No. 893,178. PATENTED JULY 14, 1908.

P. LULI.

FURNACE DOOR.

APPLICATION FILED FEB. 15, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

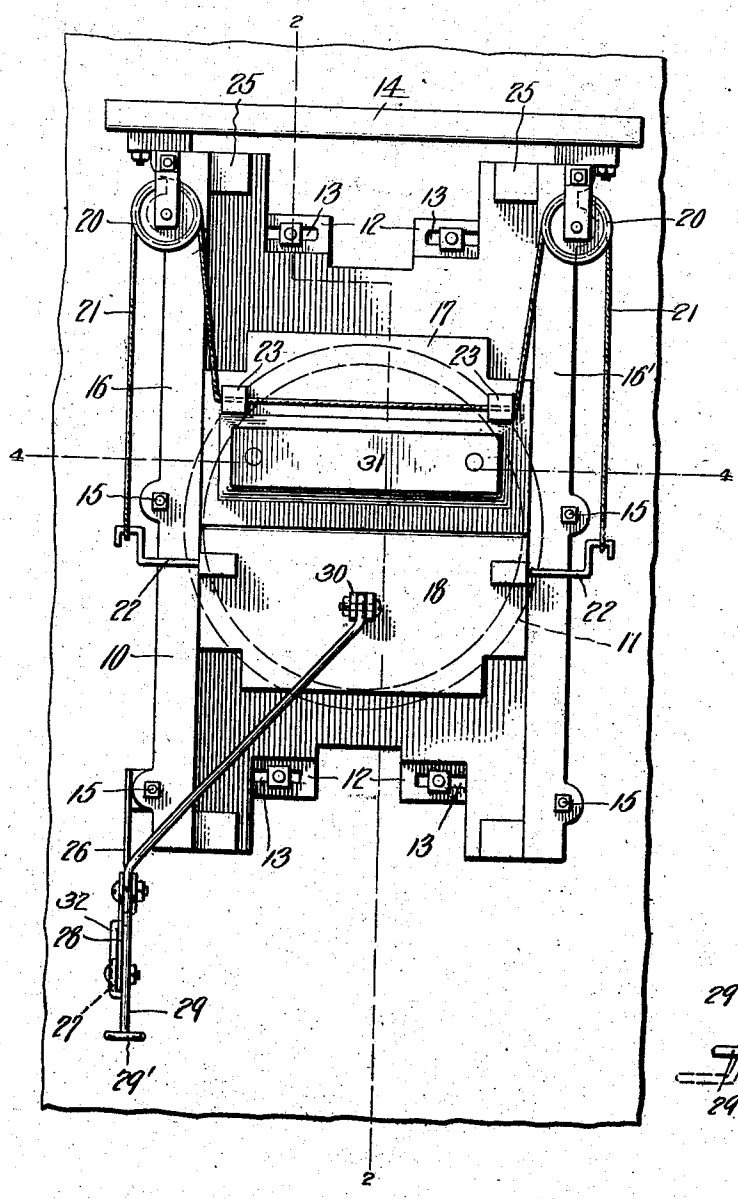
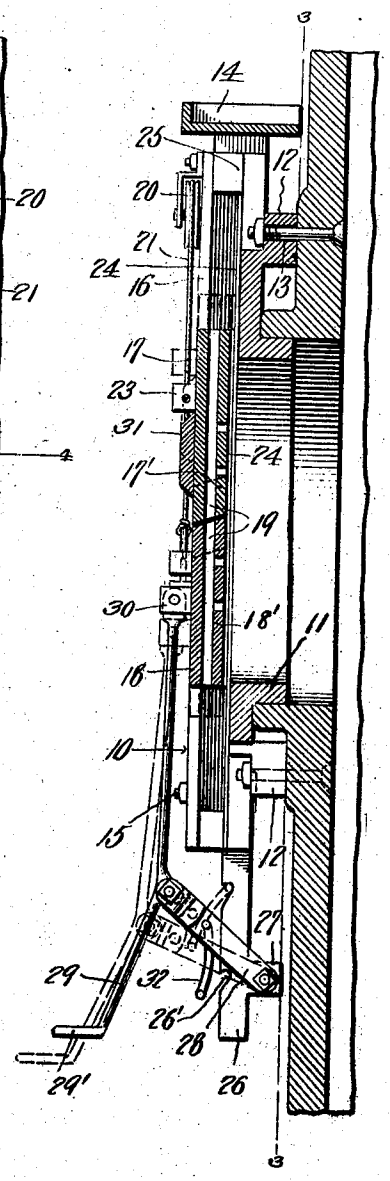


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

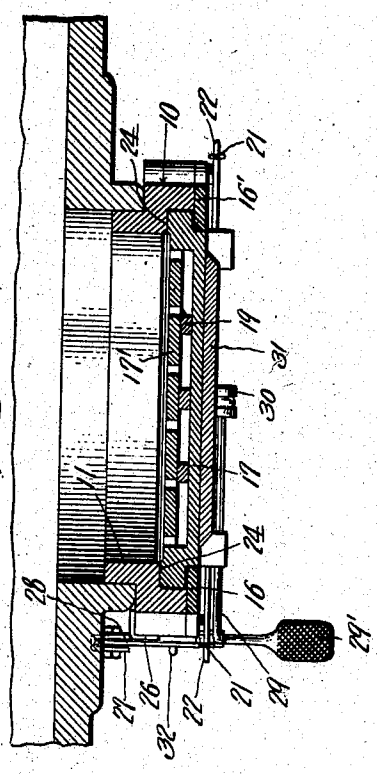


Fig. 5.

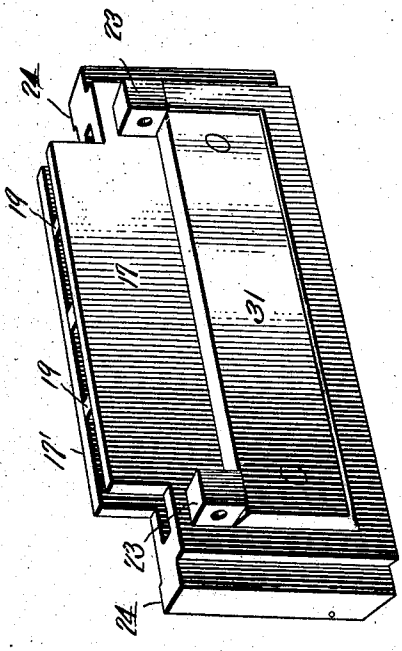
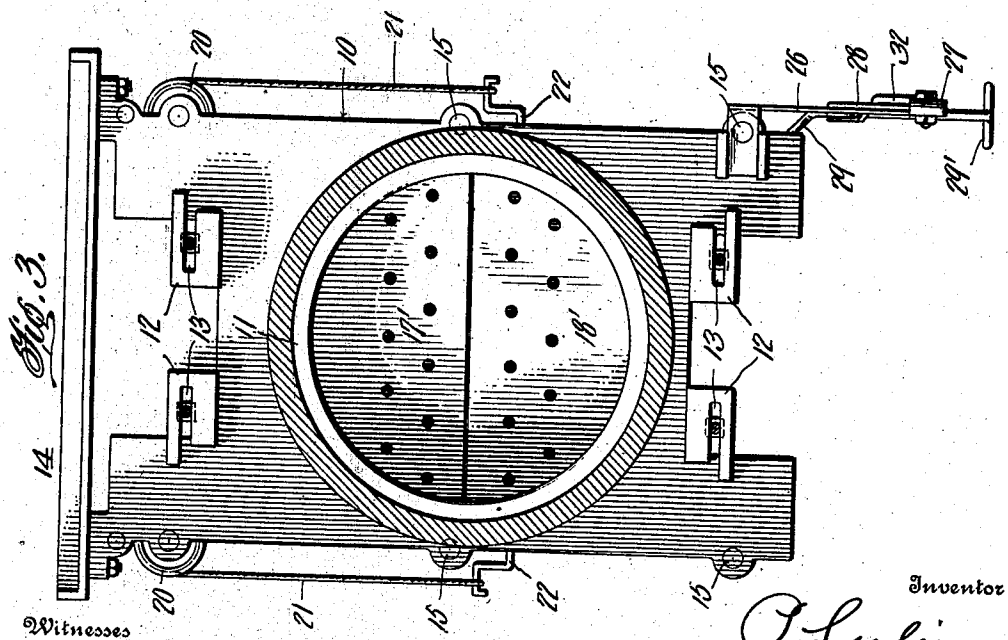


Fig. 3.



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PLEM LULI, OF KENT, OHIO.

FURNACE-DOOR.

No. 893,178. Specification of Letters Patent. Patented July 14, 1908.

Application filed February 15, 1908. Serial No. 416,127.

To all whom it may concern:

Be it known that I, PLEM LULI, a citizen of the United States, residing at Kent, in the county of Portage and State of Ohio, have invented certain new and useful Improvements in Furnace-Doors, of which the following is a specification.

This invention relates to door mechanism for closing the furnaces of steam boilers, or the like, and has particular reference to apparatus embodying a peculiar and advantageous structure of the frame work, the structure of the movable door members, and a peculiar operating means whereby the doors may be conveniently operated by a foot of the fireman.

For a full understanding of the invention, including its construction and characteristic advantages, reference is to be had to the following detail description and to the accompanying drawings in which,

Figure 1 is a front elevation showing the door members closed; Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a rear elevation of my invention as viewed from the plane indicated by the line 3—3 of Fig. 2; Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 1, and Fig. 5 is a detail perspective of the upper door member.

Similar parts are referred to in this description and indicated on the several views of the drawings by the same reference characters.

The invention in its preferred embodiment comprises a door frame 10, having an inwardly projecting flange 11 bounding the frame opening leading to the furnace. Said frame may be constructed of any suitable material and in any convenient manner, and the main portion of the same preferably is made in one piece. Near the top and bottom of the frame are adjustment lugs 12, by means of which the frame may be secured in place on the front of the furnace as by bolts passed through slots 13, the slots being provided for the purpose of adjustment. If desired a shelf 14 may be attached to the upper end of the frame for the reception of an oil can, tools, or the like. Secured to the front of the frame proper, as by bolts 15 are plates 16 and 16′, which together with the edges of the frame form grooves or slides in which the door members operate.

The door is composed of a vertical section 17 and a lower section 18 slidably movable in the aforesaid grooves, and connected for simultaneous coöperation toward and from each other in the same vertical plane. Each of the door sections or members is composed of inner and outer plates spaced by means of vertical ribs 19. The inner plate 17′ of the upper section and the inner plate 18′ of the lower section are perforated, and the outer plates of the door sections are imperforate. The free edge of each section, namely the upper edge of the upper member and the lower edge of the lower member, is open, that is to say, the intervening space between the several plates of the section is in communication with the atmosphere and also with the perforations of the inner plate. By this construction cool air may pass through the door into the furnace, whereby the door members are prevented from abnormal heating and warping.

Located near the top of the frame and journaled for rotation thereon are guide members 20, one on each side or edge of the frame. Each of these guides is so mounted that its bracket serves to hold the guide in place and to prevent displacement of the flexible member 21 operating thereover. Said flexible member, consisting of a metallic cable or chain, is secured at one end of the lower door member 18 as by means of an arm 22 and extends therefrom to and over the guide 20, thence downward to the upper door section 17, thence over the other of the guides, and thence downward to and is secured to the opposite end of the lower door section 18. As indicated herein said connection is continuous from one arm 22 to the other, and is threaded through lugs 23 on the upper door member 17. If preferred, however, separate flexible connections might be employed on the several sides of the apparatus each extending from the arm 22 to the lug 23, the operation being the same for all practical purposes. The arrangement shown, however, affords a freer operation of the doors under all conditions. On each side and on the front of the main portion of the frame are arranged vertical rabbets 24, and similar rabbets are formed on the rear contacting edges of the several door sections, the purpose of the said construction being to slightly space the door members from the main body of the frame to facilitate the operation thereof. Stop blocks or buffers 25 are located at the top and bottom of the frame and

against which the door members are adapted to impinge during the opening movement thereof. The corners of the door members are preferably cut away to receive the said buffers in order to reduce the entire length of the frame and also to reduce the length of the contacting portions of the doors.

Any suitable means may be connected to the lower door section 18 for the purpose of lowering it and thereby at the same time elevating the upper section 17 through the flexible connection 21. The mechanism herein shown for the accomplishment of this purpose comprises a bracket 26 secured near the lower end of the frame and extending vertically downward. Said bracket 26 is provided with a lug 27 to which is pivoted a link 28 for operation in a plane which is vertical and at right angles to the plane of the frame 10. An actuator 29 is pivotally secured at 30 to the lower section 18 of the door, and extends downward and outward therefrom and is pivotally connected to the outer end of the said link 28 and extends thence downwardly and is provided with the foot piece 29′. This actuator 29 is substantially rigid and is bent at an intermediate point to form an eye connection for the link 28. As the fireman approaches the furnace for the purpose of introducing fuel he will step upon the foot piece 29′ causing the same and the lower door section 18 to move downwardly. The upper section 17 is sufficiently heavier than the lower section to cause the same to drop and thereby lift the lower section upon release of the actuator 29. This additional heft may be provided by any suitable means as by a weight 31 secured to said member.

The bracket 26 may be provided with one or more notches 26′. The link 28 has pivoted thereto a dog 32 adapted to coöperate with any one of said notches 26′ when it is desired to hold the doors in a partially or entirely open position as for the purpose of banking the fire or for cleaning the same. Under ordinary circumstances, however, the dog 32 will be thrown so as to insure prompt closure of the door sections for the protection of the boiler.

Having thus described the invention, what is claimed as new, is:

1. In furnace door mechanism, the combination of a frame having an intermediate furnace opening, upper and lower door sections vertically slidable in said frame to close said opening, guide members near the top of said frame, flexible means connected to and extending from the upper door section over said guides and thence to and secured to the lower door section, and foot operated means connected to the lower door section for lowering the same and for lifting the upper section through the flexible means aforesaid.

2. In furnace door mechanism, the combination of a frame having an opening therethrough, upper and lower door sections vertically slidable in said frame to close said opening, the upper section being heavier than the lower section, guides journaled near the top of the frame, a flexible connection secured to one end of the lower door section and extended thence over one of said guides, thence to the upper door section, thence over the other of said guides, and thence to and secured to the opposite end of the lower door section, and means to lower the lower door section whereby the upper section is lifted by the connection aforesaid.

3. The hereindescribed furnace door comprising a plurality of coöperating sections, the adjacent edges of the sections abutting with each other and the remote edges being free, each of the sections consisting of spaced inner and outer plates, the inner plate being perforate, the outer plate being imperforate, and the perforations of the inner plate communicating through the space between the plates with the atmosphere at the free edge of the section.

4. In furnace door mechanism, the combination of a frame, a door member slidable vertically therein, means to move said door member upwardly, and means for moving the door member downwardly, the latter means comprising a bracket secured to the frame, a link pivoted to said bracket, a rigid actuator pivoted at one end to said door and at an intermediate point to said link, and the other end of said actuator having a foot piece.

5. In furnace door mechanism, the combination of a frame, a door member slidable vertically therein, means to move said door member upwardly, and means for moving the door member downwardly, the latter means comprising a bracket secured to the frame, a link pivoted at one end to said bracket for movement in a vertical plane at right angles to the plane of the said frame, said bracket being notched, an actuator pivoted at its upper end to said door and at an intermediate point to the outer end of said link, and being provided at its lower end with a foot piece, and a dog pivoted to said link for coöperation with a notch of the bracket, for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PLEM LULI.

Witnesses:
ROBERT REED,
W. L. FOX.