

[54] TRAY WITH REINFORCED ARTICLE POCKETS

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[22] Filed: Nov. 16, 1970

[21] Appl. No.: 89,547

[52] U.S. Cl.217/26.5, 229/29 M

[51] Int. Cl.B65d 85/34

[58] Field of Search.....217/26, 26.5, 27, 35; 229/29 M, 2.5

[56] References Cited

UNITED STATES PATENTS

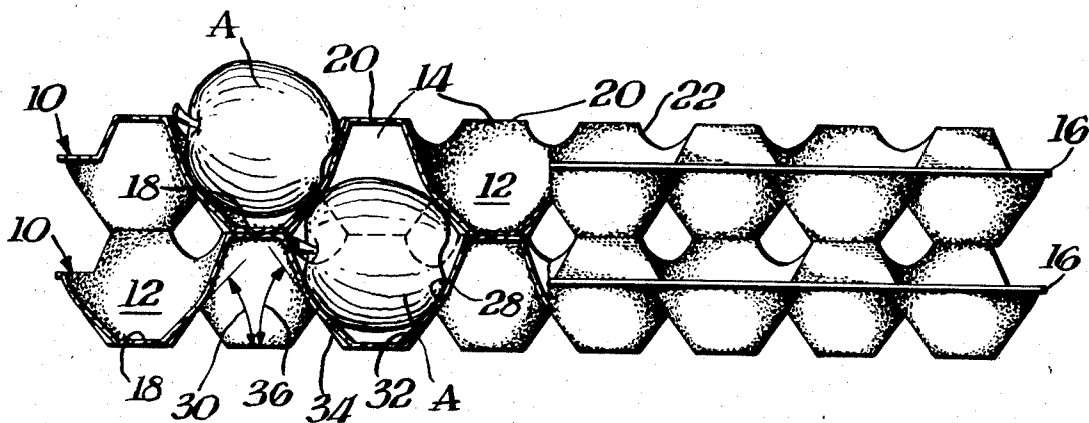
3,282,458	11/1966	Rudd.....	217/26.5
2,936,922	5/1960	Williams.....	217/26.5
3,166,467	1/1965	Reifers et al.....	229/29 M
2,939,602	6/1960	Grant.....	217/26.5
2,351,754	6/1944	Friday.....	217/26.5

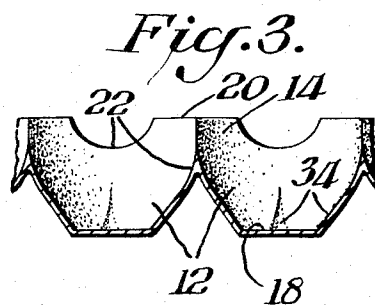
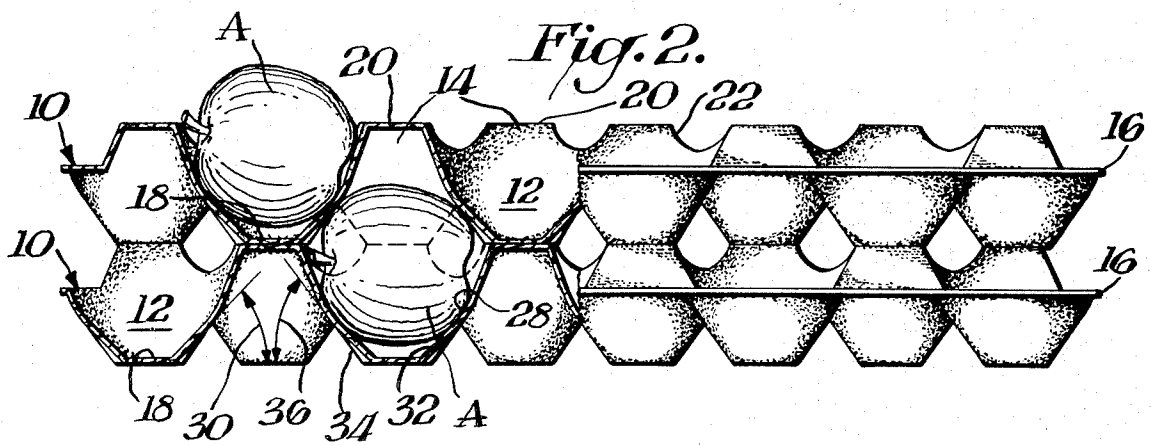
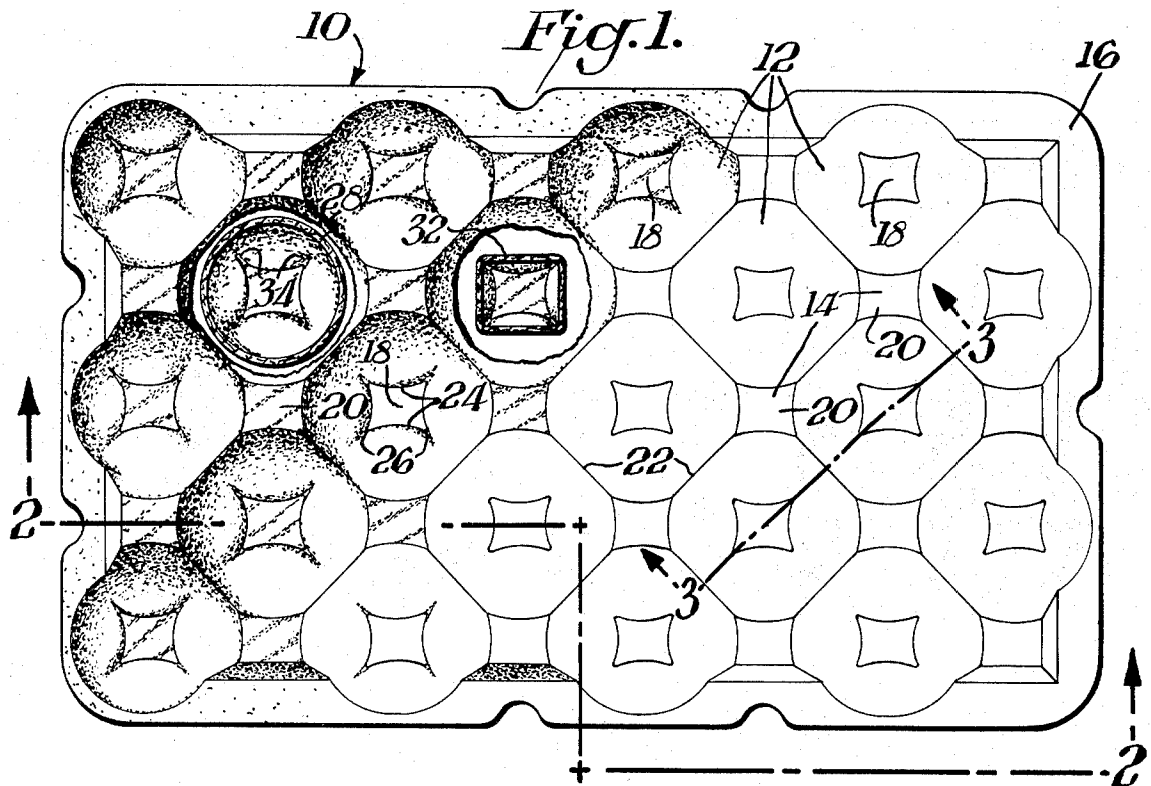
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[57] ABSTRACT

A molded packaging tray having a plurality of downwardly dished pockets for receiving soft, round, delicate articles such as apples, peaches and tomatoes, and a plurality of upwardly tapering posts. The pockets and posts are arranged so that when two or more trays are properly oriented in a stack the flat pocket bottoms of one tray rest on the flat post tops of the next lower tray in the stack, rather than resting on the fruit packaged in the next lower tray. The pockets are substantially circular in horizontal cross-section at their approximate mid-level between the pocket bottoms and the post tops to smoothly support the delicate fruit, and the pockets are without inwardly directed protrusions. The pockets below the approximate mid-level taper inwardly to join the pocket bottoms at a low angle not greater than about 55° from the horizontal to minimize the total height of the tray with respect to the diameter of the fruit packaged therein. Four reinforcing ribs are associated with each pocket below its mid-level, the ribs being outwardly convex in horizontal cross-section, and being joined to the pocket bottoms at their lower extremities and tapering upwardly therefrom to merge with the pockets. The pocket bottoms and the post tops are similar in shape and generally coextensive in size.

4 Claims, 3 Drawing Figures





TRAY WITH REINFORCED ARTICLE POCKETS

BACKGROUND OF THE INVENTION

The claimed invention relates to the field of articles molded to final shape from materials such as wood and paper pulp, plastics such as thermoplastic, and the like, for the retail packaging and merchandizing of generally round, easily bruised fruit, such as apples, peaches and tomatoes, and more particularly to the deep pocket style of tray having pockets and posts arranged so that when two or more trays are properly oriented in a stack the pocket bottoms of one tray rest on the post tops of the next lower tray in the stack. Trays of this general style are illustrated in Friday U.S. Pat. No. 2,351,754 (1944) and Williams U.S. Pat. No. 2,936,922 (1960).

Prior to the present invention, packaging trays of the foregoing variety have been beset with the significant drawback that the packaged fruit is often bruised or damaged in the area adjacent the bottom of the pocket after stacking a number of trays filled with fruit for storage and shipment. If the pockets are rounded in semi-spherical fashion to cradle the fruit as closely as possible, as in the aforesaid Friday patent, the small top of the posts of the next lower tray in the stack tend to indent the bottom of the pockets resting thereon. This causes an upwardly or inwardly directed protrusion which damages the fruit. This problem is intensified when moisture, which may collect in the bottoms of the pockets, weakens the material of the tray and renders the pocket bottoms more susceptible to puncture or indentation by the relatively small area of the post tops.

In an effort to correct the foregoing undesirable situation, the pocket bottoms were lowered and flattened in the form of feet or recesses to rest on the top of the posts, as in the aforesaid Williams patent. While this construction was a significant improvement, it was found that the corner between the pocket wall and the near vertical edge wall of the recess formed an inwardly directed protrusion of annular shape, which under some conditions could damage the fruit as severely as the purely rounded pocket bottom.

To avoid the inwardly directed annular corner formed by the sidewall of the shallow recesses, it was next proposed to have the pocket wall flow smoothly downwardly to its junction with a small flat pocket bottom and without inwardly directed corners or angles of any sort. But to maintain the total height of the tray within a range not exceeding the average diameter of the fruit packaged therein, to conserve stacking space, the angle of the walls of the pocket below the approximate mid-level of the pocket taper inwardly to join the flat pocket bottoms at a low angle no greater than about 55° from the horizontal. This, however, results in a wall angle too shallow to properly resist the vertical forces normally encountered in stacking such trays for shipment and storage. It has been recognized that when conditions permit a steeper wall near the bottom of a pocket the strong geometrical principle of the post can be utilized, such as in the steep wall pockets for eggs as illustrated in Grant U.S. Pat. No. 2,939,602 (1960), but such teachings are of little value when the stacking height requirements dictate pocket walls having extremely shallow angles at their lower extremities.

Thus, the problem which has been long recognized but heretofore unsolved, as outlined above, is the provision of a molded packaging tray having

downwardly dished pockets with shallow angle walls at the lower extremity thereof to conserve stacking height, but which will resist vertically applied forces such as those encountered when the pocket rests upon the small area top of an upwardly directed post of the next lower tray in a stack.

SUMMARY OF THE INVENTION

This invention solves the foregoing problems and provides a molded packaging tray having a plurality of downwardly dished pockets and a plurality of upwardly tapering posts arranged so that when two or more trays are properly oriented in a stack the flat pocket bottoms of one tray rest on the flat post tops of the next lower tray in the stack. The pockets are substantially circular in horizontal cross-section at their approximate mid-level between the pocket bottoms and the post tops to smoothly support delicate fruit which is easily bruised, and the pockets are without inwardly directed protrusions. The pockets below the approximately mid-level taper inwardly to join the flat pocket bottoms at a low angle not greater than about 55° from the horizontal to minimize the total height of the tray with respect to the diameter of the fruit packaged therein. Four reinforcing ribs are associated with each pocket below its mid-level, the ribs being outwardly convex in horizontal cross-section, and being joined to the pocket bottoms at their lower extremities and tapering upwardly therefrom to merge with the pockets. The pocket bottoms and the post tops are similar in shape and generally coextensive in size.

BRIEF DESCRIPTION OF THE DRAWINGS

Numerous advantages of the present invention will become apparent to one skilled in the art from a reading of the detailed description in conjunction with the accompanying drawings, wherein similar reference characters refer to similar parts, and in which:

FIG. 1 is a top view of a packaging tray according to this invention with parts broken away to illustrate the pocket construction in horizontal cross-section at different levels;

FIG. 2 is a side elevational view partly in section on line 2—2 of FIG. 1 showing the packaging tray properly oriented so that the pocket bottoms rest on the post tops of a next lower tray in a stack; and,

FIG. 3 is a fragmentary sectional elevational view on line 3—3 of FIG. 1.

DETAILED DESCRIPTION

The molded packaging tray 10 consists of a unitary sheet molded to final shape from fibrous pulp material, or plastics such as thermoplastic either injection molded or vacuum formed from extruded or foamed sheets, all according to known techniques. The tray is shaped to define a plurality of downwardly dished article receiving pockets 12 and a plurality of upwardly tapering posts 14.

The pockets 12 and the posts 14 are arranged so that when two or more trays are properly oriented in a stack, the pockets of one tray rest on the posts of the next lower tray in the stack to transmit vertical forces without damage to articles in the pockets. In the tray illustrated in the drawings, the pockets are positioned in

five rows of four pockets each, the rows being staggered with respect to each other. The posts are interspersed between the pockets in such a manner that when one tray is rotated 180° with respect to another, it is properly oriented for stacking. It will be understood, of course, that other arrangements of pockets and posts are possible, and rotation of 90° rather than 180° is possible to obtain the post-to-pocket stacking for trays of this type. The tray in the preferred embodiment is surrounded by a marginal rim 16 in a horizontal plane slightly above the mid level between the bottoms of the pockets and the tops of the posts.

The pockets 12 have flat bottoms 18 which lie in a common horizontal plane defining the bottom of the tray, and the posts have flat tops 20 which lie in a common horizontal plane which define the top of the tray. In the illustrated embodiment, the post tops 20 are substantially rectangular in shape, with convex sides. The four sides of each post 14 extend downwardly and outwardly therefrom and merge into the walls of the adjacent pockets. The corners formed where two adjacent post side walls join together form sharp, thickened strengthening ribs 22 diagonally connecting adjacent posts, and diagonally separating adjacent pockets.

The pocket bottoms 18 are also substantially rectangular in shape, with convex sides 24 and slightly rounded corners 26. The pocket bottoms 18 are similar in shape and generally coextensive in size with the posts tops 20. Each pocket is designed to hold one delicate article A, such as the apples illustrated. The articles are supported at, or slightly below (depending on their size and placement), the approximate mid-level of the tray, and to this end the pockets are substantially circular in horizontal cross-section at their approximate mid-level, as at 28. This supporting area of the pocket does not have any inwardly directed protrusions, and the articles A are supported at this level with certain spring-like or cushioning characteristics and with the article spaced a small distance above the bottoms 18 of the pockets.

Below the approximate mid-level at which the articles are supported, the pocket walls taper inwardly to join the pocket bottoms 18 at a shallow, low angle not greater than about 55° from the horizontal, as indicated at 30. At a level approximately one-fourth of the height from the bottom of the tray, the pockets in horizontal cross-section depart from the circular mid-level cross-section and merge toward rectangular shape, as at 32.

The pockets below the approximate mid-level of the tray each have associated therewith a plurality of reinforcing ribs 34. In the illustrated embodiment, there are four reinforcing ribs 34 associated with each pocket, and the ribs are joined to the pocket bottoms 18 in the horizontal plane of the pocket bottoms and taper upwardly therefrom to merge with the pockets. The ribs 34 are outwardly convex in horizontal cross-section, and are joined to the corners 26 of the pocket bottoms at their lower extremities, and become smaller in horizontal cross-section until they merge with the

pockets at or below the level where the pockets are substantially circular in horizontal cross-section, as at 28. The reinforcing ribs 34 blend smoothly with the pocket walls without abrupt inwardly directed corners. The reinforcing ribs thus form an angle, measured at the corner of the pocket bottom, which is steeper or higher, as at 36, than the low angle, as at 30, of the pocket walls between the ribs.

There has thus been described a tray having article receiving pockets wherein the lower portion of the pockets is at a low angle but is reinforced to resist vertical stacking forces by a series of reinforcing ribs, which also cause the pocket bottom to be similar in shape and generally co-extensive in size with the post tops for improved transfer of vertical forces from one tray to another in a stack without damaging the articles in the trays.

While the above described embodiment constitutes the presently preferred mode of practicing the invention, other embodiments and equivalents are within the scope of the actual invention, which is claimed as follows.

I claim:

1. A molded packaging tray having a plurality of downwardly dished article receiving pockets having flat bottoms in a common horizontal plane, a plurality of upwardly tapering posts having flat tops in a common horizontal plane, the pockets and posts being arranged so that when two or more trays are properly oriented in a stack the pocket bottoms of one tray rest on the post tops of the next lower tray in the stack, the pockets being substantially circular in horizontal cross-section at their approximate mid-level between the pocket bottoms and the post tops to smoothly support the articles without inwardly directed protrusions, and the pockets below the approximate mid-level tapering inwardly to join the pocket bottoms at a low angle not greater than about 55° from the horizontal, the improvement comprising a plurality of reinforcing ribs which are outwardly convex in horizontal cross-section and which blend smoothly with the pockets without abrupt inwardly directed corners, the ribs being associated with each pocket below its mid-level and being joined at their lower extremity to the pocket bottoms in the horizontal plane thereof and tapering upwardly therefrom so as to become smaller in horizontal cross-section until they merge with the circular cross-sectional support portion of the pockets.

2. The molded packaging tray of claim 1 wherein the pocket bottoms and the post tops are similar in shape and generally coextensive in size.

3. The molded packaging tray of claim 2 wherein there are four reinforcing ribs associated with each pocket.

4. The molded packaging tray of claim 3 wherein the pocket bottoms are substantially rectangular in shape with convex sides, and the corners thereof are joined to the lower extremity of the reinforcing ribs.

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