United States Patent

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[54] **FRUIT MEASURING AND TRANSPORTING TANK**
11 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** ..... **220/69,** 220/71, 220/97 R
[51] **Int. Cl.**..... **B65d 7/44,** B65d 21/02
[50] **Field of Search**..... 220/69, 71, 115, 5 A, 97; 248/58, 51, 119; 217/69; 73/426 T, 429; 206/46, 60 A; 294/55; 229/49, 23 C; 108/51, 52, 58

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Attorneys—Hobbs & Green and Kemon, Palmer & Estabrook

ABSTRACT: A fruit measuring and transporting tank having four sidewalls and a bottom forming a rectangular container and horizontally disposed bars mounted on the sidewalls for holding the sidewalls in an inwardly deflected position to resist the pressure of the container contents against the sidewalls, and a pallet for supporting the container The pallet consists of a horizontal frame and a pair of pockets disposed between the frame and the bottom of the container on each side for receiving the forks of a forklift truck. An adjustment mechanism mounted in the center of the pallet deflects the bottom upwardly or downwardly to obtain the desired location for the fruit-measuring instrument.

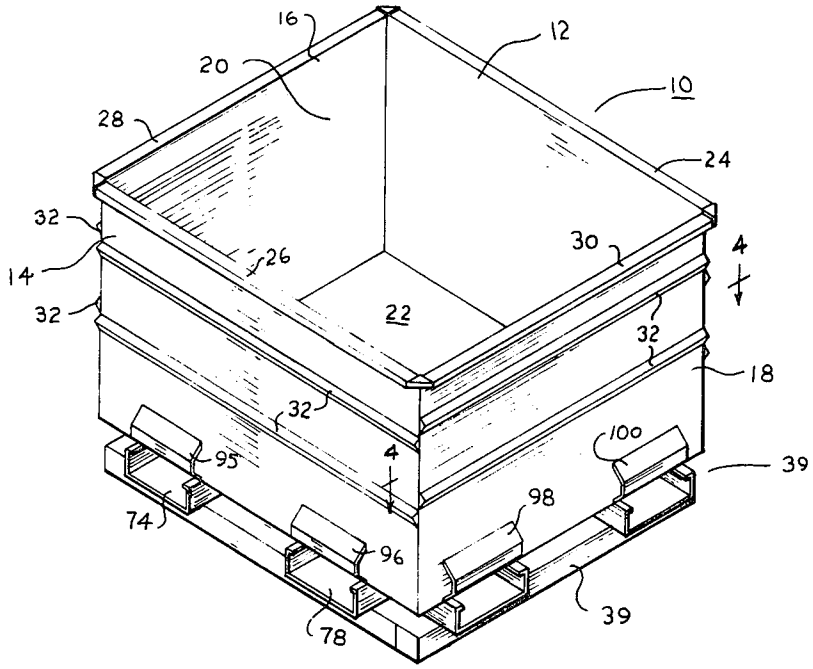


FIG. 1

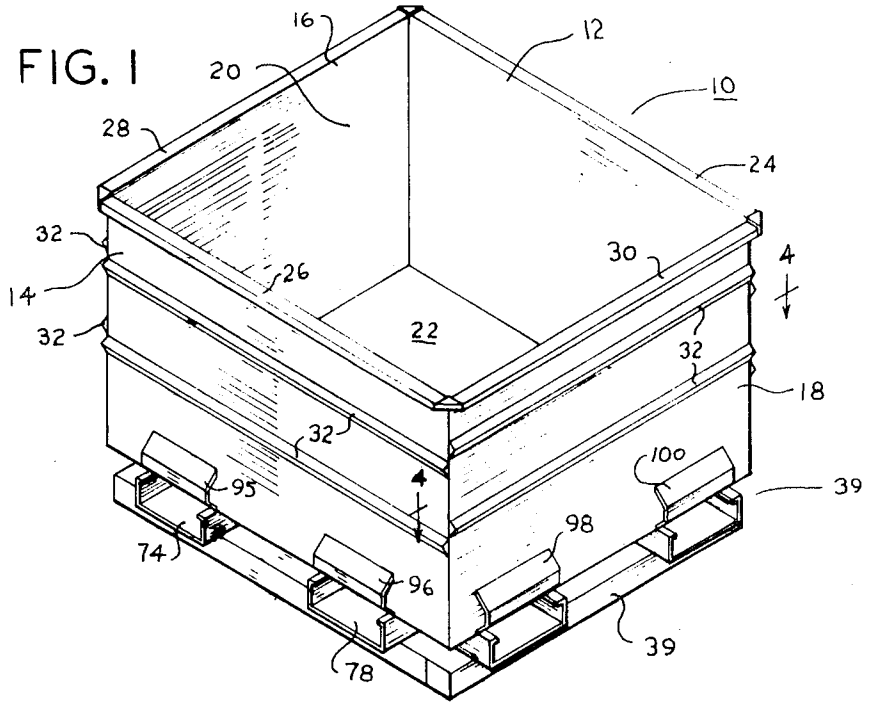
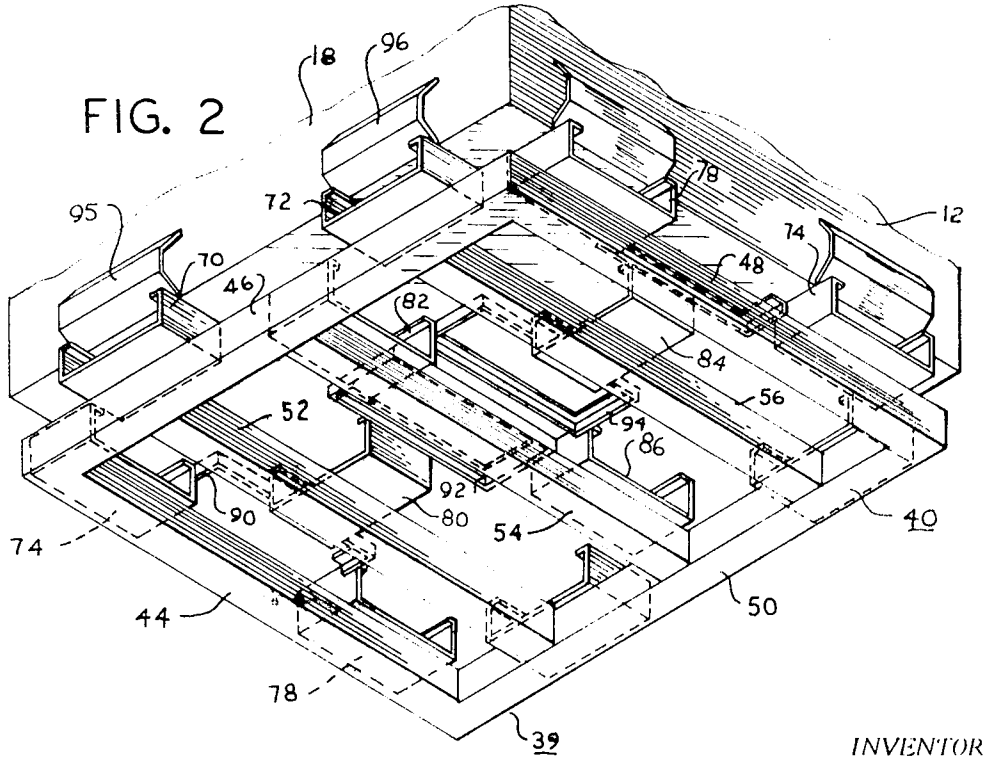


FIG. 2



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FIG. 3

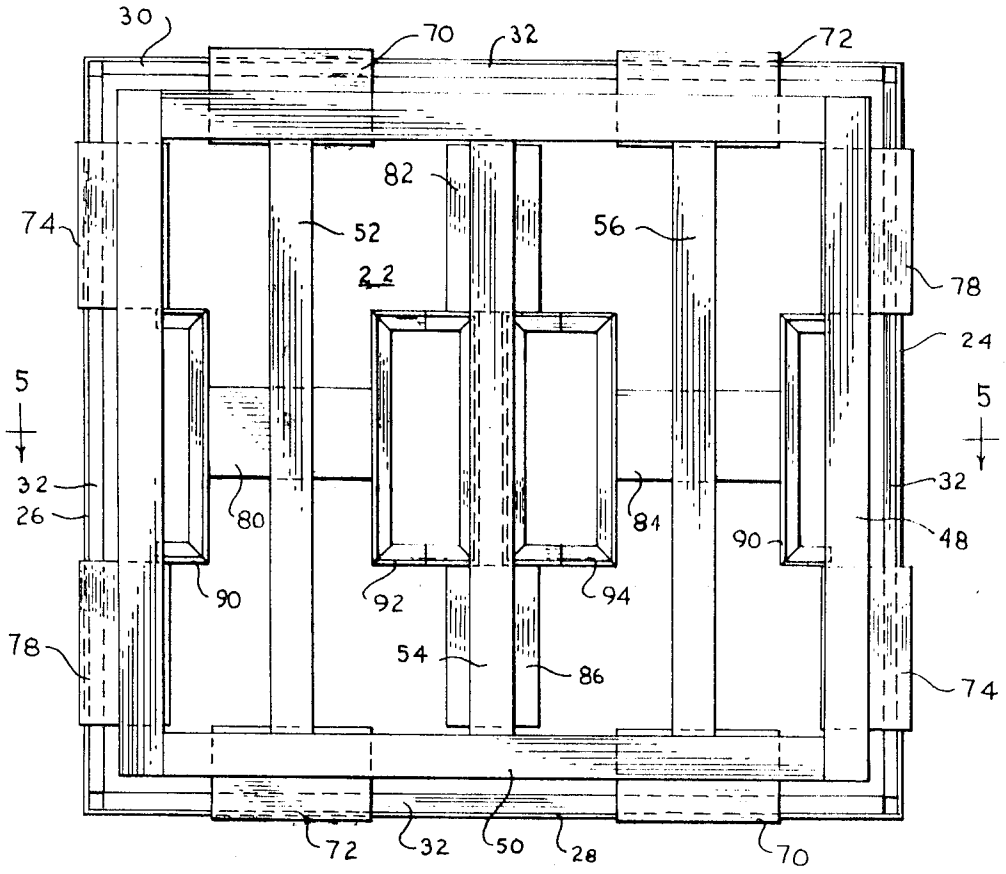
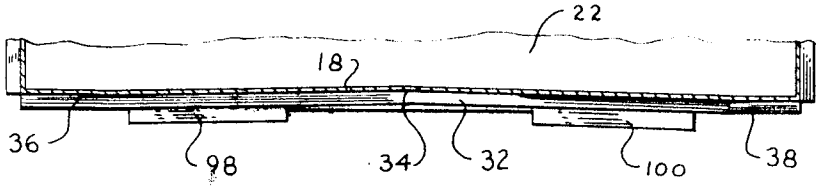


FIG. 4



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FIG. 5

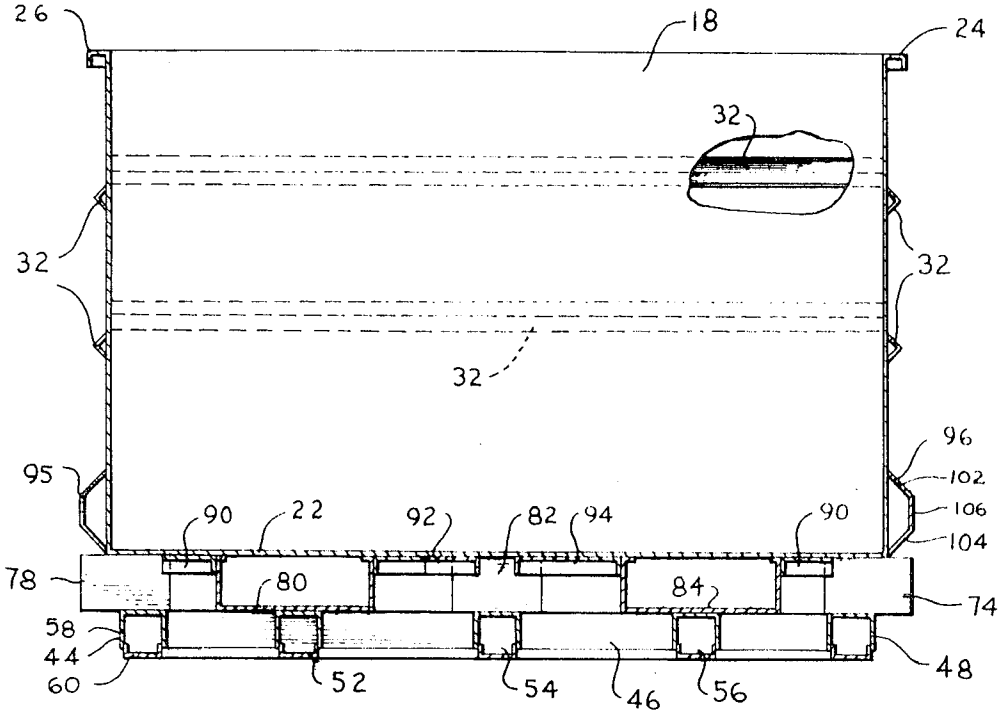


FIG. 6

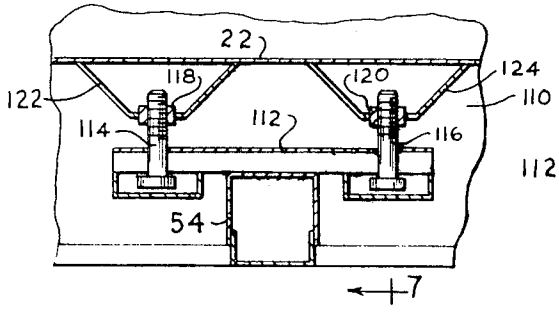


FIG. 9

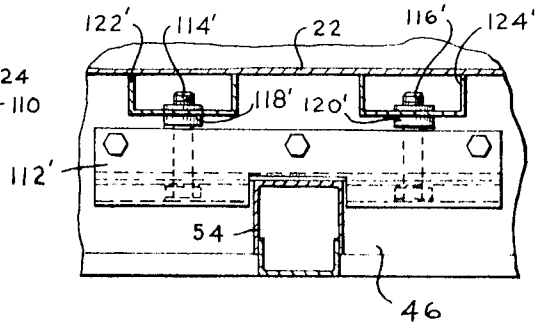


FIG. 7

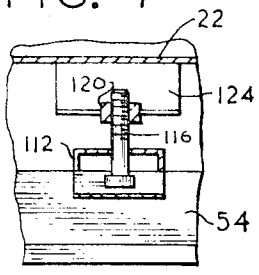
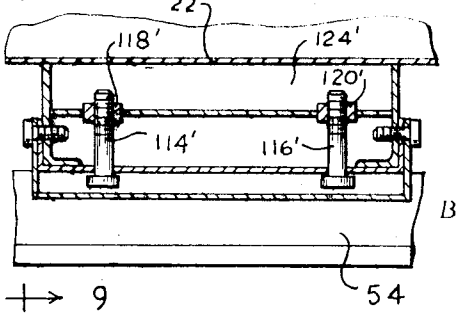


FIG. 8



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FRUIT MEASURING AND TRANSPORTING TANK

In harvesting and processing cherries on a commercial scale, the cherries are picked and placed in a relatively large bulk container for transporting, weighing and/or measuring. These containers are often referred to as measuring tanks, and contain water at a level substantially the same as the level of the bulk cherries in the tank for protecting the cherries from bruising while they are being transported. However, cherry weight is difficult to obtain in water, and at the present time the cherries are weighed by one of four methods, namely, draining the water from the tank before they are weighed, emptying the cherries into a water sump and conveying them from the water to a batch conveyor scale for weighing, weighing the total load and dumping the water and cherries, and returning the water to the tank for weighing the difference, and, lastly, measuring the depth of the cherries submerged in water in the tank and calculating the weight using a predetermined density factor. This last method is most promising from an economical point of view, as well as from the standpoint of giving maximum protection to the cherries. The cherries can be measured and the weight determined without removing them from the tank, and when they are removed, the water is removed with them, thus giving added protection to the cherries. Further, no second weighing of the tank with or without the water is required and the cherries are ready for processing without further weighing after they have been dumped from the tank. While the measuring method has been used to a limited extent, certain difficulties have been encountered which have rendered this method unreliable at times, including variations in the measuring tank dimensions from one tank to another. It is, therefore, one of the principal objects of the present invention to provide a cherry-measuring tank which will remain at constant volume through long periods of use and which can be adjusted in volume to correct for minor inaccuracies in manufacturing of the tank.

Another object of the invention is to provide a cherry tank which can easily be lifted by a lift truck approaching from any one of the four sides of the tank and which can be readily stacked for storage and for transporting on a truck with and without cherries.

Still another object is to provide a cherry-measuring tank of the aforesaid type which is so constructed and designed that it will not readily pick up dirt and soil in the orchard that might otherwise find its way into the processing facilities when the tank is emptied, and which is sturdy in construction, easy to handle, and convenient to use in measuring the volume of cherries and to maintain in optimum operating condition.

Additional objects and advantages of the present invention will become apparent from the following description and accompanying drawings, wherein:

FIG. 1 is a perspective view of a cherry measuring and transporting tank embodying the present invention;

FIG. 2 is an enlarged perspective view of the bottom and a portion of two sides of the present tank;

FIG. 3 is a bottom view of the tank;

FIG. 4 is a fragmentary cross-sectional view of the tank, this section being taken on line 4—4 of FIG. 1;

FIG. 5 is a vertical cross-sectional view taken on line 5—5 of FIG. 3;

FIG. 6 is an enlarged vertical cross-sectional view of a portion of the tank, showing an adjustment means forming a further improvement;

FIG. 7 is a vertical cross-sectional view taken on line 7—7 of FIG. 6;

FIG. 8 is a vertical cross-sectional view similar to that in FIG. 7 but showing a slightly modified form; and

FIG. 9 is an end elevational view as seen from line 9—9 of FIG. 8.

Referring more specifically to the drawings, and to FIG. 1 in particular, numeral 10 designates generally the present cherry measuring and transporting tank having sidewalls 12 and 14 and end walls 16 and 18. In the embodiment illustrated in the drawings, the tank is not square; however, the tanks may be made in various shapes, either square or elongated, this

usually depending upon the means or vehicle used in transporting the tanks between the cherry orchard and the processing plant. The container portion 20 of the tank is formed by the four walls and bottom 22 forming a rectangular, open top container with right-angle corners. The sidewalls and bottom are constructed of sheet metal material and the sidewalls are provided with outwardly extending flanges 24 and 26 and the end walls with outwardly extending flanges 28 and 30, each flange preferably being formed integrally with the upper edge of the respective wall. The flanges provide strength to the upper edge of the walls and also form a support for stacked tanks.

As explained hereinbefore, it is highly important in the use of such tanks to maintain a constant volume in order that the weight of the cherries may be calculated on the basis of the depth of the cherries submerged in the water. Since the flat sheet metal sidewalls of the container 20 are subjected to substantial pressure during use and abuse, they tend to bulge outwardly, thus changing the volume of the container. In order to eliminate this difficulty, the side and end walls of the present container are provided with special reinforcing bars 32 welded or otherwise rigidly secured to the respective walls. These bars, which are best shown in FIGS. 4 and 5, consist of inverted angle iron formed to project slightly inwardly near the center point 34. The two ends 36 and 38 are firmly secured to the sidewalls near the vertical corners thereof. The inwardly extending midsection deflects the side and end walls inwardly, forming in effect a truss structure which effectively resists the outward pressure of the container contents, thus eliminating or minimizing changes in volume of the tank normally resulting from side and end wall deflection. The exact position of bars 32 on the side and end walls may be varied upwardly or downwardly, and the number of bars on a particular sidewall may be varied; however, two have been found to be satisfactory for most tanks. The bottom 22 is supported by a pallet construction such that it normally will not deflect downwardly. Further, the bars on one or more sides may be in a spaced vertical position instead of horizontal position.

The pallet 39, which is joined permanently to the underside of container 20, consists of a rectangular frame 40 for resting on the ground and for fully supporting the container, the frame including side members 44, 46, 48 and 50 and intermediate members 52, 54 and 56. The side members and intermediate members are preferably formed of sheet metal with upper and lower sections 58 and 60, respectively. The lower section 60 is somewhat smaller than the upper section 58, and is permanently welded to member 58 to form a solid, tubular member of rectangular cross section. The side and intermediate members are welded together to form a rigid rectangular frame, with the ends of the tubular members being fully enclosed so that no dirt or water can enter the hollow structural members of the frame.

As mentioned previously herein, the tanks are normally lifted and transported at least short distances by lift trucks having forks which engage the pallet 38 or the underside of the container tank 20. In the construction illustrated in the drawings, a series of spaced pockets is provided for receiving the forks of the lift truck, two pockets 70 and 72 being provided off each end and pockets 74 and 78 being provided on each side of the pallet. These pockets are constructed of sheet metal formed into a generally U-shaped configuration and are interposed between frame 40 and the bottom of the tank container. The pockets are spaced along the side to correspond to the spacing of the forks of the forklift truck and are welded both to the upper side of frame 40 and to the bottom 22 of the tank container. The pockets extend outwardly beyond the external sidewalls of the container and beyond the periphery of frame 40 and are used, when the units are stacked, to support the upper tank on the lower tank. In order to further guide the forks on the lift truck and to permit the lift truck to invert the tanks for dumping by rotating them, inner pockets 80, 82, 84 and 86 are mounted between the frame 40 and the underside of bottom 22 and are secured to the frame and bottom by

welding or other suitable securing means. Pockets **82** and **86** are positioned to receive the outer end of the forks when the forks are inserted in the pockets **74** and **78** of either of the two sides, and pockets **80** and **84** receive the outer end of the forks when the forks are inserted in pockets **70** and **72**. The four inner pockets are rigidly supported by intermediate frame members **52**, **54** and **56** and give a support to the underside of bottom **22** of the tank container. The fork entry pockets on each side are interconnected by metal strips **90**, which are welded to the two pockets and preferably to one side of the adjacent inner pocket, for example, inner pocket **80**. These members assist in holding the bottom of the tank container rigid as well as assist in guiding the forks into the respective inner pockets. The external pockets **70**, **72**, **74** and **78** permit a four-way entry for the forks of the forklift trucks so that the tank can be lifted by the truck approaching from any one of the four sides. The inner pockets are reinforced by inner frame members **92** and **94** secured to the inner sides of pockets **80**, **82**, **84** and **86** and preferably secured by welding to the underside of bottom **22**.

The external dimensions of the frame **40** are slightly less than the internal dimensions of the tank container so that the frame will seat into and below the upper edge of tank container **20**, thus permitting the underside of outer pockets **70**, **72**, **74**, and **78** to seat on flanges **24**, **26**, **28** and **30** of the respective sides. A lid (not shown) with a recessed center panel may be used on the tank container and, when so used, the frame seats within the recessed portion of the lid and the upper tank may rest on the lid or rest on the flanges as previously described herein.

Since the operator of the lift truck often is required to maneuver the truck over uneven or soft ground and in areas where grass may restrict the visibility, the tank preferably includes bumpers **95** and **96** on each side and bumpers **98** and **100** on each end. These bumpers serve the further important function of spacing the tanks when they are loaded onto a truck, for transporting or when they are stacked for storage. Each of the bumpers is formed with upper and lower angular portions **102** and **104**, the lower angular portion forming a member for assisting in the entrance of the fork into the respective pocket. The center portion **106** of each bumper forms a flat surface against which the bumpers of the adjacent tank seat, forming an effective spacing between the tanks to prevent damage to the tanks during transit. The upper angular portion **102** assists in positioning the tanks in a level position relative to one another as they are being loaded onto a truck for transportation to and from the processing plant. The bumpers also form pockets for receiving chains or bars for holding the tanks in a firm position on the truck while they are being transported to and from the processing plant.

The instrument used to measure the fruit in the measuring tanks, includes a vertically positioned rod which is inserted downwardly through the fruit and the lower end of the shaft seats on the upper surface at the center of the bottom. A part of the instrument near the top registers the height and hence the volume of the fruit in the tank. Unintentional deflecting or improper positioning of the bottom upwardly or downwardly results in an improper footing for the rod, and hence an incorrect reading by the instrument.

The adjustment mechanism, shown in FIGS. **6** through **9**, for correcting the position of the bottom may not be included in the present fruit measuring and transporting tank. This mechanism is mounted in the space between the inner edges of pockets **80**, **82**, **84** and **86** in the position occupied by frame members **92** and **94**. The adjustment mechanism **110** consists of a support member **112** seated firmly on crossmember **54** of frame **40** and contains screws **114** and **116** extending upwardly through the support member into nuts **118** and **120**, respectively, the nuts being supported by brackets **122** and **124** welded to the underside of bottom **22**. The bottom may be deflected upwardly or downwardly to vary the instrument measuring surface of container **20**, by rotating screws **114** and **116**, causing the respective nuts to move upwardly and downwardly and consequently causing brackets **122** and **124** to move upwardly and downwardly. A second pair of screws **114** and **116** and the respective nuts may be used in the center area of the bottom to obtain a more general deflection of the bottom. Once an adjustment has been made, it will remain constant for extended periods of time and the adjustment nuts and bolts are preferably locked or sealed in the adjusted position. If the container received rough usage, such that some distortion of the sides or bottom occurs, an adjustment can readily be made in the manner previously described herein with the use of screws **114** and **116**. A modified form of adjustment mechanism is illustrated in FIGS. **8** and **9**; however, the operation is essentially the same as the mechanism illustrated in FIGS. **6** and **7**. The same numerals with primes are used to identify like parts in the modification.

In the use of the present cherry measuring and transporting tank, the tanks are delivered to the cherry orchard and filled with water and cherries. A lid is normally placed on the tanks and the tanks are then lifted and moved by a forklift truck with the forks extending into two of the outer pockets and the respective inner pockets. The tanks are then placed on a truck for transporting to a processing plant, usually in stacks of two. The frame **40** seats in the recessed lid and either rests on the upper panel thereof or the outward extensions of the outer pockets seat on flanges **24**, **26**, **28** and **30** of the four sides. After the tanks have been stacked on the truck, securing rods or chains are placed through the bumpers on the upper tanks to secure the stacks in place for transporting to the processing plant.

The present pallet construction is designed to permit the tank to rest on the ground without the likelihood of the members thereof picking up dirt and soil, which would otherwise be carried to the processing plant where they would contaminate the contents of the processing equipment when the tank is dumped. This dirt problem is partially eliminated by the enclosed frame members and the height of said frame members which eliminate any ledges or flanges next to the ground on which the dirt can accumulate or be shoved when the forklift truck is picking up the tank.

One embodiment of the present fruit measuring and transporting tank has been described in detail herein. Various changes and modifications may be made without departing from the scope of the invention.

I claim:

1. A fruit measuring and transporting tank comprising four sidewalls and a bottom of sheet metal forming a rectangular container, and a pallet structure secured to the bottom of and supporting said container, said pallet structure having four horizontal frame members under said tank and having two spaced pocket members disposed along at least two sides and connected to said horizontal members for receiving the forks of a lift truck, said pockets projecting outwardly beyond said frame members and container for supporting the tank on another tank in a stacked relation.

2. A fruit measuring and transporting tank as defined in claim **1** in which reinforcing bars are secured to the sidewalls and consist of angle iron welded at each end in a position horizontal to the respective sidewall.

3. A fruit measuring and transporting tank as defined in claim **2** in which two of such bars are mounted on and spaced from one another on the respective sidewalls.

4. A fruit measuring and transporting tank as defined in claim **1**, in which said pallet structure includes a rectangular frame having four horizontal members connected to one another at their ends to form a generally square configuration paralleling said sidewalls, and two spaced pocket members disposed along each side between said frame and the underside of said container and connected thereto for receiving the forks of a lift truck.

5. A fruit measuring and transporting tank as defined in claim **1**, in which inner pockets mounted on said frame provide openings for the ends of forks of the lift truck, said inner pockets being generally the same configuration and size as the corresponding outer pockets.

6. A fruit measuring and transporting tank as defined in claim 1, in which horizontal triangular-shaped bumpers are provided above said pockets for spacing the tanks and assisting in guiding the ends of a forklift truck into the respective pockets.

7. A fruit measuring and transporting tank as defined in claim 1, in which a mechanism is provided beneath said bottom for deflecting the bottom upwardly and downwardly to vary the vertical position of the center portion thereof.

8. A fruit measuring and transporting tank as defined in claim 7, in which said mechanism includes a support member connected to said pallet and a screw connected to said support member and having a nut threadedly received in a bracket for deflecting said bottom upwardly and downwardly to vary the effective volume of said container.

9. A fruit measuring and transporting tank as defined in claim 7 in which said frame includes a plurality of crossmembers spaced from the bottom of said container, a support mechanism for adjusting the volume of said container, including a support member mounted on one of said crossmembers, a plurality of screws supported by said crossmember, and brackets each having a threaded opening for receiving one of said screws for deflecting said bottom upwardly or downwardly.

10. A fruit measuring and transporting tank comprising four sides and a bottom forming a rectangular container, and a pallet structure secured to the bottom and supporting said container, said pallet structure including a rectangular frame having four horizontal members connected to one another at their ends to form a configuration generally paralleling said sidewalls, and two spaced pocket members disposed along at least two opposite sidewalls between said frame and the underside of said container and connected thereto for receiving the forks of a lift truck, said pockets extending outwardly beyond the frame and container for supporting the tank on another tank in a stacked relation.

11. A fruit measuring and transporting tank as defined in claim 10, in which inner pockets mounted on said frame provide openings for the ends of forks of the lift truck, said inner pockets being generally the same configuration and size as the corresponding outer pockets.

* * * * *