Dec. 1, 1953 V. A. HUTT-BRENNING 2,660,971

MANUFACTURE OF CONTAINERS FROM FIBERBOARD AND LIKE SHEET MATERIAL

Filed Sept. 4, 1946 3 Sheets-Sheet 1

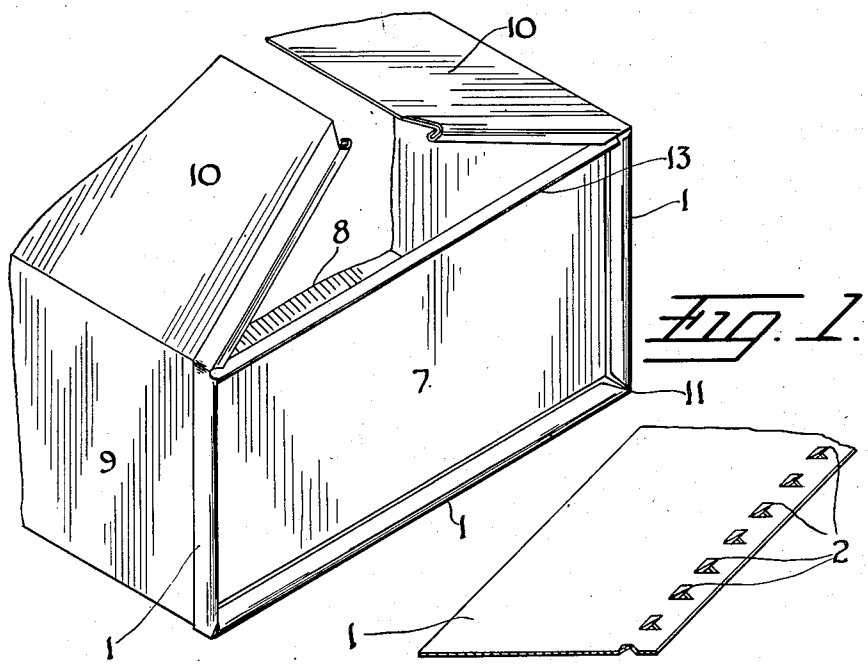


Fig. 1.

Fig. 2.

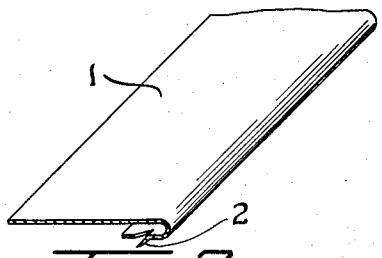


Fig. 3.

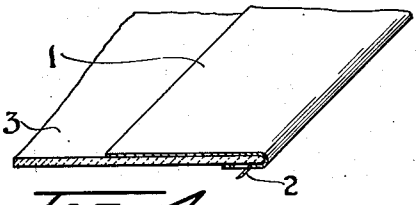


Fig. 4.

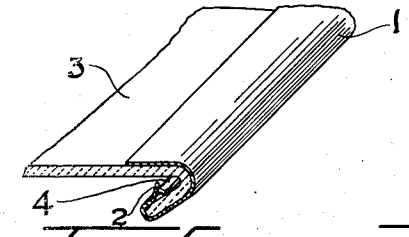


Fig. 5.

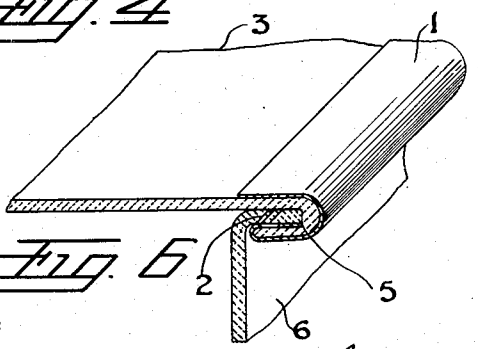


Fig. 6.

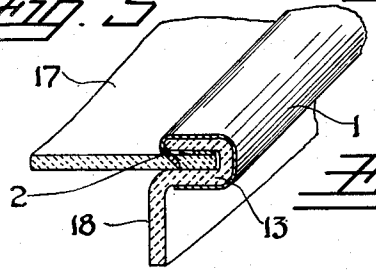


Fig. 7.

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MANUFACTURE OF CONTAINERS FROM FIBERBOARD AND LIKE SHEET MATERIAL

Filed Sept. 4, 1946 3 Sheets-Sheet 2

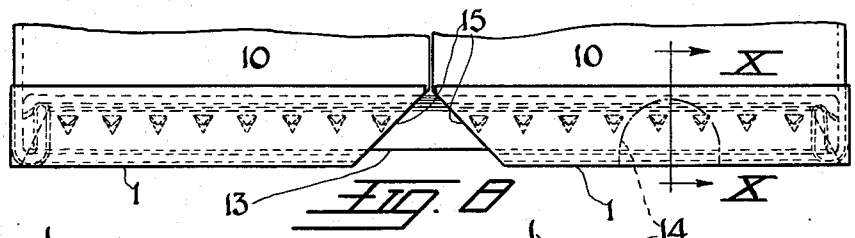


FIG. 8

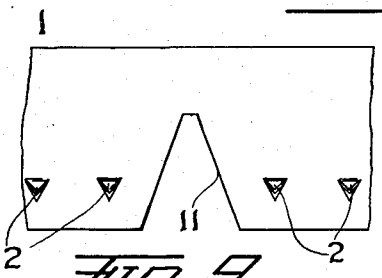


FIG. 9

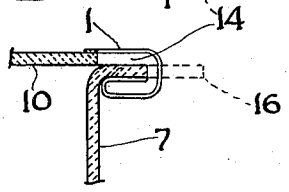


FIG. 10

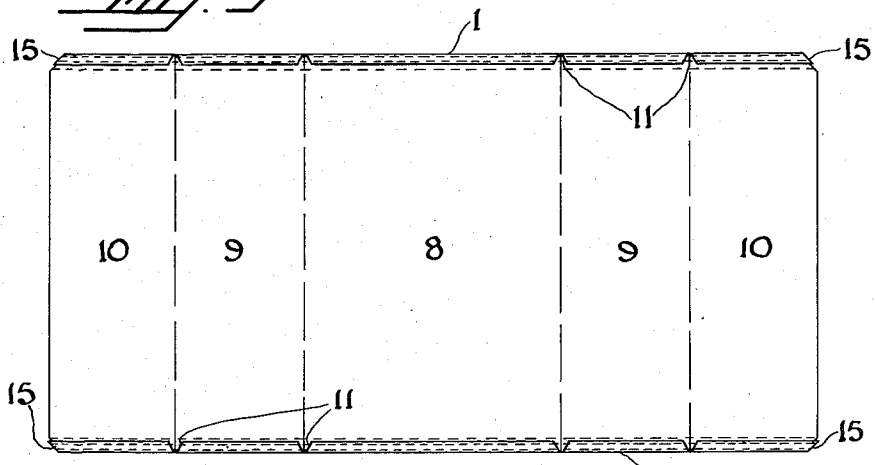


FIG. 11

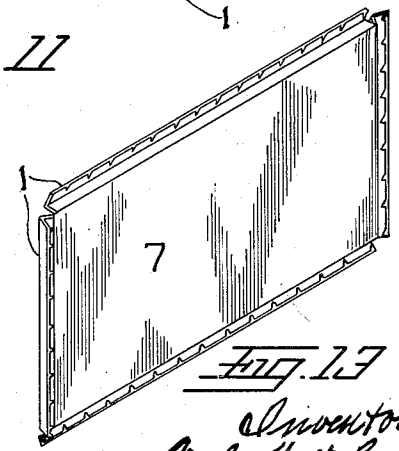


FIG. 13

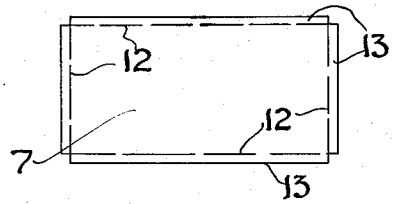


FIG. 12

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MANUFACTURE OF CONTAINERS FROM FIBERBOARD AND LIKE SHEET MATERIAL.

Filed Sept. 4, 1946 3 Sheets-Sheet 3

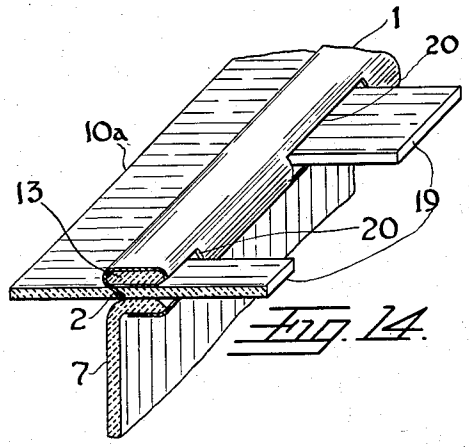


Fig. 14.

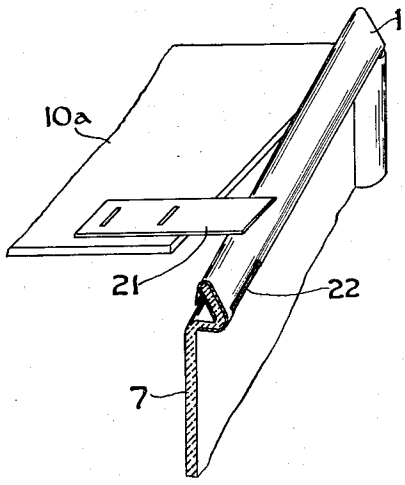


Fig. 15.

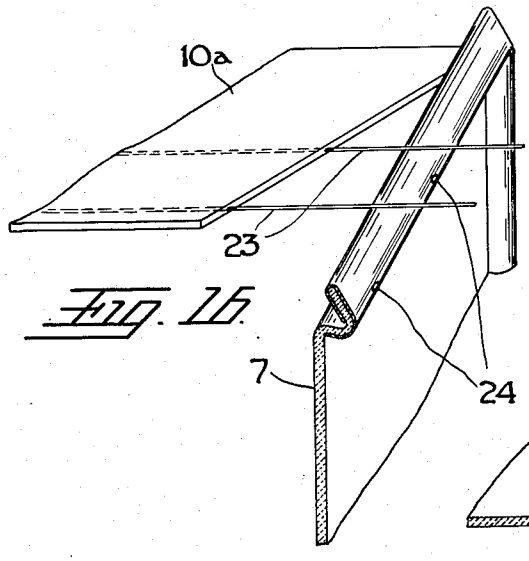


Fig. 16.

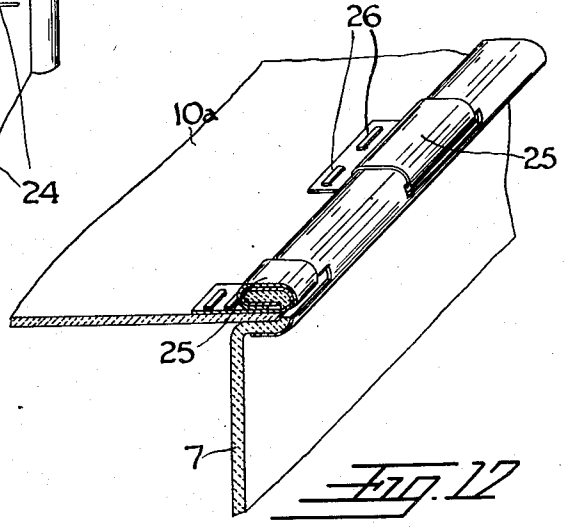


Fig. 17

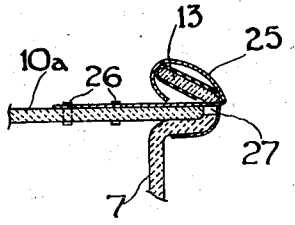


Fig. 18

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UNITED STATES PATENT OFFICE

2,660,971

MANUFACTURE OF CONTAINERS FROM FIBERBOARD AND LIKE SHEET MATERIAL

Vincent A. Hutt-Brenning, Durban, Natal, Union of South Africa

Application September 4, 1946, Serial No. 694,745

Claims priority, application Union of South Africa October 4, 1945

3 Claims. (Cl. 113—116)

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This invention relates to improvements in the manufacture of containers from fibre board and like sheet material, and refers more particularly to the joining of the co-acting edges of the boards, sheets or the like forming corners of the container.

An object of the present invention is to provide a simple and inexpensive method and means for joining the edges of fibre or like material boards, whether corrugated or solid, (hereinafter referred to as fibre boards) to form a strong and rigid corner or other joint when used to form a container such as for example, a rectangular shaped box. A further object of this invention is to provide a box, having certain of its edges, or all its edges, reinforced, to provide a container which is considerably stronger than the fibre board containers manufactured according to known methods.

According to the invention broadly, the method of joining together the edges of co-acting sheets of fibre board forming the sides of a box-like container, consists in enclosing the marginal edge of one board in a channel formed along one edge of a sheet metal strip, thereafter bending the strip-covered edge of said board inwardly over upon itself to form a groove, into which groove the marginal edge or edge flap of a co-acting or second board is inserted and tightly gripped therein by forcible closing of said groove, the arrangement being such that a joint seam is formed having the marginal edge or edge flap of the second board enclosed by the bent over edge portion of the first-mentioned board, with the edge of the metal strip forming one side of the channel located internally of the seam, while the remaining portion of said strip is wrapped around the outside of the seam, so as to hold the parts securely together and at the same time to act as channel shaped stiffening means for said seam. To increase the security of the joint, the edge portion of the metal strip which forms one side of the channel adapted to receive the edge of the first-mentioned board, is provided with outwardly projecting prongs or the equivalent which are adapted to be pressed into the material of the marginal edge or edge flap of the second-mentioned board, when the aforesaid groove into which it is inserted is forcibly closed by a clinching operation.

More particularly, the portion of the metal strip enclosing the edge of the first board is of substantially J-shape, having one limb longer than the other. The shorter limb is provided with a series of outwardly directed projections

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or prongs. The marginal edge portion of the first-mentioned fibre board is adapted to be inserted and firmly gripped by being pinched in the channel-like space formed between the said limbs, while the prongs are adapted to stand proud of the outer surface of the shorter limb. Thereafter the metal covered edge of the first-mentioned board is bent over upon itself to a U-shape, so that the enclosed portion of the edge thereof is located parallel with, but in spaced relationship to the inner surface of the said board, whereby a longitudinal groove or slot is formed. The marginal edge or edge flap of the second-mentioned or co-acting board, forming an adjoining side of the container, is inserted into the said groove and is firmly held in position by the aforesaid prongs or like projections, when these are forced into said edge by a suitable clinching operation.

The metal strip, which is of thin but relatively rigid material, has the prongs or like projections punched or pressed out from one side thereof. Said prongs or like projections are preferably adapted to extend outwardly at a suitable angle so that they act bard-fashion and thereby prevent withdrawal of the fibre board edge. They may be of a curved shape and pointed to afford rigidity and effect easy piercing and gripping of the fibre board which they are adapted to secure. Although the metal strips are conveniently made from flat metal strips, said strips may be ridged or corrugated to increase their strength, while the prongs may be arranged in a straight line or in staggered relationship to each other. The angularity may be arranged so that alternate prongs slope in opposite directions. If desired, said prongs may be arranged opposite each other or facing each other in pairs, much the same as a known wire stitch.

A container manufactured from fibre boards according to the present invention is particularly suitable for despatch and storage purposes in a flat, partly completed and unassembled or partly assembled condition, so as thereby to eliminate the necessity for large storage space when not in use. For this purpose the blank sheets of fibre boards are cut, and creased to the required size and shape, while the metal strips are applied to the appropriate edges, so that the sheets from which a box is made, may be packed flat on top of one another and are capable of being assembled or made up when required.

According to one method of carrying this out in practice; the aforesaid first-mentioned board consists of a blank creased to define fold-lines

for providing the bottom, sides and closure flaps of the container; and the said sheet metal strip is attached in the first instance along the opposite longitudinal marginal edges thereof so as to co-act for jointing purposes with outwardly bent marginal flaps provided on two end pieces, each of which constitutes the aforesaid second-mentioned board.

According to another method the said first-mentioned board consists of an end piece creased to form marginal edge flaps, and the said sheet metal strip is attached in the first instance to said edge flaps so as to co-act for jointing purposes with the marginal edge of a blank creased to provide the bottom, sides and closure flaps of the container. It will therefore be understood that in each case the parts for each container comprise a creased blank and two end pieces which can be packed flat and assembled when required.

The box when completed is therefore formed with reinforced corners and a metal edge all around and may be sealed in any suitable way such as by means of gummed tape or by soldering together the ends of the metal strips, but preferably by a clinching-operation similar to that used for making the joint seams.

In addition to the punching of the prongs in a metal strip, small sections are also punched out of said strip to coincide with the creases of the blanks, which provision obviates bulging of the metal strip at the fold lines when assembling the box.

To enable the invention to be more clearly understood and carried into practice, reference is now made to the accompanying drawings, in which like reference numerals refer to like parts throughout the several views.

In the drawings:

Fig. 1 is a fragmentary perspective view of one end of a box-like container constructed according to the invention;

Fig. 2 is a similar view of portion of the metal strip after it has been punched out to provide the prongs but before it is applied to a fibre board edge;

Fig. 3 is a similar view showing the first bending operation of the metal strip to provide a channel;

Fig. 4 is a similar view showing the insertion of a fibre board edge in the channel shown in Fig. 3, prior to the second bending operation;

Fig. 5 is a similar view showing the metal-strip-covered edge of the fibre board after it has been bent inwardly over upon itself to form a groove;

Fig. 6 is a similar view showing the completed joint or seam after the edge flap of a second board has been inserted in the groove shown in Fig. 5, and the side walls of said groove forced together by a clinching operation;

Fig. 7 is a view similar to that of Fig. 6, but showing an alternative method of carrying out the invention, in which the metal strip is in the first instance secured to the marginal edge flap of a fibre board;

Fig. 8 is a fragmentary plan view showing method of securing the closure flaps of a container of the kind shown in Fig. 1, to the top edge of an end wall for closing purposes;

Fig. 9 is a fragmentary view of portion of the metal strip showing provision of notch to facilitate bending;

Fig. 10 is an end sectional view taken on line X—X of Fig. 8;

Fig. 11 shows a creased blank for making a container as shown in Fig. 1, after the metal strip has been applied to the opposite longitudinal edges thereof;

Fig. 12 shows a creased blank suitable for an end wall of a container, as depicted in Fig. 1;

Fig. 13 is a perspective view, to a larger scale, of the blank of Fig. 12, after the metal strip has been secured to the marginal edge flaps thereof in the manner shown in Fig. 7;

Fig. 14 is a fragmentary perspective view showing method of holding the edge of a closure flap in position in the groove of the metal strip when fixed in the first instance to the marginal flap of the top edge of a container after the manner shown in Fig. 7;

Figs. 15, 16 and 17 are similar views showing alternative methods of achieving the same result; and

Fig. 18 is a fragmentary sectional view taken through a tag of Fig. 17, showing how the tag is tucked into the joint prior to the clinching operation.

Referring to the drawings, reference 1 denotes the sheet metal strip which is first of all punched out by suitable means to provide a row of prongs 2 on one side which, as shown in Fig. 2, project at an acute angle to the surface thereof. This punched out marginal portion of the strip 1 is then bent over through 180 degrees to the position shown in Fig. 3 and the edge of a fibre board 3 is inserted in the channel thus formed as clearly indicated in Fig. 4. Thereafter the metal-covered edge of the fibre board is bent over upon itself to the position shown by Fig. 5 so that a groove 4 is formed with the prongs 2 projecting inwardly. The marginal flap 5 of a fibre board 6 is inserted in the groove 4 which is then forcibly closed thereon so as to complete the joint illustrated by Fig. 6. It will be noted that the prongs 2 are forced into the material of the flap 5 which is thus securely locked in position.

A box as shown in Fig. 1 is constructed from the creased blank of Fig. 11, and two of the end pieces 7 as shown in Fig. 12. The blank is divided by transverse fold lines into a bottom panel 8, two side panels 9 and two closing flaps 10. Metal strips 1 are fixed to the longitudinal edges of the said blank in the manner illustrated in Fig. 5. To facilitate folding, notches 11 are cut out of the strips 1 in line with each fold line, as more clearly shown in Fig. 9. Each end piece 7 consists of a rectangular blank provided with fold lines 12 which, on removal of the corner portions, form the marginal edge flaps 13 which are capable of being folded to positions at right angles to the face of the blank.

The joints between the creased blank of Fig. 11 and the end pieces 7 are as depicted in Fig. 6. To facilitate the operation of holding the top edge flap 13 of Fig. 1 in the grooves of the closing flaps 10 during the clinching operation, the meeting ends of strips 1 are chamfered off as shown at 15 in Fig. 8 whereby the exposed portion of the edge flap 13 is capable of being pulled outwardly by a finger and thumb or a suitable tool, so that said edge flap can be held snugly in the grooves of the metal strips 1. Alternatively, part-circular notches 14, as shown in broken line in Fig. 8, may be cut out of the outer sides of the strips 1. In a modification of this construction the portion of the flap 13 registering with the notch 14, may be extended to provide a tag 16 as shown in broken outline in Fig. 10.

According to an alternative method of apply-

ing the invention to the manufacture of a box similar to that illustrated by Fig. 1, the metal strips 1, are, in the first instance, attached to the marginal edge flaps 13 of end pieces 7, instead of to the creased blank of Fig. 11, as clearly shown in Fig. 13. The steps involved in attaching the metal strip 1 to the marginal edge of the flap 13 of the end pieces 7 is similar to that of fixing a strip to the longitudinal edges of the board folded to form the bottom 8, sides 9 and closing flaps 10, as is described above. The metal strips for attachment to the flaps 13 are also first punched out by suitable means to provide a row of prongs adjacent one edge (see Fig. 2) whereafter the punched out marginal portion of the strip is bent over through an angle of 180° to form the channel into which the marginal edge flap 13 is inserted. The said channel is then tightly squeezed onto the flap 13. The so formed metal covered flap is then bent over upon itself to form the groove 4, so that the prongs project inwardly thereof. The crease line 12 is arranged just inwardly of the edge of that portion of the metal strip 1 which is wrapped around the outside of the bent over marginal flap edge as will be clearly seen from Fig. 7, which figure however shows the marginal ends of the coacting board inserted in the groove and after the groove is forcibly closed. When a joint is made with the creased blank it will appear as shown in Fig. 7 in which 17 represents an edge portion of the creased blank, and 18 represents an edge portion of an end piece 7.

Fig. 14 shows one way of facilitating the holding of the edge of a closure flap 10*a* in the groove of an end piece during the clinching operation. In this case one or more tongue-like extensions 19 are provided on the edges of said closure flap, which extensions are arranged to be passed through slots 20 in the strip-metal-covered edge flap 13. After closing the box these extensions may be cut off.

Fig. 15 shows a modified method of achieving the same result by the use of tags 21 of metal, or other suitable material, which are attached to the edges of a closure flap 10*a* in any suitable manner and co-act with slots 22.

Fig. 16 shows a further method in which the tags 21 of Fig. 15 are replaced by strings or wires 23, which co-act with holes 24.

Figs. 17 and 18 show still a further modification for achieving the same results as the methods of Figs. 14 to 16, but with certain additional advantages. In this case the tags 25, attached to the closure flap 10*a* by staples 26, are of sheet metal, and are long enough to be wrapped around the metal-covered edge flap 13 after being passed through the slots 27; and thereafter tucked into the joint prior to the clinching operation as clearly shown in Fig. 18. Fig. 17 shows the completed joint with the end of the tag 25 securely nipped between the two contacting surfaces thereof.

By the use of the methods illustrated in Figs. 15 to 18, the tags 21 and 25 and members 23, particularly when these are all made of metal, may be used for securing the joint parts together, and the prongs 2 may then be dispensed with.

This feature is particularly applicable in cases where the containers are required for re-use after initial filling. It will be understood that for opening purposes the said tags or their equivalent are simply straightened or unfastened.

It will be understood that the substantially channel-shaped form of the metal strip 1 in a completed joint, gives great strength to the container as a whole, besides protecting the edges and corners thereof against wear.

What I claim is:

1. A method of joining together sheets of fibre board particularly in the formation of containers, comprising bending an edge of a sheet metal strip to form a channel one side of which extends beyond the other side, enclosing the marginal edge of one board in the channel formed along one edge of the sheet metal strip, then bending the strip-covered marginal edge of said board to form a groove having metal on one inner side and exposed board on the other inner side thereof, then inserting an uncovered marginal edge of a second board into said groove between said metal and said exposed board inner sides and then forcibly closing said groove whereby a joint seam is formed in which the marginal edge of the second board is enclosed by the bent over edge portion of the first-mentioned board, with the bent over edge of the metal strip forming one side of the channel, located internally of the seam, while the remaining portion of said strip is wrapped around the outside of the seam so as to hold the parts securely together and at the same time act as a channel-shaped stiffening means for said seam.

2. A method as claimed in claim 1, wherein the edge portion of the metal strip which forms one side of the channel adapted to receive the edge of the first-mentioned board, is provided with outwardly projecting prongs which are pressed into the material of the marginal edge of the second-mentioned board, when said groove is forcibly closed by a clinching operation.

3. A method as claimed in claim 2, wherein said prongs are punched out from one side of the metal strip, and are arranged to extend outwardly at a suitable angle so that they act barb-fashion and thereby prevent withdrawal of the fibre board edge when said clinching operation has been completed.

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