Dec. 23, 1969 C. J. NEWMAN ETAL 3,485,545

KNOCK-DOWN CABINET WITH INTEGRALLY HINGED PANELS

Filed Dec. 4, 1967 3 Sheets-Sheet 1

Fig. 1

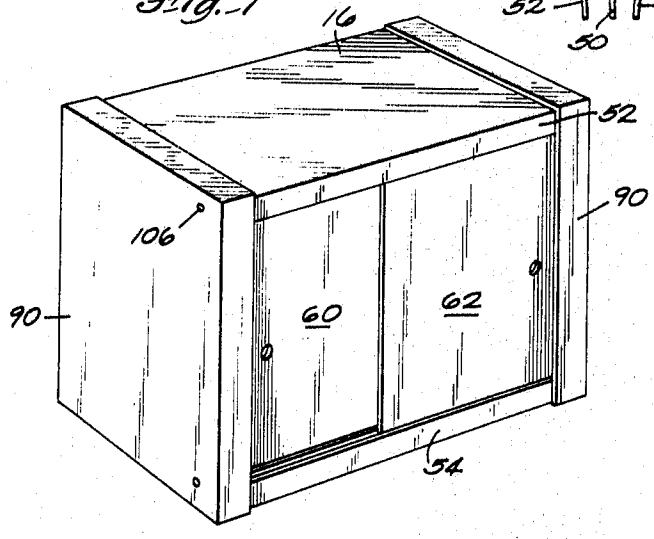


Fig. 5

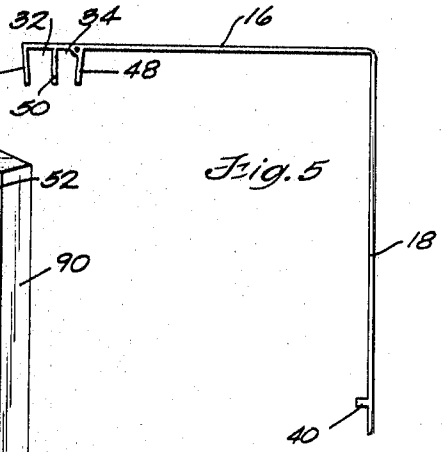


Fig. 2

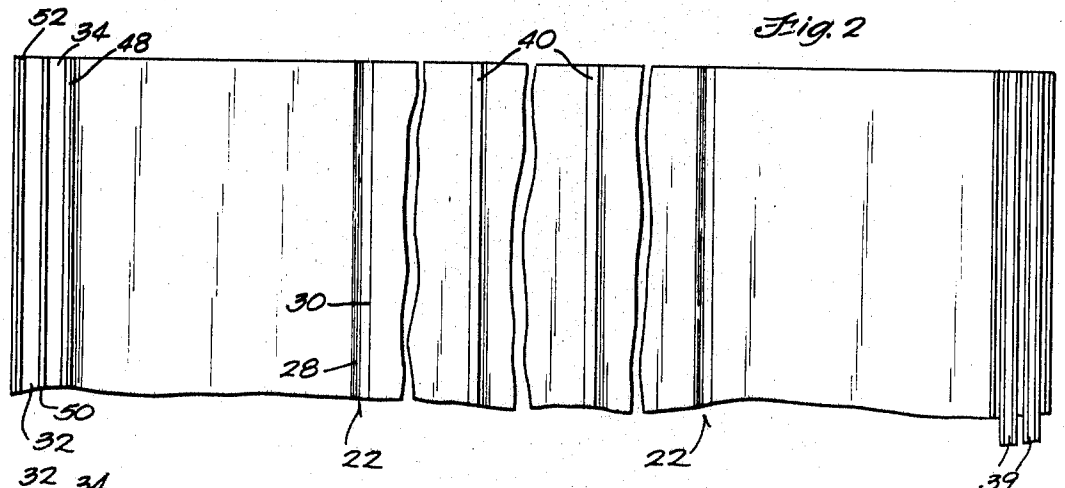


Fig. 3

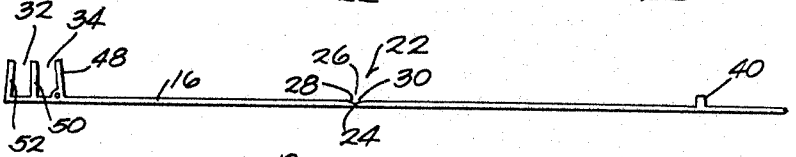
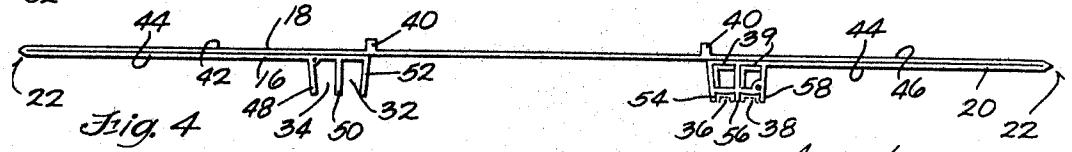


Fig. 4



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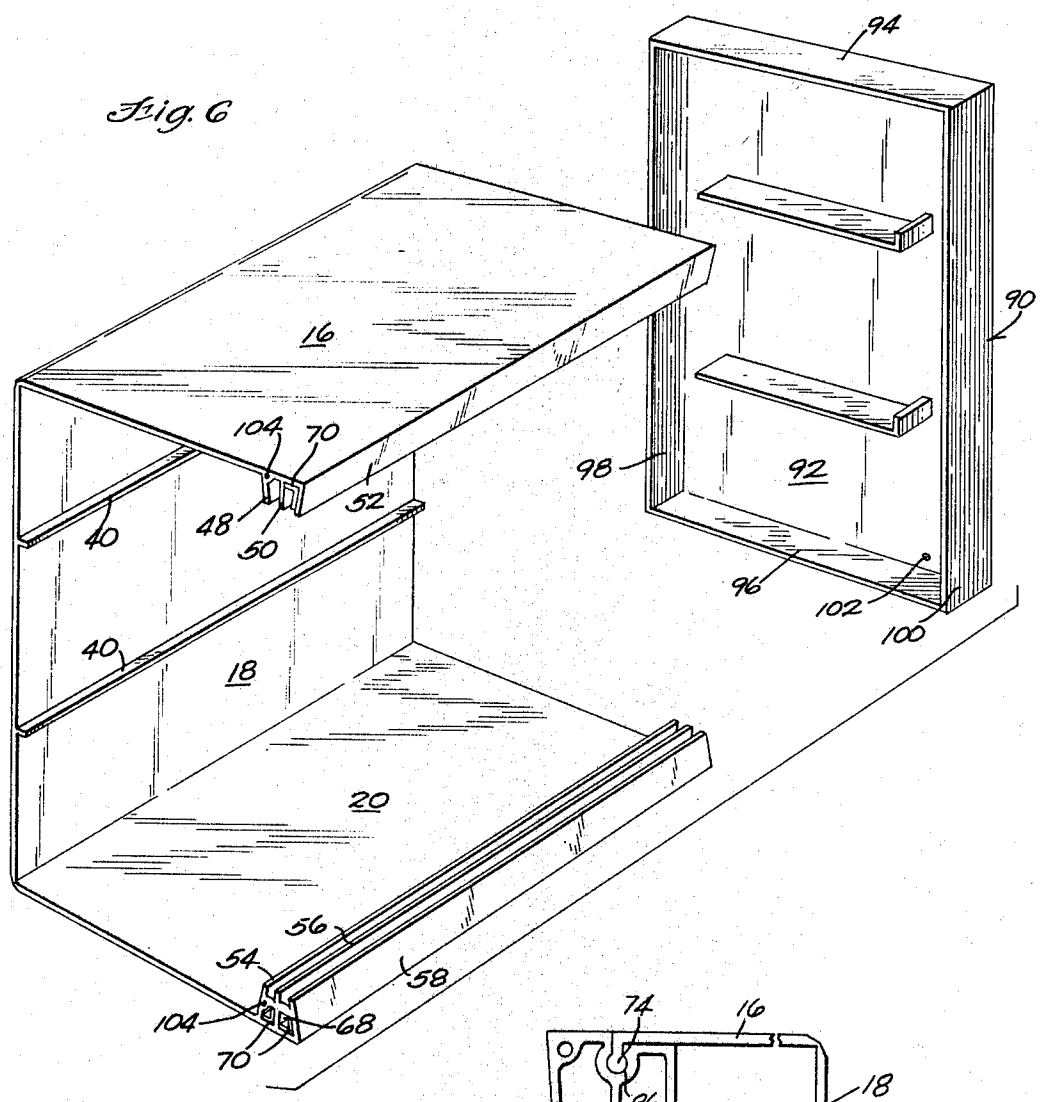
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KNOCK-DOWN CABINET WITH INTEGRALLY HINGED PANELS

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Fig. 6



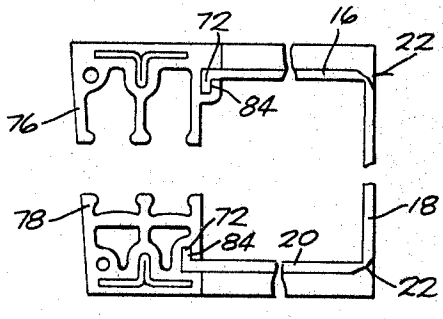


Fig. 4

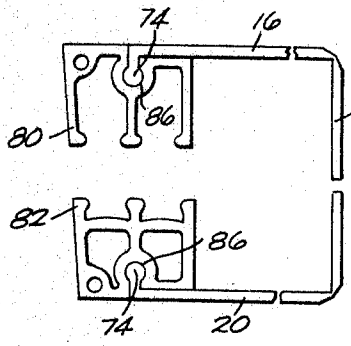


Fig. 8

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KNOCK-DOWN CABINET WITH INTEGRALLY HINGED PANELS

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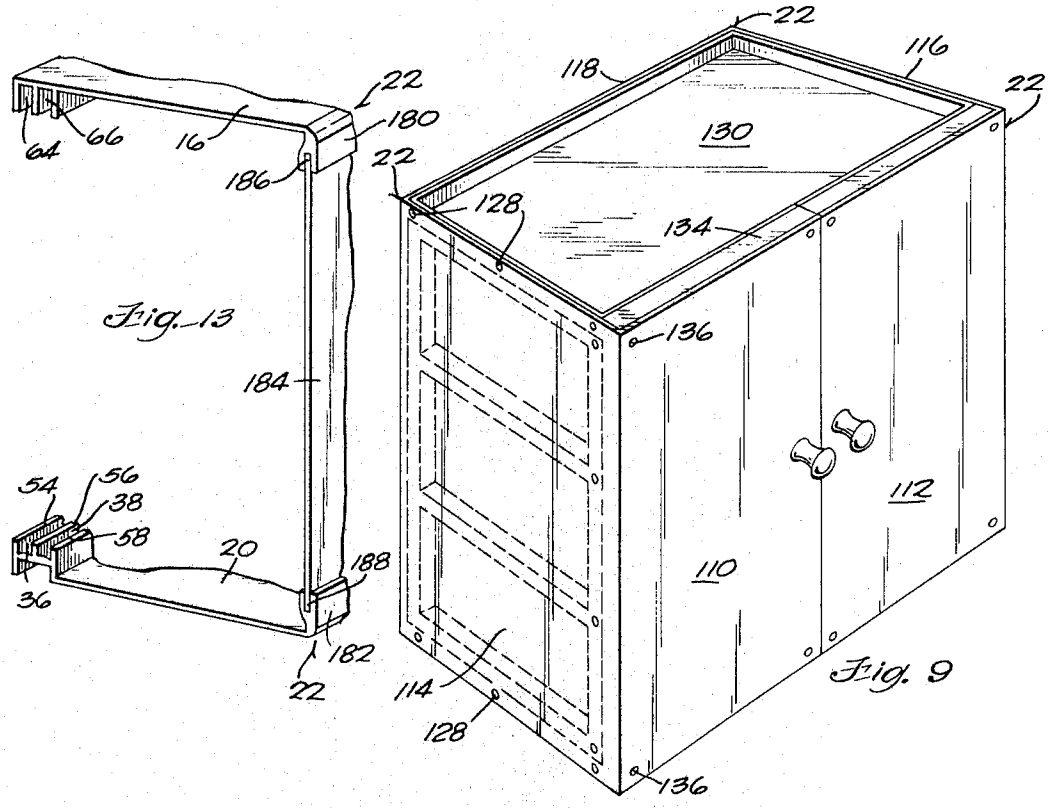


Fig. 13

Fig. 9

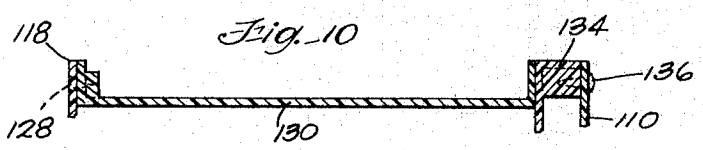


Fig. 10

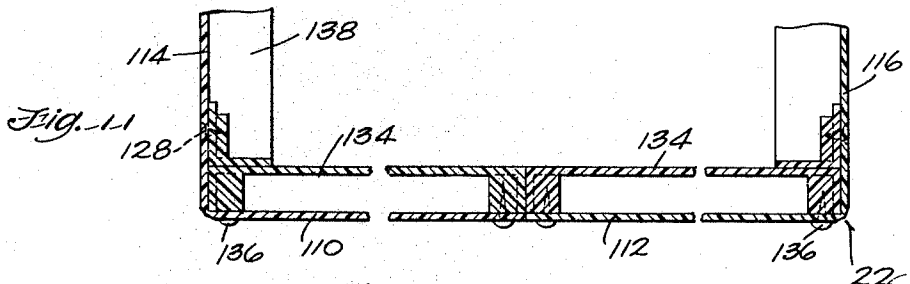


Fig. 11

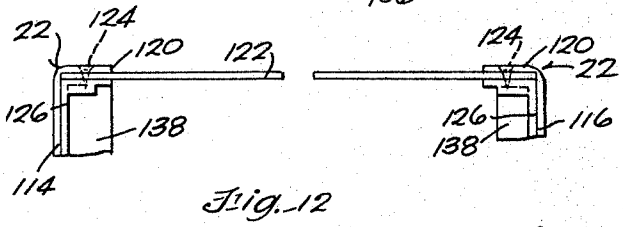


Fig. 12

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3,485,545

KNOCK-DOWN CABINET WITH INTEGRALLY HINGED PANELS

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Int. Cl. A47b 43/00, 47/04
U.S. Cl. 312—258 4 Claims

ABSTRACT OF THE DISCLOSURE

The cabinets shown to exemplify the invention are bathroom cabinets. Various wall panels or corner members are fabricated, preferably but not necessarily by extrusion, in one piece, with integrally formed hingedly movable sealed corner connections and integrally formed hinges for pivoted doors or channels for sliding doors and, optionally, brackets for shelves. The panels so hinged can be folded substantially flat for storage and shipment and readily erected and held in erected positions by applying caps or inserts.

BACKGROUND OF THE INVENTION

Small hinges have been produced commercially from synthetic resin such as polypropylene and polyallomer. The product known commercially as "Tenite" is a specific example. The hinged leaves are connected integrally by a web of reduced thickness which is fatigue-resistant and can be bent back and forth indefinitely without breakage. When such a hinge is formed, it has unoriented molecular change. If the hinge leaves are thereupon flexed along the line of reduced thickness which is to provide the fulcrum between the leaves, particularly if such flexing occurs while the hinge retains the heat imparted to it during formation, the molecules are oriented to minimize the possibility of breakage during subsequent operation.

In the instant invention, relatively few hinged movements between the interconnected parts will be required with the exception of embodiments in which the cabinet doors are hinged integrally with the side or end walls.

SUMMARY OF THE INVENTION

The present invention is primarily concerned with the construction of a knock-down cabinet in which a number of walls (which may include the doors) are foldably connected in series by integrally formed hinges, as by extruding, molding, machining, or heat stamping, with lines of reduced thickness where folding is to occur. These walls may be folded upon each other for storage or shipment and may then be folded oppositely to erect the walls for use, in which position they are held by molded caps or inserts. For the purposes hereof, the folding movements are called hinge movements, even when there are only such movements as are required for erection or collapse, no hinging being involved in use.

By reason of this construction, relatively few parts are required for a complete knock-down cabinet. The problems of manufacture, storage, packaging, shipment and erection are thereby greatly reduced, and a strong attractive product can be produced at minimum expense and erected with minimum effort. Channels for sliding doors and brackets for shelves can, in many cases, be produced as integral parts of the connected wall portions to project oppositely when the walls are collapsed for storage or shipment and to project in positions for use when the walls are erected.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in perspective of a complete cabinet embodying the invention.

FIG. 2 is a fragmentary detail view in plan of a web including integrally hinged portions which are to become wall portions, door channels and shelf brackets in the erected cabinet.

FIG. 3 is a fragmentary end elevation of the web shown in FIG. 2.

FIG. 4 is an end elevation of the integrally connected panels as folded back to back in position for storage or shipment.

FIG. 5 is a fragmentary detail view showing portions of contiguous panels as erected preliminary to assembly with molded end caps.

FIG. 6 is a view in perspective fragmentarily showing portions of the panels and a shelf, one associated end cap being separately illustrated.

FIG. 7 is a fragmentary detail view showing a modified embodiment in which the door track panels are separately fabricated and attached to the integrally hingedly connected side panels.

FIG. 8 is a view similar to FIG. 7 showing a further modified embodiment using separately prefabricated track channels.

FIG. 9 is a view showing a modified embodiment of cabinet having doors integrally hinged to the side or end walls and back wall and molded top and bottom.

FIG. 10 is a fragmentary detail view taken in section from front to rear through the molded top, the back wall, and one of the doors.

FIG. 11 is a fragmentary detail view in horizontal section through the end walls and doors and the molded door liners and molded frame and shelf support preferably used in this construction.

FIG. 12 is a fragmentary detail view showing in plan a modified embodiment using a separate back panel which is preferred when the cabinet is large.

FIG. 13 is a fragmentary view in perspective showing a modified embodiment.

DETAILED DESCRIPTION

The sliding door type of cabinet shown in FIGS. 1 to 8 comprises top, back, and bottom wall portions **16**, **18** and **20** connected by integral "hinge" or foldable portions **22**. The "hinge" portions comprise webs **24** at the bottom of elongated V-shaped notches **26**, the sides **28** and **30** of which converge toward the web as best shown in FIG. 3. The webs are, as already stated, highly flexible and can be bent repeatedly through a 270° range without breakage. For the purposes of this application, only a limited number of bending operations are required.

In the initial extrusion, all of the above portions will normally be formed in a continuous web, from which is then cut a sheet as shown in FIGS. 2 and 3. In the web, the portion which becomes panel **16** will be provided integrally with whatever flanges are required to make the desired number of door guide channels **32** and **34**. Similarly the panel **20** will be provided integrally with whatever flanges are required to make the bottom door guide channels **36** and **38**. These may optionally be reinforced by metal insert channels **39**. The back panel **18** will be made to provide integrally whatever flanges **40** may be required to contribute to the support of any needed shelf.

Upon completion of the extrusions shown in FIGS. 2 and 3, the panels **16** and **20** will be folded reversely to bring the back side **42** of the top panel **16** into face contact with the back side **44** of the back panel **18**. Similarly, the bottom panel **20** will be folded beneath back panel **18** to bring its lower surface **46** into face contact with the back surface **44** of the back panel **18**. This will leave the shelf-supporting flanges **40** projecting upwardly and the door-guiding flanges **48**, **50**, **52**, **54**, **56** and **58** projecting downwardly. The extruded parts are otherwise flat as thus folded.

It will be observed that the door guide channels **36** and **38** provided for the bottom margin of the doors **60** and **62** are relatively shallow, the top channels **32** and **34** for the upper margins of the doors being deeper. This facilitates insertion and removal of the doors by displacing them upwardly until their lower margins clear flanges **54**, **56** and **58**. The design construction of the top and bottom track sections provides an open channel at **68** which may be used to receive a reinforcing metal strip such as the angle **70** shown in FIG. 6.

In the alternative embodiments illustrated in FIGS. 7 and 8, the top and bottom panels **16** and **18** do not have the door guides formed integrally as a part of the initial fabrication. Instead they are provided respectively with flanges such as those shown at **72** in FIG. 7 or **74** in FIG. 8 and the respective upper and lower door guide members **76**, **78**, **80** and **82** are made with slots **84** or **86** to receive these flanges so that the door guide members may be slid longitudinally in connection with panels **16** and **18** into positions for use. These constructions may then be folded for storage or shipment and opened for erection in a manner substantially identical to that already described.

It will be understood that a wide variety of other cross sections and other means of reinforcement may be used within the contemplation of the invention and the invention is not concerned with the dimensions of the parts.

To erect the cabinet panels shown in FIG. 4, the respective panels are first reversely folded on their respective "hinges" to assume the positions shown in FIGS. 5 and 6. They are then held in erected position by means of end caps such as that shown at **90** in FIGS. 1 and 6. The end caps may conveniently be molded to provide end walls **92** and short top and bottom walls **94** and **96** and short rear walls **98** and front walls **100**. These telescope over the top and bottom panels **16** and **20**, and rear wall **18**, and the flanges **52** and **58** which guide the doors. Holes are provided at **102** in each end cap which register with holes **104** in the ends of the walls as originally fabricated to receive connecting screws **106** to hold the end caps in assembly with the wall panels.

In the construction shown in FIGS. 9 to 12, the door panels **110** and **112** are integrally hingedly connected by the hinges **22** with end panels **114** and **116**, respectively. The end panels **114**, **116** hingedly connected to the doors **110** and **112** at their forward margins may be similarly foldably connected by "hinges" **22** along their upright rearward margins to a back panel **118** as shown in FIG. 9. However, in larger cabinets it is preferred that the rear panel portions thus connected be limited to the flanges **120** shown in FIG. 12 thus using two separately prefabricated assembles for the respective ends and associated doors. The short flanges are then interconnected by a separately fabricated back panel **122** which may be held in place by the same screws **124** which connect the integrally connected parts of the cabinet to separately fabricated internal frames **126** which reinforce the respective end walls **114** and **116**. These will desirably be molded of synthetic resin. These frames are further held in place by screws **128** which connect the molded top and bottom members **130** to the portions **114**, **116**, **118**.

I also prefer to reinforce each of the doors **110** and **112** individually with a molded frame **134** held thereto by screws **136** (FIGS. 10 and 11), or by other conventional fastening means such as a snap or connection into an invisible channel.

The molded frames which reinforce the end walls **114**, **116** are preferably made to provide integral shelf-supporting flanges **138** shown in full lines in FIGS. 11 and 12 and in dotted lines in FIG. 9.

It appears to be unnecessary to show the panels of FIGS. 9 to 12 as they appear when collapsed, as the collapsed structure is very similar to that shown in FIG. 4,

the differences only being such as are inherent in the different dimensions of the respective panels.

It will be observed that the various "hinges" **22** are really used routinely as "hinges" only in the operation of the doors **110** and **112**. At no place in the embodiment shown in FIGS. 1, 2, and 8 (and in no place in the embodiment shown in FIGS. 9 to 12 other than in connection with the door supports), do the hinges function as such at any time except in the collapse or erection of the integrally connected panels. When the panels are erected and the product is in use as a cabinet, the "hinges" **22** serve only to provide continuously closed integral corner connections between panels.

FIG. 13 demonstrates the fact that in certain cases the foldably connected panels need not necessarily be integral from one end of the series to the other. In this embodiment the strips **180** and **182** are respectively foldably connected to panels **16** and **20**. This permits the use of a separately fabricated back panel **184**, which may be of wood, metal, glass, or plastic and which has its top and bottom margins engaged frictionally or adhesively in the channels **186**, **188** of strips **180**, **182** so that operation is the same as above described.

What is claimed is:

1. A cabinet comprising top, back, and bottom panels and intervening panel-connecting foldable hinge portions connected in series, the hinge portions comprising integral flexible elongated areas of reduced thickness, end panels for holding the top, back, and bottom panels erected in predetermined relationship to each other to constitute portions of a cabinet, each of said panels comprising a cap having flanges with which rear margins of the respective first mentioned panels are telescopically associated, front margins of the respective top and bottom panels having complementary flanges in which cabinet doors are slidably reciprocable.

2. A cabinet according to claim **1** in which margins of the panels at the ends of the series are provided with interlocking tongue and groove means for connecting such ends to give the connected panels a cross sectional form which is a closed geometrical figure.

3. A cabinet according to claim **1** in which the panels comprise top, rear wall, and bottom panels, the top and bottom panels having free margins at the ends of the series, and separately fabricated channel elements in connection with such margins and constituting tracks for a sliding closure for said cabinet.

4. A cabinet according to claim **3** in which said panel margins and separately fabricated channel elements are respectively formed to provide integral tongues and grooves which interlock to provide a connection between the channel elements and the respective panel margins.

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U.S. Cl. X.R.

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