United States Patent

Keeslar

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[54] SET-UP TRAY

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[52] U.S. Cl. 220/23.4, 220/22, 229/2.5, 229/15

[51] Int. Cl. B65d 21/02, B65d 25/04

[58] Field of Search 220/20, 22, 23.4; 206/3, 72; 229/2.5, 15

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[57] ABSTRACT

A tray assembly having a channel-shaped base into which plural disposable trays are slidably receivable for holding a variety of articles. Each tray has a bottom wall connected to one or more pairs of cooperating, channel-shaped sidewalls with integral releasable gripping means for releasably holding said sidewalls together to form a recess or compartment which normally opens upwardly. The entire tray can be fabricated by a vacuum molding process from a single sheet of plastic material. Plural trays and plural bases can be interconnected in side-by-side relationship.

7 Claims, 13 Drawing Figures

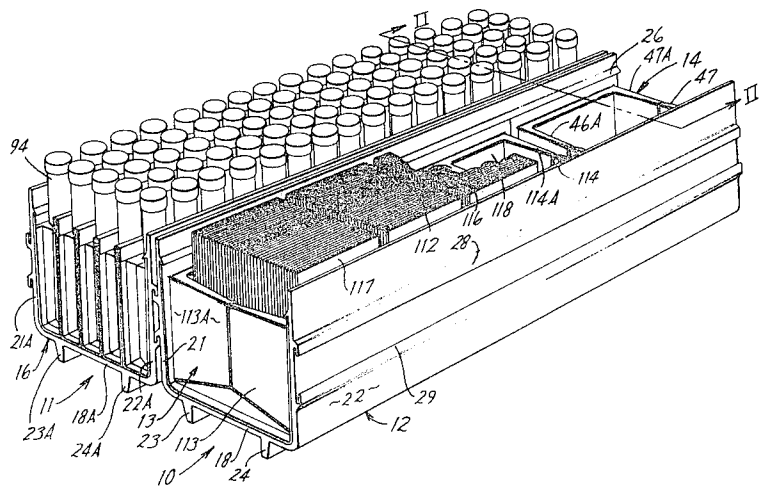
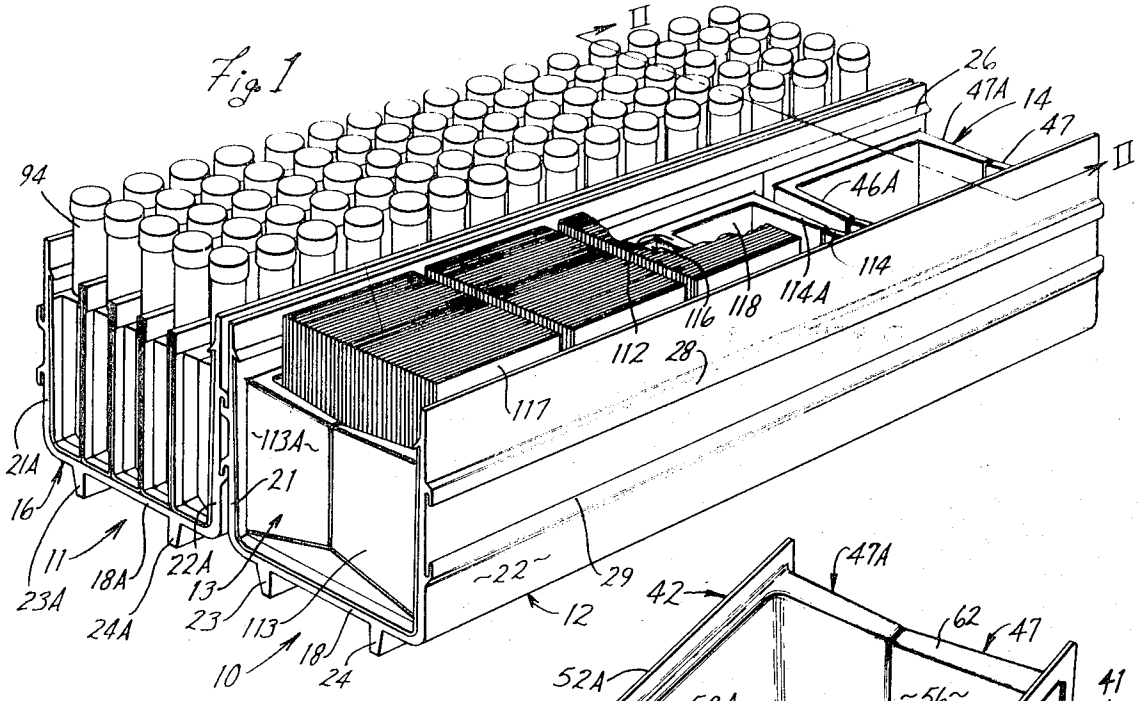


Fig. 1



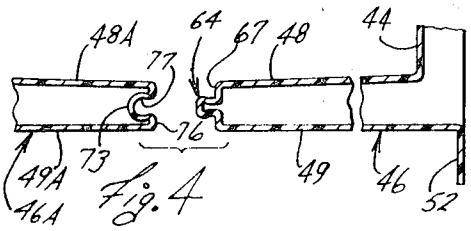


Fig. 4

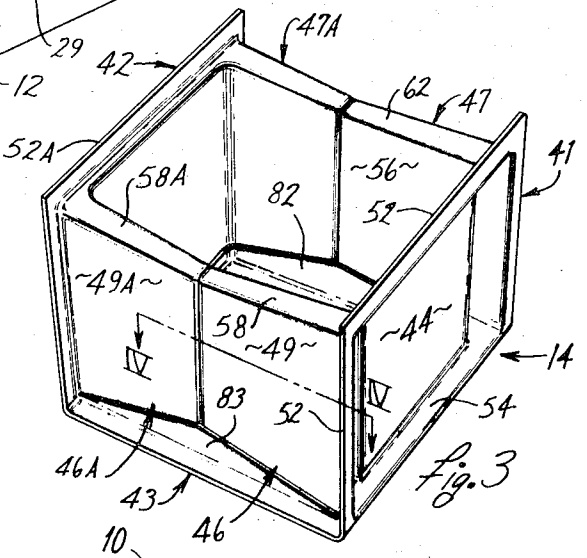


Fig. 3

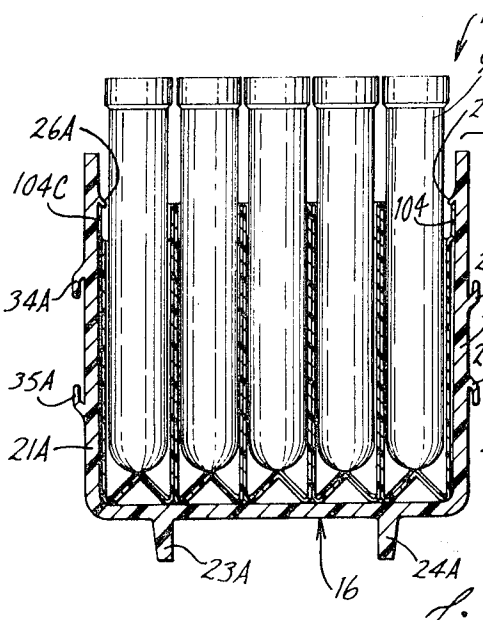
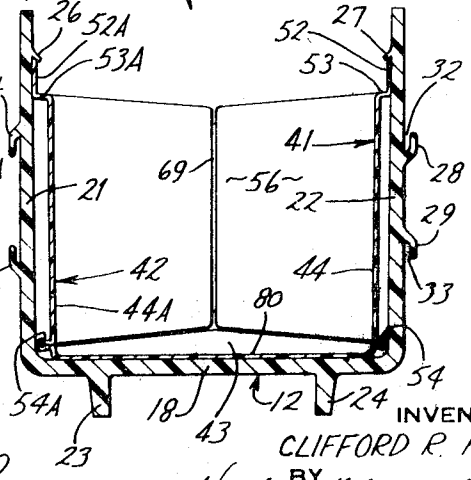


Fig. 2



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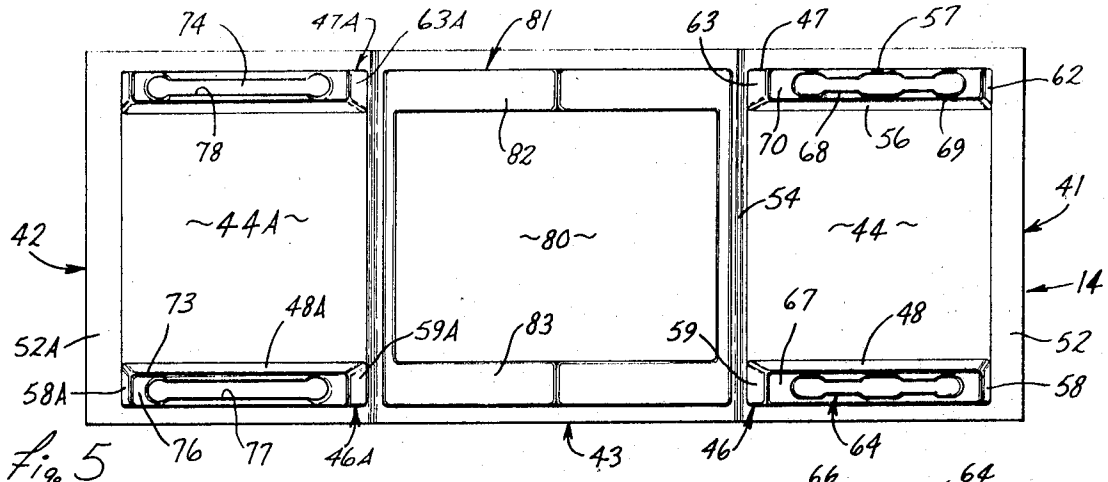


Fig. 5

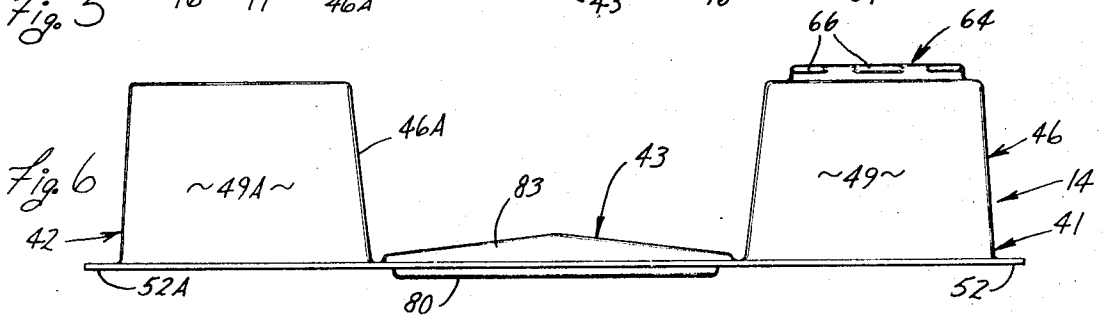


Fig. 6

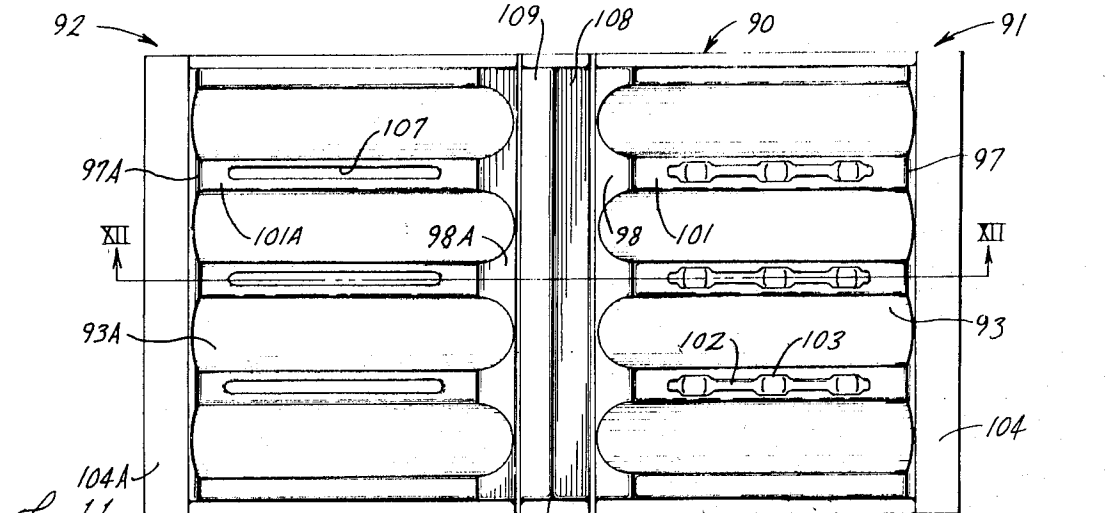


Fig. 11

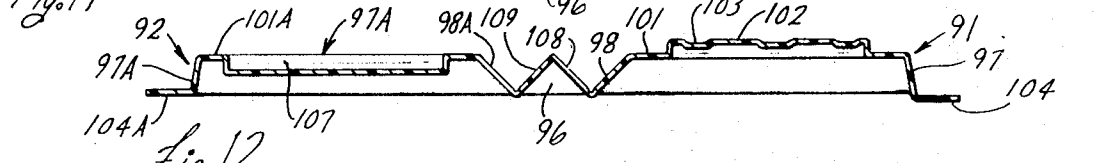


Fig. 12

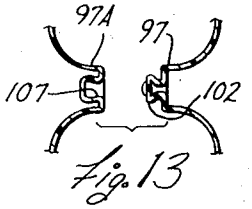


Fig. 13

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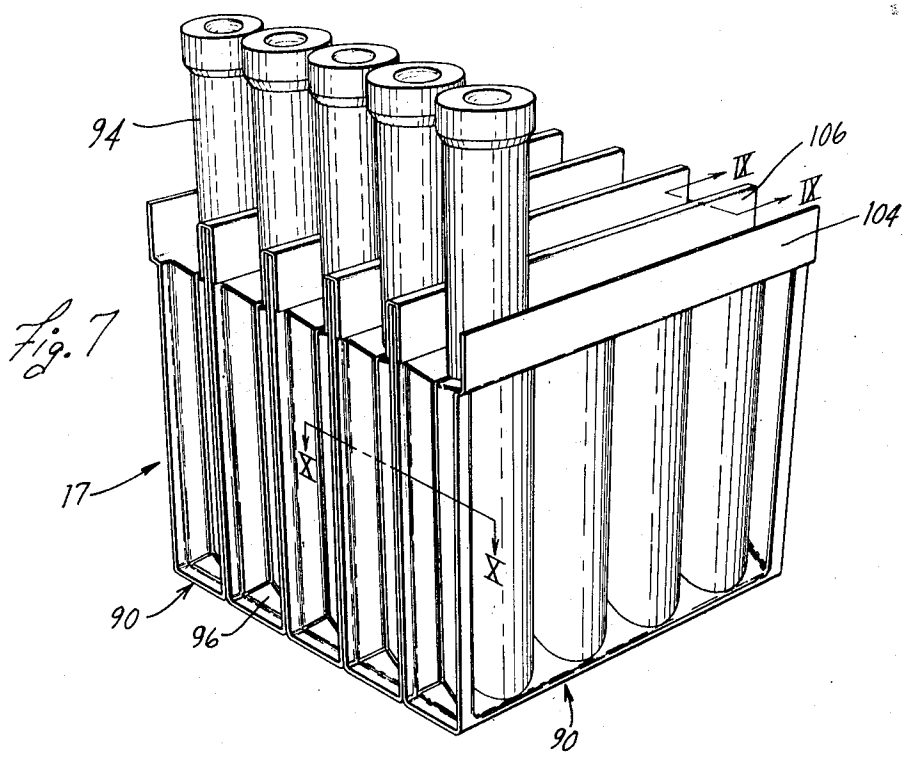


Fig. 7

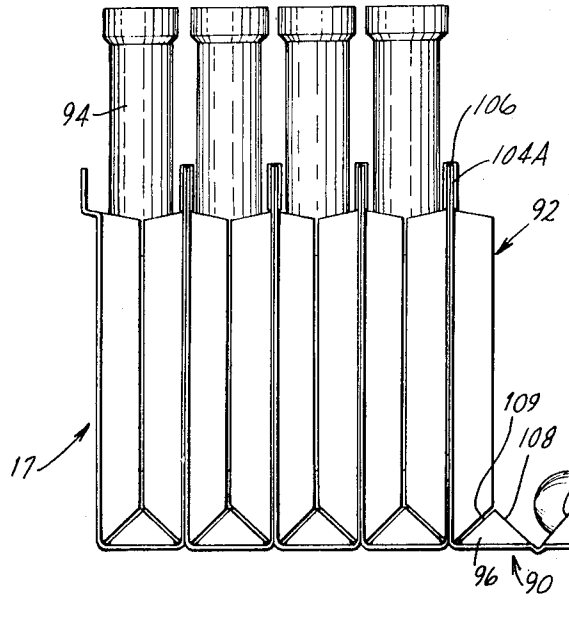


Fig. 8

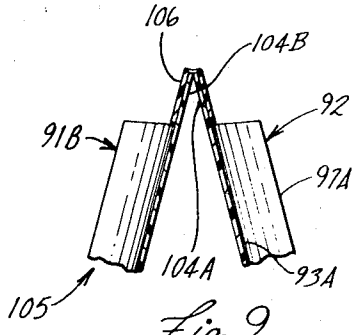


Fig. 9

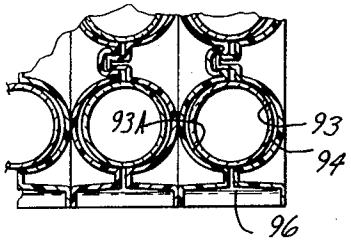


Fig. 10

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SET-UP TRAY

BACKGROUND OF THE INVENTION

This invention relates in general to a tray assembly capable of holding a plurality of similar or dissimilar articles and, more particularly, to an assembly adapted for use in collecting, identifying and storing a plurality of liquid or solid samples or specimens taken from patients usually for the purpose of conducting tests on or with said samples or specimens.

It has been common practice for many years to furnish laboratory facilities to which doctors can deliver samples or specimens taken from patients, in order to conduct one or more tests on each sample or specimen. This procedure has developed for many reasons including the complicated machinery required for some tests, the level of training required by technicians for conducting many of these tests and the wide variety of such tests which have been made available by advances in medicine. A single physician or even small groups of physicians cannot afford to maintain the equipment or staff required to conduct many of these tests on their own premises. Moreover, the unit price of some tests becomes prohibitive where they must be run on a one at a time basis.

However, the collection and identification of large quantities of samples or specimens by many doctors, followed by the mixing together of the specimen containers at the test laboratory, introduces a serious risk of confusing the specimens. Procedures have been developed for maintaining the identification of the various specimen containers when they reach the laboratory. Thus, this invention is concerned primarily with the development of a setup tray assembly which insures clear identification and simple handling of the specimens and/or samples as they are collected, for example, at a clinic or in a hospital.

In order to fill the need for a setup or specimen collecting tray assembly, it became evident that said assembly should be light in weight and fabricated from materials and in a manner so that the parts thereof, which cannot be easily and quickly sterilized, can be disposed of easily with only minor expense involved. The tray assembly should be adaptable to handling articles or containers of various sizes and shapes and this adaptability should be capable of quick application by means of interchangeable parts.

Accordingly, a primary object of this invention is the provision of an inexpensive, easily usable tray assembly for collecting and identifying plural articles, such as containers of specimens which might contaminate the assembly, and wherein the tray assembly has article-holding means which can be made sufficiently inexpensively that they can be disposed of, but which can be fabricated from a material which can be sterilized, if desired.

A further object of this invention is the provision of a tray assembly, as aforesaid, which can be expanded by coupling to it other tray assemblies and wherein each tray assembly can have various types of article-holding means or trays removably held therein.

Other objects and purposes of this invention will become apparent to persons familiar with the type of structure involved upon reading the following descriptive material and examining the accompanying drawings, in which:

FIG. 1 is a perspective view of a pair of tray assemblies embodying the invention;

FIG. 2 is a sectional view taken along the line II—II in FIG. 1, with the two assemblies separated;

FIG. 3 is a perspective view of an article-holding tray of the invention;

FIG. 4 is an exploded sectional view taken along the line IV—IV in FIG. 3;

FIG. 5 is a collapsed top view of the article-holding tray appearing in FIG. 3;

FIG. 6 is a collapsed side view of the tray appearing in FIGS. 3 and 5;

FIG. 7 is a perspective view of another article-holding tray embodying the invention;

FIG. 8 is a partially collapsed, side elevational view of the article-holding tray appearing in FIG. 7;

FIG. 9 is a sectional view substantially as taken along the line IX—IX in FIG. 7;

FIG. 10 is a sectional view taken along the line X—X in FIG. 7;

FIG. 11 is a collapsed top view of one section of the article-holding tray appearing in FIG. 7;

FIG. 12 is a sectional view taken along the line XII—XII in FIG. 11; and

FIG. 13 is an exploded fragment of FIG. 10.

For convenience in description, the terms "upper," "lower" and words of similar import will have reference to the structures described hereinafter as appearing in FIGS. 1, 3 and 7. The terms "inner," "outer" and derivatives thereof will have reference to the geometric center of the tray assembly and parts thereof.

SUMMARY OF THE INVENTION

The objects and purposes of the invention, including those set forth above, have been met by providing an elongated, channel-shaped base and a variety of article-holding trays are slidably receivable lengthwise of the base. The individual trays are characterized by their fabrication from plastic sheet material by a vacuum molding process so that they have a pair of channel-shaped sidewalls connected along corresponding edges thereof to a bottom wall, said sidewalls having connecting means for releasably securing the two sidewalls together to form compartments or recesses which open away from said bottom wall. The base and the trays are provided with cooperating means for preventing accidental dislodgement of the trays from the base in a direction transversely of the base. Dislodgement is yieldably opposed lengthwise of the base by frictional engagement.

DETAILED DESCRIPTION

FIG. 1 illustrates two tray assemblies 10 and 11 which embody the invention and which are connected together in side-by-side relationship. The tray assembly 10 is comprised of a substantially rigid, channel-shaped base 12 in which a pair of article-holding trays 13 and 14 are snugly held for resisted slidable movement lengthwise of the base 12.

The tray assembly 11 has a substantially rigid, channel-shaped base 16 which may be, and preferably is, identical to the base 12. A plurality of substantially identical article-holding trays 17, here four, are snugly held within the base 16 for resisted slidable movement lengthwise thereof.

The base 12, which is preferably, but not necessarily, cut from a plastic extrusion, has a bottom wall 18 (FIG. 2) and a pair of parallel sidewalls 21 and 22 which project upwardly from and are integral with the lateral edges of the bottom wall 18. A pair of preferably parallel and spaced runners 23 and 24, which are integral with and extend lengthwise of the bottom wall 18, project downwardly equidistantly therefrom for the purpose of supporting the base 12. A pair of parallel ridges 26 and 27 are integral with and extend lengthwise of the opposing inner surfaces of the walls 21 and 22, respectively, near the upper edges thereof.

A pair of spaced and parallel inner gripping flanges 28 and 29 are preferably integral with and extend lengthwise of the outer surface of the sidewall 22, preferably in the central portion thereof. The flanges 28 and 29 project outwardly a short distance away from the sidewall 22 and then parallel with said sidewall and away from each other. Thus, an upwardly facing groove 32 is created between the flange 28 and the sidewall 22, whereas a downwardly facing groove 33 is provided between the flange 29 and the sidewall 22.

A pair of spaced and parallel outer gripping flanges 34 and 35 are integral with and extend lengthwise of the central portion of the outer surface of the sidewall 21. The flanges 34 and 35 project outwardly a short distance from the sidewall 21 and then parallel therewith toward each other. Thus, the flanges

34 and 35 create grooves 37 and 38, respectively, between themselves and the adjacent outer surface of the sidewall 21.

The spacing between the remote edges of the flanges 28 and 29 is slightly less than the distance between the bottoms of the opposing grooves 37 and 38 so that one base 12 can be interlocked with another base, such as the base 16, by means of the flanges 28, 29 and 34, 35.

The base 16 may be and preferably is identical with the base 12. Accordingly, parts of the base 16 which are identical with corresponding parts on the base 12 will hereinafter be identified by the same numerals in addition to the suffix "A." More specifically, the base 16 has a bottom wall 18A, a pair of sidewalls 21A and 22A and a pair of supporting runners 23A and 24A. Also, the sidewall 22A has integral inner gripping flanges 28A and 29A, and the sidewall 21A has outer gripping flanges 34A and 35A.

As indicated above, and as shown in FIG. 1, the inner flanges 28A and 29A on the sidewall 22A are slidably and snugly receivable into the grooves 37 and 38 formed by the outer gripping flanges 34 and 35, respectively, on the sidewall 21 for firmly connecting the bases 12 and 16 together. It will be apparent that the engagement between the flanges 34, 35 and 28A, 29A is effected by moving one of the bases 12 and 16 lengthwise along the other base.

The tray 14 (FIGS. 3, 5 and 6) includes first and second channel-shaped wall members 41 and 42, respectively, which are preferably integral with and hingedly connected to a lower wall 43. The wall member 41 (FIG. 3) includes a relatively thin sidewall 44 and a pair of integral, spaced and substantially parallel and hollow end wall parts 46 and 47.

The end wall part 46 has an inner sheet 48 (FIGS. 4 and 5) which is integral along one edge with the sidewall 44 and an outer sheet 49 which is integral along a corresponding edge with a rectangular flange 52 which is disposed within a plane parallel with and spaced outwardly from the sidewall 44. The flange 52 is connected to the top and bottom edges of the sidewall 44 by the webs 53 and 54, respectively. The lower horizontal portion of the flange 52 is relatively narrow and serves primarily as a hinge between the web 54 and the lower wall 43.

The end wall part 47 (FIG. 5) has an inner sheet 56 and outer sheet 57 which, like the sheets 48 and 49, converge toward each other away from the sidewall 44.

The upper and lower edges of the sheets 48 and 49 (FIG. 5) are integral with elongated strips 58 and 49, respectively, which converge toward each other away from the sidewall 44. Also, the sheets 56 and 57 are connected along their upper and lower edges by the strips 62 and 63, respectively, which converge toward each other away from the sidewall 44.

The end wall part 46 has a channel-shaped edge element 64 which is connected to the adjacent edges of the sheets 48, 49 and the strips 58, 59 by an integral flange 67. The edge element 64 has closed ends and opens into the space between the sheets 48 and 49. Moreover, said element 64 has a plurality of integral ribs 66 which are spaced from the flange 67 and project from both lengthwise sides of the element 64 for reasons appearing hereinafter.

The end wall part 47 has an edge element 64 which is preferably identical with the edge element 68 and, accordingly, has integral ribs 69 and flange 70.

The wall member 42 may be, and preferably is, identical with the wall member 41 except that the edge elements 73 and 74 differ from the edge elements 64 and 68, respectively. Accordingly, the other parts of the wall member 42 shall be identified by the same numerals used on corresponding parts of the wall member 41 in addition to the suffix "A." Specifically, the wall member 42 has end wall parts 46A and 47A which are built up from sheets and strips integral with each other along connecting edges. Also, wall member 42 has a sidewall 44A which is connected to a flange 52A extending therearound.

The edge element 73 has a flange 76 integral with the adjacent edges of the sheets 48A, 49A and the strips 58A, 59A. Said edge element 73 defines an inwardly expanding recess 77 which is slightly longer than the edge element 64 and of approximately the same width. The edge element is disposed between the sheets 48A and 49A. The edge element 64 is forced into the recess 77, due to the presence of the ribs 66, to provide the means by which the end wall part 46 is releasably held with respect to the end wall part 46A.

The edge element 74 on the end wall part 47A is preferably identical with the edge element 73. Thus, the edge element 68 is snugly received into the recess 78 to releasably connect the wall parts 47 and 47A together.

The lower wall 43 of the tray 14 (FIGS. 5 and 6) has a flat and downwardly offset central portion 80 which is surrounded by a rectangular raised ridge 81 which is spaced inwardly from the peripheral edge of said lower wall 43. The opposite end portions 82 and 83 of the ridge 81 each slope upwardly toward a high central point for snug engagement with the corresponding sloped strips 59, 59A and 63, 63A on the end wall parts 46, 46A and 47, 47A, respectively, when the tray 14 is in its assembled position of FIG. 3.

The lower horizontal edge of flange 52A on the sidewall 44A serves as a flexible hinge connection to the lower wall 43.

The tray 17 (FIGS. 2, 7, 8 and 11), is comprised of a plurality of article- or container-holding sections 90 which, in this particular embodiment, are substantially identical to each other. However, it will become apparent that holding sections capable of engaging articles of different sizes and shapes can be coupled together according to the teachings of this invention to form a tray of the same general character as the tray 17.

The holding section 90 (FIG. 11) has a pair of wall members 91 and 92 which, like the wall members 41 and 42 (FIG. 5), may be substantially identical in most respects and are releasably connectable to each other to form, in this instance, a plurality of upwardly opening recesses 93 (FIG. 2) into which, also in this embodiment, the cylindrical specimen containers 93 are slidably and snugly receivable. The section 90 (FIG. 11), like the tray 14 (FIG. 5), is preferably fabricated by a vacuum molding procedure from a single sheet of plastic material.

The article-holding section 90 (FIG. 11) has a lower wall 96 which is relatively narrow and is hingedly connected along its lateral edges to the lower edges of the wall members 91 and 92. As shown in FIGS. 7, 11 and 12, the substantially semicylindrical recesses 93 in the wall member 91 are defined by inwardly offset portions 97 of the wall member 91. These offset portions or dividers are parallel with each other and extend from near the top to near the bottom of the wall member 91. Said offset portions 97 curve toward each other at their lower ends to round out the lower ends of the recesses 93. However, it will be recognized that, by appropriate shaping of the said offset portions 97, the recesses 93 can be formed to receive containers or articles having a substantially rectangular or other shape.

The lower ends 98 (FIG. 12) of the offset portions 97 are sloped outwardly, as appearing in FIG. 12, for engagement with a correspondingly sloped part of the lower wall 96, as discussed hereinafter.

The offset portions 97 (FIG. 11) have inner surfaces 101 which are preferably coplanar and are integral with elongated edge elements 102 which extend lengthwise of and project away from said inner surfaces 101. Said edge elements 102 have spaced, sidewardly projecting ribs 103 which are spaced from the surfaces 101 and the function of which will be discussed hereinafter.

The wall member 91 (FIG. 7) has an integral and peripheral flange 104, the upper horizontal edge of which is slidably engageable with the lower edge of one of the ridges 26A and 27A (FIG. 2) for the purpose of holding the tray 17, of which the article-holding section 90 is a part, within the base 16. The upper portion of the flange 104 is offset outwardly to space the articles held in this section from the ridge 26A or 27A.

Those parts of the wall member 92 which are identical or substantially identical with corresponding parts of the wall member 91 will be identified by the same numerals in addition to the suffix "A." Thus, the wall member 92 has a plurality of recesses 93A defined between elongated offset portions 97A, which recesses cooperate with the recesses 93A to define elongated openings in which the containers 94 are held.

The openings defined between adjacent and opposing pairs of recesses 93 and 93A (FIG. 10) are preferably slightly oversized and out-of-round. Thus, although the sidewall of the container 94 is snugly held between opposing parts of the offset portions 97 and 97A, said recesses automatically adapt themselves to the reception of containers which are slightly oversized or undersized.

The inner surfaces 101A of the offset portions 97A have integral elements defining elongated recesses which extend lengthwise thereof and are slightly longer and wider than the corresponding dimensions of the edge elements 102 on the offset portions 97. The recesses 107 extend away from the inner surfaces 101A in order to furnish a holding action after the ribs 103 on an edge element 102 move into a recess 107. Obviously, in order to have the foregoing connection occur, it is necessary for the recesses 107 and offset portions 97A to be in alignment with the edge elements 102 and the offset portions 97, respectively, when the wall members 91 and 92 are moved into their closed, article-holding positions of FIG. 7.

The wall member 92 has a peripheral flange 104A, the upper horizontal portion of which is normally connected to the flange 104B (FIG. 9) of the wall member 91B on a second article holding section 105. That is, the elongated flat hinge element 106 is secured to the upper edge portions of the flanges 104A and 104B so that several article-holding sections can be thusly interconnected whereby all of the wall members 91, 92, 91B and so on can be laid flat.

The lower wall 96 of the holding section 90 is elongated and has two lengthwise portions 108 and 109 which slope upwardly from their remote lateral edges to their meeting edges to furnish rigidity for the lower wall 96. This accounts for the corresponding slope in the lower ends 98 and 98A of the offset portions 97 and 97A, respectively.

The tray 13 (FIG. 1) may be and preferably is substantially identical with the tray 14 except for the length thereof and the further fact that the tray 13 has intermediate wall parts 112 and 112A which are disposed between and are parallel with the end wall parts 113, 114 and 113A, 114A, respectively. In all other respects, the structure of the tray 13 may be identical with the structure of the tray 14.

The compartment 116 defined between the end wall parts 113, 113A and the intermediate wall parts 112, 112A, for example, may be used to hold cards 117 which correspond in some convenient, conventional manner to the containers 94 disposed within the trays 17 in the base 16. Thus, complete descriptive and identification information is immediately accessible in the vicinity of the specimen holding containers 94. The compartment 118 defined between the intermediate wall parts 112, 112A and the end wall parts 114, 114A, respectively, can be used to hold the labels or the like applied to the containers 94 in order to correlate them in a convenient, conventional manner with the information on the cards 117.

OPERATION

The manner of fabrication, assembly and operation of the tray assemblies described above will be apparent to persons skilled in this art after reading said descriptive material. However, a brief discussion of assembly and operation will be given hereinafter for convenience.

The trays 13, 14 and 17, either in their disclosed forms or in slightly modified forms as suggested, can be and are advantageously designed for fabrication from sheet form plastic material by vacuum molding procedures. Thus, said trays can be manufactured inexpensively and, accordingly, can be disposable. Nevertheless, the shapes of said trays are such that they can be sterilized for reuse provided that they are fabricated from materials capable of retaining their shape when exposed to the heat of sterilization.

When the tray 14, for example, is placed in the base 12, the top edges of the flanges 52 and 52A are slidably disposed beneath and engaged by the ridges 27 and 26 in the base 12 when the flat portion 80 of the lower wall 43 is snugly and slidably engaged with the bottom wall 18 of said base 12. Thus, the tray 14 can move lengthwise of the base 12 but cannot be moved transversely of the base when it is properly disposed therein. Accordingly, the base 12 not only serves to support the trays 13, 14 or 17, but it also serves by its greater rigidity to hold said trays in their closed, operating positions which augments the gripping connection effected between the edge element 64 and the edge element 73, for example.

The only essential differences between the tray 14 and one of the article-holding sections 90 of the tray 17 are its dimensions and the fact that it is designed to receive and position plural articles or containers of a particular size and shape. Also, since the article-holding sections 90 do not have the same width as the base 16, several sections 90 are advantageously and hingedly connected together along their adjacent upper edges. That is, (FIG. 9) the flange 104A on the wall member 92 is connected to the flange 104B on an adjacent wall member 105 by the hinge element 106. The upper edges of the outermost flanges 104 and 104C of the tray 17 will be engaged by the ridges 27A and 26A, respectively, for holding the tray 17 in its container receiving position within the base 16. The upper portions of the flanges 104 and 104C are offset outwardly to space the containers 94 from the ridges 27A and 26A, respectively. However, the upper portions of the corresponding flanges, such as 104A and 104B, on intermediate wall members are preferably not offset.

By virtue of the gripping flanges on adjacent sidewalls of the bases 12 and 16, a pair of tray assemblies 10 and 11 can be rigidly but releasably interconnected to form a multiple assembly. This arrangement will be particularly advantageous in avoiding mixups between trays which could occur if they were unattached. This would be of particular value where two assemblies of containers and two assemblies of cards are being used at the same time and place, as in a hospital, for collecting specimens.

Although a particular preferred embodiment of the invention has been disclosed in detail for illustrative purposes, it will be recognized that variations or modifications of the disclosed apparatus, including the rearrangement of parts, lie within the scope of the present invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A tray assembly for holding a plurality of articles comprising:
   - channel-shaped base means having plural sidewall means;
   - tray means slidably and snugly disposed within said base means for movement lengthwise of said sidewall means, said tray means having first and second, channel-shaped sidewall members with abutting edges;
   - bottom wall means integral with and extending between corresponding ends of said sidewall members; and
   - cooperating first and second gripping means on said abutting edges for releasably holding said first and second sidewall members together so that the channel-shaped sidewall members and bottom wall define an upwardly opening compartment into which said articles are receivable.

2. A tray assembly according to claim 1, wherein said tray means includes plural pairs of sidewall members and each sidewall member has plural and parallel channel-shaped recesses, said recesses in each pair of sidewall members being aligned to define plural compartments, and said pairs of sidewall members being interconnected along adjacent edges extending lengthwise of said sidewall means.

3. A tray assembly according to claim 2, including second tray means having first and second channel-shaped sidewall

members with abutting edges and first and second connecting means integral with said abutting edges for releasably holding said sidewall members of said second tray means together to form an article-receiving compartment; and

bottom wall means integral with and extending between adjacent ends of said sidewall members of said second tray means.

4. In a tray assembly having channel-shaped base means with substantially parallel sidewall means, article-receiving tray means comprising:

plural pairs of first and second sidewall members having plural, parallel and side-by-side channels;

bottom wall means integral with and extending between adjacent ends of each pair of sidewall members;

first and second releasable gripping means on said first and second sidewall members between said channels for releasably holding said sidewall members together so that said channels are aligned to define a plurality of upwardly opening, article receiving compartments; and

hinge means connecting the first sidewall member of one pair thereof to the adjacent, second sidewall member of another pair thereof, said hinge means extending lengthwise of said sidewall means of said base means, and said tray means being snugly disposed between said sidewall means.

5. A tray means according to claim 4, wherein said compartments and articles are cylindrical;

wherein said gripping means comprises a tongue and groove connection; and

wherein said sidewall members, said gripping means and said bottom wall means are fabricated from a single sheet of plastic material.

6. A tray assembly according to claim 4, wherein said sidewall members have substantially parallel flanges projecting upwardly beyond said channels;

wherein said hinge means is secured to adjacent pairs of said flanges; and

wherein said sidewall means of said base means have lengthwise parallel ridges projecting toward each other near the upper edges of said sidewall means for engagement by the upper edges of said flanges when said tray means is disposed within said base means.

7. A tray assembly according to claim 1, including a pair of elongated, spaced and parallel slide members integral with and extending lengthwise of one sidewall means on the side thereof remote from the other sidewall means, said slide members projecting outwardly from the sidewall means and then away from each other; and

a pair of elongated, spaced and parallel guide members integral with and extending lengthwise of the other sidewall means on the side thereof remote from said one sidewall means, said guide members projecting outwardly from said other sidewall means and then toward each other, the spacing between said pairs of slide and guide members being such that a pair of slide members on one base means is slidably receivable between and within a pair of guide members on a second base means for firmly holding the two base means in side-by-side relationship.

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