March 15, 1938. A. M. KAMPER 2,111,474

MANUFACTURE OF BOXES

Filed Aug. 28, 1936 4 Sheets-Sheet 1

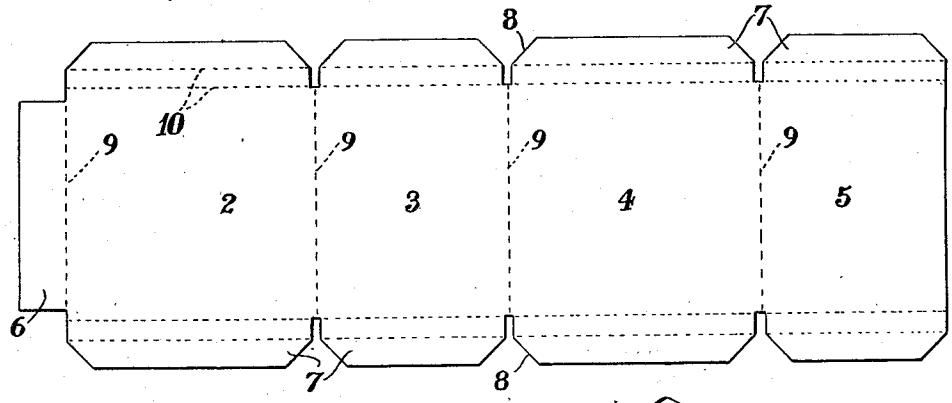

Fig. 1.

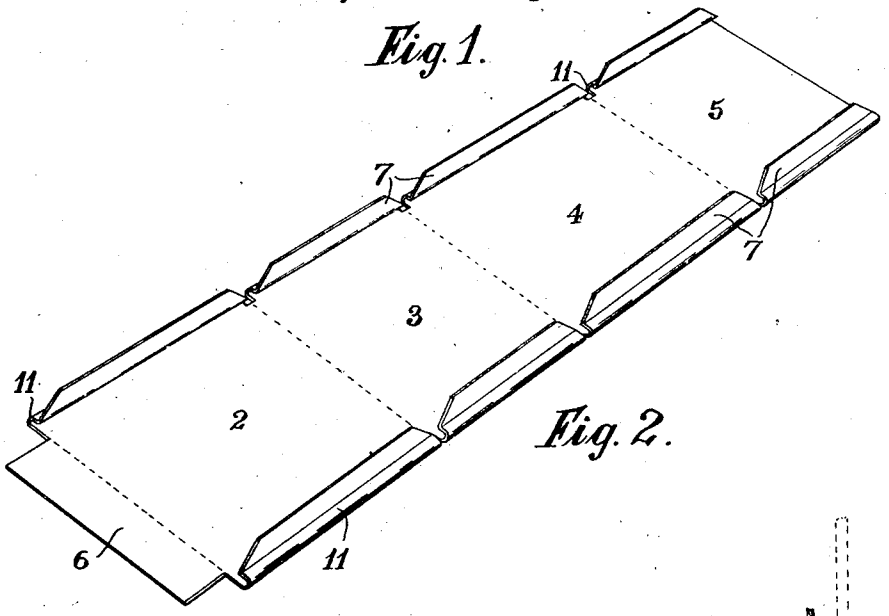

Fig. 2.

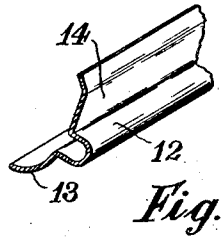

Fig. 3.

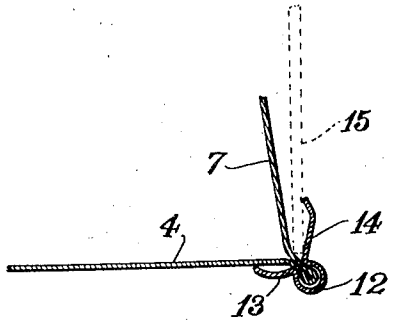

Fig. 4.

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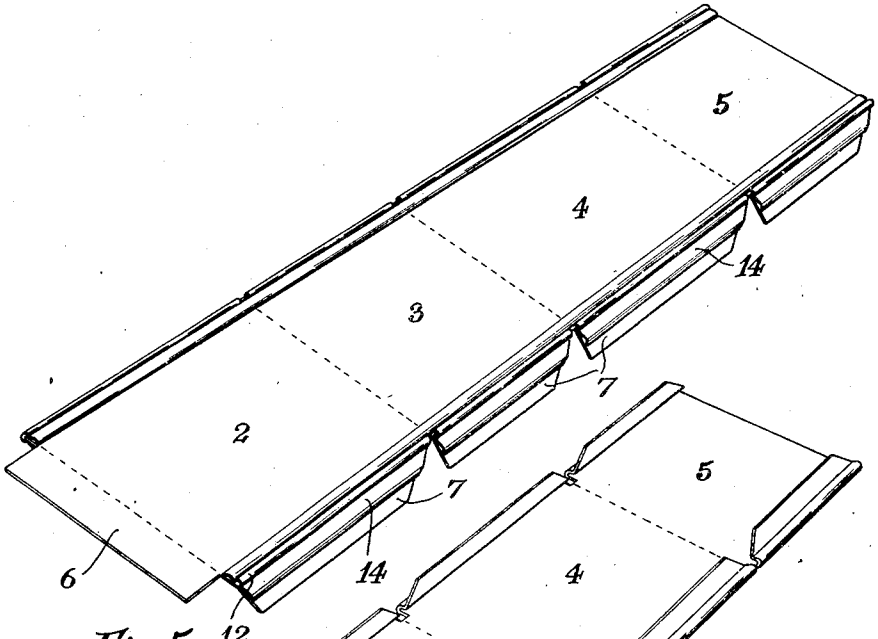

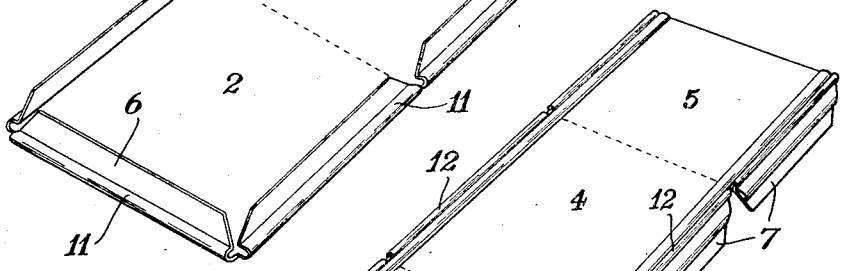

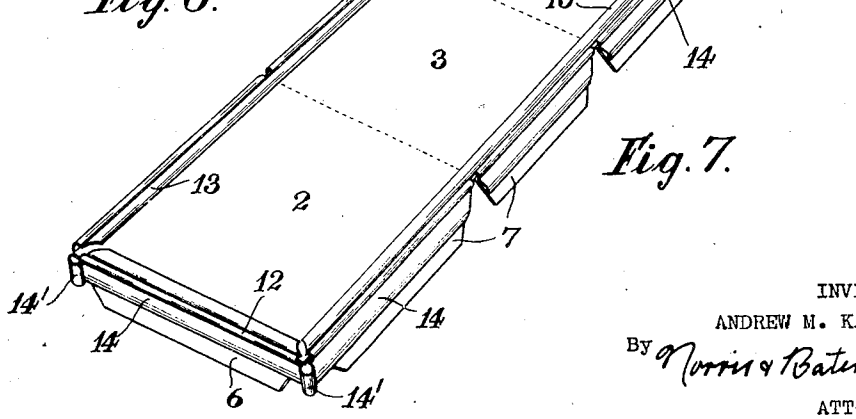

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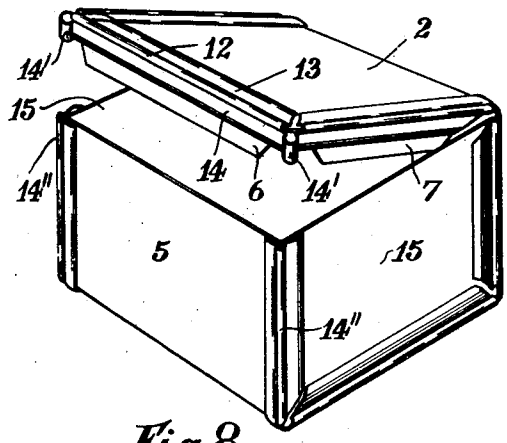

Fig. 8.

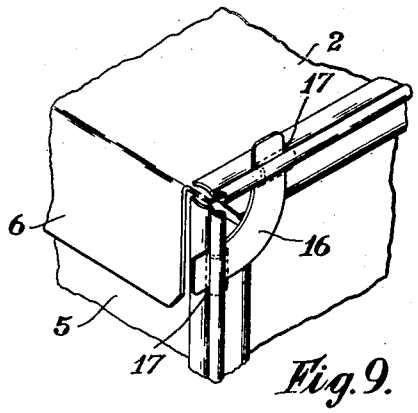

Fig. 9.

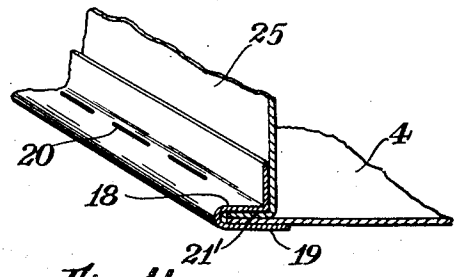

Fig. 11.

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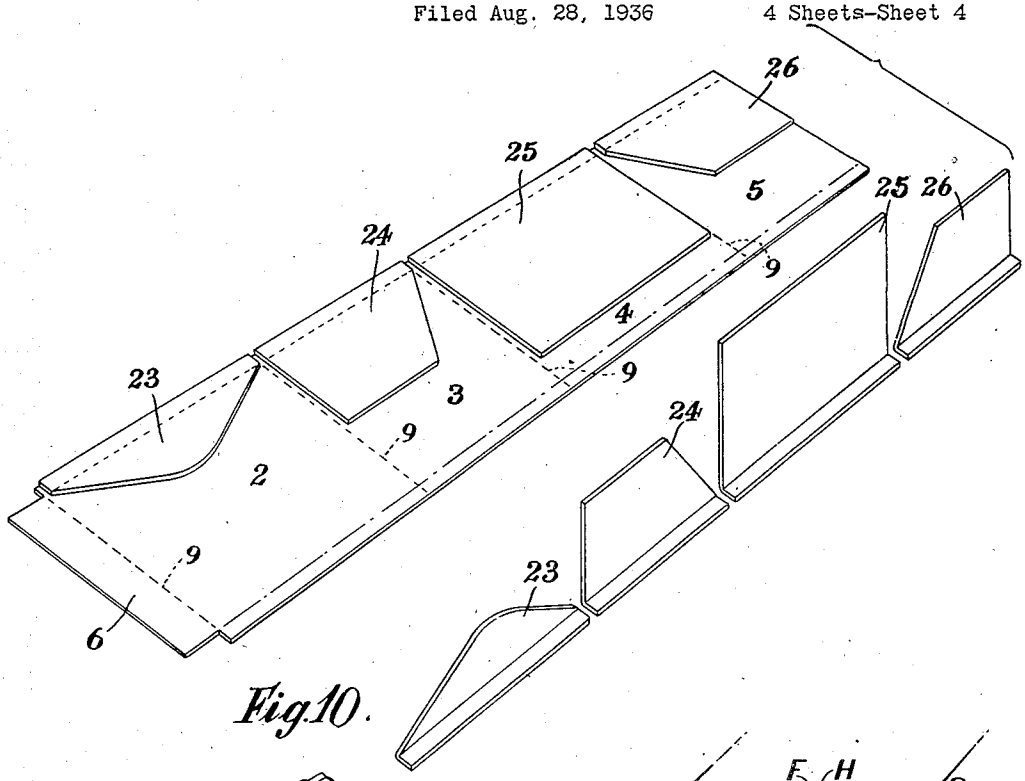

Fig. 10.

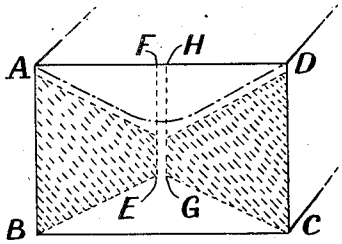

Fig. 12.

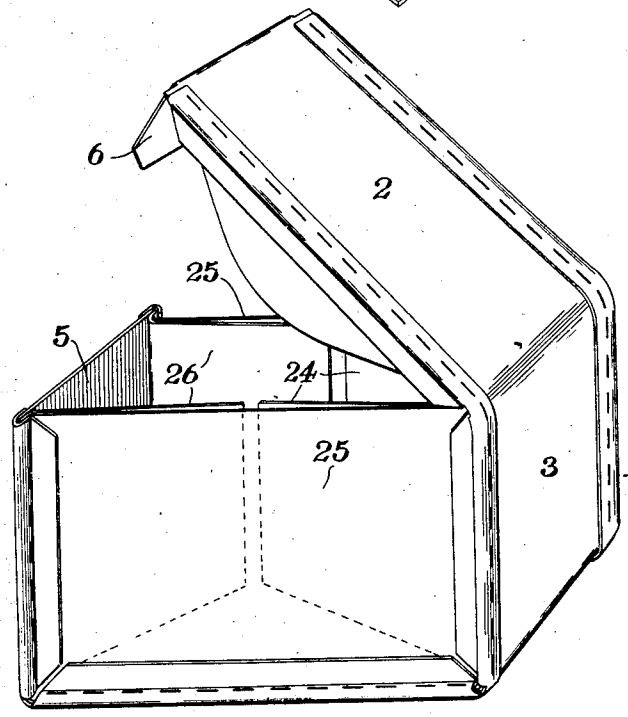

Fig. 13.

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Patented Mar. 15, 1938 2,111,474

UNITED STATES PATENT OFFICE

2,111,474

MANUFACTURE OF BOXES

Andrew Mathis Kamper, Surbiton, England, assignor to No-Nail Cases Proprietary Limited, London, England, a limited-liability company of Australia

Application August 28, 1936, Serial No. 98,383
In Great Britain July 9, 1936

6 Claims. (Cl. 229—23)

This invention relates to improvements in the manufacture of boxes of foldable material such as cardboard.

Among the objects of the invention are to produce a box having greater strength, rigidity and resistance than hitherto obtainable with boxes of cardboard and the like foldable material.

It is known to provide box blanks of cardboard with metal strips along their opposite sides whereby, when the blanks are folded up into box form, the cardboard box is stiffened and the end walls of the box can be secured in position.

In known boxes of this kind the metal strips have sometimes been attached to the cardboard by means of teeth integral with the metal strip, and sometimes by means of rivets.

The present invention consists in a box blank of cardboard or the like folding material in which metal strips at each side of the blank embrace and hold tightly a double thickness of the blank material, viz. on the one hand the borders of the body portion which is adapted to fold up to form the front, bottom, back and top of the box, and on the other hand the borders of parts adapted either to form the ends of the box or to lie against and reinforce the ends of the box on the inside and to hold them in position.

The end-forming or reinforcing parts of the folding blank may be in one piece with the parts forming the front, bottom and so on, the former being lateral extensions upon the latter, and doubled over thereon, or the end-forming parts may be cut separately from the remainder of the blank.

Each metal strip is preferably affixed to the cardboard or other foldable material by being clenched tightly thereon longitudinally of the strip, without the use of teeth, staples or rivets, and thereby the risk is avoided of the strip becoming detached owing to the teeth or rivets tearing the box material or cutting through it.

Preferably it is the middle portion only of the metal strip which is clenched onto the cardboard, a border portion on either side of the clenched portion being adapted to lie upon the material of the box in planes substantially at right-angles to one another.

In the accompanying drawings the invention is illustrated as applied to a variety of types of blanks and boxes.

Fig. 1 shows a cardboard blank cut out for one form of box.

Fig. 2 shows the edges of the blank folded ready to receive the metal strip.

Fig. 3 is a sectional view of one form of strip which may be employed according to the present invention, before it is clenched on the cardboard blank.

Fig. 4 is a sectional view of the strip clenched onto the blank, showing also the position occupied by the end wall of the box with this form of blank.

Fig. 5 is a view of the outerside of the blank with the two metal strips in position along each side.

Fig. 6 shows an alternative form of cardboard blank, bent up in the manner of Fig. 2, but with the end flap also bent up and therefore adapted to take a metal strip in one piece along one side, across the end, and along the other side, instead of in two separate pieces along the sides as in the previous case.

Fig. 7 shows a blank of this form with the metal strip clenched in position thereon.

Fig. 8 shows this form of blank made up into a box and completed with end walls.

Fig. 9 illustrates how a box of the type of Figs. 1–5 may conveniently be closed.

Fig. 10 illustrates how a box blank may be made up of a rectangular body portion and separate side members, instead of integral side members as in Figs. 1–8, but to produce a blank of different shape and arrangement from those of the earlier figures, and having the end walls as part of the blank.

Fig. 11 is a detail sectional view of the assembly of the blank according to Fig. 10, illustrating also an alternative form of metal strip.

Fig. 12 illustrates diagrammatically how the side portions co-operate to form an end wall.

Fig. 13 is a view of a completed box, using the blank shown in Fig. 12.

In Fig. 1, the cardboard blank comprises a rectangular main or body portion 1, made up of lid 2, back wall 3, bottom 4 and front wall 5, a closure flap 6, and side portions 7, between which are mitre cuts 8. The blank is creased along the lines 9, 9, to allow it to be readily folded transversely, and also along lines 10, 10 to allow the side portions to be folded longitudinally into the forms shown in Fig. 2. There are thus formed along the two sides of the blank folded or double thickness portions 11, 11 and onto these are secured the metal binding strips. Fig. 3 shows the profile of one form of strip that may be used. It has a longitudinally central channel portion 12, at either side of which are substantially arcuate section border portions 13 and 14. The strip for each side of the box is notched at points corresponding to the mitre cuts 8 in the cardboard

blank, the notches extending through the border portion 14 and the central channel portion. The metal strips are fitted over the doubled edges 11 of the blank, with the doubled edges lying within the channel portions 12 of the strips, and the strips are then closed up, as shown in Fig. 4, with the channel portion 12 firmly clenched upon the doubled edges 11, and the two border portions 13 and 14 of the strip lying in planes substantially at right-angles to one another. The whole blank with metal strips attached is shown in Fig. 5 in a position the reverse of Fig. 2. The strips may be closed down on the blanks by passing them between pressure rollers.

In Figs. 6 and 7 is shown a cardboard blank of slightly different form and in Fig. 7 is shown the same with a metal strip in one piece attached thereto. It will be seen that the lid flap 6 is here bent over also, in the same way as the side portions 7 of the blank, and the metal strip is clenched onto the folded or doubled portions 11, 11 all round the blank except at the right-hand end in Fig. 6. Fig. 7 shows the blank with the strip attached. For this pattern of blank the strip has to be notched not only as before through the border 14 and central channel portion 12, but also, at the two front corners, through the border 13 and channel portion 12. At the corners where the border 14 of the strip is uninterrupted, to keep the strip unbroken, the border is bent up to form transverse channel portions 14'. When the blank is bent up into box form as shown in Fig. 8, these parts 14' fit over the parts 14'' of the ends of the strip. The ends of the blank may then be secured together (i. e. the lid may be fastened down) by indenting or piercing the overlapped parts 14' and 14''. The lid flap 6 in this arrangement of blank is preferably passed inside the box when the lid is closed down.

Fig. 9 shows how the box lid can be fastened down when the blank is of the form shown in Fig. 5. An arcuate plate 16 is passed through slots 17 in the lid and front wall metal strips, and the ends of the plate are bent over. The flap 6 is stuck down on the front wall 5.

With blanks of the type illustrated in Figs. 1–7, the end walls of the box may be held between the borders 14 of the metal strip and the upturned side portions 7 of the cardboard blank, this arrangement is illustrated in Fig. 4, where the position of an end wall is shown in dotted lines at 15. The end walls 15 are shown in position in Fig. 8. The side portions 7 are of course not rigid on the blank, but in conjunction with the goods packed in the box they serve to hold the end walls in position, and, if required to hold the end walls more positively, they may be wire stitched to the end walls or attached thereto by means of an adhesive. The end walls may be of cardboard, or of 3-ply wood, as it may be desirable to have them of slightly stiffer material than the blank. The strip borders 13 and 14 lying upon the sides and ends of the box, keep the strip from twisting upon the double edges of cardboard on which the strip is clamped.

To cut blanks of the form shown in Figs. 1–7, with the side portions 7 all in one with the rectangular body portion of the blank, stamping dies are required, and to avoid the expense of numerous dies to suit different dimension of box, the blanks may be made up of a rectangular body portion and separately prepared side portions adapted to be fixed upon the body portion by means of the metal strips. To shape these separate parts, dies are not required.

In Fig. 10 one form of such composite blank is illustrated, which has a body portion comprising the lid part 2, back wall 3, bottom 4 and front wall 5, as before, with lid flap 6. Separate side members 23, 24, 25, and 26 are provided at each side, adapted to be attached by their edges or flanges to the body portion, by means of metal strips, in the manner illustrated in Fig. 11. With the form of metal strip here illustrated the edges of the body portion of the blank and the flanges of the side members are gripped tightly between the folds 18 and 19 of the metal strip. The grip may be made more positive by forcing indentations 20 into the metal by means for instance of a toothed roller. The side members are shown in position on the main portion of the blank at the upper side of Fig. 10, and are shown detached at the lower side; in the former case the side members are lying flat, in the same plane as their attachment edges, and in the latter case bent up at right-angles to their edges. When the side members are all mounted on the body portion of the blank as described, the blank is folded up on the dotted lines 9, 9 as before, the members 25 are raised vertical to form the end walls, the members 24 and 26 are laid against the inner sides of the members 25 (the members 24 and 26 may be of a size to abut when in position, but do not overlap one another), and the members 23, as the lid is being closed, are passed in between the members 25 and the members 24 and 26. The lid flap 6 is folded down on the outside of the box and fixed by means of an adhesive.

In conjunction with the different constructions of boxes above described, and particularly with the arrangement shown in Fig. 10, it has been found of advantage to employ well known adhesive fixing means of the kind which renders two treated surfaces adhesive to one another, but leaves a treated surface non-adhesive to a non-treated surface. If for instance, part of the inner face of side member 25 is coated with a rubber solution, and parts of the outer surfaces of side members 24 and 26 are similarly coated, these coated surfaces will be, when dry, non-adhesive for any ordinary surface with which they may come in contact; but if placed in contact with one another and pressed together, they will firmly adhere. In Fig. 12 is illustrated diagrammatically the positions of the members 23, 24, 25, and 26 in the closed box. The rectangle A, B, C, D, represents the part 25, the figures A, B, E, F and D, C, G, H the parts 24 and 26 respectively. The shaded portions indicate the areas on the parts 25, 24, and 26 which are coated to render them mutually adhesive, and the position of the part 23 is indicated in dotted lines above the shaded portions.

The lid flap 6 may be similarly treated and also that part of the front wall of the box to which the flap is required to adhere.

It will be understood that when a number of blanks are being stacked in the flat, with the side members folded down on the body portions, the coated surfaces must be kept out of contact with one another.

As a material for the box blank there may be used any compressible and foldable material such as cardboard or corrugated paper.

I claim:

1. A box blank of foldable material comprising a substantially rectangular body portion creased transversely and adapted to fold up into the front, bottom, back and top of a box, and on op-

posite sides of said front, bottom, back and top parts side members adapted to occupy in the completed box positions substantially at right-angles to said front, bottom, back and top parts respectively, and longitudinally folded metal strips running uninterruptedly along opposite sides of the blank and clamping together the borders of said body portion and of said side members.

2. A box blank as claimed in claim 1, in which the side members are cut separate from the body portion of the blank and attached thereto by the metal strips.

3. A box blank as claimed in claim 1, in which the metal strips are provided with flanges which when the strips are mounted on the blank, stand at right-angles to the body portion of the blank and upon the inner side of said body portion.

4. A box blank as claimed in claim 1, in which the side members clamped to the part of the blank which is adapted to form the bottom of the box are of equal width with the bottom and of equal height with the back and front of the box and the side members clamped on the parts of the blank which are adapted to form the back and front of the box are of such size that they do not overlap, and the side members which are adapted, when the box is made up, to contact with one another are rendered, over part of their contacting surfaces, mutually adhesive.

5. A box blank as claimed in claim 1, in which the metal strips which run uninterruptedly along the sides of the blank are the end sections of a metal strip of which the middle section runs across and is clamped to one end of the blank.

6. A box blank of foldable material comprising a substantially rectangular body portion creased transversely and adapted to fold up into the front, bottom, back and top of a box, and on opposite sides of the front, bottom and back parts, side members adapted to occupy in the completed box, positions substantially at right angles to said front, bottom and back parts respectively, and longitudinally folded metal strips running uninterruptedly along opposite sides of the blank and clamping together the borders of said body portion and said side members.

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