(No Model.)

T. R. BUTMAN.

FURNACE DOOR.

No. 273,813. Patented Mar. 13, 1883.

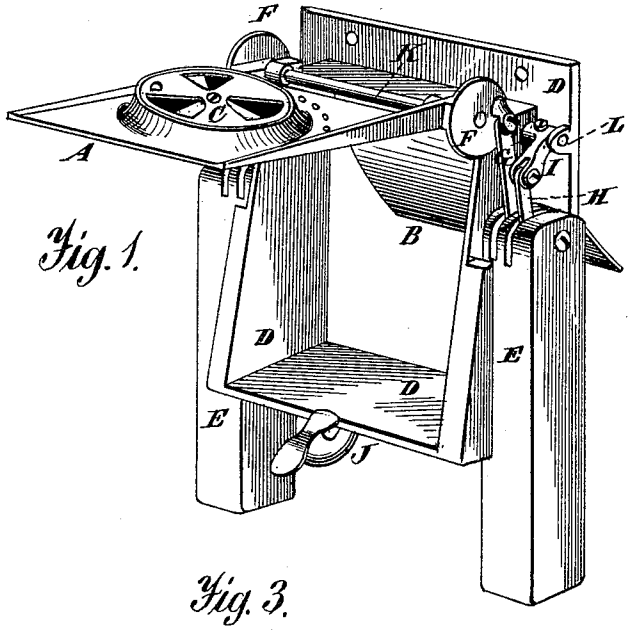


Fig. 1.

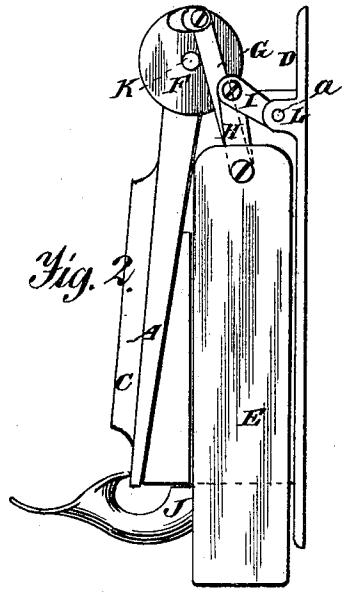


Fig. 2.

Fig. 3.

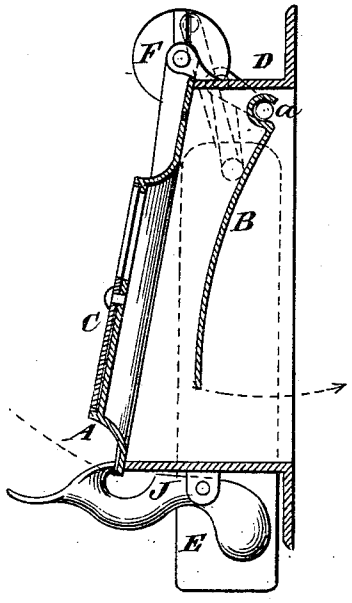
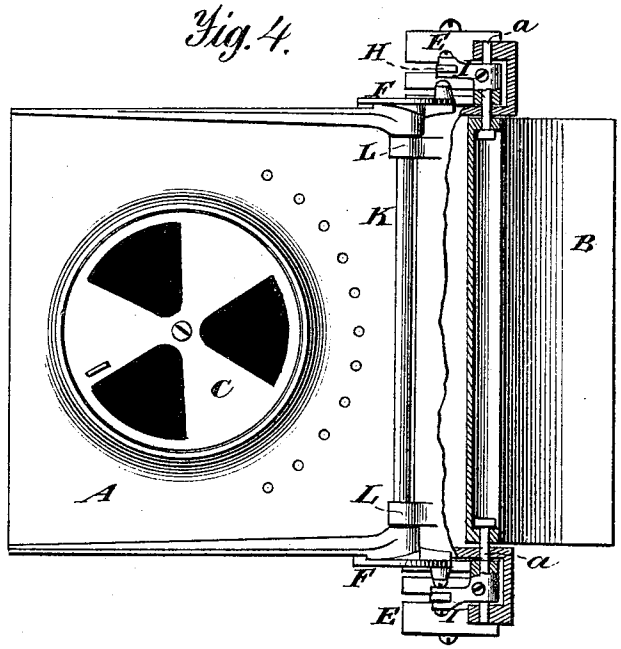


Fig. 4.



Witnesses.
A. Ruppert.
A. Cornwell.

Inventor.
Thomas R. Butman
by O. E. Duffy
Atty.

UNITED STATES PATENT OFFICE.

THOMAS R. BUTMAN, OF CLEVELAND, OHIO, ASSIGNOR TO THE BUTMAN FURNACE COMPANY, OF SAME PLACE.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 273,813, dated March 13, 1883.

Application filed August 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS R. BUTMAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnace-Doors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 the letters of reference marked thereon, which form part of this specification.

This invention relates to an improved construction of furnace-doors and a self-acting mechanical means of opening the door, and means for admitting and regulating the supply of air to furnaces. The furnace-door is carried on hinges arranged horizontally, and a large opening or aperture is formed in or about the middle thereof. In this opening is a valve or plate suitably formed to fit the opening and to govern the quantity of air passing through it to the furnace. Upon the inside or frame of the furnace front or door a horizontally-hinged valve-plate or deflector is hung, and is intermediately connected by links or other connections to the door and to weights arranged alongside of the door, the weights being retained in position by guides in such manner as to cause the door and the inner deflecting-plate to automatically and simultaneously rise when the door at its bottom is released. The means I employ for opening the door is what I term a "tripping" device, all of which will be more fully hereinafter described.

The object of the foregoing and mentioned devices is to throw upon the fuel and inflammable gases generated in the furnace of a steam-boiler a regular quantity of air, and to cause the cold air entering the furnace-door to be brought in contact with the inner hinged plate or deflector, thereby heating it to a certain degree before its admission to the eliminated gases and smoke, and preventing it while cold from impinging upon the sides, roof, or flues of the furnace; and its further object is to facilitate feeding or stoking the furnace with fuel, the details of which will be described further on.

In carrying out my invention I am not confined to the shape or position of furnaces or fire-places to which I apply my furnace-door for feeding fuel and for the combustion of smoke, as my improvements are as applicable to the furnaces of moving as to stationary engines or other furnaces, as will be seen from the description of the drawings hereunto annexed, which I will now proceed to describe.

Figure 1 of the drawings represents an isometrical perspective view, showing the front hinged door in an open position and the inner deflecting-plate in such position as to prevent the cold air entering the door from striking the crown-sheet of the boiler. Fig. 2 is an end elevation of the door-frame, weights, and disk with their connecting-links. Fig. 3 is a vertical transverse sectional view through the middle of the door, the door being closed. This figure clearly shows the configuration of the door, its valve, deflecting-plate, and manner of hinging the same, and it also shows the tripping device which holds the door in a closed position; and Fig. 4 is a top or plan view of the door in an open position and a longitudinal section of the working parts thereof.

The same letters will denote like parts in all the figures.

A is the door; B, the hinged deflecting-plate adapted to rise and fall simultaneously with the door and by the same means.

C is the valve in the door for regulating the quantity of air to be admitted through it to the furnace.

D is the door-frame, and E the operating-weights.

F are disks formed on the hinged edges of the door. It will be observed that a projection is formed on the disk, and between this projection and the disk is formed a slot, in which the link G works, having of course a pintle pin or screw passing through them for connection. These disks F F are alike, and operate at the same time, one being on each side of the door. It is obvious that cranks, arms, or levers would perform the same function as the disks; but I prefer the disks, as their appearance is neater and better.

H is a shorter link, which operates the hinged deflecting-plate by means of a crank, I. This crank is bifurcated on its end, between which the link T is jointed, forming somewhat a

knuckle-joint. The crank I is also journaled on a small shaft having one of its bearings in a lug, L, formed on the frame of the door, and the other in the side of the sill of the door-frame.

The deflector B is curved at its hinged edge its entire width, and has short journals on its edge, by which it hangs.

J is a weighted tripping device, which, when released, permits the door and hinged deflector to fly automatically and simultaneously open; but when the door is to be kept closed the weight at the rear end holds the door in a closed position. The weight is out of the way, it being under the door-sill.

It will be observed that the bottom sill of the door is wider than the top, so that when the door is closed it is on an incline. Above the valve of the door, and in a circle around the upper half thereof, is a series of apertures, through which air is admitted in fine jets, and on its passage to the furnace the air is heated between the deflector and the door. This deflector or shield B directs the air entering the door A down in contact with the generated gases and smoke before it is brought in contact with the flues and crown-sheet of the boiler. This not only prevents a cold current of air from impinging upon the boiler-plates on opening the door, but causes an additional supply to aid in consuming the increased quantity of smoke and gases caused by the introduction of new fuel. Thus the shield aids in directing a new supply of air at the important moment when needed, and at the same time prevents it from being impinged upon the side plates of the boiler before being heated, as it is well known that the cold air through the door, when directly thrown upon the plates and flues of the boiler, rapidly lowers the temperature in the furnace and the condition of the steam in the boiler, to which there are serious objections. By thus supplying to the partially-consuming smoke and gas a full porportion of oxygen a more complete consumption of the smoke is effected, and the draft of the furnace augumented, so that a more immediate and intensified heat is supplied to the boiler for the generation of steam.

This invention is an improvement upon my former patent, No. 184,061, the elements of which I do not herein claim separately; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, in a furnace-door, of the door A and deflector B, the door being provided with links connected to weights, and the deflector also having links connected to the same weight, as described, whereby the door and deflector are simultaneously operated.

2. The combination, with a door and deflector arranged to simultaneously open and close, of the links G and H, crank I, and disks F, the said parts being adapted to operate by weights in the manner shown.

3. The combination of the door-frame provided with guide-pieces, as described, and the weights E, arranged to work outside of said frames and along said guides, said weights being adapted to operate a door and deflector by means of intermediate mechanism, as shown.

4. The door and deflector, with the door-frame thereof constructed as described, and the weighted tripping device, in combination with the weights and links, as shown, whereby when the tripping device releases the door the weight will simultaneously open the door and deflector, for the purpose shown and set forth.

5. The combination, in devices for opening furnace-doors, consisting of the disks F, links G H, crank I, and weights E E, arranged as shown, suitably connected and journaled in the manner shown.

In testimony that I claim the foregoing as my own I have affixed my signature in presence of two witnesses.

THOS. R. BUTMAN.

Witnesses:

L. A. RUSSELL,

S. M. EDDY.