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H. H. HARRIS

2,148,464

HEAT TREATING FURNACE TRAY

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Fig. 1.

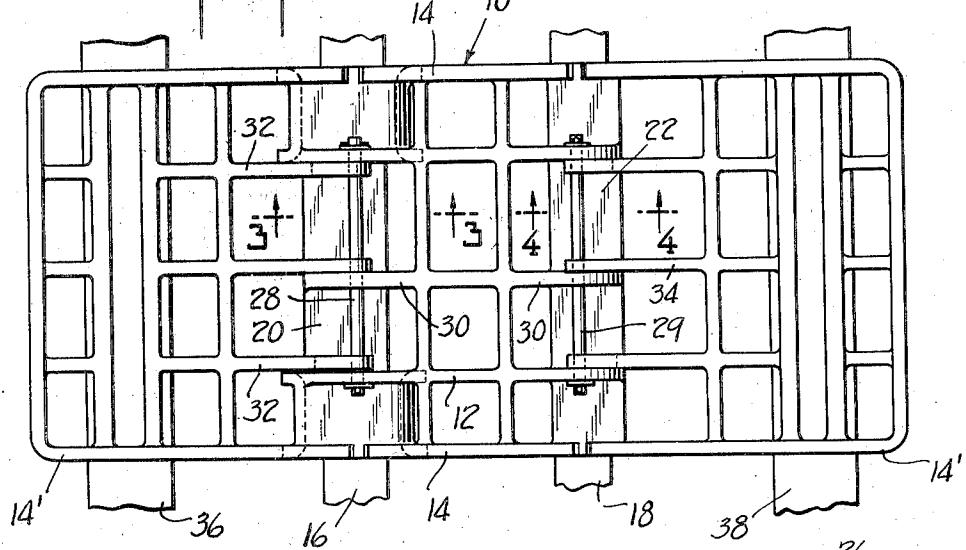


Fig. 2.

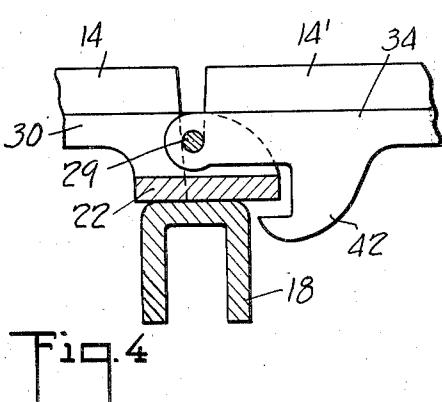
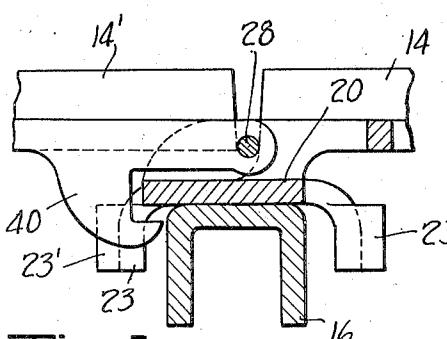
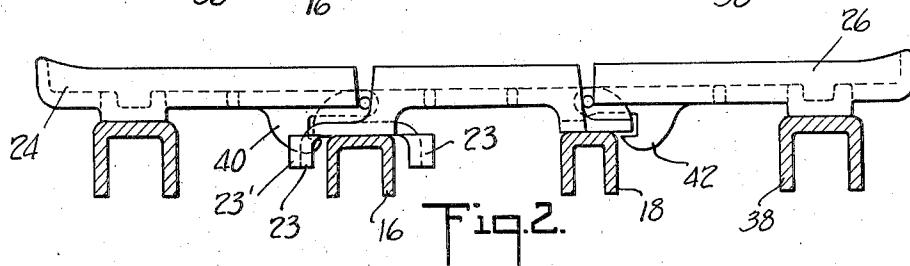


Fig. 3.

Fig. 4.

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HEAT TREATING FURNACE TRAY

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4 Claims. (Cl. 263—49)

My invention relates to heat treating furnaces, and particularly to heat and corrosion resisting alloy members used therein, especially the rails and the trays which travel upon the rails and carry loads of the work to be heat treated, annealed, and the like.

The present invention is in part an improvement on my Patent No. 2,022,283, granted November 26, 1935.

10 While the arrangement shown in the drawing of my said patent, and consisting of two tray portions hinged together and travelling, with or without an underlying shoe, upon three rails, is a great advantage over prior practice in which the 15 hinge arrangement was lacking, I have found that improvement could be made therein in several respects as will be pointed out.

With a furnace containing three longitudinal rails as shown in the drawing of said patent, 20 each tray portion must span substantially half the furnace width and must be made correspondingly strong and comparatively heavy. When the underlying shoe arrangement is provided, this shoe is an extra part to be made and for which material must be supplied, and yet the shoe performs no work-carrying function.

By the present invention I provide an odd number of tray portions, three tray portions being shown for purposes of illustration. One of the 30 tray portions is centrally disposed, and the others are wing trays hingedly related thereto at each side. The trays and the rails on which they travel are made as castings of heat and corrosion resisting alloy, preferably iron, chromium and 35 nickel alloy.

The central tray portion carries its share of the work and is mounted to travel on a plurality of rails, two rails being shown for illustration. I also provide wing tray portions hinged to the 40 central portion, or hinged to a tray portion which is hinged to the central portion, and each wing tray portion is traveled over one or more rails, one such rail being shown for illustration.

With such arrangement all the sections of the 45 tray perform useful load-carrying work. The rails, while increased in number, can be made lighter in section and serve to better distribute the weight in the furnace, and the span covered by any one of the tray portions is reduced, permitting notable saving in weight of metal and 50 ensuring increased efficiency generally at less cost.

As in my said patent, the hinge construction permits the weights which are carried to be supported uniformly by the rails, there being no

spanning or stiff, rigid tray sections across an intermediate rail to rest only thereon if the rail should be bulged up or otherwise raised, or to fail to make contact with such intermediate rail, if it or parts of it should be depressed below the rail 5 portions on either side.

In my drawing,

Fig. 1 is a plan view of the hinged tray in three portions or sections;

Fig. 2 is a section taken lengthwise of the tray 10 formation of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 1; and

Fig. 4 is a section on line 4—4 of Fig. 1.

The central tray portion is indicated by reference numeral 10, its bottom 12 being preferably 15 of light skeleton formation, and guard rails 14, 16 being provided to retain work placed thereon.

The central tray portion 10 is traveled along the rails by pushing, or otherwise. This tray portion is supported by a plurality of rails, preferably 20 two rails 16, 18. Skid rails are shown, but roller rails can also be used.

The central tray portion or section 10 is preferably cast or otherwise formed with bearing and laterally stiffening members 20, 22 to ride on the 25 rails 16, 18, and also to transmit pushing stresses should the furnace be of the pusher type wherein trays are traveled along by pushing from behind as new trays are inserted into the furnace.

Means are provided for guiding and retaining 30 the central tray portion 10 on the rails, as for example, support member 20 may be provided with downwardly extended lugs 23 which project down on each side of rail 20, and these lugs 23 may have outer enlarged faces 23' to give extended pushing contact area.

Single wing tray portions 24 and 26 are shown in the drawing hinged one on each side to the central tray portion 10. These tray portions, as also tray portion 10, are preferably made with 40 skeleton bottoms to permit free access of heat and furnace gases to the work carried thereby, and are also provided with guard rails 14' to keep work from slipping off. The illustrated hinging connection consists of pins 28, 29 passing loosely 45 through the bar portions 30, 30 of tray portion 10 and through bar portions 32, 32 and 34, 34 of the wing tray portions 24 and 26 respectively.

The bar portions 30, 32 and 34 are preferably 50 so spaced that the hinge connection, in addition to loosely hinging the parts together, serves to prevent lateral displacement between tray portions in the direction of travel. The arrangement shown for this purpose consists of arranging two of the bar portions 32 and 34 of trays 24 and 55

26 respectively between a pair of the bar portions 30, 30 of the central tray portion 10. One rail 36 is shown for supporting the outer end of wing tray portion 24, and another rail 38 for supporting the opposite and also outer end of tray portion 26.

10 The wing tray portions 24 and 26 are provided, towards the outer ends thereof furthest from their hinge connections, with bearing portions 44, 46, 15 respectively, to ride on rails 36 and 38 and to give stiffness to the structure as when being pushed through the furnace.

15 It is sometimes necessary to lift the trays and loads as by means of hoists or the like. It is of assistance in this connection to be able to attach the hoisting hooks or other lifting devices to each end of the tray structure. Accordingly I provide hinging limit means such as the hooks 20, 40, 42 on the wing tray portions 24 and 26 to catch under the supporting bearing bars 20, 22 20 of central tray 10. When the tray structure is lifted by its extreme ends, all the tray portions and their loads are lifted together with only the central tray portion sagging somewhat, the hooks 25 40, 42 engaging the under sides of the bearing bars 20, 22.

30 While I have shown but one central tray portion and one wing tray portion on each side, or three tray portions in all constituting the entire tray, other odd numbers of tray portions can be used, as five tray portions (not shown), the additional wing tray portions being hinged to the outer ends of each of the wing tray portions 24, 26.

I claim:

35 1. The combination, in heat treating trays, of a central tray portion having bearing portions

adapted to travel on a plurality of rails, with a pair of tray portions, one of which is hinged to the central tray portion at each side thereof, and each of said last named tray portions being provided with a bearing portion near its outer side 5 adapted to travel on a single rail.

2. In heat treating trays, the combination of a central tray portion having bearing portions adapted to travel on a plurality of tracks and provided with means to retain and guide the 10 tray portion on at least one of the tracks, a side tray portion hinged to one side of said central tray portion, a second side tray portion hinged to the opposite side of said central tray portion, each of said side tray portions being provided 15 with bearing surfaces adapted to travel on a single rail.

3. A central tray portion, and two side tray portions, one thereof hinged to each side of the central tray portion, and hinging limit hook 20 means adapted to limit the turning movement at the hinges, whereby the complete three-portion tray can be picked up by elevating means applied to the ends thereof.

4. In heat treating trays, the combination of 25 an openwork central tray portion, an openwork side tray portion loosely hinged to the central tray portion at one side, an openwork side tray portion loosely hinged to the central tray portion at the opposite side, and hooks depending from 30 each of the side tray portions and projecting beneath a part of said central tray portion, whereby, when the side tray portions are lifted, the central tray is also lifted therewith.

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