Jan. 3, 1939. P. ZALKIND 2,142,166

JOINT

Filed Oct. 19, 1935 3 Sheets-Sheet 1

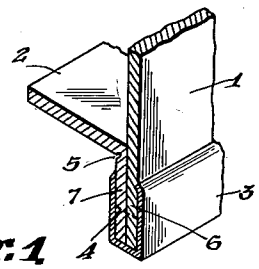


Fig:1

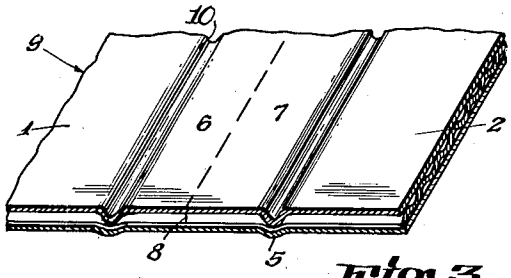


Fig:3

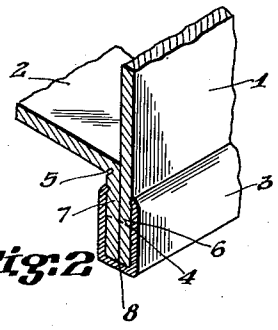


Fig:2

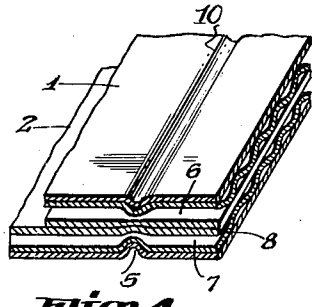


Fig:4

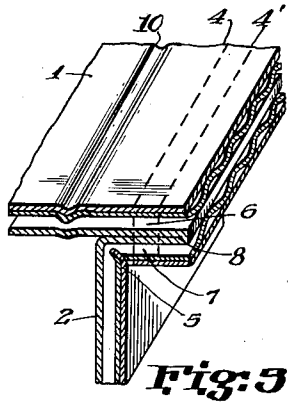


Fig:5

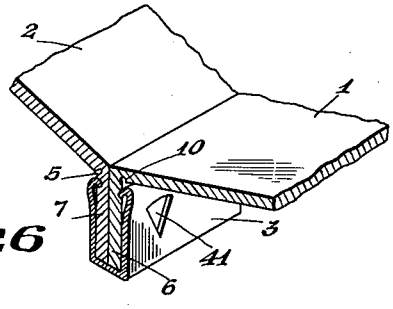


Fig:6

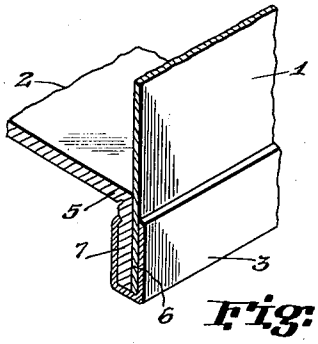


Fig:7

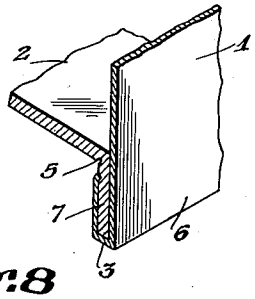


Fig:8

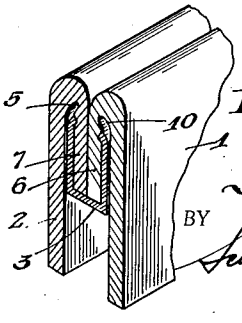


Fig:9

INVENTOR.

Philip Zalkind

BY Samuel Strotsch

ATTORNEY.

Jan. 3, 1939. P. ZALKIND 2,142,166

JOINT

Filed Oct. 19, 1935 3 Sheets-Sheet 2

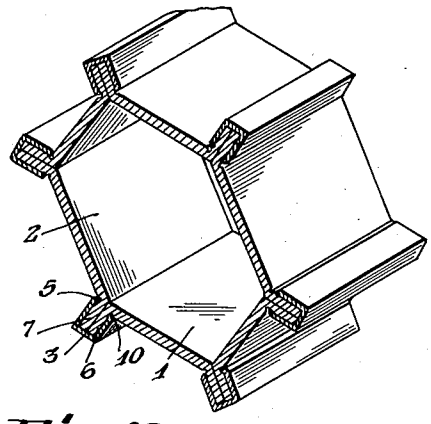


Fig:10

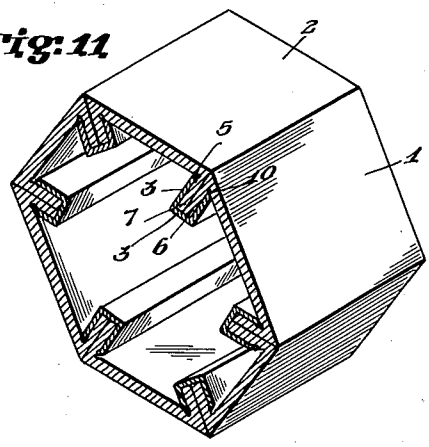


Fig:11

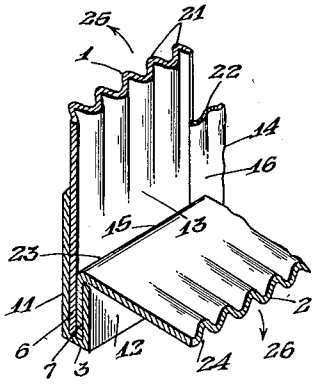


Fig:12

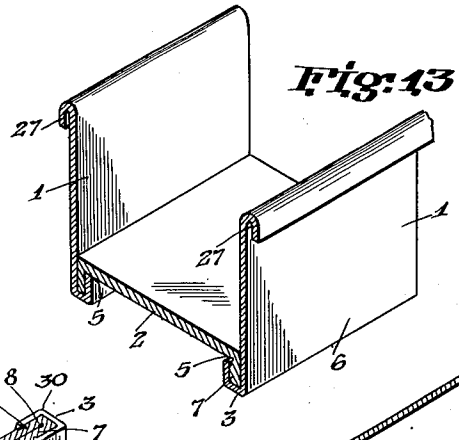


Fig:13

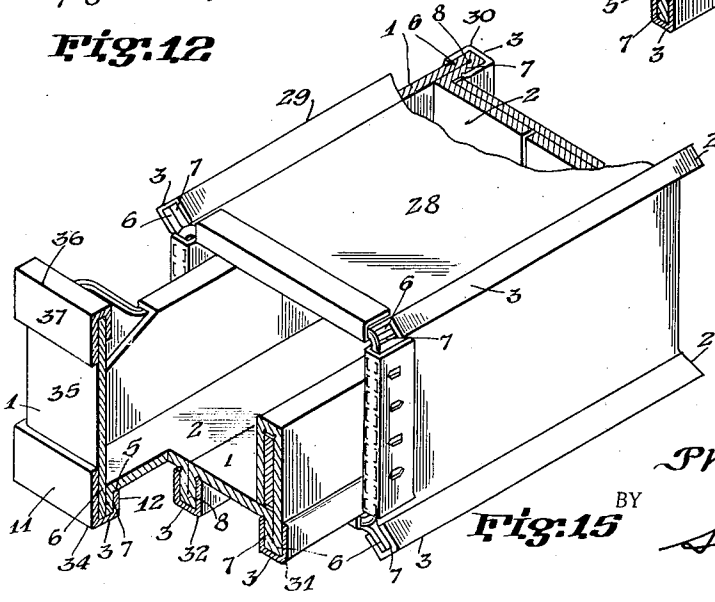


Fig:15

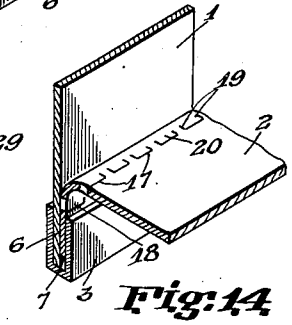


Fig:14

INVENTOR.

Philip Zalkind

BY

Samuel Atwetuck

ATTORNEY.

Jan. 3, 1939. P. ZALKIND 2,142,166

JOINT

Filed Oct. 19, 1935 3 Sheets-Sheet 3

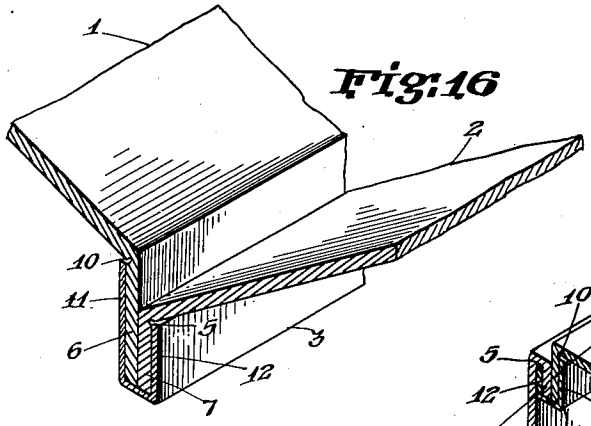


Fig:16

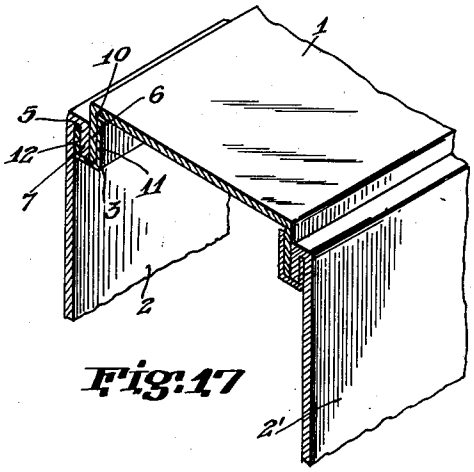


Fig:17

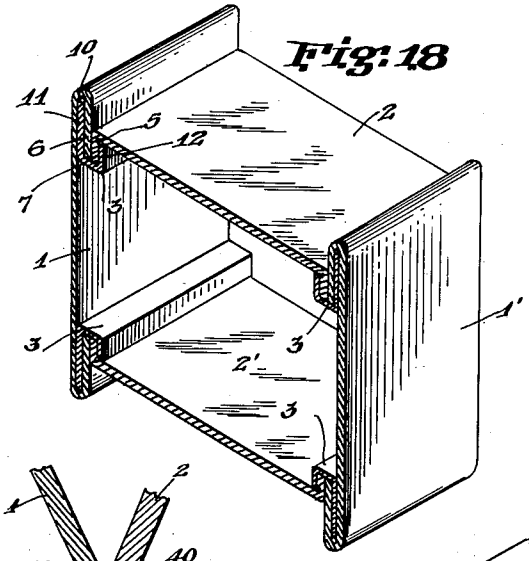


Fig:18

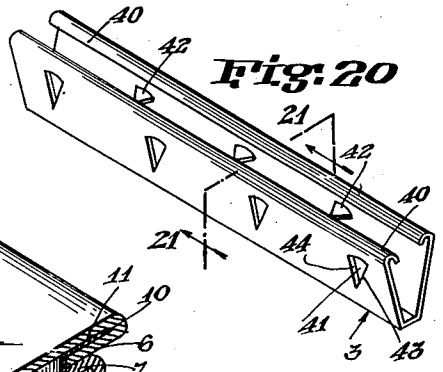


Fig:20

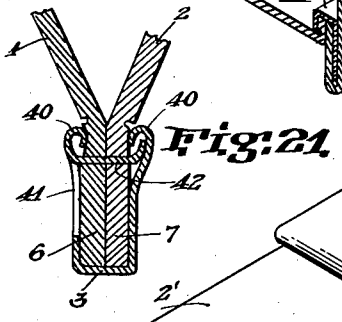


Fig:21

Fig:19

INVENTOR.

Philip Zalkind

BY

Samuel Ostrolenk

ATTORNEY.

Patented Jan. 3, 1939 2,142,166

UNITED STATES PATENT OFFICE

2,142,166

JOINT

Philip Zalkind, New York, N. Y.

Application October 19, 1935, Serial No. 45,712

3 Claims. (Cl. 229—48)

My invention relates to joining means adapted for use with collapsible or folding containers made of sheet material. It is particularly adapted to collapsible filing drawers and their casings and to cabinets and other containers in which corrugated board is the principal construction material, but it is not limited to this adaptation as it may be used with other types of folding or collapsible devices and with other construction materials.

My novel joint comprises two panels of sheet material having a common edge. The two panels are securely united along a line within the panel substantially parallel to the common edge. At least one of the panels is provided with a bending line adjacent to the line along which the panels are united. With this construction a collapsible joint is obtained along which the panels may be folded in a manner to lie adjacent to each other for shipment, but may in angular relationship to each other when set up for use. In the set up position, this type of joint forms a flange or lip along the junction of the panels which is particularly advantageous where reinforcing is required. It may thus be used in connection with my copending applications filed coincidently with this application and entitled Drawer, Serial No. 45,711; Three sided casing, Serial No. 45,714; Roller casing, Serial No. 45,715; End fold casing, Serial No. 45,713.

Moreover, when one of the panels is of metal and the bending line is provided in this metal panel, the bending line may be made according to that described in my copending application filed coincidently with this application and entitled Predetermined bend line, Serial No. 45,710.

The objects of my invention are to provide a simple and inexpensive joint for two panels which may be of the same or different sheet material which joint is at the same time collapsible and provides a reinforcing flange at the joint. Other objects will be apparent from these specifications.

My invention may be more clearly understood by references to the accompanying drawings which form a part of this application and in which

Figure 1 is a perspective view showing a portion of two panels made of two separate sheets of material united to form my novel joint.

Figure 2 is a view similar to Figure 1 except that the two panels are formed from a single integral sheet of material.

Figure 3 is a perspective view of a portion of a sheet of corrugated board scored to be made up into the joint of Figure 2.

Figure 4 is a perspective view of the blank of Figure 3 folded in position that the two panels may be united.

Figure 5 is a perspective view showing the sheet of Figure 4 with the two panels united by stitching and with one of the panels bent perpendicular to the other forming a flange.

Figure 6 is a perspective view similar to Figure 1 with a bending line provided in each of the two panels.

Figure 7 is a perspective view similar to Figure 1 except that the panel which does not have a bending line is shown as a metal sheet.

Figure 8 is a perspective view of a modified form of Figure 7.

Figure 9 is a view similar to Figure 6 except that the panels are bent over to an extent to place the flange on the inside of the panels.

Figure 10 is a perspective view of a portion of a hexagonal tube with the panels united with the joints of Figure 6 and having exterior flanges at each of the corners.

Figure 11 is a perspective view of a portion of a hexagonal tube with the panels united with the joints of Figure 9 and having interior flanges at each of the corners.

Figure 12 is a perspective view showing a joint in which both of the panels may be metallic sheet.

Figure 13 is a perspective view showing a portion of a drawer constructed using the joint shown in Figure 8.

Figure 14 is a perspective view similar to Figure 12 showing a modified form of my invention applied to two metallic sheets.

Figure 15 is a perspective view, partly broken away, showing a drawer inserted into a casing, my novel joint being applied to both the drawer and casing at a number of the panel sections.

Figure 16 is a perspective view showing a modified form similar to Figure 6, but having a flange of unequal length on the two panels.

Figure 17 shows a top for rectangular casing section with the modified joint of Figure 16.

Figure 18 shows another rectangular casing section utilizing the joint of Figure 16 in a different manner from that shown in Figure 17.

Figure 19 shows the casing section of Figure 18 in collapsed condition.

Figure 20 is a perspective view showing a form of metallic channel to be used as a fastening means in connection with my joint.

Figure 21 is an enlarged cross section along the plane 21—21 of Figure 20 after application with my joint.

In Figure 1, I have shown my joint in a form in which two separate pieces of sheet material are used to form the panels. In this figure only a small portion of the panels is shown so as to clearly show the joint. As shown, the panel 1 is united with the panel 2 by any suitable means As shown in the figure, the panels are first sewed together by means of the stitching 4, after which the metallic channel 3 is clinched over the two sheets, which firmly unites the two sheets to each other along their respective edges.

This uniting of the panels to each other is preferably performed with the panel 2 in face to face relationship with panel 1. If the channel 3 is properly and securely applied, the stitching 4 may be omitted; or if the panels are properly stitched together the channel 3 may be omitted. Panel 2 is provided with a score line 5 along which it may be manually bent, for instance, to a position perpendicular to panel 1, in which position it is shown in Figure 1. Structures provided with this form of joint may be shipped flat, that is with panel 1 and panel 2 in face to face relationship and panel 2 may be folded into position by the user. This folding operation provides a flange at the union of the panels comprising the extension 7 of panel 2, and the metallic channel 3, where the latter is used as uniting means.

In this construction the panel 1 may be any type of sheet material. It may be fiber board, corrugated board, wooden shooks, wood ply board, steel or other sheet material. The material of panel 2, on the other hand, must be such that a bending line may be applied to it in such a manner that the sheet may be bent manually along such bending line.

Where both panel 1 and panel 2 are of the same material as each other, the two panels may be made of a single piece of suitable sheet material, and in Figure 2, I have shown my joint applied to the juncture of two panels made from an integral sheet. I have found that even with comparatively thick material such as corrugated board, I can produce a relatively narrow flange at the juncture of two panels made from an integral sheet, using the method which I will now explain in detail.

Referring to Figure 3, I have shown a portion of a sheet of corrugated board 9, scored for forming into such a joint as shown in Figure 2. In Figure 3, a score 8 is formed by cutting through the upper liner and the upper portions of the corrugations with a series of disconnected slits which leave the lower liner intact and which is known in trade as a cut score. This cut score forms the common boundary between the extension 6 of panel 1 and the extension 7 of panel 2. At the line in the blank which forms the common boundary between panel 2 and its flange extension 7, the crease line 5 is provided in the sheet.

In forming up the joint the material is first folded back upon itself as shown along the score 8 as shown in Figure 4. After this operation, the panel extensions 7 and 6 are in position to be united with each other, and any suitable means may be used for this purpose. Thus, in Figure 1, I have shown the clinching channel 3 and the line of stitching 4; in Figure 5, I have shown the double line of stitching 4 and 4' and in Figure 6, I have shown the clinching channel 3 of a novel type as is shown in Figure 20 and is later described in further detail. It will be understood that other fastening means such as rivets, suitable adhesive material, etc., may be used instead of the particular fasteners that I have illustrated. After the panels 6 and 7 have been suitably fastened to each other, the panel 2 may be manually folded on the score line 5, and if it is so bent through an arc of 90° it will form the joint shown in Figure 5, which is functionally the same as Figure 2. It will be understood that a bending line may be provided on either or both sides of the cut score 8 depending upon the particular application.

It may readily be understood that I may provide a bending line in both of the panels at the common boundaries of the panels and their respective extensions. Thus in Figure 6, not only does panel 2 have the bending line 5, but also panel 1 has a bending line 10. In this figure, I have shown both the panels after each has been bent back on its score line. As shown in this figure each panel has been bent through an angle less than 90°. Depending upon the particular application, each of the panels may be bent through any desired angle up to 180°; and in Figure 9, I have shown the manner in which Figure 6 would appear with both of the panels 1 and 2 turned through 180°.

In both Figures 6 and 9 in which a bend line is provided in each of the panels, I have shown the flange extensions 6 and 7 of the two panels to be of equal length. It is not necessary to my invention that this particular relationship be maintained; and in certain applications it may be preferable that the flange extension on one panel be of a different length than the flange extension of the other panel. Thus in Figure 16, I have shown a view similar to Figure 6, except that in Figure 16, the flange extension 6 is of greater depth than the flange extension 7. In this form of my invention, if I use a clinching channel 3 to unite the two panels, as shown in Figure 16, I prefer that the leg of the channel adjacent to the short flange extension be of less depth than the other leg of the channel. Thus in Figure 16, I have shown the leg 12 in contact with flange 7 to be of less depth than leg 11 in contact with flange 6.

As I have explained in connection with Figure 1, different material may be used for one of the panels than for the other of the panels, and in connection it is unnecessary that both panels be of the same thickness of sheet material. This I illustrate in Figure 7 where panel 1 is shown to be substantially thinner than panel 2. Panel 1 in this illustration may be of metal such as steel, in which event the flange extension 6 of the panel may be united as an integral piece with the clinching channel 3 as is clearly illustrated in Figure 8.

In my copending application entitled Predetermined bend line and filed coincidently with this application, I have shown means for applying a predetermined bending line in a metallic sheet for use in folding or collapsible containers and similar construction. By the application of such a predetermined bending line in a metallic sheet, I may use metal for both panels of the joint disclosed in the present application, and I have illustrated modified forms of my joint having both panels of metal in Figures 12 and 14.

Referring to Figure 12, the panel 1 is shown with the corrugations 21 above the line 13. Also above the line 14, the leg 6 of the clamping channel 3 is provided with the corrugations 22 which

nest with the corrugation 21 in the panel 1. The corrugations 21 on the panel 1 so terminate that the extension 6 which forms a part of the plane portion of the sheet below the line 13 is in face to face relationship with the extension 7 of the sheet 2. Sheet 2 may be corrugated as shown. With proper form to the corrugations 24 on panel 2, this panel will lie in face to face relationship with panel 1 throughout their coextensive area prior to bending the panel 2 as is shown in the Figure 12. Thus a very compact package for shipping results, when my joint is used for connection. Panel 2 will bend easily along the line 23 by merely grasping the edges of panels 1 and 2 and applying a light pressure in the direction of the arrows 25 and 26. Such pressure will produce a differential of stress in the various portions of the joint; and on account of the particular construction the maximum stress will occur along the line 15 of panel 2, along which the panel will bend easily and clearly.

In Figure 14 the stress differential at the bending line is secured by providing two lines of slits 17 and 18. Each of the slits in each of these two lines has at its extremity a slit 19. Two of such slits 19 together with one of the slits 17 (or 18) form a tongue 20, which when panel 2 is in face to face relationship with panel 1 is bent out of the plane of the panel as I fully describe in my copending application above referred to. When panel 2 is bent out of the plane parallel to panel 1 for a predetermined angle, the tongues 20 and the panel 2 form a substantially continuous surface as shown in Figure 14.

In Figures 10, 11, 13, 15 and 17 to 19 inclusive, I have shown a number of applications of the manner in which my novel joint may be used in connection with various forms of containers.

Thus in Figure 10, I have shown a section of a polygonal casing in which my novel joint is utilized for joining each of the side panels. In the figure, a hexagonal casing is shown, using my joint, and as may readily be seen, it may be collapsed along any pair of opposed score lines as hinges. In Figure 10, the flanges are provided on the outside with each of the side panels 1 and 2 bent through less than 90° from their respective extensions 6 and 7 in the manner illustrated in Figure 6.

Figure 11 is similar to Figure 10 except that the flanges are located on the interior of the tubing which requires that the panels 1 and 2 be bent through an angle greater than 90° from their respective extensions 6 and 7, in the manner as illustrated in Figure 9.

In Figure 13, I have shown a section suitable for a drawer to be inserted into a casing in which is used the modified form of joint illustrated in Figure 8. As shown in Figure 13, the metallic panels are extended to a sufficient height to form the sides of the drawer; and terminate in an inverted U 27 which is adapted to serve as a track coacting with wheels on the casing as disclosed in my copending application entitled Roller casing and filed coincidentally with this application.

Figure 15 illustrates a drawer in a casing (both drawer and casing partly broken away) in which my novel joint is made use of at a number of places in the construction. Thus the tube 28 is provided with the joints 29 forming a polygonal structure similar to that shown in Figure 15 except that it is four sided instead of six sided. Another application of my joint is shown at 30 as means of connecting an inset back to the tubing. At 31 the side walls of the drawer are provided with my novel joints which raise the drawer bottom off from the inside of the bottom wall of the casing and at 32 the bottom of the drawer is provided with a longitudinal reinforcement by means of my novel joint. Both of these are fully illustrated in my copending application referred to above.

The front of the drawer is joined to the bottom of the drawer by my novel joint at 34. As shown, the drawer front 35 is provided at its top edge with a reinforcing member 36. The flange 37 of the reinforcing member 36 and the flange 11 of the clinching member 3 at the bottom of the drawer front may be extended so that they unite with each other in an integral piece as is shown in my copending application entitled Drawer and filed coincidentally with this application.

In Figure 17, I have shown the application of a joint such as is illustrated in Figure 16 wherein the score lines and clinching members on the two panels are at unequal distances from the edge of the joint. In the section shown in Figure 17, three panels are shown united by a pair of my joints with the longer leg 11 of the clinching members adjacent to the center panel. This construction may be used for the top of a casing, for instance such as is disclosed in my copending application entitled Three sided casing, and filed coincidentally with this application. When used in this manner, the casing top is raised slightly above the top of the side walls, thus forming a recess along each top edge of the casing which may be used for the purpose of interengaging superposed casings.

In Figure 18, I have shown the same form of joint as is illustrated in Figure 16, but reversed in position from that shown and described in connection with Figure 17. As the joint is applied in Figure 18, raised flanges are formed at all four corners of the casing. These flanges are of particular advantage for certain applications as they serve to protect the corners of the casing against damage from blows. The casing shown in Figure 18 is readily collapsed into the form shown in Figure 19. It will be noted that while a perfectly flat form is not obtained on collapsings, the form is nevertheless such that adjacent collapsed casings may be easily nested with each other, so that a number of casings may be conveniently packed for shipment in collapsed condition and so will occupy comparatively little space.

I have previously mentioned a novel form of channel adapted for use in my joint. Such a channel is shown in Figures 20 and 21. As shown in Figure 20, the top open edge of each of the flanges of the channel 3 is provided with the open roll portion 40. Each of the flanges is provided with the prongs 42 formed as an integral portion of the channels by slitting the flanges as at 43 and 44 and bending back the prong 42 thus leaving the opening 41 in the flange of the channel. I prefer that the prongs be arcuate in cross section, as described in my copending application Serial No. 693,841, filed October 16, 1933, of which this is a continuation in part so far as concerns the novel fastening means for my joint here disclosed. This arcuate shape provides sufficient strength to the prongs that they may be easily forced through such sheet material as corrugated board, ply board made of soft woods as are commonly used, and other sheet material.

As shown in Figure 21, this channel is clinched

over the extensions 6 and 7. In this operation, the prongs 42 pierce both of the panels and the ends of the prongs bend under the roll 40 on the opposing flange of the channel. In this manner, the two panels are efficiently locked together.

It will be understood that the prongs may be provided on only one of the flanges, in which case no roll need be provided on the one flange on which the prongs are formed.

The particular modifications which I have shown are by way of illustration only, as it will be apparent that many modifications may be made without departing from the scope of my invention. Now, having described my invention so that it may be readily understood by one skilled in the art.

I claim:—

1. A joint for connecting parts of a folding container of sheet material comprising, in combination, two panels having a common edge and formed from an integral sheet, a cut score and a creased score in said sheet and substantially parallel to each other, said cut score forming said common edge of the panels when said integral sheet is folded on itself along said cut score, and uniting means for securely fastening said panels together disposed between said cut score and said creased score.

2. A joint for connecting parts of a folding container of sheet material comprising, in combination, two panels having a common edge and formed from an integral sheet, two substantially parallel creased scores in said sheet with a cut score disposed between them, said cut score forming said common edge of the panels when said integral sheet is folded on itself along said cut score, and uniting means for securely fastening said panels together disposed between said cut score and said creased scores.

3. A joint for connecting parts of a folding container of sheet material comprising, in combination, two panels having a substantially common edge, a bending line in one of said panels parallel to said common edge, and a metallic channel member disposed over the common edge of said panels and securing the two panels together to form a unified structure, said channel having prongs on one of its flanges, and a recess along the opposed edge of the other of its flanges acting as receptacle for receiving and clamping the forward edge of said prongs.

PHILIP ZALKIND.