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Nutt

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[54] **SHEET METAL PANEL ASSEMBLY**

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[51] Int. Cl. **B65d 7/00**

[58] Field of Search ..... 220/4 F, 76, 38; 229/23 R

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[57] **ABSTRACT**

In a sheet metal panel assembly, the panels to be secured together are formed with respective elongated, transversely folded, rectilinear marginal portions. The marginal portions respectively define a rectilinear groove or socket and a complementary tongue which is slid into the socket endwise to provide a rigid joint.

6 Claims, 5 Drawing Figures

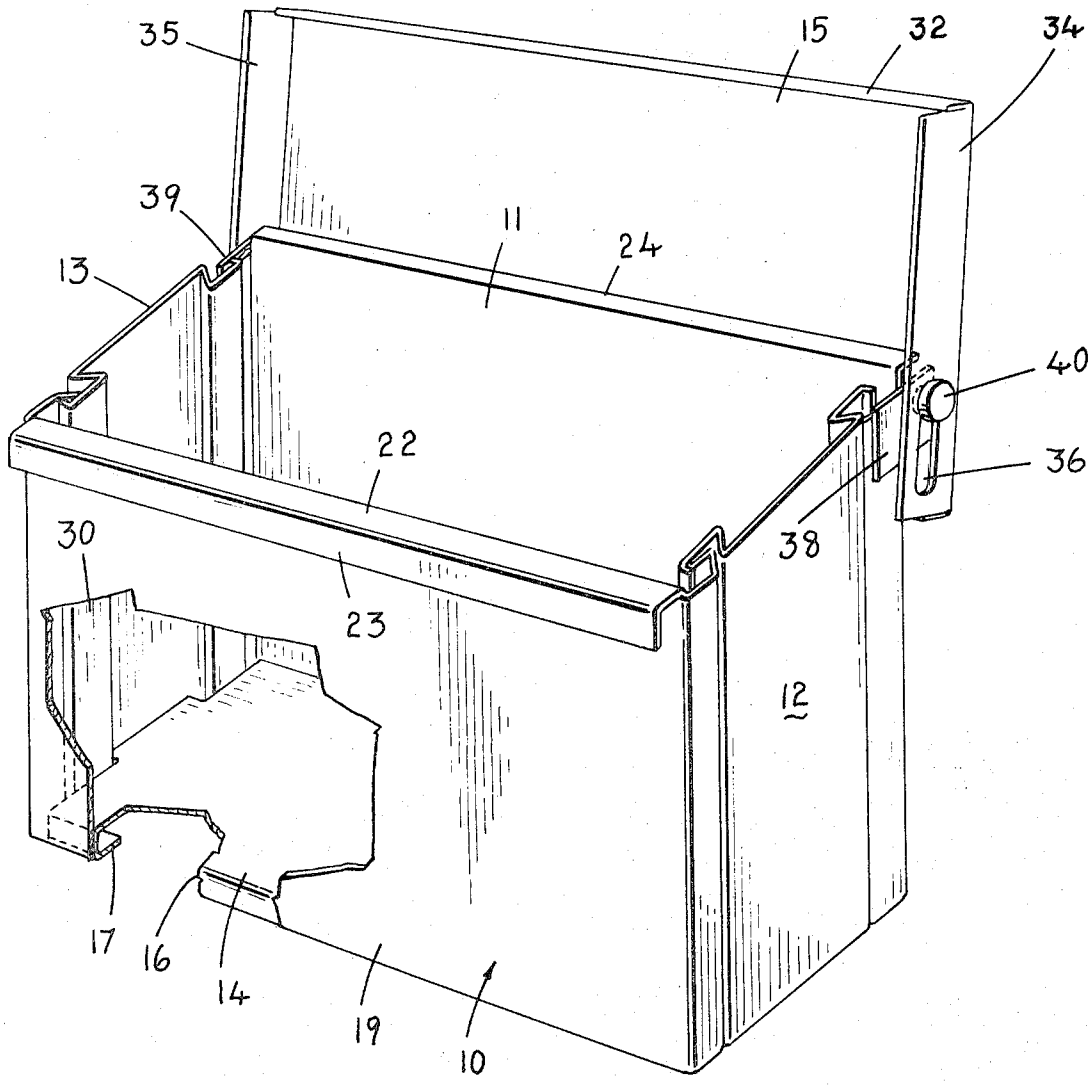
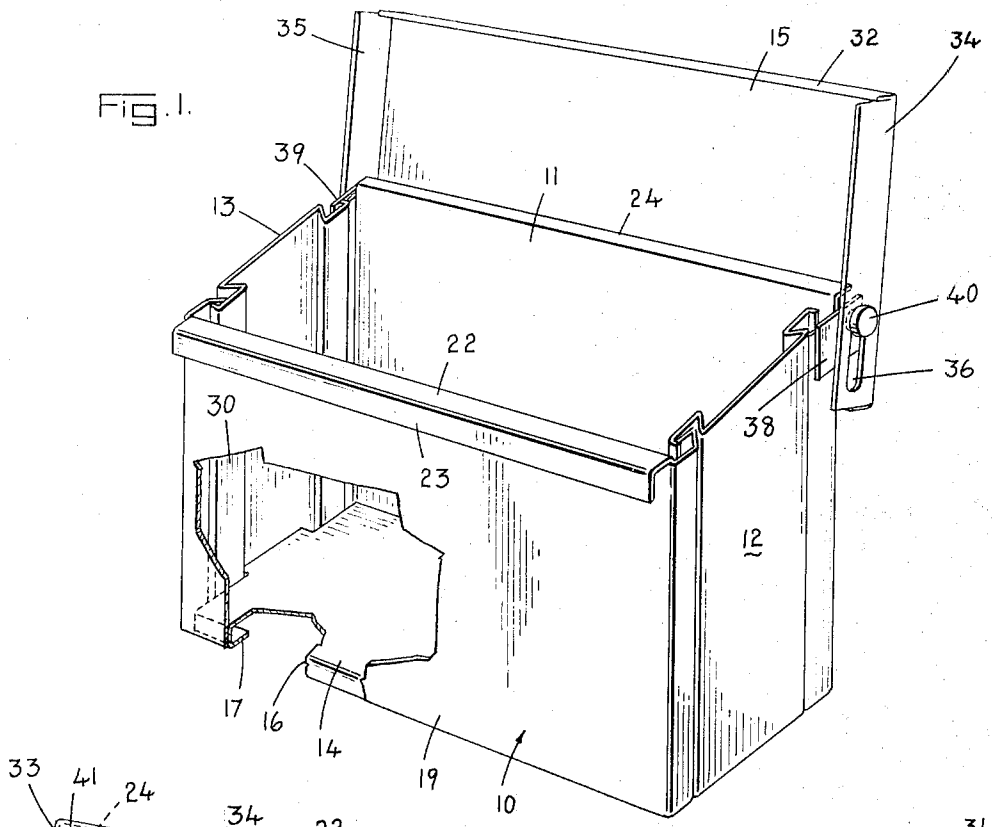


Fig. 1.



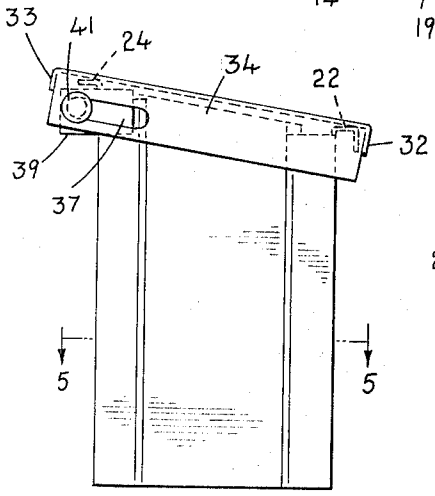
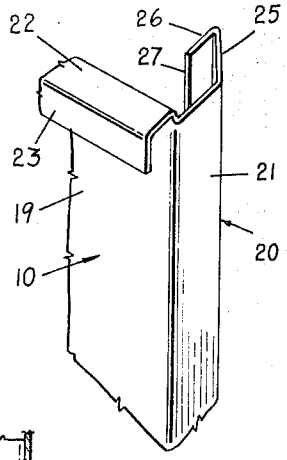


Fig. 2.

Fig. 3.



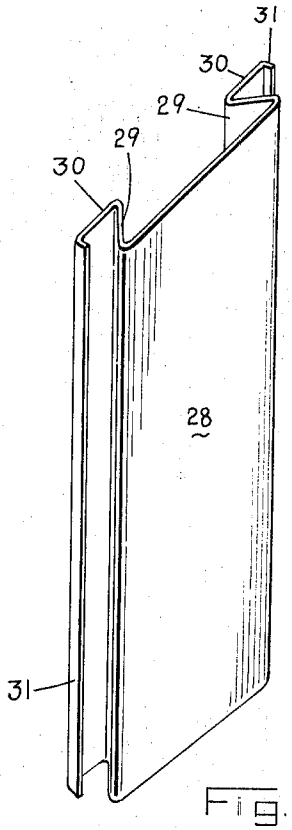


Fig. 4.

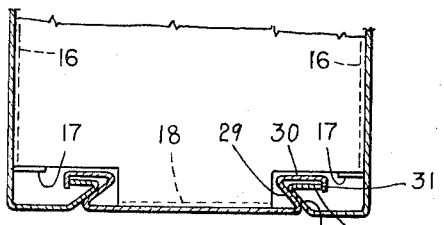


Fig. 5.

SHEET METAL PANEL ASSEMBLY

This invention relates to sheet metal assemblies, and more particularly to interlocking joints for the panels of such assemblies. The invention is especially applicable to sheet metal box constructions.

It is an object of the invention to provide an interlocking joint for panel assemblies whereby sheet metal panels may be assembled without the need for screws, rivets or like fastening means.

According to the invention, the panels to be secured together, which may be panels of a sheet metal box, are formed with respective elongated, transversely folded, rectilinear marginal portions, one marginal portion defining a rectilinear polygonal groove or socket and the other marginal portion defining a complementary tongue slidably located in the socket.

In order that the invention may be readily understood, one embodiment thereof as applied to a sheet metal box will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a general perspective view, partly broken away, of the box with its lid open;

FIG. 2 is an end elevation of the box with the lid closed;

FIG. 3 is a fragmentary perspective view showing part of a side panel;

FIG. 4 is a perspective view of an end panel of the box; and

FIG. 5 is a sectional plan on line 5-5 in FIG. 2, the figure showing the interconnection between one end panel and the respective side panels.

The sheet metal box illustrated in the drawings comprises a front panel 10 and a rear panel 11, a pair of end panels 12, 13, a rectangular bottom panel 14, and a rectangular hinged lid 15. The bottom panel 14 is formed with front and rear downturned flanges 16 which abut against the front and rear panels 10, 11 and rest on inwardly turned flanges such as 17 provided by the latter at their bottom edges. The bottom panel is also formed with a pair of downturned end flanges 18 which abut against the mid-portions of the end panels 12, 13 as shown in FIG. 5. The bottom panel is thus located by side and end panels, which are interlocked in the following manner.

The front panel 10 provides a flat, rectangular main wall portion 19 and a pair of end wall portions 20 folded at right angles to the main wall portion. Each of the end wall portions 20 provides a flat main area or panel portion 21 (see FIG. 3) and an elongated, transversely folded, rectilinear or flat portion as hereinafter described. The top edge of the front panel is flanged, being provided with a flat horizontal flange portion 22 and a downwardly turned terminal flange 23. The rear panel 11 is of the same construction as the front panel, except that its top edge is provided with a simple horizontal flange 24.

Each of the said marginal portions is defined by a first flat flange 25 folded at an obtuse angle from the flat panel portion 21, and a rearwardly directed second flat flange 26 folded at acute angle from the first flange. The second flange 26 lies parallel to the flat panel portion 21 and terminates in a free edge 27. It will be noted that the angle subtended between the flanges 25, 26 is an acute angle, the flanges thus defining a tongue.

Each of the end panels 12, 13 provides a main panel area 28 (see FIG. 4) bounded by a pair of elongated, transversely folded, marginal portions. Each of the said marginal portions is defined by a first flat flange 29 folded at an acute angle to the main panel area, and a second, forwardly directed, flange 30 folded at an acute angle to the first flat flange 29. The second flange 30 terminates in a hooked flange 31, defining an abutment seat. The angle subtended between the flanges 29, 30 is an acute angle equal to the angle subtended by the flanges 25, 26 of the tongue. The flanges 29, 30 thus define a rectilinear or polygonal groove, the tongue 21, 25, 26 being complementary to the groove. Thus, as illustrated in FIG. 5, the tongue is slidably located in the groove so that the respective pairs of first flanges 25, 29 and the respective pairs of second flanges 26, 30 lie in face to face relation, with the free edge 27 of the tongue being seated against the hooked flange 31. The panels are thus secured in nonrotative interlocking relation. It is important to note that the panels and their marginal portions are relatively rigid, and it is necessary to assemble the panels by engaging the tongues in the ends of the respective grooves, in which they are a sliding fit, and sliding them longitudinally along the grooves.

The lid 15 comprises a flat rectangular panel formed with shallow flanges 32, 33 along its front and rear edges, and a pair of wider downwardly turned flanges 34, 35 at its ends. When the lid is in its closed position, as shown in FIG. 2, the flanges 32–35 engage over the front, rear and end walls of the box with the lid panel seated on the panel flanges 22 and 24. It will be noted that the end panels 12, 13 of the box are trapezoidal, their top edges sloping upwards towards the rear top edge of the box opening; the flange 24 is therefore higher than the flange 22 and the lid 15 slopes downwardly towards the front when closed.

The end flanges 34 and 35 are formed with respective short, elongated slots 36 and 37 which extend horizontally adjacent to the rear ends of these flanges. A pair of bracket arms 38 and 39 are secured, as by welding or rivets, to the end wall portions 20 of the rear panel 11 of the box, adjacent to its rear top edge. These bracket arms are formed with aligned holes in which pivot pins are fastened, the pivot pins defining a horizontal axis rearwardly of the rear panel. Roller bushings 40, 41 mounted on the pivot pins engage in the slots 36, 37 to provide a sliding hinge for the lid. In order to open the lid from the closed position shown in FIG. 2, its front edge is raised so as to raise the lid to a vertical position, and is then moved in relation to its hinges to the extent permitted by the length of the slots 36, 37. The roller bushings 40, 41 thus engage the opposite ends of the slots, as shown in FIG. 1, the lid thus being supported in its open position.

A particular advantage of the invention is that it permits the assembly of boxes of different sizes and shapes from a minimum variety of preformed, interchangeable parts. The box illustrated in the drawings may be of any suitable size, the size being determined by the sizes of the front, rear and end panels and, of course, the bottom panel. The folded marginal portions of the panels are precision-bent to define the complementary tongues and grooves. The mode of assembly, which entails sliding or telescoping the tongues longitudinally into the grooves, results in excellent joints which are quite rigid.

What I claim as my invention is:

1. In a sheet metal assembly, first and second interlocking panels, each panel providing a main panel area bounded by an elongated, transversely folded, rectilinear marginal portion, said marginal portions defining respectively an elongated flat-sided polygonal groove and a complementary tongue slidably located in the groove, the groove of the first panel being defined by a first flange folded at an acute angle to the main panel area and a second reversely directed, flange folded at an acute angle to the first flange and lying parallel to the main panel area, said reversely directed flange terminating in a hooked flange providing a seat, and the tongue of the second panel being defined by a panel portion extending at right angles to the main panel area of said second panel and having a first flange folded at an obtuse angle to said panel portion and a second, rearwardly directed flange folded at an acute angle to the first flange and lying parallel to said panel portion, said rearwardly directed flange having a free edge, all said flanges being substantially rigid, said first and second flanges of the groove lying in face to face relation with the first and second flanges of the tongue, and said free edge bearing on the seat to maintain the panels in interlocked relationship with said panel portion substantially coplanar to the main panel area of said first panel.

2. A sheet metal box comprising interlocking front, rear and end panels, and a bottom panel located by said front, rear and end panels, each front and rear panel providing a main wall portion and a pair of end wall portions folded at right angles to the main wall portion, each end wall portion defining a flat area bounded by an elongated, transversely folded, rectilinear marginal portion, and each end panel defining a main panel area bounded by a pair of elongated, transversely folded, rectilinear marginal portions, the marginal portions of the end panels defining polygonal grooves and the marginal portions of said end wall portions defining complementary tongues slidably located in the grooves, each of said grooves being defined by a first flange folded at an acute angle to the respective panel area and a second reversely directed, flange folded at an acute angle to the first flange and lying parallel to said respective panel area, the second flange terminating in a hooked flange defining a seat, and each of said tongues being defined by a panel portion extending at right angles to the main panel area of said second panel and having a first flange folded at an obtuse angle to the respective panel portion and a second, rearwardly directed, flange folded at an acute angle to the first flange and lying parallel to the respective panel portion, the second flange terminating in a free edge, all said flanges being substantially rigid, the first and second flanges of each tongue lying in face to face relation with the first and second flanges of a respective groove with the free edge of the tongue bearing against the seat of the groove, said front, rear and end panels thereby being maintained in interlocked relationship with said panel portion substantially coplanar to the main panel area of said first panel.

3. In combination with a sheet metal box as claimed in claim 2, a rectangular lid hinged about a horizontal axis rearward of the rear panel.

4. The combination claimed in claim 3, including a pair of bracket arms mounted on the end wall portions of said rear panel and extending rearwardly therefrom, and hinge means mounted on the brackets, said hinge means engaging the lid to define said horizontal axis.

5. The combination claimed in claim 4, wherein the lid is formed with a pair of downturned end flanges engageable over the end walls of the box in the closed position of the lid, each of said down-turned flanges being formed with a horizontal elongated slot adjacent to its rear end, said hinge means comprising first and second roller bushings mounted on the brackets, said roller bushings engaging in the elongated slots of the lid flanges to provide a sliding hinge.

6. The combination claimed in claim 5, wherein each of the end walls is of trapezoidal shape having a top edge sloping downwardly from the rear to the front of the box, and wherein each of the front and rear panels is of rectangular shape having a top edge formed with an outwardly turned horizontal flange defining a seat for the lid in its closed position.

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