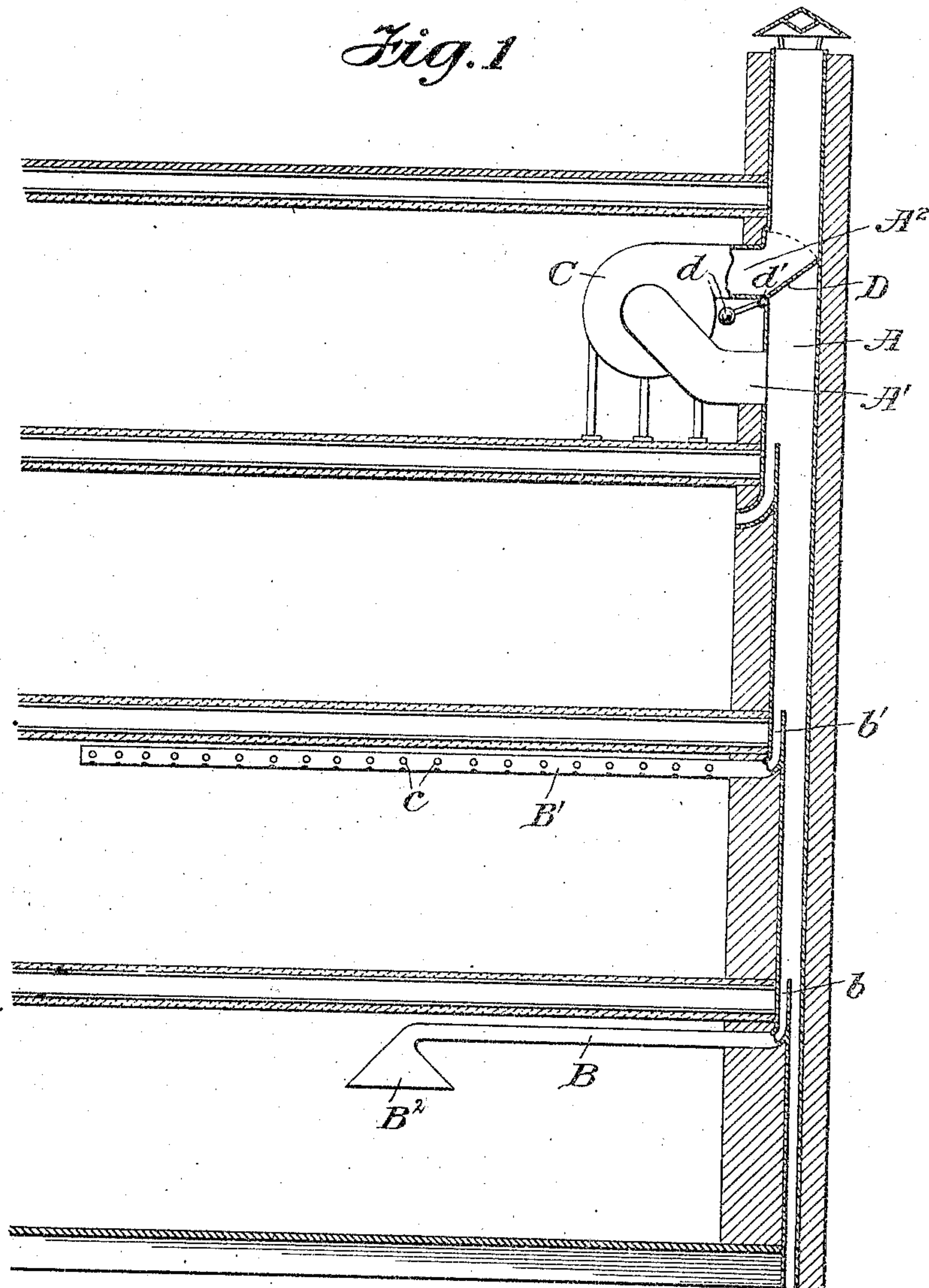


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 VENTILATING SYSTEM FOR FACTORIES, PRINTING OFFICES, AND THE LIKE.  
 APPLICATION FILED APR. 8, 1909.

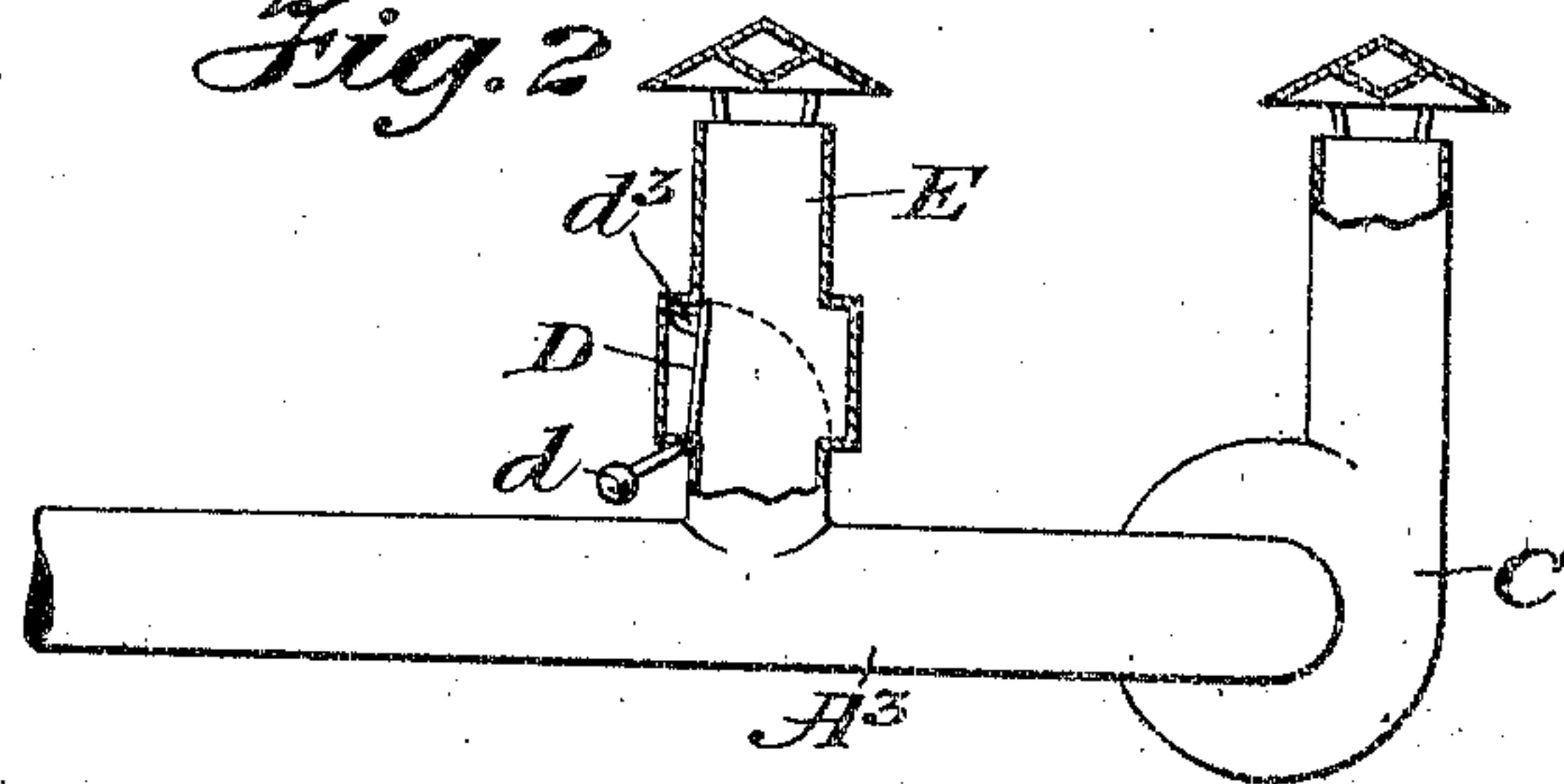
980,471.

Patented Jan. 3, 1911.

*Fig. 1*



*Fig. 2*



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# UNITED STATES PATENT OFFICE.

HENRY C. ZENKE, OF NEW YORK, N. Y.

VENTILATING SYSTEM FOR FACTORIES, PRINTING-OFFICES, AND THE LIKE.

980,471.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed April 8, 1909. Serial No. 485,743.

*To all whom it may concern:*

Be it known that I, HENRY C. ZENKE, a citizen of the United States, resident of Richmond Hill, Queens borough, New York city, in the State of New York, have made certain new and useful Improvements in Ventilating Systems for Factories, Printing-Offices, and the Like, of which the following is a specification.

My present invention relates to systems of ventilating large spaces in which the demand varies greatly, so that at one time forced ventilation is necessary; while at others it is not required.

It is desirable that the same ducts and outlets be used at all times; but when natural draft is employed, the stationary fan obstructs the air-way to such an extent as to make the system inefficient. To accomplish the purposes of the invention, therefore, I provide means for natural ventilation and also means for forced ventilation; and combine with them means for shutting off (preferably automatically) the natural draft when the forced draft is started, such means being also preferably automatically reversible, so that when the fan shuts down, the natural draft is shunted around the fan, leaving the air-way entirely unobstructed.

Other details of the invention will appear in the description; but it is obvious that it resides, not so much in the various ducts, fans and dampers, all of which are old and well-known, as in the system by which they are so combined as to secure an efficient renewal of the air in the space to be ventilated.

In the drawings I have shown what is known as an exhaust system; but the invention, by ordinary constructive skill, may be carried out by the plenum system, or by the two combined. Such changes, being within the skill of competent mechanics, I have not considered it necessary to illustrate or describe.

In the drawings, Figure 1 is a diagrammatic section of part of a building to which my invention has been applied; Fig. 2 is a diagram of another arrangement.

In Fig. 1, A is a duct or flue at the side of the building, forming a common discharge for the various rooms or floors. Each of the latter is, in the case illustrated, provided with a duct B, B<sup>1</sup>, &c., communicating with the main flue A; the ends of the ducts B B<sup>1</sup> are turned up at b, b<sup>1</sup> a short distance into

the flue so that lower floors or rooms will not discharge foul or heated air into the ones above. Upon one of the floors I have shown a hood B<sup>2</sup>, on another the pipe or duct B is perforated at c c, &c.; these are typical ways of collecting the foul air. At C is shown in diagram a suction fan for exhausting the air as occasion arises; an inlet pipe A<sup>1</sup> connects the fan with the flue, and an outlet pipe A<sup>2</sup> discharges into the flue the air drawn through the fan. At D is shown a weighted damper, the weight d of which is of just sufficient amount, and is carried upon an arm set at such an angle, as to hold the damper flat against the side of the flue when the fan is not in action. There is then no tendency for the damper to be noisy on a windy day, the air-way being entirely unobstructed and changes in pressure therein having no effect upon the damper. When in normal position, this damper closes the outlet pipe A<sup>2</sup> of the fan; but when swung outward upon the hinge d<sup>1</sup> it closes the flue A below the discharge opening.

The operation is as follows: So long as the fan is not running, the damper D lies flat against the wall of the flue, and the natural air-current is wholly unobstructed; but when the fan starts, the blast through the discharge-pipe A<sup>2</sup> swings the damper across the flue A, and the suction holds it closely in place so long as the fan continues to run. When the fan stops, the damper resumes its upright position.

In Fig. 2 I show a separate duct or flue E for the natural draft, the automatic damper being mounted therein adjacent to the pipe A<sup>3</sup>, which forms the supply of the fan. In this arrangement, inasmuch as the damper is not subjected to the blast of the fan and operates only by suction, I place upon it a lug or projection d<sup>3</sup>, which serves to cause the end or lip of the damper to project slightly into the air-way. When the fan is started, the air-current reverses in the flue E above the pipe A<sup>3</sup>, thus depressing the damper and closing flue E, the suction holding down the damper as long as the fan runs, as in the construction shown in Fig. 1. This is not so good a construction as that of Fig. 1, but is operative and may be used when occasion demands; it is often useful in old buildings, or in other cases in which it is difficult to find room.

Having thus described my invention, what



I claim and desire to protect by Letters-Patent of the United States is:—

1. A ventilating system such as described, comprising means for ventilating by natural draft, means for ventilating by artificial draft, and means for cutting off the natural draft when the artificial draft is started; such last-named means automatically actuated by the starting of the artificial draft.
2. A system of ventilation comprising means for producing a natural draft, means for producing an artificial draft, and means, automatically actuated by the artificial draft, for cutting off the natural draft when the artificial draft is started.
3. The combination, in a ventilating system, of a flue or duct communicating with the space to be ventilated, a fan communicating with said flue by inlet and outlet pipes at two points in the flue, and an automatic damper located between the fan-pipes; such damper normally closing one of the fan-pipes when in its normal position, leaving the flue unobstructed, but when operated acting to close the flue between the inlet and outlet pipes of the fan; whereby, when the damper is in normal position, the flue maintains a natural draft, and when the fan is started, the damper cuts it off.
4. In a ventilating system, the combination, with a fan having inlet and outlet pipes and a flue with which such pipes communi-

cate, of a damper located in the flue between the inlet and outlet pipes, and arranged when in its normal position to leave the flue substantially unobstructed.

5. In a ventilating system, the combination, with a fan having inlet and outlet pipes and a flue with which they communicate, of a weighted damper located in the flue and normally closing the outlet of the fan, leaving the flue unobstructed; the weight and damper being so proportioned and arranged that the starting of the fan will cause the damper automatically to close the flue between the outlet and inlet pipes.

6. In a ventilating system, the combination, with a system of pipes serving to ventilate the desired space, of a fan and a by-pass, and means for closing the by-pass at desired times; whereby the natural draft may proceed by the by-pass independent of the fan-way.

7. In a ventilating system, the combination, with a flue, a fan, and a by-pass, of a weighted damper controlling the draft through the by-pass, and means for automatically operating the damper by the starting and stopping of the fan.

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