

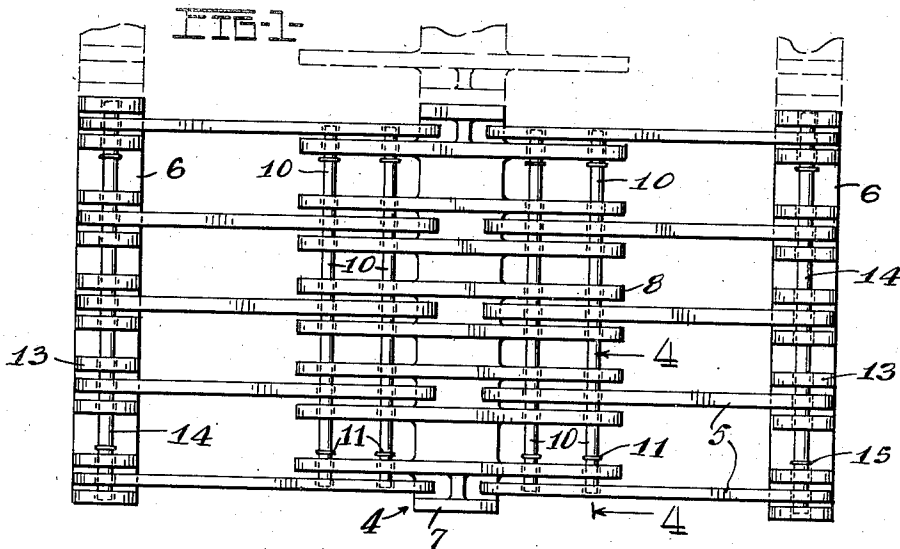
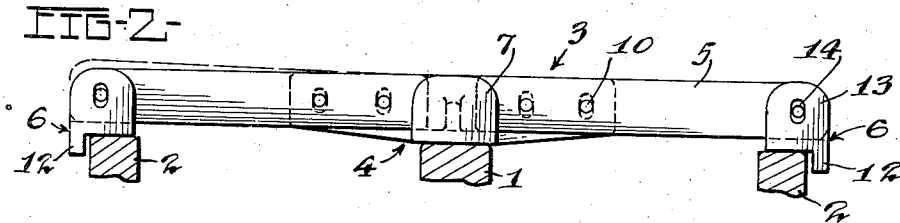
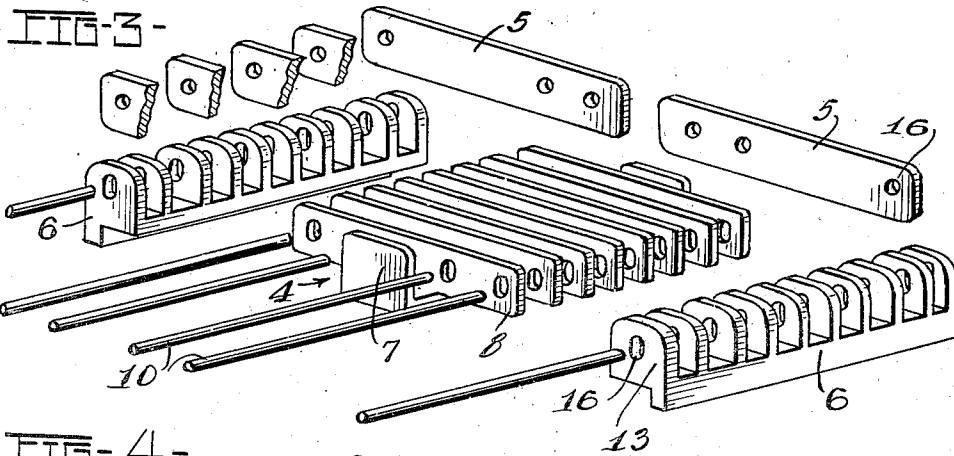
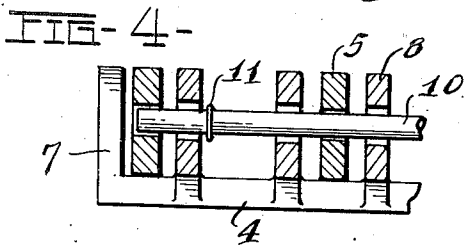
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FLEXIBLE WORK TRAY FOR HEAT TREATING FURNACES

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FLEXIBLE WORK TRAY FOR HEAT-TREATING FURNACES

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This invention relates to work trays for carburizing furnaces and the like on which material is supported for treatment under various heat conditions, and relates particularly to flexible trays of this type.

The object of the invention is the provision of a tray of this character having a plurality of sections, preferably a center and two opposing side sections, for running respectively on the center and side supporting rails of a three-rail track, with the sections connected for relative movements and with at least the side sections made of separate pieces loosely joined together to permit warping and twisting of the sections without strain or liability of breakage in use.

The invention is fully described in the following specification, and a preferred embodiment thereof illustrated in the accompanying drawings, in which—

Fig. 1 is a plan view of a sectional tray embodying the invention, in pushing abutment against another tray partially shown; Fig. 2 is an end view thereof, with the supporting rails in cross-section; Fig. 3 is a perspective view of the various parts of the tray in disassembled relation with some parts broken away and some removed, and Fig. 4 is an enlarged section on the line 4—4 in Fig. 1.

Referring to the drawings, 1 designates the center rail and 2, 2 the side rails of a track extending through a heat treating oven, and 3 the material carrying tray which rests on the rails and is guided thereby for movement through the oven.

The tray 3 comprises a center or body part 4 forming a runner for resting on the center rail 1, a plurality of side bars 5 projecting in sets from each side of the part 4, and loosely connected thereto for limited relative movements, and a side runner 6 at the outer end of each set of bars 5 loosely connected thereto and adapted to rest on the respective side rail 2.

The runner or center part 4 is of skid-bar form to rest on the center rail 1 lengthwise thereof and preferably has its ends turned up, as at 7. Provided on the top of this bar in rigid or integral connection therewith, with their ends preferably projecting beyond the same, are a plurality of spaced parallel slat-like cross-bars 8 with their flat sides facing each other. The end bars of this set are spaced, in the present instance, from the turned-up end parts 7.

The side bars 5 are parallel and of slat-like form, and extend at their inner ends into registering spaces between or at the sides of said cross-

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bars 8 at their adjacent ends, and are connected thereto for free relative vertical rocking and transverse twisting movements by a pair of transversely spaced rods 10 paralleling the runner 4.

The rod-receiving openings in both the cross-bars 8 and the side bars 5 are larger than the diameter of the rods, and those in the cross-bars are preferably vertically elongated to allow for a greater vertical than horizontal movement of the rods therein. The spacing of the rods 10 is lengthwise of the connected bars or transversely of the runner 4, and the inner ends of the side bars 5 preferably, but not necessarily, rest freely on the adjacent side edges of the runner. It is thus apparent that the vertical rocking movements of the bars 5 relative to the cross-bars 8 are limited mainly by the cooperating action of the rods 10 and to some extent by the coaction of the bars 5 with the center runner. In the present instance, the two outer side bars 5 lap the outer sides of the respective outer cross-bars 8 and enter the spaces between such bars 8 and the turned-up ends 7, while the intermediate side bars 5 extend between the members of the spaced pairs of bars 8. The rods 10 are retained in assembled relation with the cross and side bars by the provision thereon of annular shoulders or ribs 11 in position to coact with certain of the cross-bars 8.

Each runner bar 6 is of substantially flat form to adapt it to rest on a respective side rail 2, and is provided at its outer edge with a depending flange 12 for guiding engagement with the rail. On the top of the bar are provided a plurality of upstanding cross-ears or flanges 13 corresponding in position and spacing to the parts 7 and cross-bars 8 of the center runner 4. To these ears are loosely attached the outer ends of the side bars 5 by a rod 14 held in assembled relation thereto by shoulders 15 thereon. The openings 16 in both the bars and the ears through which the rods 14 extend are larger than the rods to permit free lost motion movements thereof, and the ear openings are preferably vertically elongated.

It is apparent from the foregoing description that the provision of the multiple parts forming the tray and the loose manner of connecting such parts permit both pivotal and various twisting movements of the side tray portions, so as to permit the tray to adapt itself to any unevenness in the supporting rails over which traveling and also to prevent warping or distortion of the tray under varying heat conditions and consequent breakage when subjected to stresses or when heavy materials are supported thereby.

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It is found in practice that the best results in preventing breakage of a tray are obtained by combining a relative vertical pivotal action of opposing side parts thereof with a loose connection of the members forming such parts, whereby the structure is sufficiently rigid to support heavy materials and is sufficiently flexible and loosely connected to accommodate itself to any unevenness in the supporting rails or difference in their levels, and to the differences in expansion and contraction to which subjected in use, and thus be able to withstand the varying temperatures and resulting stresses and shocks imposed thereon without permanent warpage or breakage.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent, is:

1. In a three-rail supported work tray for furnaces, a center runner having longitudinally spaced rigidly connected side projections, a plurality of side bars projecting in both directions from said member and lapping the inner ends of the adjacent projections, multiple rods loosely connecting each set of side bars and projections to permit various limited movements of the bars relative to each other and to said runner, and a side runner having loose pivotal connection with the outer ends of the bars at each side of the center runner.

2. In a work tray for furnaces, a center runner and side runners for riding respectively on center and side support rails, a center set of cross bars mounted on and rigidly attached to said center member in spaced relation lengthwise of the member with their ends projecting beyond the respective sides thereof, a side set of cross bars at each side of the center runner lapping the adjacent ends of some at least of said center set of bars and having multiple longitudinally spaced lost motion connection therewith for relative vertical movements and having their outer ends in flexible joint connection with the respective side member.

3. In a three-rail supported work tray for fur-

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naces, a center runner and opposing side runners for riding on respective supporting rails, said center runner having rigidly connected transverse projections at its sides spaced lengthwise of the runner, a plurality of side bars at each side of the center runner and lapping certain of said projections and loosely connected at their outer ends to the respective side runner, and means connecting the ends of said side bars to the respective projections in spaced relation lengthwise thereof to permit limited relative vertical movements of the side bars and projections transverse to the center runner.

4. In a three-rail supported work tray for furnaces, a center runner and opposing side runners, the center runner having a set of center cross bars fixed thereto and projecting transversely from the respective sides of the runner in spaced relation lengthwise thereof, the side runners each having a series of lugs projecting upwardly therefrom and forming a plurality of transverse spaces lengthwise thereof, a plurality of side bars at each side of the center runner with each bar at its inner end entering a different space between said projection and resting on the center runner and at its outer end entering a different space between said lugs and resting on the respective side runner, a rod for each side runner projecting through the lugs thereof and the side bars to loosely connect them together, and two rods projected through the projecting ends of said center bars and the inner ends of the respective side bars in spaced relation lengthwise thereof and at each side of the center runner to loosely connect the projections and side bars together for predetermined lost motion movements.

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