Sept. 10, 1957 L. M. DENNISON 2,805,739

HOLLOW PANEL

Filed March 9, 1953

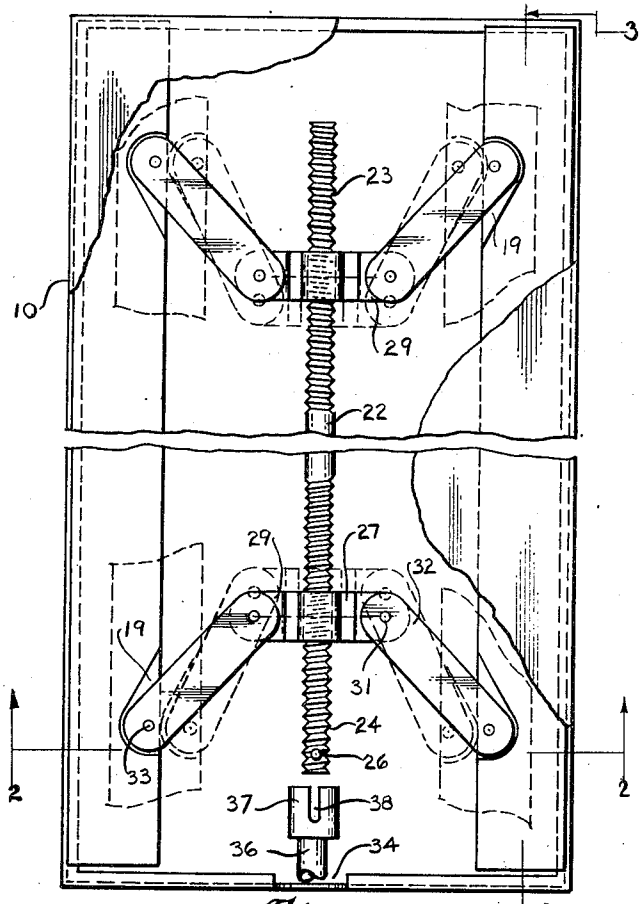

Fig. 1

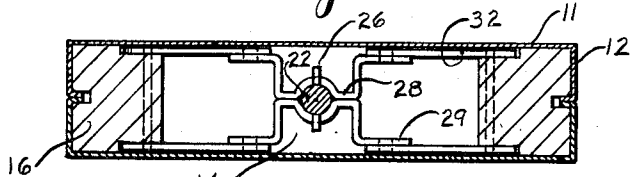

Fig. 2

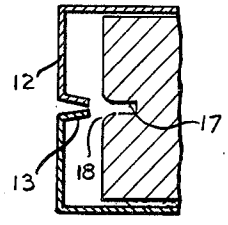

Fig. 4

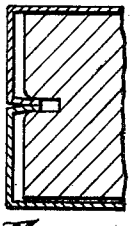

Fig. 5

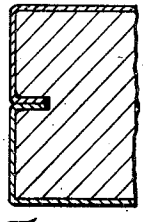

Fig. 6

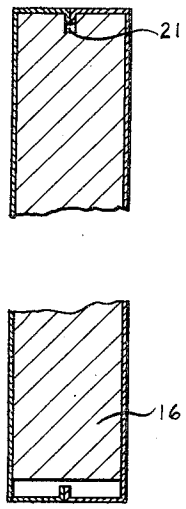

Fig. 3

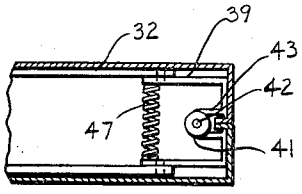

Fig. 7

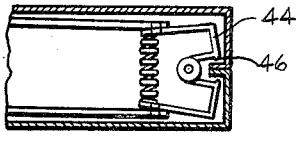

Fig. 8

INVENTOR.
LOUIS M. DENNISON
BY
Richmond L. Hayes
ATTORNEY

United States Patent Office

2,805,739

Patented Sept. 10, 1957

2,805,739

HOLLOW PANEL

Louis M. Dennison, Jamestown, N. Y.

Application March 9, 1953, Serial No. 341,155

3 Claims. (Cl. 189—34)

This invention relates to an improved hollow panel of a type suitable for use as a door, partition, wall, etc. More particularly, the invention relates to an improved panel that is formed by joining and securing together a pair of relatively thin complementary sheet metal members.

Hollow panels have generally been formed in their entirety either from metal or wood. In the construction of metal panels it has been necessary to carefully bend and flange the sheet metal, weld together the lapped or abutting parts, and subsequently fill and smooth the laps or joints in order that no unevenness could be discerned in the finished panel. Metal panels obviously required reinforcements between the metal sheets and these, in turn, had to be welded or otherwise secured. Additionally, other reinforcements were necessarily provided to permit the attachment of hinges, brackets, or other hardware fittings. Great care had to be taken during such construction to overcome a tendency of the parts to warp under the application of welding heat. Such hollow metal panels have been found to be satisfactory where weight and cost were of no moment. Hollow panels formed in their entirety from wood had certain advantages over metal panels in that they were of much less weight and, in some instances, less costly to produce. Wooden panels, however, had a considerable assembly disadvantage in that all the reinforcing interior parts, as well as the plywood or veneer surfaces, had to be carefully and accurately assembled with a suitable adhesive if the panel was to assume and retain its proper contour. The expense involved in this assembly often rendered such panels substantially as costly as the above mentioned metal hollow panels.

The present invention is directed to the provision of a light weight hollow panel that is readily adaptable to a variety of uses. The panel, in the presently disclosed form of the invention, consists of a pair of relatively thin metal sheets, the margins of which have complementary rims that are intended to abut along the panel edges. The space within the panel contains a combined supporting and rigidifying structure with a spreader mechanism. The interior support for the panel is so designed and located that it provides anchorage for exterior fittings such, for example, as hinges, brackets, latches, etc. By reason of the use of light gauge metal sheets with a combined securing mechanism and interior support, the present invention provides a panel that will not warp and that may be constructed from relatively inexpensive material and with a minimum of effort. Additionally, the panel embodying the present invention, by reason of being formed from a pair of separable metal sheets, readily lends itself to usage wherein opposite faces of the panel may follow different decorative designs or patterns. Furthermore,

any damage to either face of the panel during usage may be readily overcome simply by manipulation of the securing mechanism to permit separation of the metal sheets and replacement of the damaged sheet.

The above advantages and many others will be more apparent from a consideration of the following specification, taken in conjunction with the accompanying drawing; in which

Fig. 1 is a front elevational view of a panel embodying the structure of the invention, parts of one face of the panel being broken away to disclose the interior supporting and spreader structure;

Fig. 2 is a transverse sectional view taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary vertical sectional view taken substantially as suggested by the line 3—3 of Fig. 1;

Figs. 4, 5, and 6 are enlarged fragmentary sectional views showing the steps by which the flanges of the metal sheets are brought into and secured in abutting relationship;

Fig. 7 is a fragmentary transverse sectional view showing a modification of the means for securing the complementary flanges of the metal sheets; and

Fig. 8 is a view similar to Fig. 7 showing a step in the operation of this modification.

Referring more particularly to the drawing, the reference numeral **10** is employed to generally designate a hollow panel embodying one form of the invention. This panel is shown to consist of a pair of identical metal sheets **11**. The margins of each sheet are formed by flanges **12**. In the present disclosure, flanges **12** of one sheet are of identical depth with the corresponding flanges of the other sheet. Each flange **12** terminates in an inwardly bent rim **13**. This rim need not necessarily be parallel to the body of the sheet during the forming operation. Although the rims **13** ultimately become bent to substantially parallel relationship, this change in their angularity may occur during the assembly operation, as will hereinafter be more fully described.

The metal sheets **11** cooperate to form the exterior of the panel and create an interior space **14** in which is located supporting structure provided to prevent collapse of the metal sheets, as well as a mechanism for engaging and securing the rims of said sheets against separation. In the present instance, the interior supporting structure consists of a pair of wooden filler members **16**. Each of these members is formed with a full length slot **17** along its outer edge. This slot may be slightly rounded along the open edge thereof, as indicated at **18**. On opposite faces each of the filler members is formed with shallow recesses **19**. Either the upper or lower end of each filler member is recessed or slotted, as at **21**, for the purpose of receiving the top or bottom rims **13** of the metal sheets **11**. With panels of the type to which the invention is particularly suited, it is generally found unnecessary to completely lock both the top and bottom rims of the metal sheets and, therefore, in the present showing (Fig. 3) only the top rims are so secured. This arrangement also enables quick assembly of the filler members **16** with the formed metal sheets.

Between the filler members **16** is located a spreader mechanism. This mechanism consists of a central shaft **22** that extends approximately three-fourths of the length of the panel. The end portions of this shaft are formed with reversely directed threads **23** and **24**. At the end of the threaded portion **24** is a pin **26**. Mounted on

each threaded portion is a traveler 27 which, in the present instance, is formed by a pair of straps 28. Centrally, each strap is semi-circular and formed with threads. When these parts are joined, a circular threaded opening is formed with which the threads of the shaft 22 are engaged. Beyond the central portion, the straps are bent away from each other and terminate in spaced apart legs 29. Corresponding ends of links 32 are pivotally joined to these legs by pins 31. The other ends of these links project into the shallow recesses 19 of the filler members 16 and are secured to said members for pivotal movement by means of pins 33. It will be observed that the lower sets of links 32 extend in an opposite direction to the upper sets of links. The lower end of the panel, formed with the complementary flanges 12 of the metal sheets, is cut away to provide a small circular opening 34. This opening gives entrance into the assembled panel of one end of a crank-like tool 36, the operating end being in the form of a collar 37 having slots 38. The collar is intended to project over the lower end of the shaft 22, the pin 26 thereof fitting into the slots 38.

Having described the structural parts of one form of the invention, the method of assembling these parts is briefly set out. One of the sheet metal members is placed in a horizontal position and the filler members and connecting spreader are set into this member. The slots 21 in the upper ends of the filler members receive the upper rim 13 of the metal sheet. The spreader has been so adjusted that the filler members are some little distance from the side flanges 12. The other sheet metal member is now brought into superposed position, the top rim thereof being hooked into the slots 21 of the filler members. This member is now swung about this connection until the rims 13 thereof, on the sides and bottom, abut the corresponding rims of the first mentioned sheet metal member. The sheet metal members will now have a relationship to the filler members substantially as suggested in dotted lines in Fig. 1 and in solid lines in Fig. 4. The end of the tool 36 is now projected through the opening 34 of the panel into engagement with the pin 26 of the shaft 22. The tool is rotated to rotate shaft 22 and such rotation feeds the lower traveler 27 downwardly and the upper traveler upwardly. This movement functions to somewhat straighten the links 32 and move or spread apart the filler members. Continuing this operation, the walls of the slots 17 contact the rims 13, bringing the edges of these rims into abutment. Continued spreading of the filler members causes the rims to be pressed together into the recesses substantially as suggested in Fig. 5, and upon completion of the operation of spreading the filler members, the rims are brought into full depth abutment and the filler member into contact with flanges 12 and with the top and bottom metal sheets as shown in Fig. 6. The tool 36 is removed and the panel is now completely assembled.

Attention is particularly directed to the fact that the vertical edges of the panel are completely filled and reinforced against collapse. Also, the meeting edges of the metal sheets are such that only a fine dividing line appears on the panel edges. Although the filler members are spaced a considerable distance apart, that area of the metal sheets therebetween is sufficiently supported against collapse by reason of contact with the links 32. The outer surfaces of these links may be suitably folded or otherwise coated to give a cushioning and sound-deadening effect as between these contacting metal surfaces.

Should one of the metal sheets become damaged, either during assembly, or subsequently in use, it is a simple matter to insert the tool 36 into the panel, rotate it in the opposite direction, and withdraw the filler members from their locking or clamping engagement with the rims 13. Following this, one of the sheet metal members may be removed and the entire interior support and spreader mechanism withdrawn from the other sheet metal member.

Attention is now directed to Figs. 7 and 8 of the drawing wherein a modification of the rim clamping structure is shown. The metal sheets that go to make up the panel shown may be identical with those previously described. Also, the spreader mechanism may be identical and will, of course, include links 32. The outer ends of these links, however, are loosely, pivotally connected with the wings 39 of a hinge 41. This hinge extends the full length of the panel and supplants the member 16 of the previous modification. It includes a pivot pin 42 that carries leaves 43 from which extend flanges 44 and wings 39. At the meeting of flanges 44 and leaves 43, a slight projection in the form of a broken or continuous rib is formed. Between the free edges of wings 39 several expandable springs 47 may be located. When it is desired to assemble a panel embodying this locking or clamping mechanism, the parts are brought into proper relationship in the manner above described. Upon rotation of the shaft 22 in a given direction, links 32 will move outwardly towards the panel edges and in so doing, spread the wings 39. This movement of the wings causes the hinge leaves to move toward each other, bringing the ribs 46 into squeezing or clamping contact with the rims 13. Upon completion of operation of the spreader, the rims 13 will be secured and the flanges 44 in abutment with flanges 12, thus providing necessary interior marginal support. The spreading of the wings 39 brings links 32 into contact with the inner faces of the metal sheets, providing, in this modification, adequate support for the metal sheets against collapse.

Although applicant has shown and described only one form of his invention for an improved hollow panel and two forms of clamping or securing mechanisms for securing together the marginal edges of a pair of metal sheets, it will be understood that variations in this structure may be made and are contemplated insofar as they are within the spirit and scope of the invention as set out in the annexed claims.

Having thus set forth my invention, what I claim as new and for which I desire protection by Letters Patent is:

1. A hollow panel comprising a pair of sheet metal members, flanges of uniform height defining the marginal edges of said members, inturned rims on said flanges, the rims of one member abutting the rims of the other member within said panel, filler members in said panel located adjacent opposite edges thereof, the outer edges of said filler members being grooved and engaging and clamping together the abutting rims of said sheet metal members, and a mechanism in said panel, said mechanism being tool operated through an opening in one edge of said panel to simultaneously move said filler members into clamping engagement with said abutting rims, and into abutment with the flanges of said panels.

2. A hollow panel comprising a pair of sheet metal members, flanges of uniform height defining the marginal edges of said members, inturned rims on said flanges, the rims of one member abutting the rims of the other member within said panel, a pair of filler members mounted in said panel and extending substantially the full length thereof, said filler members being of a thickness to fill the space between opposite faces of said panel, the outer edges of said filler members having full length grooves receiving the abutting rims of opposite edges of said sheet metal members, a spreader mechanism in said panel having operative connection with said filler members, said mechanism being operable to simultaneously move said filler members into engagement with opposite edges of said panel and cause said rims to be brought into pressure abutment with each other as they become enclosed by the walls of said grooves.

3. A hollow panel comprising a pair of matched sheet metal members having corresponding edges flanged and

terminating in inturned rims, the rims of one member abutting the rims of the other member when said members are placed in panel forming relation, filler members in said panel in spaced parallel relationship, said filler members including parts interfitting and securing the inturned rims in abutment, links pivotally joined to said filler members, travelers pivotally joined to corresponding links for both filler members, a shaft having reversed thread engagement with said travelers, said shaft being rotatable to move said travelers to extend said links and cause interfitting pressure engagement of said filler members with the rims and flanges of said sheet metal members.

References Cited in the file of this patent

UNITED STATES PATENTS

1,278,210	Rabinowitz	Sept. 10, 1918
1,708,351	Auld	Apr. 9, 1929
1,910,608	Junkers	May 23, 1933
2,091,012	Pratt	Aug. 24, 1937