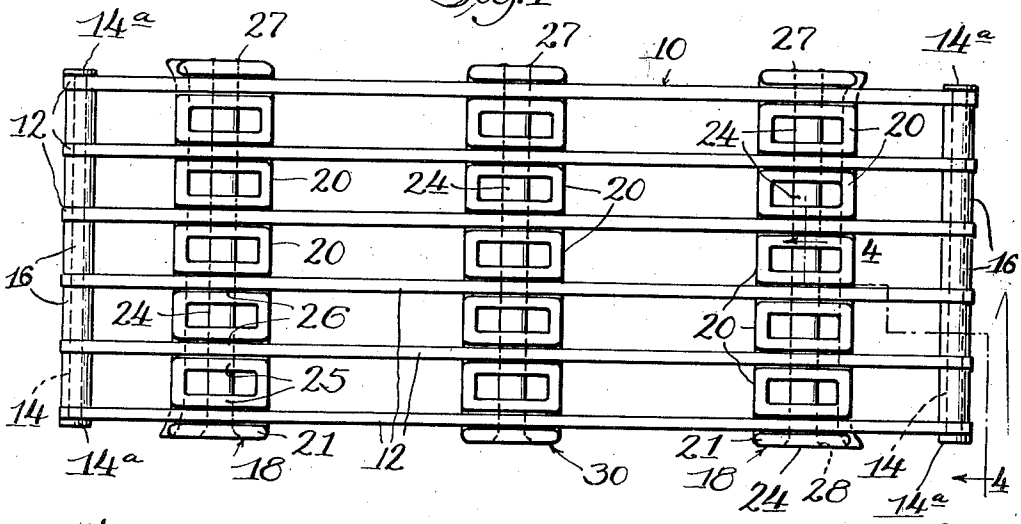
Jan. 31, 1939. F. J. BLANEY 2,145,708

FLEXIBLE TRAY FOR CARBURIZING FURNACES

Filed April 6, 1938

Fig. 1



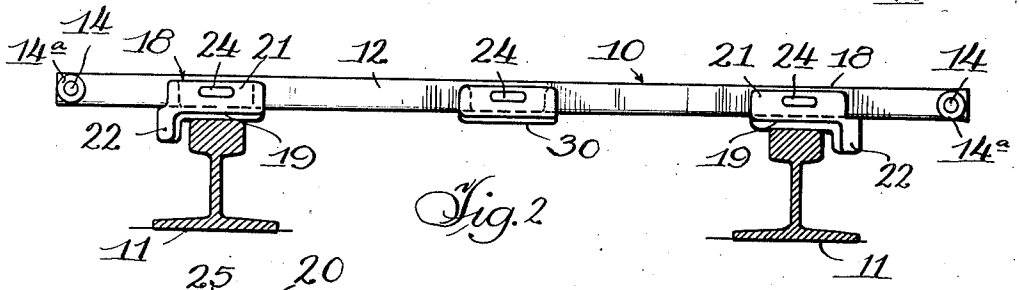


Fig. 2

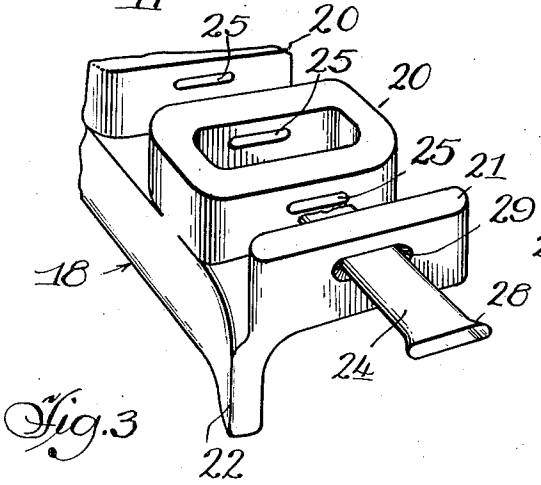


Fig. 3

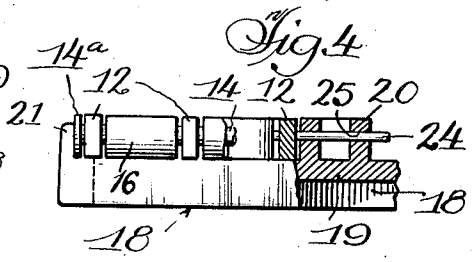


Fig. 4

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UNITED STATES PATENT OFFICE

2,145,708

FLEXIBLE TRAY FOR CARBURIZING FURNACES

Fred J. Blaney, Springfield, Ohio, assignor to The Ohio Steel Foundry Company, Lima, Ohio, a corporation of Ohio

Application April 6, 1938, Serial No. 200,340

4 Claims. (Cl. 263—49)

This invention relates to improvements in work trays for carburizing furnaces and the like, on which material is supported for treatment under high heat conditions.

The principal object of the invention is to provide an improved form of heat-resisting tray having flexibility as one of its principal characteristics. Said tray is made of separate pieces, loosely joined together, so as to overcome the effects of unequal stresses ordinarily induced by heat in rigid structures of the type previously employed for the purpose, which stresses usually resulting in warping, twisting and breakage of the tray, and shortening of its useful life.

The invention may best be understood by reference to the accompanying drawing, in which

Fig. 1 is a plan view of a tray constructed in accordance therewith.

Fig. 2 is an end view of the tray illustrated in Fig. 1, showing it mounted on supporting rails.

Fig. 3 is an enlarged detail perspective view of one of the cross supports with the supporting bars removed and a part of a tie rod partially withdrawn from one end thereof.

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

In the embodiment of my invention illustrated in the drawing, the tray is indicated generally at 10, and is designed to be supported in sliding engagement along rails 11, 11 which may pass as usual through a carburizing or other furnace of any suitable form, details of which need not be shown herein. The tray is provided to support work or material while it is being treated under high heat conditions in such furnaces. While especially adapted for progression through a continuous furnace as suggested, the tray can also be used with other types of furnaces.

The tray is made up of a plurality of parallel equispaced supporting bars 12, 12 held together at their opposite ends by the tie bars 14, 14 passing loosely through an end hole in each of said bars, and also through hollow spacing tubes 16, 16 which define the distance between adjacent bars. The outer ends of said tie bars have heads 14^a, 14^a suitably fixed thereon, as by welding, and loosely engaging the outer faces of the outermost bars.

Adjacent each end of the tray and extending the full width thereof is a support or runner 18 including a web 19 in supporting relation below the supporting bars 12, and a plurality of hollow rectangular bosses 20, 20 formed integral with said web. Said bosses project upwardly between adjacent pairs of bars, but with the side faces of each pair of adjacent bosses spaced apart to form a channel to receive the intermediate bar in loosely fitting engagement therein. The runners 18 also have integral end pieces 21, 21 loosely fitting against the outer face of the outermost bars. In the form shown, the runners 18, 18 are designed to be slidably mounted on the track rails, and therefore each of said runners is spaced apart to register with said rails, and also has an integral depending flange 22 along one edge thereof to form guides for the tray.

The runners are connected to each of the supporting bars by tie bars 24, which as herein shown are relatively flat and extend in loose-fitting engagement through registering holes or slots 25, 25 in the bosses 20, and similar holes or slots 26, 26 in the bars 12. The tie bars 14 are loosely fastened in place, as for instance by welding one end of each bar to one of the end pieces 21, as indicated at 27, and providing the opposite end with a head 28 in loose-fitting engagement in a countersunk recess 29 formed in the opposite end piece.

With the loose-fitting construction above described, the bars are permitted to have limited universal movement in any direction with respect to the furnaces or supports.

One or more additional transverse supports may also be provided, as indicated at 30. In the form shown, the single support at the center of the tray is similar in construction and arrangement to the runners 18, 18, excepting that it does not have a depending flange to engage a track.

The operation and advantages of the tray above described will now be understood. The bars 12, 12 form a substantial supporting surface for the work, but are flexibly supported and loosely connected together by the end tie bars 14, 14 and intermediate supports 18 and 30, all affording a structure sufficiently rigid for its intended purpose, and yet sufficiently flexible and loosely connected to accommodate itself to the differences in expansion and contraction, and thus be able to withstand the varying temperatures and resulting stresses and shocks imposed thereon, without warping or breaking. It is also capable of compensating for unevenness of the supporting rails, when progressed therealong in a continuous furnace. The parts of the tray are simple and economical to manufacture, and broken parts can be readily replaced as required, rather than discarding the entire tray on account of failure of a single part thereof.

Although I have shown and described one particular embodiment of my invention, it will be

understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of my invention as defined in the appended claims.

I claim as my invention:

1. In a work tray for furnaces, a plurality of parallel supporting bars and a plurality of transversely disposed supporting members, each of said supporting members including a plurality of spacing members, and connecting means passing through said spacing members and all of said supporting bars to provide loose fitting vertical and lateral engagement between said supporting bars and said supporting members at a plurality of points both along the margins and between opposite margins of the tray, whereby the tray structure can readily accommodate itself to stresses due to temperature changes imposed on the several parts thereof.

2. In a work tray for furnaces, a plurality of parallel supporting bars and a plurality of transversely disposed supporting members, each of said supporting members including a plurality of spacing members, and connecting means passing through said spacing members and all of said supporting bars so as to provide loose fitting vertical and lateral engagement between said supporting bars and said supporting members at a plurality of points both along the margins and between opposite margins of the tray, and certain of said supporting members having depending guide means formed integral therewith for engagement with track rails, whereby the tray structure can readily accommodate itself to stresses due to temperature changes imposed on the several parts thereof, and to variations in level of said track rails.

3. In a work tray for furnaces, a plurality of similar parallel supporting bars and a plurality of transversely disposed supports having loose connection therewith, at least some of which comprise continuous bottom webs each having integral upstanding projections with channels therebetween adapted to receive said bars in loose fitting engagement therein, said bars and said projections having registering holes therethrough, and a tie bar passing in loose fitting engagement through said holes whereby each of said bars has limited universal movement relative to each of said supports.

4. In a work tray for furnaces, a plurality of similar parallel supporting bars and a plurality of transversely disposed supports having loose connection therewith, at least some of which comprise continuous bottom webs each having depending guide means adapted for engagement with a track rail, and integral upstanding projections with channels therebetween adapted to receive said bars in loose fitting engagement therein, said bars and said projections having registering holes therethrough, and a tie bar passing in loose fitting engagement through said holes whereby each of said bars has limited universal movement relative to each of said supports.

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