

- [54] **90° STACKABLE AND NESTABLE TRAY**
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 [51] Int. Cl. B65d 21/04
 [58] Field of Search 220/97 R, 97 C, 97 D,
 220/66, 4 F, 97 F, 72, 74; 211/126

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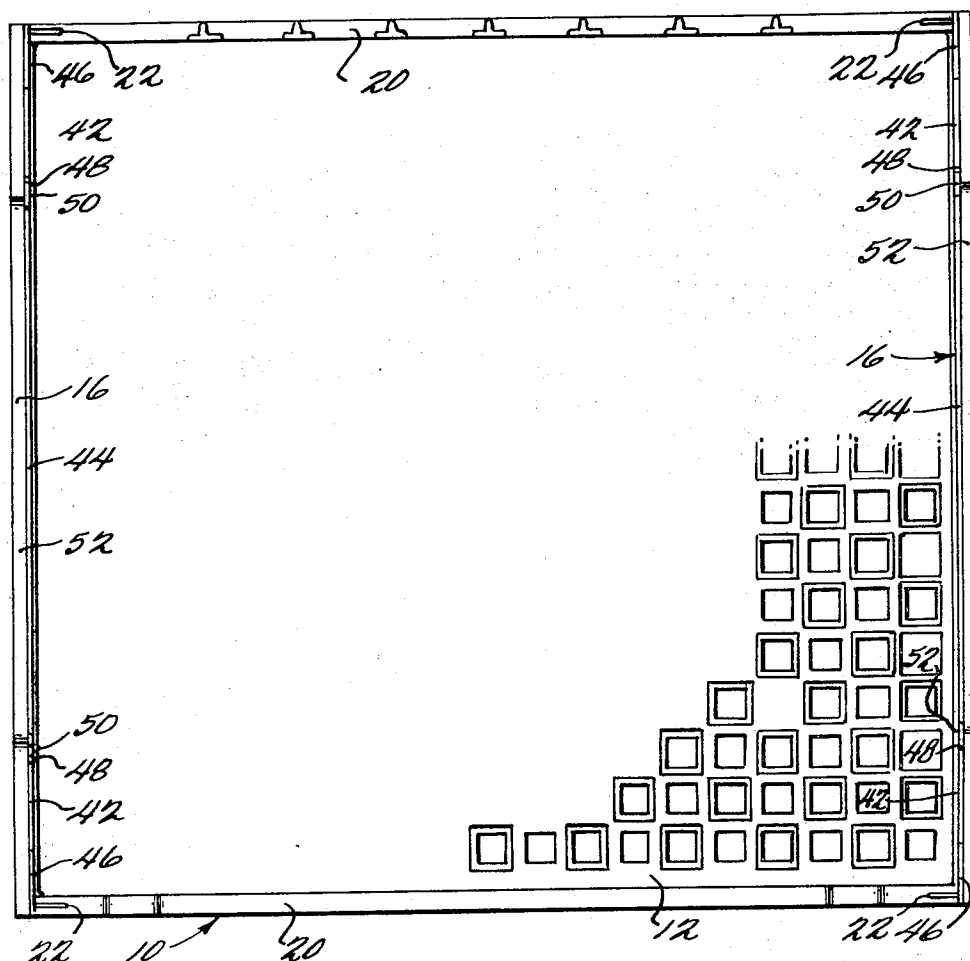
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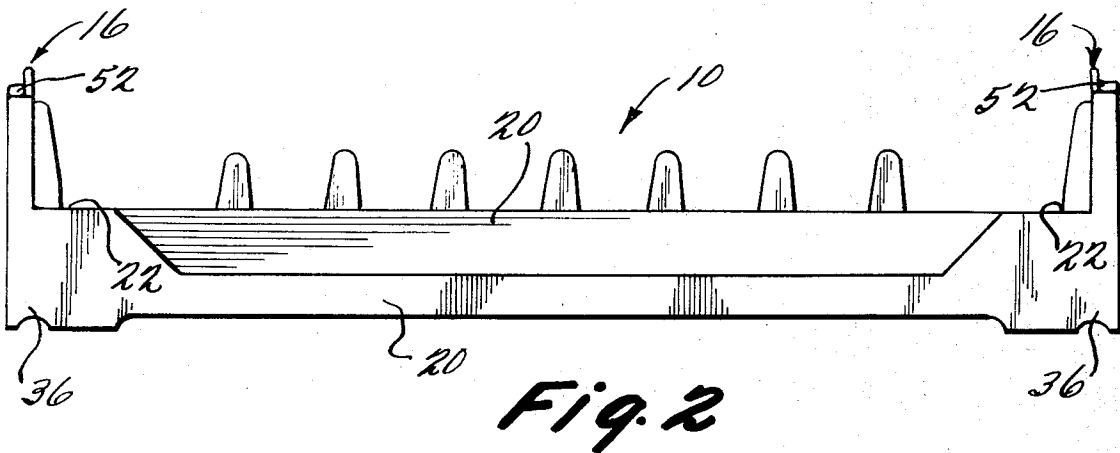
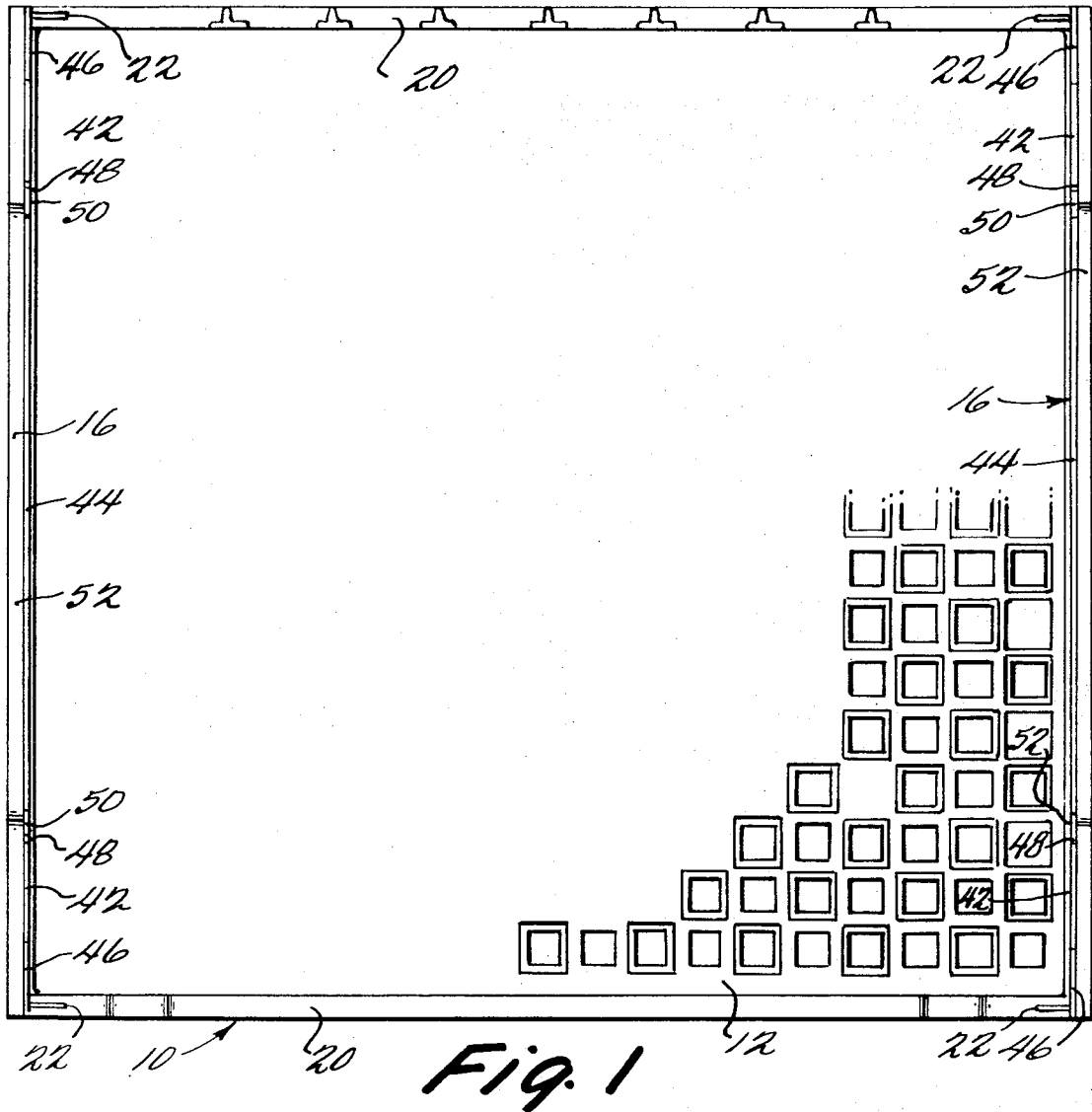
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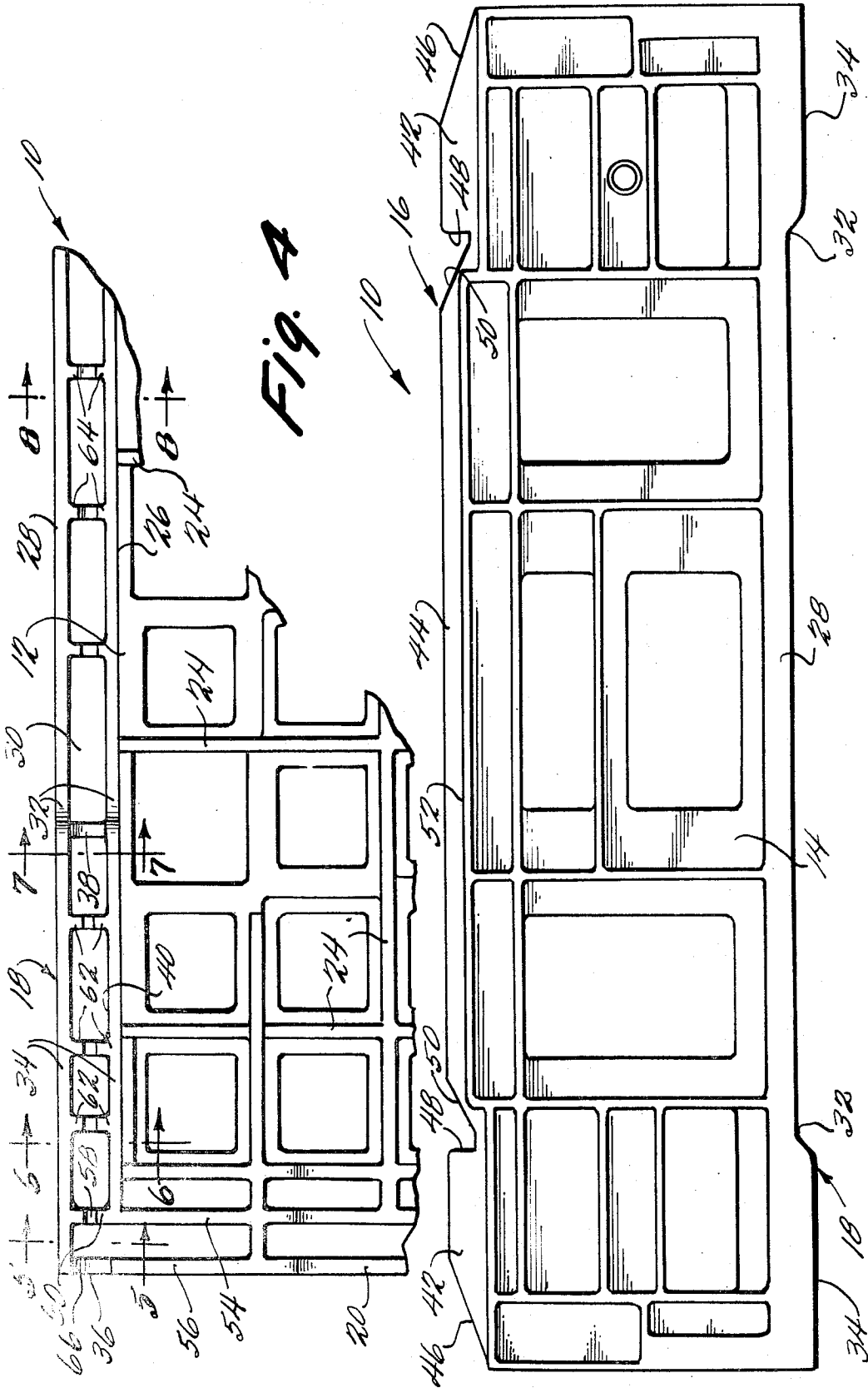
[57] **ABSTRACT**

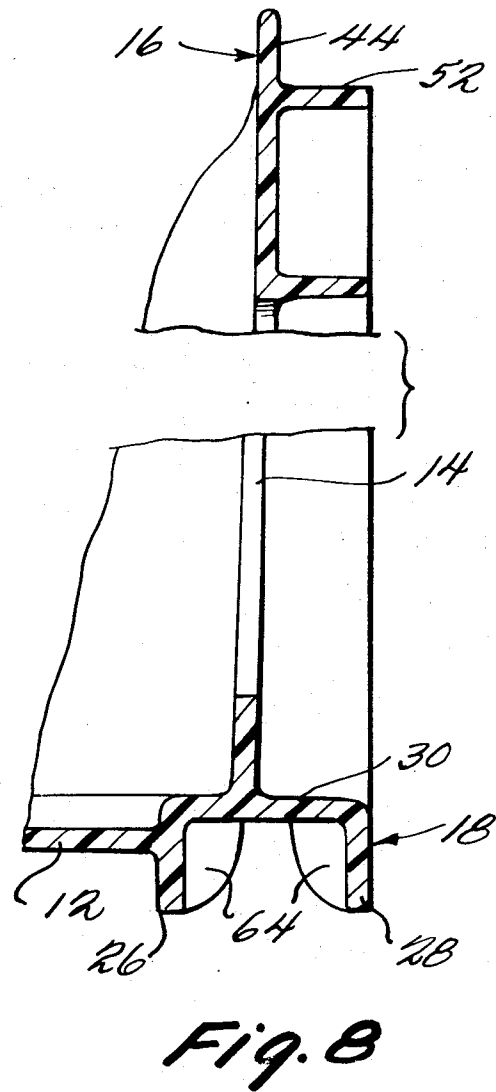
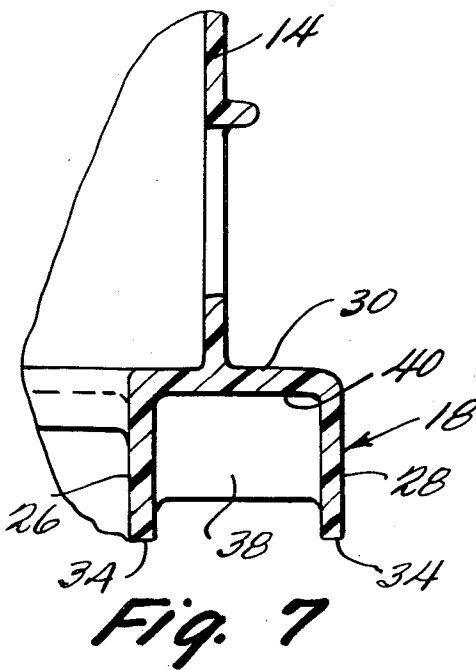
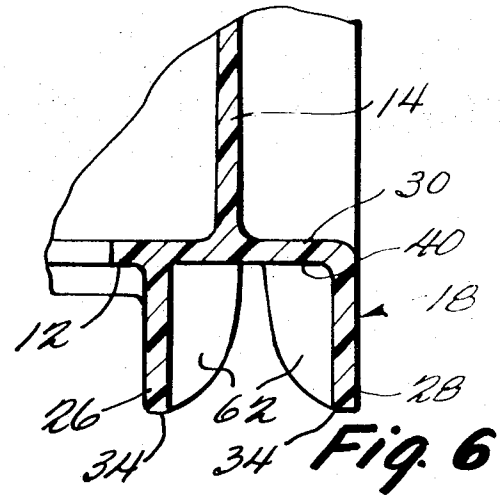
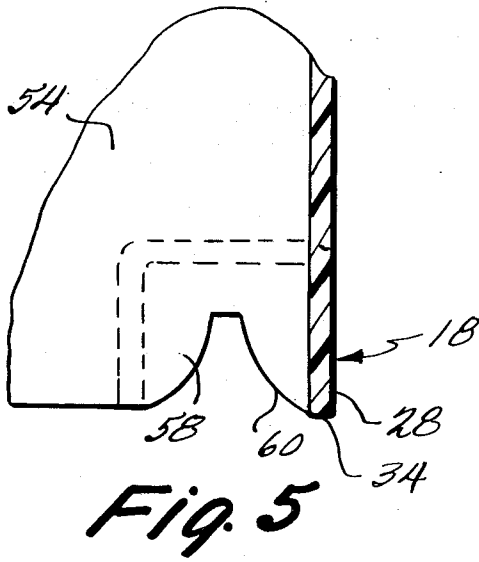
A 90° stackable and nestable tray for bakery products or the like having inner and outer stacking rails along the lower edge of the end walls thereof centrally recessed to define floor engaging structures on opposite sides thereof operable to support the tray on a floor or the like to permit end wall entry of a hand truck, the floor engaging structures further defining pockets corresponding in shape to upper stacking rail portions along the upper edge of the end walls to thereby render the tray operable to be slidably supported on a like tray for movement into stably stacked relation thereon.

5 Claims, 12 Drawing Figures









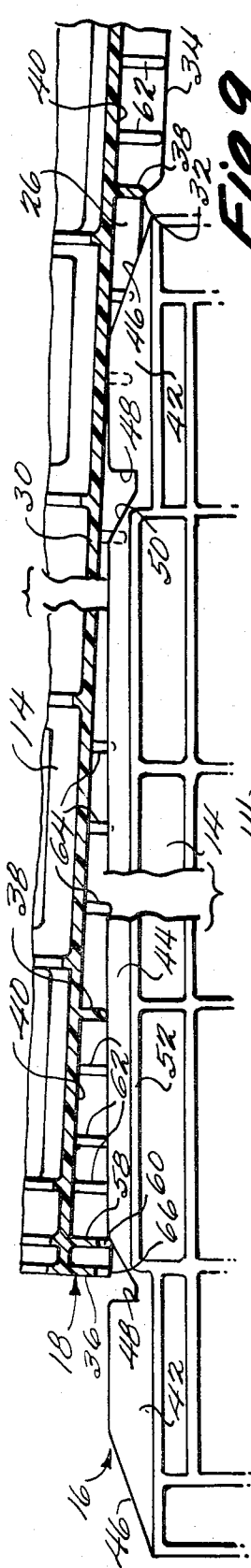


Fig. 9

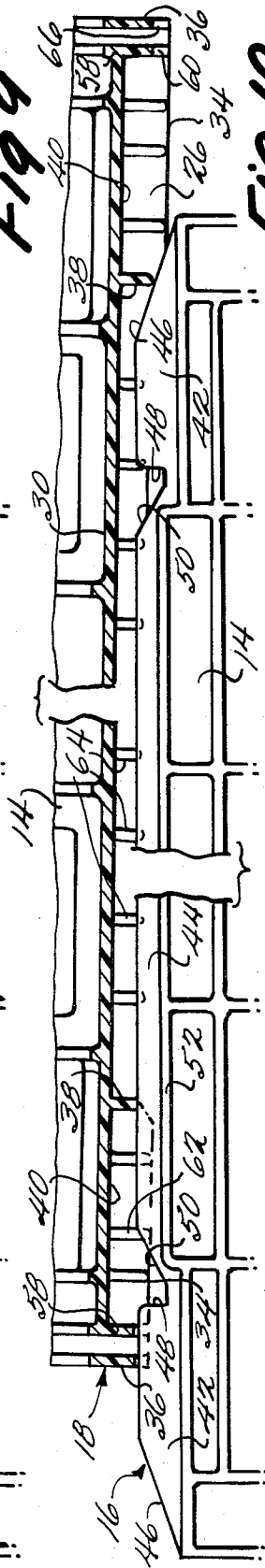


Fig. 10

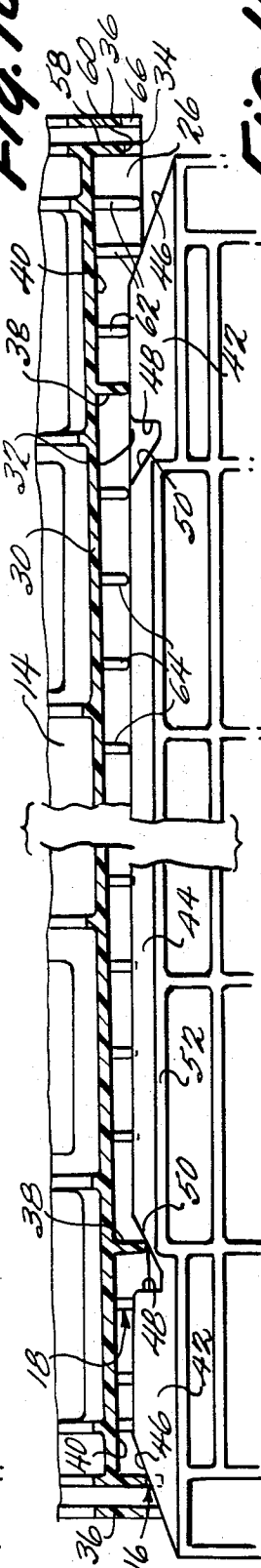


Fig. 11

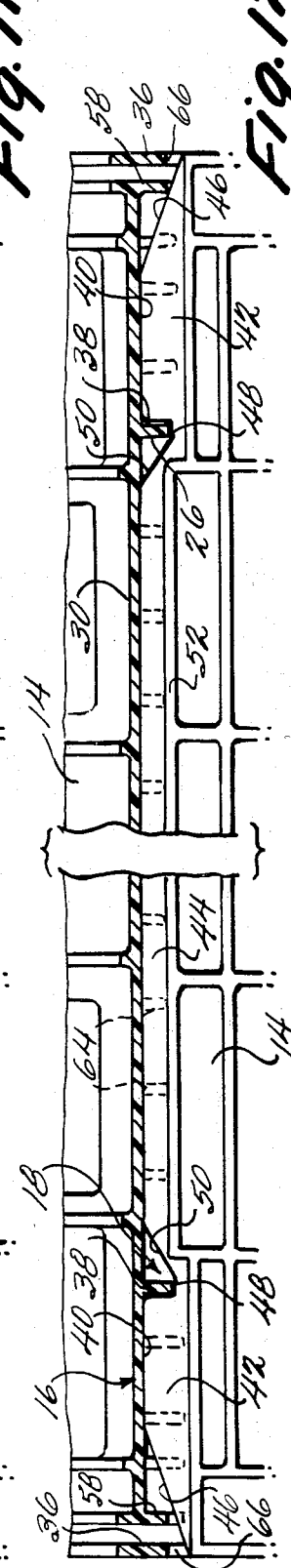


Fig. 12

90° STACKABLE AND NESTABLE TRAY

This invention relates to containers and more particularly to containers of the nestable and stackable tray type for bakery goods and the like.

Examples of trays suitable for bakery goods and the like are disclosed in commonly assigned design U.S. Pat. Des. 197,672, dated Mar. 10, 1964; and Bockenstette U.S. Pat. No. 3,392,875, dated July 16, 1968. A typical use of trays of the type disclosed in the aforesaid patents is in connection with supermarket operations. Trays used to handle bakery goods are loaded or filled with bakery products at the bakery. As each tray is filled with bread or other bakery products, each filled tray is mounted in vertically stacked relation on a previously filled tray until a number of filled trays of a predetermined height have been stacked up. As the stacks are made, they are moved into a transporting trailer vehicle or the like, usually by a hand truck. At the destination, the stacks of trays are unloaded from the trailer vehicle, again by the use of a hand truck, into the supermarket. As the trays are individually unloaded at the supermarket, the empty trays are stored in nested relation with respect to each other for return to the bakery in such nested relation.

In order to be suitable for an operation of the type described above, a tray must have the basic capability of being stackable and nestable. The trays of the aforesaid patents achieve these two basic capabilities by forming the tray with side walls which have a horizontal dimension greater than the horizontal dimension of the end walls thereof. The stacking function is achieved by providing cooperating stacking rails along the top and bottom edges of the end walls. The cooperating stacking rails enable two trays mounted in vertical relation with their end walls in alignment to be stably supported in such relation, regardless of end-to-end orientation, against horizontal movement in any direction out of such vertically aligned position. The nesting function is achieved by essentially cutting out the central portion of the side walls through a horizontal extent equal to or slightly greater than the horizontal dimension of the end wall. With this construction, a tray can be nested within a like tray by effecting a relative rotation between the two trays of 90°. The depth of nesting was conveniently chosen as a two-to-one nesting relationship so that a vertical stack of nested containers consisted essentially of two sets of vertically stacked containers with alternate trays of each stack extending between a pair of trays of the other stack in 90° rotational relation thereto.

The stacking rail construction heretofore provided by which the above basic nesting and stacking functions are achieved, as disclosed in the aforesaid design patent, consisted essentially of a straight upper stacking rail and a pair of inner and outer lower stacking rails along each end wall. With this construction, when a tray was disposed in vertically stacked relation on a like tray, the upper rails of the lower tray entered between the lower rails of the upper tray so as to provide the horizontal stability in a direction parallel with the side walls. Horizontal stability in a direction parallel with the end walls was obtained by making the inner bottom stacking rails engage between the end portions of the associated side walls. This construction provided a further functional advantage in the overall operation in that it facilitated the formation of a stack of loaded

trays by enabling the operator to supportingly slide each tray horizontally into stacked relation. Moreover, this construction provided the still further functional advantage of facilitating the handling of a stack of loaded trays by a hand truck or the like, in that the bottom stacking rail construction at the end walls of the tray serve to support the bottom tray on a horizontal surface with the bottom edges of the side walls spaced above the horizontal surface, permitting ready access by a hand truck.

One area of structural weakness provided in the straight stacking rail configuration, such as illustrated in the aforesaid design patent, was found to exist at the ends of the outer bottom stacking rails. These ends were unsupported and therefore subject to breakage in the event that the tray was dropped on a bottom corner. To provide strength at the weakened corner areas, ribs were provided adjacent each end portion of the bottom rails which extended between the inner and outer bottom stacking rails. To accommodate these ribs, each upper stacking rail was essentially cut off at its end portions. The ribbed lower rail and shortened upper rail construction, which is disclosed in the aforesaid Bockenstette patent, severed to facilitate the sliding movement of the trays into stacked relation in that the lower surfaces of the leading ribs engaging the upper surface of the upper rails provided a desirable sliding supporting contact for the leading portion of the upper tray as it was moved into stacked relation over the lower tray, the engagement of the lower surfaces of the inner stacking rails with the upper surfaces of the end portions of the trailing side wall provided for the sliding support of the trailing portion of the upper tray. When the upper tray reached the stacked position, the leading ribs would drop off the end of the upper rail and the trailing ends of the inner bottom stacking rails would drop over the end portions of the trailing side wall of the lower tray.

While the trays, such as disclosed in the aforesaid Bockenstette patent, perform their intended functions adequately, one limitation in the construction of the trays is that a stack of loaded trays could be handled by a hand truck only from the sides of the tray of the stack. In practice, the necessity to engage the hand truck only with the sides of the stack often caused considerable inconvenience. For example, in loading the trailer vehicle, it often became necessary in positioning the final stack across the trailer vehicle to move the stack into its final position with the end walls of the stack facing outwardly rather than the side walls thereof. Under these circumstances, it was necessary for the operator to disengage the hand truck with the stack disposed outwardly from its final position and then to push the entire stack into such final position. Similar more difficult problems were encountered in unloading the stack from the trailer vehicle.

Accordingly, it is an object of the present invention to provide a tray having the capability of performing all of the functions of the patented prior art trays and in addition, providing the functional advantage of enabling a hand truck to be moved beneath a loaded stack of such trays not only from either side wall, but from either end wall as well.

Another object of the present invention is the provision of a tray of the type described providing a recessed end wall bottom construction capable of achieving all of the aforesaid functions with a unique structure pro-

viding sufficient strength to prevent failure during operation.

Another object of the present invention is the provision of a tray of the type described which is simple in construction, effective in operation and economical to manufacture.

These and other objects of the present invention will become more apparent during the course of the following detailed description and appended claims.

The invention may best be understood with reference to the accompanying drawings, wherein an illustrative embodiment is shown.

In the drawings:

FIG. 1 is a top plan view of a nestable and stackable tray embodying the principles of the present invention; FIG. 2 is a side elevational view of the tray shown in FIG. 1;

FIG. 3 is an end view of the tray shown in FIG. 1;

FIG. 4 is a fragmentary bottom plan view of one corner of the tray shown in FIG. 1;

FIG. 5 is an enlarged fragmentary sectional view taken along the line 5—5 of FIG. 4;

FIG. 6 is an enlarged fragmentary sectional view taken along the line 6—6 of FIG. 4;

FIG. 7 is an enlarged fragmentary sectional view taken along the line 7—7 of FIG. 4;

FIG. 8 is an enlarged fragmentary sectional view taken along the line 8—8 of FIG. 4; and

FIGS. 9—12 are a series of fragmentary side elevational views, partly in section, illustrating the manner in which a tray is moved in sliding relation along a similar tray into a position of vertically stacked relation.

Referring now more particularly to the drawings, there is shown therein a tray, generally indicated at 10, embodying the principles of the present invention. The tray includes in general a bottom wall 12, a pair of end walls 14 extending upwardly from the ends of the bottom wall 12 and having upper stacking rail means, generally indicated at 16, formed along the upper edges thereof and lower stacking rail means, generally indicated at 18, formed along the lower edges thereof, side walls 20 extending upwardly from the sides of the bottom wall 12 between the end walls 14, the side walls 20 having nesting surface means, generally indicated at 22, formed in the upper portion thereof.

It will be understood that the tray 10 is preferably molded of integral one-piece construction of a suitable plastic material as, for example, polyethylene, polypropylene or the like, a preferred material being polypropylene. The bottom wall 12 is of any desired construction preferably perforated, the preferred embodiment shown being in accordance with the teachings of the aforesaid Bockenstette patent. The end walls 14, likewise, may be of any conventional construction and, as shown, are of ribbed panel configuration suitably apertured, generally in accordance with the teachings of the aforesaid Bockenstette patent, as well as the teachings of commonly-assigned Bockenstette U.S. Pat. No. 3,387,740. The side walls 20 and the nesting surface means 22 provided thereby may assume different constructions depending upon the particular product which the tray is adapted to handle. For example, where the tray is to handle bread or the like, the side walls may be constructed in accordance with the teachings of the aforesaid design patent. On the other hand, where the product to be handled is stacked in layers within the tray it is desirable to utilize a side wall con-

struction of the type embodying posts such as disclosed in Bockenstette U.S. Pat. No. 3,392,875. The construction shown in the drawings, however, is in accordance with the teachings of Bockenstette U.S. Pat. No. 3,387,740, which includes one side wall with posts and another side wall of low, low construction. Where a low, low side wall is utilized, as shown, the bottom wall 12 is preferably reinforced as by a plurality of cross ribs 24 integral with the bottom wall and extending therebetween in parallel relation to the side walls 20 and end walls 14 as best shown in FIG. 4.

The present invention is more particularly concerned with improvements in the construction of the upper and lower stacking rail means 16 and 18. Referring more particularly to FIG. 4, the lower stacking rail means 18 for each end wall 14 includes a pair of inner and outer rails 26 and 28 extending downwardly from a horizontally extending rib portion 30 forming the lower extent of the end wall 14. Formed in the lower portion of each pair of inner and outer rails is a central recess 32 which divides the inner and outer rails into a pair of floor engaging structures on opposite sides of the recess. As best shown in FIG. 3, the recess is preferably of a size to receive a hand truck or the like therein so as to permit the handling of a stack of filled trays from either side wall thereof.

As best shown in FIG. 4, each floor engaging structure includes the associated portion of the inner and outer rails 26 and 28, the latter having straight horizontal lower surfaces 34 for engaging a floor or the like to support the tray thereon. Each floor engaging structure also includes an outer wall portion 36 extending between the associated inner and outer rail portions at a position generally flush with the exterior surface of the associated side wall and an inner wall portion 38 extending between the associated inner and outer rail portions at a position adjacent the associated recess 32. Each set of inner and outer wall portions 36 and 38 and associated inner and outer rail portions 26 and 28 defines an upper rail portion receiving pocket 40.

As best shown in FIG. 3, the upper stacking rail means 16 at each end wall 14 includes a pair of pocket entering upper rail portions 42 and a central rail portion 44 extending between each pair of associated pocket entering rail portions 42.

Each pocket entering rail portion 42 includes a cam surface 46 extending upwardly and inwardly from the adjacent side wall and an inwardly spaced inwardly facing vertically extending stop surface 48. Preferably, the end of each central upper stacking rail portion 44 adjacent each stop surface 48 includes an inclined surface 50. The upper edge of each end wall 14 is formed with a flange 52 which extends outwardly adjacent the rail portions 42 and 44 and provides upper surfaces which generally conform to the shape of the lower surfaces of the associated outer rail 28.

The upper surfaces of the flanges 52 serve to engage the lower surfaces of the outer rails 28 of a like tray stacked thereon and in order to provide adequate strength to the tray with a minimum of material when a plurality are mounted in vertically stacked relation with a product load in each, it is preferable to strengthen each outer rail by the provision of strengthening ribs spaced longitudinally therealong. Such strengthening ribs are also preferable in connection with the inner rail portions defining the pockets 40 since the entire weight of the stack rests upon the

pocket defining portions. In this regard, it will be noted that in the preferred embodiment shown, the side walls are of inverted U-shaped cross-sectional configuration including inner and outer wall panels 54 and 56 connected at their upper ends by a bight portion. As best shown in FIG. 4, the outer wall panel 56 of each side wall forms an extension of each outer wall portion 38 and the associated inner wall panel 54 has its outer edge integrally connected with the outer edge of the associated inner rail portion 26. In the embodiment shown, the side wall construction is reinforced by a plurality of cross ribs and it will be noted that the end portion of each side wall adjacent each end wall extends downwardly from the bottom wall to provide additional floor engaging support for the lowermost tray of a stack. As best shown in FIG. 2, the floor engaging portions at each end of the side walls are spaced apart a distance sufficient to receive a hand truck or the like therebetween. This construction, whereby the end portions of the side walls form extensions of the floor engaging structures and pockets 40 of the end walls, is particularly useful when the post arrangement is embodied in the side walls. With this arrangement, the engagement of the posts within the bottom wall openings which are provided to receive the posts insure a nesting relation which is free of substantial relative horizontal movement in any direction as is indicated in the aforesaid Bockenstette patent. Where the post arrangement is not used, the floor engaging side wall end portions are preferably provided with slots to receive the upper nesting surfaces 22 of the side walls to provide this function.

Referring now more particularly to FIGS. 5-8, the reinforcing rib construction for the inner and outer rails is best shown therein. With reference to FIG. 5, the rib construction provided outwardly of the inner wall panel 54 of each side wall end portion is in the form of a web 58 integrally interconnected with the outer edge of the associated inner rail in its juncture with the adjacent wall panel 54, with the adjacent lower surface of the rib portion 30 and with the interior surface of the adjacent outer rail portion 28. The web 58 is provided with a shallow notch 60 in its lower surface of a depth sufficient to accommodate the upper rail portion 42 at a position adjacent the cam surface 46.

As best shown in FIG. 6, the strengthening rib construction provided in the socket defining portions of each of the lower rails 26 and 28 is in the form of opposed pairs of generally triangular ribs 62. As shown in FIG. 4, here are three longitudinally spaced pairs of ribs 62, each pair having upper rail portion engaging surfaces which are convexly curved and converge upwardly toward each other to the lower surface of the rib portion 30. As best shown in FIG. 8, the rib construction provided in the central portion of each pair of inner and outer rails 26 and 28 is in the form of pairs of longitudinally spaced triangular ribs 64, similar to the ribs 62, with the upper rail engaging surfaces of each pair spaced apart at their juncture with the associated rib portion 30 a distance greater than that of the ribs 62.

The tray 10, constructed as set forth above, when utilized with a plurality of similar or like trays 10, provides the following two basic functional capabilities in operation. First, when empty a plurality of trays 10 can be disposed in nested relation with respect to each other to form a stack in which adjacent trays are disposed in

a 90° rotational orientation with respect to each other. Second, when filled, a plurality of trays 10 can be disposed in a stacked relation with respect to each other to form a stack in which all of the trays have the same orientation with respect to each other. Insofar as the nesting capability is concerned, the structure provided and the manner of operation is essentially the same as that described in the aforesaid patents and hence no further detailed description of this operation is necessary. With respect to the stacking function, the upper and lower stacking rail means 16 and 18, constructed in accordance with the principles of the present invention, serve to perform this function. The preferred construction as described above has the added functional capability of facilitating the formation of a stack of trays in stacked relation by permitting each tray to be moved in sliding supported relation into stacked relation and further, the additional functional capability that once the vertical stack of trays has been formed, the stack can be handled readily with the use of a hand truck or the like by picking up the stack with the hand truck from either side wall or either end wall. This latter functional capability of being able to handle a stack of trays in stacked relation with a hand truck from either end wall of the stack constitutes a functional capability which was not provided in the tray constructions such as disclosed in the aforesaid patents. While the trays of the aforesaid patents obtain the added functional advantage of being able to move each tray into stacked relation by a sliding supported movement, the structure and cooperation by which this function is achieved by the present construction varies therefrom, due to the added capability provided.

It will be understood that the capability of handling a stack of trays with a hand truck from either end wall of the stack is obtained by the provision of the recesses 32 formed in the lower stacking rail means 18 on the end wall of each tray. The structure and operation of the present tray construction for performing the function of enabling the same to be moved in sliding supported relation into stacked position is best understood by reference to FIGS. 9-12. Initially, it will be noted that when two trays are disposed in stacked relationship with respect to one another as shown in FIG. 12, the upper stacking rail means 16 of the lowermost tray engages within the lower stacking rail means 18 of the uppermost tray and that this interengagement prevents substantial relative horizontal movement between the two trays in any direction. Of course, it would be possible in effecting this inter-engagement for the operator to initially manually support the upper tray in a position of vertical alignment over the uppermost tray of the stack and then to simply lower it into supporting relation. Such a mode of operation requires that the operator effect an alignment of the tray in two directions while manually supporting the tray. Aside from the inconvenience of this requirement, the difficulty of accomplishing an operation of this type as the stack grows higher than the operator's head presents a serious disadvantage.

By providing for the movement of the tray in sliding supported relation into its stacked position, such inconveniences and difficulties are eliminated since the initial engagement of the tray requires the operator to establish alignment in only one direction with only a portion of the tray over the uppermost tray. Thus, in normal operation, the operator grasps a tray along the hand

openings provided in the end walls and moves the tray into an initial position on the uppermost tray of the stack being formed with a leading side wall extending outwardly from the operator. The operator can then simply by aligning the end walls move the leading side wall portion of the tray 10 into supporting relation to the uppermost tray of the stack. During the initial formation of the stack, as where the lowermost tray of the stack is supported on the floor, the leading end wall of the tray will extend downwardly from the operator and, to facilitate alignment of the end walls, each outer wall portion 36 has its lower surface formed with guide or centering groove 66.

It can be seen that the grooves 66 in the leading end wall will engage the central upper rail portions 44 and due to their centering shape serve to eliminate the need for extreme accuracy of manual alignment in the initial engagement while at the same time insuring accurate alignment after initial engagement has taken place. Once the centering grooves 66 in the leading end wall have been engaged with the central upper rail portions 44, the operator can lower the trailing side wall portion of the tray into supporting relation on the uppermost tray of the stack. FIG. 9 shows the position of the tray after this movement by the operator and it will be noted that the trailing side wall portion of the tray is supported by engagement of the trailing upper rail portion 42 with the rib portion 30 while the leading side wall portion of the tray shifts from the engagement of the groove 66 with the central upper rail portions 44 to the engagement of the inner wall portions 38 therewith. The tray 10 is now completely supported on the uppermost tray of the stack and can be moved by a sliding action without manual support from such position into the fully stacked position shown in FIG. 12. FIG. 10 illustrates that as the sliding movement progresses, the trailing inner wall portions 38 will engage the trailing cam surfaces 46 so that the support of the trailing side wall portion of the tray is shifted thereto. The tray then moves with support of this type until the leading inner wall portions 38 move into engagement with the leading cam surfaces 50, as shown in FIG. 11. This movement insures that upon further horizontal movement toward the stacking position, the outwardly facing surfaces of the leading inner wall portions 38 will be in a vertical position to contact the vertical stop surfaces 48 provided on the leading rail portions 42 when the tray 10 reaches the stacking position. Simultaneously with this engagement, the trailing inner wall portions 38 move beyond the trailing stop surfaces 48 permitting the trailing side wall portion of the tray to drop down so that the trailing upper rail portions 42 engage within the trailing sockets 40.

The greater spacing provided between the ribs 64 associated with the central portion of the lower rails, as shown in FIG. 8, is desirable to minimize the interference between such ribs when the tray is moved in the supported relation such as illustrated in FIG. 9. The closer spacing of the ribs 62 as shown in FIG. 6 serves to limit horizontal movement in a direction parallel to the side walls of the tray when the tray is disposed in stacked relation as shown in FIG. 12. It will be noted that the arrangement is such that the ribs 62 are always maintained in spaced relation above the upper stacking rails until the final movement is reached, which movement is essentially vertical rather than horizontal.

It thus will be seen that the objects of this invention have been fully and effectively accomplished. It will be realized, however, that the foregoing preferred specific embodiment has been shown and described for the purpose of illustrating the functional and structural principles of this invention and is subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

I claim:

1. In a nesting and stacking tray for bakery goods and the like comprising a rectangular bottom wall having a pair of opposed parallel end walls extending upwardly from opposite ends thereof, upper stacking rail means along the upper edge of each end wall, lower stacking rail means along the lower edge of each end wall complementary with said upper stacking rail means so as to enable said tray to be slidably supported on a like tray for generally horizontal movement in the direction of extent of said end walls into a stacked position of vertical alignment and to be stably supported in said stacked position against substantial horizontal movement in any direction out of said stacked position, said tray including opposed side walls of a horizontal extent greater than the horizontal extent of said end walls extending upwardly from said bottom wall between said side walls, said side walls having nesting surface means formed in the upper portion thereof for supporting a like tray disposed in a 90° horizontally rotated orientation in a nested position therein when said tray is empty to a depth permitting said tray to support another like tray in said stacked position thereon above the tray nested therein, the improvement which comprises said bottom stacking rail means extending downwardly from each end wall below said bottom wall and having a recess formed in the lower central portion thereof defining floor engaging structures on opposite sides thereof, each of said recesses being of a size to receive a hand truck or the like therein when said tray is supported on a floor or the like by said floor engaging structures, each of said floor engaging structures including transversely spaced inner and outer rail portions having straight lower surfaces for engaging a floor or the like to support said tray thereon, an integral outer wall portion extending transversely from the outer edge of said outer rail portion in generally flush relation to the exterior surface of the associated side wall and an integral inner wall portion extending transversely between said inner and outer rail portions at a position spaced inwardly of the associated side wall, each pair of inner and outer rail portions defining with the associated inner and outer wall portions an upper rail portion receiving pocket, said upper stacking rail means including a pocket entering rail portion extending upwardly from each end wall at positions spaced vertically above each pocket thereof and a central rail portion extending upwardly from each end wall between the pair of pocket entering rail portions associated therewith, each of said pocket entering rail portions including a cam surface extending upwardly and inwardly from the associated side wall and an inwardly spaced inwardly facing generally vertically extending stop surface, each of said inner and outer wall portions having lower rail engaging surfaces spaced slightly above the straight lower surfaces of the associated inner and outer rail portions, the common interior surface of each inner wall portion facing outwardly and

extending generally vertically for engaging a stop surface of a corresponding pocket entering rail portion of a like tray when disposed in stacked relation thereon.

2. The improvement as defined in claim 1 wherein the inner and outer rail portions of each end wall constitute portions of continuous inner and outer rails extending the entire horizontal extent of said end walls.

3. The improvement as defined in claim 2 wherein the inner and outer rails are strengthened by a plurality of longitudinally spaced pairs of opposed transversely spaced ribs, each pair of ribs associated with said inner and outer rail portions being spaced transversely apart a distance less than the transverse spacing between the ribs associated with the remaining central portions of said inner and outer rails.

4. The improvement as defined in claim 3 wherein each of said end walls includes a flange formed on the

upper edge thereof extending outwardly adjacent the associated upper rail portions, said flanges having upper surfaces generally conforming to the shape of the lower surfaces of said outer rails so that a like tray is supported on said tray in said vertically stacked position by the engagement of the lower surfaces of the outer rails of said like tray with said upper surfaces of said flanges.

5. The improvement as defined in claim 1 wherein each side wall includes an end portion adjacent each end wall formed by inner and outer wall panels, each of said outer wall panels forming an integral extension of the associate outer wall portion and each inner wall panel having its outer edge integrally connected with the outer edge of the associated inner rail portion.

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