Dec. 14, 1948. W. G. BALLANTYNE ET AL 2,456,481

RIGID LIGHTWEIGHT METAL TRAY

Filed April 25, 1946 2 Sheets-Sheet 1

Fig. 1

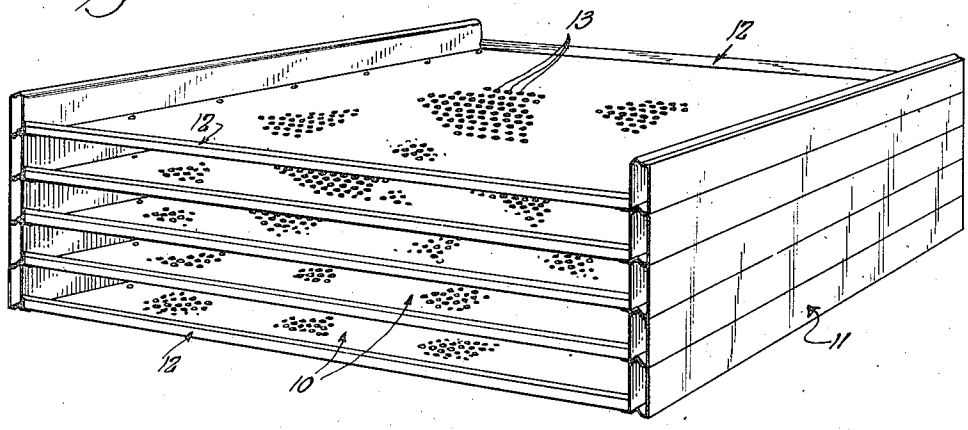
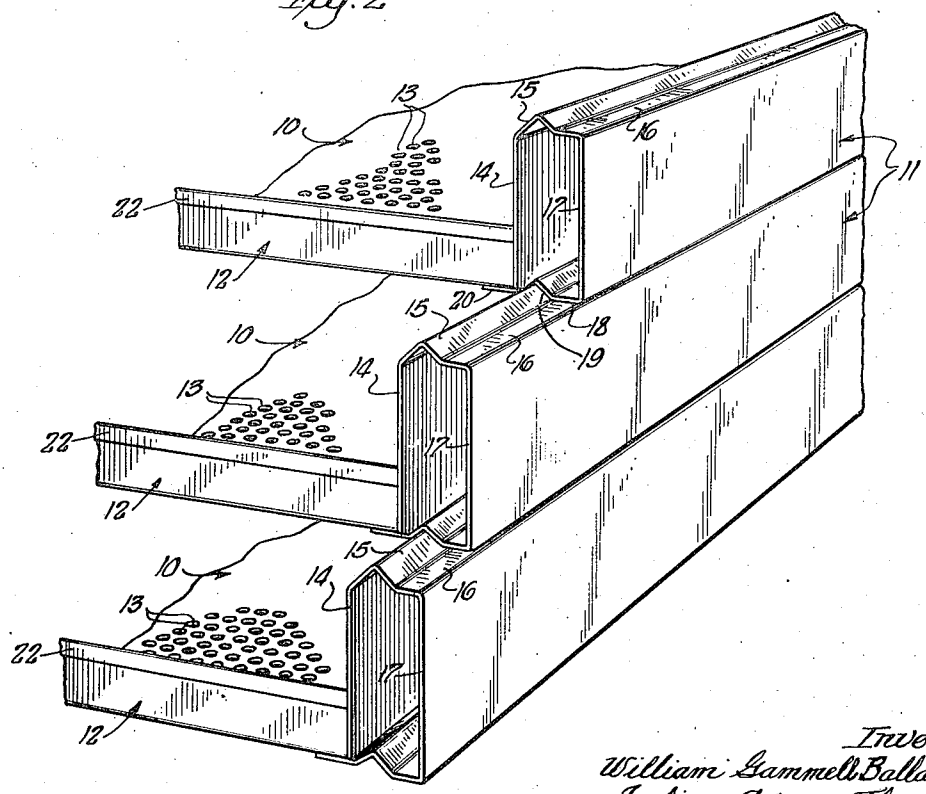


Fig. 2



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Fig. 3

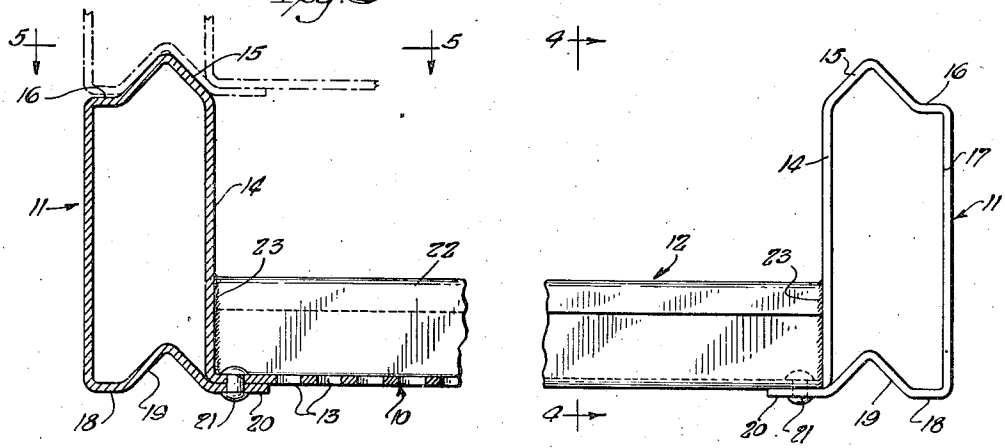
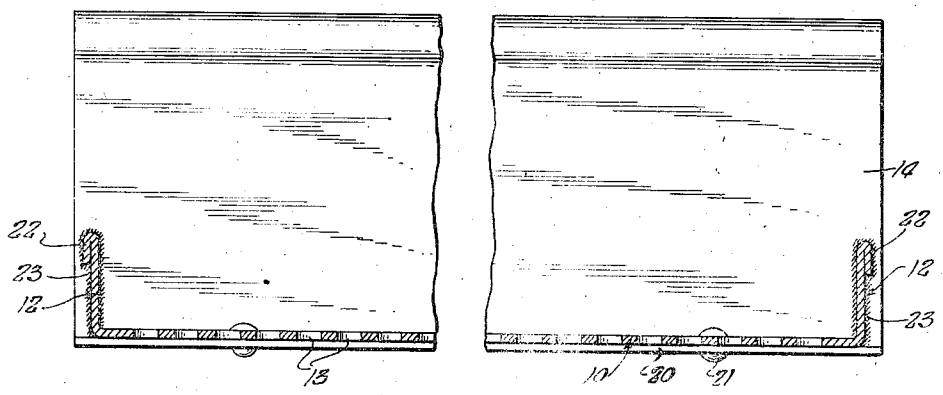


Fig. 4



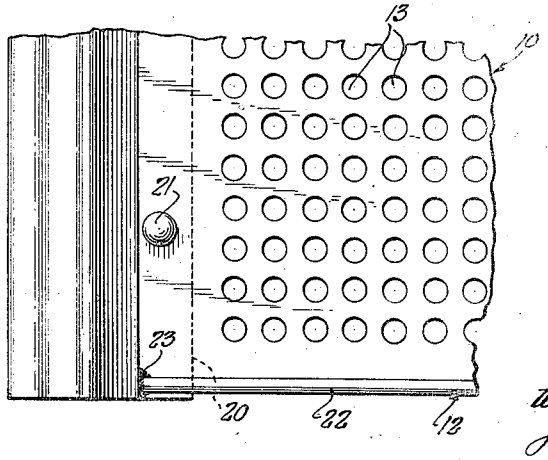


Fig. 5

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UNITED STATES PATENT OFFICE

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RIGID LIGHTWEIGHT METAL TRAY

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Application April 25, 1946, Serial No. 664,939

2 Claims. (Cl. 34—238)

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Our invention relates to trays and more particularly to trays of good heat-conducting material suitable for use in the freezing or dehydrating of fruits or vegetables.

An object of our invention is to provide all metal trays suitable for the aforementioned purposes which are of relatively light weight and at the same time desirably rigid, strong and durable.

Another object of our invention is to provide desirably rigid, strong and durable trays, of relatively light weight and otherwise suitable for the aforementioned purposes, each of which may have all of its essential elements formed from a single piece of sheet metal.

Another object of our invention is to provide desirably light weight, rigid, strong and durable trays which readily may be assembled in stable stacks requiring no elements other than the trays themselves to insure their stability.

Another object of our invention is to provide trays of the kind mentioned in the last preceding paragraph which, when assembled into a stack, define spaced-apart substantially continuous vertical walls between which air must flow in passing between contiguous trays of the stack to dehydrate or lower the temperature of the fruits or vegetables supported by the trays.

Salient features of the trays of our invention are hollow metallic side rails affording convenient handles wherewith the trays may be manipulated and through which warm air may be passed to disengage frozen-together trays, which comprise longitudinally extending upwardly presented stacking ridges and downwardly extending stacking grooves complementary to the ridges, and supporting shoulders and seating shoulders, adjacent to the ridges and grooves respectively, cooperating when occasion requires to prevent objectionable distortion of the ridges or groove walls under heavy loads.

The foregoing and other objects, features and advantages of our invention will appear from the following detailed description wherein reference is made to the accompanying two sheets of drawings wherein:

Fig. 1 is a view in perspective of a small stack of the trays of our invention;

Fig. 2 is a fragmentary perspective view, on a larger scale than Fig. 1, clearly depicting how contiguous rails of stacked trays are adapted to cooperate;

Fig. 3 is a view, partly in end elevation and partly in vertical section, of one of the trays;

Fig. 4 is a sectional view which may be regarded as taken in the plane of the line 4—4 of Fig. 3 and looking in the direction indicated by the arrows; and

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Fig. 5 is a fragmentary plan view which may be regarded as taken in the plane of the line 5—5 of Fig. 3 and looking in the direction indicated by the arrows.

Similar characters of reference refer to similar parts throughout the several views.

Each of the trays of our invention consists of a floor or platform 10, a pair of hollow side rails 11—11 and a pair of rail-spacing flanges 12—12, all preferably formed in one piece from a single sheet of a good heat-conducting metal such as aluminum.

The floor or platform 10 is flat and rectangular, and desirably has been rendered foraminous by providing it with ranks and files of small through-apertures 13—13.

The hollow rails 11—11 are disposed at opposite edges of floor or platform 10. Each of such rails 11—11 desirably consists of a comparatively wide imperforate edge portion of the floor or platform 10 which extends substantially upwardly from such floor or platform to provide an inner wall 14, thence further upwardly and outwardly and thence downwardly and outwardly to provide a stacking ridge 15, thence horizontally outwardly to provide a supporting shoulder 16, thence downwardly to provide an outer wall 17 substantially spaced from and parallel with the inner wall 14, thence horizontally inwardly to provide a seating shoulder 18, thence upwardly and inwardly and thence downwardly and inwardly to provide a stacking groove 19, and thence inwardly to provide a lip 20 contiguously underlying the adjacent marginal portion of the floor or platform 10. The lips 20 desirably are attached, as by rivets 21, to the overlying margins of the floor or platform 10.

Each of the rail-spacing flanges 12—12 consists of a comparatively narrow imperforate edge portion of the floor or platform 10 which extends upwardly from such floor or platform and is stiffened by having its upper edge return-bent as indicated at 22. Each end of each flange 12 desirably abuts and is welded, as indicated at 23, to the inner wall 14 of an adjacent side rail 11.

Trays constructed as just described have many advantages. Although they may be and preferably are very light in weight, they are nonetheless very rigid, strong and durable. The side rails 11—11 serve as handles wherewith the trays conveniently may be manipulated. The trays readily may be assembled in stable stacks requiring

for the maintenance of their stability no elements other than those afforded by the trays themselves. This is accomplished by sliding each tray above the lowermost into vertical registry with its underlying tray or trays after the stacking grooves 19—19 of its side rails 11—11 have been caused to receive the stacking ridges 15—15 of the side rails of the next lower tray. Supporting shoulders 16—16 of the side rails of each lower tray cooperate with the seating shoulders 18—18 of the side rails of the next higher tray to prevent distortion of the stacking ridges 15—15 or the walls of the stacking grooves 19—19 under heavy loads. Being formed entirely of metal, the trays afford good transfer of heat from or to their supported fruits or vegetables in any freezing or dehydrating operation.

In any stack of our improved trays the side rails 11—11 of the several trays cooperate to present continuous vertical walls between which air must flow, or may be forced to flow, in passing over the fruits or vegetables supported in the spaces between the several tray floors or platforms. Whenever in a freezing operation contiguous side rails of any two trays of a stack become frozen together, the difficulty readily may be remedied by introducing warm air or other warm fluid into the interiors of the frozen-together rails.

Having thus illustrated and described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A tray of the class described formed of a single piece of sheet metal shaped and conformed to provide a rectangular horizontal foraminous floor, a first pair of flanges coextensive with and upturned from opposite edges of said floor, each flange of said first pair extending substantially upwardly from said floor to provide an inner wall, thence further upwardly and outwardly and thence downwardly and outwardly to provide a stacking ridge, thence substantially horizontally outwardly to provide a supporting shoulder, thence substantially downwardly to provide an outer wall spaced from the inner wall, thence substantially horizontally inwardly to provide a seating shoulder, thence upwardly and inwardly and thence downwardly and inwardly to provide a stacking groove, and thence substantially horizontally inwardly contiguously to underlie a marginal portion of the floor, and a second pair of flanges coextensive with and upturned from the other two edges of the floor and having their ends welded to contiguous ends of the inner wall portions of the flanges of the first pair.

2. A tray of the class described comprising a single piece of sheet metal shaped and conformed to provide a rectangular horizontal foraminous floor, a first pair of flanges coextensive with and upturned from opposite edges of said floor, each flange of said first pair extending substantially upwardly from said floor to provide an inner wall, thence further upwardly and outwardly and thence downwardly and outwardly to provide a stacking ridge, thence substantially horizontally outwardly to provide a supporting shoulder, thence substantially downwardly to provide an outer wall spaced from the inner wall, thence substantially horizontally inwardly to provide a seating shoulder, thence upwardly and inwardly and thence downwardly and inwardly to provide a stacking groove, and thence substantially horizontally inwardly contiguously to underlie a marginal portion of the floor.

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