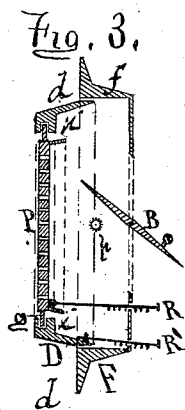
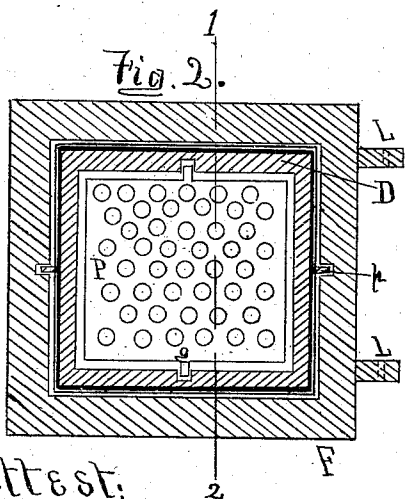
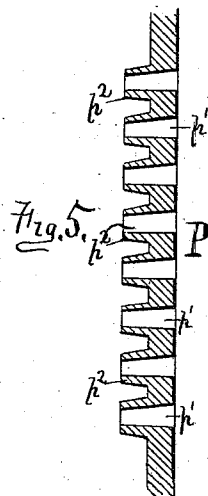
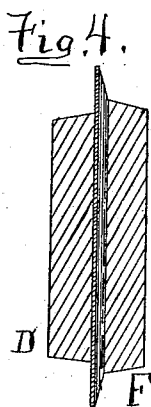
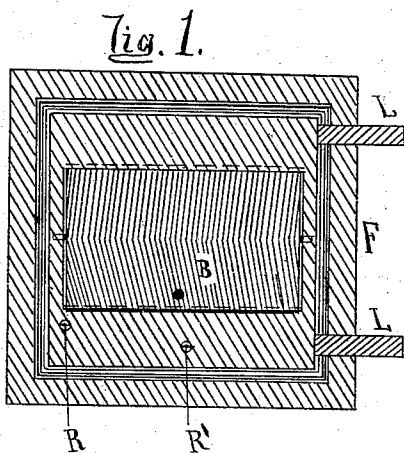
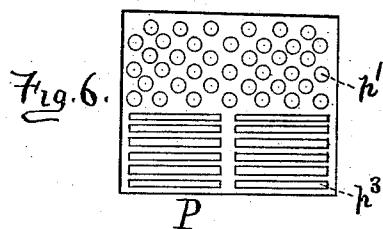


(Model.)

H. M. PIERCE.
Furnace Door.

No. 237,998.

Patented Feb. 22, 1881.



Attest:
Dennis Church Jr
Attorney for H. M. Pierce.

Inventor.
H. M. Pierce

UNITED STATES PATENT OFFICE.

HENRY M. PIERCE, OF GRAND RAPIDS, MICHIGAN.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 237,998, dated February 22, 1881.

Application filed June 9, 1880. (Model.)

To all whom it may concern:

Be it known that I, HENRY MILLER PIERCE, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Furnace-Doors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In the drawings, Figure 1 is a front view of a door embodying my invention. Fig. 2 is a rear or inside view of the same. Fig. 3 is a vertical section of the same on the line 1 2, Fig. 2. Fig. 4 is a side view of the door. Fig. 5 is a sectional view of a portion of the perforated air-delivery plate. Fig. 6 shows a delivery-plate slotted below, and to be used when it is desirable to feed the air in sheets below and in jets above.

Like letters refer to like parts wherever they occur.

My invention relates to furnace-doors for the admission of air above the fire, and has for its object such a construction as will enable the operator to limit the amount of air admitted, and also control the direction of the draft.

To this end it consists, first, in a furnace-door provided with a centrally-pivoted perforated inner or delivery plate and a swinging shutter or valve, whereby the amount of air admitted may be regulated and delivered to the fire in divided jets or currents; secondly, in providing a furnace-door with a pivoted perforated plate, whereby the angle of the delivery-plate may be changed to direct the air to different parts of the fire-chamber; thirdly, in the combination, in a furnace-door, of a pivoted delivery-plate and pivoted plate-frame, whereby the air-currents or draft may be directed to any part of the fire-chamber; and, finally, in details of construction hereinafter more specifically set forth.

It frequently occurs in furnaces that, from the irregular banking of the fuel and from other causes, the draft is unequal in different

parts of the fire-box, and combustion is consequently unequal, imperfect, and unsatisfactory. To overcome this difficulty furnaces have been constructed with air-ports in the crowns or arches, and in the bridge and side walls, and induced or forced blasts employed, all of which is more or less expensive and demands the reconstruction of the entire furnace.

My invention therefore embraces such construction of doors as will enable the air to be directed to any and all parts of the fire-box, is applicable to any and all styles of furnaces, and may be applied to any of the well-known furnaces at present in use at a slight cost and with highly beneficial results.

I will now proceed to describe my invention more specifically, so that others skilled in the art to which it appertains may apply the same.

In the drawings, F indicates the main frame or door proper, which is preferably of box form or flanged, as at *f*, so as to obtain sufficient depth for the proper movement of an inner pivoted frame, and this frame F is capable of being closed by a shutter, B, pivoted or otherwise movably secured thereto. The frame F is provided with the usual lugs, L, for attaching it to the furnace.

Pivoted within the main frame F, on journals or pivots *p*, is a second frame, D, which may be of box form or flanged, as at *d*, so that when frame D is turned on its pivots said flanges *d* may move within the main frame F and prevent any material draft or escape of air between the frames. The frame D is, in turn, closed by a perforated delivery-plate, P, pivoted therein, as at *g*, so that the perforated plate may be set at an angle to the frame D, in like manner as the frame D is set angling to the main frame F. The plate P may usually be perforated with round openings *p'*, and the perforations of the delivery-plate P should, by preference, be made through projections *p''* on the inner surface of the plate, so as to give to the air-inlets a nozzle or jet form, as the same will increase the force of the air-jets and prevent them from being broken up too soon.

The plate P, instead of being perforated over its whole surface, may have its lower portion filled in with long narrow horizontal slots or openings *p'''*, as the same will, when used, deliver the air in thin sheets on the front part of

the fire. The plate P should also be provided with flanges *i*, in order to prevent any material draft between the same and its frame when the plate is set angling to its frame. I prefer to make the pivots of the perforated plate vertical and those of the frame D horizontal, as shown; but this is not material so long as the axes of the pivots are at right angles to each other and a gimbal-joint is obtained.

R R' indicate two notched rods, one connected with the perforated plate P and the other with the pivoted frame D, and both pass through slots or holes in the main frame F. By means of these rods either or both P and D may be turned and set at an angle to the main frame.

The devices, being constructed and combined substantially as specified, when properly attached to a furnace, will be employed as follows: If the draft over the fuel in the fire-box is to be cut off entirely, the shutter B will be closed; if not, the shutter B will be set at such an angle as will admit the desired quantity of air. The air thus admitted will pass through the perforated delivery-plate P and be delivered to the fire in jets or currents. If the pivoted plate and frame are in the position shown in the drawings, the draft will be directly back from front to rear; but if the combustion is imperfect on either side the draft may be directed to the right or left, as required, by turning the perforated delivery-plate upon its pivots. It may be directed up toward the crown or arch of the fire-box or down upon the bed of fuel by turning the frame D on its pivots, and by combining the movements of the perforated plate and pivoted frame the air-

currents may be directed to any part of the fire-chamber.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a furnace-door, of a flanged perforated delivery-plate pivoted centrally in the door, as shown at *g*, whereby the delivery-plate may be turned to direct the air-currents to different parts of the furnace, substantially as and for the purpose specified.

2. The combination, with a furnace-door, of a movable frame pivoted centrally therein, and a perforated air-delivery plate pivoted centrally in the movable frame, the axes of the plate-pivots being at right angles to those of the movable frame, substantially as and for the purpose specified.

3. The combination, with a furnace-door, of a movable shutter and a movable perforated delivery-plate, substantially as and for the purpose specified.

4. The combination, with a furnace-door, of a movable shutter, a movable or pivoted frame, and a perforated delivery-plate hung or pivoted within the movable frame, substantially as and for the purpose specified.

5. The combination, with a furnace-door, of a delivery-plate perforated in its upper portion, and with its lower portion filled in with long narrow horizontal slots or openings, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY MILLER PIERCE.

Witnesses:

MARTIN BEEN,
HENRY J. PIERCE.