May 11, 1965 A. R. BARTLETT ETAL 3,182,811

SHELF INTERLOCKING DEVICE

Filed Jan. 21, 1963 2 Sheets-Sheet 1

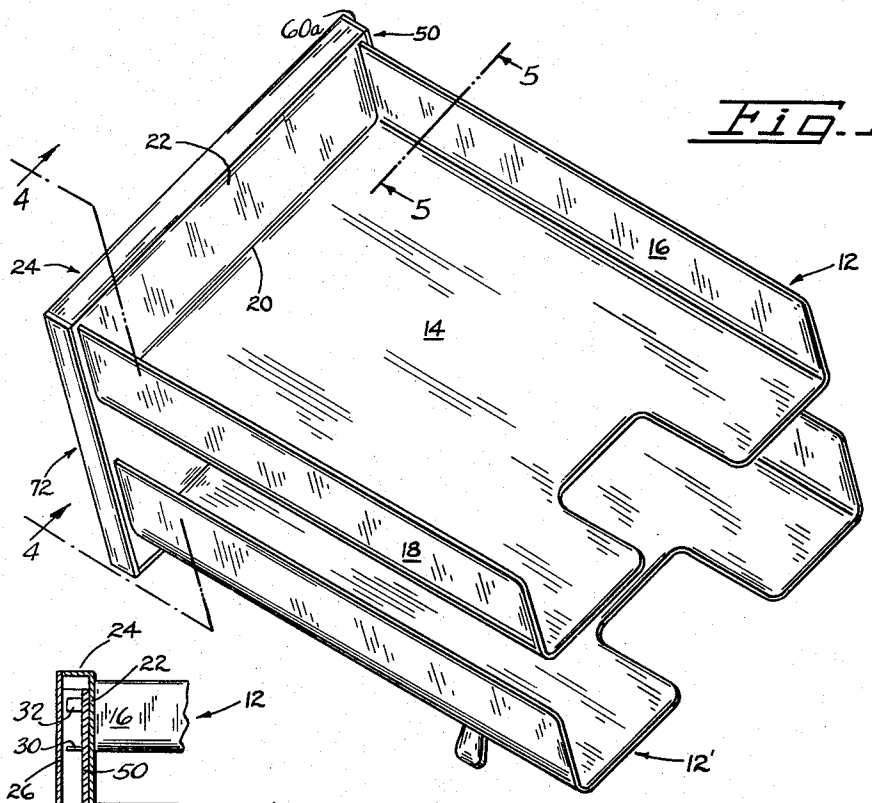


Fig. 1

Fig. 4

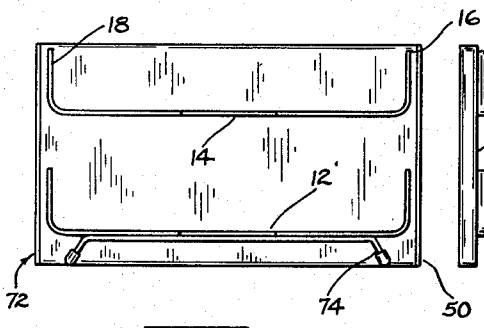


Fig. 2

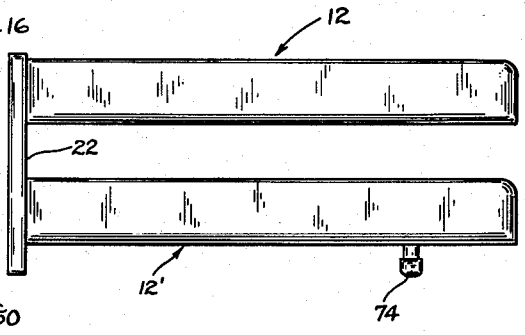


Fig. 3

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Fig. 5

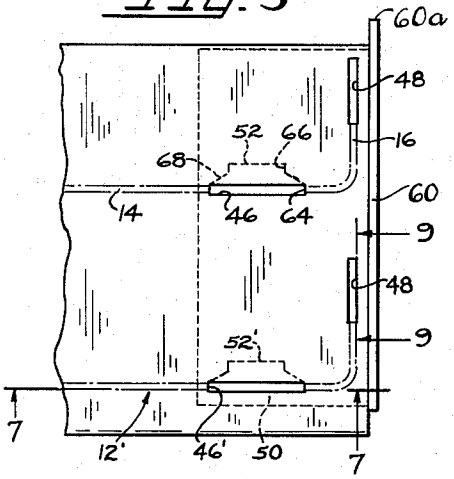
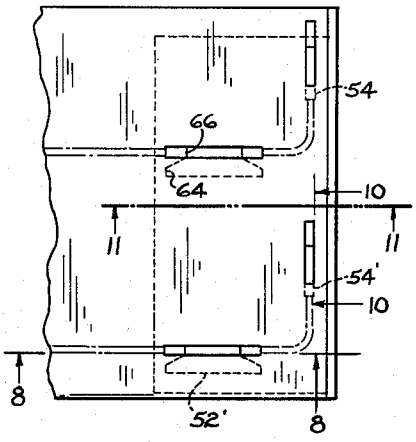


Fig. 6



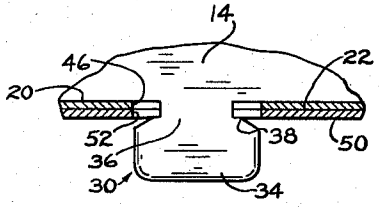


Fig. 7

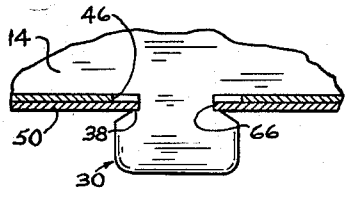


Fig. 8

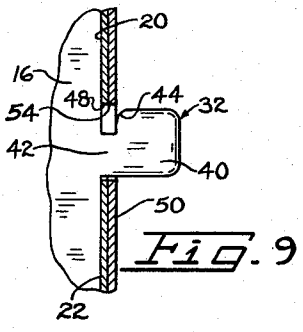


Fig. 9

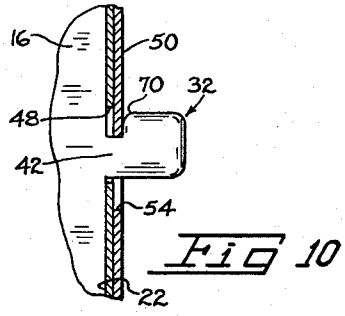


Fig 10

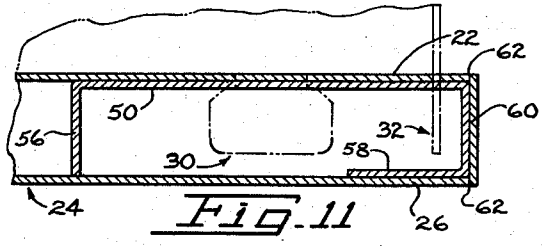


Fig. 11

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SHELF INTERLOCKING DEVICE

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10 Claims. (Cl. 211—126)

This invention relates to an interlocking device for securely fixing a member formed with two angularly disposed planar portions to the face of a flat plate. The device is particularly suited for assembling file trays and shelves but is not to be limited to such application.

Although the invention is specifically described hereinafter in connection with a file tray assembly, it is to be understood that such assembly is only exemplary and that the invention should not be considered limited to such assembly. The embodiment to be described hereinafter includes one or more trays each having a bottom wall and side walls extending outwardly from the edges of the bottom wall, a flat plate to which the trays are affixed, a plurality of tabs on one end of each tray, and a slot in the plate for each tab. A planar insert member is slidably disposed on the rear face of the panel and is formed with a plurality of apertures, one aperture being associated with each slot. The insert member is adapted to slide from a first position in which the slots are fully open in order to permit the insertion of the tabs therein to a second position which effects a partial closure of the slots so as to engage the tabs. The trays are thus quickly mounted onto the plate and are firmly secured thereto.

Prior art techniques for affixing the trays and the like to panels, of which I have knowledge, require special tools thus making impossible shipment of such assemblies in the knocked-down or disassembled condition. Therefore, it is an object of of this invention to provide an interlocking device that can be operated without special tools by persons having no special knowledge. This object is accomplished because the insert member need only be moved from the first position to the second position to firmly anchor two members together.

Another object is to provide an interlocking device which affords anchoring together two flat planar members without the use of rivets, welded connections, or the like.

A more specific object of this invention is to provide a shelf assembly which can be packaged and transported in a disassembled condition and which can be readily assembled at the point of use. Incorporation of the interlocking structure into such tray assembly permits attainment of the foregoing object.

Still another object of the present invention is to provide a shelf assembly that can be constructed very simply and inexpensively. This object is realized by virtue of the fact that all of the parts of the assembly are formed of sheet material that is provided with slots and apertures that can be formed by punching.

A feature and advantage of the invention is that, because no welding or riveting operations are required for interlocking the two planar members, a previously applied paint finish will not be damaged during assembly. Thus multi-colored structures can be easily formed by applying different color finishes to individual parts before assembly.

These and other objects will become more apparent after referring to the following specification and attached drawings in which:

FIG. 1 is a perspective view of a file tray assembly utilizing the interlocking device of the present invention;

FIG. 2 is a front view of the file tray assembly of FIG. 1;

FIG. 3 is a side view of the file tray assembly of FIG. 1;

FIG. 4 is a fragmentary cross-sectional view of the support housing taken along line 4—4 of FIG. 1 at a different scale;

FIG. 5 is a fragmentary view taken on the plane of the front face of panel 22 of FIG. 1 with the insert or locking member shown in the first or released position by broken lines, the outline of trays being shown by dash-dot lines;

FIG. 6 is a view similar to FIG. 5 with the insert member in the second or locked position;

FIG. 7 is a cross-sectional view taken along line 7—7 of FIG. 5 showing a tab in the interlocked position;

FIG. 8 is a cross-sectional view taken along line 8—8 of FIG. 6 showing a tab in a locked position.

FIG. 9 is a cross-sectional view taken along line 9—9 of FIG. 5 showing another form of tab in the interlocked position;

FIG. 10 is a cross-sectional view taken along line 10—10 of FIG. 6 showing another form of tab in the locked position; and

FIG. 11 is a cross-sectional view taken along line 11—11 of FIG. 6 and showing the configuration of an exemplary insert member.

Referring more particularly to the drawings, reference numeral 12 indicates a generally U-shaped tray having a bottom wall 14 and right and left side walls 16 and 18 respectively extending upwardly from opposite edges of the bottom wall. The rear edge 20 of tray 12 is affixed to the front face of panel 22 which face forms a rear wall for retaining articles in the tray. Panel 22 forms one side of a rectangular housing 24 which housing has a second panel 26 supported in parallel spaced apart relation from panel 22. We prefer to form housing 24 from a flat sheet of metal bent at right angles at the corners and tack welded or otherwise suitably joined as at 28, FIGURE 4.

Extending from edge 20 of bottom wall 14 is a plurality of horizontal tabs 30 and extending from edge 20 from each of said walls 16 and 18 is a vertical tab 32. Horizontal tab 30 includes an enlarged portion 34 joined to bottom wall 14 by a throat portion 36. A bearing surface 38 is provided on opposite sides of enlarged portion 34 which bearing surfaces are spaced from edge 20 by throat portion 36. Each vertical tab 32 includes an enlarged portion 40, a throat portion 42 joining the enlarged portion to the side walls and a bearing surface 44 supported in spaced relation from edge 20 by throat portion 42. Bottom wall 14 has a tab 30 extending therefrom adjacent each said wall 16 and 18.

Panel 22 is formed with an elongate slot 46 for receiving each tab 30 and a slot 48 for receiving each tab 32. Slots 46 and 48 are of sufficient size to permit insertion through panel 22 of enlarged portions 34 and 40 respectively.

An insert member 50 is slidably mounted on the rear surface of panel 22 and is formed with an aperture 52 associated with each slot 46 and aperture 54 associated with each slot 48. Insert member 50 is maintained in sliding relation to panel 22 by a straight leg 56 projecting from one side thereof and an L-shaped leg 58 extending from the other side. The portions of legs 56 and 58 remote from panel 22 are adapted to slidably bear against the interior surface of rear panel 26. Insert member 50 includes an outer plate 60 attached to L-shaped leg 58, which plate projects outwardly to form flanges 62 which slidably fit the edges of panels 22 and 26 so as to properly position the insert member within housing 24. Thus insert member 50 is vertically slidable, as viewed in FIGURES 5 and 6, between a first or upper position (FIGURE 5) and a second or lower position (FIGURE 6).

Aperture 52 forms a first portion 64 that has a width substantially equal to the dimension of slot 46 along the axis of elongation of the latter; aperture 52 has a second portion 66 that has a width substantially equal to the width of throat portion 36 of tab 30. Between first portion 64 and second portion 66, aperture 52 has converging wall portions 68 on opposite sides thereof. Aperture 54 is substantially co-extensive with slot 48 and is adapted to reduce the area of slot 48 in response to sliding movement of insert member 50 so as to securely embrace throat portion 42 of vertical tab 32.

In assembling the structure of the present invention insert member 50 is slid to the first position at which position slots 46 and 48 are fully open to admit tabs 30 and 32 respectively of tray 12. The tabs are inserted into their associated slots so that edge 20 bears against the front face of panel 22. Insert member 50 is now slid to the second position by downward pressure on the upper edge 60*a* of plate 60; slots 46 and 48 are thereby partially closed so as to firmly secure the tray to panel 22. With insert member 50 in the second position aperture 52 is so positioned relative slot 46 that second portion 66 of the aperture is in registry with slot 46. Movement of insert member 50 to the second position is facilitated by converging walls 68, the converging walls being particularly advantageous when tab 30 is off center in the slot. Positioning of second portion 66 in registry with slot 46 causes insert member 50 to engage bearing surfaces 38 on opposite sides of enlarged portion 34, thus locking tab 30 in place.

Movement of insert member 50 to the second position reduces the area of slot 48 to a dimension, along the axis of elongation of the slot, approximately equal to the width of throat 42 of tab 32. In addition, bearing surface 44 of the tab is engaged by insert member 50 to lock the tab to plate 22. We have found that provision of a rounded or sloped portion 70 adjacent the upper portion of bearing surface 44 facilitates downward movement of insert member 50.

The foregoing description concerns attachment of tray 12 along its right side wall 16; it is to be understood that a second insert member 72 is provided on the left side of housing 24 to provide an interlocking device for tray 14 and side wall 18 along the left side (as viewed in FIGURE 2), of the tray. In such structure both insert members 50 and 72 are moved to the first position to permit insertion of the tabs into slots in panel 22, and both insert members are then slidably moved to the second position to secure tray 12 to the panel.

A second tray 12' can be mounted on panel 22 in the same manner as tray 12 is mounted. Tray 12' is provided with tabs, and panel 22 is formed with slots 46' and 48' for receiving the tabs. Insert member 50 has apertures 52' and 54' to lock tray 12' into position against panel 22. It is convenient to provide tray 12' with a footed support member 74 that extends downwardly from the bottom surface of the tray by an amount equal to the downward extension of panel 22 thus to provide a convenient means for supporting the structure on a horizontal suface, such as a table top.

The present interlocking device has application in any structure in which the edge of a member having two angularly oriented walls is to be affixed to a flat surface. Thus the present invention is not to be considered as limited to file tray assemblies.

While one embodiment of this invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. In combination with a tray having a bottom panel and two side panels extending from opposite sides of said bottom panel and a thin generally flat plate having a front face and a rear face, a device for supporting said tray at one end thereof from said front face of said flat plate

comprising a tab extending from said bottom panel and from each side panel at the tray end, portions of said plate defining slots for receiving said tabs, an insert member, means for mounting said insert member for slidable movement between a first and second position on the rear face of said plate, said insert member forming an aperture for cooperation with each said slot, each said aperture being adapted to be substantially coextensive with said slots when said insert member is in said first position and to reduce one dimension of said slot when said insert member is in said second position, and each said tab having an outer portion adapted for entry in a respective slot when said insert member is in said first position and an inner throat having a minimum dimension equal to the slot dimension when said insert member is in said second position.

2. In a file tray assembly of the type having a plurality of trays, each of which includes a bottom and upstanding sides on opposite edges of said bottom, means for supporting said trays in vertically spaced apart relation comprising a plurality of tabs extending co-planarly from one end of said tray, a thin upstanding vertical plate formed with slots therethrough for receiving said tabs, each said tab being formed on the outer extremity thereof with an enlarged portion for entry through said slots and a relatively narrow throat portion between said enlarged portion and said tray, said throat extending through said plate, a planar insert member defining an aperture associated with each said slot, said planar member adapted for sliding engagement with said plate between first and second positions, said apertures being formed to admit said enlarged tab portions therethrough when said planar member is in said first position and being adapted to securely retain said tabs in said slot when said planar member is in said second position.

3. A tray assembly comprising a plurality of generally U-shaped trays each having a bottom wall and right and left side walls extending upwardly from opposite edges of said bottom wall, a tab extending from each said side wall at an end of said tray, a tab extending from the bottom wall adjacent each said right and left side walls at the same end of said tray, an upstanding flat plate forming front and rear generally parallel faces, said plate formed with elongate slots for receiving said tabs so that the tray end bears agains said front face, right and left insert members, means for mounting said insert members for slidable reciprocation upon said rear face between a first and a second position, said right insert member defining an aperture associated with each tab receiving slot associated with said tabs on the right side wall and the bottom wall adjacent said right wall, said left insert member defining an aperture associated with each tab receiving slot associated with said tabs on the left side wall and the bottom wall adjacent said left wall, each said tab being formed with an enlarged portion substantially coextensive with said slot and a throat portion joining said enlarged portion to said tray, and each said aperture being formed with a first portion substantially coextensive with an associated slot when said insert members are in said first position to permit insertion of said tab into said slot, and each said aperture being formed with a second portion smaller than each said associated slot along the dimension of elongation of said slot, to permit closure of said slot onto said throat.

4. The invention of claim 3 wherein the lowermost tray of said plurality of trays includes a footed member extending downwardly therefrom for supporting said lowermost tray in spaced relation to a horizontal surface and wherein said flat plate is formed with a portion extending downwardly therefrom for supporting said tray in parallel relation to said horizontal surface.

5. The invention of claim 3 wherein said flat plate has a generally rectangular configuration in combination with a second plate substantially congruent with first said plate, means for spacing said plates in parallel spaced

apart relation, first and second legs extending from said insert member, said legs being adapted to slidably engage said second panel to afford slidable reciprocation of said insert members upon said rear face of first said plate.

6. Apparatus for locking one end of a tray having a bottom panel and two side panels extending from opposite sides of said bottom panel to a plate having a front face and a rear face comprising a tab affixed to and extending coplanarly from one end of each of said panels; said plate defining a plurality of slots for receiving said tabs therethrough; means disposed in slidable contacting relationship with the rear face of said plate to cooperate with said slots for engaging said tabs in a fixed position through said slots.

7. Apparatus according to claim 6 wherein said tabs each comprise a relatively narrow throat portion immediately adjacent said panels and a relatively enlarged portion between the outer end of said tab and said narrow throat portion, said tab engaging means being adapted for entry between said enlarged portion and said rear face.

8. Apparatus according to claim 7 wherein said tab engaging means comprises an insert member contacting the rear face of said plate for sliding movement between a first position and a second position relative to said plate, said insert member defining apertures each having a portion substantially coextensive with the slots defined by said plate, when in said first position to permit the passage of said tabs through said slots, said apertures having portions so that said insert member in its second position extends between said enlarged portions of said tabs and said rear face adjacent said narrow throat portion of each said tab.

9. Tray assembly apparatus comprising a housing defining two open ends and having at least one pair of parallel flat sides, one of said flat sides defining a plurality of slots; a pair of flat insert members adapted for insertion into respective open ends defined by said housing, each of said insert members adapted to bear against the flat side defining said slots and being slidable between a first position and a second position, each of said insert members defining an aperture associated with each said slot; legs attached to each of said insert members adapted to bear against the parallel flat side opposite the flat side defining said slots for slidable movement with respect thereto; a plate attached to said insert member and adapted to slidably overlie the open end defined by said housing, each

said aperture having a first portion substantially coextensive with the slot with which it is associated in the first position of said insert member and a second portion to cooperate with a part only of the associated slot in the second position of said insert member; a tray having a bottom panel and two side panels extending from opposite sides of said bottom panel, each of said panels having a tab extending outwardly from and coplanarly with one end thereof, said tabs each having a narrow throat portion immediately adjacent the end of said panels and an enlarged portion extending outwardly from said narrow throat portion, each of said tabs being adapted to fit through one of said slots and its associated aperture when said insert member is in said first position, the throat portion of each said tab being adapted to receive a portion of said insert member adjacent said aperture when said insert member is in its second position for affixing said tray to said housing.

10. Apparatus according to claim 9 wherein said plurality of slots includes a first slot and a second slot having an axis of elongation oriented perpendicularly with respect to the axis of elongation of said first slot, said insert member being slidable between said first and second positions in a direction parallel to the axis of elongation of said first slot, the aperture associated with said first slot being coextensive with said first slot when in said first position to permit passage of one said tab through said flat side and said insert member, the aperture associated with said second slot having a relatively large portion to permit passage of the enlarged portion of another said tab, a relatively small portion to engage the throat of last said tab and an intermediate portion defined by edges of said insert member converging from said relatively large portion to said relatively small portion, so that on sliding movement of said insert member from said first position to said second position said converging edges guide said throat portion into the relatively small portion of said aperture.

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