

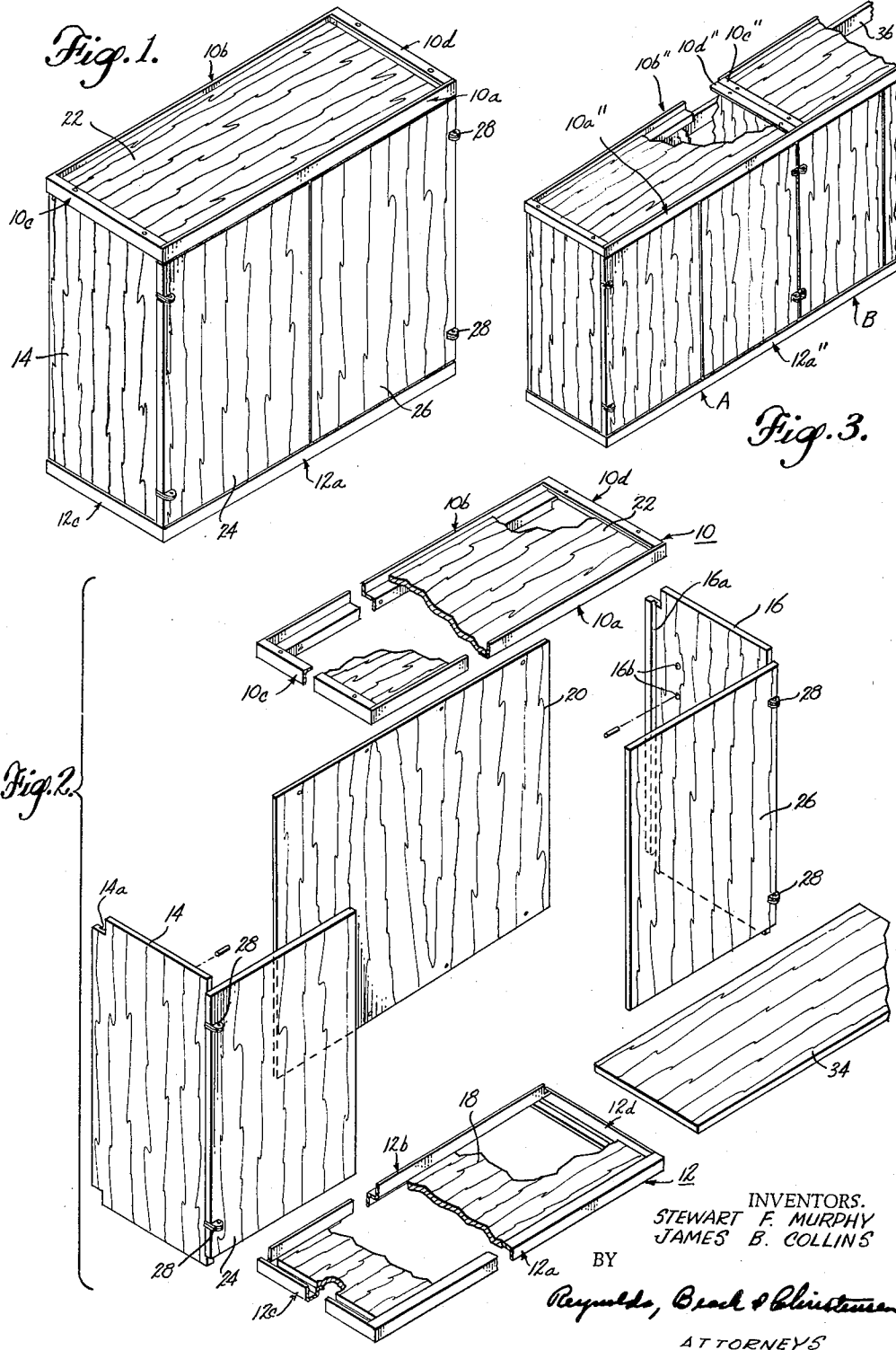
Dec. 27, 1960

S. F. MURPHY ET AL
KNOCK-DOWN CABINETS

2,966,385

Filed Sept. 27, 1957

8 Sheets-Sheet 1



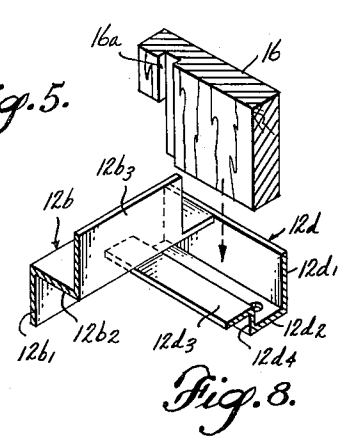
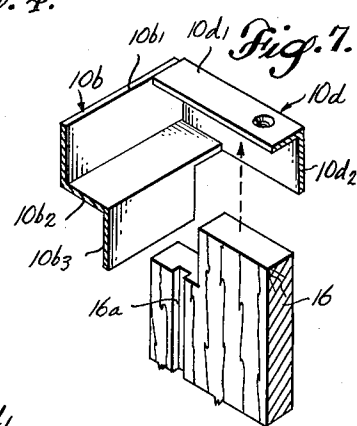
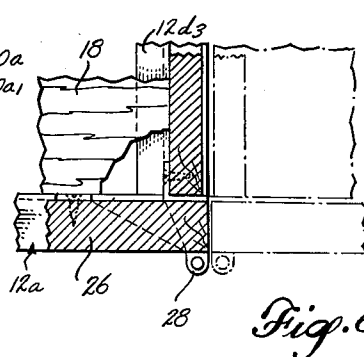
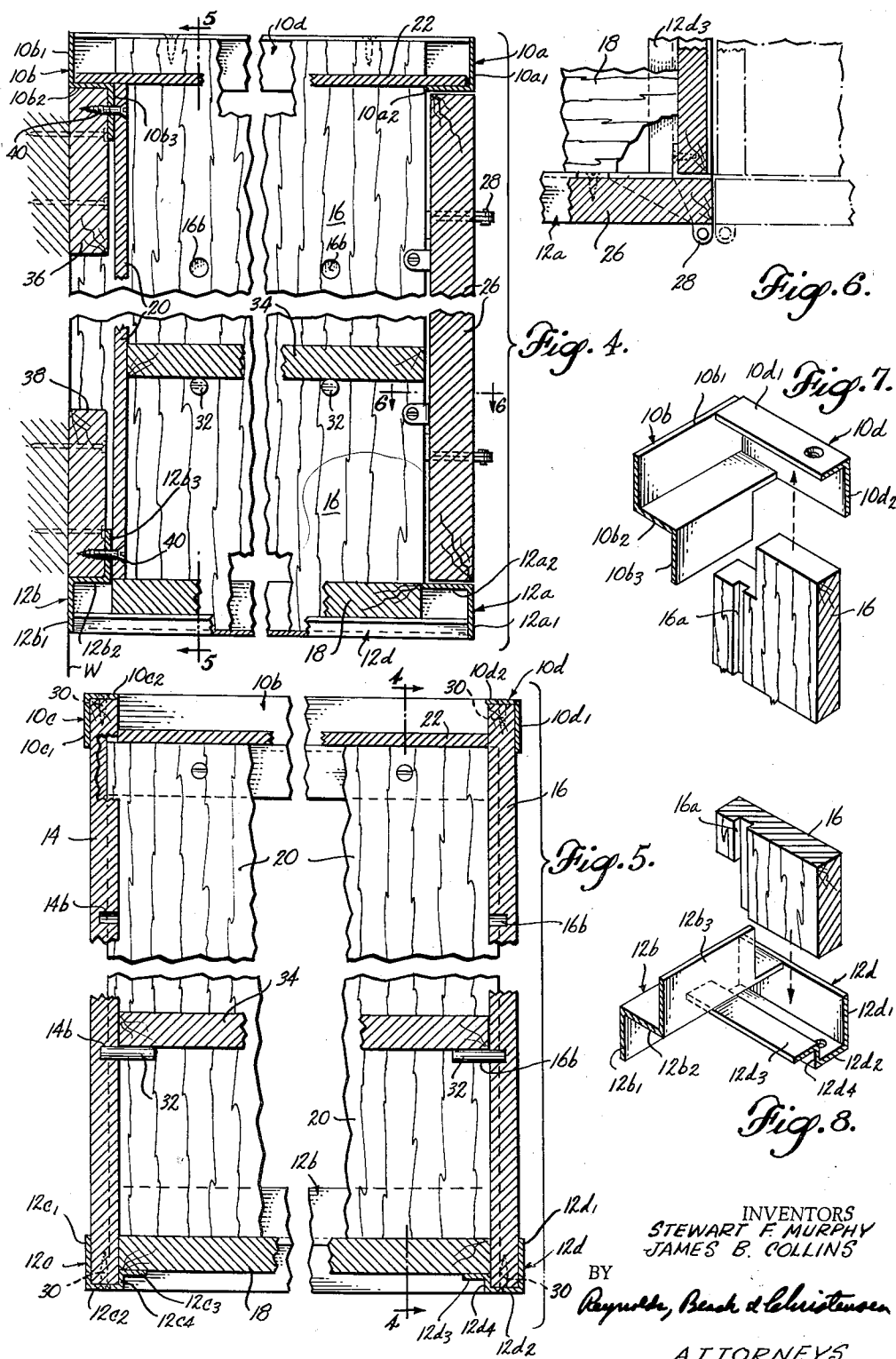
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8. Sheets-Sheet 2



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8 Sheets-Sheet 3

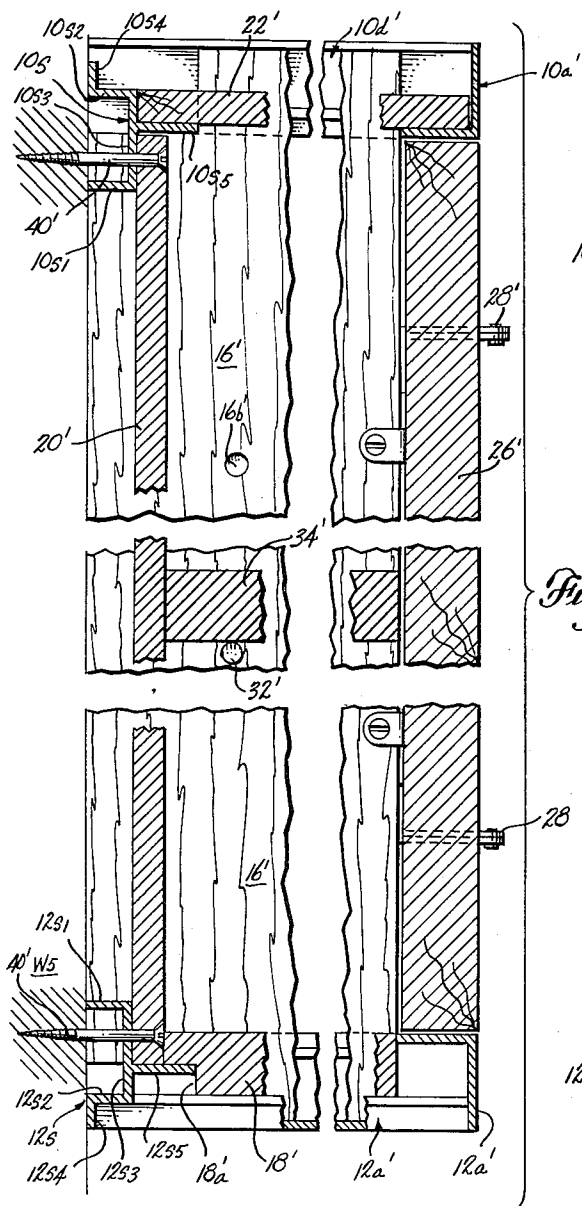


Fig. 9.

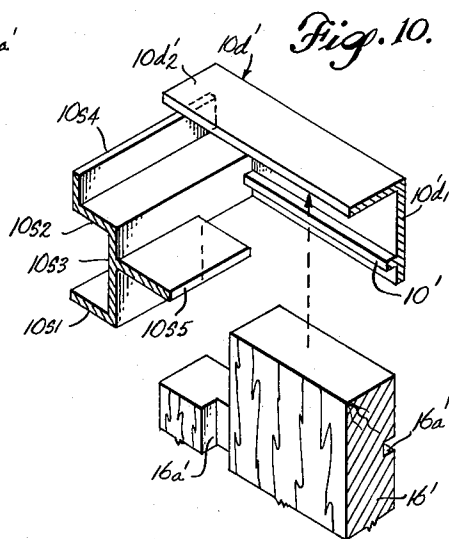


Fig. 10.

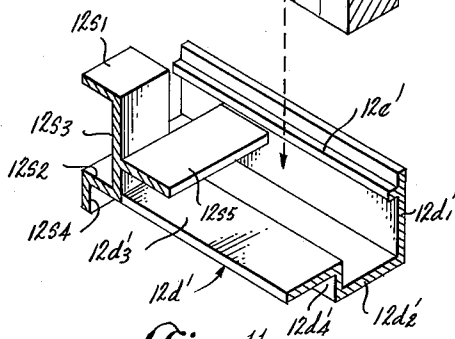
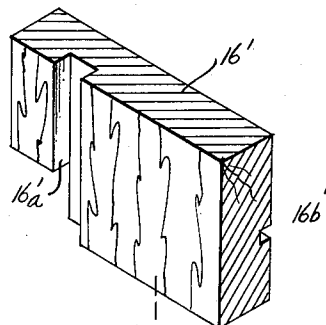


Fig. 11.

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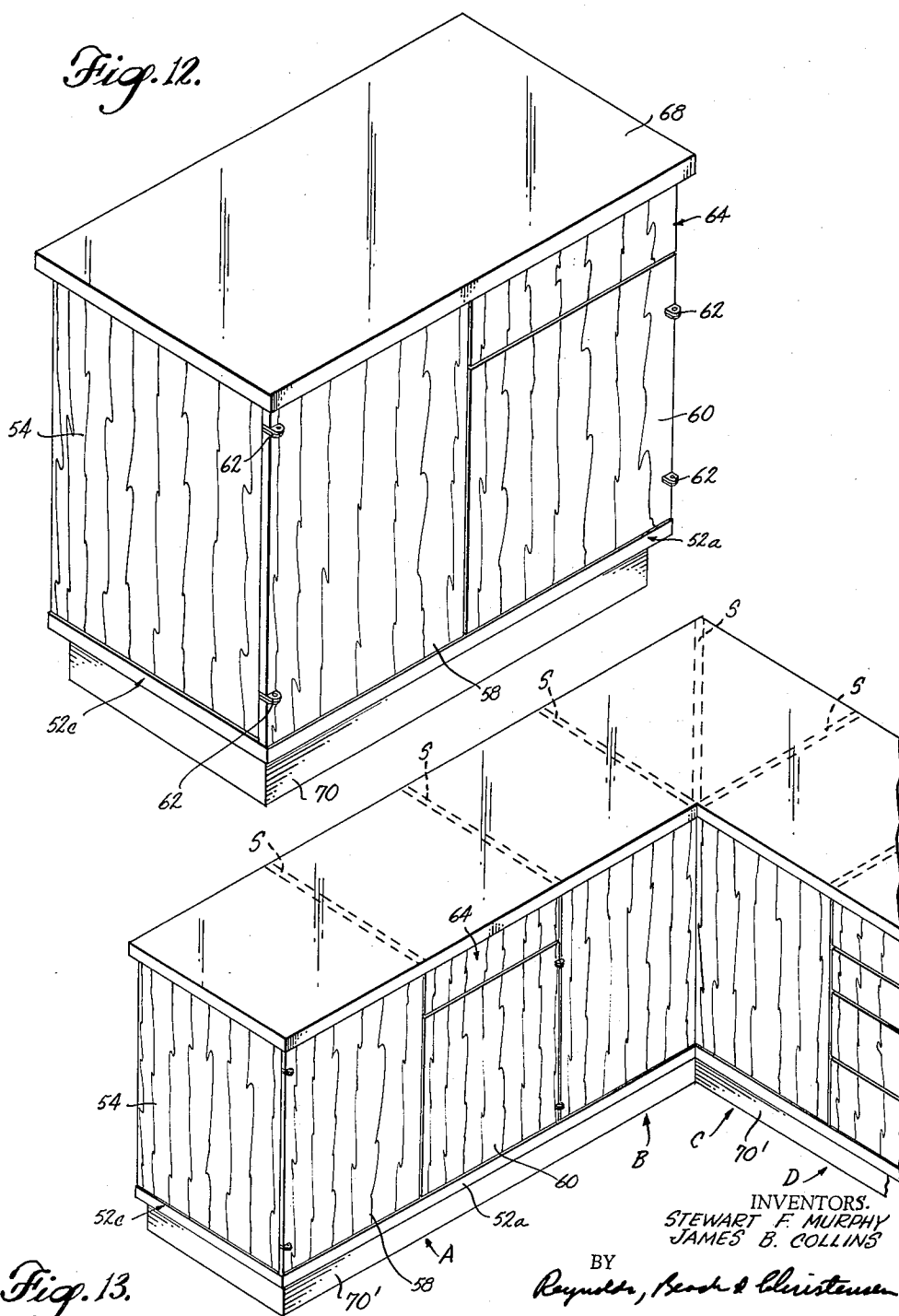
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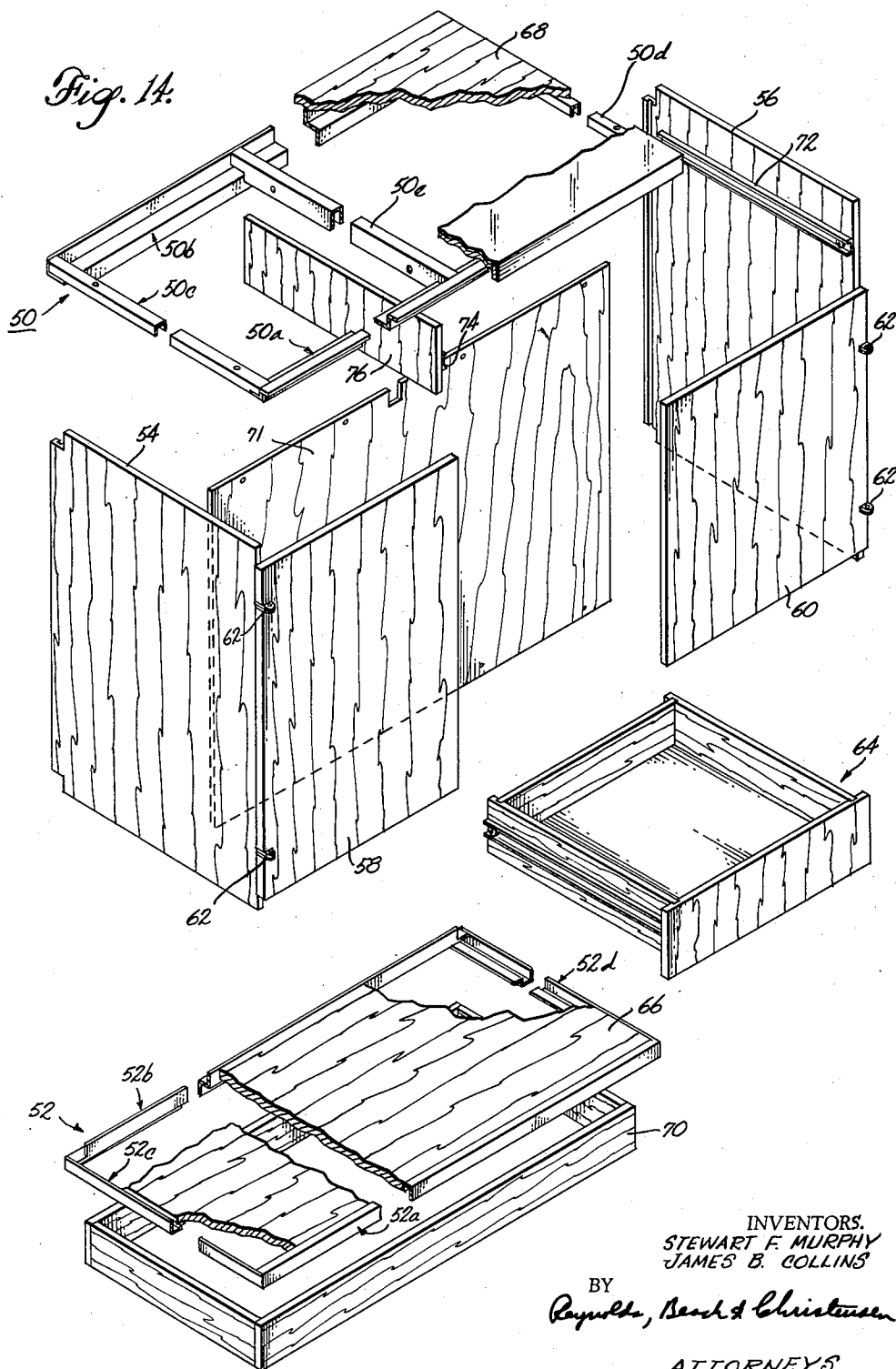
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S. F. MURPHY ET AL
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8 Sheets-Sheet 5



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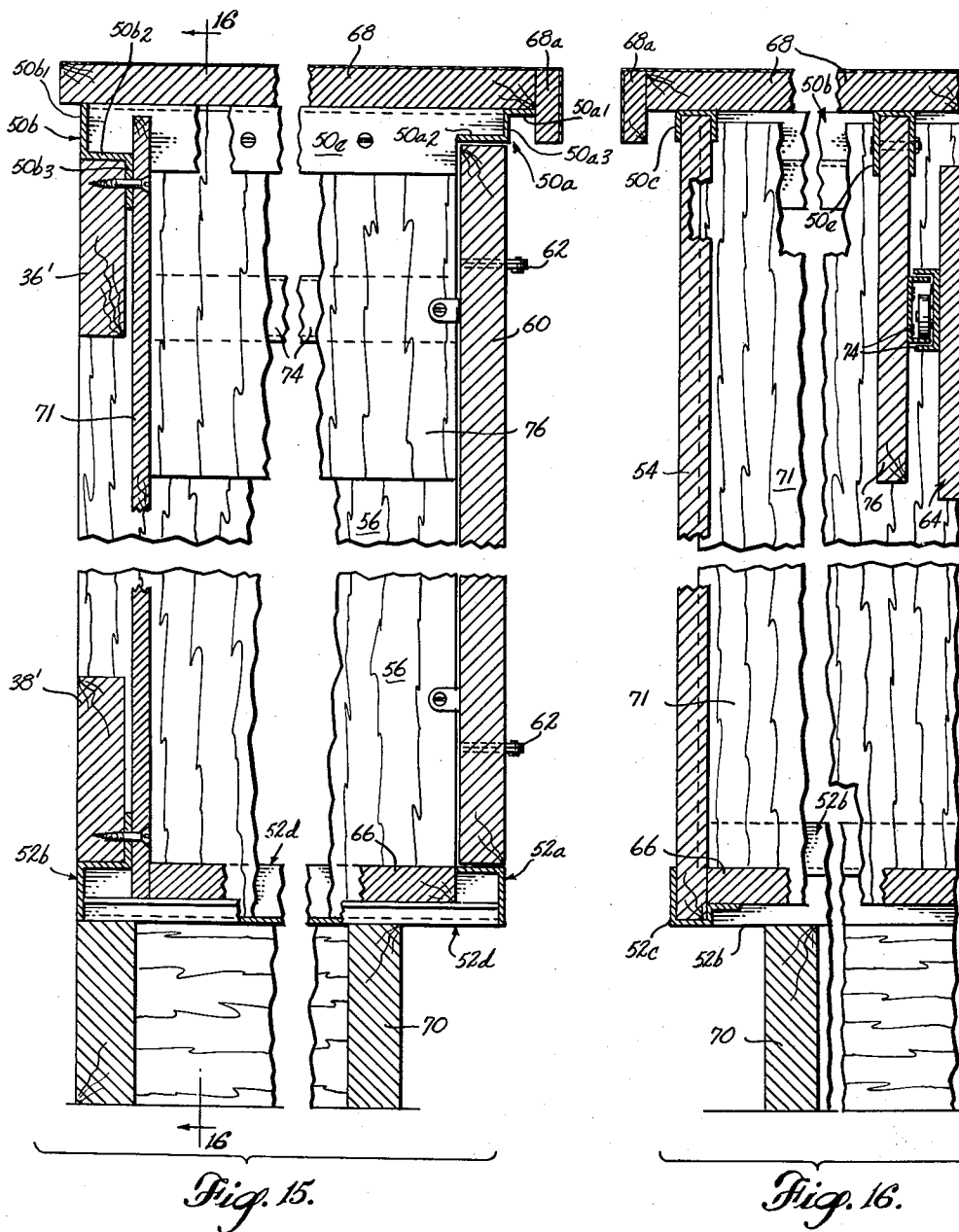
S. F. MURPHY ET AL

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8 Sheets-Sheet 6



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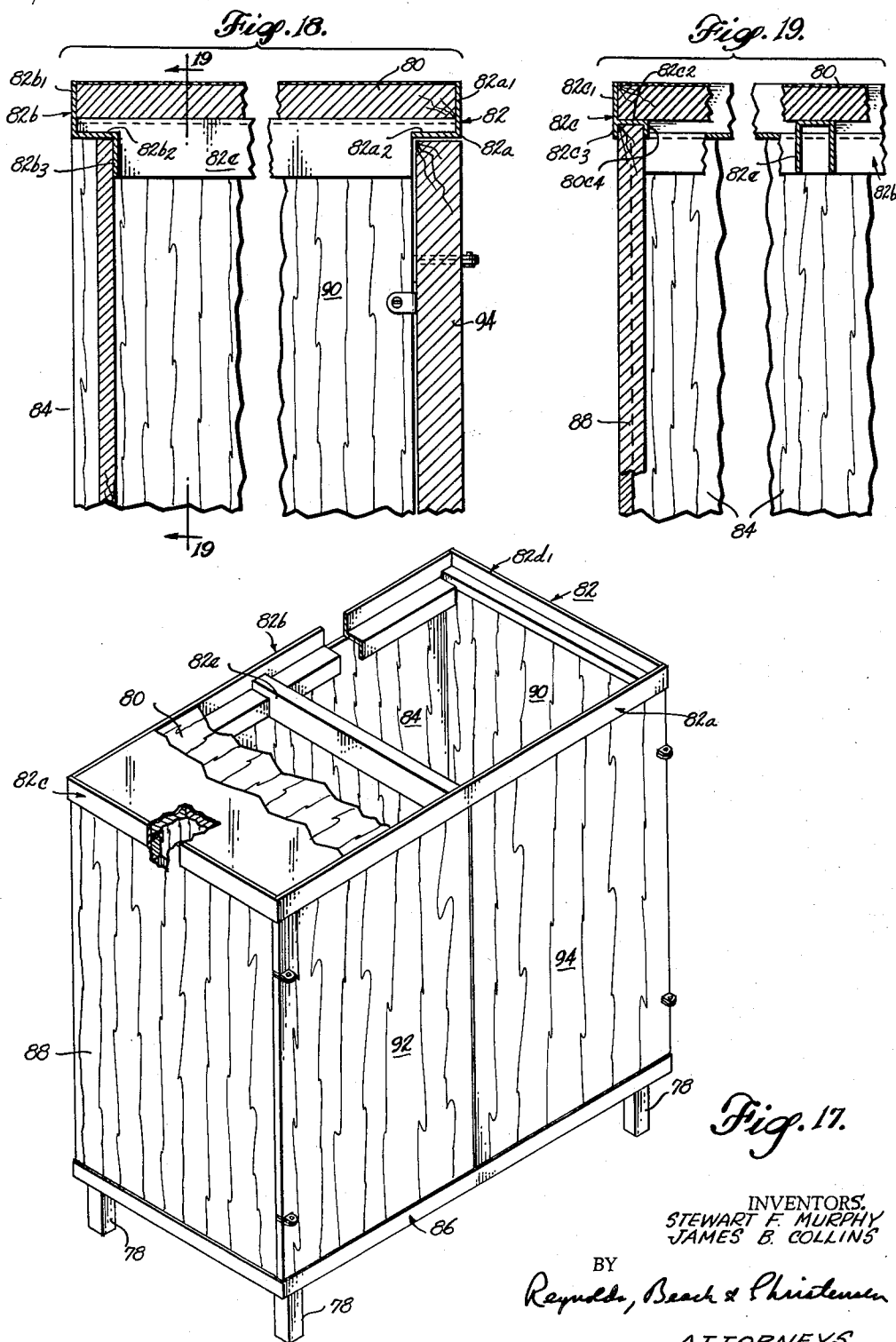
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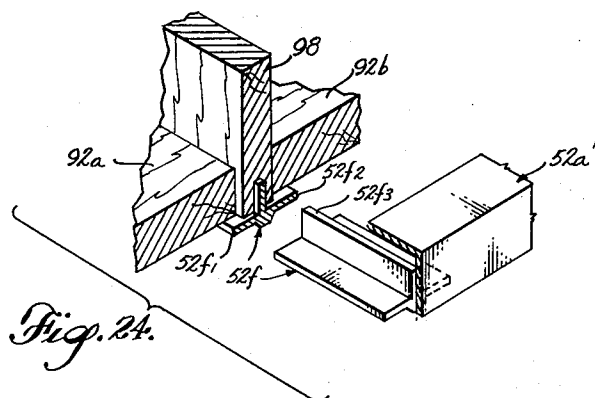
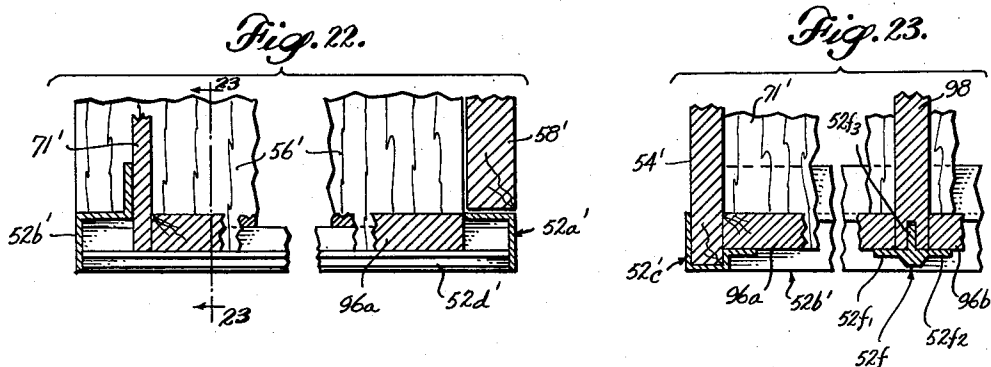
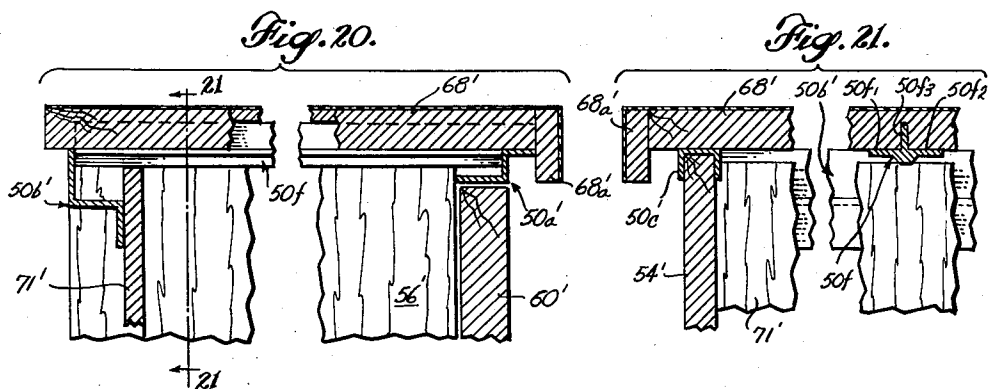
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8 Sheets-Sheet 8



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2,966,385

KNOCK-DOWN CABINETS

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Filed Sept. 27, 1957, Ser. No. 686,632

15 Claims. (Cl. 312—257)

This invention relates to improvements in cabinet construction and more particularly concerns improved knock-down cabinets and components thereof. The invention is herein illustratively described by reference to the presently preferred forms thereof, however, it will be evident that certain modifications and changes therein with respect to details may be made without departing from the essential features.

For economic and other reasons there is a large and growing demand in the field of architectural and furniture products, such as cabinets, for prefabricated construction employing subassemblies and parts all or some of which have been factory made and shipped in knock-down form at low cost to the consumer or fabricator. There is also a demand for high-quality, low cost cabinets employing woods and metals in pleasingly attractive and functional combinations. The present invention is directed generally to these and other objectives.

More specifically it is an important object hereof to provide improved cabinets wherein woods or similar materials may be employed in the paneling for reasons of appearance and economy, and wherein, for like reasons, individual metal parts may be used in the multiple capacity of elements which perform structural framing, connecting, protective edging and aesthetic edge trimming functions in the completed cabinet, all in a manner enabling the units to be manufactured easily and at low cost and to be readily assembled in short order, from a minimum of subassemblies or parts, and by inexperienced hands if necessary.

A related object is to provide such an improved knock-down cabinet construction attaining compactness of the unassembled parts and subassemblies for packaging, storage and shipment purposes.

Another and related objective is such a cabinet achieving a high degree of rigidity, strength and ability to resist wear and damage caused by ordinary usage.

Still another object is an improved knock-down cabinet construction lending itself well for modular unit cabinet assemblies, as in applications requiring a number of cabinet units mounted in serial relationship.

Another object is a knock-down cabinet construction lending itself well to wall mounted units as well as to detached or movable units serving as items of furniture.

In accordance with the invention a novel cabinet construction is provided wherein metal top and bottom frame assemblies of aluminum or other suitable metal cooperate with panels of wood or similar material forming the different sides, top, bottom, and doors or drawers, in such a manner that the panels may be held together and to the metal end frames in an effective manner simply by securing the side panels to the metal frames, and wherein such metal frames are so located and outwardly presented, if desired, as to form trim strips lending an attractive appearance to the completed cabinet and serving as edge protectors for the wood panels, top, sides and bottom. Such metal end frames alone may be furnished by the manufacturer if desired, together with plans by which the

2

cabinet maker, contractor or property owner may readily cut his own wood panels, or, of course, the complete prefabricated and precut assembly of parts may be furnished by the manufacturer for direct assembly. In the improved construction the desired strength and stiffness of the completed structure is achieved primarily by virtue of the positional interrelationship of the wood panels and metal frames with minimum reliance on fastening elements as such, and no glue or other adhesives are required to hold the parts together, as in most conventional cabinets using wood.

Additional features reside in the construction of the metal end frames and in certain details thereof simplifying manufacture and minimizing cost.

These and other features, objects and advantages of the invention, including preferred details of the end frames, and of the mode of attachment of the wood panels thereto in predetermined relation to each other will become more fully evident from the following description thereof by reference to the accompanying drawings.

Figures 1 to 8, inclusive, illustrate an upper wall-mounted cabinet unit according to the preferred form of construction embodied herein. Figure 1 is a front perspective view of the assembled unit; Figure 2 is a similar view with the parts separated; Figure 3 is a similar view of the assembled cabinet as a modular unit joined to another such cabinet unit with common front members in their top and bottom frames; Figure 4 is a sectional side view taken on line 4—4 in Figure 5; Figure 5 is a sectional front view taken on line 5—5 in Figure 4; Figure 6 is a corner detail taken on line 6—6 in Figure 4; Figure 7 is a perspective detail of a rear top corner; Figure 8 is a perspective detail of a rear bottom corner.

Figure 9 is a sectional side view similar to Figure 4, but showing a modification; Figure 10 is a perspective detail of a rear top corner of this modified construction; Figure 11 is a perspective detail of a rear bottom corner of this modified construction.

Figures 12 to 16, inclusive, illustrate a lower wall cabinet unit according to the preferred form of construction herein, corresponding generally to the upper cabinet construction shown in Figures 1 to 8, inclusive. Figure 12 is a front perspective view of the assembled unit; Figure 13 is a perspective view of such a unit joined to others in a modular arrangement employing top and bottom frames having common front members; Figure 14 is a top perspective view of the cabinet in Figure 12, with the parts separated; Figure 15 is a sectional side view taken at a location relatively similar to that of Figure 4; Figure 16 is a partial or fragmentary sectional front view taken on line 16—16 in Figure 15.

Figure 17 is a front perspective view of a floor cabinet according to the invention; Figure 18 is a sectional side view showing the upper portion of the same; Figure 19 is a partial sectional front view thereof taken on line 19—19 in Figure 18.

Figure 20 is a sectional side view of the upper portion of a cabinet comprising a modification of that shown in Figures 12 through 16; Figure 21 is a partial sectional view of such upper portion taken on line 21—21 in Figure 20; Figure 22 is a sectional side view of the lower portion of a modified cabinet; Figure 23 is a partial sectional view of such lower portion taken on line 23—23 in Figure 22; Figure 24 is a sectional detail in perspective from a front aspect showing the latter modification.

Referring to Figures 1 to 8, inclusive, the basic subassemblies and components of the illustrated cabinet unit comprise the top metal frame 10, the bottom metal frame 12, the opposite side panels 14 and 16 and the bottom panel 18. Preferably the cabinet structure also comprises a back panel 20 and a top panel 22, and if desired doors

24 and 26 may be provided, connected by hinges 28 to the forward edges of the respective side panels 14 and 16. Other types of cabinet fronts, including doors or drawers and various types of mountings therefor may be employed in obvious alternative types of construction.

It will be understood that various panels, particularly the side panels 14 and 16 and doors 24 and 26 are formed of wood or similar materials, such as pressed fibrous board, and in most cases that the back panels and top and bottom panels will also be formed of wood or such similar materials. This is not only for reasons of economy but also for reasons of achieving desired aesthetic design effects combining woods and metals.

In this first embodiment of the knock-down cabinet, the top frame 10 comprises elongated front, rear and opposite side structural members interconnected serially in rectangular form. The front structural member 10a is formed by a vertical flange 10a1 joined to a horizontal flange 10a2 in a right angle formation opening upwardly and to the rear of the cabinet. The top frame rear structural member 10b comprises a similar vertical flange 10b1 and horizontal flange 10b2. In addition, this rear structural member comprises a depending vertical flange 10b3 joined to the inner edge of the horizontal flange and projecting downwardly therefrom. The flanges 10b1 and 10b2 form a structural angle opening upwardly and forwardly of the cabinet, as shown in Figure 4. The front and rear structural members are interconnected by the mutually opposite side structural members 10c and 10d of structural right angle form comprising vertical flanges 10c1 and 10d1, respectively, and horizontal flanges 10c2 and 10d2, respectively. These structural angles open downwardly and inwardly of the cabinet. The vertical flanges of the front, rear and side structural members of the top frame 10 are joined together in substantial vertical registry at the corners in a continuous manner. Other abutting structural member end surfaces may or may not be actually joined, but preferably are joined. The corner joints may be of mitered form or any of different possible butt joint forms, or combinations thereof, depending upon factors of cost and convenience. Welding or other metal bonding techniques may be used to secure the joints.

The bottom frame 12, also formed of metal, preferably similar to that employed in the top frame, likewise comprises front, rear and opposite side structural members connected together serially in generally rectangular form having the same general dimensions as the top frame 10. The bottom frame front structural member 12a comprises a vertical flange 12a1 and a horizontal flange 12a2 which together form a structural right angle opening downwardly and to the rear of the cabinet. The rear structural member 12b comprises a vertical flange 12b1 joined to a horizontal flange 12b2 in a right angle opening downwardly and forwardly of the cabinet, and further an upright vertical flange 12b3 projecting upwardly from the inner edge of the horizontal flange 12b2 as shown in Figure 4. The bottom frame side structural member 12c comprises an outer vertical flange 12c1 joined along its lower edge to a horizontal flange 12c2. In addition such structural member includes a second horizontal flange 12c3 connected by means of a vertical flange or offset 12c4 to the free, inner edge of the horizontal flange 12c2. The flanges 12c1 and 12c2 and the offset or flange 12c4 define a channel therebetween whereas the horizontal flange 12c3 forms a ledge. The opposite structural side member 12d has two horizontal and two vertical flanges designated by reference numerals corresponding to the numerals applied to the member 12c as indicated in Figure 5. These respectively include the flanges 12d1, 12d2, 12d3 and 12d4. The four bottom frame members are suitably joined together in any suitable manner, as in the case of the top frame.

Preferably the top and bottom metal frames are formed of aluminum or other suitable metal, stainless steel

being a preferred alternative. It is desired that these metal frames be relatively inexpensive to manufacture and maintain their outward attractiveness over a long period. It is also preferred that they be of relatively light weight construction in order to reduce shipping costs and minimize the cabinet weight to be carried by a wall mounting. Obviously, aluminum and aluminum alloys suit these various requirements particularly well but it should be understood that the end frames need not be limited thereto.

The top and bottom metal frames 10 and 12 are considered to be the principal structural members or sub-assemblies of the cabinet. Of second importance, structurally, are the wooden side panels 14 and 16. Usually these will be of plywood construction. The upper end of the side panel 14 is designed to be retained in the inside corner defined by the structural angle 10c, and the lower end of such panel is designed to be received in the channel formed by the structural side member 12c, as shown best in Figure 5. The panel 16 is similarly retained in contact with the side members 10d and 12d. Wood screws 30 or other suitable securing elements hold the ends of the side panels to the top and bottom frame side structural members. In the illustrated embodiment the horizontal flanges 10c2 and 10d2 of the top frame side members have two holes therein which receive these wood screws to be threaded into the ends of the panels, whereas the bottom frame side member flanges 12c2 and 12d2 have similar pairs of holes therein receiving securing screws. Any other suitable securing technique may be used in the alternative. In Figures 9 to 11, inclusive, a different mode of securement is illustrated, and is later to be described herein.

Preferably a back panel 20 is used and has the extra advantage of imparting additional stiffness to the cabinet particularly against racking thereof in a plane parallel to the front and rear faces of the cabinet. This back panel 20 preferably butts against the forward or inside faces of the vertical flanges 10b3 and 12b3 and is retained in this position, initially at least and completely if desired, by letting the opposite vertical edges of the rear panel 20 into vertical grooves 14a and 16a formed in the inside faces of the respective side panels 14 and 16 near the rear edges thereof. Installation of the rear panel 20 is accomplished by inserting its opposite side edges in the grooves 14a and 16a, either before assembly of the side panels 14 and 16 with the top and bottom frames or after such assembly. In certain cases, depending upon the width of the horizontal flanges 10c2 and 10d2 in relation to the thickness of the side panels 14 and 16, it may be necessary to assemble the back panel 20 with the side panels 14 and 16 before the latter are assembled with the top and bottom metal frames. The upper and lower rear corners of the side panels 14 and 16 are notched as shown in Figures 7 and 8 in order to accommodate horizontal flanges 10b2 and 12b2 of the top and bottom frame rear structural members. The vertical flanges 10b3 and 12b3 of these top and bottom frame members are notched to accommodate the thickness of the side panels 14 and 16 as shown best in Figure 3. The notching of the corners of the side panels 14 and 16 does not mar the external appearance of the cabinet, however, inasmuch as the horizontal cut edges or faces of the respective notches lie flush with the edges of the vertical flanges of the top and bottom frame sides to form a substantially invisible interface or crack therebetween, or if desired may be overlapped by these flanges, depending upon the vertical width of such flanges.

The side panels 14 and 16 if desired may be provided with peg holes 14b and 16b, respectively, at suitable locations heightwise thereof to receive the pegs 32 for supporting one or more shelves 34 at selected levels. The shelves are, of course, optional.

The cabinet structure further comprises a bottom panel 18 as previously described, having rectangular dimen-

5

sions suiting it to those of the bottom frame 12. Specifically the length of the bottom panel 18 is such that its end edges abut the inside faces of the side panels 14 and 16 (Figure 5) with the panel resting on the ledge flanges 12c3 and 12d3 as shown. The forward edge of the bottom panel 18 preferably lies in contiguous relationship to the inner edge of the horizontal flange 12a2, preferably with the top faces of the flange and panel substantially flush. The rear edge of the bottom panel 18 lies just slightly forwardly of the inside face of the flange 12b3, the width of the panel 18 measured from front to rear being slightly less than the distance between the inside edge of the horizontal flange 12a2 and the inside face of the vertical flange 12b3, thereby permitting the panel 18 to be installed by sliding it down into the space between these flanges until it rests on the ledge 12c3 and 12d3 of the preassembled bottom frame 12 and side panels.

In addition, the cabinet preferably also includes a top panel 22 having a width somewhat less than the spacing between the inside faces of the vertical flanges 10b1 and 10a1 and having a length somewhat less than the spacing between the inside edges of the flanges 10c2 and 10d2, thereby enabling this panel to be dropped into position on top of the horizontal supporting flanges 10b2 and 10a2 after the cabinet structure is otherwise assembled. No fastening devices are required to hold either the top panel, rear panel or the bottom panel in place, once the cabinet is assembled.

Installation of the completed cabinet assembly on a wall may be accomplished in any of different ways. That considered to be most suitable in this instance is the conventional technique of nailing a pair of furring strips or boards 36 and 38 to the face of the wall W in horizontal parallel relationship so as to fit into the inside corners formed by the respective top and bottom frame rear structural members, whereupon wood screws 40 may be threaded through holes in the vertical flanges 10b3 and 12b3 of these structural members in order to hold the cabinet on the wall. Holes are first drilled, of course, through the back panel 20 and these vertical flanges at a sufficient number of locations, such as the four locations shown in Figure 4 along top and bottom edges of the rear panel 20. In the case of modular units serially arranged, a continuous furring strip may be used, appropriately notching the abutting side panels to accommodate the strip.

It will be evident that once the cabinet is assembled it is held together simply and entirely by means of the simple fastening elements by which the panel top and bottom frames are secured to the upper and lower ends of the side panels 14 and 16. After installation, of course, the screws 40 do assist in holding the cabinet structure together in a rigid form inasmuch as these screws which penetrate the furring strips necessarily interconnect the back panel 20 and the rear structural members of the top and bottom frames. All other forces required for holding the parts of the cabinet in the desired relationship derive from gravity and the forms and interrelationships of the various members.

It will also be recognized that the resulting cabinet structure is not only simple and inexpensive in construction but that the various corners of the wood panels employed are edge protected and aesthetically trimmed by the structural metal frames themselves. Thus, the forward corner or edge of the bottom panel 18 is protectively covered and trimmed by the corner angle 12a, the same being true of the forward edge of the top panel 22. The top edges of the side panels are protected by the side structural members 10c and 10d of the top frame whereas the bottom edges of the side panels are protectively received within the channels defined by the bottom frame side structural members 12c and 12d as shown. The overlap of the vertical flanges of the top and bottom frame side structural members on the out-

6

side faces of the side panels provides an attractive metal trim appearance matching the metal trim appearance afforded by the vertical flanges of the top and bottom frame front structural members 10a and 12a.

In case one or more units are to be joined together in a combination of modular units as shown in Figure 3, cabinet A and cabinet B may be formed of separate panels and of separate or joined top and bottom metal frames. Preferably a common top and bottom frame structure is used in this case wherein the front and rear structural members are formed each as one continuous elongated member extending the full length of the modular unit assembly as shown. Thus, as shown in Figure 3, the bottom frame may comprise a structural angle member 12a'' corresponding to the member 12a in Figure 2 but of a length equal to the combined length of the desired series of units, and the top frame front structural member 10a'' may be similar to the member 10a in Figure 2 but of a length corresponding to the length of the member 12a''. Likewise the rear structural member 10b'' of the top frame will have the same total length but otherwise will resemble the structural member 10b in the single unit form. Various intermediate frame cross members may be used corresponding to the frame side members in Figure 2, for example. In the illustrated modular structure in Figure 3 the abutting units A and B have abutting top frame side structural members 10d'' and 10c'', although at the joint only a single side panel need be used, if indeed any at all is required at that location.

For groupings of modular units in any of various ways such as the arrangement illustrated in Figure 3, it is preferred as previously mentioned that the top and bottom frame structures be integrated not only for convenience of assembly of the cabinet but also for reasons of assuring perfect alignment of the front panels or doors so as to avoid any appearance of jogs in the assembly caused by vertical offset of one cabinet relative to the other or possible tilting of one cabinet relative to the other in a vertical plane parallel to the supporting wall.

In the modification shown in Figures 9 to 11, inclusive, the top and bottom frame rear structural members are somewhat different than in the first described embodiment in order to permit the cabinet to be mounted on a wall without need of furring boards such as the boards 36 and 38 shown in Figure 4. In this case, the top frame rear structural member 10s is of rearwardly open channel form including a bottom horizontal flange 10s1 connected to a top horizontal flange 10s2 by a vertical web 10s3, with an upstanding vertical flange 10s4 joined to the free edge of the flange 10s2, and with a horizontal flange 10s5 projecting forwardly from the web 10s3 at a location generally intermediate the top and bottom thereof. The flange 10s5 serves as a ledge for supporting the rear edge of the top panel 22'. The projection of the web 10s3 below the flange 10s5 serves as a means to receive mounting bolts or screws 40' by which to anchor the top frame to the wall W. Pressure of the screws 40' is reacted against the wall by the free edge of the flange 10s1 and the face of the flange 10s4. The bottom frame rear structural member 12s is formed similarly to the member 10s but is inverted in its relative position. It comprises the flanges 12s1, 12s2, 12s4, 12s5, and the web 12s3, and serves a function similar to the function of the member 10s. The bottom panel 18' is notched at 18a' to accommodate the ledge 12s5, the main function of which is to support the lower edge of the back panel 20'. The bottom panel 18' is itself supported by resting on the horizontal flanges 12c3' and 12d3' of the bottom frame side members 12c' and 12d' (only one of which is shown in the drawings because of the selection of views).

In this embodiment the side panels 14' and 16' have top and bottom edges which are accommodated by the top and bottom frame side members as in the previous embodiment. Thus, the top frame side member 10d' has

a horizontal flange 10d2' overlying the upper end edge of the side panel 16', and has a vertical flange 10d1' lapping downwardly over the outer face of such side panel. Similarly the bottom frame side member 12d' has the flanges 12d1', 12d2', and 12d4' forming a channel which received the lower edge of the panel 16'. A ledge flange 12d3' serves as a support for the end of the bottom panel 18', as before. In this embodiment, instead of using screws driven into the end edges of the side panels 14' and 16' the top and bottom frames are secured to the side panels by a pressure fit between the rib 10e' formed horizontally along the inside face of the vertical flange 10d1' and a complementary groove 16a' formed in the outside face of the side panel 16'. Also, a similar bead or rib 12e' is formed horizontally along the inside face of the flange 12d1' of the bottom frame side member, engageable in a complementary groove 16b' in the side panel. The top and bottom rear corners of the panel 16' (the same being true of the panel 14' of similar form) are notched to accommodate the flanges 10s5 and 12s5. Also, notching of the rear members 10s and 12s at their ends, from their mutually adjacent faces outwardly to the horizontal plane of the free edges of the respective vertical flanges 10d1' and 12d1' provides space for insertion of the ends of the side panels 14' and 16' into the top and bottom frames in order to permit such side panels to be advanced laterally into contact with the side structural members so as to engage the ribs 10e' and 12e' in the complementary panel grooves. In this embodiment the top and bottom panels received between the side panels hold the latter in locked engagement with the top and bottom frame side members.

In other respects, the modified cabinet structure illustrated in Figures 9 to 11, inclusive, is generally similar to that described in the first series of figures and the parts are similar so as to require no separate description or discussion herein.

In Figures 12 to 16, inclusive, the cabinet structure is adapted for resting on a floor surface and to be secured against a vertical wall, whereas the embodiments previously described applied to elevated wall-mounted cabinets. These lower cabinet units are, of course, preferably designed to match the upper cabinet units for use in the same installations.

The cabinet unit as shown in Figures 12, 14, 15 and 16 comprises the top metal frame 50, bottom metal frame 52, wooden side panels 54 and 56, doors 58 and 60 connected by hinges 62 to the forward edges of the respective side panels, a drawer 64, a bottom panel 66, a top panel 68, a base 70, a rear panel 71, and drawer guides 72 and 74, one mounted on the side panel 56 and the other on a hung partition 76 situated between the cabinet sides. The construction of top and bottom frames and their structural cooperation with the side, bottom and rear panels is generally similar to the construction of the first described embodiment.

Top frame 50 comprises front and rear structural members 50a and 50b interconnected at their ends by side structural members 50c and 50d to form a generally rectangular frame structure. The front and rear structural members are interconnected generally intermediate their ends by a downwardly open channel member 50e. The end members 50c and 50d are also in the form of downwardly open channels and their top sides are substantially flush with that of the intermediate channel 50e. The rear member 50b comprises two vertical flanges 50b1 and 50b3 and a horizontal flange 50b2 extending between the lower edge of flange 50b1 and the upper edge of flange 50b3. The front member 50a comprises the two horizontal flanges 50a1 and 50a2 and a vertical flange 50a3 joined to the inner edge of flange 50a1 and the outer edge of flange 50a2. Flanges 50a2 and 50b2 are substantially coplanar and serve as supports for the channels 50c, 50d and 50e. The top face of flange 50a1 is substantially flush with the top faces of members 50c, 50d and 50e.

Top panel 68 rests on these coplanar faces and is suitably secured thereto in the position indicated, preferably with the rear edge of this panel abutted to the flange 50b1, and the front edge of the panel flush with or projecting slightly beyond the free edge of flange 50a1. Edging strips 68a may be secured to the front and side edges of the panel 68, and the panel proper and these strips covered exteriorly by a suitable surfacing material if desired. The rear edge of the panel 68 is permitted to overhang slightly so that it may be contoured to match wall irregularities, if desired.

Bottom frame 52 comprises front and rear structural members 52a and 52b the ends of which are interconnected by the opposite side structural members 52c and 52d. These members and their relationship to the rear, bottom and side panels are substantially the same as in the upper cabinet embodiment of Figures 1 to 8, inclusive. Furring boards 36' and 38' may also be used to mount the present lower cabinet structure to a wall in a manner similar to that employed in the illustration of the upper cabinet in Figures 1 to 8.

The upper edges of side panels 54 and 56 are retained in channels 50c and 50d, as is the drawer support partition or panel 76. These panels are suitably secured to the channels by screws entering the panel sides or ends through a channel web or flange, or by any other suitable device.

Details of the drawer construction and of the guides therefor form no part of the present invention. Base 70 simply acts as a support upon which the bottom frame rests.

Figure 13 illustrates a modular construction assembly wherein the unit A, similar to that shown in Figure 12, is joined to other units B and C, which form a corner cabinet, and wherein the unit D is joined to unit C as an extension thereof. As in the case of modular unit assemblies of upper units it is preferred that the frames be integrated and include common front and rear structural members comprising the top and bottom frames of the different units. A continuous base 70' is of course also desirable. The pairs of dotted lines S indicate the necessary or desirable locations of top frame intermediate or side structural members. The manner in which these units may be formed and assembled will be evident.

Figures 17, 18 and 19 illustrate a modified lower cabinet construction designed as a detached piece of furniture wherein the cabinet base 70 is replaced by legs 78 and wherein the top 80 and top frame 82 are modified in order to permit all edges of the top panel 80 to be protectively edged or trimmed by the structural members of the top frame. The bottom panel (not shown), bottom frame 86, and panels 88 and 90, and hinged doors 92 and 94 may be formed and mounted similarly to the corresponding elements in preceding embodiments.

In the embodiment of Figures 17, 18 and 19, the top frame side members 82c and 82d, interconnecting front and rear members 82a and 82b, are formed as inwardly and upwardly open structural angles, with depending vertical flanges forming, with the horizontal flange, a downwardly open channel retaining therein the upper ends of a side panel. Thus, member 82c comprises a vertical flange 82c1, a horizontal flange 82c2 and depending channel flanges 82c3 and 82c4. The member 82d is similar.

The rear structural member 82b, of Z-section, comprises an upper vertical flange 82b1, a horizontal flange 82b2 and a lower vertical flange 82b3. Front structural member 82a is formed similarly, as an angle having a vertical flange 82a1 and horizontal flange 82a2, opening upwardly and toward the rear. The four vertical flanges 82a1, 82b1, 82c1 and 82d1 are interconnected end to end in a rectangular frame or molding snugly retaining and surrounding the top panel 80. The back panel 84 butts up against the rear side of lower vertical flange 82b3 and its side edges are retained in grooves formed in the side panels 88 and 90. The lower edge of panel

84 is abutted to the top of a bottom frame rear member. Depending upon whether an intermediate partition or panel is required in the cabinet, the intermediate channel member 82e may or may not be employed.

Figures 20 and 21 illustrate a variation of the form shown in Figures 12 to 16, inclusive, and parts similar to those in the previous figures are designated by similar reference numerals primed. The principal difference represented by this variation is in the formation of the intermediate structural members of the top frame, and in the complementary grooved formation in the top panel. In the case of long top panel spans, and particularly where an intermediate partition is not required, a T-section cross-brace is convenient as a substitute intermediate structural member replacing the intermediate channel. This substitute member is designated 50f and has horizontal flanges 50f1 and 50f2 and an upright central flange 50f3 retained in a slot in the lower face of the top panel, the latter resting on flanges 50f1 and 50f2.

In Figures 22, 23 and 24 a modified bottom construction is shown, in a cabinet requiring a full-height intermediate partition. The bottom frame intermediate structural member 52f has oppositely projecting horizontal flanges 52f1 and 52f2 serving as ledges supporting the adjacent ends of bottom panel sections 96a and 96b. An upstanding flange 52f3 fits into a slot in the lower end of partition 98, thereby retaining the partition in the desired position. The upper end of the partition may be held in a top frame channel as in the embodiment of Figures 12 to 16, or may be slotted to receive a frame member rib or flange, as is the bottom end thereof.

Thus, in these revised constructions additional support for long top and bottom panels is provided by the intermediate structural members 50f and 52f. These members may also be employed to lock the partition 98 in position without use of other fastener elements.

From the foregoing description, as well as from the accompanying drawings, it will be apparent that the improved cabinet construction has all of the advantages indicated and others. The top and bottom frames may be manufactured at relatively low cost from extruded aluminum sections or the like, cut and joined together at low cost in any of different convenient ways. The wooden panels completing the cabinet assembly may be provided conveniently either by the frame manufacturer, by a cabinet maker or ultimate user, since these parts are also readily cut and since no special tools or jigs are required for their preparation. Assembly of the parts into the completed cabinet structure requires no gluing operations and only a minimum of securing elements, yet when once assembled the parts interact in such a manner that the structure is very rigid and strong. Furthermore, it will be evident that the multiple functions of the end frame members as structural subassemblies as well as protective and ornamental trim elements provide at low cost a very practical design, particularly in a knock-down construction, and that wood and metal surfaces are combined together harmoniously appearance-wise and cost-wise. Further, cabinet designs satisfying contemporary concepts of architectural design using woods and metals together are provided thereby. While the parts naturally must fit together properly in order for the cabinet to be structurally sound and pleasing to the eye, critical dimensioning is not involved nor is it necessary to carefully joint edges as in the case of glued cabinet structures.

When the parts are disassembled for packaging, storage or shipment, all of the components are in the form of relatively flat panel elements which take up very little space and are easily managed.

Further, it will be evident that the features of the invention may be incorporated either in wall-mounted cabinets or in detached cabinets as movable items of furniture and that certain parts of one type of cabinet are interchangeable with corresponding parts of another type.

These and other advantages of the invention including

the various aspects and possible modifications thereof within the scope of the novel concepts will be recognized by those skilled in the art.

We claim as our invention:

1. A knock-down cabinet construction comprising top and bottom metal frames, opposite side panels to interconnect and space apart said frames, and a bottom panel, said top and bottom frames having interconnected elongated front, rear and mutually opposite side structural members, at least the side structural members having substantially vertical flanges extending along substantially the outer wall of said cabinet, at least said side structural members having horizontal base flanges extending along and projecting inwardly from said vertical flanges thereof and adapted to overlap top and bottom edges of the respective side panels in their assembled position, said side structural members being secured to the adjacent end portions of said side panels overlapped by the vertical flanges of said side structural members to maintain said top and bottom frames in spaced relation interconnected by said side panels, the side panels having top and bottom end portions retained between the front and rear structural members of the top and bottom frames, respectively, the side structural members of said bottom frame further having inwardly projecting ledge-forming horizontal flanges joined to the inner edges of said base flanges thereof and supporting said bottom panel by the respective opposite end portions thereof, with the end edges of such bottom panel substantially abutted to and retained between the inside faces of said side panels, said side panels being received between said end edges and the vertical flanges of said bottom frame side structural members, respectively, said bottom frame front structural member having a horizontal flange projecting inwardly from the upper edge of its vertical flange substantially flush with said bottom panel, whereby the two flanges of said bottom frame front structural member form an exposed outside corner.

2. The cabinet construction defined in claim 1, wherein the top frame front and rear structural members have inwardly projecting horizontal flanges disposed in a common plane, and wherein the cabinet further comprises a top panel adapted to rest horizontally on said coplanar horizontal flanges with its ends abutting the inside faces of the respective side panels.

3. The cabinet construction defined in claim 2, wherein the cabinet further comprises a back panel, the top and bottom frame rear structural members having substantially vertical flanges adapted for abutment by the rear panel, said vertical flange of the top frame rear structural member projecting downwardly from the inside edge of the horizontal flange of this structural member and being coplanar with the vertical flange of said bottom frame rear structural member, offset forwardly from the rear of said top and bottom frames, and adapted for mounting of the cabinet on a wall.

4. The knock-down cabinet construction defined in claim 3, wherein the side panels have vertically extending grooves formed in their inside faces near the rear of said cabinet, which grooves retain opposite side edges of the rear panel with the cabinet assembled.

5. The knock-down cabinet construction defined in claim 1, wherein the side structural members of the bottom frame have upright offsets supporting the ledge-forming horizontal flanges thereof and joined to the inner edges of the base flanges of such side structural members.

6. A knock-down cabinet construction comprising top and bottom metal frames, opposite side panels to interconnect and space apart said frames, and a bottom panel, said top and bottom frames having interconnected elongated front, rear and mutually opposite side structural members, at least the side structural members having substantially vertical flanges extending along substantially the outer wall of said cabinet, at least said side structural members having horizontal base flanges extending along and projecting inwardly from said vertical flanges thereof

and adapted to overlap top and bottom edges of the respective side panels in their assembled position, said side structural members being secured to the adjacent end portions of said side panels overlapped on the exterior by the vertical flanges of said side structural members to maintain said frames in spaced relation interconnected by said side panels, the side panels having top and bottom end portions retained between the front and rear structural members of the top and bottom frames, respectively, at least two oppositely situated structural members of said bottom frame further having inwardly projecting ledge-forming horizontal flanges adapted to support said bottom panel by respective opposite edge portions thereof, with the end edges of such bottom panel substantially abutted to and retained between the inside faces of said side panels.

7. A metal top frame for a knock-down cabinet construction comprising a metal bottom frame, opposite side panels, a rear panel and a bottom panel, said top frame comprising interconnected elongated front, rear and mutually opposite side structural members, at least the front and side structural members having substantially vertical flanges located along their outer edges, at least said side structural members having horizontal base flanges extending along and projecting inwardly toward each other from the upper portions of said vertical flanges thereof and adapted to overlies the top edges of the respective side panels mounted against said side members, with said vertical flanges overlapping the exterior faces of such side panels, said side structural members being adapted for securement to the tops of such side panels, said rear structural member having a horizontal flange, having a vertical flange depending from the inner edge of such horizontal flange for abutment of a rear panel against said latter vertical flange, and having a second vertical flange projecting upwardly from the outer edge of such horizontal flange at least substantially to the level of said side member base flanges.

8. The top frame defined in claim 7, wherein the side structural members comprise downwardly open channels adapted to receive therein the upper edges of cabinet side panels.

9. A metal bottom frame for a knock-down cabinet construction further comprising a metal top frame, opposite side panels, a rear panel and a bottom panel, said bottom frame comprising interconnected elongated front, rear and mutually opposite side structural members, at least the front and side structural members having substantially vertical flanges located along their outer edges, at least said side structural members having horizontal base flanges extending along and projecting inwardly toward each other from the lower portions of said vertical flanges thereof and adapted to overlap the bottom edges of the respective side panels mounted against said side members, with said vertical flanges overlapping the exterior faces of such side panels, said side structural members being adapted for securement to the bottoms of such side panels, said rear structural member having a horizontal flange, having a vertical flange projecting upwardly from the inner edge of such horizontal flange for abutment of a rear panel against said latter vertical flange, and having a second vertical flange joined to the outer edge of such horizontal flange.

10. The bottom frame defined in claim 9, wherein the side structural members further comprise vertical flanges projecting upwardly from the horizontal flanges and spaced inwardly from the first-mentioned vertical flanges to retain the lower edges of side panels therebetween, and a second horizontal flange projecting inwardly from the second-mentioned vertical flange and adapted to serve as ledge supports for the sides of a cabinet bottom panel.

11. A knock-down cabinet construction comprising, in combination, top and bottom metal frames, opposite side wood panels, a rear panel, and a bottom panel, said top and bottom frames being generally rectangular and hav-

ing interconnected elongated front, rear and mutually opposite side structural members, said top and bottom frame side structural members comprising substantially vertical and horizontal flanges forming structural angles which open diagonally inwardly of the cabinet, with the top and bottom ends of the side panels being retainable in said angles overlapped on their outside faces by the vertical flanges, means for securing said side panel ends to said top and bottom frame side structural members, respectively, thereby to maintain spaced relationship between said frames and between said side panels, means for supporting said bottom panel horizontally with opposite ends thereof in abutted relationship with the lower inside faces of said side panels, and means retaining said rear panel vertically extending between said top and bottom frame rear structural members and between said side panels, such means for supporting the bottom panel comprises substantially horizontal flanges projecting inwardly from the bottom frame side structural members and raised above and joined to inner edges of the first-mentioned horizontal flanges of said side structural members through a vertical flange abutting the lower inside face of the adjacent side panels, respectively, said top frame front and rear structural members comprising structural angle formations extending along the length thereof, having substantially horizontal and vertical flanges, and wherein the cabinet construction further comprises a top panel adapted to rest by its front and rear edges on the horizontal flanges of said top frame front and rear structural members, said top frame rear structural member comprising a rearwardly open horizontal structural channel having a forwardly projecting substantially horizontal flange joined to the web of said channel generally intermediate top and bottom thereof, whereby said latter horizontal flange and the channel web above such flange comprise the structural angle formation of said top frame rear structural member.

12. The cabinet construction defined in claim 11, wherein the bottom frame rear structural member comprises a rearwardly open structural channel having a substantially horizontal flange projecting forwardly from the web thereof generally intermediate top and bottom of said channel, and wherein the top frame front structural member angle formation opens upward and toward the rear of the cabinet, opposite ends of the vertical flange of such top frame front structural member being joined to the forward ends of the vertical flanges of the side frame structural members, and further wherein the bottom frame front structural member comprises structural angle formation having substantially horizontal and vertical flanges, and opening downwardly and toward the rear of the cabinet, opposite ends of the vertical flange of said bottom frame front structural member being joined to the forward ends of said bottom frame side structural members.

13. A knock-down cabinet construction comprising top and bottom metal frames, opposite side panels to interconnect and space apart said frames, a bottom panel, said top and bottom frames having interconnected elongated front, rear and mutually opposite side structural members, at least the side structural members having substantially vertical flanges extending along substantially the outer wall of said cabinet, at least said side structural members having horizontal base flanges extending along and projecting inwardly from said vertical flanges thereof and adapted to overlap top and bottom edges of the respective side panels in their assembled position, said side structural members being secured to the adjacent end portions of said side panels overlapped on the exterior by the vertical flanges of said side structural members to maintain said frames in spaced relation interconnected by said side panels, the side panels having top and bottom end portions retained between the front and rear structural members of the top and bottom frames, respectively, at least two oppositely situated structural members of said

13

bottom frame further having inwardly projecting ledge-forming horizontal flanges adapted to support said bottom panel by respective opposite edge portions thereof, with the end edges of such bottom panel substantially abutted to and retained between the inside faces of said side panels, said top frame front and rear structural members comprising structural angle formations extending along the length thereof, having substantially horizontal and vertical flanges, and a top panel adapted to rest by its front and rear edges on the horizontal flanges of said top frame front and rear structural members, said top frame rear structural member angle formation opening upward and forward of the cabinet, said rear structural member further comprising a depending substantially vertical flange joined to the horizontal flange, spaced forwardly from the first-mentioned vertical flange of such member.

14. The cabinet construction defined in claim 13, wherein the bottom frame rear structural member comprises an angle formation having a substantially vertical flange and a substantially horizontal flange projecting rearwardly from the lower edge of the vertical flange, and wherein the top frame front structural member angle formation opens upward and toward the rear of the cabinet, opposite ends of the vertical flange of such top frame front structural member being joined to the forward ends of the vertical flanges of the side frame structural members, and further wherein the bottom frame front structural member comprises structural angle formation having substantially horizontal and vertical flanges, and opening downwardly and toward the rear of the cabinet, opposite ends of the vertical flange of said bottom frame front structural member being joined to the forward ends of said bottom frame side structural members.

15. A knock-down cabinet construction comprising top and bottom metal frames, opposite side panels to interconnect and space apart said frames, a bottom panel, said top and bottom frames having interconnected elongated front, rear and mutually opposite side structural members, at least the side structural members having substantially vertical flanges extending along substantially the outer wall of said cabinet, at least said side structural members having horizontal base flanges extending along and projecting inwardly from said vertical flanges thereof and adapted to overlap top and bottom edges of the re-

14

spective side panels in their assembled position, said side structural members being secured to the adjacent end portions of said side panels overlapped on the exterior by the vertical flanges of said side structural members to maintain said frames in spaced relation interconnected by said side panels, the side panels having top and bottom end portions retained between the front and rear structural members of the top and bottom frames, respectively, at least two oppositely situated structural members of said bottom frame further having inwardly projecting ledge-forming horizontal flanges adapted to support said bottom panel by respective opposite edge portions thereof, with the end edges of such bottom panel substantially abutted to and retained between the inside faces of said side panels, said top frame side structural members comprising downwardly open channels retaining therein the upper ends of the respective side panels, and a top panel adapted to rest upon the tops of said channels, the top frame further comprising a generally intermediate elongated structural channel member extending between front and rear structural members and connected thereto, between opposite sides of said top frame, said generally intermediate channel member opening downwardly, the top thereof being substantially flush with the tops of the side structural members, said cabinet construction further including a vertical partition panel having an upper edge received in and secured to said intermediate channel.

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