

J. R. GEORGE.
DELIVERY MECHANISM OF A BILLET HEATING FURNACE.

APPLICATION FILED OCT. 24, 1908.

997,494.

Patented July 11, 1911.

2 SHEETS-SHEET 1.

Fig. 1.

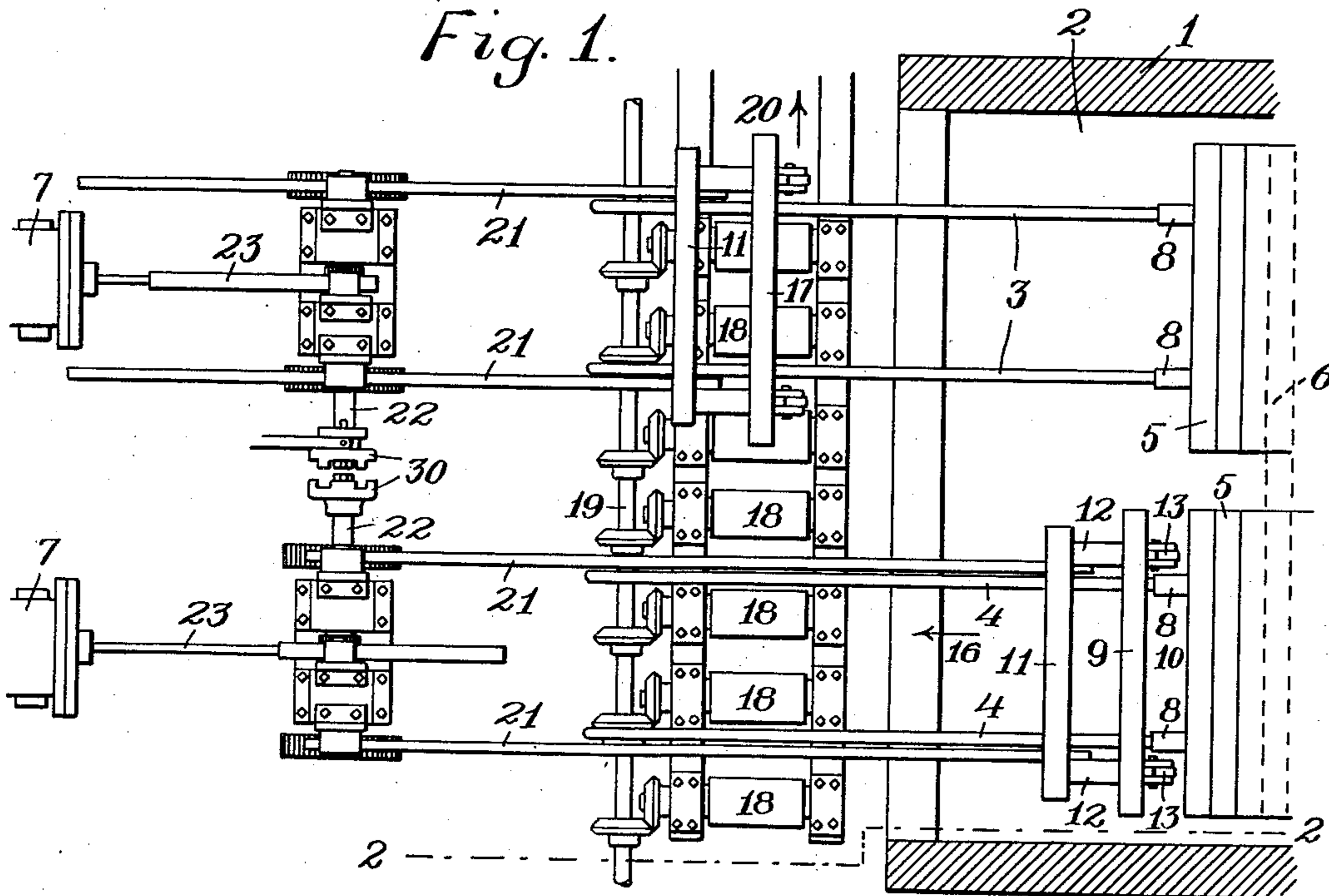
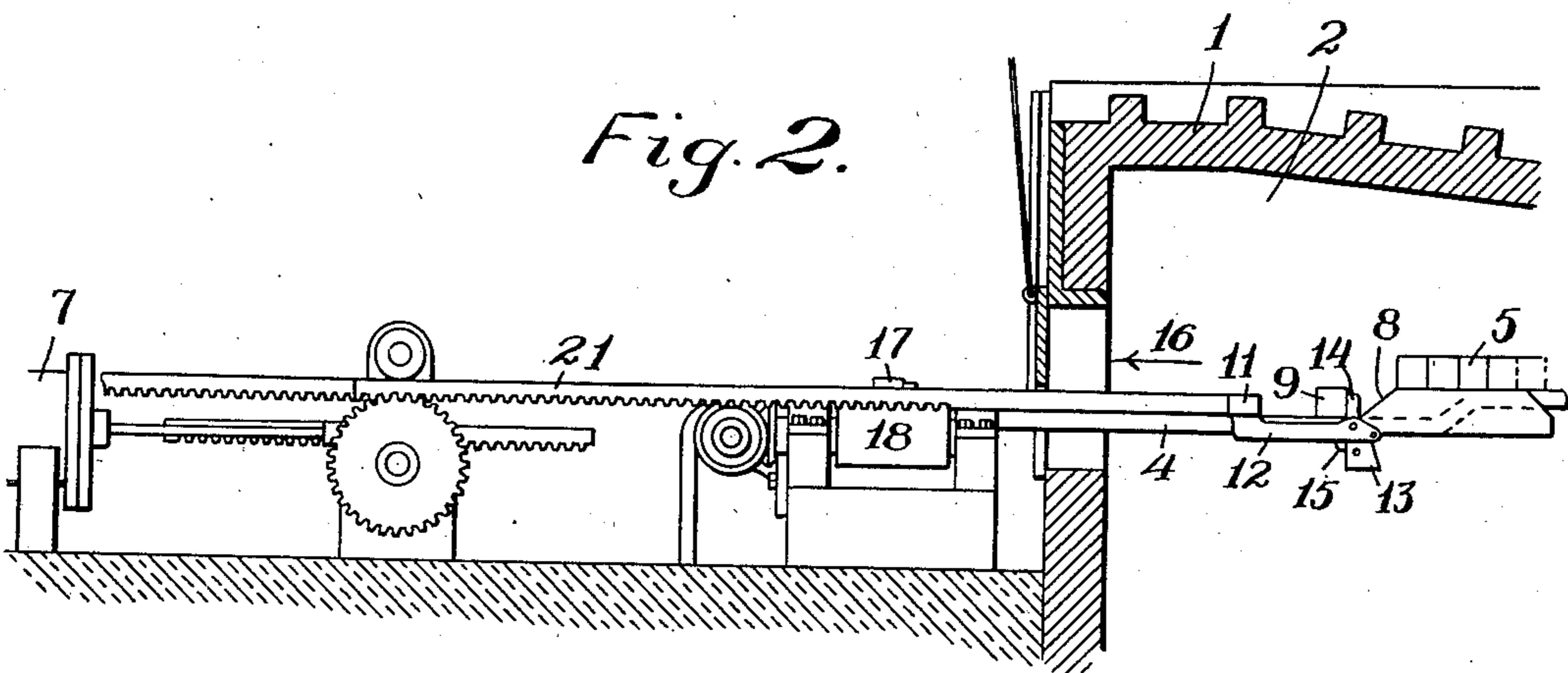


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

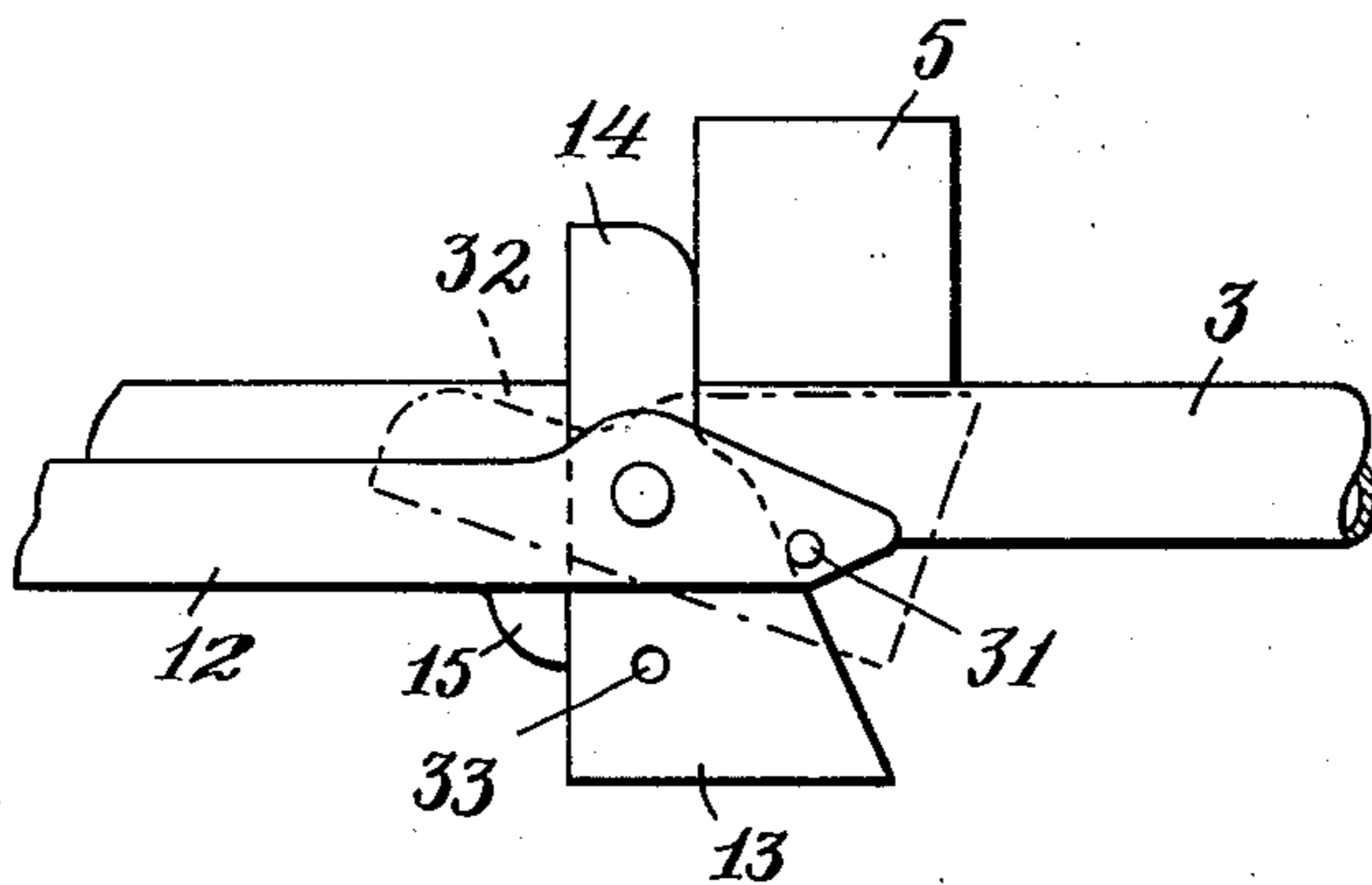
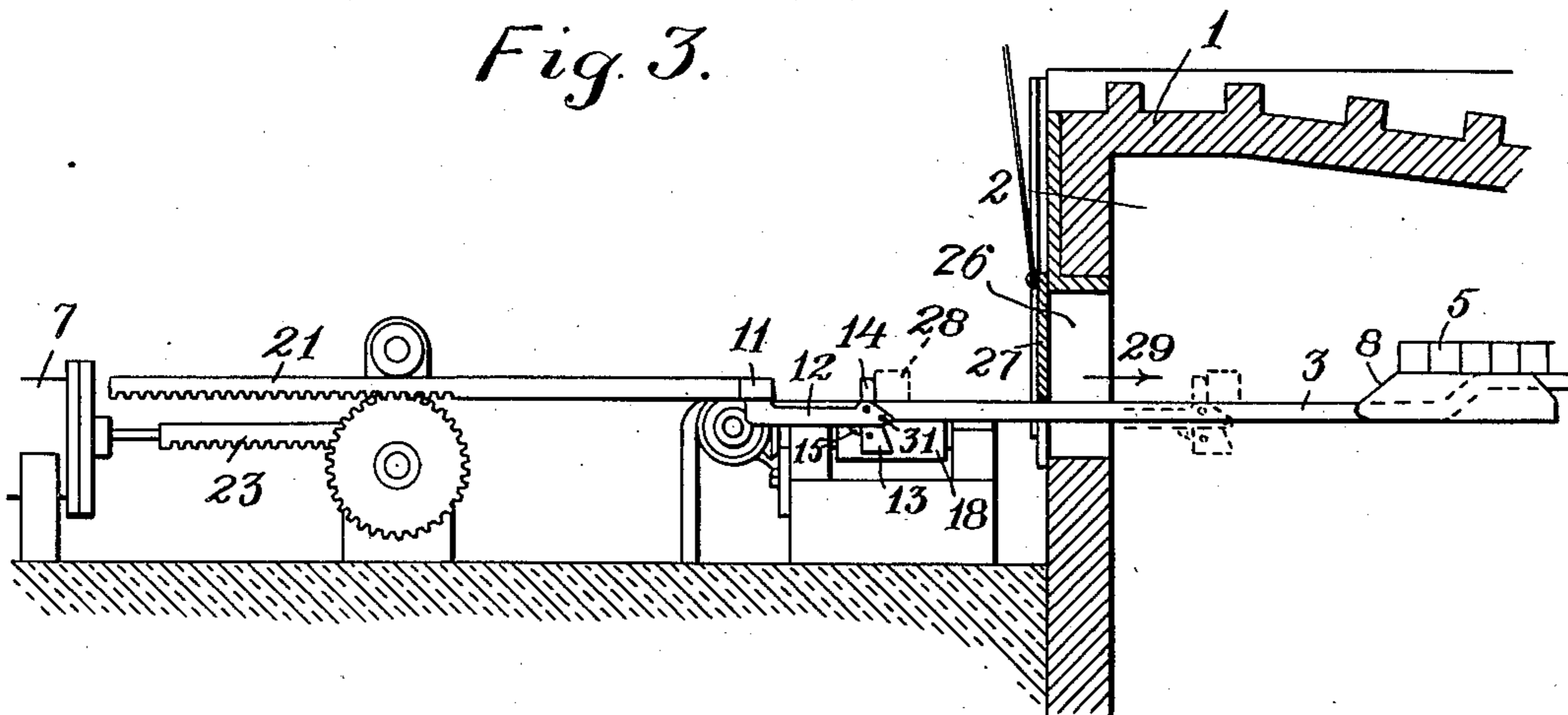


Fig. 4.

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DELIVERY MECHANISM OF A BILLET-HEATING FURNACE.

997,494.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed October 24, 1908. Serial No. 459,372.

To all whom it may concern:

Be it known that I, JEROME R. GEORGE, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in the Delivery Mechanism of a Billet-Heating Furnace, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a horizontal sectional view of the delivery end of a billet heating furnace with a plan view of a billet delivering mechanism embodying my invention. Fig. 2 is a vertical sectional view of the delivery end of the furnace and of my improved billet delivering mechanism on the plane of the broken line 2—2, Fig. 1, showing the billet delivering mechanism at the time of its engagement with a billet within the furnace. Fig. 3 represents the same vertical sectional view as shown in Fig. 2, but with the billet delivering mechanism in position to return a billet to the heating chamber from the furnace, and Fig. 4 is a detached view on a larger scale of the billet withdrawing latch.

Similar reference letters and figures refer to similar parts in the different views.

My present invention relates to means for withdrawing heated billets or metal bars from a furnace, and it has for its object to provide the delivery end of the furnace with a mechanically operated withdrawing mechanism by which the heated billets may be individually withdrawn from the furnace at will, and it has for its further object to provide means by which the heated billet may be again returned to the furnace through its delivery opening.

Referring to the accompanying drawings 1 denotes a billet heating furnace having a heating chamber 2 provided, in the present instance, with two longitudinal tracks 3 and 4 upon which two rows of short billets may be supported, such as are shown at 5, 5, or, if desired, both tracks may be used for the support of a single row of long billets, like those indicated by the broken lines 6. The billets are introduced upon the tracks 3 and 4 through the receiving end of the furnace and are advanced along the tracks by the ordinary pushing mechanism, well known to those skilled in the art. Whether one or

two rows of billets are heated, the foremost billet in the row, when suitably heated, is withdrawn by a mechanically operated withdrawing mechanism actuated, in the present instance, by piston equipped cylinders adapted to the use of steam or water under pressure, and having the usual valves and operating mechanism by which the action of the cylinder is controlled by an attendant.

The longitudinal tracks on which the billets are supported are provided near the delivery end of the furnace with an inclined section 8, 8, over which the foremost billet in the row falls by gravity as the row of billets is pushed forward by a suitable pushing mechanism, such as that usually employed for this purpose in furnaces of this class, causing the foremost billet to roll down the inclined section and become supported upon the lower section of the track, as shown at 9; the passage of the billet over the inclined section 8 causing its separation from the remaining billets in the row, and forming a space between it and the remaining billets for the insertion of the billet withdrawing mechanism.

The billet withdrawing mechanism comprises a reciprocating framework having a cross bar 11 suitably supported, in the present instance, upon the longitudinal supporting track. Projecting from the cross bar 11 are arms 12, 12, in the free ends of which are pivoted the gravity latches 13, 13, which are pivoted in their arms midway their length, and having one end of the latch heavier than the opposite end by which they are caused to hang by gravity in a vertical position, with the upper ends 14 of the latches projecting above the arms 12 and in position to engage the separated billet 9, as represented in Fig. 2. In the vertical position of the latches 13, they contact with a projection 15 on the arms 12 by which the latches are held from rotation in one direction so that, when the mechanism is moved in the direction of the arrow 16, Figs. 1 and 2, the upper ends of the latches will slide the billet 9 along the longitudinal track into a position upon conveyor rolls 18, which are positively driven by a common driving shaft 19 to convey the billet in the direction of the arrow 20 toward the rolls of the rolling mill. By a reverse movement of the withdrawing mechanism, the gravity latches are moved beneath the

succeeding billet which has assumed the position of the billet 9, and, as the latches pass beneath the billet, the contact of their upper ends 14 against the front side of the billet will cause the latches to be rocked on their pivots, as shown in Fig. 4, until they pass the billet when the latches will be swung by gravity into a vertical position, with their upper ends 14 in the space 10 and behind the advanced supported billet. The reciprocating movement of the withdrawing mechanism may be produced by any suitable means such, for example, as that shown in the accompanying drawings, which consists in a rack and pinion connection 21 between the reciprocating frame of the withdrawing mechanism and driving shafts 22, which are rotated in opposite directions by means of rack and pinion mechanisms 23, which are actuated by the piston equipped cylinders 7.

When two rows of short billets are being heated and the billets are to be withdrawn alternately from the rows, the withdrawing mechanisms may be operated alternately from the driving shafts 22 by the alternate operation of the piston equipped cylinders 7. When long billets are being heated, both withdrawing mechanisms may be operated simultaneously, acting upon opposite ends of the same billet, by connecting the shafts 22 by means of the clutch 30.

The delivery opening 26 of the furnace is preferably provided with sliding gravity doors 27, which are opened by an upward movement by means of any suitable lifting mechanism connected with the doors by a chain or cable.

It sometimes occurs that the heated billet after having been deposited upon the conveyer rolls 18 and moved toward the rolls of the mill is prevented from entering the rolls. In such cases the withdrawing mechanism is brought into the position shown in Fig. 3; the motion of the conveyer rolls 18 is reversed and the heated billet returned to the position shown by the broken lines 28, Fig. 3, and in front of the gravity latches. The gravity door 27 is then raised and a movement is given to the withdrawing mechanism in the direction of the arrow 29, Fig. 3, causing the billet to be pushed over its longitudinal track into the heating chamber 2, where its heat may be maintained until the rolling mill is ready to receive it.

The shafts 22 are provided with a clutch connection 30 by which they may be united and actuated by one only of the piston equipped cylinders 7, producing a simultaneous movement of the withdrawing mechanisms for the withdrawal of long billets, as indicated by the broken lines 6, Fig. 1. The usual valve mechanism is employed for controlling the action of the piston equipped cylinders 7, and means now in

common use are employed for reversing the motion of the conveyer rolls 18.

The gravity latches 13 are held from rocking while a billet is being pushed into the heating chamber by a pin 31, inserted in the frame of the withdrawing mechanism in front of the lower ends of the latches. By rocking a latch into the position shown by broken lines 32, Fig. 4, and inserting the pin 31 through the hole 33, the latch is held in an inoperative position.

I claim,

1. In a billet heating furnace, the combination with a heating chamber provided with a longitudinal track along which a row of billets is advanced and means for separating the advancing billet in the row, of a reciprocating withdrawing mechanism arranged to engage automatically the separated billet, and means for reciprocating said withdrawing mechanism at will.

2. In a billet heating furnace, the combination with a heating chamber having a delivery opening and a longitudinal track for the support of a row of heated billets, of means for separating the foremost billet in the row, a reciprocating withdrawing mechanism comprising pivoted latches adapted to engage the separated billet and move it through said delivery opening.

3. In a billet heating furnace, the combination with a heating chamber having an opening for the delivery of heated billets, of a reciprocating withdrawing mechanism movable through said delivery opening, means for reciprocating said withdrawing mechanism, and a latch arranged to hang by gravity in a vertical position for automatically engaging a billet.

4. In a billet heating furnace, the combination with a heating chamber having a support for heated billets, of a reciprocating withdrawing mechanism comprising a pivoted latch, arranged to be rocked on its pivot by its contact with a billet, and to hang by gravity in a vertical position when it is out of contact with a billet.

5. In a billet heating furnace, the combination with a heating chamber having a delivery opening and a longitudinal track for the support of heated billets, of a reciprocating withdrawing mechanism, comprising pivoted latches arranged to hang in a vertical position by gravity, means for limiting the rocking movement of said latches in one direction, and means for reciprocating said withdrawing mechanism to carry said latches beyond a billet held on said track.

6. In a billet heating furnace, the combination with a heating chamber having a delivery opening and a longitudinal track for the support of heated billets and along which said heated billets are advanced, said track having an inclined section whereby the advancing billet is changed from a

higher to a lower level, a withdrawing mechanism comprising means for engaging a billet at said lower level, and means for reciprocating said billet withdrawing mechanism.

7. In a billet heating furnace, the combination with a heating chamber having a delivery opening and a longitudinal track in alinement with said opening, of a withdrawing mechanism for moving a heated billet along said track and through said delivery opening, comprising a reciprocating framework, pivoted latches carried by said framework in a plane below the plane of the supporting surface of said track, with the tips of said latches extending above the plane of the surface of said track, and means for reciprocating said framework.

8. In a billet heating furnace, the combination with a multiplicity of longitudinal tracks for the support of billets, of billet withdrawing mechanisms for each of said tracks, and means for the independent operation of each of said withdrawing mechanisms at will.

9. In a billet heating furnace, the combination with a multiplicity of longitudinal tracks for billets, of billet withdrawing mechanisms for each of said tracks, means for the independent operation of each of said withdrawing mechanisms at will, and a common conveyer arranged to receive the billets from each of said withdrawing mechanisms.

10. In a heating furnace for metal billets or bars, the combination of a multiplicity of tracks along which the billets are moved toward the delivery end of the furnace, a withdrawing mechanism for each of said tracks, and means for actuating said with-

drawing mechanisms either independently or conjointly at will.

11. In a furnace for heating metal billets or bars, the combination with a heating chamber having a delivery opening at one end, of a pair of billet withdrawing mechanisms, a common actuating shaft, and means for engaging said shaft with either of said withdrawing mechanisms at will.

12. In a heating furnace for billets, the combination with a heating chamber having a delivery opening, of a withdrawing mechanism for withdrawing the heated billets through said opening, and means carried by said withdrawing mechanism for returning the withdrawn billet into the heating chamber.

13. In a billet heating furnace, the combination with a heating chamber having a delivery opening at one end, of a reciprocating frame and pivoted latches carried by said frame, said latches being adapted to engage a billet for withdrawal of a billet and also for the reëntance of a billet through the delivery opening.

14. The combination with the heating chamber of a billet heating furnace, having a delivery opening, of a reciprocating billet withdrawing mechanism, a conveyer in front of said delivery opening, means for supporting a billet between said conveyer and the heating chamber, and means carried by said withdrawing mechanism for pushing a billet from said conveyer into the heating chamber.

Dated this 22nd day of October 1908.

JEROME R. GEORGE.

Witnesses:

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