

No. 712,386.

Patented Oct. 28, 1902.

H. B. A. KEISER.

CONTINUOUS BILLET HEATING FURNACE.

(Application filed Jan. 25, 1901.)

(No Model.)

2 Sheets—Sheet 1.

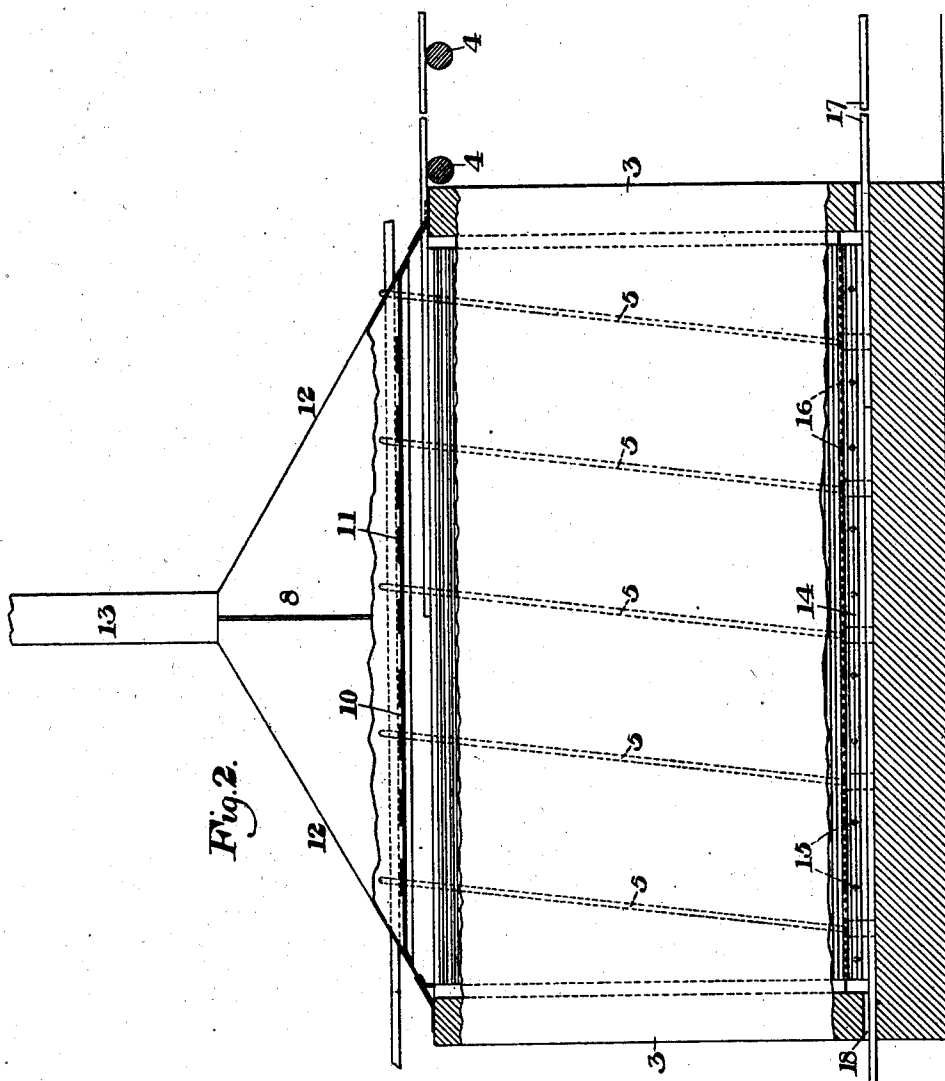


Fig. 2.

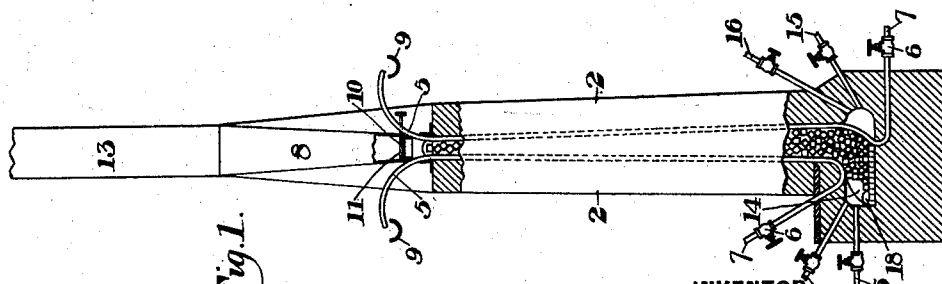


Fig. 1.

WITNESSES

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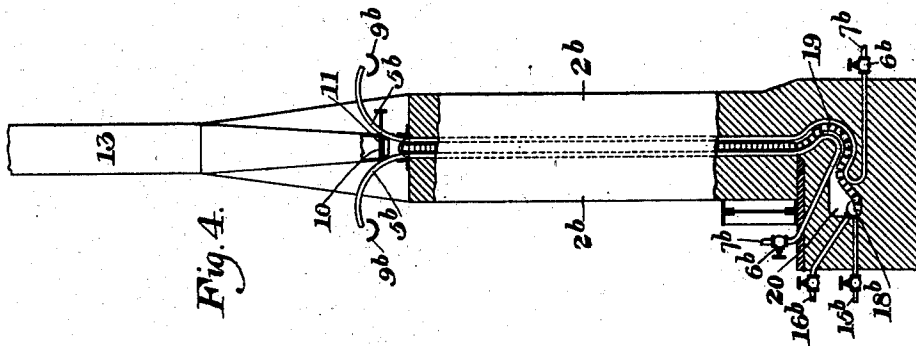
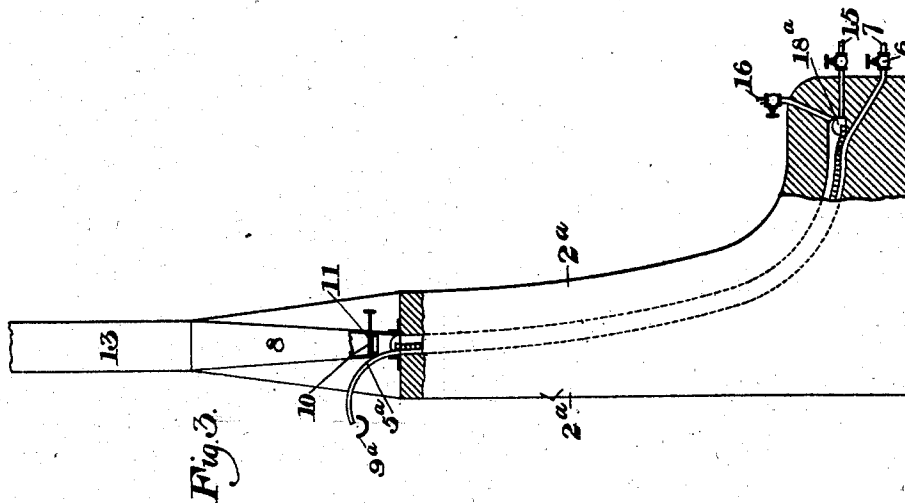
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2 Sheets—Sheet 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY B. A. KEISER, OF EDGEWOOD, PENNSYLVANIA.

CONTINUOUS BILLET-HEATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 712,386, dated October 28, 1902.

Application filed January 25, 1901. Serial No. 44,697. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. A. KEISER, of Edgewood, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Continuous Billet-Heating Furnace, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation, partly in vertical transverse section, of a billet-heating furnace constructed in accordance with my invention. Fig. 2 is a side elevation of the same, partly broken away; and Figs. 3 and 4 are views similar to Fig. 1, showing a modified form.

My invention relates to the continuous heating of billets or bars and is designed to increase the capacity of furnaces therefor and avoid the costly skewback-roof construction of horizontally-extending billet-furnaces as now built.

In the present construction, where the billets lie side by side and move each other along, they are liable to rise upon the top of each other, and hence the furnaces are of very limited capacity and wasteful of fuel.

My invention is designed to overcome the many difficulties of the horizontal furnace now used; and it consists in a furnace in which the billets or bars rest upon each other by gravity and descend either vertically or at an angle.

It further consists in vertically-extending guiding-walls, preferably in the form of water-cooled guides, though plain refractory guiding-walls may be used, and in the construction and arrangement of the parts, as hereinafter more fully described, and set forth in the claims.

In the drawings, referring to the form of Figs. 1 and 2, 2 2 represent the vertical side walls, and 3 3 the end walls, of a vertical heating-furnace, the furnace-chamber of which is preferably enlarged downwardly, as shown. This furnace-chamber is of a length sufficient to receive the billets, which are fed in over rollers 4 4 and through an opening at the top of one of the end walls, as shown in Fig. 2. The inner faces of the side walls are provided with inclined vertical guides, consisting of

water-pipes 5, each of which extends outwardly through the side wall at the bottom and is provided with a valve connection 6 to a supply-pipe 7. The inclination of the water-pipes serves to shift the point of contact between the pipes and the billets, thereby enabling the billets to be more uniformly heated. The upper end of each pipe extends outwardly through the side of the roof 8 and empties into a trough 9, a pair of which extends along each side of the roof. The top of the furnace-chamber is formed of a plate 10, having dampers 11 on it, which dampers may be regulated from the sides, so as to distribute the heat in the desired way throughout the furnace-chamber. The ends 12 of the roof are inclined inwardly toward each other and are joined to the stack-flue 13. The furnace-chamber connects at the bottom with an enlarged cavity or combustion-chamber 14, which extends laterally from the furnace-chamber on both sides and into which are directed the gas and air supply pipes 15 and 16. The pusher-bar 17 for extracting these billets operates through one end of this enlarged bottom cavity and pushes the billet through the registering hole 18 at the other end. These holes are out of alinement with the furnace-chamber, so that the weight of the mass of billets in the chamber will not rest upon the billet being ejected. This is an important part of my invention and is obtained in the various forms of my furnaces by changing the direction of the billet at some point in its path instead of moving it forward in a flat horizontally-extending plane, as in the present furnaces. In the operation of this furnace the billets are fed in endwise at the top without reference to any registering or piling of them one upon another. As they descend they enter successively hotter zones, and when they arrive at the bottom of the chamber they move sidewise, and the weight of the mass of billets is sustained by those immediately under the furnace-chamber at any one time. The pusher-bar is actuated, as desired, to force the billets endwise from the side part of the bottom cavity or they may be pulled out of opening 18 by tongs.

Instead of making the furnace-chamber of

sufficient width to allow the billets to arrange themselves in any accidental manner therein I may feed the billets in a single vertical row. Thus in the form of Fig. 3 I show the furnace-chamber as extending down for some distance in a nearly-vertical direction and then curving laterally and horizontally, its width being substantially the same throughout. This enables the intermediate portion

of the row to carry the weight of those above, so that the lowermost billets do not carry the weight of the entire row and may be easily pushed out through the end opening 18^a. In this form I show a single row of pipes 5^a, extending along one side only of the furnace-chamber. Otherwise the furnace is similar to that of Fig. 1. In the operation of this furnace the entering billet is slid in so as to rest upon and register with the one just previously fed, and a single row is thus formed.

In the form of Fig. 4 I show two sets of pipes 5^b, the major portion of the furnace-chamber being vertical and of a width to receive one row of billets. Near its lower end the chamber is curved laterally in one direction, as shown at 19, and thence in the other direction, entering a chamber 20. In this way again I release the lower billets from the weight of the superimposed row and push or pull them endwise through the opening 18^b. The friction between the pipes and the billets aids in the supporting of the mass by the intermediate billets.

The advantages of my invention will be apparent to those skilled in the art. The troublesome and expensive roof construction of horizontal furnaces is done away with and a great source of repair expense thus removed. The floor-space is greatly economized and the heat is greatly economized and easily equalized upon the various parts of the billet. The changing of direction of the billets removes the weight from the lowermost billets and enables them to be easily removed. The furnace is compact, easily constructed and kept in order, and of great capacity for the space occupied. The heat obtained may be fully utilized by regulating the height of the row or mass of billets.

By the words "vertically extending" in the claims I intend to cover any furnace-chamber which is either vertical or at such an angle that the weight of one billet will bear upon the next beneath it. The shape of the furnace-chamber, the means for feeding in and feeding out, and the other parts may be varied widely without departing from my invention.

I claim—

1. A furnace, comprising a heating-chamber having means for introducing products of combustion and an outlet for waste gases, and a guide or guides in said chamber extending in a general vertical direction but having a deflected portion or portions upon which

bars may be partially supported and thereby carry the weight of those above; substantially as described.

2. A furnace, comprising a heating-chamber having means for introducing products of combustion and an outlet for waste gases, a guide or guides in said chamber extending in a general vertical direction but having a deflected portion or portions upon which bars may be partially supported and thereby carry the weight of those above, and means for feeding in bars at the top and removing them at the bottom; substantially as described.

3. A furnace, comprising a heating-chamber having means for introducing products of combustion and an outlet for waste gases, and a water-cooled guide or guides in said chamber extending in a general vertical direction but having a deflected portion or portions upon which bars may be partially supported and thereby carry the weight of those above; substantially as described.

4. A furnace, comprising a vertically-extending heating-chamber having means for introducing products of combustion, a stack-flue above, a series of dampers extending across said flue, and means for feeding in bars at the top and removing them at the bottom; substantially as described.

5. A furnace, comprising a heating-chamber having means for introducing products of combustion and an outlet for waste gases at the top, guides in said chamber extending in a general vertical direction, and means for feeding in bars lengthwise across the heating-chamber at the top and for removing them lengthwise and transversely of the heating-chamber at the bottom; substantially as described.

6. A furnace, comprising a heating-chamber having means for introducing products of combustion and an outlet for waste gases, said furnace-chamber being enlarged downwardly, and a guide or guides in said chamber extending in a general vertical direction but having a deflected portion or portions upon which bars may be partially supported and thereby carry the weight of those above; substantially as described.

7. A furnace, comprising a heating-chamber having means for introducing products of combustion and an outlet for waste gases, and water-cooled guides in said chamber extending in a general vertical direction but inclined between the top and bottom of the chamber so that bars to be heated will shift their points of contact with said guides as they descend in the chamber; substantially as described.

8. A furnace, comprising a narrow heating-chamber of considerable height and length, means for introducing products of combustion at different points along the lower end of said chamber, a stack-flue extending from the top of the furnace, and a series of dampers

arranged across the stack-flue; substantially as described.

5 9. A furnace, comprising a heating-chamber arranged to receive a vertical pile of horizontally-extending bars resting upon each other, said chamber having a lateral extension at the bottom and an outlet opening from one end of said extension, and water-cooled guides in said chamber and extending in a

general vertical direction; substantially as described.

In testimony whereof I have hereunto set my hand.

HENRY B. A. KEISER.

Witnesses:

FRED. GERDTS,
C. P. BYRNES.