

Oct. 30, 1962

L. R. HOCK
COLLAPSIBLE CABINET

3,061,396

Filed May 2, 1960

3 Sheets-Sheet 1

FIG. 1.

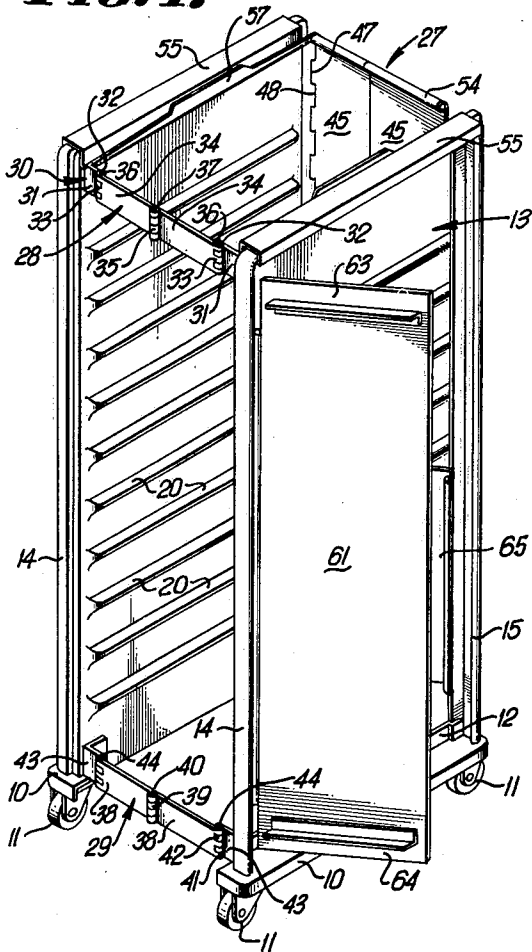


FIG. 2.

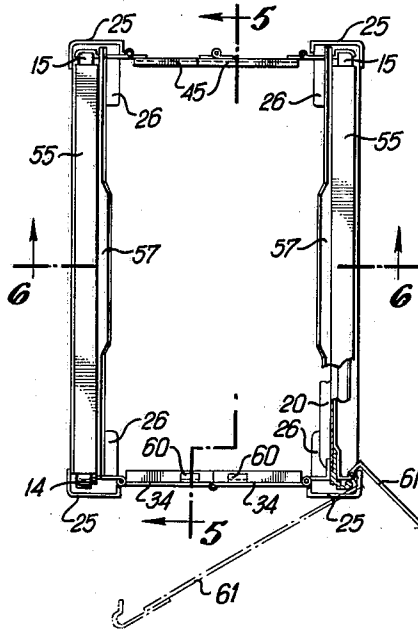


FIG. 3.

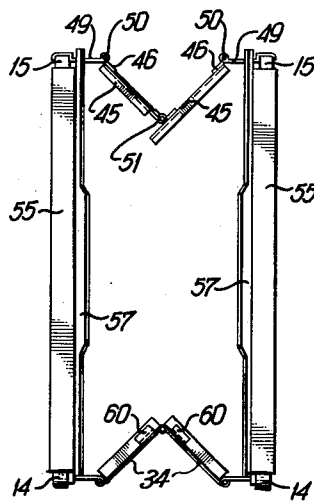
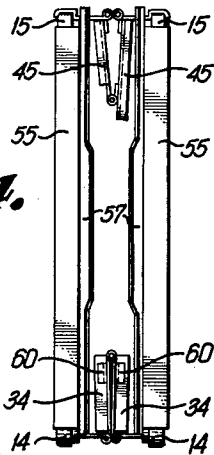


FIG. 4.



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FIG. 5.

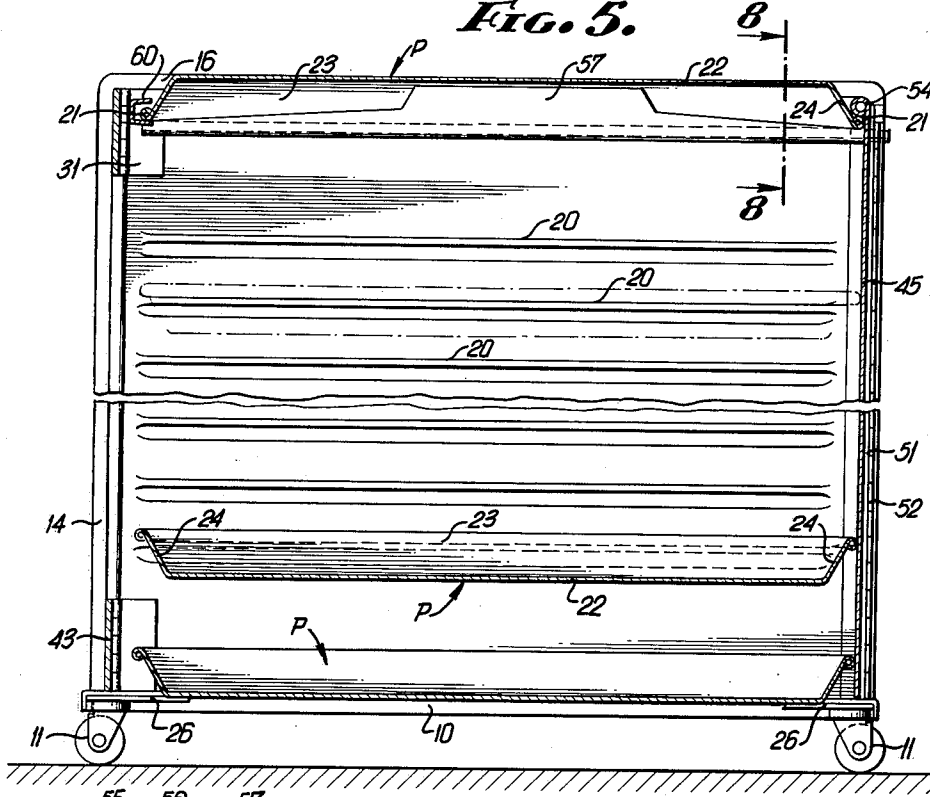
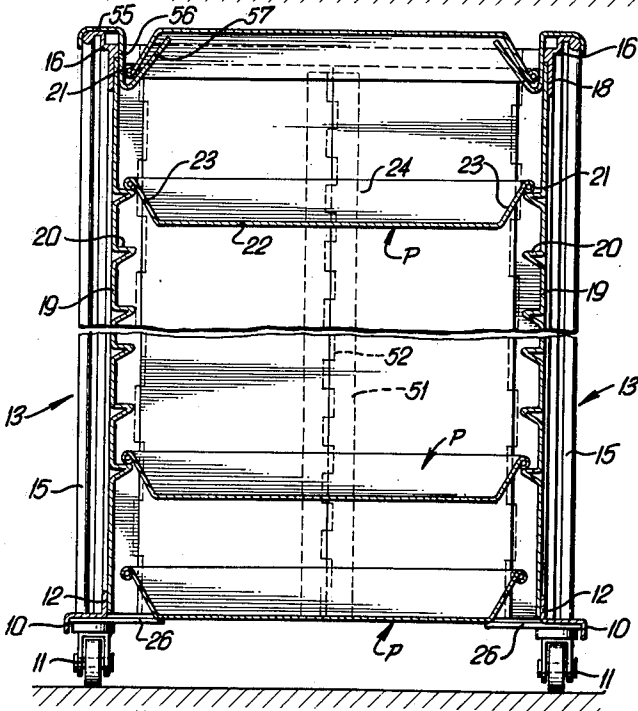


FIG. 6.



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FIG. 7.

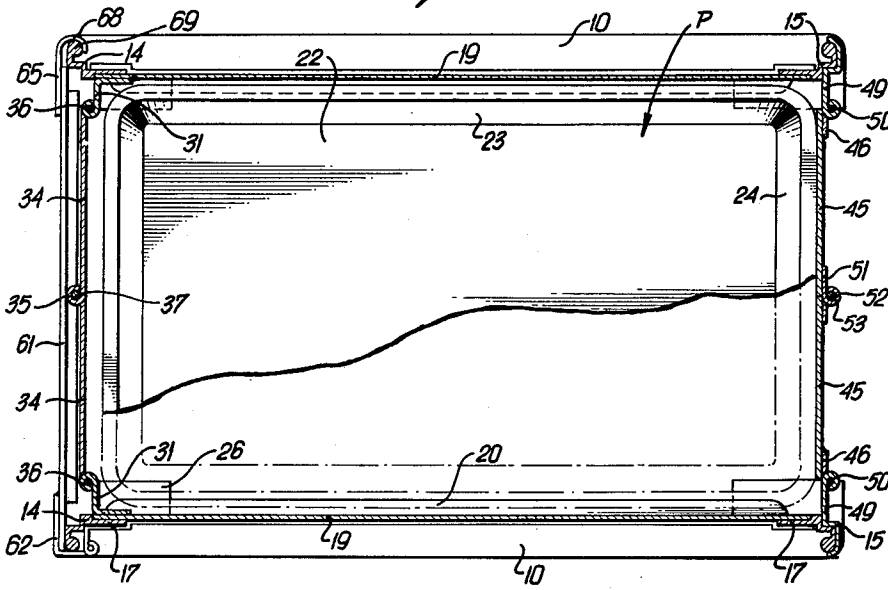


FIG. 8.

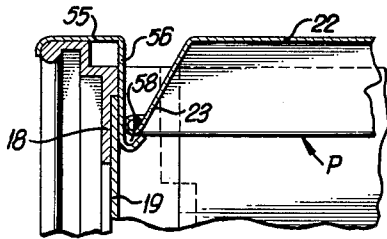


FIG. 9.

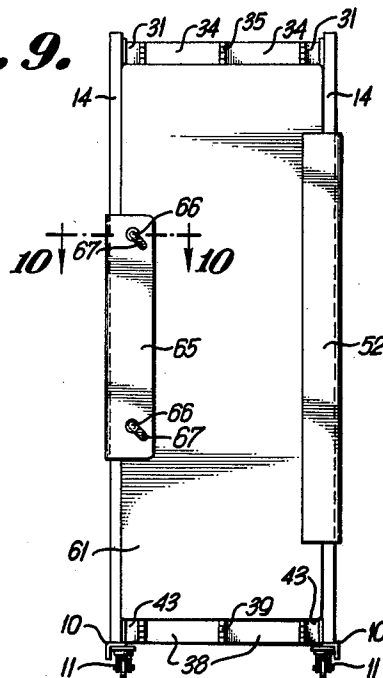
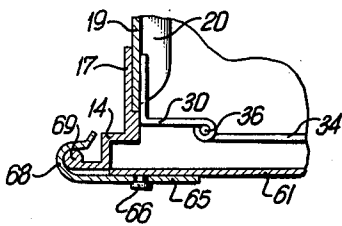


FIG. 10.



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COLLAPSIBLE CABINET

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11 Claims. (Cl. 312-258)

The present invention relates to cabinet structures.

Cabinets are used for shipping products between different locations. In many situations, the contents of the cabinets remain at their destination, the empty cabinets being returned to their point of origin. Such empty cabinets occupy as much space in the conveying vehicle during the return trip as they occupied when containing products, making the cost of returning the empty cabinets about the same as the cost of shipping them to their destination.

An object of the present invention is to provide a cabinet capable of being readily folded when empty so as to occupy only a fraction of the space that it occupies when unfolded. As a result, a much greater number of empty cabinets can be shipped in the same vehicle than was heretofore possible.

Another object of the invention is to provide a foldable cabinet which is retained in its unfolded condition of normal use by some of the objects disposed therewithin.

A further object of the invention is to provide a foldable cabinet adapted to hold trays, pans, and the like, the cabinet being retained in its unfolded or extended condition by the trays or pans contained therein.

An additional object of the invention is to provide a foldable cabinet adapted to hold trays, pans, or the like, one or more of the trays being employed to form part of the cabinet when in its unfolded or extended condition.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of a form in which it may be embodied. This form is shown in the drawings accompanying and forming part of the present specification. It will now be described in detail, for the purpose of illustrating the general principles of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

FIGURE 1 is an isometric view of a cabinet in its extended or unfolded condition, and with pans or trays removed therefrom;

FIG. 2 is a top plan view of the cabinet disclosed in FIG. 1;

FIG. 3 is a view similar to FIG. 1 showing the cabinet in the process of being shifted to a folded condition;

FIG. 4 is a view similar to FIGS. 2 and 3 showing the cabinet in its fully folded condition;

FIG. 5 is an enlarged vertical section taken along the line 5-5 on FIG. 2;

FIG. 6 is an enlarged vertical section taken along the line 6-6 on FIG. 2;

FIG. 7 is a horizontal section through the cabinet taken near the bottom portion thereof and with the door or closer member in a closed position;

FIG. 8 is an enlarged fragmentary vertical section taken along the line 8-8 on FIG. 5;

FIG. 9 is a front elevational view of the cabinet with its door in closed position;

FIG. 10 is an enlarged section taken along the line 10-10 on FIG. 9.

A cabinet structure is disclosed in the drawings, particularly designed to hold trays or pans P that may contain other products, such as baker goods (not shown). The cabinet structure can be disposed in an unfolded or extended condition, or, when the pans or trays are re-

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moved therefrom, it may be folded so as to occupy only a fraction of the space that it occupies when in its extended condition. When in the latter condition, the pans and trays assist in retaining it in such condition.

As shown, the cabinet structure includes a pair of spaced apart base members 10 that have casters 11 secured thereto in any suitable manner so that the structure can be rolled along a supporting surface, such as a floor, including the floor of a truck or other vehicle. Each horizontal base member 10 has an inner flange 12 extending upwardly to which the sides 13 of the cabinet are secured. Each side includes forward and rearward corner posts 14, 15 which may be integral with a top portion 16 extending between the upper ends of the corner posts, the corner posts being welded, or otherwise suitably secured, to the base portion 10. The corner posts have flanges 17 extending integrally toward each other, and the top 16 also has a depending flange 18. A side panel 19 engages the base flange 12 and also the flanges 17, 18 of the corner posts 14, 15 and of the top 16, being suitably secured thereto, as by welding.

Side structures 13 are arranged in opposed relation to one another, each side panel 19 being formed with inwardly projecting shelves or ledges 20 that only extend inwardly toward each other to a limited extent, the shelves or ledges 20 on one side panel 19 being disposed the same vertical distance from its base 10 as the shelves or ledges on the other side panel. These shelves or ledges 20 are adapted to support the trays or pans P, the bead portions 21 of the trays or pans resting upon the shelves or ledges. As shown, each tray or pan includes a bottom 22 and tapered side and end walls 23, 24, the side and end walls terminating in the bead 21 projecting laterally outwardly thereof. A trap P can be disposed on a pair of opposed shelves or inward projections 20, the trays being vertically disposed above one another and in, at least, slightly spaced relation with respect to one another.

The forward and rearward ends of the bases 10 may be enclosed by suitable front and rear bumpers 25 attached thereto, as by welding. Also secured to the base members 10 adjacent to each end thereof are horizontal corner plates 26 on which the lowermost tray or pan P is adapted to rest.

The side structures 13 are interconnected by front and back hinge structures 27, 28, 29. The front hinge structures are constituted by top or upper hinged members and by lower or bottom hinged members, the space between the upper and lower hinged members 28, 29 constituting the opening in the cabinet through which the trays P are inserted and removed. A top angle plate 30 is welded, or otherwise suitably secured, to an upper side structure 13, the front flange 31 of the angle plate extending substantially normal to the side structure. A similar angle plate 30 is welded, or otherwise secured, to the other side structure 13, its front plate 31 being disposed at right angles thereto. These front plates or flanges 31 of the angle members are relatively short and may terminate in hinged knuckles 32 adapted to interleave with the outer hinge knuckles 33 of top plates or straps 34, the inner parts of which are formed with hinge knuckles 35 interleafing with one another. Hinge pins 36 pivotally secure the plates or straps 34 to the angle plates 30, whereas a central hinge pin 37 pivotally attaches the hinge knuckles 35 of the strap or plates 34 to one another. It is to be noted that the hinge knuckles and hinge pins are so arranged that the central pin 37 and knuckles 35 can move inwardly within the cabinet with the hinge plates 34 swinging toward one another, the hinge plates swinging about the axes of the outer hinge pins 36 to a position approaching parallelism with the side structures 13 of the cabinet (FIG. 4).

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A similar hinge member arrangement 29 is provided at the lower front portion of the cabinet. Thus, the lower hinge plates or straps 38 have interleaved hinge knuckles 39 pivotally secured to one another by means of a hinge pin 40, the outer ends of these plates or straps having hinge knuckles 41 interleaving with companion hinge knuckles 42 on angle plates 43 welded, or otherwise suitably secured, to the lower side portions of the cabinet structure, hinge pins 44 extending through the knuckles. Actually, the several hinge pins of the upper and lower structures 28, 29 are in substantial vertical alignment with one another, so as to facilitate folding of the cabinet and its unfolding without restriction.

The back or rear 27 of the cabinet is constituted by a pair of panels 45, each panel extending from the rear side structures 13 to a position substantially midway therebetween. The outer end of each panel 45 has a hinge plate 46 welded or otherwise suitably secured thereto, which has its hinge knuckles 47 interleaving with the hinge knuckles 48 of a plate 49 suitably secured, as by welding, to the rear portions 15 of the side structures 13. A hinge pin 50 passes through each set of interleaved knuckles 47, 48. The inner portions of the back members 45 have hinge plates 51 welded or otherwise suitably secured thereto, these plates having interleaving knuckles 52 through which a hinge pin 53 passes. The hinge structure between each back panel 45 and its adjacent side member 13, as well as the central hinge structure between the back members or panels themselves, may, if desired, extend substantially along the full length of the back panels 45, a single hinge pin 50 or 52 extending through each of the interleaved sets of knuckles, so that, in effect, piano type of hinges are employed at the back portion 27 of the cabinet structure. The hinge knuckles of the back portion are so arranged as to permit the inner ends of the panels 45 to swing inwardly of the cabinet, or toward the front thereof, and toward each other, occupying a position approaching parallelism with the side members 13 of the cabinet, as shown in FIG. 4. The upper ends 54 of the back panels 45 may be constituted as a bead extending inwardly of the cabinet for a purpose that will be described hereinbelow.

Mounted on top of the side structures is an upper or top cover 55 welded or otherwise suitably secured to the top structure, this side cover extending from the front to the back of the cabinet structure, free from interference with the hinged back panels 45 and the top hinge plates 34. The inner portion of the top structure 55 includes a vertical web 56 that merges into an upwardly and inwardly inclined flange 57 to form a trough or gutter 58 with the web. The spacing between the gutter or trough portions 58 of the tops 55 at each side structure 31 is such that the sides 23 of an inverted pan or tray P can be received therewithin, with the tray P forming a top for the cabinet structure, the pan or tray P being of such a length as to extend from the back to the front of the cabinet. As shown in FIG. 5, when the sides 23 of an inverted tray P are disposed in the gutters 58, the rear bead 21 of the inverted tray is disposed under the back beads 54 of the rear panel members 45, whereas the front bead 21 of the inverted tray is received within spaced clips 60 welded or otherwise secured to the top front hinge plates 34, these clips being of channel shape so as to receive the forward bead 21. When the top tray P is in the inverted position and mounted in the gutters 58, with its rear bead 21 under the back bead 54, and with its front bead 21 disposed in the forward channel clips 60, the cabinet structure cannot be folded inwardly since the top tray itself will preclude such action from occurring. When in the unfolded or extended condition, the cabinet is also retained in such condition by a bottom tray P placed upon the corner plates 26, such as shown in FIG. 6. The side bead portions of this tray will engage the side panels 19 of the cabinet, its rear bead portion will engage the back

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panels 45, and its front bead will engage the lower hinge plates 38, to prevent any substantial inward pivoting of the hinged members.

Not only does the inverted tray or pan P serve to form the top of the cabinet when in its unfolded or extended condition, and retain the cabinet in such condition, but it also serves to direct moisture, and the like, that might strike it toward the side gutters 58 from which the moisture will flow toward the back and then to the exterior of the cabinet structure.

The front of the cabinet may be closed by a door or closure member 61 that has an elongate hinge plate 62 secured to one side thereof which is pivotally secured to a forward corner post 14. The door is adapted to be swung from a fully opened position flat against a side structure 13 to a closed position across the front cabinet opening, with the upper portion 63 of the door overlapping and adjacent to the top front hinge plates 34 and the lower portion 64 of the door overlapping and adjacent to the lower front hinge plates 38. The door carries a latch 65 which is mounted on the door by pins 66 passing through inclined slots 67 in the latch. The latch includes an end channel portion 68 adapted to receive a vertical rib 69 on the other front corner member 14 when the door is in the closed position. By lifting the latch 65, it will be moved laterally outwardly so that the channel 68 is removed from the corner rib 69, because of the inclined slots 67 and pins 66, allowing the door 61 to be swung to an open position. When the channel 68 is disposed outwardly of the corner rib 69, and the latch is released, gravity will lower the latch along the door and shift it inwardly so that the channel 68 encompasses the companion rib 69 on the corner post.

The latch structure forms no part of the present invention, being fully described and claimed in my patent 2,717,064, for "Door Latching Apparatus," to which attention is directed.

When the cabinet is to be used for containing articles or products, an inverted tray P is placed in the side gutters 58 with its rear bead 21 underlying the back beads 54 of the back structure 27 and with the front bead 21 disposed in the channel clips 60. A bottom tray P is then placed in an upright position within the cabinet on the corner plates 26, thereby holding the cabinet in its extended or unfolded condition. The other trays P can then be moved inwardly through the front opening of the cabinet and placed upon the opposed shelves 20 extending inwardly from the sides 13 of the cabinet. The door 61 is then swung to closed position and is latched in such position.

The top and bottom trays P prevent inward swinging of the front and rear hinged members 27, 28, 29, retaining the cabinet in its extended position. The front hinge members 28, 29 cannot pivot in an outward direction to any substantial extent since the hinge plates 34 or 38 will abut one another. Even more than a slight outward movement is prevented by the fact that the door 61 is latched across the front opening, and any tendency of the upper and lower hinge plate members 34, 38 to pivot outwardly is prevented by their engagement with the upper and lower portions 63, 64 of the latched door. The back members 45 cannot swing outwardly to any material extent, since their confronting edges will abut one another and preclude any material outward movement.

The cabinet can then be rolled along the ground on its caster wheels 11, with the load contained therein, and moved to any desired point, as to a remote location through use of a truck or other vehicle (not shown). The truck may have a plurality of such cabinets mounted therein.

When arriving at the destination, the trays P are removed. Since the cabinet, when in its extended position, occupies the same volume or space loaded or unloaded, it can be shifted to the collapsed condition when

unloaded, permitting its return to its point of origin while occupying only a fraction of the space that it occupied when in the extended condition. Accordingly, the same capacity of vehicle can carry many more empty cabinets than cabinets with products contained therewithin.

In order to collapse the cabinet, all of the trays P are removed from its interior, including the bottom-most tray resting upon the hinge plates 26. The upper inverted tray or pan P is also removed. The door 61 is swung back against the adjacent side 13 of the cabinet, the upper and lower hinge plates 34, 38 are swung inwardly, which is also true of the back panels 45, such as disclosed in FIG. 3. The back panels and the upper and lower hinge plates are then shifted to the fullest extent against one another, as shown in FIG. 4, the cabinet then being in its fully collapsed position, with the door 61 flat against one of the sides 13. Such a collapsed or folded cabinet can then be rolled along a supporting surface, for convenience in handling, on its casters 11.

A comparison between FIGS. 2 and 4 will show that the cabinet in its folded condition occupies only a fraction of the space it occupies when in its unfolded condition. In fact, it only occupies about one-third of the space. Accordingly, in the example, about three times the number of empty folded cabinets can be placed in a vehicle as can be carried when the cabinets are in their extended position.

When the cabinet is to again be unfolded, the sides 13 are merely pulled away from one another so that the hinged backs 45 swing to their position substantially normal to the sides of the structure, which is also true of the top and bottom hinge plates 34, 38. The upper inverted tray or pan P is then inserted in place and the lower upright pan P placed in the cabinet on the corner plates 26. The cabinet can then be loaded with other trays P to the extent desired, within its capacity. The closing of the door 61 and latching it in place will insure the retention of the cabinet in its extended position.

I claim:

1. In a cabinet structure: opposed vertical side members; opposed vertical back and front members extending between and pivotally secured to said side members for movement about vertical axes; said back and front members each comprising sections pivoted to each other for movement about a vertical axis whereby said sections can be swung inwardly toward each other to move said side members toward each other; means adapted to be disposed between said front and back members and engageable therewith to prevent inward swinging of said sections toward each other; said front member having an access opening therein; and a vertical closure member adapted to be placed across said front member to prevent outward swinging of the sections of said front member and to close said access opening.

2. In a cabinet structure adapted to contain upright pans, trays, or similar receptacles: opposed vertical side members having inwardly projecting vertically spaced ledges thereon on which the upright receptacles can rest for supporting the upright receptacles in spaced relation one above the other; opposed vertical back and front members pivotally secured to said side members for movement about vertical axes; said back and front members each comprising sections pivoted to each other for movement about a vertical axis whereby said sections can be swung inwardly toward each other and move said side members toward each other; and means at the upper portions of said opposed side members to receive a receptacle in a position between and engageable with said back and front members to prevent inward swinging of said sections toward each other.

3. In a cabinet structure adapted to contain upright pans, trays, or similar receptacles: opposed vertical side members having inwardly projecting vertically spaced ledges thereon on which the upright receptacles can rest for supporting the upright receptacles in spaced relation

one above the other; opposed vertical back and front members pivotally secured to said side members for movement about vertical axes; said back and front members each comprising sections pivoted to each other for movement about a vertical axis whereby said sections can be swung inwardly toward each other to move said side members toward each other; said opposed side members having troughs at their upper ends to receive the side portions of an inverted receptacle positioned between and engageable with said back and front members to prevent inward swinging of said sections toward each other.

4. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members defining a front opening therebetween, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; means at the upper portions of said side members to receive a receptacle in a position between and engageable with said back and upper front members to prevent inward swing of said sections towards each other and removable closure means adapted to be placed across said front opening to close the same.

5. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in upright spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members defining a front opening therebetween, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; means at the upper portions of said side members to receive a receptacle in a position between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; means secured to some of said members to support an upright receptacle between said side members and between said back member and lower front member to prevent inward swinging of said sections toward each other; and removable closure means adapted to be placed across said front opening to close the same.

6. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members defining a front opening therebetween, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly

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toward each other, whereby said side members are shifted toward each other; said side members having troughs at their upper ends to receive the side portions of an inverted receptacle positioned between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; and removable closure means adapted to be placed across said front opening to close the same.

7. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members defining a front opening therebetween, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; said side members having troughs at their upper ends to receive the side portions of an inverted receptacle positioned between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; means secured to some of said members to support an upright receptacle between said side members and between said back member and lower front member to prevent inward swinging of said sections toward each other; and removable closure means adapted to be placed across said front opening to close the same.

8. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; means at the upper portions of said side members to receive a receptacle in a position between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; and a closure member adapted to be placed in overlapping relation to said upper and lower front members to close the opening therebetween and to prevent outward swinging of the sections of said upper and lower front members.

9. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the

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sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; said side members having troughs at their upper ends to receive the side portions of an inverted receptacle positioned between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; and a closure member adapted to be placed in overlapping relation to said upper and lower front members to close the opening therebetween and to prevent outward swinging of the sections of said upper and lower front members.

10. In a cabinet structure adapted to receive pans, trays, or similar receptacles having a bead running around the perimeter thereof: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; said side members having troughs at their upper ends to receive the side portions of an inverted receptacle positioned between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; clip members on said upper front member sections; a bead on the upper portion of said back member sections; said clip members and bead on said back member sections being so located as to receive the bead of the inverted receptacle when its side portions are disposed in said troughs.

11. In a cabinet structure adapted to receive pans, trays, or similar receptacles: opposed vertical side members having means thereon for supporting the receptacles in spaced relation; a vertical back member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; vertically spaced upper and lower front members defining a front opening therebetween, each front member comprising sections having outer portions pivoted to said side members for movement about vertical axes and inner portions pivoted to each other for movement about a vertical axis; said back member sections being swingable inwardly toward each other and the sections of each front member being swingable inwardly toward each other, whereby said side members are shifted toward each other; means at the upper portions of said side members to receive a receptacle in a position between and engageable with said back and upper front members to prevent inward swinging of said sections toward each other; and a closure member pivoted to one of said side members and adapted to be disposed adjacent to said upper and lower front members to close said front opening.

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