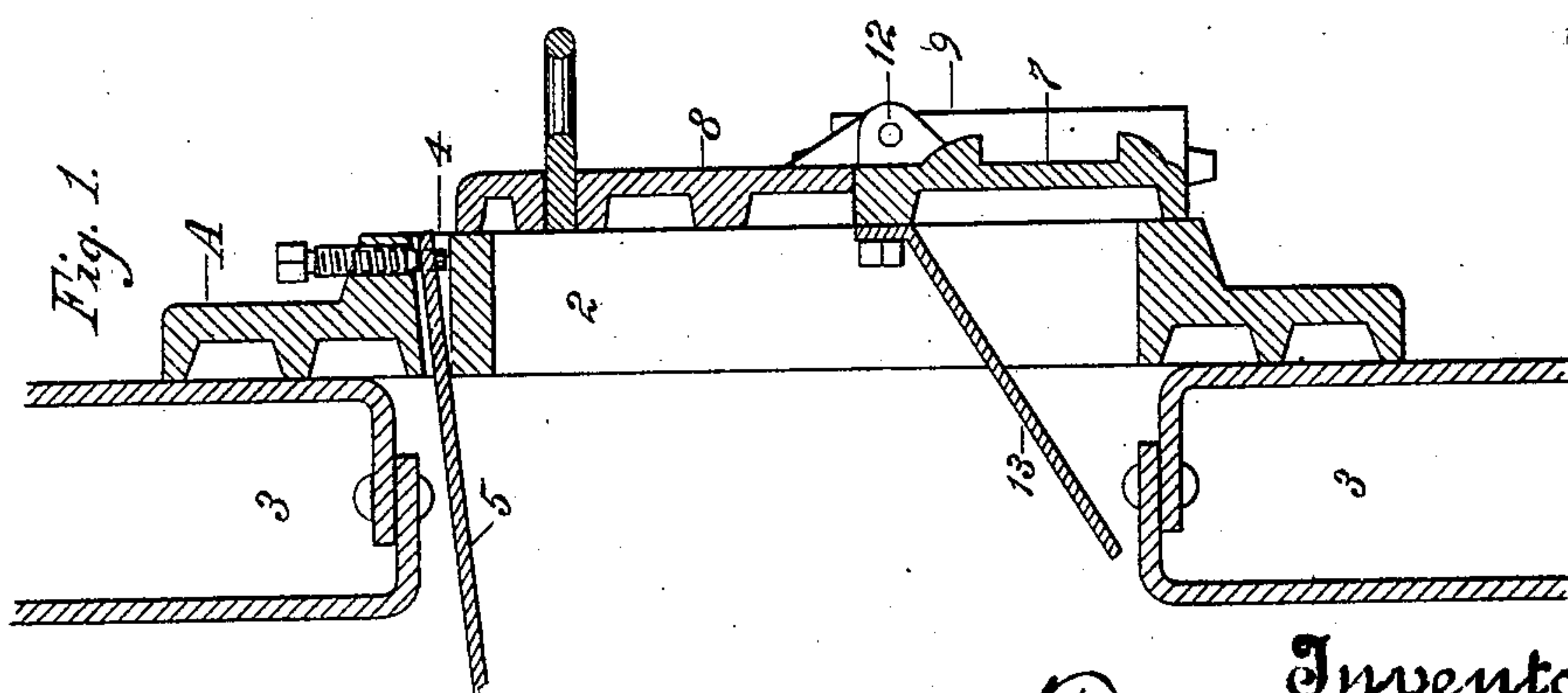
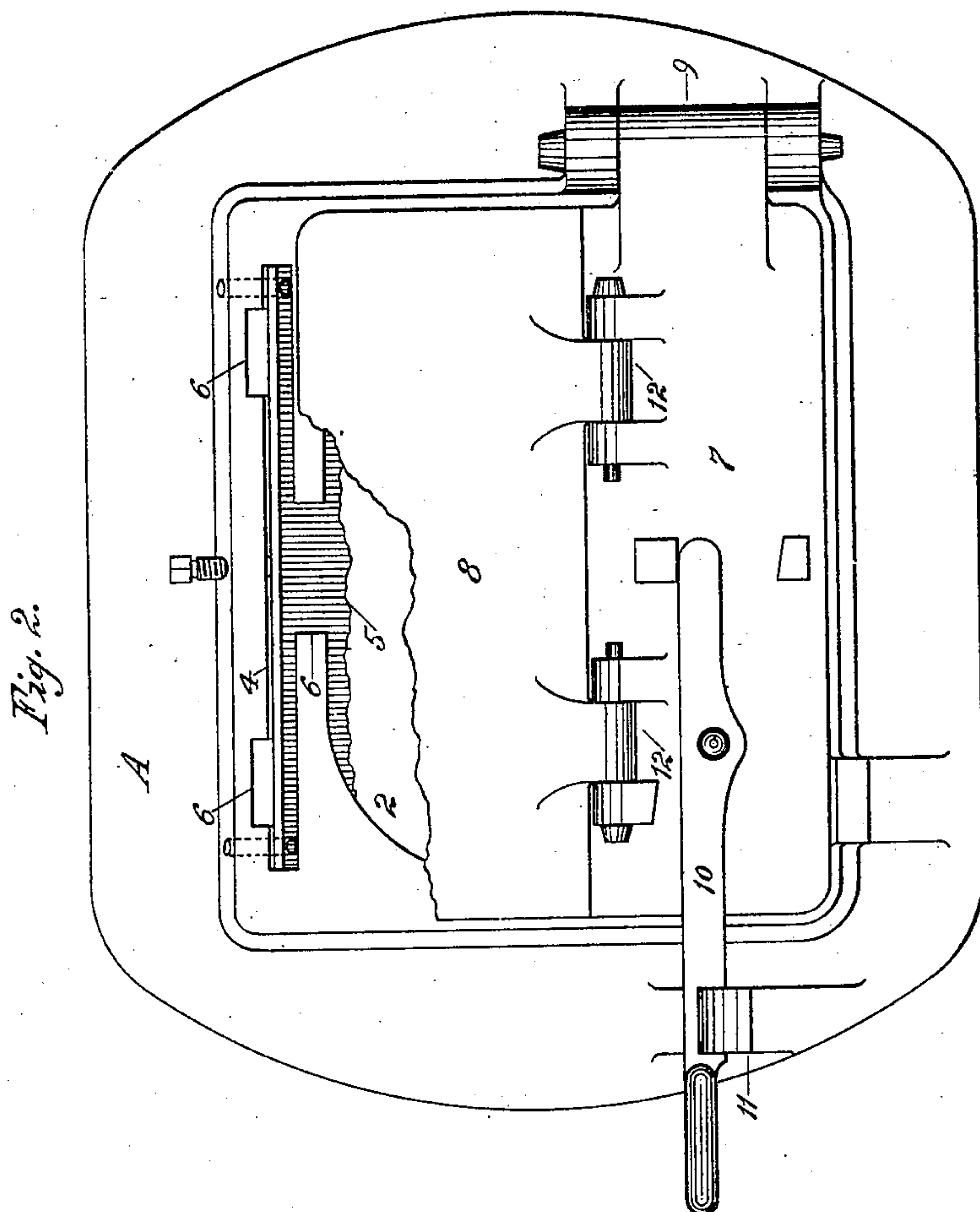


No. 680,369.

Patented Aug. 13, 1901.

F. L. BATES.
FURNACE FIRE DOOR AND ATTACHMENT.
(Application filed Apr. 18, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

FRANK L. BATES, OF SAN FRANCISCO, CALIFORNIA.

FURNACE FIRE-DOOR AND ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 680,369, dated August 13, 1901.

Application filed April 13, 1901. Serial No. 55,649. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. BATES, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Furnace Fire-Doors and Attachments; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in furnaces, the fire-doors thereof, and a draft-regulating attachment, whereby air is so supplied to the fuel which is being consumed in the furnace as to provide a more perfect combustion and reduce the apparent smoke caused by escaping unconsumed gases and carbon.

My invention consists in the novel construction of a horizontally-divided two-part door, the lower part of which opens about a vertical hinge on one side and the upper part opens downwardly about horizontally-disposed hinges upon the lower part, so that fuel may be introduced through the open upper portion of the door. An inclined guard-plate is fixed to the upper edge of the lower half of the door to direct the fuel and prevent its lodging and burning upon the bottom of the door-opening. A horizontal slot is made in the upper part of the door-casing above the door-opening, and an air-deflecting plate is fitted into said slot, with suitable adjustments and supplemental air-openings in proximity to said plate.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical central section through the door. Fig. 2 is a front view of the same.

The door-casing A is adapted to be fixed to the boiler-front and has a door-opening of suitable size and shape, as at 2, which registers and is coincident with the opening through the boiler-front. In my present invention I have shown the device as especially designed for locomotive-boiler furnaces, in which the depth of the door-opening through the boiler-front depends upon the width of the water-leg 3, which surrounds the furnace in the usual manner.

Above the door-opening 2 of the casing is made a horizontal slot 4, and through this

slot a plate 5 is fitted and inserted, so that it projects a considerable distance into the interior of the furnace. This plate serves in conjunction with the upper open part of the door, to be hereinafter described, to deflect and direct the air-draft which is admitted through said opening, so that the air is mingled with the gases and smoke or unconsumed carbon arising from the combustion of the fuel in such a manner as to consume said smoke and gases and to practically form a smoke-consumer. This plate may be made adjustable by tilting it to raise or lower the inner edge, and it may also be made slidable in or out; but I have found that an adjustment having been determined for the particular furnace to which it is applied the plate may thereafter be left in position until so burned or destroyed that it needs renewing. In order to protect the plate as far as possible from the intense heat of the furnace, I have shown supplemental channels or openings 6, made in the door-casing upon either side of the plate where it passes through the slot, and these openings admit sufficient air in direct contact with the plate and independent of the body of air which is admitted through the main door-opening, so that the plate is largely protected from the intense heat of the furnace.

The door consists of two parts 7 and 8, the lower part 7 being hinged, as shown, at one side, so as to open, when desired, about its vertical hinge 9. A suitable latch, as 10, engaging a catch 11 upon the opposite side of the door-casing, serves to retain the lower part of the door normally in a closed position. The upper part 8 of the door is horizontally hinged to the upper edge of the part 7, as shown at 12, so that it may open outwardly and downwardly, and this is the normal position of this portion of the door while the engine is running and using steam. Firing is done through this opening by the use of a small shovel, which will not take more than about eight pounds of coal, and this is continually supplied at regular intervals, thus avoiding the production of smoke and unconsumed gases, which is caused by adding large quantities of fuel at each firing. The coal thus introduced can be spread and any fault occurring in the fire is always visible to the fireman, so that he can correct it.

Fixed to the inner upper edge of the part 7 of the door is a plate 13, which inclines downwardly and inwardly, so that when the lower half of the door is in its normally-closed position the lower edge of this plate projects to or beyond the inner face of the furnace, and thus extends over and protects the lower part of the door-opening, so that the coal or fuel when introduced will slide over this plate and be prevented from lodging upon the comparatively broad ledge at the bottom of the door-opening caused by the thickness of the water-leg at this point. This prevents an accumulation of coal at this point, which would under other conditions become ignited and cause such a heat as to warp or destroy the door.

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

1. The combination with a furnace and a fire-door, of a door-casing having a slot above the door-opening, and a downwardly-inclined directing-plate fitted in said slot said slot having offsets forming supplemental air-openings leading to the furnace.

2. The combination with a furnace having a door-opening, of a door-casing having an opening which registers with that of the boiler-

front, a two-part door hinged to the casing and the upper portion of which is hinged to the lower portion to open outwardly and downwardly, and a plate projecting into the furnace, said casing having a slot in it above its opening, adapted to adjustably receive said plate, and having supplemental air-openings contiguous to the plate.

3. A steam-boiler furnace having a surrounding water-leg, an opening made through the rear wall thereof, a door-casing fixed to said wall and having an opening coincident with that of the boiler, and having a slot above said opening, a horizontally-divided door, the lower part of which is closed, and the upper part is hinged to remain open when the boiler is in use, a deflecting-plate secured within said slot and extending into the furnace, said casing having supplemental air-openings contiguous to said plate, and an inclined deflecting-plate extending inwardly from the upper edge of the lower portion of the door.

In witness whereof I have hereunto set my hand.

FRANK L. BATES.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.