

(No Model.)

S. P. SMITH.
AUTOMATIC DAMPER.

No. 322,492.

Patented July 21, 1885.

Fig. 1.

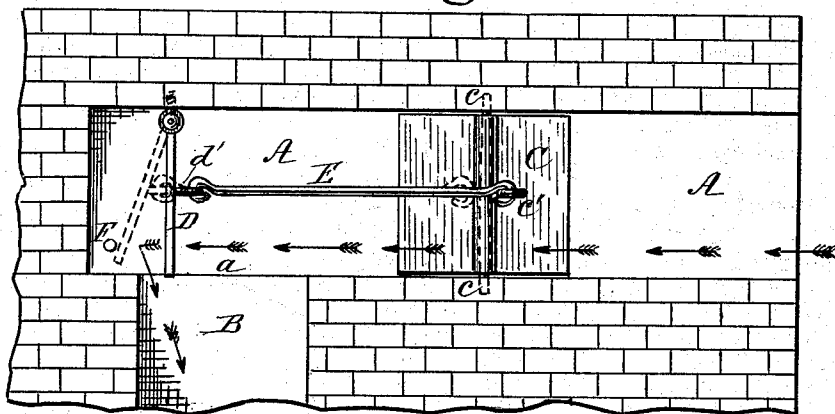


Fig. 2.

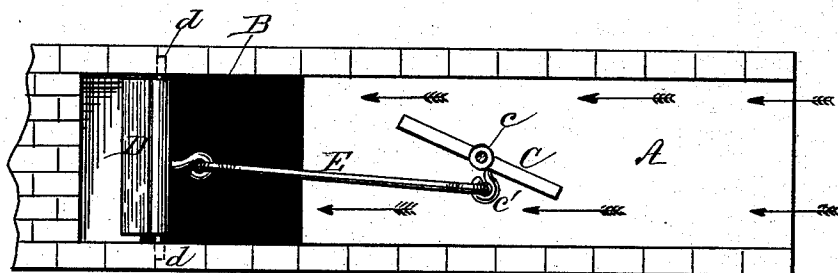
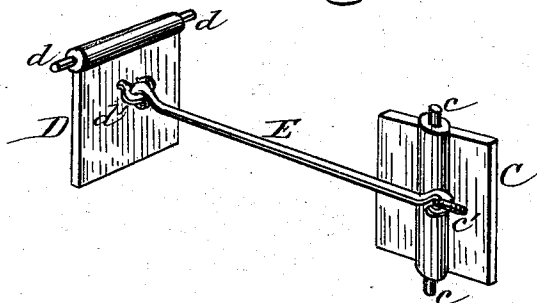


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

SOLOMON P. SMITH, OF WATERFORD, NEW YORK.

AUTOMATIC DAMPER.

SPECIFICATION forming part of Letters Patent No. 322,492, dated July 21, 1885.

Application filed April 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON P. SMITH, a citizen of the United States, residing at Waterford, in the county of Saratoga and State of New York, have invented new and useful Improvements in Automatic Dampers, of which the following is a specification.

My invention relates to automatic dampers for air-ducts, such as the cold-air conduit of a hot-air furnace, for regulating the quantity and force of the air supplied to the heating-chamber of such furnace, or for regulating the draft at the grate of a furnace or closed stove to maintain an even combustion.

The primary object of my improvement is to provide an automatic damper device for the open end of the horizontal branch of the cold-air conduit of an air-heating furnace which will so regulate the quantity of air passing into the furnace heating-chamber as to cause it to be properly heated before its passing therefrom to the rooms to be warmed.

In carrying out this object my improvement consists in providing said conduit, near its entrance, with a damper mounted upon vertical central pivots in the roof and floor of the conduit, and a hanging plate hinged upon horizontal pivots across the conduit and swinging from the roof thereof in rear of said damper, the damper and its controlling-plate being loosely connected by a horizontal rod in such manner that the plate will constantly tend to seek a vertical position, which is its normal position, so as to form a closed back to the entrance-branch of the conduit in rear of the damper to receive the pressure of the wind which passes the damper, and thus to control the position of the damper, and to receive and direct the incoming currents of air into and down a flue opening into the hot-air chamber of the hot-air furnace. The function of the hanging plate is, therefore, to control the position of the damper and to act as a deflector; and these two connected dampers must be arranged in the entrance-branch of the conduit, the one near such entrance and the other in such relation to a descending branch of said conduit as to act as a deflector for the air after it has passed the damper, and in such deflecting and controlling function to operate and to

hold the damper in whatever position it may assume, according to the degree of pressure of the wind upon the hanging plate.

The primary matter of my improvement is the controlling of the regulating-damper by a vertically-swinging plate hung to the roof of the conduit in rear of the damper, and connected with the latter in such manner as to change its position without itself varying the area of the air-passage of the conduit, and to maintain the damper in its normal open position in the central longitudinal plane of the conduit, leaving the conduit unobstructed for the free passage of air into and through the conduit in the absence of high winds or gusts. The damper and the hanging plate are of equal transverse area, which is equal, also, to the transverse section of the flue. The damper needs no adjustment, but is connected with the hanging plate by the loose rod E, so that the normal position of the hanging plate will be vertical across the conduit. The normal position of the damper will be edgewise, or approximately so, in the longitudinal center of the conduit, and the loose coupling-rod will stand from the center of the hanging plate at one end along the side of the damper at the other end, and when so set will require no further attention. The damper will give the full required opening at all times when there is no wind, simply vibrating with a tremulous motion imparted by the pressure of the current of air induced by the heat of the furnace against the plate hanging in the path of the currents behind the damper. During high winds, however, air would be blown through the conduit and heating-chamber more rapidly than it can be properly heated. It is then that the hanging back plate will receive the pressure of the wind after it has passed the damper, and will be borne back, giving thereby a downward course to the wind and instantly turning the damper so as to close the conduit just enough to neutralize the force of the increased velocity of the wind.

In high winds the force will at times act upon the back plate to close the damper momentarily, but the inflow of cold air will be practically continuous, and the quantity of air passing through a given area of opening in a

given time will be in proportion to the pressure of the wind upon the hanging back plate to turn the damper in front of said plate.

In the drawings accompanying and forming part of this specification, Figure 1 represents a vertical longitudinal section of a flue with the automatic damper mechanism attached; Fig. 2, a horizontal section of the same, and Fig. 3 details of construction of the damper and connecting parts.

In the accompanying drawings, A, Fig. 1, represents the horizontal entrance portion of a ventilating or other air flue, and B the descending portion of the same that runs to the heater, the part B communicating with A by the opening *a*. Situated in front of said opening *a*, and pivoted vertically in the central longitudinal plane of the flue B, is the damper C, which is provided at the centers of its upper and lower edges with the journals *c c*, to engage proper bearings in the roof and floor of A. The damper C is also provided at a little to one side of the center of its rear surface with the engaging hook or loop *c'*.

D is a hanging plate situated over the opening *a*, near to but not quite over its rear edge. The door or damper D hangs vertically in the flue A, having journals *d d* at the corners of its upper edge, which turn in proper bearings fixed to the roof of the flue. It is provided also at the center of its front surface with the engaging loop or hook *d'*.

E is a connecting rod or link joining the two parts C and D by having its ends formed to engage the hooks or loops *c'* and *d'*, and causing motion to be transferred from one door part to the other.

F is any proper stop to prevent the plate D swinging too far upwardly.

The operation of the invention is as follows: In its normal position the plate D hangs vertically downward, and by means of its weight acting through the connecting-rod E, attached to the door C at *c'*, a little to one side of the center of the rear surface of said door C, causes the same to stand vertically in the central longitudinal plane of the flue A, the latter then being entirely open. Now, when the wind blows into A it tends to raise the rear plate, D, and consequently, by means of the connecting-rod, rotate and close, or partially close, the front door, C. Moreover, the air that enters, after passing the latter, strikes against the rear plate, D, and is deflected thereby into and down the descending flue B, as shown by the arrows in Fig. 1. It is evident that with this construction the area of the unclosed orifice of entrance will vary inversely as the strength of the current, and consequently the draft will be automatically regulated.

I claim—

1. The combination, with an air-conduit, of a damper mounted upon vertical pivots centrally therein, and a vertically-hinged deflecting-plate hung to the roof of said conduit in rear of the damper and connected with the latter, so as to receive the pressure of the wind after it has passed the damper and to control the position of the same, substantially as described, for the purpose specified.

2. The combination, with a cold-air duct of a hot-air furnace, having a horizontal branch and a diving branch, of a damper device for regulating the supply of air to the furnace heating-chamber, consisting of the damper C, mounted upon vertically-central pivots, a pivoted plate, D, depending from horizontal pivots across the roof of said conduit behind the damper, and a loosely-connected coupling-rod, the said hanging plate being arranged behind the damper in the same conduit to receive the pressure of the wind and deflect it into the diving branch and to maintain the damper in its normal open position, substantially as described.

3. The hanging plate D, arranged across the inner closed end of the horizontal conduit A, from the roof thereof, over a diving branch, B, of said conduit, combined with a damper, C, arranged upon vertical central pivots between said diving branch and the entrance of said conduit, a rod, E, connecting the damper and hanging plate, and a stop, F, arranged to limit the rearward swinging movement of said plate, substantially as described, for the purpose specified.

4. An automatic damper device for regulating the volume of air passing through a flue, consisting of a damper, C, maintained in its normal open position by means of a hanging plate, D, placed in rear of and in the same conduit branch with and connected to said damper, said damper and hanging plate being of equal area to each other and to the cross-section of the air-conduit, and the said plate hanging in said conduit in position to receive and deflect the air-currents from the entrance-conduit, substantially as herein set forth.

5. The damper C, mounted upon vertical central pivots, *c c*, having the eye *c'* at one side of its axis, combined with the damper-plate D, hung upon horizontal pivots *d d* at its top edge, having the center eye, *d'*, and the rod E, joined to the said eyes, as described.

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

SOLOMON P. SMITH.

Witnesses:

CHARLES BATCHELDER,
CHARLES H. COLE.