

April 20, 1948.

P. ZALKIND

2,439,998

FIBRE REINFORCED COLLAPSIBLE CONTAINER

Filed Feb. 26, 1943

2 Sheets-Sheet 1

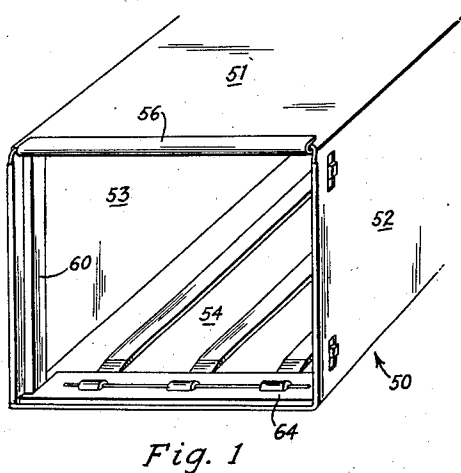


Fig. 1

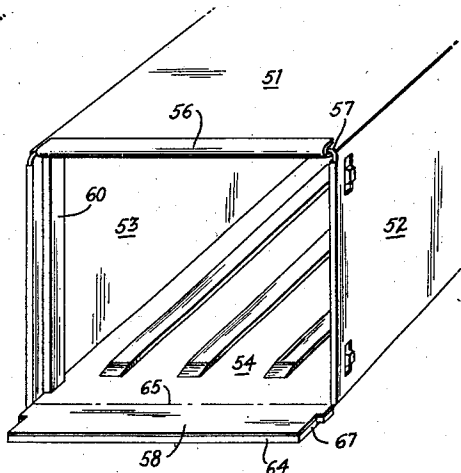


Fig. 2

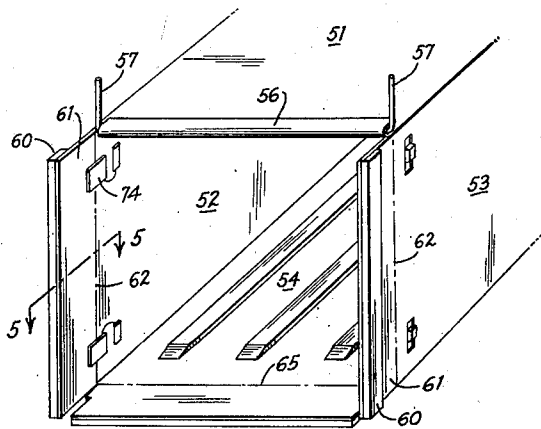


Fig. 3

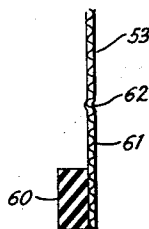


Fig. 5

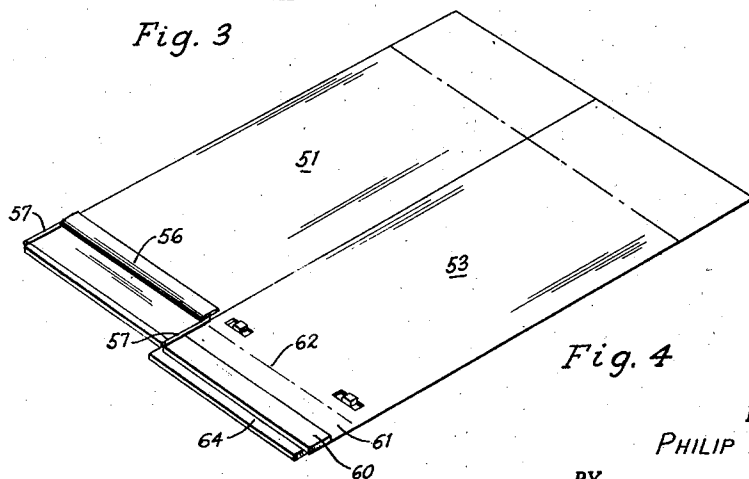


Fig. 4

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2 Sheets-Sheet 2

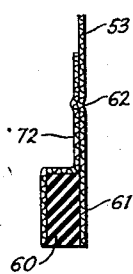


Fig. 6

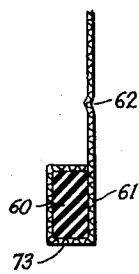


Fig. 7

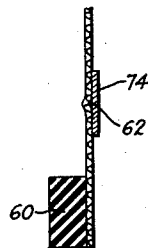


Fig. 8

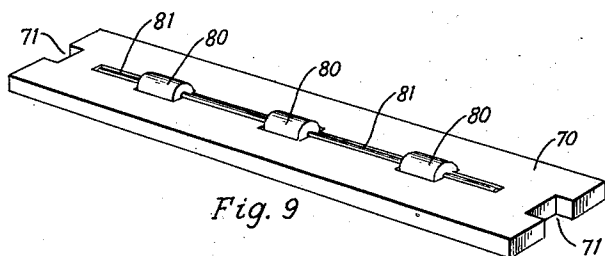


Fig. 9

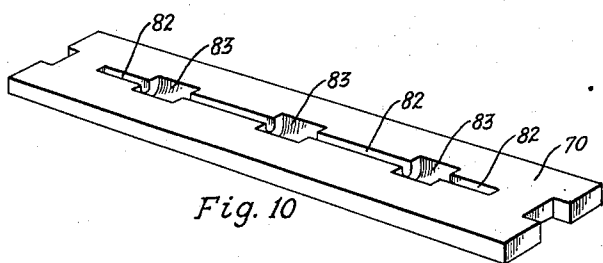


Fig. 10

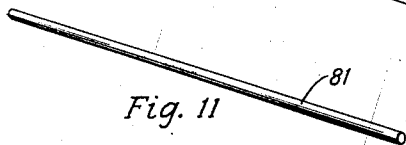


Fig. 11

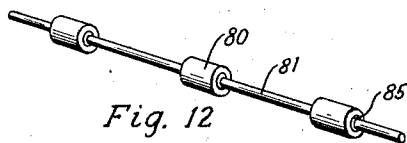


Fig. 12

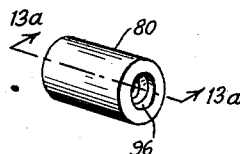


Fig. 13

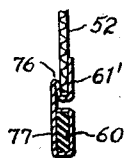


Fig. 16

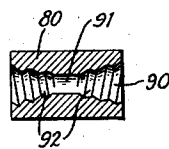


Fig. 13a

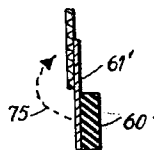


Fig. 14

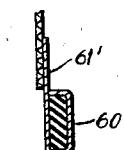


Fig. 15

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2,439,998

FIBRE REINFORCED COLLAPSIBLE
CONTAINER

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Application February 26, 1943, Serial No. 477,203

6 Claims. (Cl. 312-108)

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My present invention relates to collapsible containers of the casing and drawer type adapted to coact to form file cabinet sections which may be stacked one upon the other.

In the formation and construction of such casings and drawer combinations, particularly where they are made of a sheet material having relatively little edgewise compressive strength such as paper, corrugated board and the like, it is necessary that reinforcing means be applied particularly to the casing section so that when a plurality of casings are stacked one upon the other, the superposed load on a lower casing can be resisted so as not to create a distortion which will impede the movement of the drawer into and out of the casing.

In my previous patents, such as 2,118,011, 2,233,906, 2,246,966 and 2,245,026, various reinforcements and modifications thereof are shown. However, the structural members shown therein are comprised primarily of metal. At various times, during metal shortages as in war time, etc., it becomes desirable to substitute non-metallic materials for reinforcing elements.

These substitutions however have presented new problems and opportunities with respect to friction reducing elements, interlocking elements, rigidifying elements and structures and other accessories.

An object of my invention therefore is the provision of structural supporting elements for collapsible casings and drawers and combinations thereof.

An important object of my invention is the formation of friction reducing devices primarily from non-metallic materials and the securement thereof to the cooperating casing and drawer structure in such a manner as not to interfere with collapsibility thereof.

An additional object of my invention is the arrangement of various interlocking members for interengaging the reinforcing structure of vertically and horizontally adjacent cabinets in order to lock the same in stacked formation.

These and many other objects of my invention will in part be apparent and where not apparent will be pointed out in the following description and drawings, in which:

Figure 1 is a view in perspective showing the front of a casing member embodying the reinforcing structure of my present invention.

Figure 2 is a view corresponding to that of Figure 1 showing one of the reinforcing members disengaged preliminary to collapse.

Figure 3 is a view in perspective corresponding to those of Figures 1 and 2 showing all of the reinforcing members disengaged preliminary to collapse.

Figure 4 is a view in perspective of the casing structures of Figures 1-3 in collapsed condition.

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Figure 5 is a cross sectional view taken on line 5-5 of Figure 3 looking in the direction of the arrows and showing one method of attachment of the vertical reinforcing members.

Figures 6, 7 and 8 are cross sectional views corresponding to Figure 5 showing alternative methods of attaching the vertical strip.

Figure 9 is a view in perspective of the lower horizontal reinforcing member showing the friction reducing device on the casing.

Figures 10, 11, 12 and 13 are views in perspective showing the various parts of the lower horizontal reinforcing member of Figure 9.

Figure 13a is a cross sectional view taken on line 13a-13a of Figure 13 looking in the direction of the arrows.

Figures 14, 15 and 16 are cross sectional views corresponding to that of Figure 5 showing further methods of securement of the vertical reinforcing strip to the container member.

Referring now to Figures 1 to 4, I have here shown a collapsible casing member 50 constructed in accordance with my invention having a top wall 51, side walls 52 and 53 and bottom wall 54. A channel shaped reinforcing member 56 preferably of metal is clamped over the forward margin of the top wall and serves to rotatably secure at each end thereof one leg of each of the angle wires 57, 57.

The opposite angle wires 57, 57 may be independent thus each having a leg which is rotatably captured by the reinforcing member 56 or the angle wire members may be formed from a single U-shaped wire the base of which extends along the entire length of channel 56 and the projecting legs of which rotate together. The angle wires 57 may be utilized to maintain the walls of the casing in rigid angular relation in the manner described in my Patent No. 2,118,011.

While it is preferred that the channel shaped reinforcing member 56 be of metallic material, it may be of any other suitable material adapted to engage the angle wire member 57, 57 in a manner to permit rotation thereof and I am thus not necessarily limited to metal in the formation thereof.

The vertical reinforcing members 60, 60 consist of rigid longitudinal fibrous strips secured in any suitable manner as, for instance, by adhesive, to the extensions 61, 61 of the respective side walls 53 and 52, which are separated therefrom by the fold lines 62, 62.

While it is preferred that the extensions 61, 61 be integral with the side walls in order to economize in the manufacturing processes, it is obvious that the said extensions 61 may be rotatably secured to the forward margins of the walls 52 and 53 in any other suitable manner.

The bottom reinforcing member 64 may be secured to the bottom wall 54 in substantially the same manner as are the vertical reinforcing

members 60, 60 secured to their walls. That is, an extension 58 from the bottom wall 54 either integral therewith or otherwise hingedly secured thereto carries secured thereon preferably by adhesive, the reinforcing member 64. When the extension 58 with reinforcing member 64 is then folded up around the hinging line 65 into the interior of the casing, the bottom reinforcing member serves to provide a spacing and reinforcing means for the bottom of the casing.

The manner by which the various reinforcing elements cooperate to interlock each other and maintain the casing in erected condition will best be understood from an explanation of the method of erecting the casing from the collapsed condition of Figure 4 to the erected condition of Figure 1.

The collapsed casing member of Figure 4, is first unfolded to the form shown in Figure 3. The angle wires 57, 57 are then rotated downwardly inside the extensions 61 so that they coincide with the fold lines 62, 62. The vertical reinforcing members 60, 60 are then folded inwardly around the angle wires 57, 57 so that the casing then assumes the form shown in Figure 2.

The bottom reinforcing member 64 is then folded inwardly from the position shown in Figure 2 to the position shown in Figure 1 where the notches 67, 67 bear against the lower ends of the vertical reinforcing members 60, 60.

The lower reinforcing member 64 is a tight frictional fit between the vertical reinforcing member 60, 60 and is thus securely held therein. Further when the drawer is in place within the casing, the weight of the drawer resting on the lower reinforcing member 64 serves further to maintain the same in position.

The casing walls are maintained in rigid angular relation by means of the rigid angle wires, one leg of each of which is now captured in the upper horizontal channel 56 and the other leg of which is captured between the extensions 61 and their respective associated walls. The reinforcing members 60, 60 carried by the extensions 61, 61 are held in place by the abutment between them of the lower reinforcing member 64.

Accordingly when the lower reinforcing member 64 is in place, the vertical reinforcing members cannot move out of their erected position. Since these members cannot move out of position the angle wire legs are rigidly held both with respect to the top wall and the side walls thus maintaining the walls of the casing in rigid angular relation.

The several reinforcing members thus brought into the erected position further serve (although this is not essential) to maintain rigid angular relation between the walls. The main purpose of the bottom reinforcing members of course is to maintain the vertical reinforcing members in position.

Various materials may be utilized for these reinforcing members. Thus I have found that reinforcements made of cardboard or of corrugated board or of laminations thereof may be sufficient to provide compressive strength. In larger structures, harder fibrous structures such as wood, plywood, veneers, paper board or pressed pulp materials may be used.

In my commercial structures I have found that hard board furnishes a good result both with respect to strength and appearance.

In Figures 1-4 the bottom reinforcement is shown as having a form adapting it to be permanently secured to the casing and folded there-

into when the casing is erected. I have found that a tight frictional fit between the vertical reinforcing members plus the securement of the extension 53 which supports the lower reinforcing member 64 at the fold line 65 to the bottom wall 54 will serve to maintain the lower reinforcing members of Figures 1-4 in place irrespective of any longitudinal stresses which may be exerted thereon by the sliding movement of the drawer.

However, the reinforcing member need not necessarily be permanently secured in place but may be a separate piece such as the reinforcing member 70 in Figure 9 which is provided with lateral three-sided notches 71-71 which are adapted to surround the lower ends of the vertical reinforcing members 60, 60.

Where a lower reinforcing member 70, such as that of Figure 9 is used, then the reinforcing member 64 of Figures 1-4 is dispensed with. When the casing has assumed the form shown in Figure 2, the reinforcing member 70 is inserted therein so that the notches 71 engage the lower ends of the vertical reinforcing members 60, thus serving to complete and reinforce the casing in the manner previously set forth.

In Figures 5-8 I have shown various ways of securing the vertical reinforcing member 60 to the vertical walls of the casing.

Figure 5 is a cross sectional view showing the method of securement specifically shown in Figures 1-4. Here again the extension 61 is an integral extension of the side wall 53, being separated therefrom by the fold line 62. The reinforcing member 60 is adhesively secured to the outer edge of the extension 61 or it may be secured in any other suitable manner.

In Figure 6 I have shown a construction exactly similar to that of Figure 5 with the addition, however, that a facing sheet 72 is secured on the outer side of the extension 61 and surrounds the outer surface of the reinforcing member 60.

In Figure 7 I have shown a modification of the construction of Figure 5 wherein the extension 61 has a further extension 73 which is wrapped around the reinforcing member 60 in order to provide a facing for the same.

In Figure 8 I have shown a construction exactly like that of Figure 5 showing, however, a metal reinforcing member 74 secured over the fold line 62. The metal reinforcing member is intended to be secured adjacent the upper end of the fold line to provide a bearing surface for the leg of the angle wire 57. This metallic member need not necessarily have a fold line therein coinciding with the fold 62 since it is of relatively thin material and the fold line 62 in the heavier paper material will serve to predetermine the bend of the laminated structure in the manner shown in my Patent No. 2,274,765. The metallic sheet 74, which protects the paper and provides a bearing surface for the angle wire may be an integral extension of the interlocking element. The metallic bearing member may have lugs, wings or other deformations therein as shown in my Patent Nos. 2,088,315 and 2,233,906 to grip the angle wire when folded.

In Figures 14, 15 and 16 I have shown a slight modification of the method of securement of the reinforcing member. In these various modifications, the extension which carries the reinforcing member is not an integral extension of the side wall of the container but is a separate member which, however, is permanently secured thereto.

Thus in Figure 14 a tape member 61' is secured

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to the outer side of the front margin of the side wall 52. The tape may be secured adhesively or in any other suitable manner as, for instance, by wire stitching, staples or the like. The reinforcing member 60 is secured to the outer end of the reinforcing tape 61' in the same manner as it is secured to the extension 61 of Figure 5.

When the tape is now folded inwardly in the manner indicated by the dotted line and arrow 75, the additional reinforcing tape 61' serves to face the outer edge of the wall 52 and provide a finished appearance for the casing.

Essentially, the structure and operation of the form shown in Figure 14 is the same as that shown in Figure 5, the only distinction being that the tape carrying the reinforcement is not integral with the container.

In Figure 15 I have shown a slight modification of the structure of Figure 14 wherein the additional reinforcing tape 61' has an extension 73' (like that of Figure 7), which wraps around and faces the reinforcing member 60.

In Figure 16 I have shown an additional slight modification wherein the additional reinforcing tape 61' is adhesively secured not only to the front margin of the wall 52 but also over the front edge thereof and is provided with a re-entrant fold 76 between it and the extension 77 which is wrapped around the reinforcing member 60.

Here the tape is rotated inwardly around the fold line 76 when the casing is to be erected.

Many other methods of securing of the vertical reinforcing member to the casing so that they may be readily rotated into the casing to reinforce the same should now be obvious.

I have here illustrated but a few of the preferred embodiments of this preferred construction. It will now be obvious from an inspection of Figure 1 that the reinforcing member 60 provides a rabbeted reinforcement for the front of the casing which ensures compressive strength and provides a bearing for the front of the drawer casing as shown, for instance, in my Patent No. 2,118,011. The front of the drawer may be wider than the drawer body so that while the drawer body may pass between the reinforcing members 60, 60, the outer lateral edges of the front of the drawer will abut against the outer surfaces of the rabbeted reinforcements 60, 60 to provide a finished appearance for the cabinet structure when the drawer is closed, as shown in my Patent No. 2,152,676.

My lower horizontal reinforcing member, either of the form 64 of Figure 1 or of the form 70 of Figure 9, is particularly adapted for use in connection with any friction reducing means which may be needed to facilitate the movement of the drawer into and out of the casing.

Referring now to Figures 9-13, I have here shown one way of adapting the lower reinforcing member to carry roller members. In Figure 9 it will be seen that the reinforcing member 70 is provided with a plurality of rollers 80, which are rotatable on the common axle 81. Referring to Figure 10, the lower reinforcing member 70 is provided with a plurality of coaxial longitudinal grooves 82 spaced apart by wells 83. Each of the wells 83 is of a width and length to receive a roller 80 and permit the same to rotate freely therein.

Accordingly, the depth of each of these wells should be at least greater than a radius of the roller. Preferably they should be somewhat

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deeper in order to accommodate for any individual variations which may occur during use of the rollers. Where desired, full holes or cut-outs extending entirely through the member 70 may be provided to ensure clearance for large rollers, and registering openings may even be provided in the bottom of the container further to ensure clearance.

In the form shown in Figures 9-13, three rollers 80, each having a longitudinal opening 85 therein, are threaded on the continuous axle 81 and are spaced apart thereon by distances equal to the length of the central grooves 82, 82 between the wells 83. The axle is then placed in the grooves 82, while at the same time the rollers are adjusted so that they each enter their respective wells 83. The axle 81 is then secured in place in the grooves 82 in any suitable manner, preferably by adhesive, though staples or any other suitable securing means may be used.

Obviously, each of the rollers 80 may have an individual axle instead of the common axle 81, which individual axle may be secured in the same manner without departing from the principle of my invention.

The grooves 82 are preferably, although not necessarily, of such depth that the axle 81 is completely or almost completely embedded therein so that virtually the only projections from the upper surface of the lower horizontal reinforcing member 70 are the roller elements 80. The roller elements are freely rotatable on the axle and hence can cooperate with any suitable track member on the lower surface of the drawer.

While in ordinary commercial embodiments of the above structure it has been found feasible to utilize a simple longitudinal bore in each of the rollers 80, I have also found, however, that where the bore is of the form 90 shown in Figure 13a, improved results are achieved. The bore 90, it will be seen from the cross sectional view of Figure 13a, is formed primarily from two conical perforations which meet at the center of the roller 80. The section of the interior of the roller 91 where they meet is not sharp, but rounded off so that each of the rollers may tilt independently to accommodate for any variations in the depth of the tracks with which they cooperate. This formation also provides for less friction between the roller and the axle.

I have found also in commercial embodiments that the rollers and axle may consist of wood and, owing to the large bearing surfaces provided, need not necessarily consist of a hard wood material, although this is preferred. In any case, the use of the double conical longitudinal perforation 90 of Figure 13a serves to prevent any jamming of the rollers on the axle and provides a means for cleaning out the interior of the roller should any foreign material lodge therein and jam the same.

Also the wider end openings of the longitudinal bore 90 of Figure 13a facilitates the waxing or oiling of the interior bearing surfaces of the rollers where that is necessary. And, in order to ensure that the wax is carried inwardly to the point where the roller actually bears on the axle, the interior bore 90 may be threaded inwardly from each end as at 92, 92 to provide a conveyor means for carrying the oil or wax inwardly to the bearing surface. If desired, the axle may be thus threaded or grooved inwardly from each end of the roller.

In the foregoing, I have set forth my invention

in connection only with preferred embodiments thereof. Many variations in the formation of the various elements and in the adaptation thereof to various collapsible structures should now be clear to those skilled in the art. I therefore prefer to be bound not by the specific descriptions herein set forth, but only by the appended claims.

I claim:

1. A folding casing of the class described, having an open front and top, bottom and side walls; said walls being hingedly connected together along fold lines extending to said open front; extensions on said side walls hingedly connected thereto and extending in said container in surface to surface relation with the interior of their respective walls; vertical reinforcing members secured to said extensions; said reinforcing members, when said extensions are folded in, extending between the top and bottom walls; and means for locking reinforcing members in position in the erected casing, said means also assisting in maintaining rigid angular relation between the walls of the casing; and additional means for maintaining rigid angular relation between the walls of the casing, said last mentioned means being mounted on a horizontal wall of the casing and engaging a side wall thereof and being disengageable therefrom.

2. A folding casing of the class described, having an open front and top, bottom and side walls; said walls being hingedly connected together along fold lines extending to said open front; extensions on said side walls hingedly connected thereto and extending in said container in surface to surface relation with the interior of their respective walls; vertical reinforcing members of fibrous material and of substantial cross-section secured to said extensions; said reinforcing members, forming posts extending between the top and bottom walls; and an additional horizontal reinforcing member inserted in said open front; the ends of said horizontal reinforcing member having a portion reduced in length each end of which portion is engaging a surface of one of said vertical reinforcing members; said horizontal reinforcing members having longitudinal extensions defining shoulders for engaging other surfaces of said vertical reinforcing members.

3. A folding casing of the class described, having an open front and top, bottom and side walls; said walls being hingedly connected together along fold lines extending to said open front; extensions on said side walls hingedly connected thereto and rotatable into said container in surface to surface relation with the interior of their respective walls; vertical reinforcing members secured to said extensions; said reinforcing members, when said extensions are folded in, extending between the top and bottom walls; and an additional horizontal reinforcing member removably inserted in said open front; rollers on said horizontal reinforcing member projecting above one surface thereof; said horizontal reinforcing member having a plurality of openings in at least one surface thereof; channels communicating with said openings; an axle member secured in said channels and extending across said openings and rollers mounted on said axle in registry with said openings; said horizontal reinforcing member having a portion reduced in length each end of which portion is engageable with a surface of said vertical reinforcing member; said horizontal reinforcing member having longitudinal extensions defining shoulders for

engaging other surfaces of said vertical reinforcing members.

4. A folding casing of the class described, having an open front and top, bottom and side walls; said walls being hingedly connected together along fold lines extending to said open front; extensions on said side walls hingedly connected thereto and rotatable into said container in surface to surface relation with the interior of their respective walls; vertical reinforcing members secured to said extensions; said reinforcing members, when said extensions are folded in, extending between the top and bottom walls; and an additional horizontal reinforcing member removably inserted in said open front; rollers on said horizontal reinforcing member projecting above one surface thereof; said horizontal reinforcing member having an opening in at least one surface thereof; channels in said surface communicating with said opening; an axle secured in said channels and extending across said opening; and a roller mounted on said axle in registry with said opening; said horizontal reinforcing member having a portion reduced in length each end of which portion is engageable with a surface of said vertical reinforcing member; said horizontal reinforcing member having longitudinal extensions defining shoulders for engaging other surfaces of said vertical reinforcing members.

5. A folding casing of the class described, having an open front and top, bottom and side walls; said walls being hingedly connected together along fold lines extending to said open front; extensions on said side walls hingedly connected thereto and rotatable into said container in surface to surface relation with the interior of their respective walls; vertical reinforcing members secured to said extensions; said reinforcing members, when said extensions are folded in, extending between the top and bottom walls; and an additional horizontal reinforcing member removably inserted in said open front; rollers on said horizontal reinforcing member projecting above one surface thereof; said horizontal reinforcing member having a plurality of openings in at least one surface thereof; an axle secured to said surface and extending across said openings; and rollers mounted on said axle in registry with said openings; said horizontal reinforcing member having a portion reduced in length each end of which portion is engageable with a surface of said vertical reinforcing member; said horizontal reinforcing member having longitudinal extensions defining shoulders for engaging other surfaces of said vertical reinforcing members.

6. A folding casing of the class described, having an open front and top, bottom and side walls; said walls being hingedly connected together along fold lines extending to said open front; extensions on said side walls hingedly connected thereto and extending in said container in surface to surface relation with the interior of their respective walls; vertical reinforcing members secured to said extensions; said reinforcing members, when said extensions are folded in, extending between the top and bottom walls; and means for locking said reinforcing members in position when said casing is erected; said means also assisting in maintaining rigid angular relation between the walls of the casing; and additional means for maintaining rigid angular relation between the walls of the casing; said last mentioned means comprising an angle wire having one leg rotatably secured at a horizontal wall and

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another leg engaging a side wall at the hinged connection thereof to its extension; and means for reinforcing said hinged connection at the area where said angle wire leg bears against the side wall.

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