Jan. 31, 1933. J. W. OFFUTT 1,895,726

HEATING FURNACE

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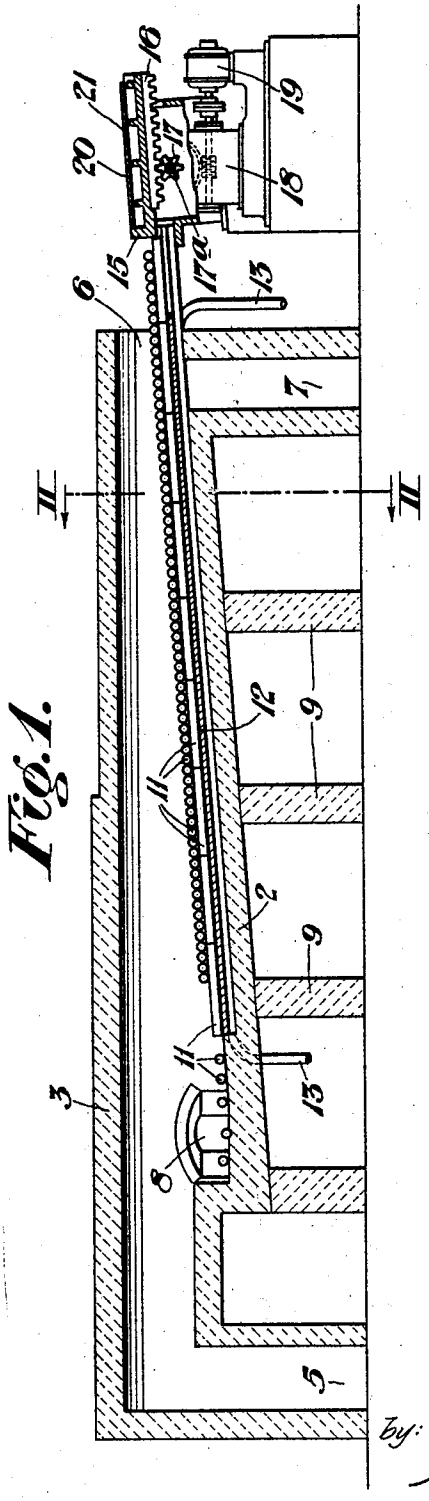


Fig. 1.

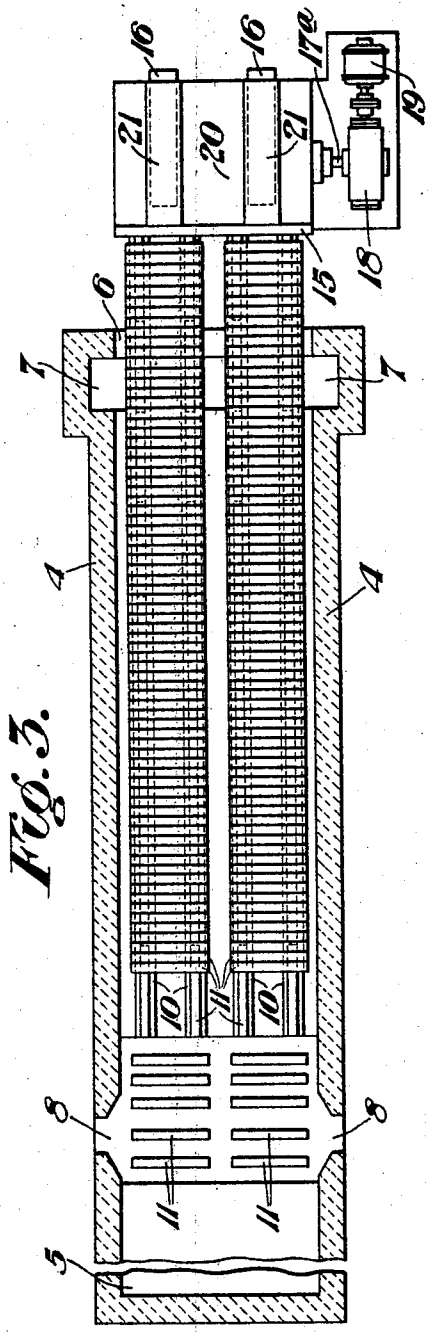


Fig. 3.

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Fig. 2.

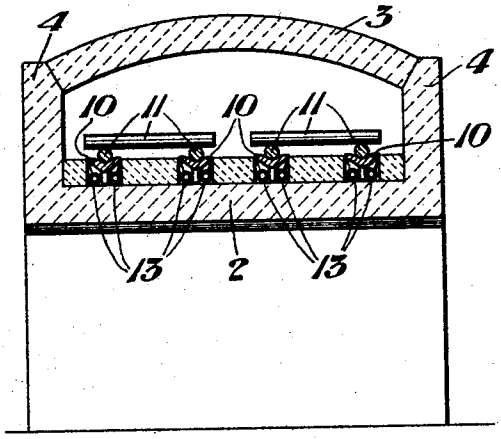


Fig. 4.

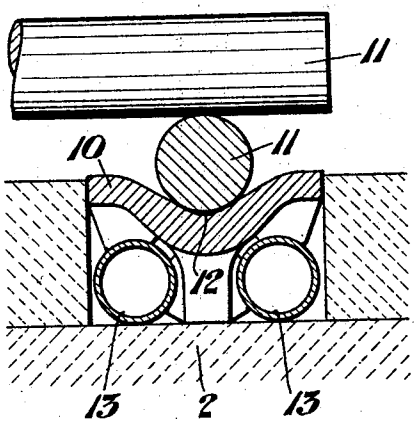
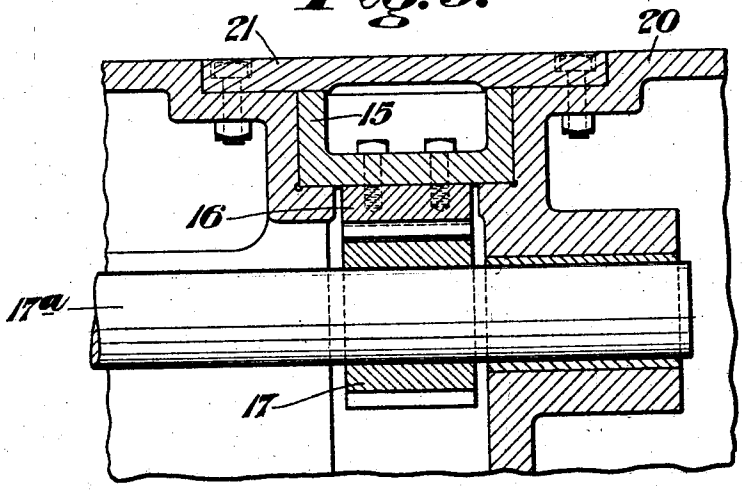


Fig. 5.



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UNITED STATES PATENT OFFICE

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HEATING FURNACE

Application filed August 12, 1931. Serial No. 556,686.

This invention relates to billet heating furnaces and more particularly to furnaces designed to especially handle round billets in a continuous manner.

Heretofore, in the heating of round billets it has been necessary to roll down the billets from one end of the furnace at which they were charged, all the way along to the point of discharge, such rolling down requiring considerable labor and being a hot and disagreeable task.

When attempts have been made to push round billets through a furnace, difficulties have arisen in that the rows of billets would buckle and gorge, thereby making it impossible to obtain a uniform heating in their passage through the furnace.

In accordance with the present invention it is proposed to provide a furnace in which the round billets may be pushed along the hearth in an axial direction on inclined skids and at the same time billets may be disposed transversely of the billets that are pushed, thus constituting the pushed billets a conveying means for the transversely disposed billets. By this method of feeding billets through a heating furnace, the billets are uniformly heated without interruption and without the difficulties heretofore encountered.

The invention will become more apparent from a consideration of the accompanying drawings in which like reference characters designate like parts and in which—

Figure 1 is a vertical cross-sectional view taken longitudinally of a billet heating furnace embodying the principles of this invention.

Figure 2 is a cross-sectional view taken along the line II—II of Figure 1.

Figure 3 is a top plan view of the furnace and pusher mechanism with the roof cut away.

Figure 4 is a sectional elevation taken of a detail of the skid on which the billets are pushed through the furnace.

Figure 5 is a cross-sectional view of a portion of the pusher ram.

With reference to the several figures of the drawings, the structure therein illustrated comprises a furnace, the heating chamber of which is constituted by an inclined hearth 2, a roof 3 and side walls 4, having a fire-box 5 adjacent the front end of the inclined hearth and a charging opening 6 at the other end, the side walls 4 being offset at the charging end to constitute a pair of side flues 7. A charging table 20 is provided at the charging end on which the billets to be charged may be supported. Discharge openings 8 are provided to which the billets are rolled down and discharged from the furnace, and the hearth structure is supported on a plurality of pillars 9. As shown in Figure 2 the hearth is provided with a plurality of skids 10, there being two pairs of said skids in spaced relation each of which supports a round billet 11, and each pair of round billets lying in the trough of the skids, in turn, supporting a series of round billets disposed in transverse relation to the skids. The skids are constructed as shown in Figure 4 and comprise a plurality of relative short castings of heat resisting alloy in end-to-end fashion to prevent buckling due to thermal expansion, and the castings are provided with a groove 12 in which the round billets 11 are pushed. The castings 10 are provided with cooling pipes 13 for circulating a cooling fluid therethrough to prevent excessive heating of the castings. The castings 10 adjacent the discharge openings 8 are preferably plain with the groove 12 eliminated to facilitate removal of the round billets by hooks at the discharge end of the furnace. The billets are conveyed through the furnace by rams 15 which are shown in Figure 1 and Figure 5 of the drawings.

The rams 15 each have a tooth rack 16, which racks are operated by pinions 17 carried by a shaft 17^a operated through a gear reduction unit 18 connected to a reversing motor 19. The construction of the racks is shown in detail in Figure 5 in which the racks are shown as attached to the rams 15 over which cover-plates 21 are placed to form a continuous top for the charging table 20.

In the operation of the billet heating furnace, billets are placed longitudinally of the furnace in the grooves 12 of the castings 10

and other round billets are placed transversely of the longitudinally disposed billets, and the pusher rams are operated to engage the ends of the billets in the grooves 12 so as to push said billets. As the billets in the grooves 12 are pushed into the furnace they will carry the other billets arranged transversely thereof into the furnace. When the rams are returned the upper portion of the skid track is again loaded with billets and the operation of pushing the billets into the furnace is repeated. The billets are discharged through the openings 8 in the customary manner, that is, by rolling each billet over on the hearth of the furnace to insure uniform heating before they are discharged for use.

On account of the longitudinally disposed billets making contact with the cooled castings 10, it may be desired to bring them up to the proper temperature before discharging them, and for this purpose they may be placed to one side until they have reached the proper temperature. However, the transversely arranged billets, due to their being spaced from the skid castings 10 by the longitudinally arranged billets, are thoroughly heated. As previously explained, the longitudinally disposed billets are turned to the position shown in Figure 3 by pulling them from the castings 10 by hooks and they are turned down with the other billets once they have been placed in the position shown.

It will be evident from the foregoing description of this invention that billet heating furnaces made in accordance therewith are especially adapted for the heating of round billets by continuous operation and provide uniform heating of the billets passing through the furnace. It is, of course, obvious that the furnace and pusher mechanism may be utilized for square billets or billets of other shapes than the round billets illustrated.

Although one embodiment of the invention has been herein illustrated and described, it will be obvious to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. In the method of heating cylindrical billets, the steps of which comprise placing a plurality of billets in axial alinement and in spaced relation on the furnace hearth, placing other billets upon said first named billets with their axes disposed at right angles to the axes of said first named billets, permitting all of said billets to come to the desired working heat and then discharging all of said billets for processing, whereby the heat absorbed by said first named billets is utilized.

2. The method of heating billets, the steps of which comprise placing a plurality of billets in axial alinement and in spaced relation on the furnace hearth, placing other billets on said first named billets with their axes disposed at right angles to the axes of the said first named billets, turning said first named billets at the discharge end of said furnace into parallelism with said second named billets, permitting all of said billets to come to the desired working heat and discharging all of said billets for processing, whereby all of said billets pass only once through the furnace and the heat adsorbed by all of said billets is utilized.

In testimony whereof, I have hereunto set my hand.

JOHN W. OFFUTT.