Aug. 5, 1941. M. I. WILLIAMSON 2,251,605

COLLAPSIBLE STRUCTURE

Filed Oct. 24, 1939

Fig. 1.

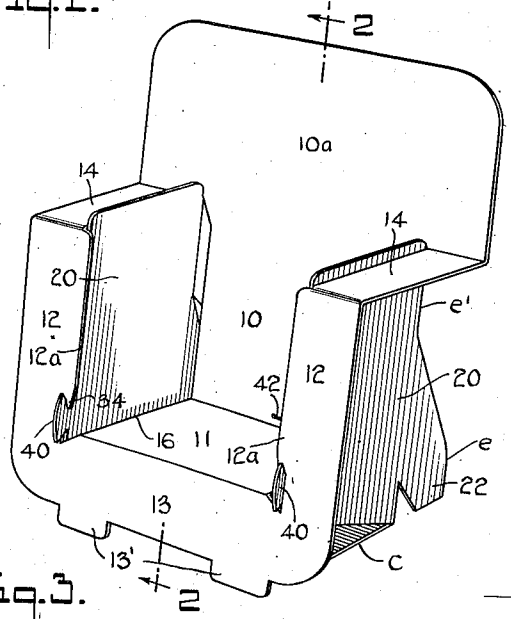


Fig. 2.

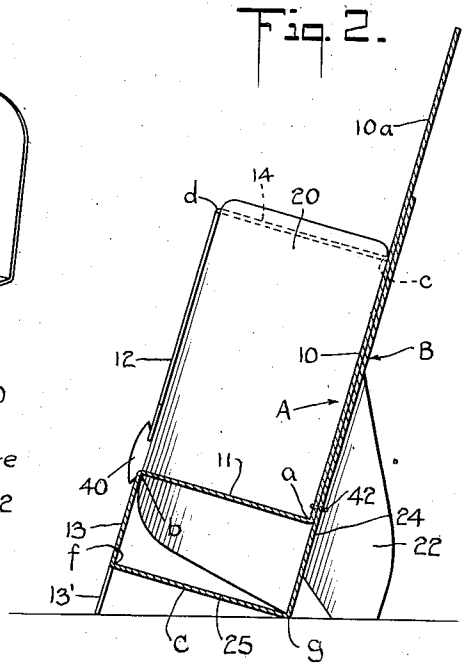


Fig. 3.

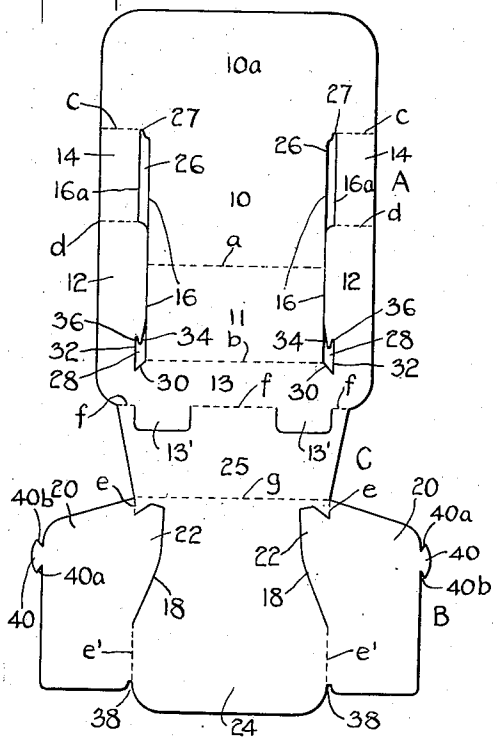


Fig. 4.

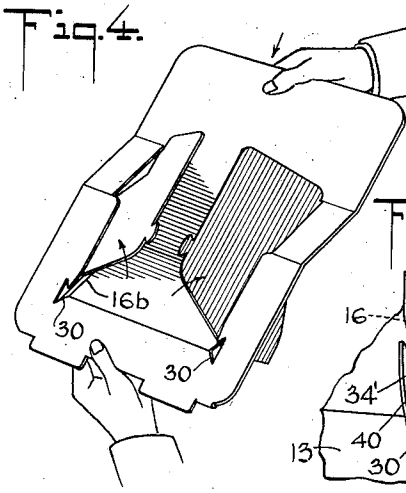


Fig. 5.

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COLLAPSIBLE STRUCTURE

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11 Claims. (Cl. 248—198)

This invention relates to structures for the display of merchandise or the like.

A primary object of the invention is to provide a structure foldable into flat status for shipping and storing yet instantly convertible, by a simple single manipulation, into a three-dimensional structure having substantial usable space for the reception of merchandise and substantial facial areas for decorative treatment or the like.

A further object of the invention is to provide a self-easeling structure in which the easeling structure is automatically erected concurrently with erection of the structure itself from flat-folded to three-dimensional operative status.

A further object of the invention is to provide a flat-folding structure in which members adapted to form the side walls will snap automatically into their respective wall positions upon the exertion of pressure applied by hand against opposite edges of the folded structure in the plane of its flat status and which members, further, will automatically lock themselves in their thus assumed wall positions immediately upon the release of such pressure.

Yet another object of the invention is to provide a structure of the character described which may be formed entirely of a single blank of foldable sheet material, such as cardboard or the like, only one side of which need be printed or otherwise embellished in order to view the effect on all principal areas of the structure normally visible when it is in set-up position.

It is a feature of the invention that the automatically positioned and locked side wall forming members, while readily releasable at will, are nevertheless so securely held as to prevent accidental displacement of such side wall members or their integral easel leg portions even in the circumstance of lifting or hanging the structure when fully loaded with relatively heavy merchandise.

Other features and advantages of the invention, including the economical configuration of the single blank, its ease and simplicity of assembly and the necessary cut, score and fold lines provided to effect the indicated production and erection characteristics, will hereinafter more fully appear.

In the accompanying drawing:

Fig. 1 is a perspective of a structure of the nature of a display receptacle formed pursuant to the present invention, said receptacle being in merchandise-receiving, i. e., fully set-up status;

Fig. 2 is an elevation, in section, of the receptacle of Fig. 1;

Fig. 3 is a plan view of the single blank of cardboard or like material from which the display receptacle is formed;

Fig. 4 is a representation of a manner of bringing the receptacle from its flat storage or shipping status to the operative status shown in Fig. 1; and

Fig. 5 illustrates a second form of front panel tab-lock structure.

Referring to the drawing for a more detailed description of the invention, Fig. 1 illustrates an embodiment of the invention in set-up form ready to receive merchandise for display and merchandising purposes. The improved foldable structure, in its embodiment illustrated in Fig. 1 is characterized by a merchandise-receiving compartment of substantial volume, surmounted by adequate advertising and display space, and framed or bordered on three frontal sides by frame-like members affording additional advertising or decorative space, and "setting off" the contained merchandise to optimum advantage.

A feature of the construction, later defined in detail, lies in the combination of side wall panels, and therewith unitarily combined rearwardly extending easel legs, with novel locking means, whereby the structure may be brought from flat storage or shipping status to full operative status with minimum of effort. No supplemental manipulation, such as bending or other adjustment of easel legs or side wall panels, is required to bring such elements into full operative status.

Specifically, and referring to Figs. 1 and 3, the structure comprises but a single blank of stiff foldable material, usually cardboard, suitably configurated and provided with scorings and cut lines to permit of the folding and interaction of the component portions of the blank into the completed display device. The blank may be divided, broadly speaking, into three sections, integrally and serially related and defined by cut lines and by score lines permitting folding thereof. Section A provides the back panel 10 of the merchandise compartment and its display section 10*a*; the compartment base 11; the frontal vertical and horizontal frame forming members 12, 12 and 13, and the offset arms 14, 14.

As clearly appears, the base 11 is defined by the score or crease lines *a*, *b*; the vertical frame members 12, 12 result from cut lines 16, 16; offset arms 14, 14 are defined by the respective smooth-cut edges 16*a*, 16*a*, and the crease lines *c*, *d*.

Through the agency of crease lines *e, e'* and cut lines **18, 18**, the compartment side wall panels **20, 20** and their therewith associated easel legs **22, 22** are formed from section B of the stated blank of foldable material, said section B including also a central tongue-like portion **24** which forms a sub-back effective to reinforce the compartment back **10**, as later described.

The panel **25** of intermediate section C, may advantageously afford the stock out of which the front feet **13', 13'** are cut; such front feet are effectuated by the fold lines *f, f, f*. To permit the required movement of base **11** into operative position, fold line *g* is provided. Said fold line *g* desirably intersects the terminii of the respective fold lines *e, e*.

In section A, it will be observed that there are suitably configurated snap-lock slots at the upper and lower portions thereof, said upper and lower slots being designated **26** and **28**, respectively.

Each upper slot **26** terminates in a notch **27** adjacent the edge **16***a*; each lower slot **28** is defined by the smooth cut edge **30**, sloping sharply downwardly and outwardly from each terminus of fold line *b* to intersect cut edge **32**, and is characterized by a tongue **34** affording a notch **36** at the upper terminus of each slot **28**. Desirably the approach to each tongue **34**, i. e., the edge remote from edge **32** of each slot **28** is relatively gradually sloping, the angle of said slope with respect to the vertical cut line **16** being appreciably less than the slope of cut edges **30, 30**.

For interlocking cooperation with notches **27, 27**, each side wall panel **20** is provided with a notch **38**, in alignment with fold lines *e, e'* of said panels. For interlocking cooperation with notches **36** of the front frame members **12, 12**, each side wall panel **20** has a lock tab **40**, provided with notched portions **40***a* and **40***b* at the terminii thereof.

As Fig. 3 shows, crease lines *e, e'* are in rectilinear alignment with the cut edges **16***a* and **32**, and notch **38** of each side panel **20** is in substantial alignment with its cooperating notch **27**; and it is apparent from Figs. 1 and 3 that upon rotating side wall panels **20** to a position at right angles to the plane of Fig. 3,—the respective crease lines *e, e'* affording a hinge for such rotation—the lock tabs **40** of such side wall panels may be brought into operative register with the notches **36**.

It will be apparent from Fig. 1 that all the surfaces visible to a prospective purchaser of merchandise displayed within the structure are on the same surface of the blank; the blank may, therefore, be imprinted, embossed, or otherwise embellished entirely on such single surface prior to the actual creasing and cutting or dieing out of the blank for subsequent assembly.

In assembling the duly cut, scored and creased blank, sections B and C are brought behind section A, by folding along crease lines *f, f, f*; such folding brings the feet **13', 13'** into effective projection. It will be noted that notches **27, 27** of section A and **38, 38** of section B are substantially equidistantly spaced with respect to crease lines *f, f, f*; therefore, upon folding sections B and C as aforesaid, the respective side wall panels **20** are properly positioned with respect to cut lines **16, 16** and the therewith associated slots **26, 26** to permit insertion of the panels **20** therethrough.

Either prior or subsequent to the stated folding about crease lines *f, f, f*, the side wall panels **20** may be folded along their respective hinge crease lines *e, e'* to a position substantially at right angles to the plane of section B. Such folding or rotation of the panels about the stated hinge crease lines effects projection of the leg portions **22** of such side wall panels from the blank. Each side wall panel **20** may then be passed through the associated cut line **16** of section A, whereupon the panels **20** are folded downwardly toward each other to lie against the upper surface of such section A. The necessary concurrent flat folding of the thus assembled blank brings notch **38** of each side wall panel into locking engagement with notch **27** formed in back member **10**. Also the folding of the side wall panels **20** downwardly against the surface of section A, brings the easel leg portion **22** of each such panel into a position directly under the respective vertical frame member **12**, and it is, therefore, desirable for their own protection and to conserve space in shipping and storing so to contour the leg portions **22** that no part thereof will extend beyond the outer edges of the frame member **12**.

It will be noted that the distance between the crease lines *e, e'* hingedly connecting the side wall panels **20** to the sub-back panel **24** is substantially greater than the distance between the cut lines **16** defining the lateral edges of the compartment back and base panels **10** and **11** upon which the side wall panels **20** are folded in the flat status of the structure. This advantageously and desirably affords a clearance of the cut lines **16** by the respective crease lines *e, e'* and relieves the latter of what would be an undesirable weakening strain if suitable clearance were not provided.

So provided, however, the structures may be kept in folded status for substantial periods of time without deleterious effect.

The effectiveness of such clearance to eliminate a possible condition of strain on hinge creases *e, e'* is enhanced by the width of slots **26** and the resiliency of marginal portions **12***a* of frame panels **12**.

At this stage, the assembly is secured by fastening sub-back panel **24** of section B to the underside of compartment back panel **10**, as by pasting, stitching or the like, but preferably by a single wire staple **42** passed through back panel **10** and sub-back **24** and clinched. Such staple is preferably positioned centrally of and adjacent to crease line *a*.

Sub-back **24**, thus secured, stiffens the compartment back panel and maintains the interengagement of notches **27** and **38**. Such interengagement is effective to maintain the upper portion of sub-back **24** snugly against compartment back panel **10**, thus rendering it practicable to employ only a single staple **42**, disposed adjacent fold line *a*. Such location of staple **42** strengthens the base **11** and insures a square line of demarcation between base **11** and back panel **10** upon setting up the display receptacle.

To erect or set up the structure, the assembled flat blank may be grasped at opposite ends, as suggested by Fig. 4, and pressure exerted upon the upper and lower edges thereof in the plane of the blank. The blank yields along its transverse crease lines, and upon movement of the back panel **10** and its therewith associated subpanel **24** in a downward direction, base portion **11** is transformed from a status coincident with the plane of back panel **10** to a plane in angular relation thereto, and the structure assumes three-

dimensional status, characterized by a parallelogram defined by compartment base 11, front frame members 12, 12, compartment back panel 10 and arm members 14, 14, the parallelogram approaching rectangular status upon continuing such downward movement of said back assembly.

Conjointly, side panels 20, 20 are automatically rotated outwardly about their respective hinge crease lines *e*, *e'* by the camming action exerted by the lower portions 16*b* of cut lines 16, see Fig. 4, against the preferably sloping lower edges of their associated side wall panels 20. It is recalled that the hinge crease lines *e*, *e'* of the side wall panels 20 are spaced outwardly of the adjacent cut lines 16, whereby the lower portions 16*b* of such cut lines engage the lower edges of the side wall panels 20 at points sufficiently spaced from their crease lines *e*, *e'* to effect a marked leverage on the panels 20 in initiating their upward movement.

Immediately prior to completion of the erection movement, notch 40*a* of tab 40 of each side panel 20 engages the sharply sloping edge 30 of its respective slot 28, and the said sloping edges 30 automatically guide the panels 20 to a position behind marginal portions 12*a* of front frame members 12, 12 and into a plane vertical to the plane of back panel 10, while moving the tabs 40 beyond the tongues 34 of slots 28 to bring the side surfaces of said tabs into contact with the edges 32 of said slots 28.

Desirably, the proportion and arrangement of the respective portions of the display are such that the final movement, i. e., the moving of the side surfaces of tabs 40 into contact with edges 32, coincides with a slight straining or overthrow of the stated parallelogram beyond its desired rectangular status, the inherent stiffness of the material and its resistance to such overthrow engendering reactive forces which, upon release of pressure by the operator, snap notch 40*b* of tab 40 sharply upwardly into locking engagement with its operatively associated locking notch 36.

It is seen from Figs. 1 and 2 that side wall panels 20 are brought to rest against the inner edges of the offsetting side arms 14, and that the forward edges of such side wall panels are concealed behind the marginal portions 12*a* of front frame members 12, thereby stiffening and strengthening the compartment portion of the set-up display. Such extending marginal portions 12*a*, 12*a* may serve also to confine the merchandise within the compartment.

It will be noted that by reason of the locking engagement of tabs 40 with front frame members 12 and the locking engagement of notches 38 with notches 27 of the back panel 10, forces imposed upon the structure by the weight of merchandise contained therein are resisted by the tensile strength of the side wall panels 20, the line of resistance of said panels being in a diagonal direction running from the lower front corner to the upper rear corner of each such side wall panel.

The set-up structure, therefore, may be lifted by its back portion 10*a* without fear of collapse, even when completely filled with merchandise. The above described locking and supporting organization further makes the structure readily adaptable to wall-hung forms. In certain such latter instances it is conceivable that all easel structure be eliminated or that such structure be made optionally operative.

It is noted that in the "counter" type or easel supported form of the structure illustrated, the easel legs 22 come into operative status automatically, and conjointly with the movement of the side wall panels 20 into their ultimate position; and that the respective snap-lock tabs 40 prevent accidental movement of such legs 22 out of effective position, thus locking the easel legs as well as the side walls in place.

It is noted particularly from Fig. 2, that the load imposed by the merchandise is carried principally by the rigid panel 25 of section C, the crease line *g* at the juncture of said blank and sub-back panel 24 resting upon the table or counter top. It is noted, further, that at the portion of sub-back panel 24 below compartment base 11, there is formed a channel section, of which panel 24 is the web and the lowermost portions of compartment side panels 20 the flanges, such flanges being structurally effective by reason of the locking engagement of lock tab 40 with notch 36. Easel legs 22, therefore, are relieved of substantially all load-carrying strains, and serve primarily to support the receptacle against backward movement.

My improved foldable structure is characterized by transformation from collapsed status to full operative status through a one-stage manual operation, involving definite automatic action of the several parts, which is literally of only momentary duration.

A second form of snap lock formation is illustrated in Fig. 5. In such arrangement, it will be noted that the slope of the approach to tongue 34' is substantially more acute, measured with respect to vertical cut line 16, than is the approach to tongue 34 in Fig. 3, whereas the slope of edge 30 may be substantially the same in each instance. By such arrangement tab 40 is warped outwardly during the final stages of setting up the display, and when the upper edge of tab 40 clears tongue 36', the said tab snaps sharply into locking engagement with the locking notch 36. Such snap lock formation is advantageous with certain soft materials wherein the resiliency of the material at the hinge crease lines *e*, *e'* of the respective side wall panels 20 may be inadequate to effect the carry over of the tabs 40 sharply by the tongues 34 of the embodiment illustrated in Fig. 3, in which embodiment the approach to the said tongues interposes a minimum of resistance to the movement of the tabs 40 into locking status.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. A collapsible structure formed from a single sheet of foldable material, comprising a back panel arranged to form a back for a merchandise-receiving compartment, a panel hingedly associated with said back panel and displaceable from a position in the plane of said back panel to a plane angularly related thereto to form a base for said merchandise-receiving compartment, and means adapted to form side walls for said merchandise-receiving compartment, said means including portions of said sheet of foldable material hinged adjacent said back panel and said compartment base-forming panel to overlie said compartment base-forming panel when the structure is in collapsed status and engageable by an edge of said compartment base-forming panel for outward rotation thereby into side-forming position during the stage of dis-

placement of said compartment base-forming panel into its base-forming position.

2. A collapsible structure formed from a single blank of foldable material, comprising a back panel arranged to form a back for a merchandise compartment, a compartment base forming section hingedly associated with said back panel and displaceable from a position in the plane of said back panel to a plane angularly related thereto, front frame means arranged to be displaced forwardly of said back panel, an element of said front frame means being integral with said compartment base section and supporting said section in its load carrying function, and side panel means hingedly mounted behind said back panel, the side edges of said base-forming section being disposed intermediate of the hinge mounting means of said side panel means and adapted to operate on said side panel means to rotate the same into side-forming position during the stage of displacement of said base-forming section into its base-forming position.

3. A collapsible and self-easeling structure, comprising a back panel arranged to form a back for a merchandise-receiving compartment, a compartment base-forming section displaceable from a position in the plane of said back panel to operative position in angular relationship to the plane of said back panel, and side panel means for said merchandise compartment hingedly mounted in operative relationship to said back panel and said compartment base section, said side panel means being provided with easel leg forming members, said base-forming section being arranged to rotate said side panel means and therewith associated easel leg means into operative position in angular relationship to the plane of the back panel upon moving said compartment base-forming section into its said operative position.

4. A foldable display receptacle formed from a single blank of sheet material, comprising a back panel, side arms extending from said back-panel, a front frame panel, means connecting the forward portions of said side arms with said front frame panel, compartment side wall panels fitting against the inner edges of said side arms when the display receptacle is in set up status and adapted to be displaced inwardly when the display receptacle is folded, said side arms lying in planes which are angularly related to the planes in which said compartment side wall panels lie when fitting against said inner edges of said side arms, and means operatively associated with said side arm connecting means and said front frame panel for locking said compartment side wall panels against such inward displacement upon setting up the display receptacle.

5. A collapsible structure formed from sheet material, comprising a back panel arranged to form a back for a merchandise-receiving compartment, a compartment base-forming section displaceable from a position in the plane of said back panel to a plane angularly related thereto, front frame means arranged to be displaced forwardly of said back panel, hinged side panels for said merchandise compartment, said side panels having locking means, slot means associated with said front frame means for cooperating with said locking means to secure the said side panels against displacement when the display receptacle is in merchandise-receiving status, and means for moving said side panel locking means into locking relationship with said slot means.

6. A collapsible structure formed from sheet material, comprising a back panel arranged to form a back for a merchandise-receiving compartment, a compartment base-forming section hingedly secured to said back panel and displaceable from a position in the plane of said back panel to a plane angularly related thereto, front frame means arranged to be displaced forwardly of said back panel, hinged side-forming panels for said merchandise compartment arranged to be folded inwardly upon said back panel when the display receptacle is in folded status, said side forming panels having a lowermost portion in operative association with said base-forming section and adapted to be moved thereby into a position angularly related to said back panel and said front frame members, said side forming panels having locking means, and means associated with said front frame members for directing said side forming panels into a position rearwardly of said front frame members and into operative association with said locking means.

7. A display container formed from a single blank of sheet material, comprising a back panel, side arm members extending forwardly from the lateral sides of said back panel at locations intermediate the top and bottom of the same and defining, with said back panel, a merchandise display compartment opening, a base member for said merchandise compartment, a lower transverse front frame panel disposed at said base member, vertical front frame means extending at opposite sides of said lower transverse front frame panel to said side arm members, compartment side panels arranged to be moved from folded status against said back panel to operative status against said side arms, said compartment side panels having tab-lock means, notched locking means provided in said vertical front frame means for operative association with said tab-lock means, and cam means provided in said lower front frame member for guiding said tab-lock means into locking position with respect to said notched locking means.

8. A collapsible structure, comprising back panel means for a load-supporting compartment, a compartment base-forming section integral with said back panel means and arranged to be displaced from a position in the plane of said back panel to a position in angular relationship therewith, frame means comprising side members and an integral transverse base member arranged to be displaced forwardly of said back panel to a position in substantial parallelism therewith, arm means hingedly securing said side members and said back panel means, hinged side panels for said compartment and arranged to be folded inwardly upon said back panel means when the display receptacle is in folded status, the side edges of the base-forming section being arranged intermediate the hinge lines of the side-forming panels to bring each of said side edges in contact with its associated side panel during the displacement of said base-forming section with respect to said back panel and thereby rotating said side panels from folded status to a position substantially at right angles to said back panel, and means associated with said compartment side members and said side and base frame members for completing the movement of the compartment side panels and locking the same in position behind said frame side members and in engagement with said arm means.

9. A collapsible structure adapted for use as a display receptacle or the like, formed from a

single integral blank of foldable material, and comprising a back panel having fold lines whereby said panel may be displaced to form a base and a back for a merchandise-receiving compartment, a panel serially connected therewith and foldable to form an element disposed beneath said back panel to provide a principal load-supporting member of said structure, and a third panel hingedly connected with said second panel for folding to a position rearwardly of said first panel and adapted to be secured thereto, said last mentioned panel having hinged side members arranged to be disposed at an angle with respect to said first mentioned panel to form side wall members of said compartment, lower extending portions of said side members forming, with their associated panel, a channel section for stiffening and strengthening the structure, said side members, further, having tab lock means adapted to cooperate with elements of said first mentioned panel to secure the structure in set-up status.

10. A single integral blank of foldable sheet material for forming a collapsible structure of the type described, comprising a series of panel members defined by lines of fold, said series of panels including a panel adapted to form a back and a base for a load-carrying compartment for said structure, said panel being cut along its lateral edges to form arm members and front frame members for said structure; a second panel adapted to be folded rearwardly of said first panel to form a principal supporting element of the structure; and a third panel having hinged members at the sides thereof for forming foldable side wall members of the structure.

11. A collapsible structure formed from a single blank of foldable material, comprising a panel arranged to form a back for a compartment, a compartment base-forming section displaceable from a position in the plane of said back-forming panel to operative position in angular relationship to the plane of said back-forming panel, and side panel means for said compartment hingedly mounted in operative relationship to said back-forming panel and said compartment base section, said base-forming section being arranged to rotate said side panel means into operative position in angular relationship to the plane of the back-forming panel upon moving said compartment base-forming section into its said operative position.

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