

April 12, 1966

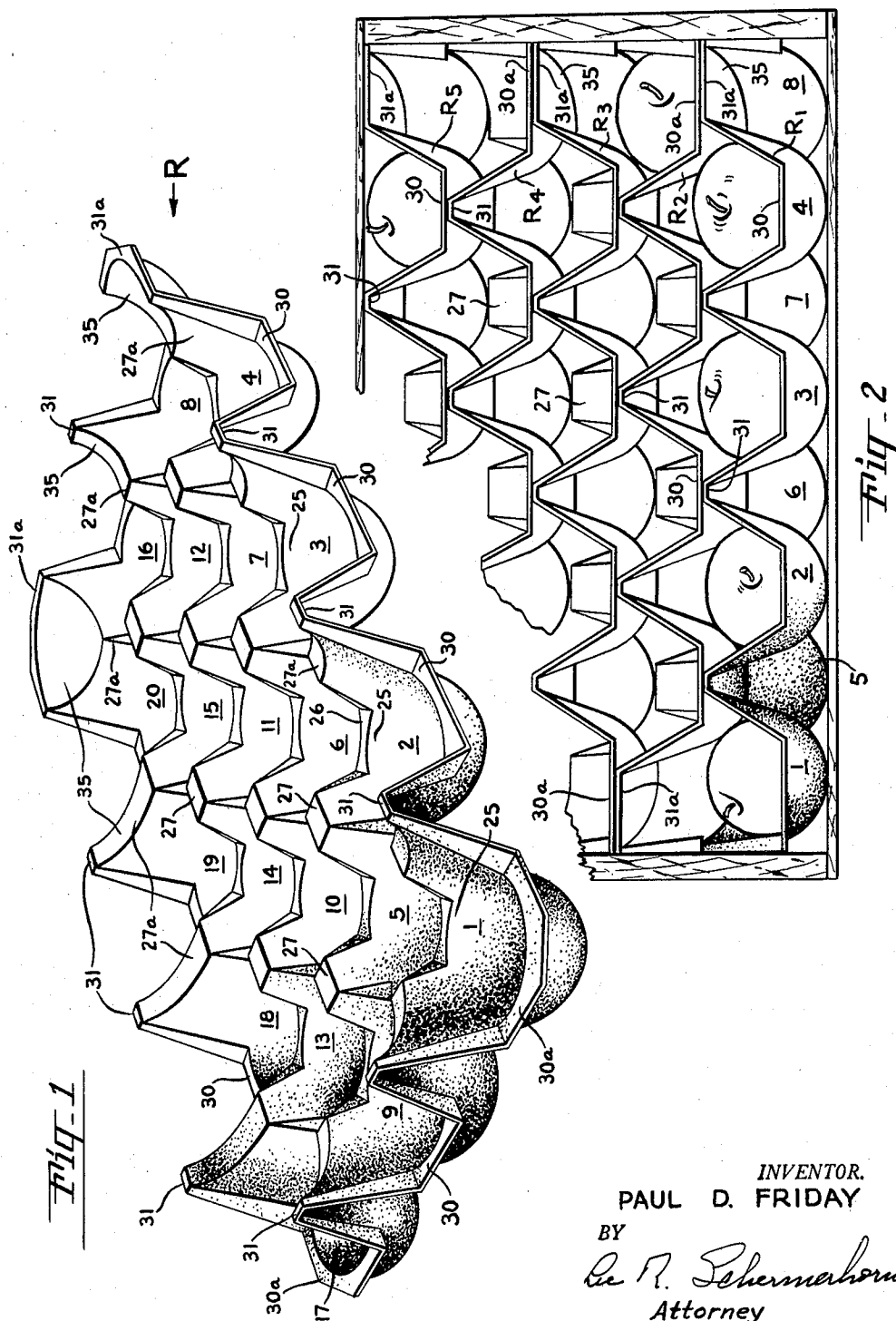
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3,245,570

PACKING TRAY

Filed May 15, 1964

3 Sheets-Sheet 1



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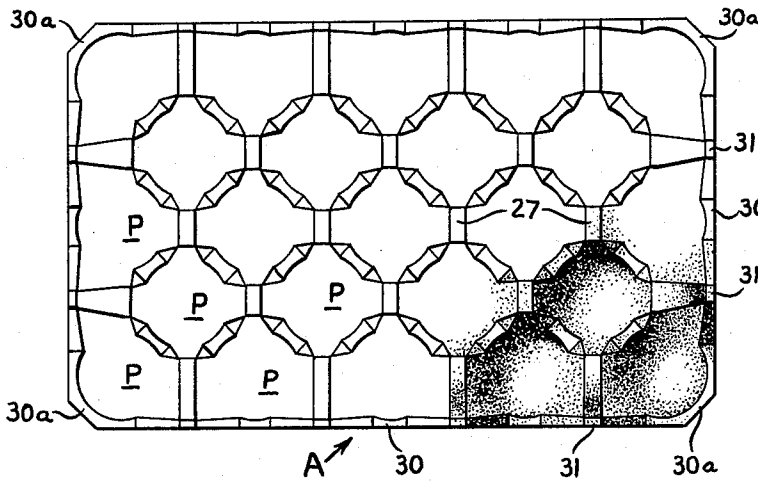


Fig. 3

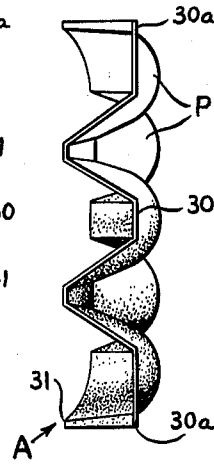


Fig. 4

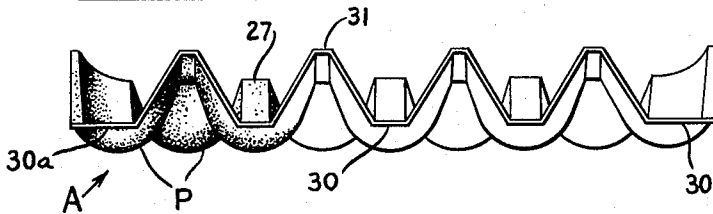


Fig. 5

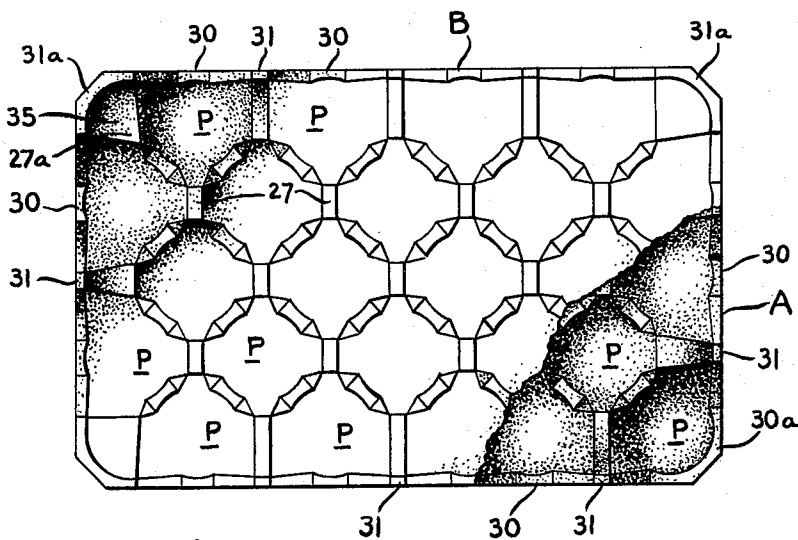


Fig. 6

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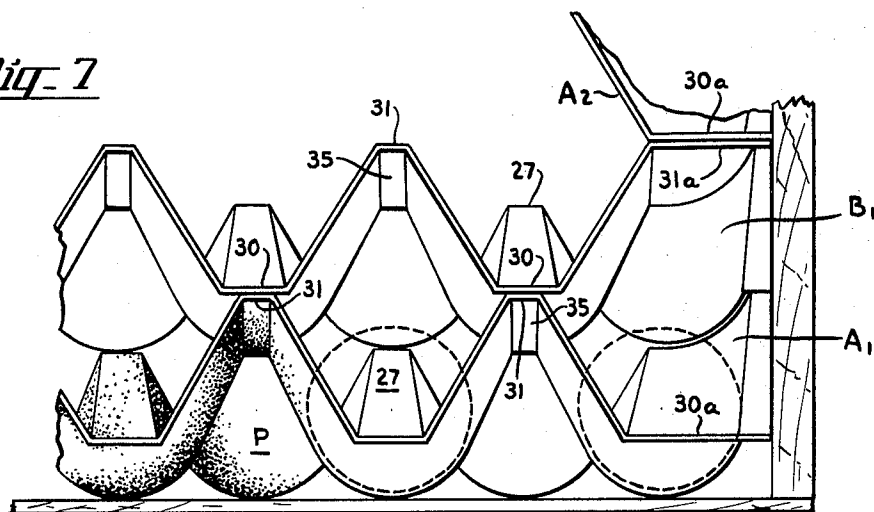
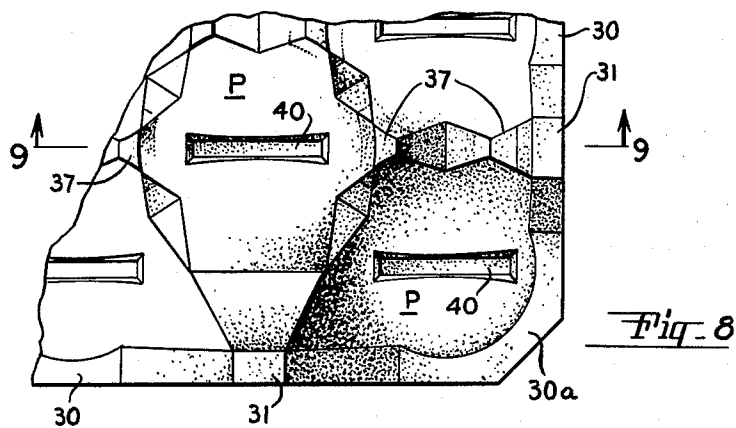
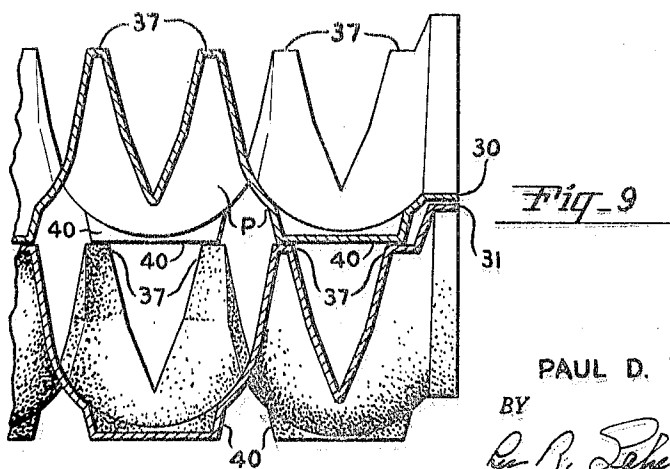
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PACKING TRAY

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Fig. 7



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PACKING TRAY

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15 Claims. (Cl. 217-26)

This invention relates to improvements in packing trays for packing fruit or fragile articles in shipping containers.

Although the present packing trays are useful for packing various kinds of articles for shipment, the invention will be described particularly in connection with trays for apples. Apples vary through a wide range of sizes and the apple industry has need for economical trays to support and separate the apples in layers and in such arrangements that certain standard counts will be contained in the standard size of box which is preferred by the apple industry.

The main commercial sizes of apples vary from a count of fifty-six apples per box to two hundred sixteen apples per box. Within this range there are fourteen different standard counts. In order to pack these various counts into the standard size box, the number of layers or trays varies from four to six and the number of apples per layer varies from fourteen to thirty-six. In arranging the apples as compactly as possible with a minimum amount of waste space, it is apparent that the pattern of pockets in the trays must vary for each different count and for some counts there must be a variation in the number of apples from layer to layer. Different trays are therefore required for each count or size of apple and, in those cases where the number of apples varies from layer to layer, two different types of trays must be used in a single box.

Some conventional fruit trays heretofore proposed are not sufficiently adaptable to afford the variations necessary for packing such a wide range of sizes. Some allow an excessive amount of waste space and other types of trays, particularly those intended for packing eggs in square cases, are not adaptable to rectangular apple boxes. A common fault of all conventional trays is that they do not provide sufficient support for the overlying trays as well as the fruit in order to protect the bottom layers from the weight of fruit above and to protect the top layer against possible damage from the lid of the box.

The general object of the present invention, therefore, is to provide a new and improved form of molded tray construction which successfully overcomes the shortcomings and faults of the trays heretofore proposed and used in shipping containers such as apple boxes. Another object is to provide a tray which is adaptable to wide variations in regard to the number of pockets and the pattern of the pockets while minimizing waste space and without sacrificing the strength and support characteristics in any of the variations. A particular object is to provide an improved tray having high posts around its rim to provide direct support to the rim of the overlying tray, to provide improved corner support for the trays and to protect the fruit in the top layer from pressure by the lid of the box.

The present trays are of three different types. A first type is a rotatable tray which is turned end for end in successive layers whereby a single type of tray may be used for all layers throughout the box with certain sizes of apples. For other sizes of apples, two different trays are used alternating from layer to layer. These trays are symmetrical and, therefore, do not have to be turned end for end in different layers. All of the trays embody common novel features which provide improved support not only for the pockets themselves but also for the rim portions of the overlying trays and which protect the fruit in the top layer from lid pressure.

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The invention will be better understood and the foregoing and still other objects and advantages will become apparent from the following description of the preferred embodiments illustrated in the accompanying drawings.

5 Various changes may be made, however, in the details of construction and certain features may be employed without others. All such modifications within the scope of the appended claims are included in the invention.

In the drawings:

10 FIGURE 1 is a perspective view of a reversible or rotatable non-symmetrical tray embodying the features of the invention;

FIGURE 2 is a side elevation view showing a box containing a stack of the trays of FIGURE 1;

15 FIGURE 3 is a top plan view of a symmetrical tray which is used in combination with a different symmetrical tray for certain counts;

FIGURE 4 is an end elevation view of the tray in FIGURE 3;

20 FIGURE 5 is a side elevation view of the tray in FIGURE 3;

FIGURE 6 shows in top plan view the major portion of a second symmetrical tray to be used with the tray in FIGURE 3, one corner of the view showing a portion of the tray in FIGURE 3 in superimposed relation;

25 FIGURE 7 is a fragmentary side elevation view showing the relation of the trays of FIGURES 3 and 6 as placed to form the first three layers in the bottom of a box;

FIGURE 8 is a fragmentary top plan view of a modification having dual center posts between the pockets for certain counts; and

30 FIGURE 9 is a sectional view on the line 9-9' of FIGURE 8.

The reversible or rotatable tray R in FIGURE 1 has 35 five rows of four pockets each numbered 1 to 20 to hold twenty apples. Five of these trays stacked one on top of the other fill a standard size box with one hundred apples. This is a medium size of apple whereby this tray is typical as being one of those with a pocket arrangement in greatest demand.

The standard size of apple box has inside dimensions of 40 twenty inches long by twelve and one-quarter inches wide by twelve inches deep. Any packing tray for apples, to be commercially useful, must fit a box of this size regardless of the number of pockets in the tray. As the description proceeds, it will be appreciated that the tray R is not symmetrical whereby turning of the next higher tray end for end will place its rounded pockets in nesting relation between the upper portions of the apples in the 45 pockets of the tray below. Also, as observed in FIGURE 1, the second row pockets 5 to 8 are staggered relative to the first row pockets 1 to 4. The third row pockets 9 to 12 and the fifth row pockets 17 to 20 are aligned transversely with the first row pockets while the fourth row pockets 13 to 16 are aligned transversely with the second row pockets. This arrangement provides maximum utilization of the area of the tray.

Between adjacent pockets in both diagonal directions, 50 the hollow division walls 25 taper upwardly to a relatively narrow top edge 26. Between the pockets in longitudinal and transverse direction are hollow supporting posts 27 of medium height. Thus, for example, one of the medium height posts 27 projects upward between the laterally opposite pockets 2 and 10 in the first and third rows and between the consecutive pockets 5 and 6 in the second row. These posts may be referred to as center posts.

Extending around the four sides of the tray is a continuous stepped rim having low segments 30 above the 55 bottoms of the pockets in intervals alongside adjacent pockets and high segments 31 forming hollow high posts in intervals between adjacent pockets. The low segments

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30 are on the same level as the top edges 26 of dividing walls 25 and the tops of medium height posts 27 are above this level but below the tops of high posts 31. Bearing in mind that the tray is unsymmetrical, it will be observed that low rim segments designated 30a extend around the two corners on the near end of the tray while high rim segments define high corner posts 31a extending around the two corners on the remote end of the tray.

The high posts 31 merge into the marginal medium height hollow posts 27a in a curve 35 which fits the bottom of a pocket in a tray above when the trays are stacked. Similarly, the high corner posts 31a merge into two of the posts 27a in a curve or cup 35.

When the trays are reversed end for end in alternate layers and stacked in a box as shown at R₁ to R₅ in FIGURE 2, each medium height post 27 and 27a supports the bottom of a pocket in the tray above. Each high post 31 supports a low rim segment 30 of the tray above. At the four corners of the box each high corner post 31a supports the low rim corner segment 30a of the tray above. Also, the high posts 31 and 31a are dimensioned to project slightly above the tops of the fruit whereby these posts on the uppermost tray R₅ prevent the marginal portions of the box lid from bearing down against the fruit when the box is lidded and when the boxes are stacked one on another.

The corner supports afforded by high corner posts 31a under the corner low rim segments 30a are particularly important because this has been a point of weakness in previous packing trays. Without such corner support the corners of the trays break down, loosening the pack and causing destruction of the trays themselves. The present corner supports hold the loaded trays in their original positions under the jostling and vibration of shipment and reduce damage to the trays. The same advantage obtains along all four sides of the trays by reason of the rim support furnished at intervals by high posts 31, preventing the sides and ends of the trays from breaking down and loosening the pack.

As previously explained, with some sizes of apples the standard counts cannot be obtained with the same number of apples in every layer. In such cases, two different trays are used as shown in FIGURES 3 and 6. These trays are symmetrical and do not have to be reversed end for end as the layers are built up in a box. The A tray in FIGURE 3 has three rows of five pockets P each and two rows of four pockets P each for holding twenty-three apples in a layer. The B tray in FIGURE 6 has three rows of four pockets each and two rows of five pockets each to hold twenty-two apples in the layer. Thus three A trays plus two B trays provide a one hundred thirteen box count which is the next smaller standard size of apple from that accommodated by the five R trays in FIGURE 2.

When the A and B trays of FIGURES 3 and 6 are stacked in a box as shown in FIGURE 7, the underhanging pockets of the tray above fall between the upper portions of the apples in the tray below for compact placement of the apples as illustrated in the lower right corner of FIGURE 6 where a portion of an A tray is shown superimposed on a B tray. Both of these trays have the same supporting features as the R tray but the corner construction must of necessity be arranged differently.

All four corners of the A tray have low rim segments 30a while all four corners of the B tray have high rim segments for high corner posts 31a. Thus, as shown in FIGURE 7, the same effective corner support is achieved as described in connection with FIGURE 2, each high corner post 31a supporting a low rim corner segment 30a of the tray above. Along the sides of the trays each high post 31 supports a low rim segment 30 of the tray above and between the pockets each medium height center post 27 supports a pocket in the tray above. In this way the salient advantageous features of the R tray

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in FIGURE 1 are retained in the combination of A and B trays shown in FIGURE 7. In FIGURE 7 the tray A₁ is placed in the bottom of the box, then B₁ and then A₂. Above this, in order but not shown, are B₂ and A₃ which forms the topmost layer. The high posts 31 extend slightly above the tops of the fruit in the top layer to protect this layer of fruit from downward pressure or weight applied around the margin of the lid, the same as shown in FIGURE 2.

In certain sizes or counts there is insufficient space between the pockets to form the center posts 27 as shown in FIGURES 1 to 7. In such cases, these posts are bifurcated to form dual posts 37 as shown in FIGURES 8 and 9. Since the dual posts would not satisfactorily support the curved bottoms of the overlying pockets, the pocket bottoms are provided with hollow, flat base extensions 40 of sufficient length to span the gap across the bifurcation and rest on both dual posts as shown in FIGURE 9. Either the R-type tray in FIGURE 1, the A-type tray in FIGURE 3 or the B-type tray in FIGURE 6 may have such bifurcated center posts as will presently appear. In other respects the trays shown in FIGURES 8 and 9 are the same as the A, B and R trays previously described.

The following tabulation of tray arrangements shows how the three types of trays A, B and R are used to pack the main commercial apple counts from fifty-six to a box to two hundred sixteen to a box, using from four to six trays per box.

Tray arrangements

Size	Trays	Pockets	Center Posts Posts
56	4 R trays	2 rows of 4 and 2 rows of 3	Single.
64	2 A trays	2 rows of 4 and 2 rows of 5	Do.
72	2 B trays	2 rows of 4 and 2 rows of 6	Do.
80	4 R trays	2 rows of 5 and 2 rows of 4	Do.
88	2 A trays	4 rows of 5	Dual.
96	2 B trays	4 rows of 5	Do.
104	4 R trays	2 rows of 5 and 2 rows of 6	Do.
112	5 R trays	5 rows of 4	Single.
120	3 A trays	3 rows of 5 and 2 rows of 4	Do.
128	2 B trays	2 rows of 5 and 3 rows of 4	Do.
136	5 R trays	5 rows of 5	Do.
144	3 A trays	3 rows of 6 and 2 rows of 5	Do.
152	2 B trays	2 rows of 6 and 3 rows of 5	Do.
160	5 R trays	5 rows of 6	Either.
168	3 A trays	3 rows of 7 and 2 rows of 6	Dual.
176	2 B trays	2 rows of 7 and 3 rows of 6	Do.
184	5 R trays	5 rows of 7	Do.
192	6 R trays	3 rows of 5 and 3 rows of 6	Single.
200	3 A trays	3 rows of 7 and 3 rows of 5	Do.
208	3 B trays	3 rows of 5 and 3 rows of 7	Do.

It will be observed that the R-type trays are never used with A and B trays. The R trays alone accommodate more than half of the different sizes. As previously stated, the R tray illustrated in FIGURE 1 is for the one hundred count size in the tabulation. Except for the number and size of pockets and type of center posts, all of the other R trays correspond to the structure shown in FIGURE 1.

The A and B trays are used in different combinations, such as two each, three and two and three and three. Except for the number and size of pockets and type of center posts, all of the A trays correspond to the A tray structure shown in FIGURES 3 to 5, and all of the B trays correspond to the B tray structure shown in FIGURES 6 and 7.

Also, as previously stated, it will be observed that the dual or bifurcated center posts shown in FIGURES 8 and 9 are employed in certain R trays and certain A and B trays. In the case of the one-hundred-fifty-count size, the center posts may be formed as dual posts if they cannot be satisfactorily molded as single posts.

By applying the principles of the invention as described and illustrated herein, similar trays may also be designed for abnormally large and abnormally small apples or other fruit or articles to be packed. Of course, the trays are not limited to the given dimensions for a standard

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apple box. There is no limitation on the size of the trays except that they must be capable of being molded of suitable materials. While such trays are usually made of pulp for reasons of economy, they may also be molded of plastic or any other moldable material. For packing apples it is contemplated that the trays will be made with sufficient stiffness to furnish substantial support to the overlying trays as herein described but, for other purposes, they may be considerably more flexible depending upon the weight and nature of the articles to be packed. For example, trays for extremely light weight, fragile Christmas ornaments such as thin glass balls would not need to be as stiff and thick as trays for large and relatively heavy apples.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. A packing tray comprising a rectangular body of molded material having a plurality of rows of pockets with the pockets in staggered relation in adjacent rows, a stepped rim around the four sides of said trays, said rim having low segments above the bottoms of said pockets in intervals alongside adjacent pockets and high segments forming high posts in intervals between adjacent pockets, and center posts of medium height between pockets in the same row and between corresponding pockets in alternate rows, said center posts having tops higher than said low rim segments and lower than said high posts.

2. A stack of trays as defined in claim 1, said high posts of each tray supporting said low rim segments of the tray above, and said center posts of each tray supporting the bottoms of the pockets of the tray above.

3. A lidded box containing a stack of trays as defined in claim 1, said high posts of the top tray being adapted to engage the lid of the box to protect articles in the pockets of said top tray from pressure by the lid.

4. A tray as defined in claim 1, said center posts being bifurcated into dual posts.

5. A tray as defined in claim 4, said pockets having flat bottom portions arranged to bridge and rest upon the bifurcated posts of an underlying tray.

6. A stack of trays as defined in claim 2, said pockets and posts being arranged so that all the trays are identical, each tray being rotated to a different orientation than the underlying tray and the overlying tray.

7. A stack of trays as defined in claim 6, said difference in orientation being 180°.

8. A stack of trays as defined in claim 2, alternate trays being identical and having one pattern of pockets and posts, and the intervening trays being identical to each other and having a different pattern of pockets and posts, whereby the stack comprises two different tray patterns.

9. A tray as defined in claim 1, at least two corners of the tray having said high posts.

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10. A tray as defined in claim 1, two corners of the tray having said high posts and two corners of the tray having said low rim segments.

11. A tray as defined in claim 1, the four corners of the tray having said low rim segments.

12. A tray as defined in claim 1, the four corners of the tray having said high posts.

13. A stack of trays as defined in claim 8, said alternate trays having said high posts at their four corners and said intervening trays having said low rim segments at their four corners.

14. A stack of trays as defined in claim 2, each high post being merged with an adjacent center post by a supporting surface shaped to fit the bottom of a pocket of the tray above.

15. A stack of identical packing trays, each tray comprising a rectangular body of molded material having a plurality of rows of pockets with the pockets in staggered relation in adjacent rows, a stepped rim around the four sides of said tray, said rim having low segments above the bottoms of said pockets in intervals alongside adjacent pockets and high segments forming high posts in intervals between adjacent pockets, and center posts of medium height between pockets in the same row and between corresponding pockets in alternate rows, said center posts having tops higher than said low rim segments and lower than said high posts, said high posts of each tray supporting said low rim segments of the tray above, and said center posts of each tray supporting the bottoms of the pockets of the tray above, two adjacent corners of each tray having said high posts and the other two corners having said low rim segments, each tray being rotated 180° with respect to orientation of the underlying and overlying trays.

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