(No Model.)

S. P. SMITH.

AUTOMATIC DAMPER.

No. 323,539. Patented Aug. 4, 1885.

Fig. 1.

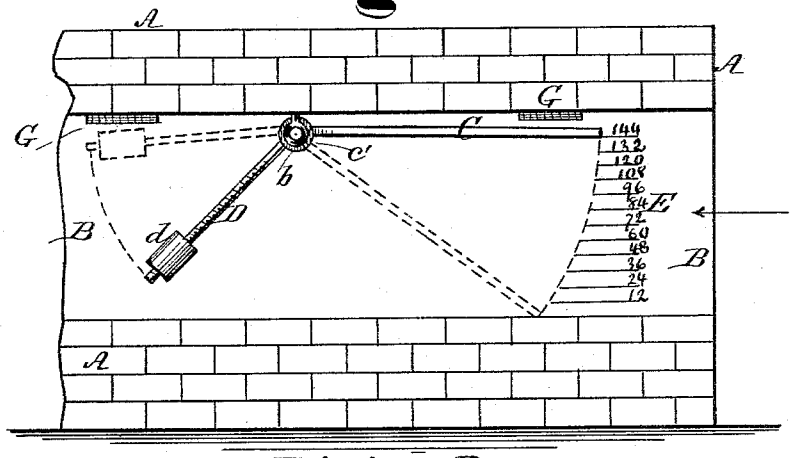


Fig. 2.

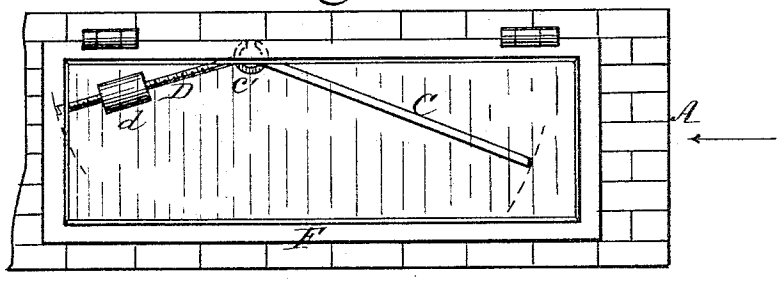


Fig. 3

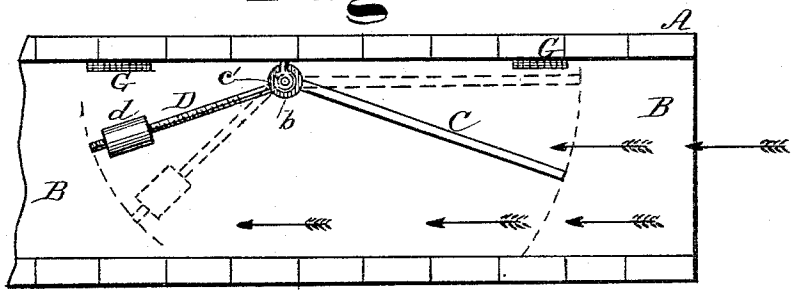
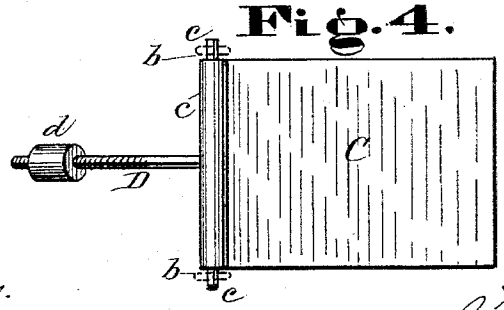


Fig. 4.



WITNESSES:

Lytle Morris.

D. R. Cowl

INVENTOR:

Solomon P. Smith

by Johnson & Johnson

Attys.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

SOLOMON P. SMITH, OF WATERFORD, NEW YORK.

AUTOMATIC DAMPER.

SPECIFICATION forming part of Letters Patent No. 323,539, dated August 4, 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 improvements in balanced automatic dampers for the open end of the cold-air duct of an air-heating furnace for regulating the quantity of the air supplied to the heating-chamber of such furnace, and for preventing the blowing of gusts into said heating-chamber. In such damper it is necessary to provide for adjustment to prevent a greater volume of air from blowing into the heating-chamber than the capacity of the latter to properly heat before its passage therefrom to the rooms to be warmed. For this purpose I provide an adjustable balance-arm whereby to maintain the free end of a damper hung at and in contact with the roof of the air-conduit at such a point between the roof and the floor of the duct as will lessen the area of the entrance and give the required supply, and thus avoid filling the heating-chamber with air beyond its capacity to heat. A little experience, with the aid of a scale on the duct-wall and a glass door on the opposite duct-wall, will afford facility for determining the position at which the damper should be balanced—that is, the degree of its inclination from the roof of the duct—so that, however the blasts may vary in force and constancy, the quantity of air passing through the conduit will be regulated, so as to give a comparatively uniform supply to the heating-chamber. When there is no wind blowing, the damper will vibrate with a tremulous motion imparted by the current of air induced by the heat of the furnace. During high winds, however, the damper would be vibrated with such violence as to cause it and its balancing-arm to beat against the roof with such force as to be annoying to the occupants of the house. To avoid such annoyance, I provide roof-cushions to deaden the sudden blows of the damper and of its balancing-weight. In applying the damper to a furnace having a cold-air inlet 18×18, giving three hundred and twenty-four inches area, I balanced the damper at three hundred and twenty-four square inches when the inlet-opening was closed, and found it to suit the heating capacity of the furnace and the draft of the duct. A change in the area of the inlet, a different draft in the duct, and a furnace having a different heating capacity would have required a different adjustment of the damper, and as these conditions are more or less changed in every furnace the provision for adjusting the damper to suit them is important. A weighted damper cannot operate effectively without provision for ready adjustment to the extent that will give perfect balance in whatever position it may be set to suit the conditions stated.

In the drawings accompanying and forming part of the specification, Figure 1 represents the section of a part of a furnace or building having an air-flue constructed therein with the automatic mechanism attached. Fig. 2 is a longitudinal elevation of a flue with the automatic damper mechanism attached, and the same set in a certain position. Fig. 3 is a side view of the damper in different positions, as shown in dotted lines; and Fig. 4 is a plan view of the damper with the counterbalancing-weight.

In the accompanying drawings, A, Fig. 1, is a part of a furnace or building having constructed within it the air-flue B, as shown.

C is the damper or door provided at each corner of its upper edge with the journals *c c*, which turn freely in the bearings *b b*, firmly attached to the roof of the flue. The upper edge of the door is set into or connected with the transverse rod or bar *c'*, on the ends of which the journals *c c* are fixed. The rod *c'* lies and turns in contact with the roof of the flue, so that but little air can escape over the top of the door. The door C is considerably longer than the vertical transverse section of the air-flue, so that when it entirely closes the said flue it makes an acute angle with the floor of the same.

D is the threaded lever attached to the upper edge of the door. The lever D has one end fixed to the middle part of the rod *c'* and extends inwardly from the same, making such an angle with the plane of the door that when the latter is closed the counterbalancing-weight *d* will come in contact with the roof of the

flue. The weight *d* is longitudinally adjustable on the rod D, so as to increase or diminish its leverage, as shown.

E is a scale of equal parts attached within and on one side of the flue to show how much of the area of the transverse section of the flue the door leaves unclosed when in any given position. Thus when the lower edge of door is at 12, one-twelfth of a square foot or twelve square inches (if the dimensions are in feet and inches) will be open for the passage of air, and for each following division of the scale twelve square inches of open orifice will be added, at 144 there being then just one square foot of such orifice.

F is a door, provided with a glass-covered opening, hinged to the side of the flue at a point corresponding to the position of the automatic closing mechanism just described. By means of this door the operation of the damper may be watched, and any desired adjustment of the counter-balance may be made.

G G are buffing devices attached to the roof of the flue in such positions as to buff the damper and the lever D, so as to prevent jar or noise when the damper is acting.

If it is desired to lessen the whole quantity of inflowing air, the block may be so adjusted on the lever as to hold the door at any required point on the scale—with the normal draft, for instance. Should but one-half of the quantity which is the natural capacity of the flue be desired, the block would be adjusted so that the lower edge of the door would set at 72 on the scale. On the other hand, should a blast be established through the flue and it be desired to pass more air than the quantity which represents the natural capacity of the same, the block *d* may be adjusted to hold the damper against the roof of the flue with a given force, which will have to be overcome before the blast can close the damper.

I do not claim the damper hung in an inclined position to the roof of the cold-air conduit, nor the damper so hung provided with a weighted arm whereby to maintain the damper in an open position against the roof, but improvements whereby such a damper is adapted for more satisfactory use under the varying conditions of supplying air to the heating-chamber of a hot-air furnace.

I claim—

1. The automatic damper herein described, consisting of the open cold-air conduit B, having upon one of its vertical walls an indicating-scale, the opposite wall having a hinged glass door, F, and between them a balanced damper provided with an adjustable weight, as and for the purpose specified.

2. The open cold-air conduit B, having the roof-cushions G G, and the damper C, having the screw-threaded arm D, and the adjustable weight, the said cushions being arranged to receive the blows of the damper and weight, as and for the purpose specified.

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.