T. J. COSTELLO.

PAIR HEATING FURNACE AND METHOD OF OPERATING THE SAME.

APPLICATION FILED DEC. 16, 1919.

1,378,326. **Patented May 17, 1921.**

3 SHEETS—SHEET 1.

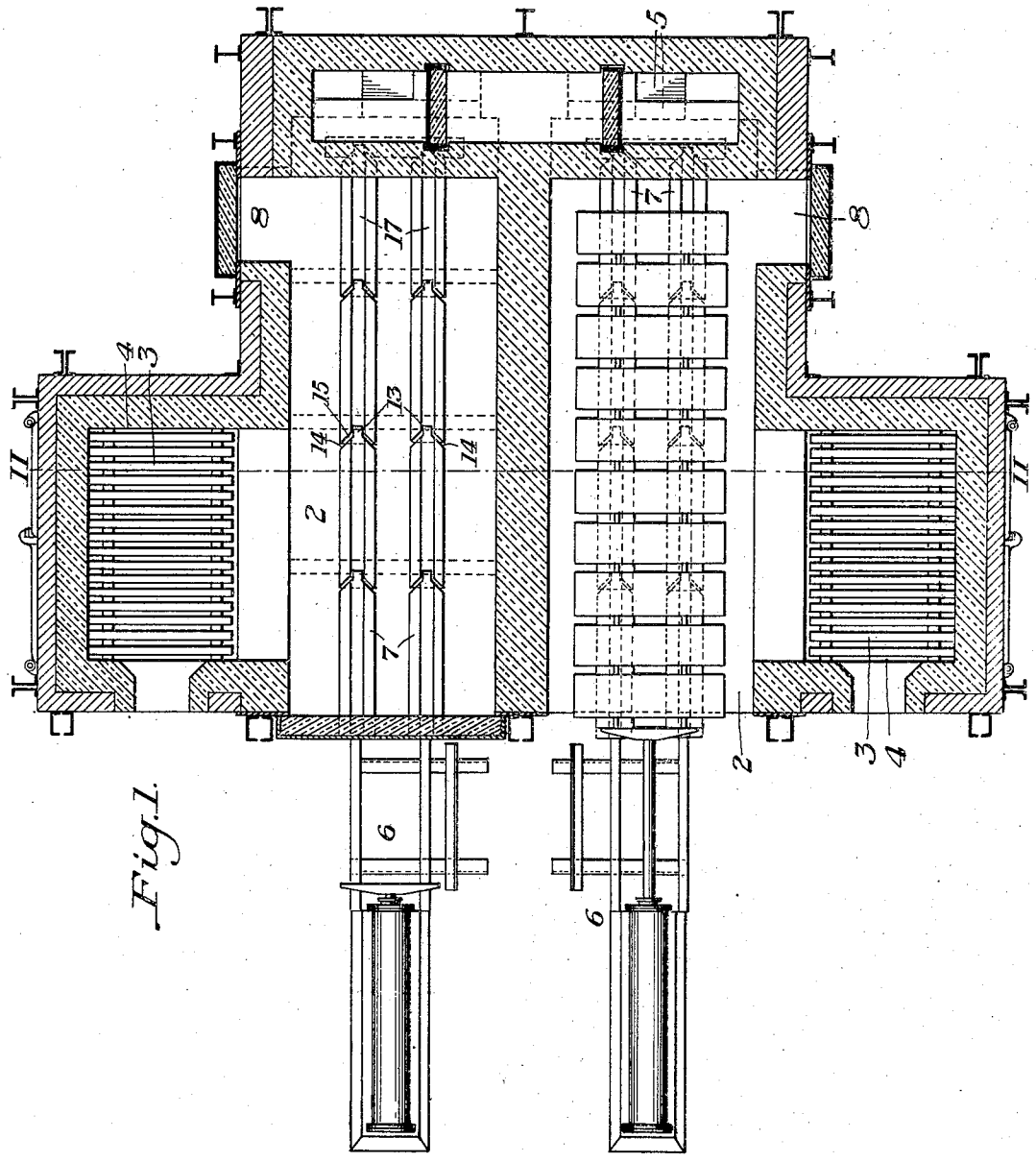


Fig. 1.

WITNESS

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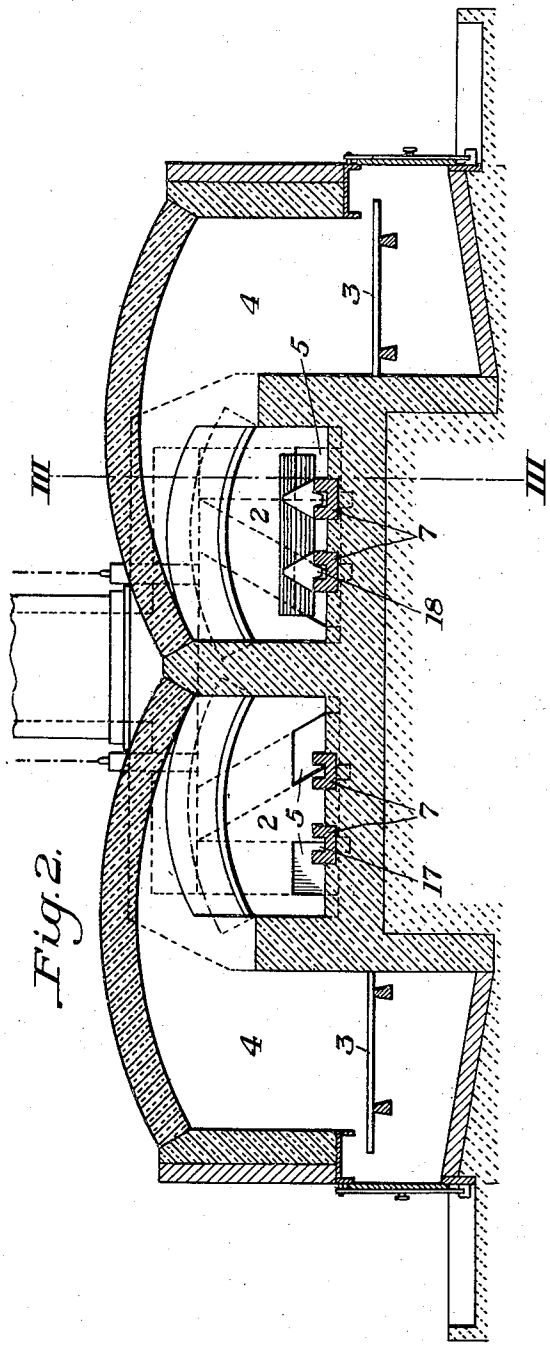


Fig. 2.

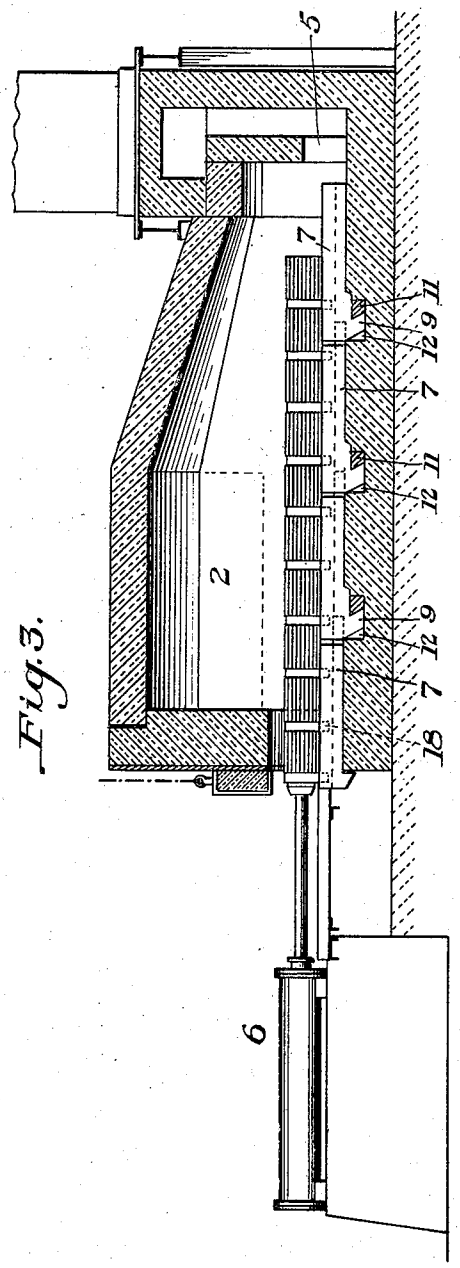


Fig. 3.

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3 SHEETS—SHEET 3.

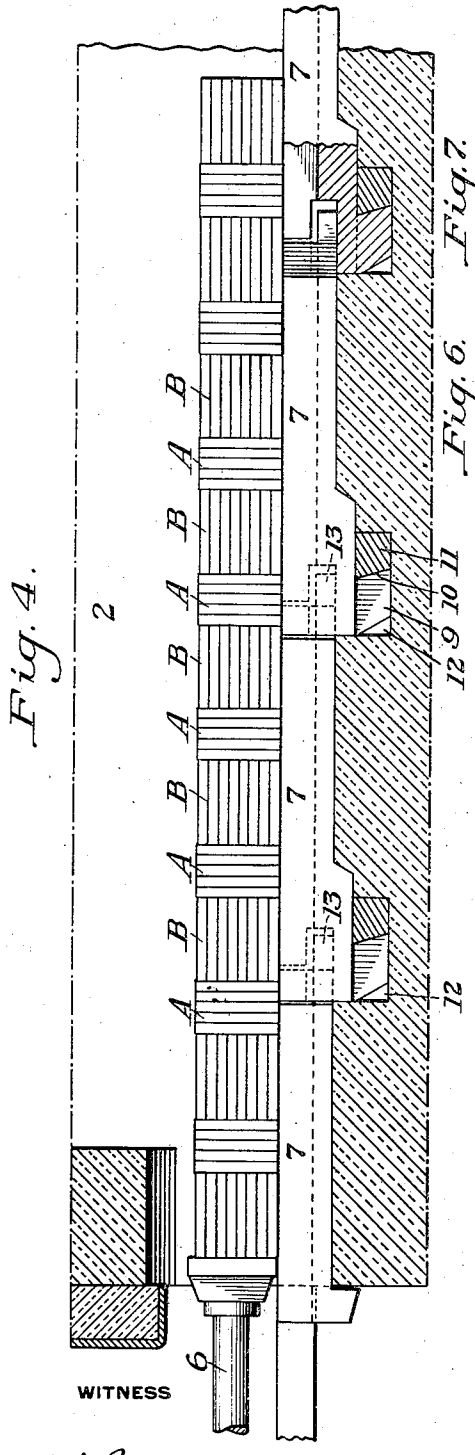


Fig. 4.

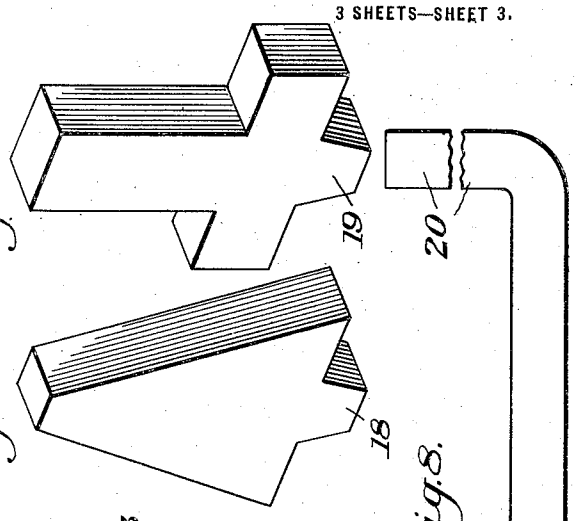


Fig. 7. Fig. 6. Fig. 8.

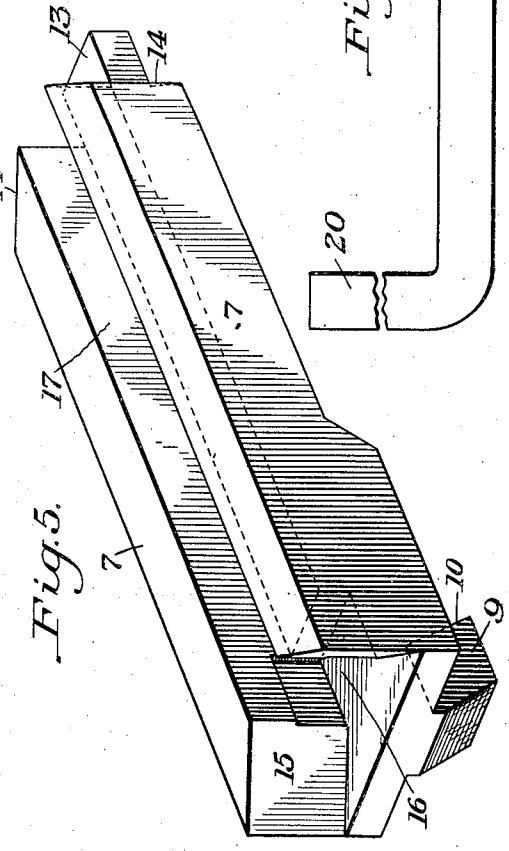


Fig. 5.

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UNITED STATES PATENT OFFICE.

THOMAS J. COSTELLO, OF WARREN, OHIO.

PAIR-HEATING FURNACE AND METHOD OF OPERATING THE SAME.

1,378,326. Specification of Letters Patent. Patented May 17, 1921.

Application filed December 16, 1919. Serial No. 345,316.

To all whom it may concern:

Be it known that I, THOMAS J. COSTELLO, a citizen of the United States, residing at Warren, in the county of Trumbull and State of Ohio, have invented a new and useful Improvement in Pair-Heating Furnaces and Methods of Operating the Same, 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 a horizontal section of a pair-heating furnace embodying my invention.

Fig. 2 is a section on the line II—II of Fig. 1.

Fig. 3 is a section on the line III—III of Fig 2.

Fig. 4 is a longitudinal section of one of the heating chambers showing a different way of spacing the packs.

Fig. 5 is a perspective view of one of the skid sections or bearers.

Figs. 6 and 7 are perspective views showing two different forms of spacers, and

Fig. 8 is a side view partly broken away showing another form of spacer.

My invention has relation to pair-heating furnaces for heating sheet and tin plate bars and is designed to provide a furnace of this character, together with a novel method of operating the same, whereby the packs of bars may be more conveniently and economically handled and may be better and more uniformly heated.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown a preferred embodiment of one form of furnace and which will now be described, it being premised, however, that my invention may be carried out with other types of furnaces and that various changes may be made in the details of construction, arrangement and combination of the parts, without departing from the spirit and scope of my invention as defined in the appended claims.

In the drawings I have shown my invention applied to a double pair-heating furnace which is generally of the well-known type. In these drawings the numerals 2 designate the heating chambers of the furnace, 3 the grates located in lateral combustion chambers 4, 5 the stack outlets, and 6 pushing mechanism of any well known or usual character by means of which the packs of bars to be heated are pushed through the heating chambers.

In accordance with my invention I provide the floor of each heating chamber 2 with longitudinally arranged parallel skids or bearers 7 which extend the full length of the heating chambers from the entrance ends thereof to the discharge ends, opposite the laterally arranged discharge doors 8.

These skids or bearer features are preferably in sections arranged end to end. One of the sections is illustrated in perspective in Fig. 5. Each section is preferably provided with a depending lug or heel piece 9 at one end portion having the oblique face 10 adapted to be engaged by a securing wedge or key 11. These heel pieces or lugs engage recesses 12 formed in the floors of the heating chamber, in which recesses the wedges or keys 11 are also seated, these being permanently seated in said floors. Each piece is formed at one end with a projecting tongue 13 and with beveled ends 14, the latter being arranged to fit in the beveled recess 15 in the other end of an adjacent section. The recesses 15 are extended forwardly as shown at 16 to receive the tongue 13 of the adjacent section. In this manner the skid or bearer sections are not only securely held in proper alinement, but the sections may, when necessary, be readily removed and replaced. In the form shown the sections are provided with longitudinal grooves 17 extending from end to end, for the purpose hereinafter described.

In accordance with my invention the bars to be heated are piled into packs, in the manner shown in Figs. 1, 2 and 3, these packs extending transversely of the furnace and resting upon the upper surfaces of the bearers or skids 7 upon which they are pushed through the furnace. In the form shown in these figures, adjacent packs are spaced from each other by suitable spacers. These spacers may take various forms. In the form shown in Figs. 2 and 6, they consist of separate blocks, shown as of general triangular form with depending beveled lugs 18 at their lower ends which are adapted to have a sliding fit in the grooves 17 of the skids or bearers. Two of these spacers are employed between each adjacent pair of packs, one engaging each of the skids or bearers. In the form shown in Fig. 7, the spacers are of T-shape with lugs 19, simi-

lar to the lugs 18, and adapted to engage the grooves 17 of the skids or bearers.

Fig. 8 shows another kind of bearer in the form of a transverse bar having upwardly extending end portions 20. These bars rest and slide upon the skids or bearers with the upwardly extending portions lying between the end portions of adjacent packs.

In the arrangement shown in Fig. 4 the spacing of the packs is effected by means of a number of sheet bars A which are placed transversely on edge between the adjacent packs B. I prefer, however, to use spacers, such as shown in the other figures, because, with such spacers, provision is made for a better circulation of the heating medium between adjacent packs so that a more uniform heating of the packs is obtained.

By placing the packs transversely of the heating chamber with suitable interposed spacers, it will be readily understood that the packs may be readily pushed through the heating chambers without danger of their buckling and unpiling. This method also avoids all difficulties due to unequal lengths of the bars since the pushing action is always against the longitudinal edges of a plurality of bars, and not against the ends thereof. When the spacers such as shown in Figs. 6, 7 and 8 are employed, there is also afforded free space for the circulation of the heating medium between adjacent packs. In all cases, the skids or bearers give a space below the packs for heat circulation. The skids can be raised to any desired extent, thus giving substantially the same heating effect at both top and bottom.

I claim:

1. The herein described method of heating sheet or tin plate bars, which consists in piling separate bars flatwise in a plurality of packs extending transversely of a heating chamber, each pack containing a plurality of bars, and pushing said packs through said chamber while subject to the action of the heating medium therein, substantially as described.

2. The herein described method of heating sheet or tin plate bars, which consists in piling separate bars in a plurality of packs extending transversely of the heating chamber, each pack containing a plurality of bars, placing spacing means between adjacent packs, and pushing the packs through said chamber while subject to the action of the heating medium, substantially as described.

3. The herein described method of heating sheet or tin plate bars, which consists in piling the separate bars in a plurality of packs extending transversely of the heating chamber, each pack containing a plurality of bars superimposed flatwise upon each other, maintaining said packs in spaced relation, pushing the packs through the heating chamber, and heating them therein and then withdrawing said packs in an endwise direction from said chamber, substantially as described.

4. The herein described method of heating sheet or tin plate bars, which consists in piling separate bars flatwise in a plurality of separate packs extending transversely of the heating chamber, and spacing said packs longitudinally of each other by other bars piled edgewise between the flatwise piled packs, and pushing said bars through said chamber while subject to the action of the heating medium therein, substantially as described.

5. A pair-heating furnace comprising a heating chamber having parallel skids or bearers therein, and pack spacing devices having a guiding engagement with said skids or bearers, substantially as described.

6. A pair-heating furnace comprising a heating chamber having parallel longitudinal skids or bearers, said skids or bearers being formed in sections having interfitting end portions, together with means for removably securing the sections in the floor of the heating chamber, substantially as described.

7. A pair-heating furnace comprising a heating chamber having parallel longitudinally extending skids or bearers formed in removable inter-engaging sections together with means for removably securing the sections in the floor of the heating chamber, substantially as described.

8. A pair-heating furnace comprising a heating chamber having parallel longitudinally extending skids or bearers formed in separately removable inter-engaging sections, each of said sections having a securing member engaging a recess in the floor of said chamber, and key or wedge means engaging said member, substantially as described.

9. A heating furnace comprising a heating chamber having longitudinally extending parallel skids or bearers formed with longitudinal grooves in their upper surfaces, and pack spacing members having means for engaging said grooves, substantially as described.

10. A heating furnace comprising a heating chamber having longitudinally extending parallel skids or bearers, such skids or bearers being formed in sections, the end portions of adjacent sections having an overlapping interfitting engagement with each other together with means for removably securing the sections in the floor of the heating chamber, substantially as described.

11. A heating furnace comprising a heating chamber having longitudinally extending parallel skids or bearers, such skids or bearers being formed in sections, the end portions of adjacent sections having an

overlapping interfitting engagement with each other, and said sections having guiding means for pack spacers, substantially as described.

12. A heating furnace having parallel skids or bearers in the heating chamber, said skids or bearers being formed in sections, and the floor of said chamber having anchoring means which are removably engaged by said sections, substantially as described.

In testimony whereof, I have hereunto set my hand.

THOMAS J. COSTELLO.