Aug. 2, 1932. F. T. COPE ET AL 1,869,468

HANDLING ARRANGEMENT FOR FURNACES

Filed Dec. 24, 1928 2 Sheets-Sheet 1

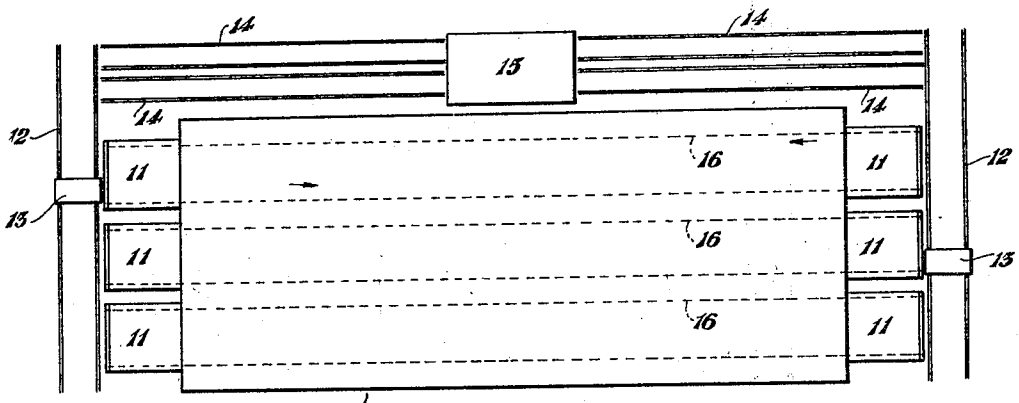


Fig. 1

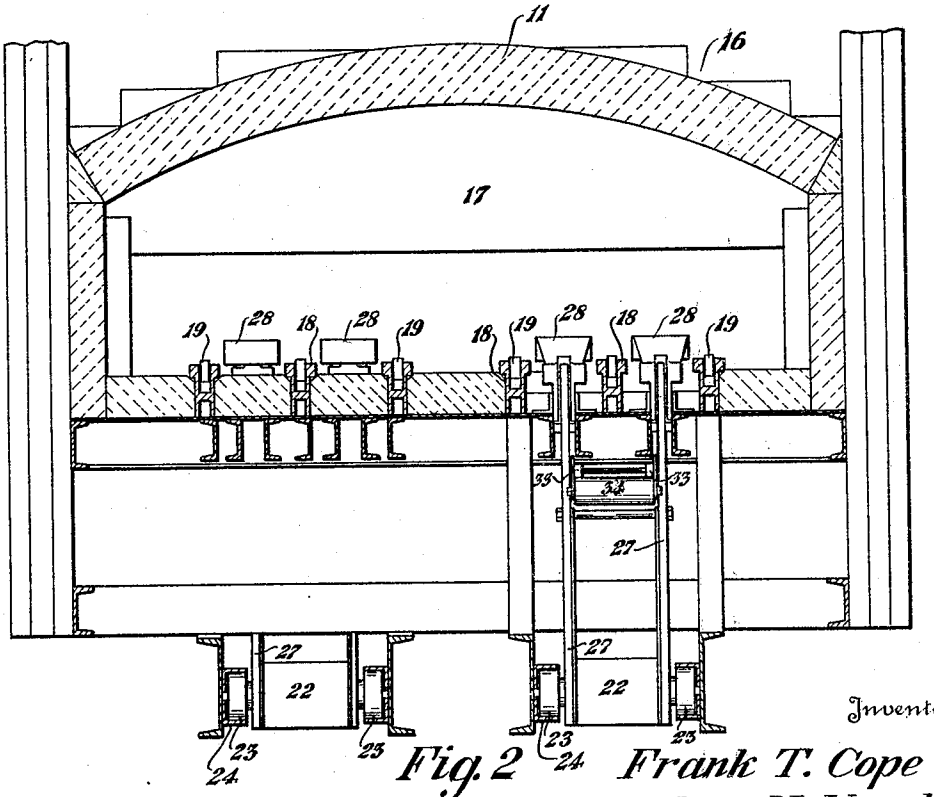


Fig. 2

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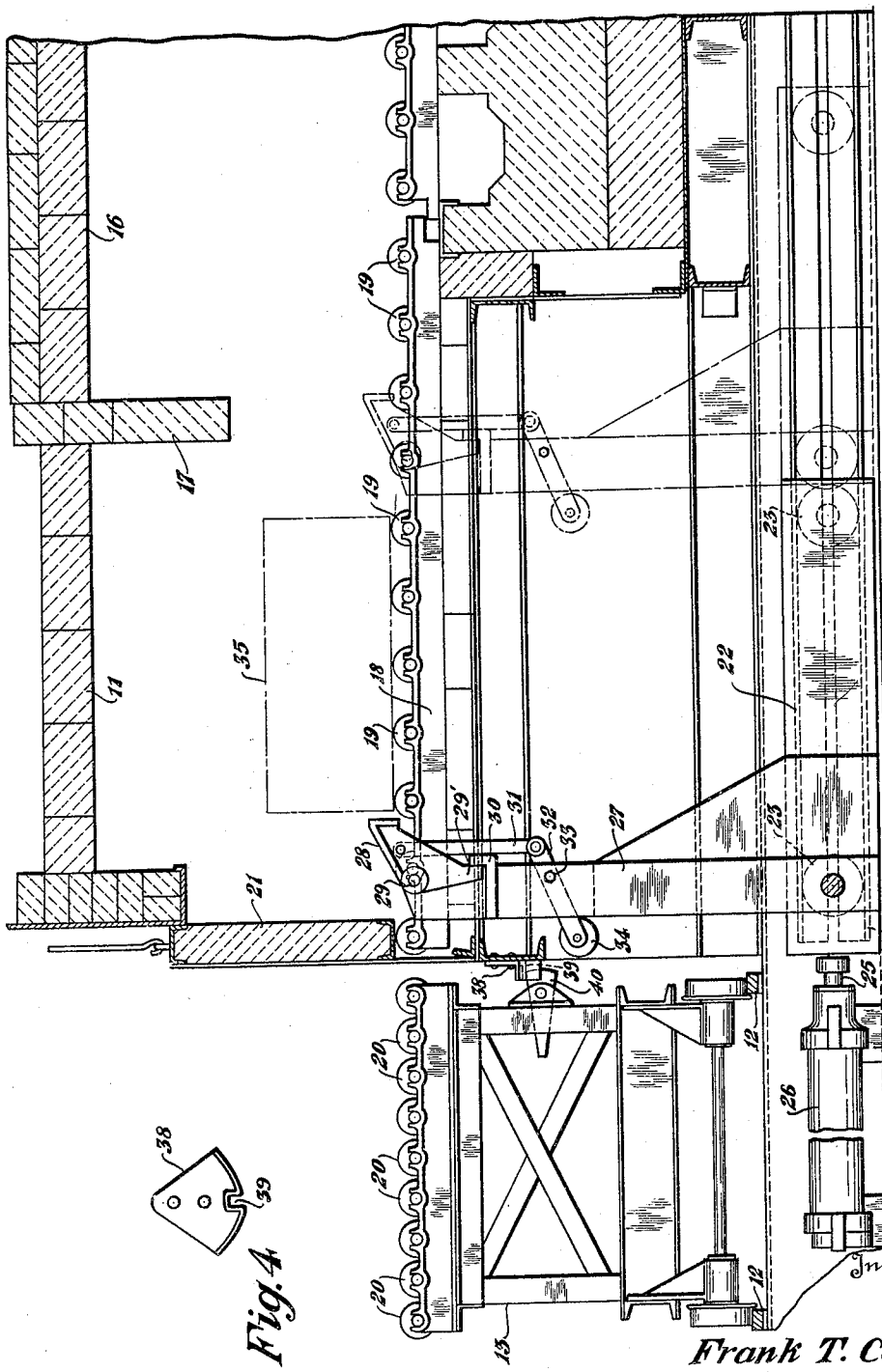


Fig. 3

Fig. 4

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UNITED STATES PATENT OFFICE

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HANDLING ARRANGEMENT FOR FURNACES

Application filed December 24, 1928. Serial No. 328,273.

The invention relates to furnaces and particularly to furnaces of the continuous or intermittent type adapted for the heating, heat treating and annealing of material.

The objects of the improvements are to provide in combination with a furnace or plurality of furnaces, a transfer car adapted to convey material from a charging station adjacent to the furnace or furnaces to and from each of the furnaces; a receiving and discharging hood being located at the end of each furnace for receiving material from the transfer car, and a disappearing pusher being located within each receiving hood, adapted to normally protrude above the hearth of the furnace and arranged to be depressed by the movement of material thereover.

Another important object of the improvement is to provide a hood at the end of the furnace, to prevent the heat loss which would occur in a furnace open at its ends sufficiently long to clear material under the doors.

An embodiment of the invention is illustrated in the accompanying drawings, in which

Figure 1 is a diagrammatic plan view of a battery of furnaces provided with receiving hoods and showing the arrangement of transfer car and charging station;

Fig. 2, a vertical transverse section through the receiving hood, showing the disappearing pusher;

Fig. 3, a vertical longitudinal section through the receiving hood and the adjacent portion of the furnace, showing the disappearing pusher and the transfer car; and

Fig. 4, a detached elevation of the latch plate.

Similar numerals refer to similar parts throughout the drawings.

As shown in Fig. 1, a battery of furnaces may be located together in parallel position as indicated generally at 10, each furnace having at each end thereof a receiving and discharging hood 11, a track being located on the charging floor adjacent to each row of receiving hoods as shown at 12 for movement thereon of a transfer car shown generally at 13.

These tracks are located in communication with opposite ends of the conveyers or tracks 14 leading to and from a charging station 15 which may be located at one side of the battery of furnaces.

Each furnace indicated generally at 16 may be of the continuous or intermittent type, being arranged for step by step movement of material therethrough and the receiving and discharging hoods 11 are located in alignment with opposite ends of the furnace, being separated therefrom as by a depending partition wall 17 terminating at a point spaced above the hearth to permit material or articles to be moved to and from the furnace and hood.

A continuous hearth extends entirely through each furnace and the receiving and discharging hoods thereof and if it is desired to provide a furnace of the recuperative type, two such hearths may be located side by side as best shown in Fig. 2.

The hearth comprises a plurality of spaced rows of conveyers of any suitable description such as the roller conveyers illustrated, which may comprise the supporting frames 18 upon which are journaled the rollers 19, there being longitudinal slots in the hearth between certain of the rollers as shown in Fig. 2.

The transfer car may be provided with a similar roller table or conveyer having the rollers 20 located in the same horizontal plane as the rollers 19 of the hearth of each furnace and as best shown in Fig. 3, the cars are arranged to be moved into alignment with any one of the hearths, after which the door 21 of the furnace may be opened to permit material or articles upon the roller table of the transfer car to be moved onto the hood and upon the hearth therein.

For the purpose of moving the material from the hood into the furnace and for giving it step by step movement therethrough, a pusher mechanism is provided, which may comprise the carriage 22, having wheels or rollers 23 arranged to travel upon the track 24 located below the floor of the hood, the carriage being spaced considerably below the hearth and below the level of the transfer car tracks 12.

This carriage is adapted to be moved horizontally upon the track as by the piston rod 25 of the fluid cylinder 26 located without the furnace in alignment with and connected to the carriage. Thus the pusher mechanism is located below the path of the transfer car so as not to interfere in any way with the charging of the furnace.

A substantially upright vertical pusher arm 27 is carried by the carriage and extends upward to a point just below the tops of the hearth rollers 19, a pusher finger 28 being pivoted upon said arm as at 29 and adapted to normally protrude above the level of the hearth rollers as shown in Figs. 2 and 3.

This pusher finger has a depending stop portion 29′ arranged to contact with the stop flange 30, upon the pusher arm 27, to limit the upward movement of the pusher finger.

For the purpose of normally holding the pusher finger in this raised position, a link 31 connects the same with one end of a lever 32 pivoted as at 33 upon the pusher arm and having a counterweight 34 at its other end.

When material is moved from the transfer car onto the hearth of the hood, it will be seen that the material passing over the pusher finger 28 will depress the same to the level of the hearth rollers and as the material passes over the finger, the counterweight will bring it back to the normal position. The material is then placed upon the hearth rollers, within the hood, as indicated in dot and dash lines at 35 in Fig. 3.

The fluid cylinder 26 is then operated to move the carriage from the full line to the broken line position shown in Fig. 3 and the pusher finger will thus contact with the rear end of the material and carry the same forward from the hood into the furnace.

As successive loads of material are thus moved forward from the hood into the furnace, the entire train of material will be thus moved step by step through the furnace, moving upon the roller hearth therein and finally being ejected from the furnace into the hood at the opposite end thereof and the operator may then remove the material therefrom onto the transfer car which is first positioned in alignment with the same.

For the purpose of accurately registering the transfer car with the charging or discharge door of the furnace, a latch plate 38 may be fixed to the outside of the furnace, adjacent each door and provided with a notch 39 adapted to be engaged by a pivoted latch 40, upon the car.

From the above, it will be evident that a handling arrangement is provided by means of which material may be carried from a charging point, delivered to a transfer car and carried to the entrance end of any desired one of a battery of furnaces and charged into the hood thereof, disappearing pusher means being provided in the hood, which permits the material to be placed upon the hearth, after which the pusher means is operated to carry the material step by step through the furnace; the material discharged from the hood at the opposite end of each furnace being discharged directly upon a transfer car by means of which the material may be conveyed back to the charging point or other point of delivery.

We claim:

1. A furnace having a hearth comprising spaced rows of rollers, the hearth having a longitudinal slot formed therein within one end of the furnace, means for moving articles along the hearth, said means including a carriage spaced below the slot, a pusher arm carried by the carriage and extending upwardly therefrom through said slot, a pusher finger pivoted on the arm, and means located in alignment with the carriage for reciprocating the carriage longitudinallly of the hearth.

2. A furnace having a hearth comprising spaced rows of rollers, the hearth having a longitudinal slot formed therein within one end of the furnace, means for moving articles along the hearth, said means including a carriage spaced below the slot, a pusher arm carried by the carriage and extending upwardly therefrom through said slot, a pusher finger pivoted on the arm, means for normally holding the finger above the level of the hearth, and means located in alignment with the carriage for reciprocating the carriage longitudinally of the hearth.

3. In combination, a charging floor, a furnace supported on the charging floor, said furnace having a hearth comprising spaced rows of rollers, the hearth having a slot formed therein at one end of the furnace, a carriage located below the charging floor and under the slot, a pusher arm on the carriage extending upwardly therefrom through the slot and having a pusher finger pivoted thereon for engaging articles on the hearth, and means in alignment with the carriage for reciprocating the carriage to move articles on the hearth.

4. In combination, a furnace having a hearth comprising spaced rows of rollers for carrying articles along said hearth, a transfer car having rollers and adapted to be positioned at the charging end of the furnace so as to align said rollers with said hearth rollers, the hearth having a slot formed therein adjacent the charging end of the furnace, a pusher carriage spaced below said slot, an arm mounted on said carriage and extending upward through said slot, a pusher finger pivoted on said arm at its upper end and adapted to engage articles on said hearth, and means located below the path of the transfer car for causing reciprocatory motion of said pusher carriage.

5. In combination, a furnace having a re-

ceiving hood at one end thereof, a hearth comprising spaced rows of rollers extending into the hood, a transfer car operating adjacent the receiving hood and having spaced rows of rollers adapted to be aligned with the rows of rollers on the hearth, the hearth having a slot formed therein under the hood, a pusher carriage below and spaced from said slot, an arm mounted on said carriage and extending upwardly through the slot, a pusher finger pivoted on said arm at its upper end for moving articles on the hearth, and means outside of the furnace for reciprocating the pusher carriage, said means being located below the path of the transfer car.

In testimony that we claim the above, we have hereunto subscribed our names.

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