

June 26, 1962

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3,040,923

MOLDED PULP PACKING TRAY

Filed July 7, 1958

3 Sheets-Sheet 1

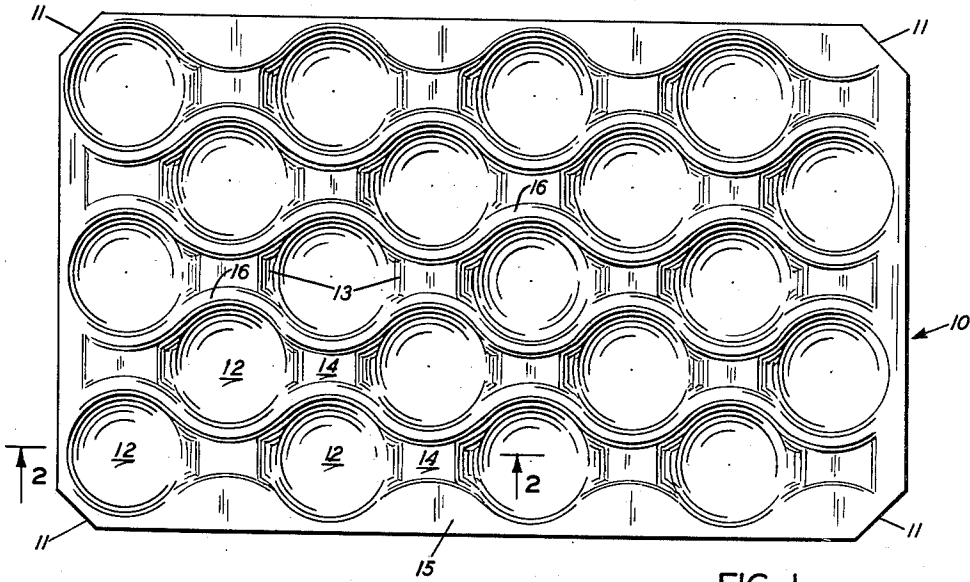


FIG. 1

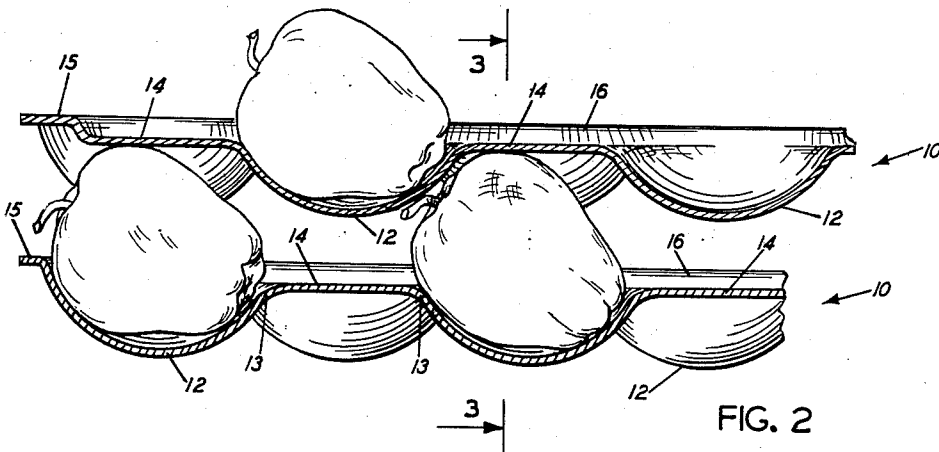


FIG. 2

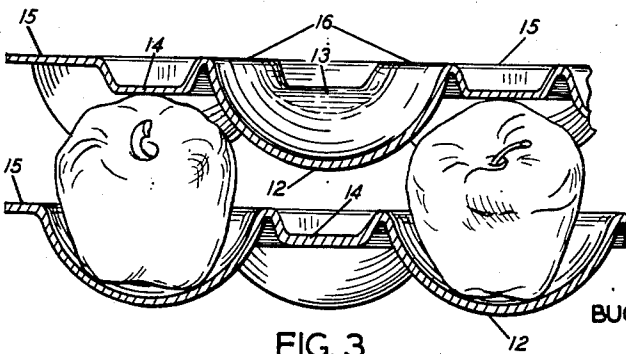


FIG. 3

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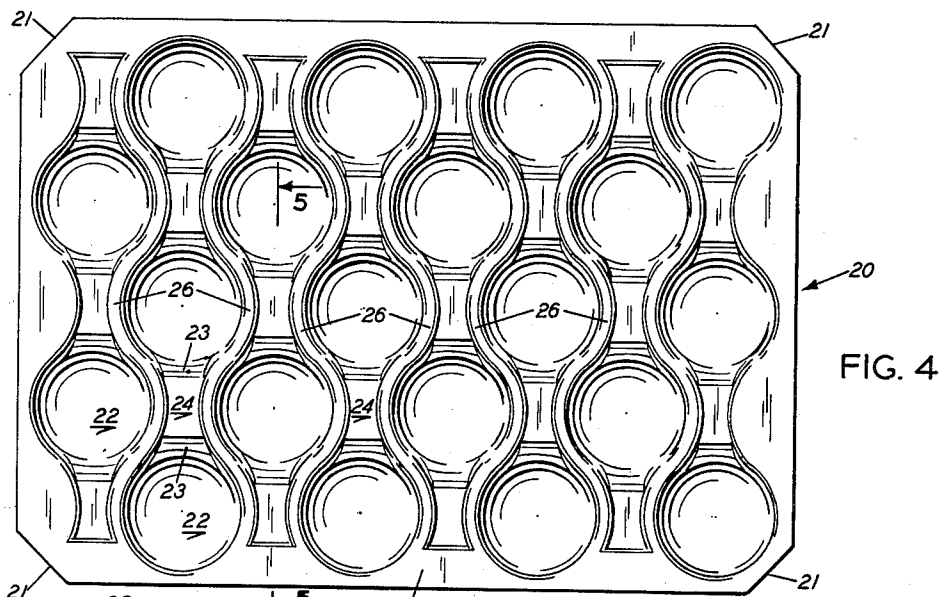


FIG. 4

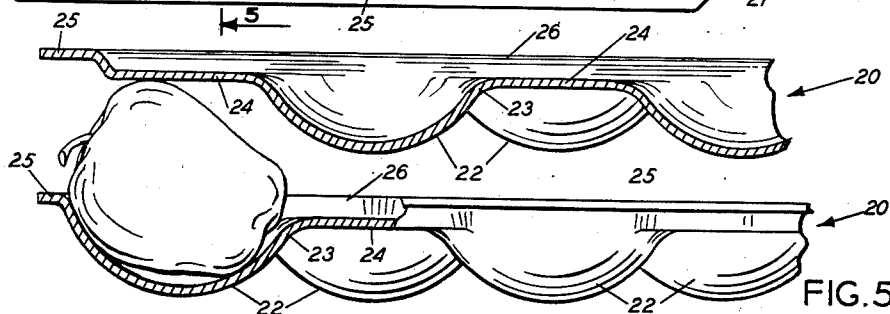


FIG. 5

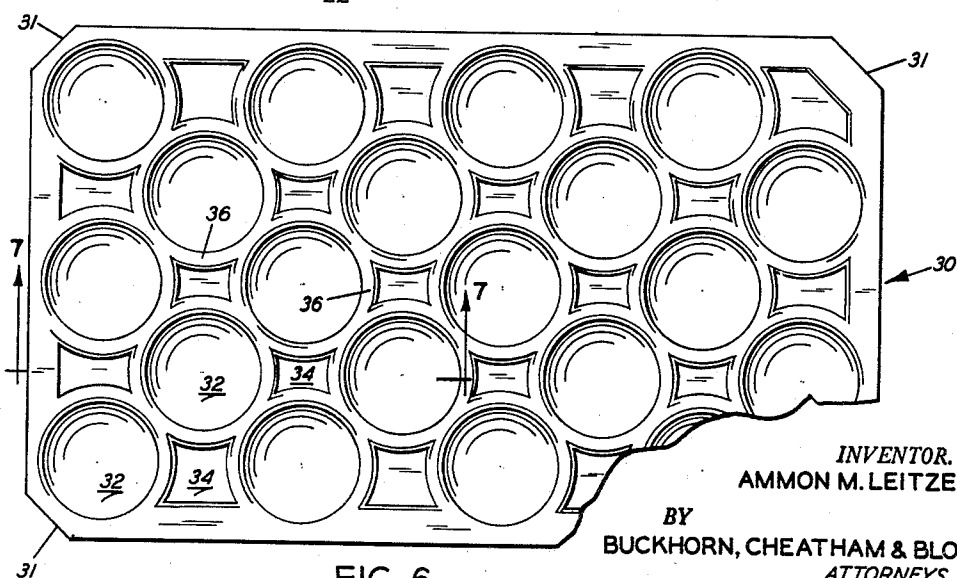


FIG. 6

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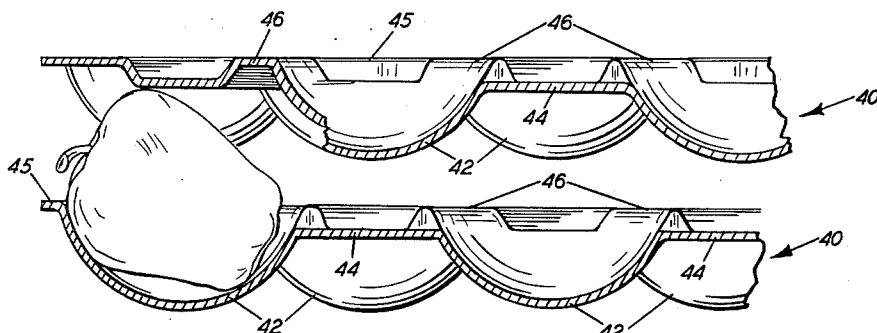
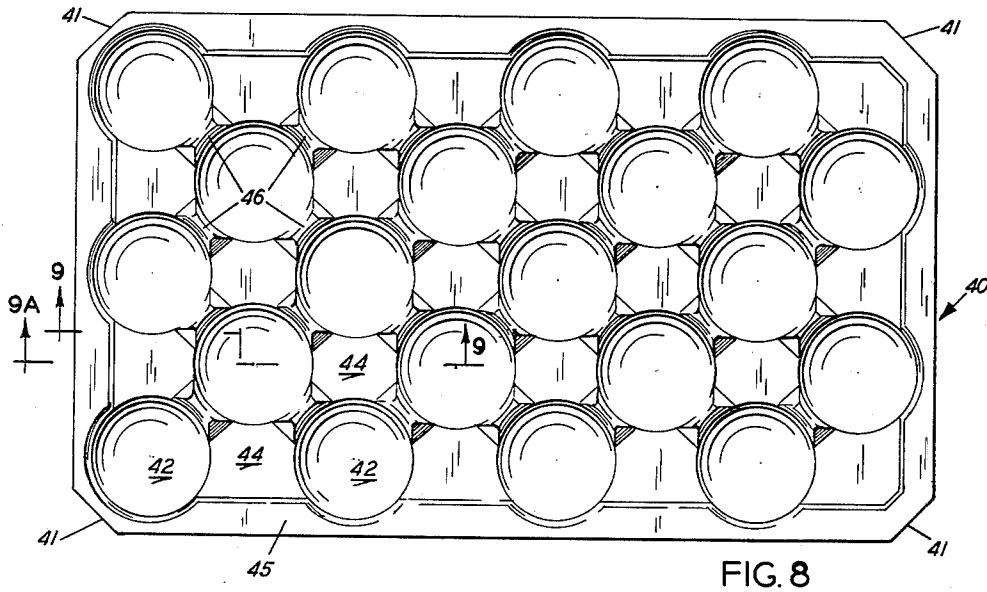
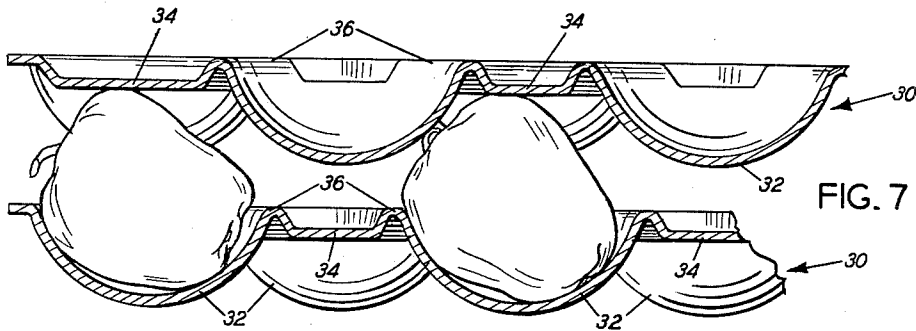
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3 Sheets-Sheet 3



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3,040,923

MOLDED PULP PACKING TRAY

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5 Claims. (Cl. 217-26.5)

My present invention comprises an improvement in molded pulp packing trays for fragile articles or fruit, the tray being principally designed for the packing of fruit.

A principal object of the present invention is to provide a tray in which the articles supported in one tray engage an upper tray in a tier of trays and articles in yielding areas at each point of contact whereby the individual articles are softly but firmly held in position and do not engage sharp or unyielding portions of the trays. Trays formed in accordance with the present invention have been subjected by an industrial research and engineering laboratory to shipping tests designed to simulate a railroad journey from the West Coast to the East Coast of the United States and have protected fresh apples to the extent that a substantial improvement over the best known prior trays with respect to sound fruit remaining after the tests has been found in all cases and that the average results over a considerable number of tests has shown an increase in such sound fruit in excess of twenty percent.

A further object of the present invention is to provide a packing tray of the foregoing character which may be made of softer, less compacted pulp than heretofore possible, while retaining rigidity so that a loaded tray may be picked up by its ends or sides and deposited in or removed from a packing container without having the tray collapse and drop its load.

A further object of the present invention is to provide a tray which may be provided with pockets receptive of elongated fruit or articles, such as apples of the Delicious type, pears, avocados, oval Christmas tree ornaments, and the like, yet which will also protect spherical objects and globular fruit.

A further object of the present invention is to provide a packing tray in which the pockets are arranged in diagonal rows with the pockets relatively close together, the pockets are arranged in transverse rows with the pockets relatively far apart, and the pockets are arranged in longitudinal rows with the pockets relatively far apart, and in which the numbers of pockets in the rows parallel to one axis of the tray are alternately odd and even, there being an odd number of pockets at one end of the tray and an even number at the other end, whereby the alternate trays in a tier may be reversed end for end so that the articles engage the lower surfaces of relatively large flat areas of a resilient nature in the tray above, which do not have their upper surfaces in contact with articles in such tray above. This distinguishes the present tray from prior art devices such as represented by the patent to Friday No. 2,351,754 in which there are posts between the pockets which rise above the plane of the tray and engage the bottoms of the pockets in the next uppermost tray. Even if the posts are not sufficiently high to engage the next uppermost tray, the lower portions of the articles in the next upper tray engage the same portions of the trays which are engaged by the articles in the tray below so that the packed articles are separated only by the thin layer of the material of the tray. A result of the new tray structure described above is to enhance and achieve the object of having a tier of packed trays compressible in a yielding manner without having unyielding portions or article supporting portions of one tray bear against the articles in another tray.

The objects and advantages of the present invention will be more readily apparent from inspection of the following specification, taken in connection with the accom-

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panying drawings wherein like numerals refer to like parts throughout.

In the drawings,

FIG. 1 is a plan view of one form of the present invention;

FIG. 2 is a partial section through a pair of superimposed loaded trays, the view being a partial vertical section taken substantially along line 2-2 of FIG. 1 and on an enlarged scale;

FIG. 3 is a vertical section taken substantially along line 3-3 of FIG. 2;

FIG. 4 is a plan view of another form of tray;

FIG. 5 is a view, partially in end elevation and partially in vertical section taken along line 5-5 of FIG. 4, on an enlarged scale, showing a pair of trays in superimposed relation;

FIG. 6 is a plan view of another form of the invention;

FIG. 7 is a vertical section through a superimposed pair of trays taken substantially along line 7-7 of FIG. 6;

FIG. 8 is a plan view of a further modification of the invention; and

FIG. 9 is a vertical section on an enlarged scale through a superimposed pair of trays, with the upper tray being shown along section line 9-9 of FIG. 8 and the lower tray being shown along section line 9-9A of FIG. 8.

The form of the invention illustrated in FIGS. 1, 2 and 3 comprises a substantially rectangular molded pulp tray 10 having parallel sides and parallel ends, with the sides longer than the ends. The corners of the trays are preferably cut off as indicated at 11 so that vertical circulation of air may be achieved in a ventilated carton or box in which articles are packed in a plurality of superimposed trays. The tray is provided with a plurality of rounded pockets 12 which are substantially in the shape of a section of a sphere, less than a hemisphere. The pockets are developed from spherical sections by fairing a cylindrical fillet into the pockets in the longitudinal direction of the tray, as indicated at 13, so that the longitudinal centerline sections of the pockets comprise reverse curve portions and the transverse centerline sections of the pockets comprise single circular sections. Due to this formation elongated articles such as Delicious apples, pears, quince, and avocados may be retained in the pockets with their major axes parallel to the longitudinal axis of the tray, without having a portion of the fruit rest upon an unyielding, sharp edge.

The pockets 12 are arranged in diagonal rows with adjacent pockets fairly close together in both diagonal directions, the pockets are arranged in a set of longitudinal rows parallel to the longitudinal axis of the tray with adjacent pockets relatively far apart in the longitudinal direction, and the pockets are arranged in a set of transverse rows with the adjacent pockets relatively far apart in the transverse direction of the tray. The numbers of pockets in alternate transverse rows are odd and even; and there is an odd number of pockets at one end of the tray and an even number of pockets at the other end of the tray, whereby when alternate trays are reversed end for end in a tier of trays each pocket in a lower tray is below a relatively large flat area 14 in an upper tray. There is a large, flat area 14 surrounding each intersection of the centerlines of longitudinal rows of pockets with the centerlines of transverse rows of pockets. The tray is surrounded by an edge portion 15 which lies in a horizontal plane when the tray is in use. Adjacent pockets are separated from each other in the diagonal directions by continuous, sinuous ridges 16, the crests of the ridges lying in the same plane as the edge portion 15 and defining therewith the highest portions of the tray. Thus, in the diagonal directions of the tray, fruit or other articles to be protected are separated from

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each other by narrow ridges 16 forming portions of the rims of each pocket.

The flat areas 14 lie in a common plane parallel to and intermediate of the planes of the ridges 16 and the lower extremities of the pockets 12. The extremities of the pockets 12 are the lowest portions of the tray, and all lie in a common plane. Each fruit, or other perishable article, engages the central portion of one of the large, flat areas 14 as the only support for the upper tray. The flat areas are naturally resilient to a slight extent and are resiliently supported by the sides of the adjacent ridges so that the upper tray may be forced downwardly in applying pressure to the lid of a filled carton to a considerable extent without the pockets thereof engaging the fruit or articles in the lower tray. If the pockets do engage the lower articles the chances are that very seldom will there be an article in an upper tray engaging the inner surface of a pocket opposite a point that an article in the lower tray engages the outer surface, so that even though the outer surfaces of the pockets should engage the articles there is little chance for bruising contact to be made.

The sinuous ridges 16, running in the longitudinal direction of the tray, so stiffen the tray that a loaded tray may be picked up by its end edges without having the tray buckle in the middle. Likewise, the ridges have sufficient lateral components that the tray is rigid in the transverse direction to the extent that it may be picked up and supported by its lateral edges without buckling when loaded.

In the modification disclosed in FIGS. 4 and 5 the same features are embodied in a tray of different configuration. The tray 20 comprises a sheet of molded pulp of generally rectangular form having its corners cut off at 21. Rounded pockets 22 of the same size and configuration, as in the previous example, provided with faired elongations indicated at 23 are arranged with their long axes transversely of the tray rather than longitudinally thereof. The pockets are arranged close together in diagonal rows, separated in longitudinal rows and separated in transverse rows, there being flat areas 24 of considerable extent surrounding the intersections of longitudinal centerlines with the transverse centerlines of the pockets. The tray is provided with a continuous edge portion 25 which lies in a common plane with the sinuous ridges 26 separating transverse rows of pockets from each other, the edge portion and ridges defining the highest extremities of the tray. Elongated articles and fruit may be packed and protected in the same manner, with their major axes extending transversely of the tray. The number of pockets in the transverse rows are alternately odd and even, there being an even number of pockets in the transverse row at one end of the tray and an odd number in the other end row so that alternate trays in a tier of packed trays may be reversed end to end with the resulting advantages previously described. The same number of pockets may be contained in a tray which is shorter in its longitudinal dimension than the previous tray and wider in its lateral dimension. The tray is stiffer transversely than longitudinally but there are sufficient longitudinal components to each of the ridges 26 that the tray may be picked up either by its lateral or its end edges without having it collapse. As previously described, the flattened areas 24 lie in a plane intermediate of the uppermost plane defined by the crests of the ridges and the lowermost plane defined by the lower extremities of the pockets.

A modification is disclosed in FIGS. 6 and 7 which is more suited for the packing of spherical objects or fruit of a generally globular nature. The same considerations are present in this modification. The tray 30 has its corners removed as indicated at 31 and is provided with a plurality of pockets 32 of spherical contour, the pockets being somewhat less than hemispheres. The pockets are arranged relatively close together in the diagonal direc-

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tions of the tray, and separated in horizontal and lateral rows as previously described, there being a large, flat area 34 surrounding each intersection of a longitudinal centerline with a transverse centerline. A plurality of sinuous longitudinal ridges are provided, as well as a plurality of transverse sinuous ridges, the ridges intersecting and fading into each other whereby each pocket is outlined by a continuous circular rim ridge 36 merging with the continuous rim ridges outlining each adjacent pocket. This tray is quite stiff in both directions, and is provided with raised rim portions separating all pockets in the diagonal directions where the contained objects come most closely together.

The form of tray illustrated in FIGS. 8 and 9 incorporates the principles of the preceding forms. The generally rectangular tray indicated at 40 has its corners cut off as indicated at 41. The tray is provided with a plurality of spherical pockets 42 which are less than hemispheres. The pockets are arranged close together in diagonal rows in both directions, and separated in longitudinal and transverse rows, with the result that there is a large flat area 44 surrounding each intersection of a longitudinal centerline with a transverse centerline. Discontinuous ridges are provided, the ridges forming separated rim portions indicated at 46, with each extending transversely to opposite sides of the diagonal centerlines so as to preserve the ridge protection between the articles at their closest points of approach to each other. The crests of the rim portions lie in the same plane as the continuous edge portion 45, the plane including the highest portions of the tray. The extremities of the pockets define the lowest plane of the tray, parallel to the first plane, and the flattened areas 44 define a plane parallel to and intermediate of the first and second planes. It will be appreciated that due to the removal of sections of the ridges, the tray is somewhat weak as to lengthwise and transverse rigidity; but such a tray nevertheless has sufficient rigidity to be picked up by its edges or ends when loaded with fruit. Removing sections of the ridges enlarges the flat areas 44, giving a greater cushioning effect and reducing the chance of bruising or crushing the fruit or articles. The pockets illustrated are spherical, principally for use with spherical or globular fruit and articles, but it is to be appreciated that the pockets could be elongated, either longitudinally or transversely, or both, while still retaining the advantages of the construction and permitting the use of the tray with elongated fruit or other articles.

The pockets, whether spherical sections or elongated ovoid sections, are aptly described as rounded pockets, which term is meant to embrace either form.

Having illustrated and described a preferred embodiment of the present invention, it should be apparent to those skilled in the art that the same permits of modification in detail and arrangement. I claim as my invention all such modifications as come within the true spirit and scope of the appended claims.

I claim:

1. A molded pulp packing tray comprising a sheet of molded pulp having a plurality of similar rounded pockets displaced out of the general plane of said tray and having rounded article receiving surfaces therein, all of the pockets in said tray being displaced out of said general plane in the same direction and certain of said pockets being adjacent each other, said tray having ridge portions displaced out of said general plane in a direction opposite the first mentioned direction, said adjacent pockets being separated from each other by a single one of said ridge portions and said ridge portions having surfaces forming continuations of said rounded article receiving surfaces of said adjacent pockets, said tray having a plurality of flattened portions positioned in said general plane and having a plurality of said pockets disposed around and adjacent each of said flattened portions, said pockets being

arranged in rows and said ridge portions extending sinuously between said rows and separating said pockets from said flattened portions, said tray having a reinforcing rim displaced out of said general plane in the same direction as said ridges and extending around the periphery of said tray.

2. A molded pulp packing tray comprising a sheet of molded pulp having a plurality of similar rounded pockets displaced out of the general plane of said tray to provide inner rounded pocket surfaces on one side of said tray and outer rounded pocket surfaces on the other side of said tray, all of the pockets in said tray being displaced out of said general plane in the same direction and certain of said pockets being adjacent each other, said tray having ridge portions displaced out of said general plane in a direction opposite the first mentioned direction, said adjacent pockets being separated from each other by a single one of said ridge portions and said ridge portions having surfaces forming continuations of said inner rounded pocket surfaces of said adjacent pockets, said tray having a plurality of flattened portions positioned in said general plane and having a plurality of said pockets disposed around and adjacent each of said flattened portions, said pockets being arranged in rows and being positioned relative to said flattened portions to provide on said other side of said tray and between said pockets spaces in which rounded articles having surfaces fitting said inner rounded pocket surfaces can be positioned in contact with said flattened portions while spaced from said outer rounded pocket surfaces, said ridge portions extending sinuously between said rows of pockets and separating said pockets from said flattened portions, said tray having a reinforcing rim portion extending around its periphery and displaced out of said general plane in the same direction as said ridge portions.

3. A molded pulp packing tray for a plurality of rounded articles, said tray comprising a sheet of molded pulp having resilient cushioning support portions of substantial area lying in the general plane of said tray and a plurality of rounded pockets displaced out of said general plane, in the same direction said pockets all being displaced out of said general plane, said pockets being arranged in rows to provide four pockets around certain of said support portions with the pockets of the pairs of said four pockets adjacent each other, said tray having ridge portions positioned between said pockets of said pairs of pockets, said ridge portions being parts of sinuous ridges displaced out of said general plane in a direction opposite the first mentioned direction and extending along the edges of rows of said pockets, said support portions being positioned for vertical alignment with pockets in a next lower tray when a plurality of similar trays are employed in superimposed relation with said pockets opening upwardly to pack said articles, said pockets of the first mentioned tray being positioned relative to said support portions to provide spaces between the pockets of said first mentioned tray in which rounded articles positioned in and fitting said rounded pockets in said next lower tray have supporting contact with the lower surfaces of said support portions of said first mentioned tray and are spaced from

the lower surfaces of said pockets of said first mentioned tray.

4. A molded packing tray comprising a sheet of shock absorbing and insulating material having a plurality of similar rounded pockets displaced out of the general plane of said tray and having rounded article receiving surfaces therein, all of the pockets in said tray being displaced out of said general plane in the same direction and certain of said pockets being adjacent each other, said tray having ridge portions displaced out of said general plane in a direction opposite the first mentioned direction, said adjacent pockets being separated from each other by a single one of said ridge portions and said ridge portions having surfaces forming continuations of said rounded article receiving surfaces of said adjacent pockets, said tray having a plurality of flattened portions positioned in said general plane and having a plurality of said pockets disposed around and adjacent each of said flattened portions, said pockets being arranged in rows and said ridge portions extending along and conforming to the curved boundary portions of adjacent pockets.

5. A molded packing tray comprising a sheet of shock absorbing and insulating material having a plurality of similar rounded pockets displaced out of the general plane of said tray to provide inner rounded pocket surfaces on one side of said tray and outer rounded pocket surfaces on the other side of said tray, all of the pockets in said tray being displaced out of said general plane in the same direction and certain of said pockets being adjacent each other, said tray having ridge portions displaced out of said general plane in a direction opposite the first mentioned direction, said adjacent pockets being separated from each other by a single one of said ridge portions and said ridge portions having surfaces forming continuations of said inner rounded pocket surfaces of said adjacent pockets, said tray having a plurality of flattened portions positioned in said general plane and having a plurality of said pockets disposed around and adjacent each of said flattened portions, said pockets being arranged in rows and being positioned relative to said flattened portions to provide on said other side of said tray and between said pockets spaces in which rounded articles having surfaces fitting said inner rounded pocket surfaces can be positioned in contact with said flattened portions while spaced from said outer rounded pocket surfaces, said ridge portions extending along and conforming to the curved boundary portions of adjacent pockets.

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