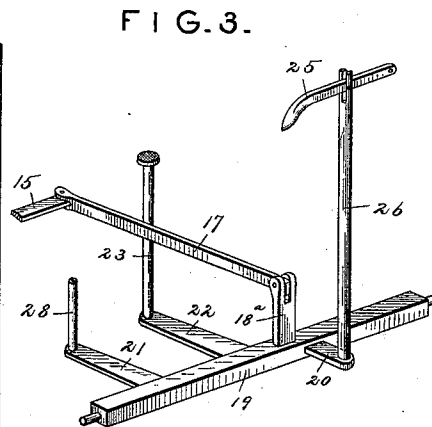
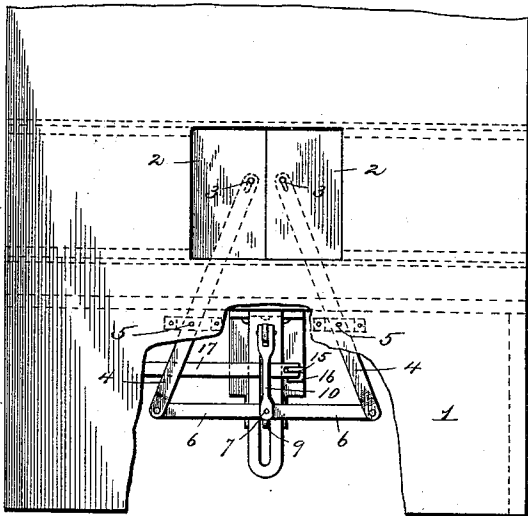
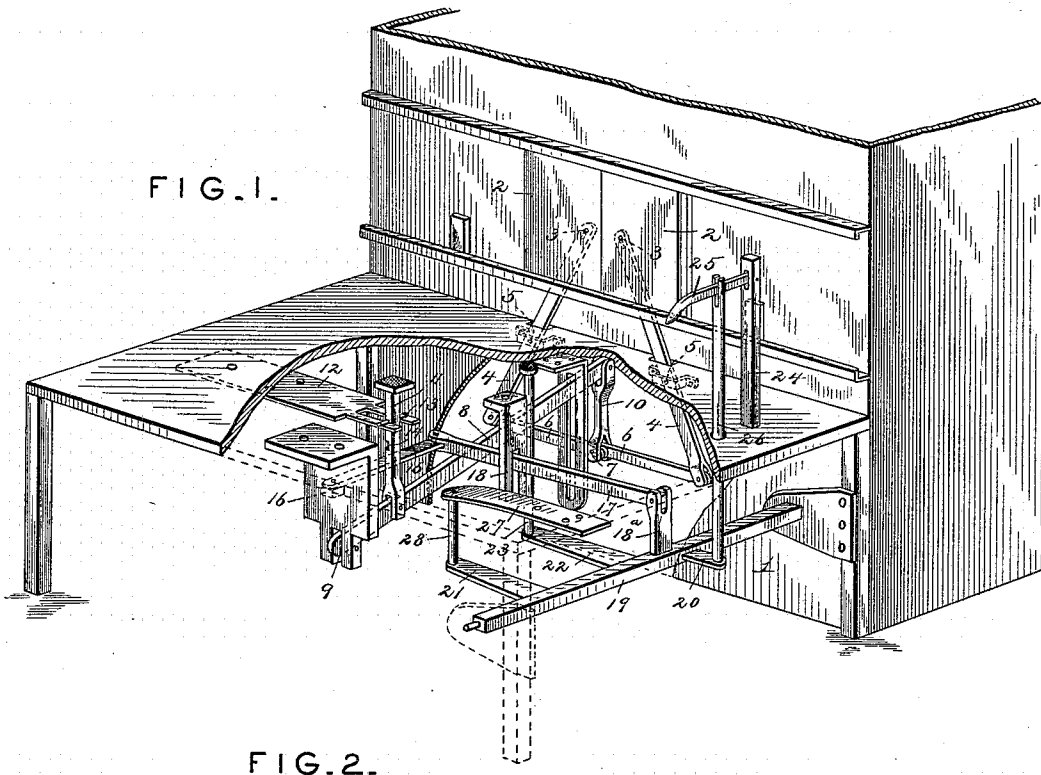


(No Model.)

D. E. ROBINSON.
MEANS FOR OPENING OR CLOSING FURNACE DOORS.
No. 543,968. Patented Aug. 6, 1895.



Inventor

David E. Robinson.

Witnesses

Harry L. Amer.
R. M. Smith.

By his Attorneys.

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

DAVID E. ROBINSON, OF ARDEN, WEST VIRGINIA.

MEANS FOR OPENING OR CLOSING FURNACE-DOORS.

SPECIFICATION forming part of Letters Patent No. 543,968, dated August 6, 1895.

Application filed February 27, 1895. Serial No. 539,882. (No model.)

To all whom it may concern:

Be it known that I, DAVID E. ROBINSON, a citizen of the United States, residing at Arden, in the county of Barbour and State of West Virginia, have invented a new and useful Means for Opening or Closing Furnace-Doors, of which the following is a specification.

My invention relates to an improvement in furnace-doors, or more particularly in the means for opening and closing the doors of a furnace.

The object of my invention is to provide means, within convenient reach of the fireman or furnace attendant, whereby he may be enabled to instantly open and close the doors of the furnace at will, and thus prevent continuous drafts of cold air from entering and chilling the boiler-tubes.

While my invention is especially useful in and applicable to locomotive fire-boxes, it is equally applicable to stationary or marine boiler-furnaces.

It consists in certain features and details of construction and arrangement of parts hereinafter specifically described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a portion of a fire-box, showing the furnace-doors and means, constructed in accordance with my invention, for opening and closing said doors, the floor or platform being broken away for the purpose. Fig. 2 is a rear view looking from the interior of the furnace, showing the sliding doors, operating-levers, and their connections. Fig. 3 is a detail perspective view of the releasing mechanism and the rock-shaft and connections for operating the same.

Similar numerals refer to corresponding parts in the various figures of the drawings.

1 represents a portion of the front wall broken away, of the furnace or fire-box 2 2, the doors thereof made in two separate and independent sections, as shown in the drawings. The door-sections 2 2 slide in suitable horizontally-arranged ways or tracks attached to the front of the furnace in the manner well understood. As the doors 2 2 are ordinarily quite heavy, weighing from thirty to fifty pounds, or even more, I prefer to mount said doors upon suitable rollers, located beneath the same, in the lower track or way attached to

the front of the furnace. The door-sections are each made double or have an inner and an outer plate, with an intervening air-space, and are provided each with a pin or pivot 3 therein, adapted to be engaged by the operating-levers 4 4, the upper ends of which are slotted and adapted to lie between the inner and outer plates of the doors and to engage said pivots. The levers 4 4 extend downwardly to a point beneath the line of the floor or platform, and are pivoted at 5 5. At their lower extremities the levers 4 4 are connected by two pivoted arms or links 6 6, which are in turn pivoted together at a central point by a horizontal pivot 7, thus forming toggle-levers. 8 indicates a horizontal lever pivoted at its forward end, at 9, to the platform, framework, or other connecting-point. This lever extends from thence rearward and is connected at its rear end to the central pivot of the toggle-levers 6 6 by means of a link 10, also pivoted to said horizontal lever. At a point intermediate the ends of lever 8, the latter has pivoted to it a vertical post 11, extending upward through a perforation or opening in the platform upon which the attendant stands. This vertical post is provided with an enlargement or foot-piece upon its upper end, by means of which it is adapted to be depressed by foot-power.

12 indicates a strong flat spring secured beneath the platform, and having a bifurcated end adapted to engage trunnions 13 extending laterally from the vertical post 11, whereby the latter and the parts connected therewith are held and the doors kept closed, as will hereinafter appear.

14 indicates a notch or depression in one face of the vertical post 11, and 15 indicates a catch or latch-bar adapted to engage the notch 14 when the post 11 is depressed for holding said post 11 in such depressed position. The catch 15 is preferably pivoted to a lug 16 on the framework, and its other end is connected pivotally with a sliding rod 17, sliding in suitable ways 18, secured to convenient points beneath the platform. The opposite end of the rod 17 is pivotally connected with a crank-arm 18* on a horizontal rock-shaft 19, as shown. The rock-shaft 19 is provided with additional crank-arms 20, 21, and 22.

23 indicates a vertical post extending upwardly through the perforation or opening in the platform, above which it is provided with a flange or foot-piece similar to but preferably smaller than the foot-piece on the post 11. The lower end of the post 23 rests upon and is pivoted to the crank-arm 22 on the rock-shaft 19.

24 indicates a vertical post or standard rigidly secured upon the platform and extending upwardly therefrom, and 25 a hand-lever pivoted to said vertical post 24. A vertical rod 26, attached to said hand-lever 25, extends downwardly through the platform and is connected to the end of the crank-arm 20 on the rock-shaft 19.

27 indicates a flat spring secured to the lower face of the platform, and 28 a rod or chain interposed between and connecting the free end of the spring and the crank-arm 21 of the rock-shaft 19.

The operation of the device is as follows: When it is desired to open the doors of the furnace, the attendant presses his foot upon the upper end of the vertical post 11, which acts to depress the horizontal lever 8, thereby causing the latter to act upon the toggle-levers 6 6, which act to draw the lower end of levers 4 4 together and thrust the upper ends of said levers apart, thereby opening the doors 2 2. When depressed in this manner, the pivoted catch 15 engages the notch 14 in the vertical post 11, said catch 15 being operated by the tension of the spring 27 through the interposed connections, consisting of the crank-arms 21 and 18, the rod 17, and the rod or chain 28. Thus the doors are held open. To close the doors, the attendant depresses the post 23, which acts upon the crank-arm 22 of the rock-shaft 19, thereby operating through the crank-arm 18 and rod 17 to push the catch 15 out of engagement with the vertical post, and the strong spring 12 will exert its tension to return the parts to their normal position and close the doors. The catch may be released in another way, by pulling up on the hand-lever 25, thereby operating through the rod 26, crank 20, rock-shaft 19, crank 18^a, and rod 17 to throw said catch out of engagement with the post 11.

By means of the construction above described it will be apparent that the doors may be quickly thrown open and instantly closed by means within convenient reach of the fireman, engineer, or other attendant. This operation will occupy but a few seconds, and the fire may be readily kept up without the necessity of having the doors open for any considerable period of time. This is very important, and for the reason that it is almost impossible to keep a sufficient head of steam in a locomotive for propelling a heavy train up a long grade where the doors are allowed to remain open and the boiler-tubes exposed to cold drafts of air.

By means of my invention the fireman, having filled his shovel with coal, steps to the

doors of the furnace and pressing upon the top of the post 11 quickly throws open the doors and feeds coal to the furnace, when, by letting his shovel fall upon the top of the post 23 or by pressing thereon with his foot, the doors are instantly closed.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, what I claim is—

1. A furnace door, comprising twin halves or sections each composed of front and rear plates and mounted in suitable horizontal tracks or ways adapting said sections to move laterally in a horizontal plane, in combination with the pivoted and spring-actuated levers arranged with their ends between said plates and slotted to engage pins also arranged between said plates for operating the door sections, and one or more foot levers for operating said door levers, substantially as specified.

2. A furnace door made of two halves or sections and arranged to move in a horizontal plane between suitable ways or tracks, in combination with a pair of pivoted levers connected with said sections for opening and closing the same, a forwardly extending horizontal lever for operating said door levers, a foot post or standard connected with said horizontal lever, and extending to a point within convenient reach of the attendant, and a spring-actuated catch for holding the door sections open, substantially as specified.

3. The combination with a furnace door made in two sections, of two vertical levers for opening and closing the same, a horizontal lever connected with said vertical levers for operating the same, a spring-actuated catch for holding the door sections open, and a releasing mechanism consisting of a rock shaft and a push rod connected with said spring-actuated catch for closing the door sections, substantially as specified.

4. The combination with a furnace door made in two sections and provided with trunnions or pivots, of two vertical levers, slotted at their upper ends to engage said pivots, a pair of pivoted links or toggle levers connecting the lower ends of said vertical levers, a horizontal lever for operating said toggle lever, a foot post for depressing the horizontal lever, and a catch for engaging said foot post, as and for the purpose substantially specified.

5. A furnace door made in two sections, adapted to be moved laterally in a horizontal plane, means for opening and closing said door sections, and a pivoted catch for holding the same open, in combination with a rock shaft provided with a crank arm, a rod interposed between said crank arm and the pivoted catch, and means for operating said rock shaft, in the manner substantially as specified.

6. A furnace door made in two sections, means connected therewith for opening and

closing the same, and a spring-actuated catch for holding the door sections open, in combination with a rod for releasing the catch, a rock shaft provided with a crank arm for operating said rod, a vertically extending rod
5 connected with a crank arm on the rock shaft and passing up through the floor or platform, and a pivoted hand lever connected to said vertical rod, and located within convenient

reach of the engineer or fireman, substantially as specified.

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

DAVID E. ROBINSON.

Witnesses:

GEORGE M. BALL,
ELBIN L. MCDUGAL.