

H. BENTON.
FURNACE.
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1,328,116.

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Fig. 1.

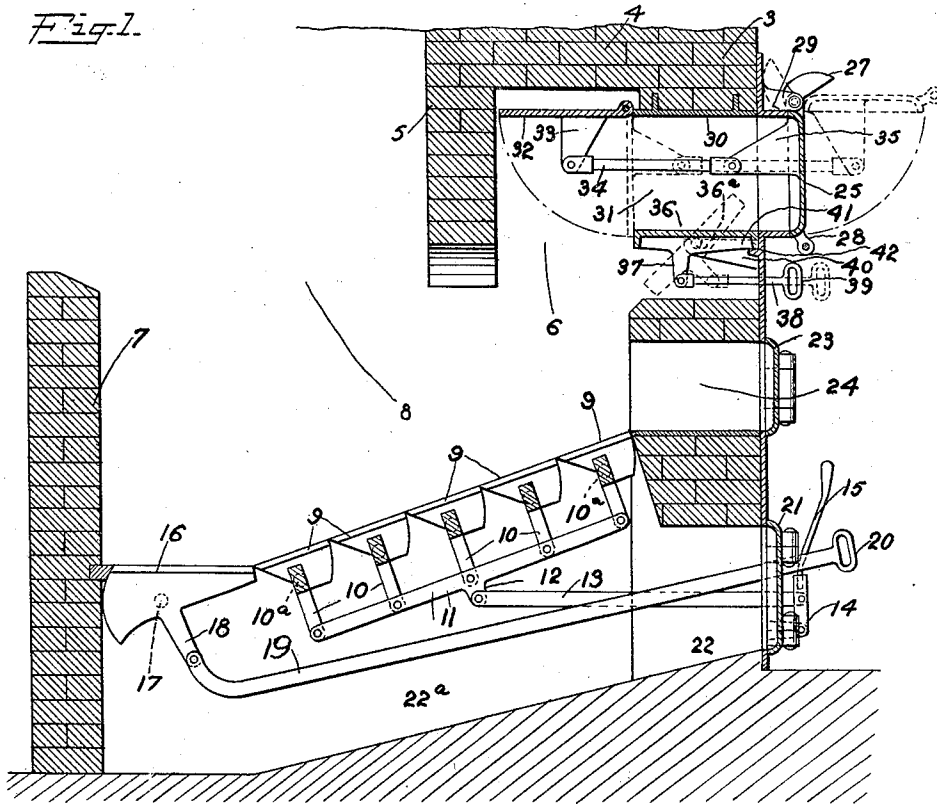
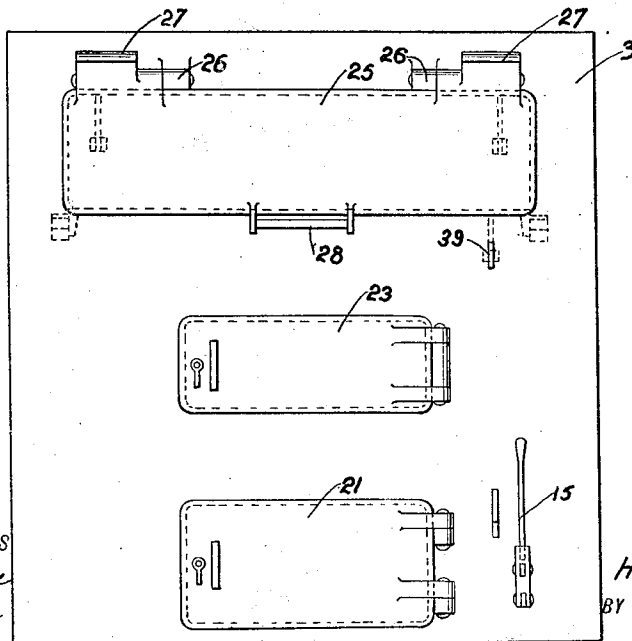


Fig. 2.



WITNESSES
George A. Blume
W. Harrison

INVENTOR
HENRY BENTON
BY *M. M. M. Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY BENTON, OF ELIZABETH, NEW JERSEY.

FURNACE.

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To all whom it may concern:

Be it known that I, HENRY BENTON, a citizen of the United States, and a resident of Elizabeth, county of Union, and State of New Jersey, have invented a new and Improved Furnace, of which the following is a full, clear, and exact description.

My invention relates to furnaces of a type suitable for heating boilers and the like, and adapted to be fired by hand.

Stated more in detail, my invention comprehends a furnace of the kind just mentioned, and in which coal is used as the fuel, provision being made for giving the coal a preliminary heating, thus reducing it to coke before it is carried into the flames, the heating of the coal serving to drive off the volatile matter present so as to reduce it to gases, these gases being conducted into the flames. Reference is made to the accompanying drawings forming a part of this specification, and in which like letters indicate like parts throughout the several figures.

Figure 1 is a substantially central section through my improved furnace.

Fig. 2 is a front elevation of the same.

The front wall of the furnace is shown at 3, and extending rearwardly from it is masonry 4. Connected with this masonry and extending downwardly therefrom is a wall 5 having the form of an arch. Between the arch 5 and the front wall 3 is a compartment 6 for the purpose hereinafter explained.

The rear wall is shown at 7. Between this rear wall and the arch 5 is a space 8, shown more particularly in Fig. 1 and serving as a throat through which all of the flames travel obliquely upward. A number of grate bars are shown at 9, and connected with them are arms 10, whereby they may be actuated. These grate bars are provided with journaled necks 10^a. The connecting bar 11 is journaled to all of the arms 10 and is provided with a laterally extending portion 12. Pivotally connected with this laterally extending portion 12 is a bar 13, which extends out in front of the furnace, and is pivotally connected to a lever 14. This lever has an upwardly extending handle 15, whereby it may be actuated in order to move the bars 13 and 11, and thus rock the grate bars. An ash plate 16 is journaled upon the furnace walls at 17, and is provided with a downwardly extending arm 18. Pivotally connected with this arm is a bar 19, provided with a handle 20. The opera-

tor, by grasping the handle 20 and pulling it out in the general direction of its length, can cause the ash plate 16 to tilt. An ash door is shown at 21, and associated with it is a doorway 22, leading to the ash pit 22^a. Above the door 21 is a door 23 normally closing a doorway 24. If desired, the fuel may be thrown into the furnace through the doorway 24, and this door may also be used in kindling fires as well as for facilitating inspection of the grate bars.

I provide a door 25 which is mounted upon hinges 26, and is provided with counter-weights 27, the latter extending upwardly from it as indicated in Fig. 1. The door 25 is further provided with a handle 28; the operator by grasping this handle can open or close the door as may be understood from the dotted and full lines in Fig. 1. Mounted upon the front wall 3 of the furnace is a neck 29, made of metal and supporting the door 25. Disposed adjacent the neck 29 is a jamb 30 and below this jamb is a space 31. Hinged upon the inner edge of the jamb 30 is a door 32, which I designate as the inner door. It carries an arm 33 and pivotally connected with this arm is a link 34, this link being pivotally connected with an arm 35 carried by the door 25. The parts just mentioned are so connected and arranged that whenever the door 25 is opened the door 32 is closed, and whenever the door 25 is closed the door 32 is opened, as indicated by full and dotted lines in Fig. 1. A dumping plate 36 is journaled at 36^a, and adapted to be tilted. This plate is provided with a downwardly extending arm 37. A rod 38 is pivoted to this downwardly extending arm and extends out in front of the furnace, being provided with a handle 39. The operator, by grasping the handle 39 and pushing the rod 38 inward or drawing it out can tilt the dumping plate 36. The dumping plate 36 is supported by a pair of arms, one of which is shown at 40, and is provided with a portion 41, adapted to rest upon a ledge 42. When the rod 38 is pushed inwardly to the limit of its travel, the ledge 42 is engaged by the adjacent portion of the dumping plate 36 so that this plate rests in a horizontal position, as indicated in Fig. 1. When, however, the rod 38 is drawn outwardly, as indicated by dotted lines in Fig. 1, the dumping plate 36 is thereby tilted so as to occupy the position indicated by dotted lines in Fig. 1.

In practice, the operator, by grasping the handle 28 and swinging the door 25 upwardly so as to close the door 32, leaves the furnace in such condition that the door 32 extends vertically downward so that fuel cannot be thrown into the furnace; this being done while the dumping plate 36 occupies its horizontal position.

The operation of my device is as follows:
The various movable parts normally occupy the positions indicated by full lines in Fig. 1. The door 25 being closed and the rod 38 being at the inward limit of its travel so that the dumping plate 36 is horizontal.

Suppose now, that the operator wishes to feed coal into the furnace through the door-way 31. He grasps the handle 28 and opens the door 25 by swinging it upwardly so as to close the door 32. He then shovels the coal into compartment 31, the door 32, and the dumping plate 36, effectively preventing it from dropping directly into the furnace, with the coal now resting upon the dumping plate 36, the operator closes the door 25 by swinging it downwardly into its normal position. The coal resting upon the dumping plate 36, is now subjected to the heat of the furnace, and gradually becomes coked. During this operation the volatile parts of the coal are driven out in the form of combustion gases. These gases pass obliquely downward under the arch 5, and directly into the flames within the furnace. They are thus completely consumed so that little or no smoke can make its escape. The coal being completely coked, the operator grasps the handle 39 and draws it outwardly as indicated by dotted lines in Fig. 1. This actuates the dumping plate 36 so that it assumes the position indicated by dotted lines in this figure. The coke resting upon it, therefore, slides off down upon the grate bars 9, or at least upon the fuel bed of the furnace. At the time when the dumping plate 36 is thus actuated in order to release the coke, as just described, the furnace door 25 is preferably closed, the inner door 32 being consequently open.

The fireman is protected from excessive heat, because when the door 25 is open, the door 32 acts as a baffle to prevent the heat from going out; and when the door 32 is open so that the heat can readily pass from the space 6 into the compartment 31, the door 25 being closed does not allow the heat to get out of the furnace. Thus the fireman can work with a considerable degree of comfort.

If for any reason the operator does not desire to disturb the door 25, and yet wishes to add more fuel, there is nothing to prevent him from opening the door 23 for this purpose.

Under normal conditions, however, I prefer to feed all of the coal through the space

31, forming it in batches one at a time, each batch resting upon the dumping plate 36 until it becomes completely coked and finally discharging it into the hottest portion of the furnace. By doing this and especially by giving the gases of combustion driven off from it by the coking process, such direction that they must pass under the arch 5, the combustion of the gases is rendered very thorough. My device is, therefore, quite serviceable as a smoke consuming furnace.

I do not limit myself to the particular mechanism here shown, as variations may be made therein without departing from the spirit of my invention.

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

1. In a device of the character described, the combination of a dumping plate, an inner door disposed adjacent said dumping plate and mounted to swing, an outer door disposed adjacent said dumping plate and likewise mounted to swing, connections from said inner door to said outer door for enabling said inner door to be actuated by movements of said outer door, and mechanism controllable at the will of the operator for actuating said dumping plate.

2. A device of the character described, comprising a furnace provided with a doorway and with a neck bounding said doorway, a door journaled upon said neck, another door located in the furnace at a distance from said first mentioned door, a connecting member extending from said first mentioned door to said second mentioned door and so arranged that closing said first mentioned door causes said second mentioned door to open, and a dumping plate disposed intermediate said doors, and means controllable at the will of the operator for actuating said dumping plate.

3. In a device of the character described, the combination with a furnace having a wall and a doorway, of a dumping plate located within said furnace and partly bounding said doorway, means controllable at the will of the operator for tilting said dumping plate, an inner door journaled adjacent said doorway and adapted to close the same, another door journaled adjacent said doorway and adapted to close the same, connections from one of the said doors to the other for enabling the closing movement of said second mentioned door to open said first mentioned door, and counter-weights connected with one of said doors for balancing the same.

4. A device of the character described, comprising a furnace having a doorway, a dumping plate disposed adjacent said doorway and heated by the furnace, mechanism controllable at the will of the operator for

tilting said dumping plate in order to discharge coke or the like resting upon it so as to feed the same into a hot portion of the furnace, a door controllable by hand for
5 normally closing said doorway, another door disposed adjacent said doorway and normally leaving the same open yet capable of closing said doorway, and connections from
10 said first mentioned door to said second mentioned door for enabling movements of said first mentioned door to cause movements of said second mentioned door.

5. In a furnace, the combination of a wall provided with a doorway, a plurality of
15 doors, each mounted to close said doorway,

a connecting member extending from one of said doors to the other for enabling the closing movement of one of said doors to open the other of said doors, a dumping plate disposed adjacent said doorway, and heated by
20 the furnace, means controllable at the will of the operator for tilting said dumping plate, and a wall member disposed adjacent said doorway and spaced therefrom, said wall member having suitable form and being
25 so positioned as to direct into the hot portion of the furnace the gases of the combustion driven from fuel resting upon said dumping plate.

HENRY BENTON.