

[54] CUP TRAY AND CONTAINER

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[51] Int. Cl. .... B65d 1/36, B011 3/00

[58] Field of Search ..... 206/72; 23/292

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[57] ABSTRACT

A tray for holding a plurality of sample cups having different top and bottom configurations in either an upright or an inverted position including a top tray member having a plurality of rows of recesses with each of the recesses having a circular portion with radial projections for engaging and holding the cups in an inverted position, and a rectangular portion for holding the base of the cups so that the cups are in an upright position. The tray is provided with a flat bottom member fixed to the top member so that the trays with the cups held therein may be stacked and slid laterally easily with respect to one another. Also provided is a container having a side opening therein to permit one of a stack of trays with or without the cups assembled therewith to be removed therefrom through the side opening whereupon the trays thereabove drop down one step at a time.

7 Claims, 6 Drawing Figures

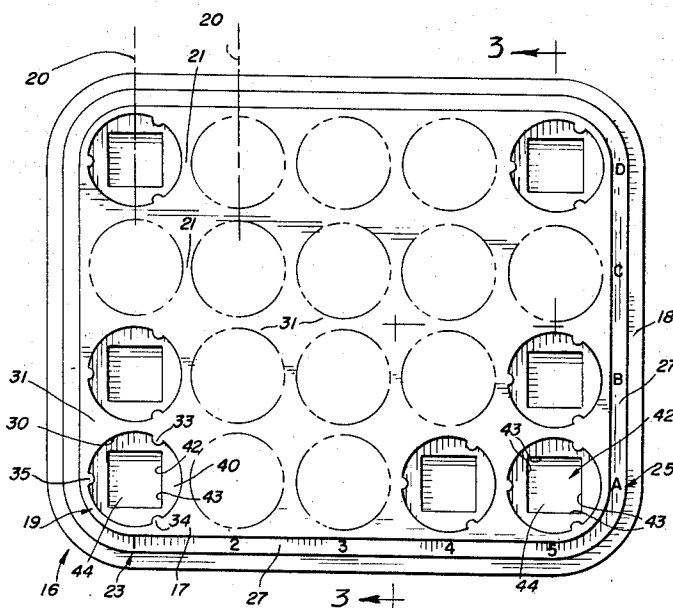


FIG. 1

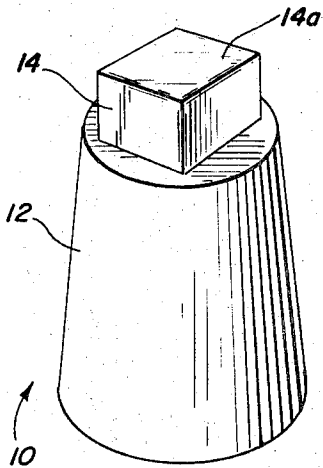


FIG. 4

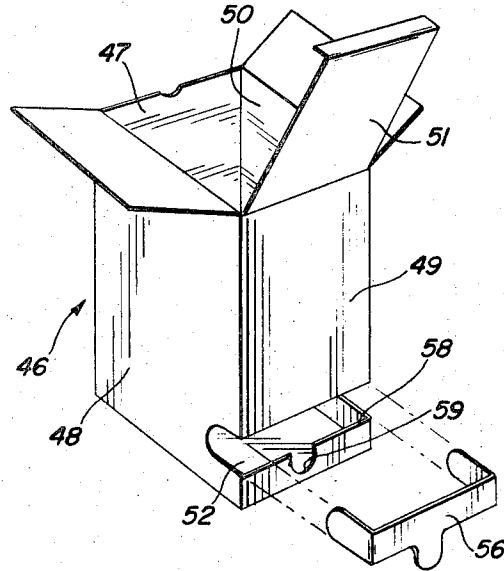
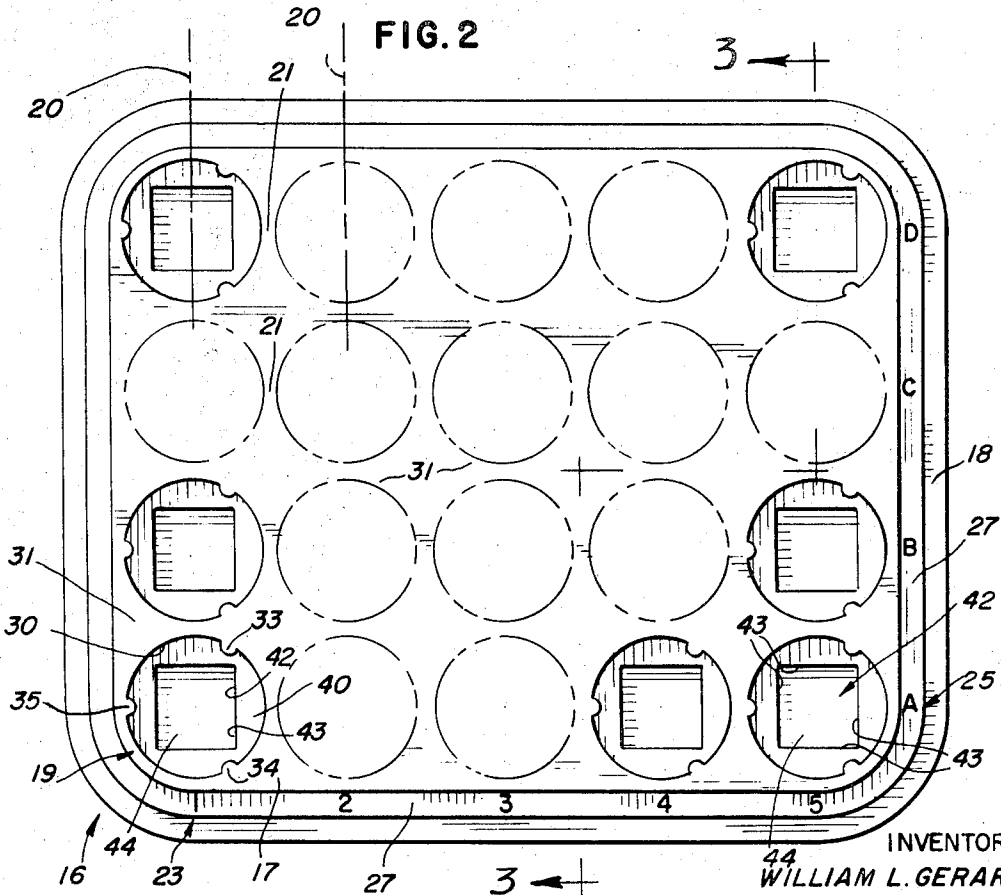


FIG. 2



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FIG. 3

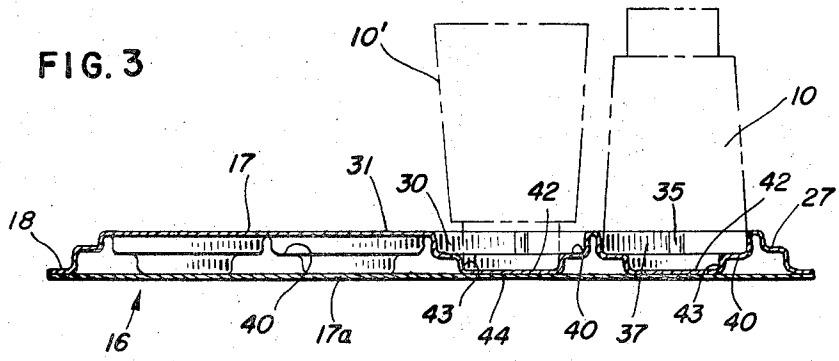


FIG. 6

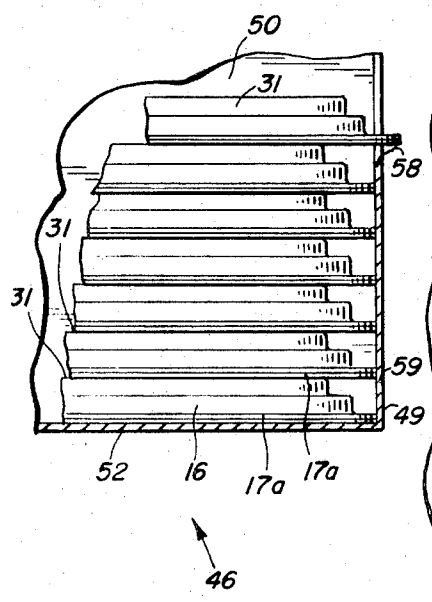
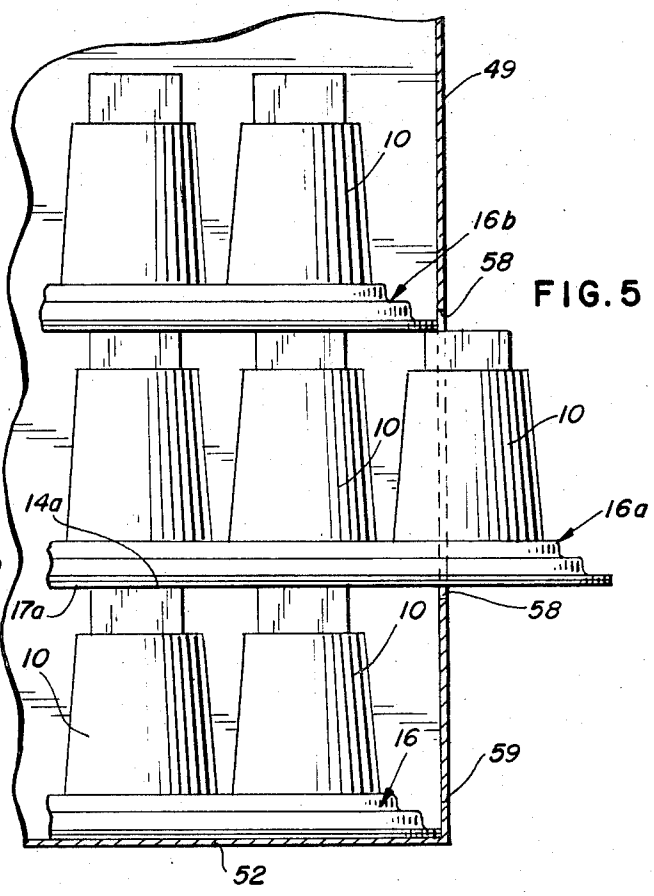


FIG. 5



## CUP TRAY AND CONTAINER

## BACKGROUND OF THE INVENTION

Cup trays in the past have been provided for holding cups in either upright or inverted positions. These trays have used the same cup engaging portion to engage a conical cup on the inside when the cup is inverted and to engage the conical cup on the outside when the cup is in an upright position. The disadvantage in this construction is that the cups when in an inverted position do not have their open ends closed, so that foreign matter may enter the cup and contaminate the same. This is a greater disadvantage in trays employed in storing sample cups for analytical purposes.

Moreover there has not been provided in the past a storage container for a plurality of trays holding sample cups that permits one of the lower-most trays in the stack to be removed through an opening in the side of the container.

It is a primary object of the present invention to overcome the prior art problems above.

## SUMMARY OF THE PRESENT INVENTION

In accordance with the present invention a molded plastic tray is provided by releasably holding a plurality of particle sample cups in an inverted position during storage and in an upright position during use. A plurality of recesses are provided in rows in the tray each having a circular portion with radial projections that engage the periphery of the open end of the sample cup holding the cup in an inverted position for shipping and storage purposes. Each of the recesses is also provided with a square recessed portion that engages and holds a square bottom of the cups so that the cups may be inverted to an upright position in use. The sample tray thus holds the cups in an upright position during any desired sampling procedures that may be carried out with the sample cups.

The external engagement of the top of the sample cup when in an inverted position assists in sealing the cup during shipping and storage to keep the inside of the cup as clean as possible.

To facilitate and identify the sampling from one cup to another the rows and columns of the sampling tray have indicia thereon so that each cup may be located by alpha-numeric identifications.

During shipping and storage, the trays may be stacked one on top of the other with the cups in an inverted position. To facilitate the sliding of one tray with respect to another when the trays are stacked, there is provided a flat bottom member on each of the trays that engages the flat bottoms of the cups on the tray immediately therebelow.

A rectangular container is provided with an opening near the lower end thereof that permits the withdrawal of the second lower-most tray in the container by sliding the tray outwardly until it clears the tray immediately above, whereupon the remaining trays will drop one step downwardly positioning another tray adjacent the opening in the container.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the sample cup according to the present invention in an inverted position;

FIG. 2 is a plan view of a sample cup holding tray according to the present invention

FIG. 3 is a cross-section of the sample cup holding tray taken generally along line 3—3 of FIG. 2;

FIG. 4 is a perspective view of a container for the trays according to the present invention;

FIG. 5 is an enlarged fragmentary elevation of the trays within the container shown in FIG. 4; and

FIG. 6 is a fragmentary elevation of the container of FIG. 4 showing the trays stacked without any sample cups.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings and particularly FIG. 1 the sample cup 10 according to the present invention is seen to be constructed of a molded plastic having a conical body portion 12 and a rectangular base portion 14. The cup shown in FIG. 1 is in an inverted position. The sample cup 10 is adapted to be employed in conjunction with the tray of the present invention to provide a particle counter sample cup and tray assembly employed during various sample collecting and analyzing procedures in the medical and scientific fields.

The cups shown in FIG. 1 are usable with the sample cup holding tray 16 illustrated best in FIGS. 2 and 3. Sample tray 16 is seen to include a plastic top member 17 that may be, for example, either vacuum formed or thermo molded. The tray 16 also includes a flat plastic bottom wall member 17a attached thereto as will be described hereinafter.

The top tray member 17 has a plurality of recesses 19 arranged in vertical columns, each column lying along a center-line indicated at 20 in FIG. 2. The recesses 19 are also aligned in horizontal rows, each row lying along a centerline indicated at 21 in FIG. 2. The recess 19 may be identified by a numeric column indicia indicated at 23 in FIG. 2 as well as alpha-row indicia indicated at 25. Both the alpha and numeric indicia 23 and 25 are defined by embossing, labeling or molding on a shoulder or ridge 27 about the periphery of the tray. In this manner each of the recesses 19 may be discretely identified by alpha-numeric coordinates.

Each of the recesses 19 includes a cylindrical recess portion 30 extending downwardly from top wall or surface 31. Extending inwardly in a generally radial direction from the walls of the recess 30 are axially disposed projections 33, 34, and 35, which are sized to engage the outer edge of upper portion 37 of the cup 10 to hold the cup in its inverted position with its open end abutting horizontal wall 40 of recess portion 30. This construction seals the open end of the cups 10 when in an inverted position during storage or shipment keeping the inside of the cups free of any foreign material.

To hold the cups in an upright position during use, a second smaller recess portion 42, rectangular in configuration, is provided extending centrally of and downwardly from wall portion 40. The rectangular recess portion 42 is sized sufficiently small that the opposing walls 43 thereof are closed enough together to securely engage and hold the rectangular bottom 14 of the cups 10, holding them in a position with their open ends upward as viewed at 10' in FIG. 3.

The tray 16 has the flat plastic bottom wall member 17a attached not only to an edge or flange portion 18 of the plastic top member 17, but also to the bottom wall 44 of each recess 42 as seen in FIG. 3.

For the purpose of shipping and storing the trays 16 with the cups 10 held therein in an inverted position as shown in FIG. 5, a container 46 is provided having side walls 47, 48, 49, and 50, cover 51, and a bottom wall 52. A removable table 56 is provided at the lower portion of the wall 49 of the container 46 immediately above the bottom wall 52 providing a three-sided opening 58 of sufficient height and width to permit the passage of the second tray 16 from the bottom and the inverted cups 10 carried therein from the container 46. A cut-out portion 59 is provided in the center of the bottom edge of opening 58, the portion 59 serving as a grip opening such that a person may insert a finger below the bottom wall 17a of the tray 16 through the portion 59 to facilitate gripping and removing the tray 16.

As seen in FIG. 5, the bottom wall 17a of the second tray 16a from the bottom engages the flat bottoms 14a of the bases 14 of the inverted cups 10 secured in bottom tray 16. This flat sliding engagement permits the second tray 16a from the bottom, with the cups 10 therein, to be slid from the container 46 through opening 58. After this tray 16a has passed through the opening, the third tray 16b and fourth tray 16c drop together until tray 16b hits the tops 14a of cups 10 in the bottom tray 16. This procedure may be repeated until all of the trays are removed, whereupon the bottom tray is removed by inserting a finger in the opening 59 and lifting the tray through opening 58. Since opening 58 is spaced from the bottom of container 46, the rigid integrity of the container is maintained.

The container 46 is manufactured with a weakened line defining the edges of the opening 58 in the front wall 49 and in the side walls 48 and 50. The bottom segment of the weakened line is spaced from the bottom edge of the wall 49 by an amount slightly less than the height of the tray and sample cups assembled on the tray while the top segment of the weakened line is spaced from the bottom segment by an amount slightly greater than the height of the tray and assembled sample cups. The wall section 56 is removed by severing along the weakened line whereupon the opening 58 with cut out 59 is exposed for removal of trays from the stack of trays in the container.

The container 46 is also capable of holding the trays 16 in a stacked position without the cups 10 held thereby as seen in FIG. 6. The flat top walls 31 of each of the trays 16 and the flat bottom walls 17a permit the easy removal of the various trays 16 from the container 46 by transverse sliding movement through opening 58. The opening 58 may be reduced in vertical height to permit only the passage of one tray 16 at a time, with the lower-most tray acting as a bottom shelf until the next to the last tray is removed. Then the bottom-most tray can be removed by gripping through opening 59

and lifting and pulling the tray through opening 58. By maintaining the unbroken corners of the container the container remains rigid and functional until ready to be thrown away.

We claim:

1. A cup holding tray, comprising: a tray member, a plurality of recesses in said tray member for holding cups having a different bottom configuration than top configuration in either an upright or an inverted position, each of said recesses having a generally rectangular first portion for engaging and receiving a generally rectangular bottom of a cup and holding the cup in an upright position, said recesses having a cylindrical second portion separate from said first portion for engaging and receiving a generally circular periphery of the top of the cup and holding the cup in an inverted position.

2. A cup holding tray as defined in claim 1 wherein said second recess portion includes a plurality of generally radially extending projections engageable with the top periphery of the cup to hold the cup in an inverted position.

3. A cup holding tray as defined in claim 1 including a flat bottom member fixed to the bottom of said tray member so that the trays may be stacked.

4. A cup holding tray as defined in claim 1 including indicia on the tray member for identifying the recesses.

5. The cup holding tray according to claim 1 wherein said rectangular first recess portion of each of said recesses has a smaller horizontal dimension than said cylindrical second recess portion, and said rectangular first recess portion is centrally of said cylindrical second recess portion.

6. The cup holding tray according to claim 1 further including a top wall and wherein said cylindrical second recess portion of each of said recesses has a lower horizontal wall and side walls extending downwardly from said top wall toward said lower horizontal wall, and said rectangular first recess portion has a horizontal bottom wall and side walls extending downwardly from said lower horizontal wall toward said horizontal bottom wall.

7. A cup tray assembly, comprising: a first tray member having a plurality of recesses therein in generally parallel rows, each of said recesses being adapted to hold cups having a different bottom configuration than top configuration in either an upright or inverted position, said recesses each having a generally rectangular first portion for engaging and receiving a generally rectangular periphery of the bottom of the cup and holding the cup in an upright position, said recesses each having a cylindrical second portion including a plurality of generally radially extending projections engageable with a generally circular top periphery of the cup to hold the cups in an inverted position, a generally flat second tray member fixed below the first tray member so that the trays may be stacked, and means identifying the recesses.

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