

Oct. 23, 1962

A. STROM

3,059,983

CABINET PANEL AND CONNECTING MEANS THEREFOR

Filed April 2, 1959

2 Sheets-Sheet 1

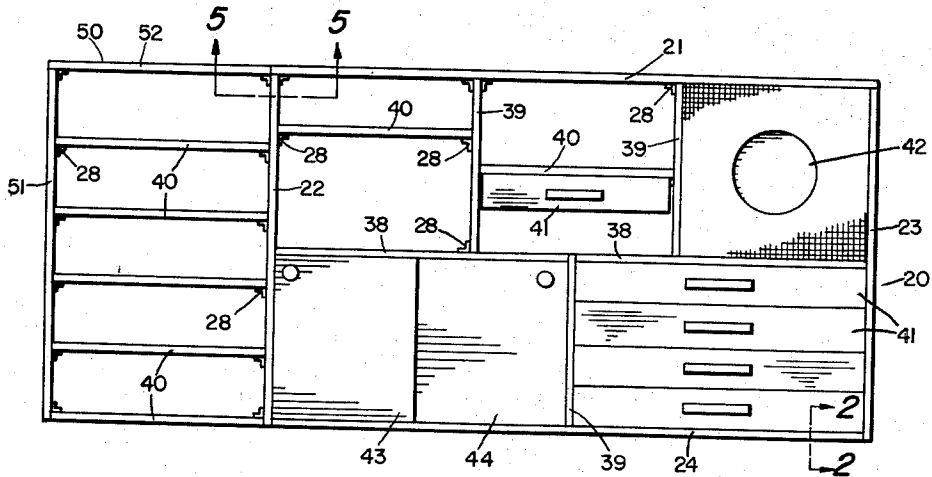


Fig. 1

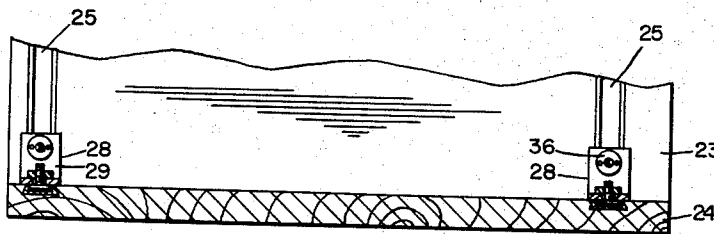


Fig. 2

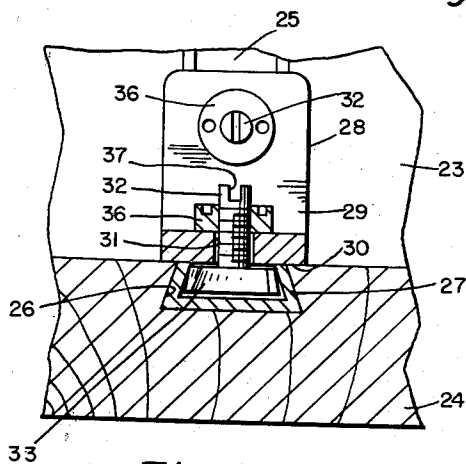


Fig. 3

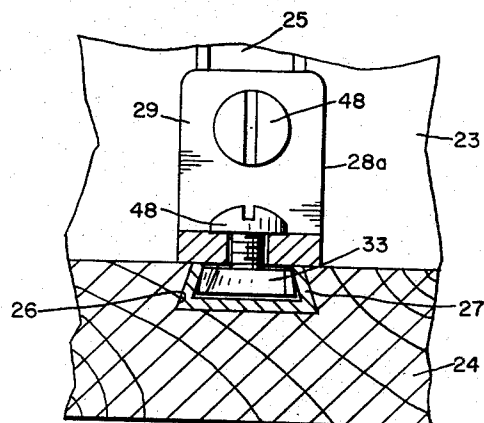


Fig. 4

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2 Sheets-Sheet 2

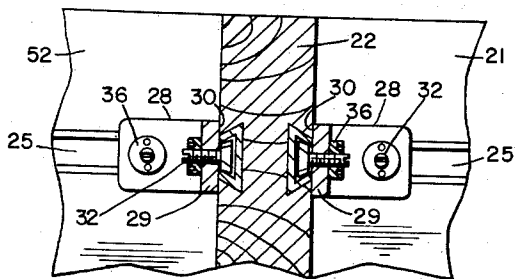


Fig. 5

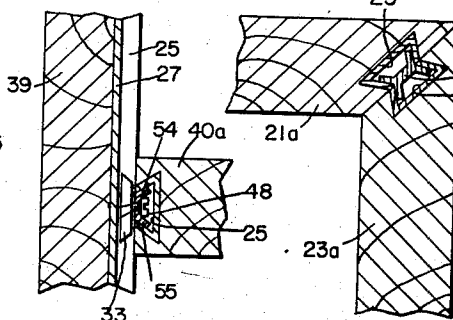


Fig. 6

Fig. 7

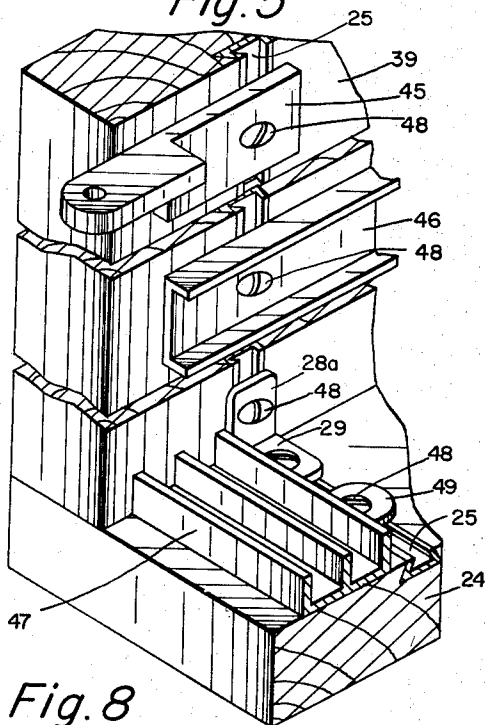


Fig. 8

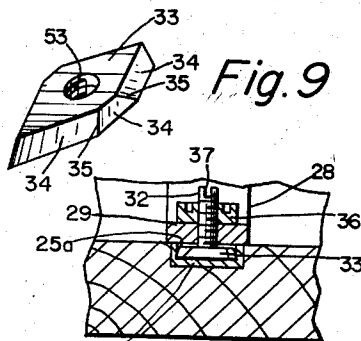


Fig. 10

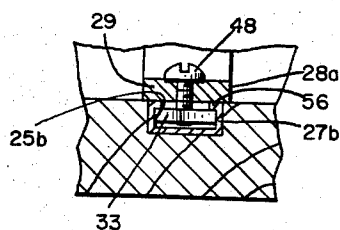


Fig. 11

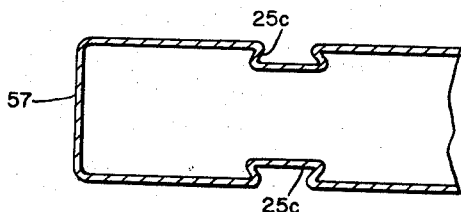


Fig. 12

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3,059,983

CABINET PANEL AND CONNECTING MEANS
THEREFOR

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5 Claims. (Cl. 312-108)

This invention relates generally to custom-built cabinets or similar storage units for use as furniture pieces in residences and the like. More particularly, this invention relates to a form of wood panel for use in cabinets and means for assembling such panels into a cabinet structure.

The use of cabinets for housing sound reproduction equipment, recordings, video equipment, books, etc., in a single unit is increasingly popular. The making of fine custom cabinets for such purposes involves considerable labor cost in the making and fitting of joints between panels. Furthermore, the completed cabinet piece is often of considerable bulk, making its transportation and installation a costly matter.

It is a primary object of my invention to provide a wood panel in which means are provided for adjustably securing a plurality of such panels to each other to create a custom-built cabinet or storage unit.

Another object of my invention is to provide connectors for conveniently securing such panels to each other efficiently and quickly at the location of use of such cabinet.

A further object of my invention is to provide a cabinet structure in which panels can be rearranged internally to accommodate changing requirements and additions thereto can also be easily effected.

Other objects and advantages of my invention will become apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

FIG. 1 is a front elevation of a cabinet structure embodying the features of my invention;

FIG. 2 is a fragmentary cross-sectional view of the connection between panels, taken on line 2-2 of FIG. 1;

FIG. 3 is a view similar to that of FIG. 2 but enlarged to show greater detail;

FIG. 4 is a view similar to FIG. 3 but showing a modified form of connector which may be employed;

FIG. 5 is a fragmentary cross-sectional view showing the manner in which additional panels may be added to augment or supplement the original cabinet unit, and is taken as indicated on line 5-5 of FIG. 1;

FIG. 6 is a fragmentary view in section showing the manner in which panels may be assembled to conceal the connecting means;

FIG. 7 is a fragmentary view in section of a method of assembling a mitered corner in a cabinet unit;

FIG. 8 is a perspective view showing the manner in which the panels are used for the attachment of hardware;

FIG. 9 is a perspective view of the rotatable nut which is utilized with the connectors of FIGS. 3 and 4;

FIG. 10 is a view similar to FIG. 3 showing a modified form of groove in a cabinet panel;

FIG. 11 is a view similar to FIG. 4 showing another modification of the panel groove and connector; and

FIG. 12 is a fragmentary cross-sectional view of a metal panel which might be utilized in my invention.

Referring more particularly to FIG. 1 of the drawings, I have shown a cabinet unit 20 which embodies features of my invention. The cabinet includes a top wall pro-

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vided by a panel 21; an end wall provided by a panel 22; another end wall provided by a panel 23; and a bottom wall provided by a panel 24. Both the front and the back of the cabinet 20 may be open as shown. However, if it is desired to provide a back wall, this may be of cloth, paperboard, wood or any other material applied in a conventional manner.

Each of the wood panels 21-24 is provided with a pair of parallel spaced longitudinally extending grooves 25 which preferably extend the full length of the panel proximate and parallel to the edges thereof. As best seen in FIGS. 2-4, the grooves 25 are formed by undercutting the face of the panel to create a tapered slot or channel 26 in the wood. A complementary slot liner 27 is pressed-fitted in the slot 26. The slot liner 27 is preferably of metal, such as aluminum, which may be extruded to provide the desired tapered cross-section. However, other soft metals or synthetic resins, in cast or molded form, may also be used as liners, provided that they have the necessary degree of hardness, smoothness and durability for the purpose intended. It will be noted that the spacing between the pairs of grooves 25 is maintained uniform in each panel, so that when the panels are assembled, the grooves of one panel will be aligned or in registry with the grooves of an adjacent or intersecting panel.

The exterior panels 21-24 need have grooves 25 only on the interior faces thereof. However, it is preferable that the vertically extending panels, that is, the end panels 22 and 23, be provided with grooves 25 on both surfaces, as shown in FIG. 5, as this permits greater flexibility in the augmentation of the cabinet structure.

The panels 21-24 are secured to each other by means of connectors 28, as shown in FIG. 3, which are adapted to engage the grooves 25 and interconnect adjacent panels. For purposes of joining panels at right angles, the connector 28 consists of a right-angled retainer body 29 having bearing surfaces 30 which are disposed normal to each other. Clearance holes 31 are provided in the body 29 through each of which extends the threaded shank 32 of a fastener element 33. The element 33, as best seen in FIG. 9, is of such dimension in one direction that it can enter the narrow neck of the groove 25. However, when it is rotated within the groove, portions of the edges thereof will abut against the inwardly-directed surfaces of the liner and will prevent withdrawal of the element 33 through the neck of the groove. The edges 34 of the fastener are inclined angularly in general correspondence with the inclination of the walls of the groove and the edge is also formed with biting projections 35 which, due to the relative hardness of the material used, such as high carbon steel, tend to dig slightly into the groove liner 27 when the fastener is in its locked position. The element 33 thus may be termed to be a "self-serrating" retainer in the same sense that certain screws are termed "self-tapping."

In order to secure the element 33 in its locked position, a nut 36, preferably of the spanner type, is threaded onto the free end of the shank 32 and is tightened against the body 29 to draw upwardly on the element 32 to clamp the element 33 against the liner 27. The upper end of the shank 32 is provided with a screw driver slot 37 to permit the retainer element to be rotated to locking position before the nut 36 is tightened.

As shown in FIGS. 2 and 3, the connector 28 is applied at the intersection between vertical and horizontal panels, such as the end panel 23 and the bottom panel 24, and provides a tight and rigid connection and support for joining the panels at right angles, without the necessity of any other type of securing means. In this manner, the exterior panels 21-24 are assembled to form the shell of the cabinet.

The interior of the cabinet 20 can be arranged with shelves, drawers, cupboards in any desired combination. In the example shown in FIG. 1, the cabinet is divided into upper and lower sections by means of two horizontally-extending shelf panels 38 which are intersected by a vertical partition panel 39 in the lower section. The upper section is divided into three compartments or areas by means of two vertical partition panels 39. The left upper section is provided with a shelf panel 40. The middle upper section is also provided with a shelf panel 40 below which is mounted a sliding drawer 41. The right upper section accommodates a speaker 42. The right lower section is provided with drawers 41 and the left lower section is provided with sliding doors 43, 44 for concealed storage space.

All the vertical panels are provided with grooves 25 on both faces thereof. The large shelf panels 38 which serve as horizontal dividers also are provided with grooves on both sides. The smaller shelf panels 40 are provided with the grooves 25 on only one face thereof. As previously described with reference to the panels 21-24, the interior shelves and panels are assembled by means of the connectors 28. It is to be noted that any shelf panel 40 may be adjusted to any desired position of height by loosening the connectors 28 and moving the shelf. The vertical partitions are also adjustable. Any of the panels can be replaced, removed, or relocated to effect any desired arrangement. Panels or drawers or doors may be removed, relocated or added in like manner. FIG. 8 shows the manner in which hardware is removably secured to the cabinet for the support of drawers or doors. Represented are a door hinge 45, a drawer slide 46 and a track 47 for sliding doors. The track 47 is shown mounted on the bottom panel 24 and the hinge and drawer slide are shown mounted on the vertical divider panel 39.

Instead of employing the connector 28 heretofore described, the hardware is secured by means of a screw 48 which extends through the piece to be secured and threadedly engages the retainer element 33 and serves to rotate it and clamp it in the manner heretofore described. It will be noted that the track 47 is provided with a slotted ear 49 which overlies the grooves in order to permit securement in the foregoing manner. Both the hinge and the drawer slide can be adjusted to any required position. This is of particular significance because precise location of these parts need not be predetermined before assembly but can be established after preliminary assembly of the doors or drawers, as the case may be.

If the space provided by the cabinet 20 is, at a later time, found to be inadequate, an auxiliary matching cabinet 50 can be added, as shown in FIG. 1. The cabinet 50 has the common end wall 22 of the cabinet 20; an end wall 51; a top panel 52; and shelves 40. As shown in FIG. 5, the exterior grooves 25 on the panel 22 are utilized for attaching panels externally of the cabinet 20 to add the cabinet structure 50.

In FIG. 4, I have shown a modified form of angle connector 28a, in which the screw 48 is utilized instead of the threaded shank 32 as heretofore described with reference to the connector 28. The screw 48 threadedly engages a tapped opening 53 in the retainer element 33 as shown in FIG. 9. The screw 48 extends through the connector body 29 and serves to rotate and clamp the retainer element 33 in the same manner previously described.

In FIG. 6, I have shown a manner of utilizing my grooved panel structure to provide an invisible joint in those instances where the use of the connector 28 or 28a is not considered desirable from the standpoint of appearance. For this purpose, I provide a panel 40a in which a groove 25 is provided on an edge of the panel instead of or in addition to the grooves 25 on the face of the panel. I provide a pair of retainer elements 54, of the form shown in FIG. 6, which have divergent leg portions 55 adapted to slidably engage the groove 25 and be retained therein. The retainers 54 are secured to a vertical panel, such as panel 39, by means of the screw 48 and element 33 in the

same manner as the hardware is attached. The horizontal panel 40a is then slid over the retainers 54 to effect a securement which is concealed from view.

A similar arrangement for connecting exterior panels of the cabinet by means of a miter joint is shown in FIG. 7 as applied to a top panel 21a and an end panel 23a. As shown, the mitered edges of the panels are provided with grooves 25 and are then secured by the sliding insertion of a flared retainer element 54a which is a double form of the retainer 54 shown in FIG. 6. In this manner, the securement is concealed from view.

In FIG. 10 I have shown a modified form of groove 25a utilizing a liner 27a in which the side walls are parallel instead of angularly convergent, as in the liner 27. With this form of groove, the retainer element 33 must be rotated sufficiently so that it undercuts the wall of the liner to a considerable extent before the nut 36 is tightened.

In FIG. 11 is another form of groove 25b in which the liner 27b is provided with internally-directed flanges 56 to provide abutments against which the retainer element 33 can be clamped by the action of the screw 48.

However, I prefer to use that form of liner and groove in which tapered or undercut portions are provided on the liner and groove, as in the form of FIGS. 3 and 4. This arrangement not only provides for more effective securement by the retainer 33, but also serves as an effective means for retaining the liner within the groove. Although I have heretofore indicated that some of the panels should be grooved on both faces and other panels need only be grooved on one face thereof, it will be apparent that it is practicable and expedient to groove both faces of all the panels, so that any desired changes and additions can be made from time to time, even though the grooves in both faces of all panels might not always be utilized. For purposes of ornamentation, the liners of aluminum may be anodized or otherwise colored to provide a decorative appearance and design to the panels.

The various forms of connectors and grooves which have been illustrated and described are merely exemplary of the versatility which is derived from the use of grooved wood panels to create custom-built cabinet structures, which are pleasing to the eye, economical to manufacture, easy to assemble and flexible in arrangement. Although the use of the grooved wood panel is the preferred form of the invention, it may be desirable for certain conditions to employ metal panel structures for cabinets. In FIG. 12 I have shown a double wall steel panel 57 in which formed grooves 25c are embossed by any suitable means. Such a grooved panel 57 can be assembled to like grooved panels by means of the described connectors to create the desired arrangement of cabinet structures.

The term "cabinet," as I have used it, is not intended to be limited to a closed structure, but is intended to define any type of shelf or storage unit.

It is to be understood that the forms of my invention, herewith shown and described, are to be taken as preferred examples of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a cabinet structure, the combination of a plurality of wood panels disposed in intersecting planes, each of said panels having a pair of longitudinally-extending grooves provided in a face thereof, a complementary liner element for the walls of said grooves mounted in each groove, said liner element being of harder material than said panel, the spacing between each pair of said grooves being uniform on each of said panels and connector means engageable with the aligned grooves of adjacent panels for adjustably and releasably securing said adjacent panels to each other, said connector means including a rotatable retainer element provided with lateral cutting edges for serrating the opposite side walls of said liner element in response to rotation thereof and means for rotating said retainer element within said groove.

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2. A combination as defined in claim 1, wherein the opposite side walls of said liner element are angularly convergent in a direction upwardly from the bottom of said groove.

3. A combination as defined in claim 1, wherein the opposite side walls of said liner element are parallel to each other in a direction upwardly from the bottom of said groove.

4. A combination as defined in claim 1, wherein the opposite side walls of said liner element are provided with inwardly directed projections adapted to overlie said retainer element when said retainer element is rotated into locked position.

5. In a cabinet structure, the combination of a plurality of wood panels disposed in intersecting planes, each of said panels having a pair of parallel longitudinally-extending grooves provided in a face thereof, a complementary liner element for the walls of said grooves mounted in each groove, said liner element being of harder material than said panel, the spacing between each pair of said grooves being uniform on each of said panels, and connector means engageable with and removable from the

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aligned grooves of adjacent panels for adjustably and releasably securing said adjacent panels to each other, said connector means including a rotatable retainer element slidable in said groove and having a width dimension smaller than the width of said groove and a length dimension greater than the width of said groove, and means engaging said retainer element for rotating it in one direction for locking engagement within said groove and in the other direction for withdrawal from said groove.

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