

No. 653,480.

Patented July 10, 1900.

C. H. MORGAN.
FURNACE.

(Application filed Dec. 27, 1897.)

(No Model.)

2 Sheets—Sheet 1.

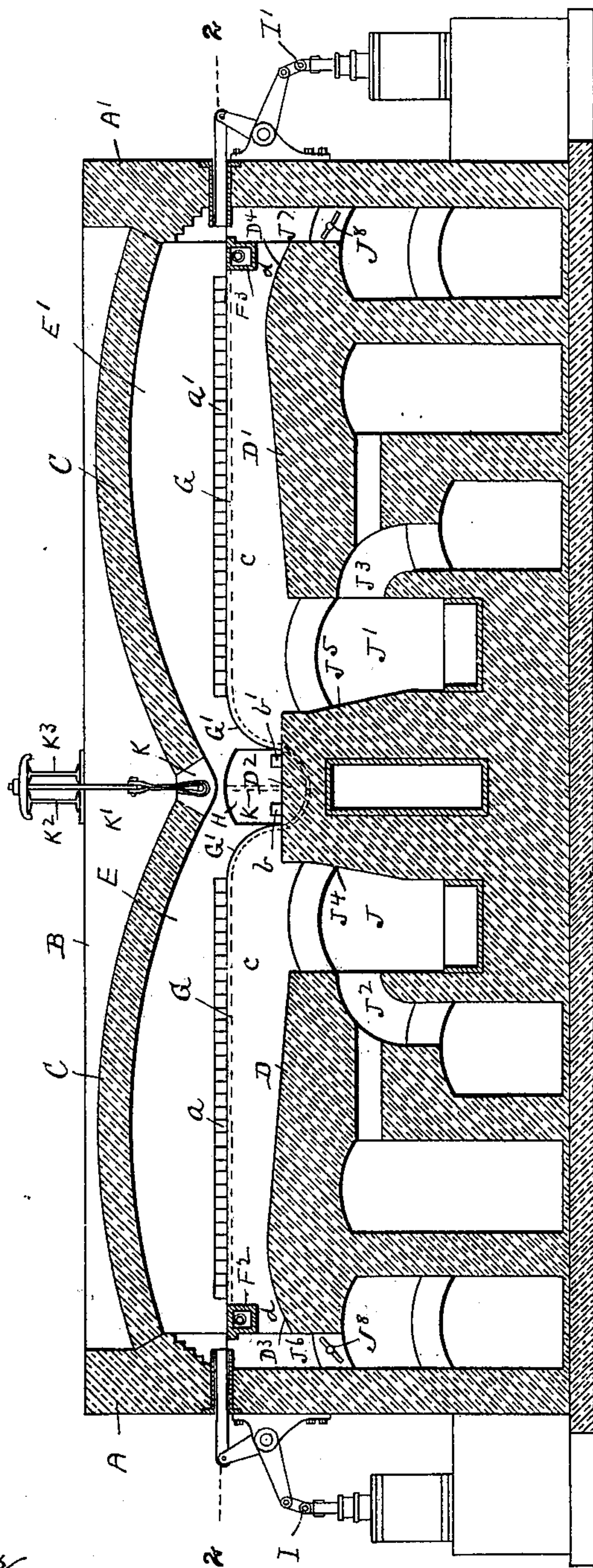


Fig. 1.

Witnesses
J. A. Kinley
W. H. Price

Inventor
Chas. H. Morgan
By his Attorney
Rufus B. Fowler

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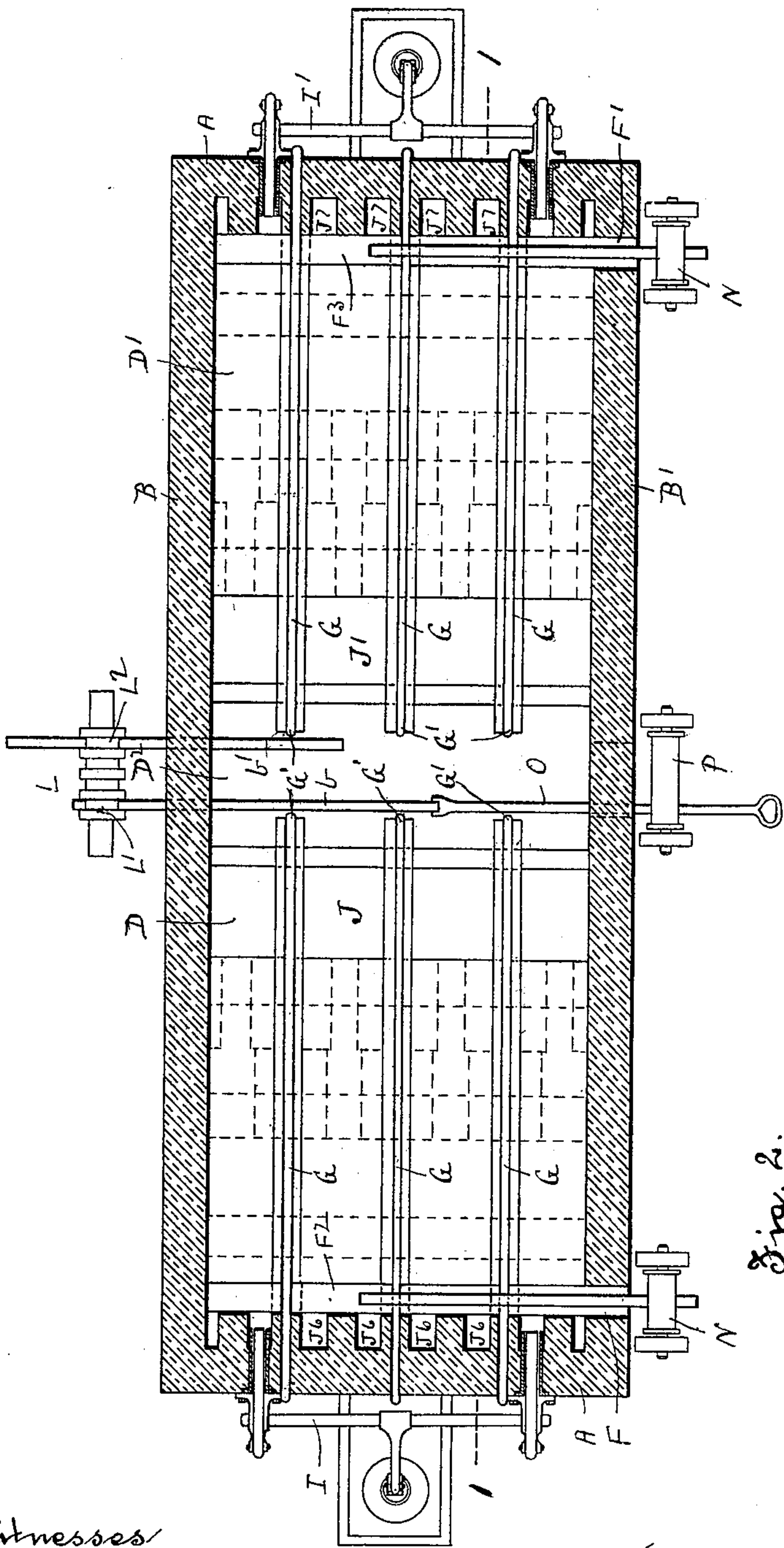


Fig. 2.

Witnesses
S. A. Winsley
W. Price

Inventor.
Chas. H. Morgan
By his Attorney
Refus B. Fowler

UNITED STATES PATENT OFFICE.

CHARLES H. MORGAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE
MORGAN CONSTRUCTION COMPANY, OF SAME PLACE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 653,480, dated July 10, 1900.

Application filed December 27, 1897. Serial No. 663,529. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. MORGAN, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Furnaces, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 is a vertical longitudinal sectional view of a furnace on line 1 1, Fig. 2; and Fig. 2 is a horizontal longitudinal sectional view on line 2 2, Fig. 1.

Similar letters refer to similar parts in both figures.

My present invention relates to that class of furnaces designed for heating billets for rolling-mills; and it has for its objects to increase the efficiency and capacity of the furnace and enable two lines of billets to be fed to two sets of grooves in the rolls of the mill; and I attain these objects by means of the construction and arrangement of parts, as hereinafter described, and shown in the accompanying drawings, in which—

A A' denote the end walls, B B' the side walls, C the roof, and D D' D² different portions of the bed, of a furnace having the heating-chambers E E'. One of the side walls is provided at opposite ends of the furnace with openings F F' for the admission of billets, which are received upon sole-plates F² F³, from which they are pushed by a pushing apparatus I upon tracks, preferably formed of water-pipes G. A current of water is maintained through the pipes G and also through the sole-plates in order to preserve them from the action of heat. The pipes G extend from the opposite ends of the furnace toward the center, where they are curved downwardly, as at G' G', to meet the central portion D² of the bed.

At the center of the furnace an opening H is formed in one of the side walls for the delivery of heated billets from the bed D². The billets are successively pushed in rows *a a'* along the water-pipes G until they reach the downwardly-curved portions G' of the track, when they fall by their own weight and are deposited upon the bed D², opposite the delivery-opening H, in the position represented by the billets *b b'*. Upon each side of the cen-

tral portion D² of the bed are pits J J', into which the gaseous fuel is admitted through conduits J² J³ and from which the currents of ignited gases after impinging against the walls J⁴ J⁵ of the pits are directed upward into the heating-chambers E E', through which they pass in opposite directions and escape through the downward flues J⁶ J⁷ at the ends of the furnace.

The roof C comprises two arches, which are supported at their outer ends by the end walls A A' and at their inner walls by skewbacks K, suspended by rods K' from the I-beams K² K², which extend transversely across the furnace and rest at their ends upon the side walls B B'. The central portion D² of the bed forms a lower hearth, upon which the billets are delivered from the pipes G and from which they are withdrawn through the delivery-opening H to a pair of rolls L, having two sets of circumferential grooves or passes L' and L² and adapted to act simultaneously upon two lines of billets. The sections D D' of the bed are placed at considerable distance below the pipes G in order to provide an ample space *c* between the bed and the rows of billets *a a'* for the passage of the products of combustion, and at the ends of the furnace the portions D D' of the bed are curved downwardly, as at D³ D⁴, to provide a clear space *d* beneath the sole-plates F² F³ for the passage of the products of combustion to the flues J⁶ J⁷. The flues J⁶ and J⁷ are provided with dampers J⁸ J⁸, by which the flues may be closed or partially closed at either end of the furnace. The flues J⁶ and J⁷ communicate with the usual vertical stacks or chimneys, and I prefer to locate the dampers J⁸ at or near the top of the chimneys.

The heating-chambers E E' are preferably communicating chambers at the central portion of the furnace, although they may be divided by a partition-wall, as shown by the broken lines K, Fig. 1; but when they communicate I am able by means of dampers controlling the escape-flues at opposite ends of the furnace to vary the relative intensity of the oppositely-directed currents or, if desired, to direct both currents toward the same end of the furnace.

Two rows *a a'* of billets are simultaneously heated, and the heated billets are withdrawn

from one side and fed to the grooves L^2 or from the other side and fed to the grooves L^3 of the rolls L. In the furnace represented in the accompanying drawings I have represented the billets as being pushed through the admission-openings $F F'$ by means of rolls N N, which are positively driven, and as being pushed into the rolls L by a push-bar O, actuated by rolls P upon the side of the furnace opposite the rolls L. Other means may be employed, however, for the purpose of entering and delivering the ingots from the furnace. The rolls L are placed adjacent to the opening I, and the billets are pushed a short distance, so that their ends will enter the rolls L, and they are then supported upon the hearth D^2 while they are being withdrawn by the action of the rolls L. The row a supplies billets to the line of grooves L' , and the row a' supplies billets to the grooves L^2 , and the necessity of moving one billet over another is thereby avoided.

I am aware that it is not new to place the rolls of the roughing-mill adjacent to the delivery-opening of the furnace, so that an ingot could be pushed a short distance from the furnace and entered between the rolls and be supported by the hearth of the furnace during its withdrawal by the action of the rolls; but I consider it new to feed two rows of ingots from opposite ends of the furnace and deliver them at the center of the furnace to rolls adapted to roll two lines of billets simultaneously, whereby two lines of billets are kept in the mill without requiring the billets to be moved over each other within the furnace or entirely withdrawn from the furnace before they are entered in the rolls.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A furnace for heating billets having openings at its ends for the admission of billets, tracks extending from the charging ends of the chamber toward a central hearth, a central hearth means for delivering billets from each of said tracks by a sidewise movement, and an opening opposite said hearth and in the side wall of the furnace, for the delivery of billets by an endwise movement and at right angles to their line of movement over said tracks, substantially as described.

2. In a furnace for heating billets, the combination of two heating-chambers placed end to end and in alinement with each other, openings at the outer ends of said chambers for the admission of billets, a hearth common to said chambers and between them, tracks leading from the charging ends of said chambers to said hearth, means for pushing billets by a sidewise movement along said tracks upon said hearth and an opening in the side wall of the furnace and at one side of said hearth for the delivery of billets by an endwise movement, substantially as described.

3. In a furnace for heating billets the combination of two communicating heating-chambers placed end to end and in alinement with

each other, a common hearth between said chambers, openings at the outer ends of said chambers for the admission of billets, tracks leading from the charging ends of said chambers to said hearth, means for moving the billets by a sidewise movement over said tracks, fuel-openings upon each side of said hearth, escape-flues at the charging ends of said chambers and an opening at one side of said hearth by which the billets are removed by an endwise movement, substantially as described.

4. In a furnace for heating billets the combination of two heating-chambers placed end to end and in substantially a straight line, a common hearth between said chambers for the reception of heated billets, means for pushing the billets by a sidewise movement from the outer ends of said chambers upon said hearth, and means for removing the heated billets from said hearth, in a line at right angles to their line of movement through said heating-chambers, substantially as described.

5. A furnace for heating billets having openings at its opposite ends for the admission of billets to the interior of the furnace, an opening at its central section for the delivery of billets therefrom, ports for the admission of gaseous fuel upon each side of said central delivery-opening and escape-flues at opposite ends of the furnace, substantially as described.

6. A furnace for heating billets inclosing two communicating heating-chambers, two series of ports for the admission of gaseous fuel near the central section of the furnace, escape-flues at opposite ends of the furnace and means for closing said flues whereby the currents of heated gases may be directed from either of said series of ports to either of said escape-flues, substantially as described.

7. In a furnace for heating billets, the combination of two heating-chambers placed end to end, a common hearth between said chambers, means for delivering billets from each of said chambers to said hearth by a sidewise movement of the billets, and means for delivering the billets from said hearth by an endwise movement, substantially as described.

8. In a furnace for heating billets, the combination of two heating-chambers placed end to end and having their axes parallel, openings at the outer ends of said heating-chambers for the admission of billets, tracks leading from the charging ends of said chambers toward the opposite or inner ends of said chambers, means for pushing the billets by a broadside movement along said tracks, a common receiving-hearth at the inner ends of said tracks, and a common billet-delivery opening through which billets are delivered from said hearth, substantially as described.

Dated this 21st day of December, 1897.

CHAS. H. MORGAN.

Witnesses:

RUFUS B. FOWLER,
M. C. PRICE.