No. 626,280. Patented June 6, 1899.

F. L. HORSPOOL & G. J. KELLY.

DOOR AND DEFLECTOR PLATE FOR STEAM BOILER FURNACES.

(Application filed July 21, 1898.)

(No Model.)

Fig. 1.

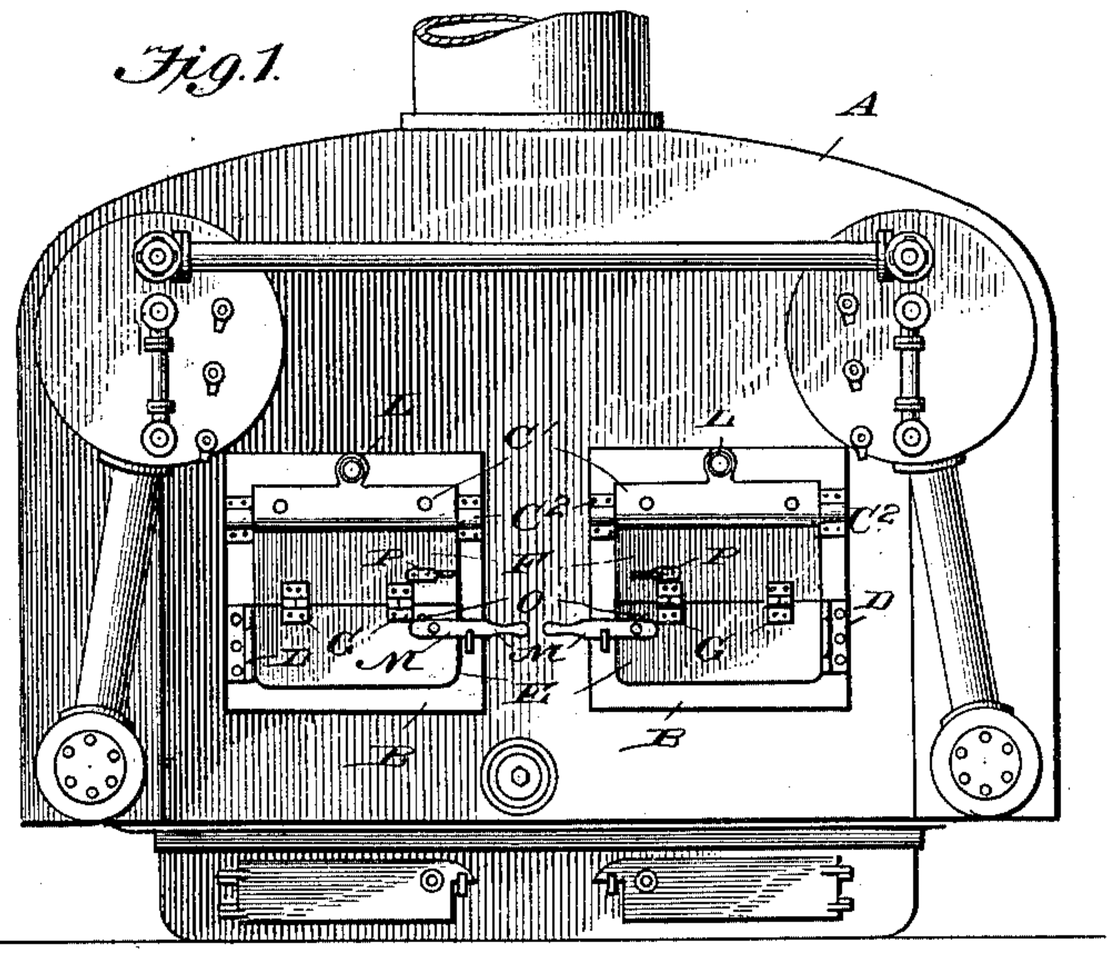


Fig. 2.

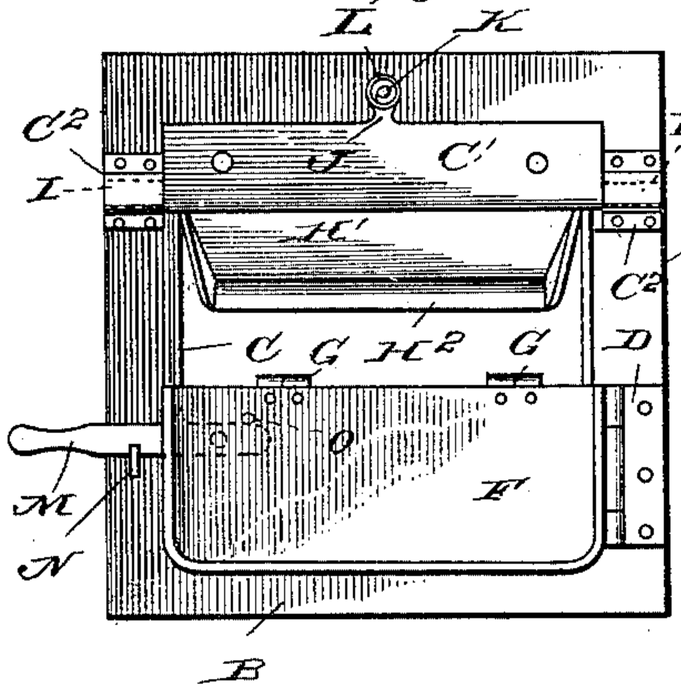


Fig. 3.

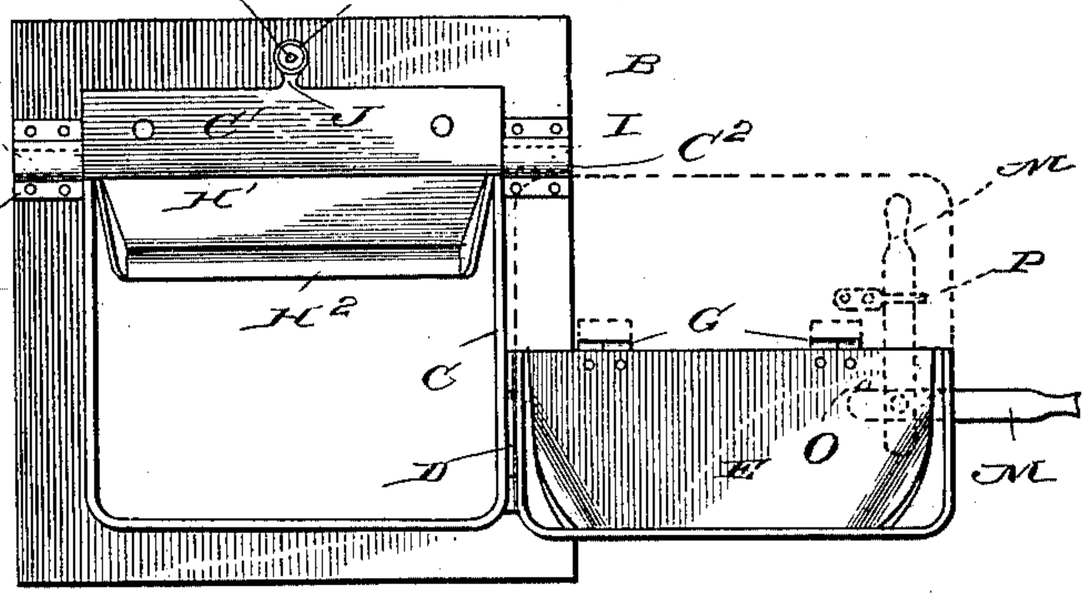


Fig. 4.

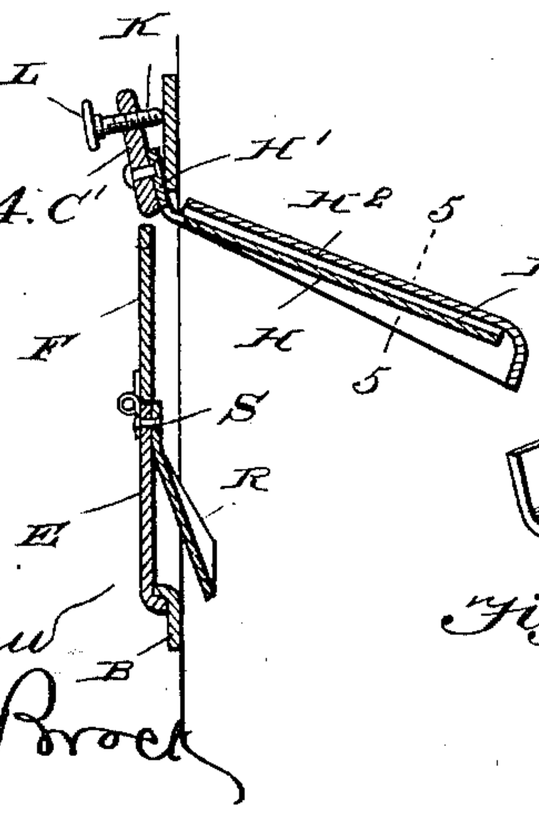


Fig. 5.

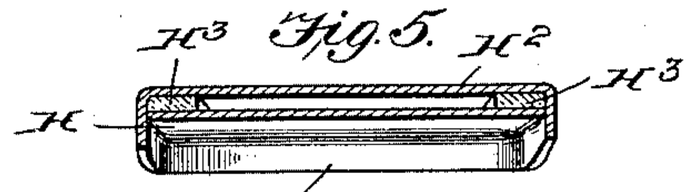
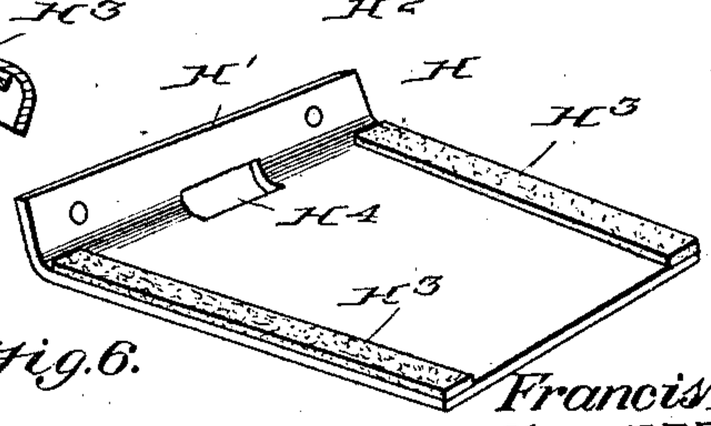


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANCIS L. HORSPOOL AND GEORGE J. KELLY, OF OGDEN, UTAH.

DOOR AND DEFLECTOR-PLATE FOR STEAM-BOILER FURNACES.

SPECIFICATION forming part of Letters Patent No. 626,280, dated June 6, 1899.

Application filed July 21, 1898. Serial No. 686,516. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS L. HORSPOOL and GEORGE J. KELLY, citizens of the United States, residing at Ogden, in the county of Weber and State of Utah, have invented a new and useful Door and Deflector-Plate for Steam-Boiler Furnaces, of which the following is a specification.

This invention relates generally to doors for steam-boiler furnaces, and more particularly to certain improvements therein embodying the application of deflector-plates in conjunction with the doors.

The object of this invention is to provide a furnace-door which will save time and labor in firing the furnace and will admit the necessary amount of air above the fire in the fire-box to supply sufficient oxygen to complete the combustion of the carbon of the fuel, thereby economizing in the consumption of the fuel.

With this object in view our invention consists in a steam-boiler furnace provided with a door made in sections capable of independent operation and the lower section hinged at its side to the frame and provided with a deflector or guard plate permanently secured to the inside thereof, whereby accumulation of cinder or ashes against the door is prevented, and an improved deflector being projected from the door-frame into the fire-box.

The invention further consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and afterward particularly pointed out in the claims.

In order to enable others skilled in the art to which the invention most nearly appertains to make and use the same, the invention will now be described, having reference to the accompanying drawings, in which—

Figure 1 is a view in elevation of furnace-doors constructed in accordance with this invention applied to a well-known form of marine engine. Fig. 2 is a view in elevation of a door and frame, the upper section of the door being open or let down upon the closed lower section. Fig. 3 is a similar view with the upper section lowered upon the lower section and the lower section thrown open. Fig. 4 is a vertical sectional view through the door and frame, illustrating both sections of the door closed and showing the deflector-plates. Fig. 5 is a detail sectional view on the line 5 5 of Fig. 4. Fig. 6 is a detail perspective view of the lower plate of the upper deflector detached.

Like letters of reference indicate the same parts in all the figures of the drawings.

Referring to the drawings by letters, A indicates the boiler-head, provided with a suitable opening, in which is secured the door-frame B, having an outwardly-projecting flange C, over which the door fits snugly when closed. The door is hinged to the door-frame B at one side by means of hinges D and is composed of two sections E and F, these sections being secured together by hinges G, so that the whole door may be closed, the upper section alone opened, or both sections opened, as may be desired.

Pivoted to the sides of the door-frame B is a plate C′, to which is secured the upwardly-bent front edge H′ of a baffle-plate or deflector comprising a lower plate H, which is as wide as the door, projects into the fire-box, and normally rests in an inclined elevated position.

H^2 indicates a plate secured upon the top of the plate H and separated therefrom by strips of asbestos H^3, thus forming a passage between the plates H and H^2 for the air entering opening H^4 in plate H. The side edges of the plates H H^2 are inclined slightly toward the center and the side and front edges of plate H^2 bent downward, whereby air entering through the opening H^4 and the door is deflected and prevented from coming into direct contact with the crown-sheet of the fire-box or flues of the boiler. The pivots I of the hinge-plate are extended into bearings C^2 outside of the flanges of the door-frame, and the plate is provided with an arm J, which has a threaded opening through which passes a bolt K, having on its outer end a hand-wheel L, whereby by turning the bolt inward or outward through the arm J, with the inner end of the bolt bearing against the door-frame, the deflector is adjusted in position higher or lower, as may be desired. This deflector also serves to conduct the cold-air draft to the center of the fire-box, thereby supplying oxygen at the proper point to complete the combustion of the carbon of the fuel. A latch M,

pivoted to the lower section E of the door, engages a catch N to hold the door closed, a lug O preventing the rear end of the latch from rising too high. A catch P on the upper section of the door serves to receive the latch-arm when turned vertically and support the upper section of the door when both sections are opened together, keeping it in line with the lower section E of the door. A latch of any desired construction may be used to hold the upper section F of the door in its closed position. A deflector-plate R, rigidly secured to the inside of the lower section E of the door by means of the bolts S, which in this instance are shown as securing also the hinges G, projects in a downwardly-inclined position into the fire-box, serving as a fender, deflector, or guard to prevent clinkers or ashes from falling into direct contact with the door-section E.

The provision of a door made in upper and lower sections permits of the firing of the furnace without the necessity of opening the whole door, and inasmuch as the door is partially opened all the time during the firing and during the time the engine is working steam a sufficient amount of air is admitted to the fire to supply the necessary amount of oxygen to complete the combustion of the smoke and coal-gas, whereby the objectionable black smoke usually issuing from the stack is consumed and much waste of fuel avoided. The passage of air between the two plates of the deflector serves to keep them from burning up as rapidly as would a single sheet in the same position. By means of the catch P the latch-lever is made to perform the function of a brace to hold the upper section in line with the lower when it is desired to open both sections together, this function being in addition to its usual function of keeping the lower section closed.

The advantages attending the use of this invention are many and will be readily apparent from the foregoing description, and while the best means now known for carrying out the invention have been herein illustrated and described it is not to be understood that the invention is restricted to the exact details of construction shown and described, but will include within its limit and scope any such slight changes or variations as might suggest themselves to the ordinary mechanic.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent of the United States, is—

1. The combination in a steam-boiler furnace with the door-frame, of a door comprising an upper and a lower section, the lower section being hinged at one side to the door-frame, and the upper section hinged at its lower edge to the upper edge of the lower section, a catch projecting from the door-frame, a latch-lever hinged to the lower section of the door to engage said catch to hold the door closed, and a catch secured to the upper section in vertical alinement with the pivot of the latch and adapted to hold the latch-lever in a vertical position to rigidly secure the upper section in line with the lower section when both are opened together, substantially as described.

2. The combination in a steam-boiler furnace with the door-frame, of a hinged bar or lever pivoted in bearings thereon, a deflector-plate having its outer edge turned upward and secured to the hinged plate and provided with an opening at the bend of the plate, asbestos strips secured along the upper edges of the plate, and an upper deflector-plate rigidly secured upon the asbestos strips leaving an air-passage between the upper and lower plates, the upper plate having its edges turned downward and its side edges inclined toward the center, to properly conduct and deflect the air, substantially as described.

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