

Dec. 28, 1965

B. CHIORRI
CONNECTION JOINT FOR PAPER-BOARD-MADE
PACKING BOXES OR THE LIKE

3,226,008

Filed Aug. 26, 1963

2 Sheets-Sheet 1

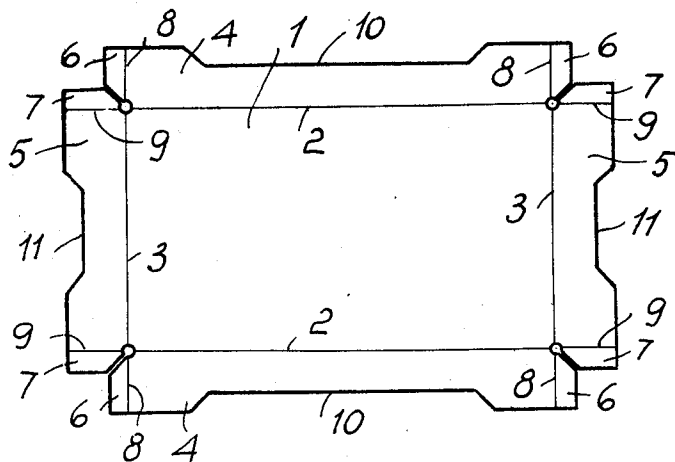


Fig. 1

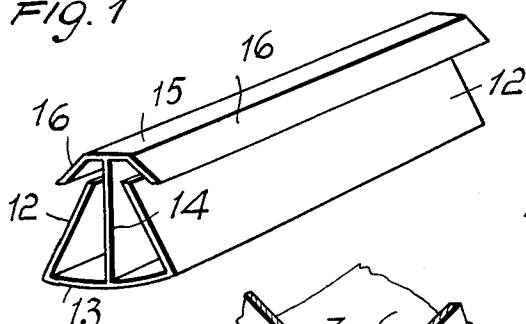


Fig. 2

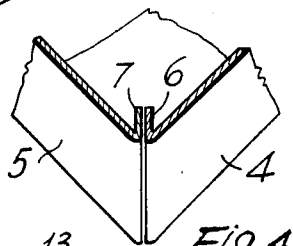


Fig. 4

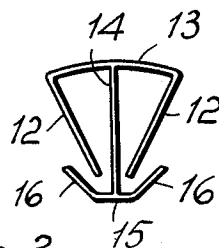


Fig. 3

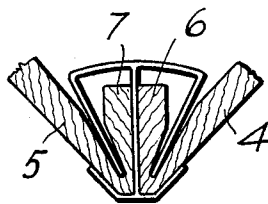


Fig. 5

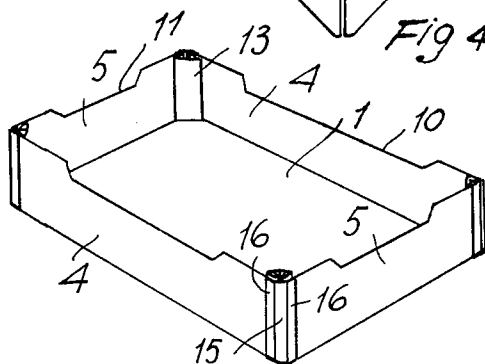


Fig. 6

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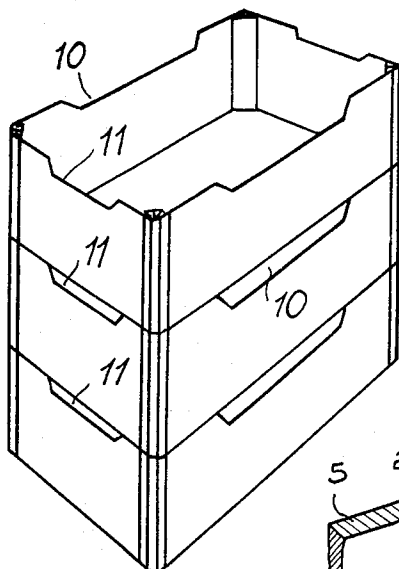


Fig. 7

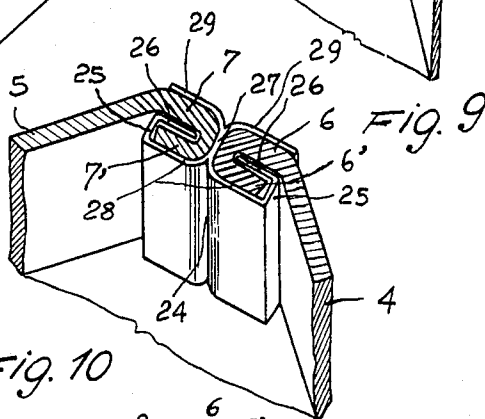
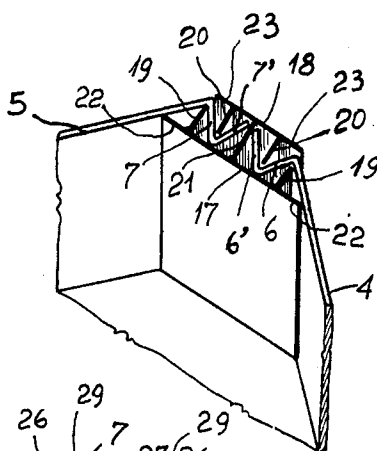


Fig. 9

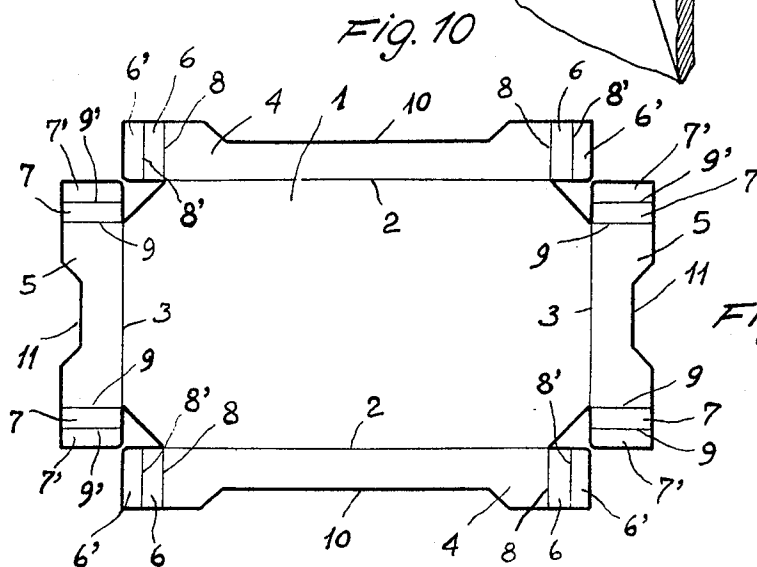


Fig. 10

Fig. 8

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3,226,008
**CONNECTION JOINT FOR PAPER-BOARD-MADE
PACKING BOXES OR THE LIKE**
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Patent 674,925
1 Claim. (Cl. 229—49)

This invention relates to connection joints for packing boxes made of paperboard or similar materials.

It is known that, generally speaking, when manufacturing paper-board-made packing boxes, the process starts from punch-cut material having double sides and provided with multiple tangs. Making up the widely known type of box requires, therefore, lifting of the sides, their folding over towards the inside of the double sides and the fitting of the tangs in carefully pre-arranged slots. At this stage, in various cases, it is proceeded with by effecting a strengthening process by means of metal staples, adhesive tape or by tangs fitted under the sides folded over towards the inside of the box, with subsequent insertion along the box corners of angular pieces which act as supports or spacers in the case of boxes being piled up one on another. It may be readily understood, that the time spent for making up paper-board boxes, e.g. of the type just described, is a considerable one and that the operation itself requires a certain amount of labour while the product is not always top quality, as box sides tend to open under stress during transport with consequent damage to the content. Furthermore, the initial blank involves a complicated shape and considerable sizes in comparison with the size of the end product obtained and the angular elements, whose only task is that of acting as supports and spacers, which are fitted to the already made-up boxes, form a set of accessories which influence the overall cost of boxes obtained, both on account of their own cost and because of the time required for fitting. It should also be noted that these supports and spacer elements are generally of irregular shape with undercut portions, so that their manufacture is slow and expensive; actually, if they are made of plastic material, they are obtained by means of press-casting, presses being used in the case of sheet metal, and by what may almost be called artisan processes, if the material is wood.

Among other things, the manufacture of the aforesaid elements requires costly equipment of dies and punches as each box size needs a special angular element and, consequently, a special die or punch.

It is an object of this invention to eliminate the above drawbacks by providing a connection joint for the manufacture of boxes made of paper-board or similar materials, which connection joint allows of using much smaller punches than those required for known models, reducing, at the same time, in a very considerable manner the time involved for making up the conventional types of boxes.

Another object of the invention is to provide a joint which should not require operations such as folding, inserting tangs, using of staples or adhesive tape for making-up the boxes, as in the case in the manufacture of known types.

A main object of the invention is that of eliminating the preliminary preparation step of boxes.

A further object of the invention is the provision of a box joint which will allow of shipping the boxes laid out flat, to the users, as a consequence of the fact that assembly is easily and quickly effected, considerably less space being thus required for shipping and storing empty packing boxes.

Not the least important object is the provision of a connection joint, according to this invention, which is simple

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in shape, so that its manufacture requires only simple operations which are already well known and which furthermore are adjustable for all box heights without special operations or costly dies being necessary.

The foregoing and other objects are reached by means of a connection joint for the manufacture of packing boxes according to the invention, characterized in that the box is mainly composed of a length of cut-out material whose section is formed of a practically U-shaped portion and by a diaphragm joined on one side to the central part of the aforesaid U-shaped portion and, on the other to a transversal outer wing fitted with extensions which extends in a direction which is essentially opposite to that of the arms of the aforesaid U portion and which are spaced from the latter by a space which corresponds approximately to the thickness of the box parts to be joined, foldable strips being provided at the corners of the base sheet forming the box body, for engagement with the elements of aforesaid joint.

Further features and advantages of the invention will be more clearly set forth in the description in full detail of preferred embodiments of the invention, which are, however, to be intended in a non-limiting way as to the inventive features, these embodiments being illustrated in the accompanying drawing, in which:

FIG. 1 is a top view of a base sheet, in a plan developed position,

FIG. 2 is a perspective of a connection joint according to the invention,

FIG. 3 is a cross sectional view of said connection joint,

FIG. 4 is a perspective view of a box corner before fitting the joint,

FIG. 5 is a cross section of a joint fitted to a box corner,

FIG. 6 is a perspective view of an assembled box,

FIG. 7 is a perspective view of a pile of boxes,

FIG. 8 is a plan view of a base sheet according to an alternative embodiment of the invention,

FIG. 9 is a perspective view of the application of an alternative embodiment of the joint according to the invention,

FIG. 10 is a perspective view of the application of another embodiment of a joint according to the invention.

With reference to these figures, the box is formed by (FIG. 1) folding over a base sheet (which has been obtained by punching operation from a blank) and by fitting a joint according to the invention, at each corner of the folded sheet. More specifically, the base sheet appears to be made of a quadrangular central part 1 limited by impressions 2 and 3 which, in their turn, determine the limits of the relative sides 4 and 5.

At the ends of sides 4 and 5 strips—respectively 6 and 7—are provided and the limits of these strips are determined by the respective impressions 8 and 9.

Further, sides 4 and 5 are provided with slot 10 and 11 located at the edges so as to allow the boxes to be aerated.

The connection joint (FIGS. 2, 3 and 5) is composed of a profile piece, or integral elongated section member, the cross-section of which comprises a practically U-shaped portion whose arms 12 converge between each other, while the central part 13 is joined to one side of the partition or diaphragm 14 thereby forming gaps between diaphragm 14 and arms 12; the other side of this diaphragm is fixed to a cross wing 15, having arms 16 which are divergent in a direction that is complementary to the direction of arms 12 (element 15 is, in section, approximately semi-hexagonal in shape). Arms 16 are spaced, in respect of arms 12 by a gap which is approximately equal to the thickness of base sheet and which extends substantially in the direction of said arms 12 and

at an acute angle to the gap between the portions 12 and 14.

Box assembly is effected by folding over the base sheet along impressions 2 and 3 in such a way as to raise the sides and by subsequently folding over towards the inside strips 6 and 7 so as to arrange the corners as illustrated in FIG. 4.

When this has been done, a connection joint is fitted to match each corner, so as to force strips 6 and 7 to enter into the joint itself, while the box corner is surrounded and strengthened by element 15 (and respective arms or extensions 16).

The manner in which the joint is fitted clearly appears from FIG. 5. As can easily be understood, the box sides are firmly held and there is no danger that the box should open in any way due to stress applied during transport, since the more the joint is stressed the more it strengthens its engagement with the folded sides.

The assembled box appears to be as shown in FIG. 6, while a pile of boxes may be formed in the manner illustrated in FIG. 7 (the latter figure clearly shows how openings 10 and 11 ensure efficient aeration of the inside of boxes).

As can be easily understood, on account of the simple shape of the parts, whereof the joint according to the invention is made, such a joint may be obtained by means of drawing operations so that, by merely rotating the drawbench handle which moves the cutting device, it is possible to obtain joints of various lengths according to the sizes required for specific heights of packing boxes.

As can be seen, the making-up of a packing box, when recourse is had to connection joints according to the invention, can be carried out in a very practical and simple way as the fitting of the joints is effected by simply having said joints mounted onto the edges of the base sheet, such corners having been previously folded over.

It is not necessary to effect any special fitting in, or folding and there is not subsequently required any strengthening device as metal staples for the formation of box as are used for conventional types of boxes.

This, in respect of already known types of boxes affords a considerable saving of time when assembling the boxes. Actually it has been found that the time required for making-up boxes of conventional types is a minimum of three minutes, equal to a production of 20 boxes per hour; on the other hand, assembly of a box by means of joints according to the invention required 20 seconds, equivalent to an hourly output of 180 boxes. As to the saving on materials, it has been found that a conventional type box requires cardboard blanks having an area of 9900 sq. cm. while a box of the same size, made by means of the joint according to this invention requires a cardboard blank having a surface of 4800 sq. cm. i.e. approximately one half of the former with less cardboard scrap. The economic result obtained is clear and requires no further comments.

In an alternative embodiment, the connection joint may be shaped for instance as shown in FIG. 9.

The section of the shaped parts is formed of two parts, 17 and 18, which give rise to a U shaped member with arms 19 and 20 which are respectively parallel to each other, said parts being joined to each other by the diaphragm 21. Wing portion 18, which is of smaller size has, consequently, its arms or bracket portions 20 within the space comprised between arms 19 of central part 17 and separated by the diaphragm. Parts 17 and 18 are both provided with extensions 22 and 23 located at the outside of arms 19 and 20 respectively.

The base sheet (FIG. 8) which is suitable for use in the forming of the box by fitting the joint according to the invention and according to the alternative embodiment previously described, presents sides 4 and 5 which, besides of being provided with strips 6 and 7 respectively, as in the base sheet formerly described in FIG. 1, com-

prise strips 6' and 7' fitted as an extension of strips 6 and 7 respectively and delimited by impressions 8' and 9'.

To proceed with the assembling, extensions of sides 4 and 5 formed of strips 6 and 6' and 7, 7', respectively, are folded in a V shape as shown in FIGURE 9. Thereafter at each corner, a joint according to the alternative embodiment of the invention is fitted, by the same method as disclosed for the first joint described. To the same base sheet described and illustrated in FIG. 8, the joint as per FIG. 10 may be fitted, thus forming a second embodiment of the invention. As it can be seen, the arms of the central portion 28 which are practically U shaped, after a first length 25 which is normal to the central portion 28 of aforesaid U shaped part, have extensions and portions 26 towards inside of above mentioned U shaped part.

The diaphragm 27 is joined on one side to the central part 24 of central portion 28 of aforesaid U shaped part, while on the other side it is joined to the cross wing 29 which is parallel to the central portion 28 of the U shaped part.

The folding over of strips 6, 6' and 7, 7' so as to form a box by means of such a joint is clearly shown in FIG. 10. As it may be noted, the alternative embodiments of the connection joint according to the invention allow boxes to be formed with bevelled edges and, more generally speaking, allow also rectilinear joining of two flaps to be performed.

Further, it is obvious that openings 10 for aeration can be eliminated if goods being transported do not require air to be changed.

I claim:

A connection joint for connecting folded corner edges of packing boxes, comprising an integral elongated section member having in its cross-section a U-shaped portion with two spaced apart arm portions and a central portion connecting said two arm portions and extending transverse thereto said arm portions having each a free extremity and mutually converging in the direction leading beyond said free extremities, the angle of said convergence being an acute angle, a diaphragm portion connected with one end thereof to an intermediate portion of said central portion and extending at a right angle therefrom between said arm portions, said diaphragm portion having a free end projecting beyond the free extremity of said arm portions, and being spaced apart from said arm portions, a wing portion fixed on said free end and extending transverse to said diaphragm portion above said free extremities, said wing portion having a central portion perpendicular to said diaphragm portion and free ends inclined towards said free extremities and extending along a length of said arm portions near said free extremities thereof and in spaced relationship thereto, thereby to provide a first gap between said free ends and said arm portions near said free extremities and extending substantially in the direction of said arms, and a second gap communicating with said first gap and extending between said arms and said diaphragm member at an acute angle to said first gap.

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