Lewis Boore Inventor
by Jay Hyatt atty.
John J. Bonner
Edward Wilhelms Witnesses

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

2 Sheets--Sheet 2.

LEWIS BOORE.

Damper Regulator for Stoves.

No. 124,931. Patented March 26, 1872.

Fig. V.

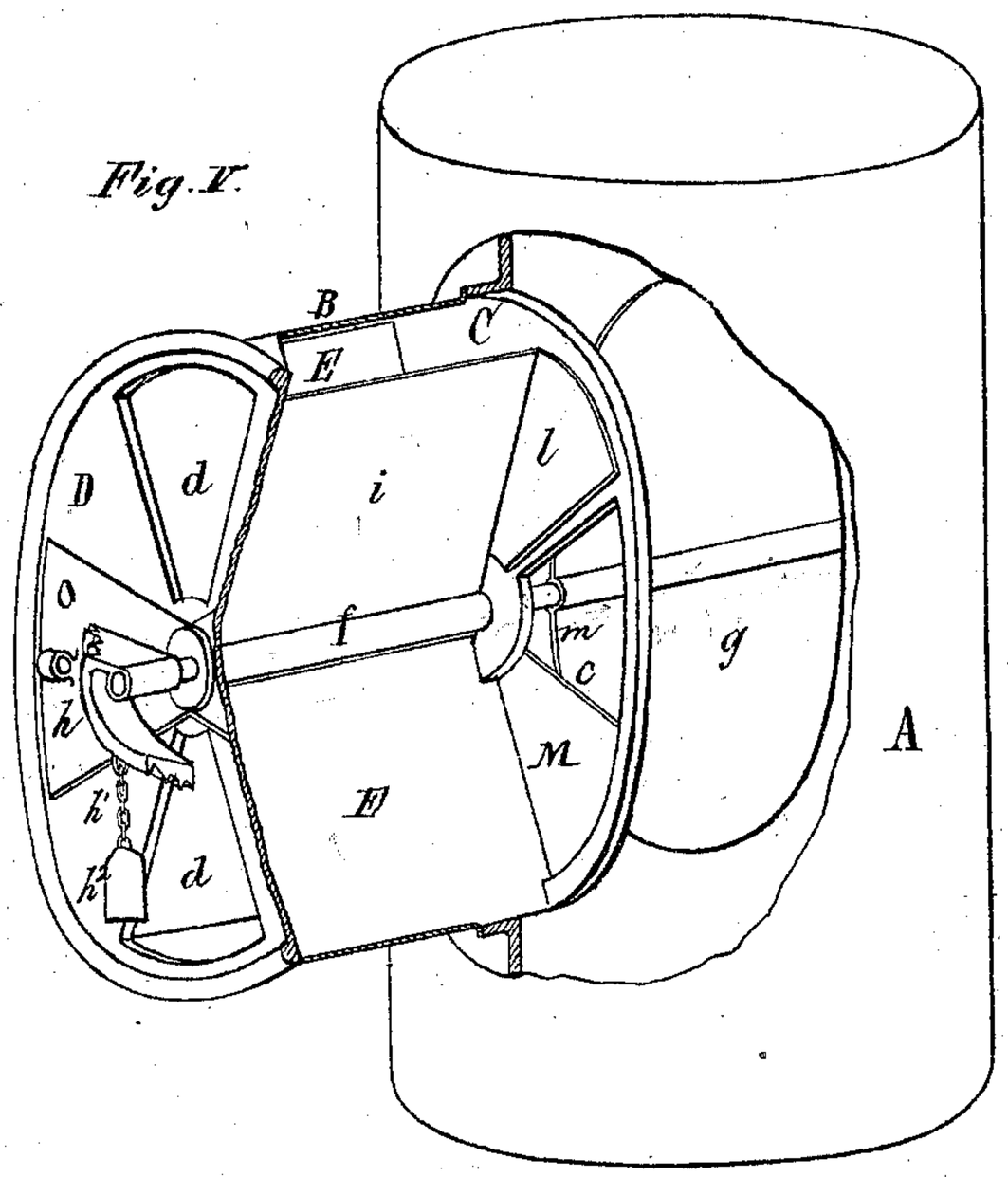


Fig. VI.

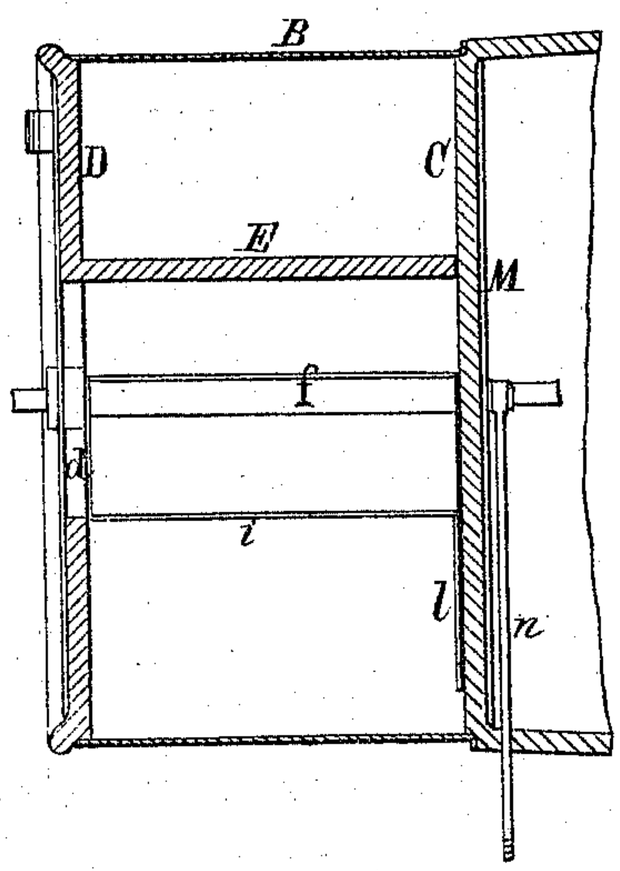


Fig. VII.

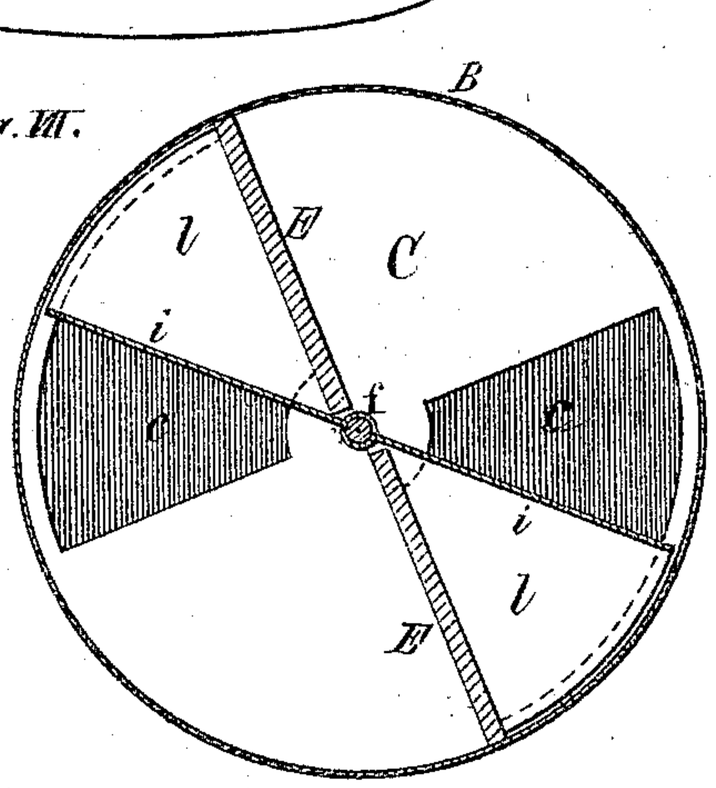
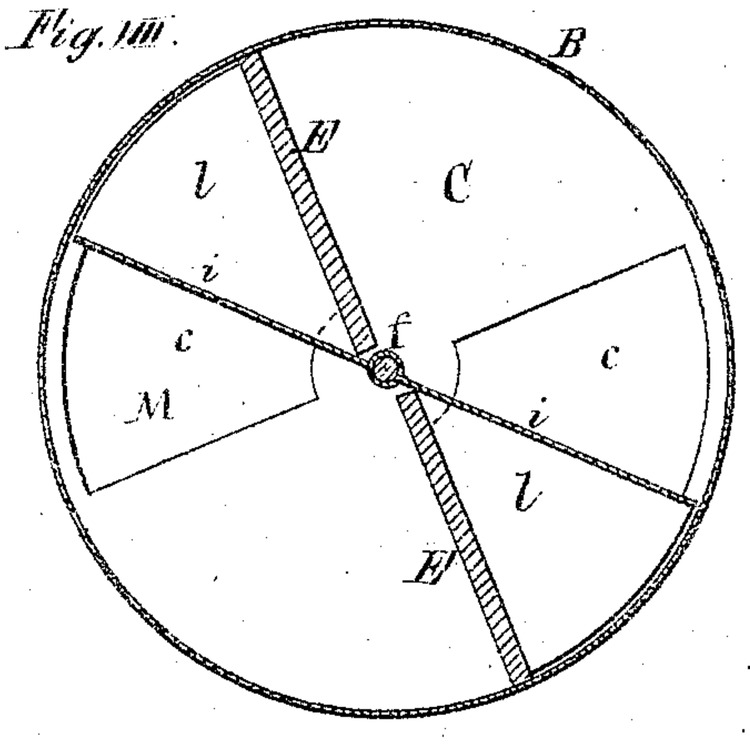


Fig. VIII.



Lewis Boore Inventor

by Jay Hyatt Atty.

John J. Bonner

Witnesses.

Edward Wilkelus

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

124,931

UNITED STATES PATENT OFFICE.

LEWIS BOORE, OF BUFFALO, NEW YORK, ASSIGNOR TO HIMSELF AND WILLIAM BOORE, OF SAME PLACE.

IMPROVEMENT IN DAMPER-REGULATORS FOR STOVES.

Specification forming part of Letters Patent No. 124,931, dated March 26, 1872.

SPECIFICATION.

I, LEWIS BOORE, of the city of Buffalo, county of Erie and State of New York, have invented a new Regulator for Stoves, Furnaces, &c., of which the following is a specification:

My invention consists, first, in the combination, with a stove-pipe damper, of a counterbalanced valve or diaphragm arranged in a passage opening into the flue or pipe, and connected with the damper in such a manner as to be actuated by the pressure of the external air as the draught increases, and automatically open and close the damper and regulate the draught. Second, in the combination, with a stove-pipe damper and the pneumatic valve or regulator, of a segment and weight, so arranged that the leverage of the latter will increase as the damper begins to close, thereby in a measure counteracting the increased pressure of the external air, which results from the rarefaction of the air and gases in the pipe above the partially-closed damper. Third, in the combination, with the damper-spindle, pneumatic valve, and case, of a flange or a sector attached to the valve so as to gradually close the section aperture between the valve and pipe as the damper is being closed, thereby insuring a more perfect counterbalancing of the damper when closed or in a nearly-closed position. Fourth, in the combination and arrangement of a plate or disk for regulating the position of the inner parts, as hereafter fully set forth.

In the accompanying drawing, Figure I is a sectional elevation of my improved draught-regulator applied to a stove-pipe. Fig. II is a cross-section on line *x x*, Fig. I. Fig. III is a front elevation, and Fig. IV a rear elevation of the regulator. Fig. V is a perspective view of the regulator and stove-pipe with portions broken away so as to expose the interior. Fig. VI is a sectional plan view on line *x y*, Fig. III. Fig. VII is a cross-section of the regulator with the air-valve open. Fig. VIII is a similar view with the valve closed.

Like letters designate like parts in each of the figures.

In the drawing my improvements are represented as applied to a vertical stove-pipe, A. B is a cylindrical case attached at right angles thereto, and forming a passage for the air into the stove-pipe. The inner and outer ends of this case are provided, respectively, with plates C and D, and is divided lengthwise into two compartments by a diaphragm, E. The outer plate D has, preferably, two openings, *d d*, arranged opposite each other and opening into each of the compartments of the case, while the plate C is provided with openings *c c*, shown in the drawing, of larger size than the openings *d*, but arranged in the plate C at right angles to, or so as not to coincide with the openings *d*. *f* is a spindle axially arranged in the case B, with the inner end projecting into the stove-pipe and secured to a disk, *g*, forming a damper for the pipe, while the outer end extends through the outer plate D and carries a stepped segment, *h*, and weight and chain h^1 h^2 which act as a counterpoise to the regutor, as will presently be explained. *i i* are two wings attached to the spindle *f*, opposite each other, and extending into each of the compartments of the case B, so as to work within the same. These wings or vanes are so arranged that when in their normal position, and when the damper is open, they will form a partition in each of the compartments of the case B and shut off the communication between the outer and inner openings *d* and *c*, and prevent the air, which is free to enter through the opening *d* from passing through the opening C into the stove-pipe, as clearly shown in Figs. II and V. The counterbalancing weight operates to draw the wings *i* in the direction of the arrows, and tends to retain them in the position shown in Fig. II, any suitable stop, *e*, being provided to limit the movement in that direction.

The operation of my improvement, so far as described, is as follows: The upward draught through the pipe A tends to produce an inward suction through any openings or apertures leading into said pipe or flue, the force of which increases with the intensity of the draught. The counterpoise *h* is so adjusted as to hold the vane *i* in the position shown in the Figs. I, II, and V, when the intensity of the draught does not exceed any required degree. As the intensity of the draught exceeds this limit the air, which enters through the openings *d* into the confined space between the fixed partition E and wings *i*, presses against the latter with

sufficient force to move them in the direction opposite from that shown by the arrow in Fig. II, and partially closes the damper. During the first part of the movement of the vanes *i* the regulation of the draught is effected by the damper alone, but as soon as the vanes *i* pass by the edge of the inner openings *c*, so as to partially open the same, as shown in Fig. VII, the external air passes through the opened portions thereof into the stove-pipe and helps to diminish the draught. The angular distance through which the wings *i* have to move before air is admitted into the stove-pipe may be varied, by changing the size of the inner openings *c*, or by locating the same nearer to or further from the normal position of said wings. In the one case the air is admitted sooner, and the regulation of the draught may be entirely accomplished by the admission of air, and the damper be dispensed with. In the other case the admission of air may be entirely prevented, and the draught regulated by the damper alone, although I prefer to combine the same, as shown. The partial closing of the damper produces an increased rarity of the air and gases above the same, which causes a sudden increase in the inward pressure of the air against the wings *i*, which, if not counteracted, would result in the entire closing of the damper. To prevent this result, and to insure a more gradual and uniform action of the regulator, the stepped segment *h* and weight h^2 are employed. The former is constructed eccentrically, so that the leverage on which the weight h^2 acts increases as the wings are moved out of their normal position. By placing the chain h^1 in one or the other of the grooves of the segment *h*, the regulator may be adjusted so as to maintain a greater or less normal intensity of draught in the pipe.

It is obvious that only one compartment of the case B and one wing, *i*, is essential to the operation of the regulator. I prefer to use the two, as they increase the surface exposed to the action of the draught, and insure a more equal action of the parts. The opening or openings *c* may communicate with the pipe either above or below the damper, or on both sides, the opening shown in Fig. I being above the damper.

l, in Figs. II and V, represents a sector-shaped flange or plate attached to the inner end of the wing *i*, on the side next to the opening *c*, and so as to slide on the plate C. This sector is of sufficient size to close the opening *c* entirely or partially, when brought in coincidence therewith, as may be required. When the wing *i* is forced out of its normal position by a sudden increase in the intensity of the draught in the pipe, it might happen, if the sector *l* was not provided, that the wing *i* would be turned ninety degrees, thereby closing the damper entirely, and holding the same in this position for a short time, until the equilibrium is partially restored, which might cause an escape of gas into the room. To prevent this result the sector *l* is arranged on the wing *i*. As the latter is moved toward the opening *c* the sector *l* partially closes this opening, thereby diminishing the action of the draught in the pipe on the wing *i*, and enabling the counter-balance to partially reverse the parts, and slightly open the damper and cause it to fluctuate, without remaining entirely closed. M, in Fig. IV, represents a disk or valve arranged on the spindle *f*, in contact with the plate C on the side next to the stove-pipe, so as to turn thereon. It is provided with two openings, *m*, coinciding with the openings *c* in the plate C, but of smaller size. *n* is a rod by which the disk M can be turned, suitable stops being provided to limit this movement. By turning the disk M in either direction the openings *c* will be partially closed from one side or the other by the solid portion of the disk, thus changing the position of the open portions of said apertures, whereby air can be admitted into the stove-pipe; or the apertures *c* so arranged that the movement of the wings *i* will not uncover these apertures, and therefore prevent the entrance of air, leaving the damper to perform the whole office of regulating the draught. *o* is a plate arranged on the outside of the plate D for the purpose of closing the opening *d*, when the regulator is not required to be used.

I claim as my invention—

1. The combination, with the flue of a stove or furnace, of a damper and pneumatic valve, connected together so that the damper will be automatically actuated by the valve, substantially as hereinbefore set forth.

2. The combination, with the flue A, of the damper *g*, case B, valve *i*, and eccentric segment and weight $h\ h^2$, substantially as hereinbefore set forth.

3. The combination, with the damper *g*, spindle *f* and case B of the pneumatic valve, provided with the sector or flange *l*, arranged substantially as hereinbefore set forth.

4. The disk M, combined and arranged with the plate C and connecting parts, as herein shown and described.

LEWIS BOORE.

Witnesses:
JOHN J. BONNER,
EDWARD WILHELM.