

No. 652,294.

Patented June 26, 1900.

J. P. SHAFER.
FURNACE DOOR.

(Application filed Oct. 4, 1899.)

(No Model.)

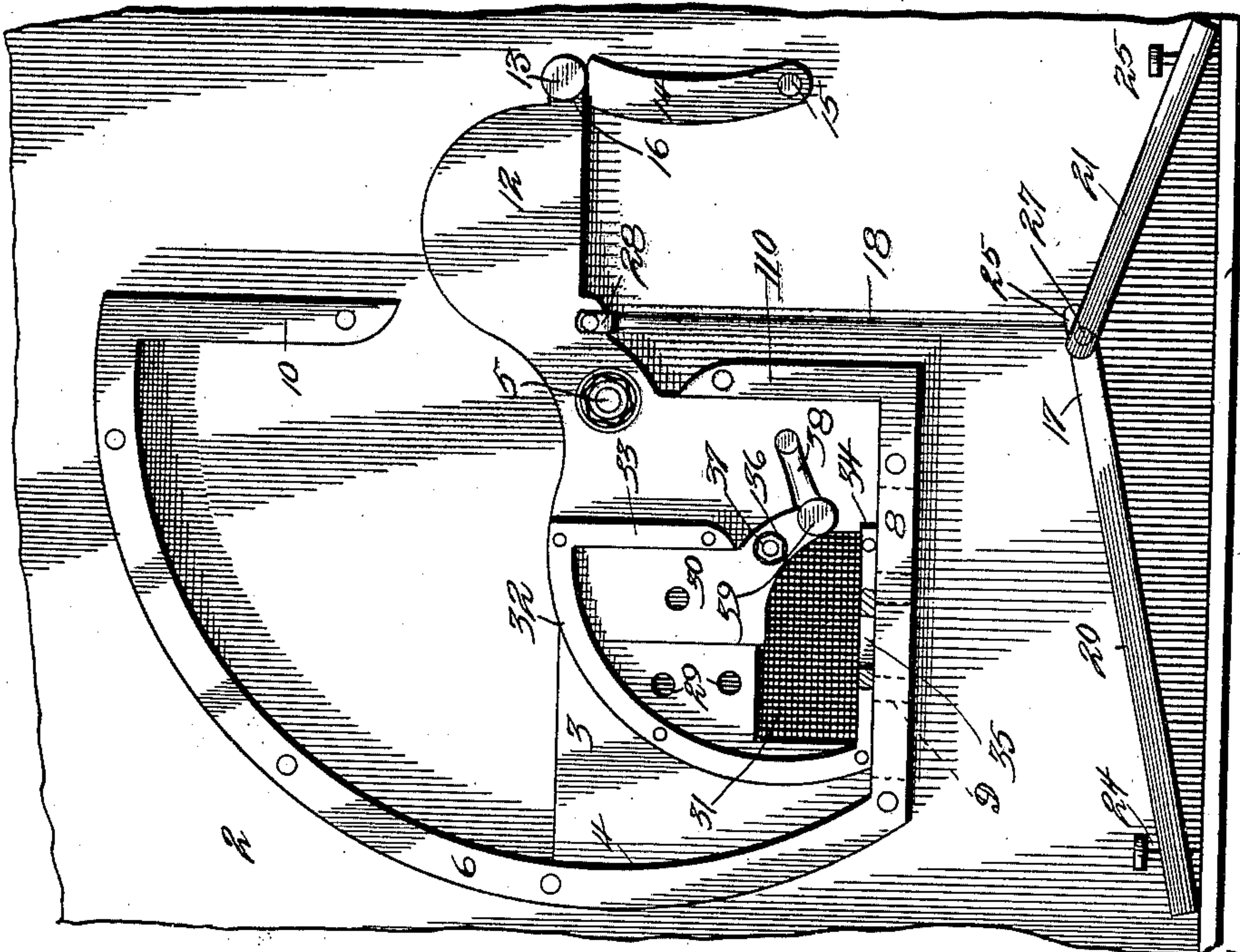


Fig. 2.

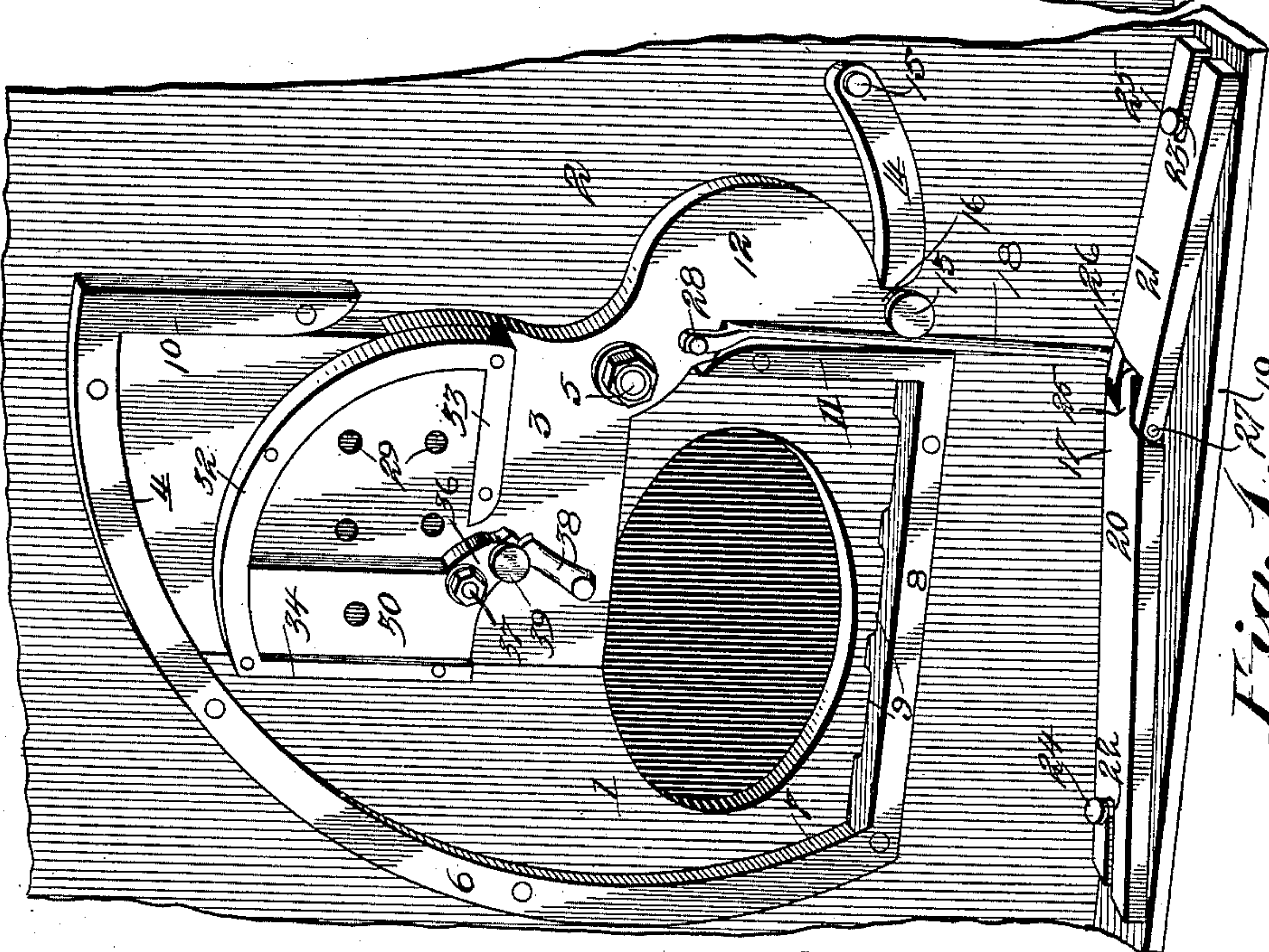


Fig. 1.

Witnesses
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UNITED STATES PATENT OFFICE.

JACOB P. SHAFER, OF TERRA ALTA, WEST VIRGINIA, ASSIGNOR OF ONE-HALF TO WILLIAM H. MCKNIGHT, OF SAME PLACE.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 652,294, dated June 26, 1900.

Application filed October 4, 1899. Serial No. 732,536 (No model.)

To all whom it may concern:

Be it known that I, JACOB P. SHAFER, a citizen of the United States, residing at Terra Alta, in the county of Preston and State of West Virginia, have invented a new and useful Furnace-Door, of which the following is a specification.

The invention relates to improvements in furnace-doors.

The objects of the present invention are to improve the construction of furnace-doors for locomotives, stationary engines, and the like and to provide a simple, inexpensive, and efficient device capable of enabling a furnace-door to be readily opened and closed by the foot of the operator, so that his hands will be left perfectly free for supplying fuel, whereby the same may be quickly placed in the fire-box, thereby effecting a great saving in labor, time, fuel, and heat.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a perspective view of a portion of the front wall of a furnace provided with a door constructed in accordance with this invention. Fig. 2 is a front elevation of the same.

Like numerals of reference designate corresponding parts in both figures of the drawings.

1 designates an opening formed in the front wall 2 of a furnace and communicating with the fire-box and adapted to permit fuel to be introduced into the same when a pivoted door 3 is swung upward, as illustrated in Fig. 1 of the accompanying drawings. The opening 1 is lifted, and the vertically-swinging door 3, which is approximately rectangular, is provided with a convexly-curved edge 4 at its outer end and is pivoted at its inner end near its upper edge by a bolt 5 or other suitable fastening device. The curved free edge of the pivoted door is supported by a curved guide 6, arranged concentric with the pivot 5 and forming a groove 7 at its inner edge for the reception of the free end of the door, as clearly illustrated in Fig. 1 of the

accompanying drawings. The door is supported in its closed position by a horizontal ledge 8, located a short distance below the bottom of the opening 1 and provided with a series of apertures 9, adapted to permit the escape of coal crushed by the falling of the door. Should any particles of coal remain on the ledge, the door in falling will crush the same and the dust will escape through the said apertures 9. The flange and the ledge may consist of a frame bolted or otherwise secured to the wall of the furnace and provided with upper and lower vertical portions or flanges 10 and 11, the upper flange 11 forming a stop for the door when the latter is open and the lower flange serving to incase the edge of the door when the same is closed. The door is provided with a weighted counterbalancing-arm 12, extending horizontally from the upper portion of the inner end of said door when the latter is closed and designed to be weighted to within a few pounds of the weight of the door, so that the latter may be opened easily by the means hereinafter described and will close quickly when released by the operator. The weighted counterbalancing-arm, which is approximately segmental, is provided at its outer end with a knob 13, and it has a lower straight edge which is adapted to be engaged by a pivoted arm or button 14, whereby the door is locked against movement. The arm or button 14 is pivoted at one end at 15, and it is adapted when the door is closed to be swung upward beneath the outer end of the counterbalancing-arm, as illustrated in Fig. 2 of the accompanying drawings, whereby the door is locked in its closed position. The weighted arm is provided at its outer end with an extension 16, and when the door is opened the pivoted button is adapted to engage the said extension, as illustrated in Fig. 1 of the accompanying drawings.

The door is opened by means of a treadle 17, which is connected with it by a rod 18. The treadle, which is adapted to be readily depressed by the foot of the operator, is mounted upon a horizontal flange or ledge 19, located at the bottom of the front wall of the furnace, and the said treadle is composed of

sections 20 and 21, having their outer ends slotted or bifurcated at 22 and 23 for the reception of headed pins or studs 24 and 25, which are adapted to prevent the treadle from getting out of position when a train is running rapidly. The inner end of the section 20 is reduced to form a tongue 25, which fits in a recess or bifurcation 26 of the inner end of the section 21, and the lower end of the rod 18 is bent at an angle to form a pivot 27, which passes through the inner ends of the sections of the treadle and forms a pintle for the same. The upper end 28 of the rod 18 is bifurcated and pivoted to the inner portion of the counterbalancing-arm adjacent to the pivot 5. When the treadle is depressed, the door is quickly opened, and as soon as the foot of the operator is removed from it the door drops quickly back to its closed position and is open only a short time and while the fuel is being actually introduced into the furnace.

The door is provided with perforations 29 to prevent it from warping and also to furnish light at night, and it has a supplemental door 30, adapted to cover an opening 31 of the door 3 and designed to be opened for raking or poking the furnace. The door 30 is supported by a curved guide or flange 32, having vertical and horizontal extensions 33 and 34 and adapted to support the door and prevent the same from warping. The free edge of the door 30 is beveled to fit the groove formed by the flange 32, and the horizontal extension thereof is provided with an aperture 35 to permit the escape of any dust or ashes accumulating on the horizontal flange 34. The vertical flange 33 forms a stop for the door, which is provided with an arm 36, having a perforation for the pivot 37 and adapted to be engaged by a pivoted button 38 to hold the door in its open and closed positions. The arm 36 is provided with a knob 39, and the knobs 13 and 39 are adapted to be readily grasped when it is desired to open the doors by hand.

It will be seen that the furnace-door is simple and comparatively inexpensive in construction, that it is adapted to be quickly opened and closed by the foot of the operator, and that it will effect a saving in time, labor, fuel, and heat. It will also be seen that the door 3 in closing will crush any coal accumulating on the ledge 8 and that the dust will escape through the openings or apertures 9.

Changes in the form, proportion, size, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

What is claimed is—

1. In a device of the class described, the combination with a furnace, of a door pivoted flat against one end of the furnace and arranged to oscillate across the same and pro-

vided with a rigid counterbalancing-arm extending beyond the pivot, and operating mechanism connected with the rigid arm and adapted to open and close the door, substantially as described.

2. In a device of the class described, the combination with a furnace, of a door pivoted flat against the adjacent wall of the furnace and arranged to oscillate on the same and provided with a rigid counterbalancing-arm, and a treadle connected with the arm and composed of two sections, substantially as described.

3. In a device of the class described, the combination with a furnace, of a door pivoted flat against the adjacent wall of the furnace and arranged to oscillate on the same and provided with a rigid counterbalancing-arm extending from one end of it, operating mechanism for opening the door, and a pivoted locking device arranged to engage the arm, whereby the door is held in its open and closed positions, substantially as described.

4. In a device of the class described, the combination with a furnace, of a door pivoted flat against the adjacent wall of the same and arranged to oscillate thereon, and provided with an arm arranged parallel with the said wall, and a treadle extending along the bottom of the said wall and composed of sections connected with the said arm, substantially as described.

5. In a device of the class described, the combination with a furnace, of a door pivoted at one end to the same and provided with a rigid counterbalancing-arm extending beyond the pivot, said door having its free end provided with a curved edge, a curved guide mounted on the furnace and receiving the free end of the door, and operating mechanism connected with the arm, substantially as described.

6. In a device of the class described, the combination with a furnace having a curved guide and provided with a horizontal supporting-ledge having apertures, of a pivoted door mounted on the furnace and provided with a rigid counterbalancing-arm, and operating mechanism connected with the arm, substantially as described.

7. In a device of the class described, the combination with a furnace provided at the bottom of its opening with a supporting-ledge having apertures, of a pivoted door mounted on the furnace and arranged to swing vertically, said door being arranged to strike the ledge, whereby any coal remaining on the same will be crushed and caused to escape through the apertures, substantially as described.

8. In a device of the class described, the combination with a furnace, and a pivoted door provided with an arm, of a treadle composed of two sections provided at their outer ends with slots, pins arranged in the slots and retaining the treadle in position, and a rod

connected with the arm and with the inner ends of the sections, substantially as described.

9. In a device of the class described, the
5 combination with a furnace, of a door pivoted flat against the adjacent wall thereof and arranged to oscillate thereon, and having an opening, a supplemental door pivoted flat against the main door and arranged to oscillate thereon to cover and uncover the opening, and a flange or bar mounted on the main

door and forming a curved guide receiving and supporting the supplemental door, substantially as described.

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

JACOB P. SHAFER.

Witnesses:

T. L. RIGG,
O. C. CRANE.