

[54] CABINET STORAGE RACKS

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[58] Field of Search211/49, 162, 94

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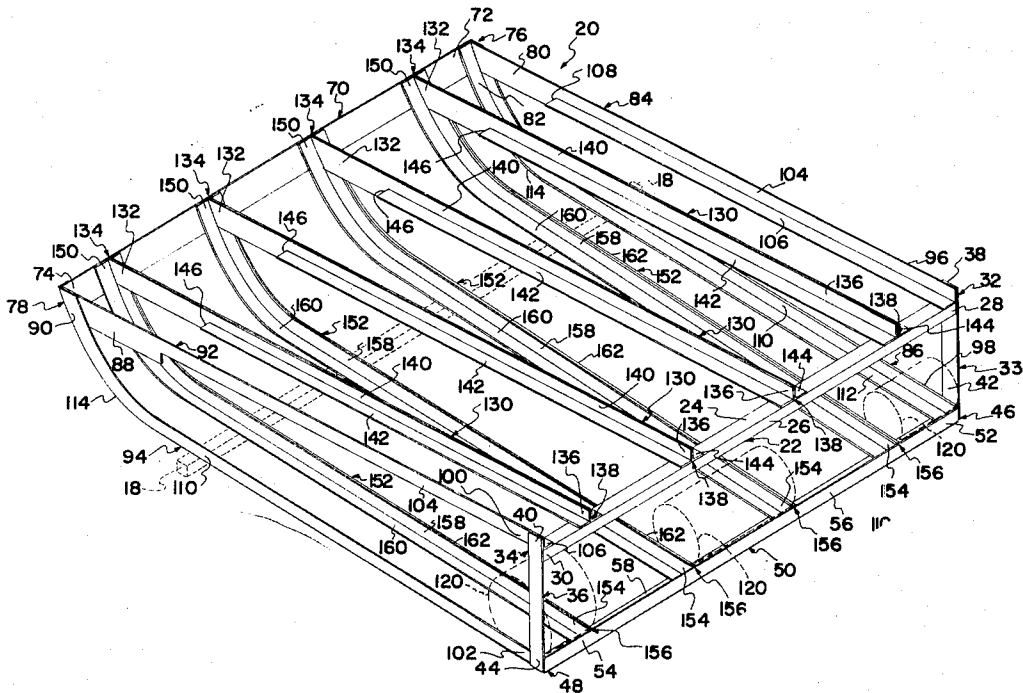
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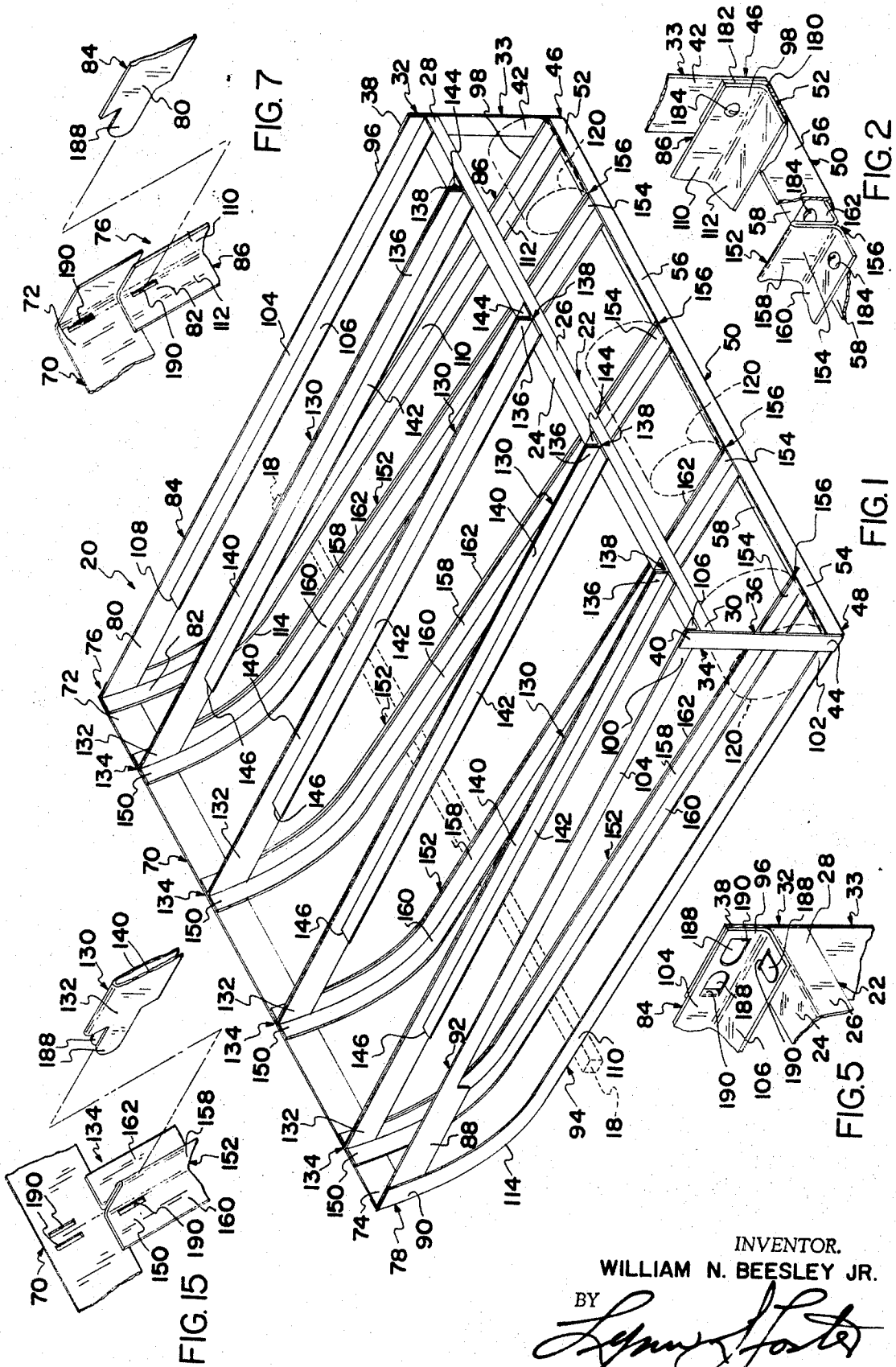
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[57] ABSTRACT

Two tier storage and dispensing racks comprising a frame of components, fabricated of sheet material, comprising in assembled combination, upper and lower ramp-defining members together with stabilizing and reinforcing members. Provision is made for quickly assembling the components without special tools, and the components, when assembled, can be installed in a household kitchen cabinet or secured to related vertical walls, or the like, alone or in combination with additional racks of like configuration arranged vertically whereby the rack or racks are rigidly maintained for receiving cylindrical containers to be stored and sequentially removed in first-in, first-out fashion.

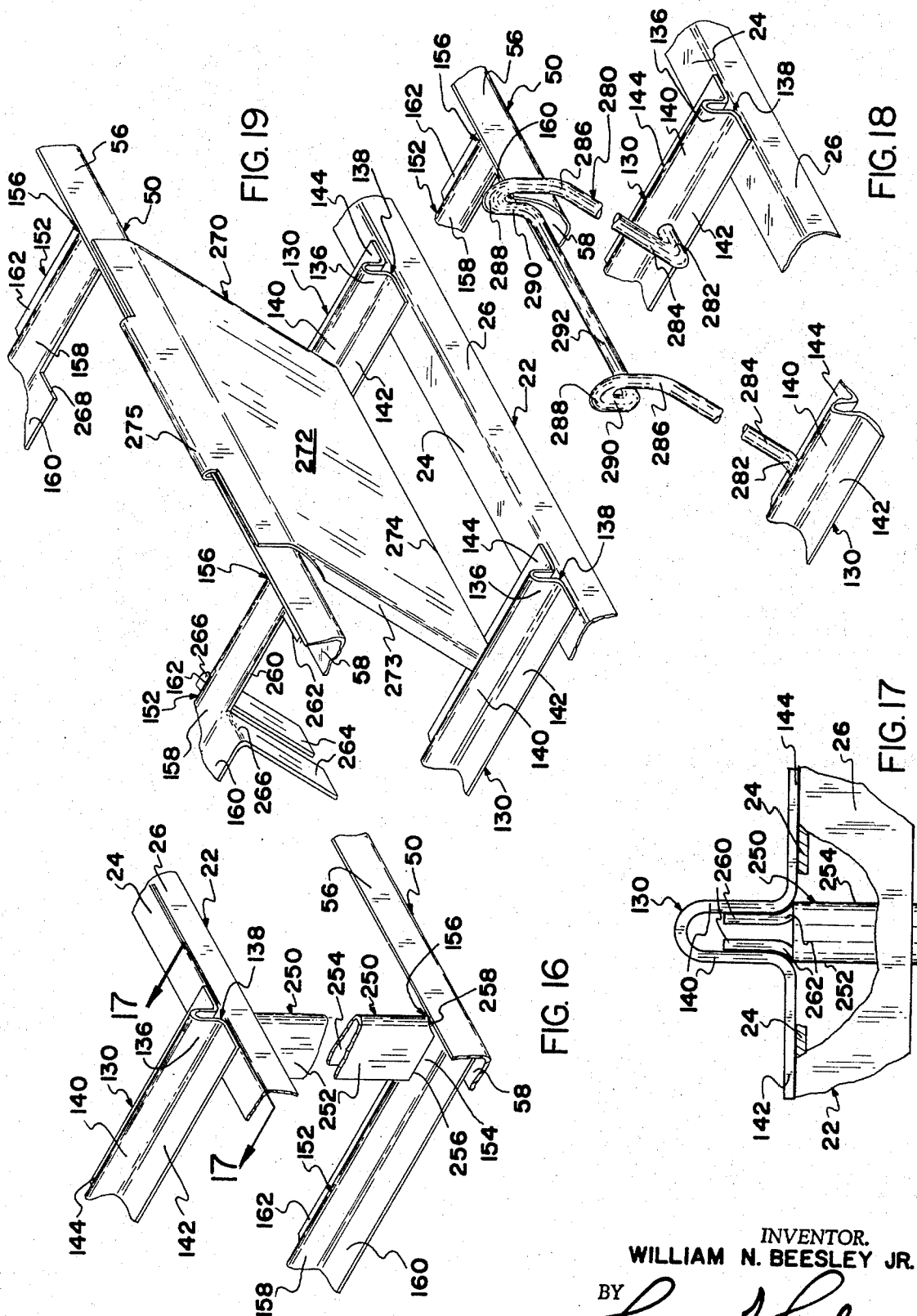
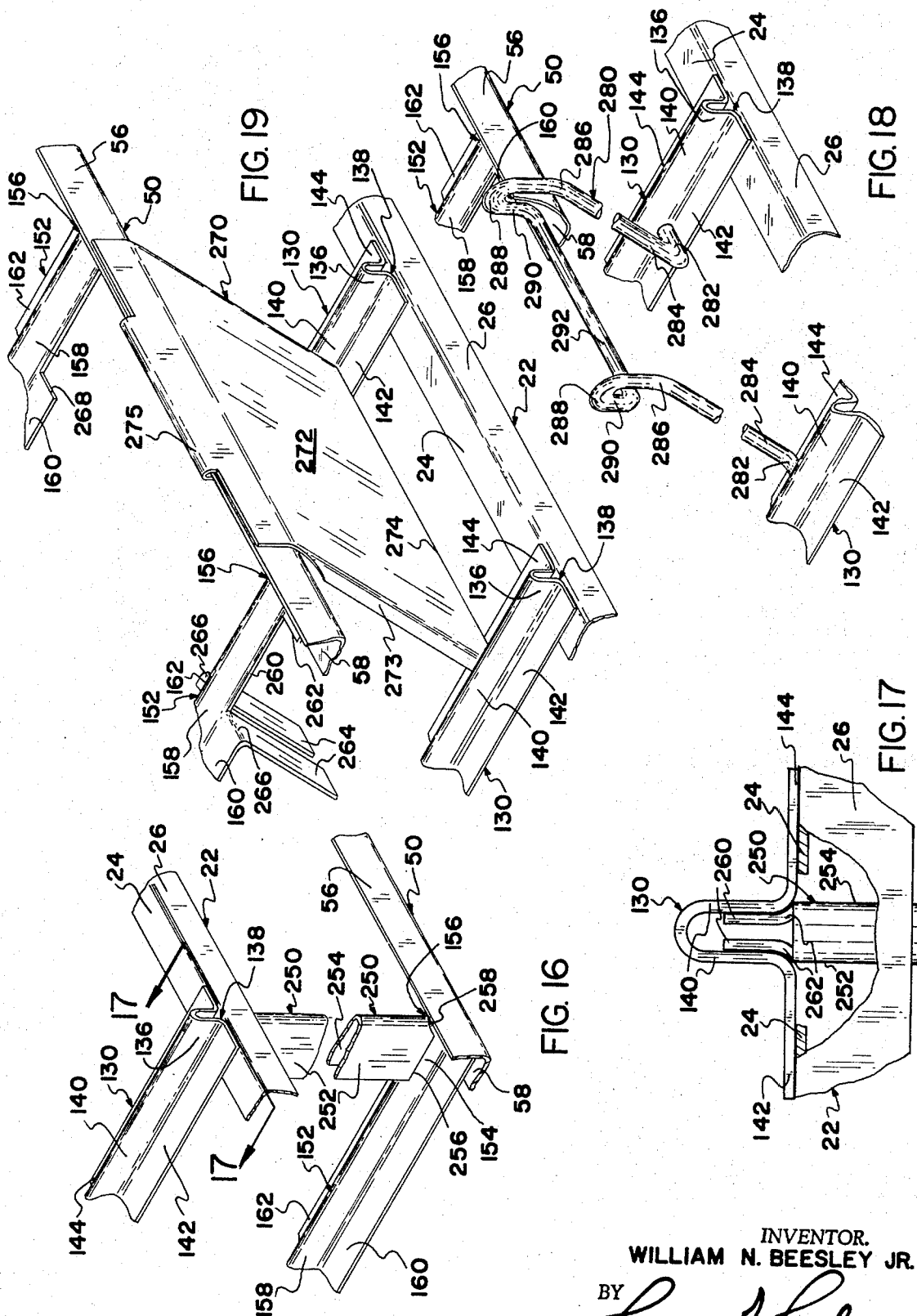
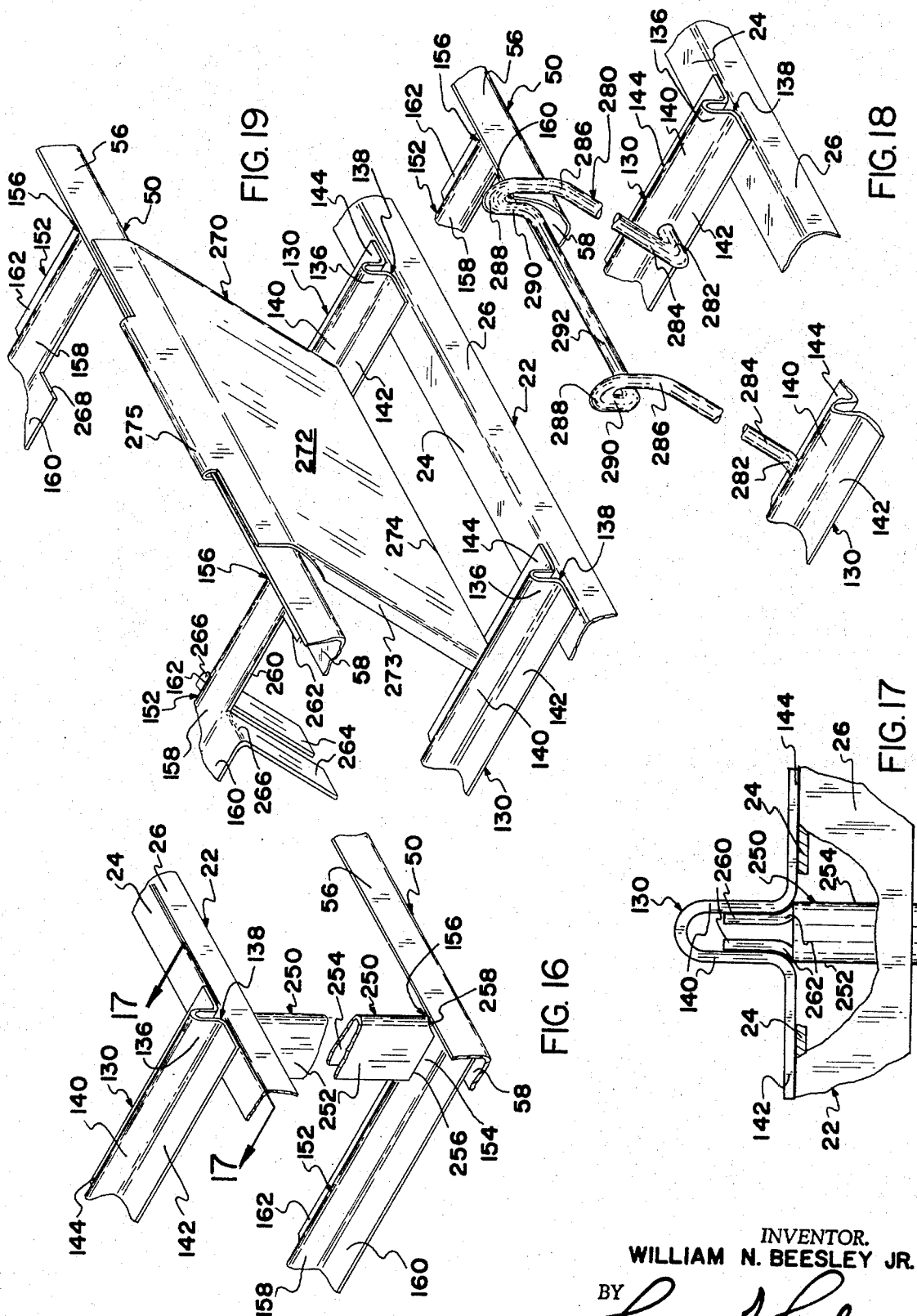
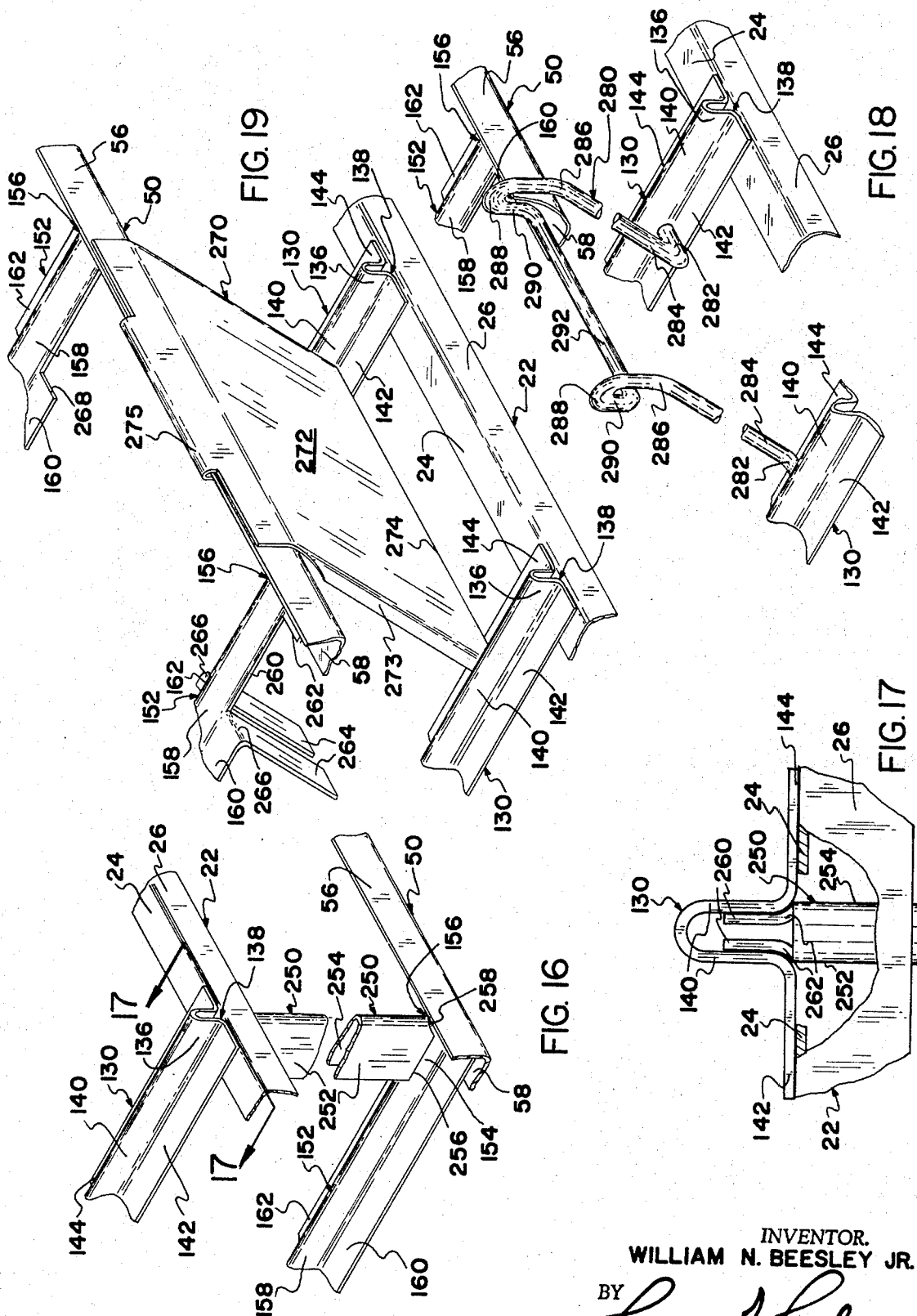
17 Claims, 19 Drawing Figures





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CABINET STORAGE RACKS

BACKGROUND

1. Field of the Invention

The present invention relates to storage racks and more particularly to two tier storage and dispensing racks comprising a frame with upper and lower ramp-defining members which can be mounted individually or in groups to or in household cabinets for storage and sequential removal of cylindrical containers.

2. The Prior Art

Racks for storing canned goods and the like are well known in the art. Examples of known prior art racks can be found in U.S. Pat. Nos. 2,915,162 and 2,969,152. Conventionally, such prior art racks include a fixed size or fixed number of tiers, and are intricately configured and so constructed that the cost thereof is disadvantageously high, and, accordingly, use thereof has been limited.

BRIEF SUMMARY AND OBJECTS OF THE PRESENT INVENTION

According to the present invention, two tier storage and dispensing racks for receiving cylindrical containers are economically provided, which racks are formed of components fabricated of sheet material, preferably sheet metal, the components being assembled to comprise an open frame including upper and lower ramp-defining members and stabilizing and reinforcing members. Racks of this invention may be quickly assembled or dismantled without special tools, and, when assembled, can be mounted individually or in vertically oriented groups to vertical walls or the like, such as those comprising the interior of household kitchen cabinets, or properly supported upon a floor, shelf or other surface. Containers placed within the rack or racks follow each other along the ramps under force of gravity each time the lowest container is removed.

It is a primary object of the present invention to provide a novel two-tier storage and dispensing rack for receiving cylindrical containers.

It is another paramount object of the present invention to provide a novel storage and dispensing rack in the form of an open frame comprised of elongated members fabricated from sheet material and assembled by connectors.

It is another important object of the present invention to provide an improved storage rack for receiving cylindrical containers such as those in which canned goods are placed for commercial distribution which can be readily mounted to vertical surfaces such as those comprising the interior of household kitchen cabinets.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective representation of a presently preferred storage and dispensing rack for cylindrical containers, according to the present invention;

FIGS. 2 and 3 are fragmentary perspective representations illustrating two ways of connecting the frame members at the lower left and lower right front corners of the rack of FIG. 1;

FIGS. 4 and 5 are fragmentary perspective representations of two ways of connecting frame members at the upper left and upper right front corners of the rack of FIG. 1;

FIGS. 6 and 7 are fragmentary perspective representations illustrating two ways of connecting frame members at the left and right rear corners of the rack of FIG. 1, FIG. 7 being in exploded perspective;

FIGS. 8 and 9 are fragmentary perspective representations, with parts broken away for clarity, illustrating two ways of connecting frame members at intermediate locations at the lower front portion of the rack of FIG. 1;

FIGS. 10 through 12 illustrate in fragmentary perspective three ways in which frame members may be connected at intermediate locations along the top front portion of the rack of FIG. 1;

FIGS. 13 through 15 are fragmentary perspective representations showing three ways in which the frame members may be connected at intermediate locations along the rear portion of the rack of FIG. 1, FIG. 15 being in exploded perspective;

FIG. 16 is a fragmentary enlarged perspective representation illustrating one way in which a central vertical strut or column may be used in accordance with racks according to the present invention;

FIG. 17 is an elevation view with parts broken away for clarity taken along lines 17—17 of FIG. 16;

FIG. 18 is a fragmentary enlarged perspective representation of one chute structure to accommodate movement of a row of cylindrical containers from one rack to another, vertically stacked rack; and

FIG. 19 is an enlarged fragmentary perspective representation of a second chute structure which accommodates movement of cylindrical containers by force of gravity between vertically related racks.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

Reference is now made to the Figures, and particularly to FIG. 1, wherein a presently preferred cabinet storage rack, generally designated 20, is illustrated. The components of the rack 20 are preferably fabricated from sheet metal having an appropriate exterior covering of paint or the like for decorative and/or protective purposes. The rack 20 is comprised of spaced structural components which, in combination when assembled, comprise a frame adapted to be nailed, screwed or bolted in proper orientation to one or more vertical walls, for example, the interior walls of a kitchen cabinet, or adapted to be properly supported upon a floor, shelf or other surface, for example, by placing an elongated piece of wood 18 (FIG. 1) or the like below the rack 20 toward the rear. The frame members of the rack 20 comprise a top front cross member 22, which, in cross section, is of right angular configuration presenting an inwardly directed horizontal leg 24 and a vertical leg 26 depending below the leg 24. The upper front cross member 22 is joined at its ends 28 and 30 by connector structures 32 and 34, respectively, to side column members 33 and 36, respectively, at the respective top ends 38 and 40.

In like manner, the respective lower ends 42 and 44 of the column members 33 and 36 are joined by connector structure 46 and 48 to a front lower cross member 50 at ends 52 and 54, respectively. The cross member 50 is also right angular in cross sectional configuration, presenting a vertical leg 56 and a lower horizontal leg 58, which extends toward the rear of the rack 20. If desired, additional stiffeners or reinforcing members (not shown) may be interposed between the top and bottom cross members 22 and 50 and/or other members of the rack 20. Also, the columns 34 and 36 may be strengthened in any desirable way, including the use of one or more strengthening ribs 60, as shown in FIG. 3.

The frame of rack 20 also comprises a rear cross member 70 which is of planar configuration, extending transversely across the entire rack 20. The ends 72 and 74 of the rear cross member 70 are respectively joined by suitable connector structures 76 and 78 to (a) the trailing ends 80 and 82 of top and bottom ramp-defining side members 84 and 86 and (b) the back ends 88 and 90 of the top and bottom ramp-defining side members 92 and 94. The upper side ramp-defining members 84 and 92 are identical though opposite hand, as are lower ramp-defining members 86 and 94. The front end 96 of the upper ramp-defining side member 84 is joined by connector structure 32 to the end 28 of the cross member 22 and the end 38 of the column 33. The lower ramp-defining side member 86 is joined at its front end 98 by connector structure 46 to the cross member 50 at end 52 and end 42 of the column

33. The front end 100 of the upper ramp-defining side edge member 92 is joined by connector structure 34 to the upper end 40 of the column 36 and the left end 30 of the cross member 22. The front end 102 of the lower ramp-defining side member 94 is joined by connector structure 48 to the lower end 44 of the column 36 and the left end 54 of the cross member 50.

The upper ramp-defining side members 84 and 92 are each, primarily, right angular in configuration being comprised of a vertical leg 104 and an inwardly directed transverse leg 106 which is sloped from front to back in each case. Each transverse leg 106 terminates at a back edge 108, which is spaced from the back cross member 70 a horizontal distance in excess of the diameter of the cylindrical containers to be stored in the compartment of the rack 20. The cylinder containers are shown in dotted lines in FIG. 1 and are identified by the numeral 120, being ordinarily cans or the like used to provide canned food and beverage to consumers. Preferably, the upper ramp-defining side members 84 and 92 are initially of flat stock material each having a width as illustrated to the rear of edge 108 at 80 and 88 and are fabricated by cutting the edge 108 in the flat strip, following which the portion of each member 84 and 90 forward of the edge 108 and denominated 106 is bent into the illustrated 90° angular relation with the associated vertical leg 104.

The lower ramp-defining side members 86 and 94 are also angular in configuration, each defining a vertical leg 110 and a lower inwardly directed leg 112 which is sloped from back to front in each case. The lower ramp-defining side members 86 and 94 each define an arcuate section 114 below and slightly in front of the rear cross member 70, the arcuate portions 114 preferably being formed by conventional sheet metal rolling techniques.

The inwardly directed flanges 106 are sloped slightly in respect to the horizontal from front to rear and the flanges 112 from rear to front to accommodate gravity displacement of the cylindrical containers 120, each leg 106 and 112 forming one side of upper and lower ramps respectively, along which the cylindrical containers 120 roll, only three such cylindrical containers being illustrated in FIG. 1. The space between the back edge 108 of each leg 106 and the cross member 70 defines a vertical chute through which the cylindrical containers 120 pass by force of gravity from the upper to the lower ramp as downstream containers 120 are removed from that row.

A plurality of intermediate upper ramp-defining members 130 span between the front top cross member 22 and the rear cross member 70 and are each connected at back ends 132 to the cross member 70 by connector structure 134 at a suitable location to define acceptable upper ramps in conjunction with adjacent ramp-defining members. Each intermediate upper ramp-defining member 130 is joined at its front end 136 to the upper front cross member 22 by connector structure 138 also at a suitable ramp-establishing position.

Each intermediate upper ramp-defining member 130 is comprised of a central vertical rib portion 140 and oppositely extending transverse legs 142 and 144, each ramp leg 142 and 144 terminating in a back edge 146 to provide, in combination with the adjacent upper ramp-defining member, a vertical chute between upper and lower ramps, as previously mentioned. It is to be noted that all ramp-defining members are disposed in parallel vertical planes and are secured by the mentioned connector structures to the mentioned cross members at predetermined locations so as to define a transverse distance between each ramp-defining member adequate to accommodate reception, storage and removal of various sized cylindrical containers. Likewise, the location of back edges 108 and 146 may vary, depending upon the diameter of the cylindrical container to be received and stored in a given compartment between spaced ramp-defining members.

If desired, each intermediate upper ramp-defining member 130 may comprise in combination the side upper ramp-defining members 84 and 92, placed back-to-back along their

respective vertical legs to form portion 140 so that the transverse legs extend in opposite directions. See FIG. 10. Alternatively, each intermediate upper ramp-defining member 130 may comprise a single piece of sheet material with the vertical leg 140 comprising a 180° fold and the transverse legs 142 and 144 comprising 90° folds. See FIG. 12.

Intermediate lower ramp-defining members 152 span between the lower front cross member 50 and the rear cross member 70, each in a vertical plane containing one of the intermediate upper ramp-defining members 130. The back end 150 of each intermediate lower ramp-defining member 152 is secured to the back cross member 70 by connector structure 134 and the front end 154 of each member 152 is secured to the lower front cross member 50 by connector structure 156.

Each intermediate lower ramp-defining member 152 may comprise in combination the members 86 and 90 placed with their vertical legs back to back to form portion 158 so that the transverse legs of the combination extend oppositely. See FIG. 8. Alternatively, each member 152 may comprise a single piece of sheet material with the vertical leg 158 comprising a 180° bend and the transverse legs 160 and 162 comprising 90° bends. See FIG. 9.

From the foregoing, it should be clear that adjacent vertical legs of the upper ramp-defining members are spaced a transverse distance slightly greater than the length of cylindrical containers 120 to be accommodated in that compartment of the rack 20 and the transverse legs are sloped from front to back for rolling displacement of the containers under force of gravity along the indicated transverse legs, with the vertical legs of the upper ramp-defining members serving as guides to define part of the path of displacement taken by the containers.

Once the cylindrical container 120 reaches the end of the transverse legs of the upper ramp-defining members upon which it rests, it will move by force of gravity through the mentioned vertical chute located to the rear of said transverse legs and be received by the transverse legs of the aligned lower ramp-defining members, the transverse legs of which slope from back to front. Ultimately, a container 120 will come to rest against the lower cross member 50, from which position the user may manually grip the container and remove it for consumption.

In order for the described travel path of containers 120 to be properly available, a suitable orientation of the rack 20 must be provided. This is achieved by nailing, screwing or otherwise securing peripheral members of the rack 20 to one or more vertical walls. Nails or screws can, therefore, be appropriately passed through the rear cross member 70, the upper ramp-defining side members 92 and 84, the lower ramp-defining side members 86 and 94 and/or the columns 34 and 36, with the rack 20 properly oriented.

Reference is now made to FIG. 2 which illustrates at the right end thereof one manner in which connector structures 46 and 48 may be defined, connector structure 46 being illustrated. Specifically, the horizontal leg 58 of the lower cross member 50 is extended at end 52, being bent through 90° at location 180 so as to define a vertical extension 182. The vertical leg 110 of the lower ramp-defining side member 86 and 98 is provided with an aperture (not shown) as are the extension 182 and the end 42 of the column 33, each aperture being aligned with the others. A bolt 184 is fitted through the aligned apertures and secured in position by a nut (not shown).

The lower right or left front corner may be fabricated to define connectors 46 and 48 in the manner illustrated in FIG. 3, connector 46 being shown. Specifically, a tab 188 is pressed from the leg 58 of the lower cross member 50 at end 52 and is caused to initially be vertically erect. Similarly, tabs 188 are punched from the column 34 at end 42 and are initially caused to project inwardly of the rack 20. Appropriately sized, shaped and located slots 190 are fabricated in member 86, one in the transverse leg 112 and two in the vertical leg 110. Once the end 98 of the member 86 has been placed in the position

illustrated in FIG. 3 so that each tab 188 appropriately projects through a corresponding slot 190, the tabs are bent over through 90° to complete the connector structure 46 of FIG. 3.

Reference is now made to FIG. 4 which illustrates in fragmentary perspective one way of forming connector 30 or 32, the illustration of FIG. 4 pertaining to connector structure 32. Specifically, suitably sized and aligned apertures (not shown) are placed in leg 24 at end 28 of the top front cross member 22 and in leg 106 at end 96 of member 84 and a bolt 184 is placed therethrough and secured by a nut (not shown). If desired, leg 24 may be extended and bent downward through 90° at 194 to form a stabilizing extension 196. Additionally, properly sized and aligned apertures (not shown) are formed in the top end 38 of column 33 and in leg 104 at end 96 of member 84 through which a bolt 184 is placed and secured by a nut (not shown).

Particular reference is now made to FIG. 5 which illustrates another manner in which connector structures 34 and 32 may be fabricated, connector structure 32 being depicted. Specifically, one tab 188 is fabricated from leg 24 of cross member 22 at end 28 and two tabs 188 are fabricated from column 33 at end 38, each tab 188 being aligned with and projecting through an appropriately sized, shaped and located slot 190 in the member 84 and bent through 90° as illustrated.

The rear connector structures 76 and 78 may be fabricated as illustrated in FIGS. 6 and 7, the connector structure 76 being depicted. In respect to FIG. 6, the connector structure 76 is formed by providing aligned apertures (not shown) in the leg 112 of the member 86 at end 82 and in the member 70 at end 72 following which a bolt 84 is placed therethrough and secured by a nut (not shown). In like manner, aligned apertures (not shown) in the member 84 at end 80 and in the leg 110 of the member 86 at end 82 receive a bolt 84 which is secured by a nut (not shown), to complete the connecting structure 76 of FIG. 6.

In respect to FIG. 7, a single tab 188 is fabricated at the back end 80 of the member 84 and is fitted through aligned slots 190 disposed in leg 112 of the member 86 at end 82 and member 70 at end 72 following which the tab 188 is bent or twisted to retain the union and complete the connector structure 76 of FIG. 7.

The connector structure 156 which unites the front end of each intermediate lower ramp-defining member 52 with the lower front cross member 50, may be fabricated as illustrated in FIG. 2 at the left portion thereof. Specifically, the transverse legs 160 and 162 are provided with apertures (not shown) each in alignment with an aperture (not shown) in the leg 58 of member 50. Bolts 184 are placed through the aligned apertures and secured by nuts (not shown).

Alternatively, the connector structure 156 of FIG. 8 may be relied upon. Connector structure 156 is fabricated by providing an extension of transverse legs 160 and 162 of the member 152 at end 158, the extensions comprising an initial vertical leg 200 disposed in 90° relation in respect to the remainder of associated leg 160 or 162 and a terminal portion 202 which is a continuation of leg 200 but is directed through a 180° bend. The recess 204 provided between the portions 200 and 202 is sized so as to receive the upstanding leg 56 of the cross member 50 and is retained in the illustrated position by abutment between components and the force of gravity acting upon the rack 20 and all cylindrical containers placed therein.

Also, the connector structure 156 of FIG. 9 may be utilized. Specifically, two tabs 188 are punched from a leg 58 of member 50 and are extended through appropriately sized, located and shaped slots 190 (as shown by dotted lines in FIG. 9). Each tab 188 is bent through 90° to complete the connector structure 156 of FIG. 9.

The connector structure 138 may be fabricated in any one of several ways, three of which are illustrated in FIGS. 10 through 12. In FIG. 10, bolts 184, secured by nuts (not shown) pass through aligned apertures (not shown) in the respective legs 142 and 144 of the member 130 at end 136 and in the leg 24 of the member 22.

In lieu of apertures in the leg 24 of the member 22, a slot 210 may be placed in the leg 24 through which the bolts 184 pass and in which the bolts are secured by nuts, washers or the like, as illustrated in FIG. 11. In this way, the location of the ramp-defining members may be adjusted by the user for properly receiving various sized cylindrical containers.

The connector structure 138 of FIG. 12 may also be utilized wherein two spaced tabs 188 are fabricated in the leg 24 of the member 22 and are fitted through spaced slots 190 disposed in the legs 142 and 144 respectively, of the member 130 at end 136, as shown in dotted lines in FIG. 12. Thereafter, the tabs 188 are rotated through 90° to complete the connector structure 138 of FIG. 12.

Rear connector structure 134 may be fabricated in any one of several ways, three of which are illustrated in FIGS. 13, 14 and 15 to which reference is now made.

The connector structure 134 of FIG. 13 comprises two spaced bolts 184 which respectively extend through aligned apertures (not shown) in the leg 160 of member 152 at end 150 and the member 70 as well as through the leg 162 of the member 152 at end 150 and the leg 70. Each bolt 184 is secured by a nut (not shown). The member 130 is secured at connector structure 134 by spreading the two walls of the vertical portion 140 at end 132 so that they snugly fit over the vertical portion 158 of the member 152 and are welded, soldered or otherwise suitably secured at interfaces 216, to complete the connector structure 134 of FIG. 13.

Alternatively, the connector structure 134 of FIG. 14 may be utilized wherein the member 130 is joined to the member 152 in the manner described in connection with FIG. 13 and the member 152 at end 150 is coupled to the member 70 by extending the legs 160 and 162 at 218 so that a reverse bend 220 is provided and a U-shaped recess 222 results. The recess 222 of each extension 218 receives the member 70 and rests upon the top edge thereof to retain the members 130 and 150 in their proper orientation and transverse location.

Additionally, the connector structure 134 of FIG. 15 may be utilized wherein the two walls comprising portion 140 of member 130 each terminate in a longitudinally directed tab 188, which is fitted through aligned slots 190 respectively disposed within the leg 160 or 162 of the member 152 at end 150 and the member 70. Thereafter, the tabs 188 are bent or twisted to retain the assembled union and complete the connector structure 134 of FIG. 15.

In cases where the transverse distance of a rack according to the present invention is substantial or where heavy cylindrical containers are being supported, it is desirable to have intermediate or central vertical struts or columns. One such suitable strut is illustrated in FIGS. 16 and 17 and is generally designated 250. The strut or column 250 is U-shaped in cross section comprising vertical walls 252 and 254 joined to the front of the rack only. The spaced vertical walls 252 and 254 terminate at lower edges 256, only one of which is shown. The lower edges 256 are joined by a curved recessed edge 258, which rests upon the summit of vertical flange 158 of one lower ramp-defining member 152 in load-transferring relation.

Free ends 260 of the side walls 252 and 254 extend from the upper end of the strut 250 into the hollow of the vertical flange 140 of one upper ramp-defining member 130. Each free end 260 comprises a rounded portion 262, against which the fillet between the vertical flange 140 and the transversely directed flange 142 or 144 rests in loadtransferring relation. Because of the described construction of the vertical strut 250, it can be manually inserted and removed at or from any suitable location in rack 20.

Under some conditions, it is desirable to stack or otherwise arrange several racks 20 in vertical relation and to provide for continuous displacement of a row of cylindrical containers 120 through each rack to the stop flange 56 of the bottom rack. Preferably each lower ramp-defining member is slotted for a distance greater than the diameter of cylindrical containers to be serviced at the fillet between the vertical flange

and each transverse flange. By way of example, this is illustrated in FIG. 19 at 260. Consequently, to prepare lower ramp-defining members of one rack to pass cylindrical containers to a lower rack, the user need only shear the transverse flanges 160 and 162 at 262 following which the flap 264 is bent out of the way at bend 266. Alternatively, the transverse flanges 160 and 162 may be sheared at locations 266 to form edge 268, shown at the upper right portion of FIG. 19. The transverse flanges of the lower outside ramp-defining members 86 and 94 would be managed in essentially the same way.

Thereafter, the chute structure 270 or 280 may be placed in position. The chute structure 270 comprises a plate 272 disposed at a slight angle in respect to the vertical and flanked by integral flanges 273. The lower edge 274 rests upon oppositely directed transverse flanges 142 and 144 of two adjacent upper ramp-defining members 130 of the lower rack 20. The top of chute structure 270 comprises a U-shaped flange 275 which comprises an inverted U-shaped connector which rests by force of gravity over the upwardly directed flange 56 of the lower front cross member 50 of the top rack 20. Thus, with the transverse flanges of the lower ramp-defining members of the top rack properly removed cylindrical containers will pass from a lower ramp of the top rack to an upper ramp of the lower rack.

The chute structure 280 comprises a continuous wire terminating in transverse ends 282 which rest upon transverse flanges 142 and 144 respectively of two adjacent upper ramp-defining members 130. The transverse ends 282 respectively merge with rods which extend upwardly at a small acute angle in respect to the vertical. Each rod 284 is bent at location 286 and is formed into a loop 288. Each loop 288 terminates in a downwardly extending length 290, which are respectively joined by a crossbar 292. The loops 288 are placed over and rest by force of gravity upon the upwardly directed flange 56 of the lower front cross member 150 of the upper rack. The chute structure 280 serves the same purpose as that described in connection with chute structure 270.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A gravity feed storage rack comprising a frame for storage and dispensing several side-by-side rows of cylindrical containers, adapted to be mounted to vertical support structure, comprising:

two outside upper ramp-defining members, each comprising
 (a) generally upwardly extending first flange means disposed essentially in a vertical plane, which first flange means help retain a row of cylindrical containers within the rack and define the direction of gravity displacement of said row of cylindrical containers through part of the rack, and (b) an inwardly directed second flange means extending from the first flange means essentially normal thereto to define one side of an upper sloping ramp;

two outside lower ramp-defining members each comprising
 (a) first flange means disposed essentially in one of said vertical planes, below one outside upper ramp-defining member a distance greater than the diameter of the cylindrical containers being stored, which first flange means help retain said row of cylindrical containers within the rack and further define the direction of gravity displacement of said row of cylindrical containers through another part of the rack, and (b) an inwardly directed second flange means extending from the last-mentioned first flange means essentially normal thereto to define one side of a lower sloping ramp;

a plurality of spaced intermediate upper ramp-defining members disposed at space locations between and extending generally parallel to the outside upper ramp-defining members, each intermediate upper ramp-defining member comprising (a) generally upwardly extending first flange means disposed essentially in a vertical plane which first flange means help retain two rows of cylindrical containers within the rack and define the direction of gravity displacement of said two rows of cylindrical containers through part of the rack, (b) one outwardly directed second flange means extending from the last-mentioned first flange means essentially normal thereto toward one outside ramp-defining member to define one side of an upward sloping ramp for cylindrical containers, and (c) an outwardly directed third flange means extending from the last-mentioned first flange means essentially normal thereto toward the other outside upper ramp-defining member to define one side of another upper sloping ramp for cylindrical containers, said last-mentioned second and third flange means terminating forward of the back end the last-mentioned first flange means to define in part a chute through which cylindrical containers pass by force of gravity;

a plurality of spaced intermediate lower ramp-defining members disposed at spaced locations between and generally parallel to the outside lower ramp-defining members, each intermediate lower ramp-defining member comprising ((a) generally upwardly extending first flange means disposed essentially in one vertical plane containing but below the first flange means of one intermediate upper ramp-defining member a distance greater than the cylindrical containers being stored, which first flange means of said intermediate lower ramp-defining member help retain two rows of cylindrical containers within the rack and further define the direction of gravity displacement of said two groups of cylindrical containers through another part of the rack, (b) one outwardly directed second flange means extending from the last-mentioned first flange means essentially normal thereto toward one outside lower ramp-defining member to define one side of a lower sloping ramp for cylindrical containers, (c) an outwardly directed third flange means extending from the last-mentioned first flange means essentially normal thereto toward the other outside lower ramp-defining member defined one side of another sloping ramp for cylindrical containers;

structure bridging between lower and upper ramp-defining members further defining said chute;

structure supporting the ramp-defining members in fixed relation one to another.

2. A rack as defined in claim 1 wherein the supporting structure comprises a back cross member firmly joined to the back end of each upper ramp-defining member and also to the back end of the bridging structure; an upper front cross member firmly joined to the front end of each upper ramp-defining member; and a lower front cross member firmly joined to the front end of each lower ramp-defining member.

3. A rack is defined in claim 1 wherein the supporting structure comprises beam means interconnecting and holding the ramp-defining members in the identified spaced positions and column means spanning between and holding the upper and lower ramp-defining members in their vertically spaced positions.

4. A rack as defined in claim 1 wherein the bridging structure comprises an upward continuation of the back part of several lower ramp-defining members with each such continuation merging at its back end with the back end of the upper ramp-defining member which is in the same vertical plane.

5. A rack is defined in claim 4 for the comprising cross members at the front and back of the ramp-defining members and connector structure firmly joining each upper ramp-defining member to one cross member at the front and one cross

member at the back and joining each lower ramp-defining member to one cross member at the front end one cross member at the back.

6. A rack as defined in claim 1 wherein connector structure firmly joins the members and bridging structure to the supporting structure.

7. A rack as defined in claim 6 wherein the connector structure comprises tightened fasteners fitted through apertures in the members, bridging structure and supporting structure.

8. A rack as defined in claim 6 wherein the connector structure comprises tabs formed in some parts of the connector structure and mating apertures in other parts of the connector structure through which the tabs pass and beyond which the tabs are bent to retain the relationship.

9. A rack as defined in claim 6 wherein the connector structure comprises parts which are welded or bonded together.

10. The rack as defined in claim 6 wherein the connector structure comprises parts which are releasibly fitted together and are so retained by force of gravity.

11. A rack as defined in claim 6 wherein the connector structure comprises fasteners fitted through elongated slots to accommodate various spaced settings of the intermediate ramp-defining members one in respect to another for receiving cylindrical containers of diverse size.

12. A rack as defined in claim 1 wherein the lower ramp-defining members are connected to a transverse cross member at their front ends, the transverse cross member having a lip which acts as a stop for the leading cylindrical container in a string of cylindrical containers fed by gravity along one upper ramp from the front to back, through the chute and along one lower ramp from back to front.

13. A rack as defined in claim 1 further comprising additional chute structure extending downwardly from at least two adjacent lower ramp-defining members of the rack and adapted to successively communicate cylindrical containers from said two adjacent lower ramp-defining members to two adjacent upper ramp-defining members of a second rack disposed vertically below the previously mentioned rack.

14. A rack as defined in claim 13 wherein the oppositely disposed flange means of the adjacent lower ramp-defining members, which together define the two sides of one lower sloping ramp, are slotted adjacent the front ends thereof to accommodate folding or removal thereof out of alignment with the path of cylindrical containers to and along the additional chute structure.

15. A rack as defined in claim 13 wherein the additional chute structure comprises a wire bracket suspended by gravity from the first-mentioned rack.

16. A rack as defined in claim 13 wherein the additional chute structure comprises a bracket of sheet material suspended by gravity from the first-mentioned rack.

17. A two tier storage rack frame comprising:

an upper tier of at least two spaced upper beams spanning between front and rear of the rack, each upper beam being angular in cross section and having at least one vertical flange and at least one flange disposed at a slight angle to the horizontal, the angularly disposed flange of one upper beam being directed toward the angularly disposed flange of the other upper beam;

a lower tier of at least two spaced lower beams respectively in vertical alignment with the two beams of the upper tier and spanning between the front and rear of the rack, each lower beam being angular in cross section and having at least one vertical flange and at least one flange disposed at a slight angle to the horizontal, the angularly disposed flange of one lower beam being directed toward the angularly disposed flange of the other lower beam;

the back end of each lower beam generally merging with the back end of the aligned upper beam, each being attached to a back cross piece;

the front end of each upper beam being attached to an upper front cross piece and the front end of each lower beam being attached to a lower front cross piece; and column means holding the front upper beams in fixed vertically spaced relation with respect to the front lower beams.

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