Dec. 15, 1931. P. W. DIETMANN 1,836,909

METHOD OF MANUFACTURING BOXES

Filed Oct. 14, 1930

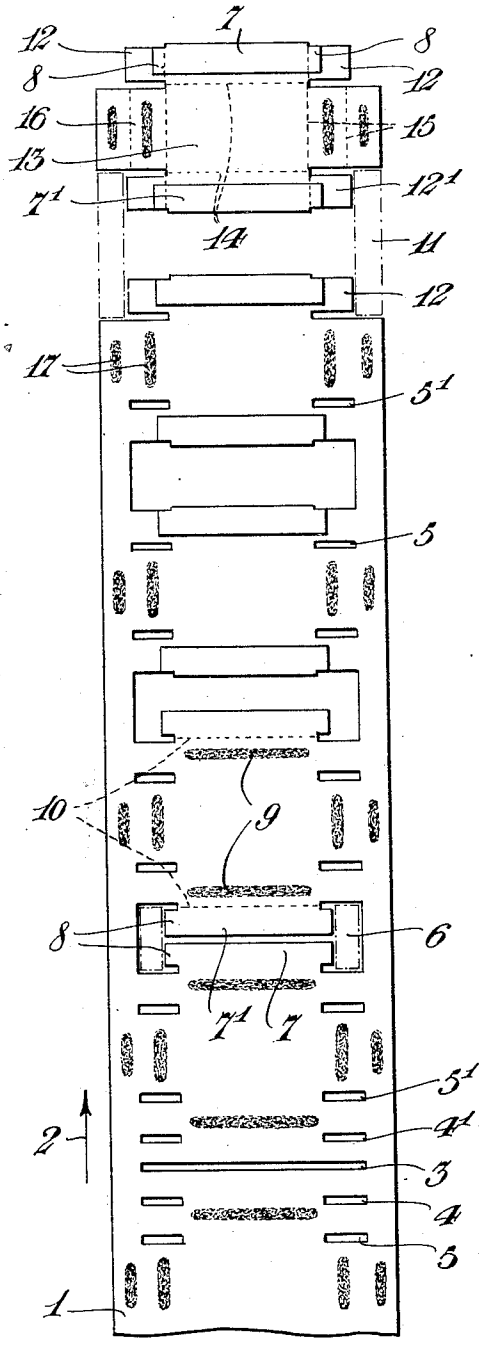


Fig. 1.

Fig. 2.

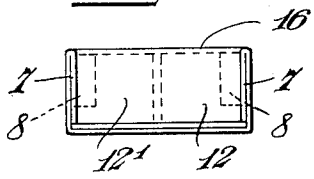
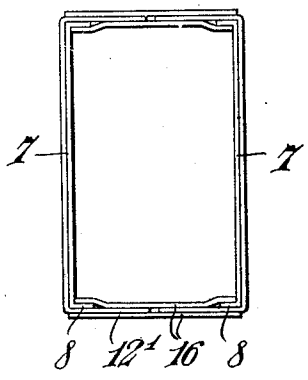


Fig. 3.



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Patented Dec. 15, 1931

1,836,909

UNITED STATES PATENT OFFICE

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METHOD OF MANUFACTURING BOXES

Application filed October 14, 1930, Serial No. 488,636, and in Sweden September 8, 1930.

This invention relates to the manufacture of open, rectangular boxes of paper, cardboard or other material, which are made by folding one single cutting and provided with double walls and corners formed of folded lateral flaps of the walls. Such boxes are, by preference, used as inner boxes in push boxes consisting of an inner and an outer box, said lateral flaps being preferably folded and fixed so as to strengthen the end-walls of the inner box, which are subjected to greater stresses than the remaining portions of the inner box. The object of the invention is a method of manufacturing, from a continuous web of paper, cardboard or other material, the cuttings to be folded to finished boxes. The invention consists, chiefly, in this, that in the web transverse I-shaped or double T-shaped cuts or punched slits are made to produce tongues adjacent to each other in pairs, said tongues being folded down on adjacent portions of the web in order to form, together with those portions, double walls in two consecutive cuttings. On each side of said double T-shaped slits two additional transverse cuts or slits are, by preference, made extending inwards to the corner points of the bottom of the box. The cohering cuttings may finally be separated by cutting away the edges of the web to a length corresponding to the distance between the bottoms of two adjacent boxes. Thus, box cuttings separated from the web are obtained in which the necessary folding lines have been made and on which paste, glue or another adhesive has been applied in spots in a suitable step of the prior procedure. The portions of the box cuttings, on which the tongues are folded down to engage them, shall, as mentioned above, form two opposite sides of the box together with the tongues and are at each end provided with lateral flaps left between the cuts and the additional transverse slits to form the corners of the box and to strengthen the two other sides, which are formed by folding up and doubling the material left between the additional transverse slits.

The width of the web of material and the length of the cuts and the distance between the latter may be chosen in such manner that the longitudinal direction of the box cuttings either coincides with the longitudinal direction of the web or is perpendicular thereto. The last-mentioned embodiment, in which it is the end-walls of the box, that are strengthened by the lateral flaps of the other walls, is, however, preferred, because when carrying out the different steps of operation simultaneously the distance, which the web has to be fed between each working position, is by this rendered shorter, so that the working speed of the machine serving to carry out the method may be increased. The shorter distances between the working positions also render it possible to reduce the dimensions of the machine.

One embodiment of the invention is shown in the annexed drawings.

Fig. 1 shows a continuous web of paper or other material whose different parts are successively subjected to the working steps which are used for manufacturing the box cuttings in accordance with this invention.

Figs. 2 and 3 show a longitudinal section and a cross-section through a box manufactured by folding such a cutting.

Referring now to the drawings 1 indicates a continuous web of paper, cardboard or other material fed in the direction of the arrow 2 and having a width substantially corresponding to the sum of the length and four times the height of the walls of the box to be manufactured. In a distance from each other substantially corresponding to the sum of the width and four times the height of the walls of the box I-shaped or double T-shaped cuts or punched slits are to be made in the web. In the particular embodiment as shown this punching is not made in one single operation but is partially made in a primary working position and completed in a second working position. In the first working position a central punched slit 3 and in addition an outer and an inner pair of transversal cuts or slits 4, 4′ and 5, 5′ respectively on each side of the central slit 3 are made. These slits do not reach the edges of the web said edges being thus uncut which facilitates the correct feeding of the web. The distance in

the longitudinal direction of the web between the slits corresponds to the height of the walls of the box and the transverse distance between the slits 4, 4′ and 5, 5′ arranged in pairs at each end of the central slit 3 is equal to the length of the box. In the second working position the portion 6 indicated by dash and dot lines between the slits 4 and 4′ is cut away, so as to form a punched double T-shaped slit and two adjacent tongues 7, 7′ having under-cut lateral flaps 8. In the next step of operation the tongues 7, 7′ belonging to one and the same cutting are folded to a fixed engagement with the adjacent portions of the web, after the latter have been provided with strips 9 of paste, glue or another adhesive in a prior step and folding lines 10 have been made at the places of the web which correspond to the base or root of the tongues. After the tongues have been folded, those portions 11 of the edges of the web are cut away which are situated between the prolongations of the slits 5, 5′ in two consecutive cuttings to such a depth that the lateral flaps 12, 12′ thus formed on the parts of the web connected with the tongues 7, 7′ get the length desired. When the portions 11 are cut away, one box cutting 13 is separated from the web. Before that, however, the cutting has in a prior step of operation been provided with further folding lines 14 in the prolongation of the slits 5, 5′ and with folding lines 15 at right angles thereto in those parts 16 of the cutting, which shall form the end-walls of the finished box and to which strips 17 of an adhesive have been applied in a still prior step.

The cutting thus produced is to be folded into the shape shown in Figs. 2 and 3. For this purpose the tongues 7, 7′ having the lateral flaps 8, 8′ and 12, 12′ are folded up to a perpendicular position in relation to the bottom of the box and said flaps are folded inwards at right angles to the tongues proper. After that the end portions 16 are folded up at right angles to the bottom of the box and their upper portions are folded down on the lateral flaps 12, 12′ folded inwards and caused to engage them fixedly.

In the method described above the additional transverse slits 5, 5′ are cut at the same time as the slits 4, 4′ and 3. It is, however, obvious, that said slits 5, 5′ may be punched also in other steps of operation, for instance, simultaneously with the punching away of the parts 11. The method may also be modified in other ways without departing from the spirit of the invention. Thus, it may be advantageous in some cases to make the lateral flaps 12, 12′ longer than those shown in the drawings in order to cause them to overlap each other partially in such manner that the end-walls become the fourfold thickness of the web all over. Instead of making slits 3, 4, 4′ and 5, 5′, i. e. instead of removing material, it is also possible to make corresponding incisions or cuts into the web. In the embodiment shown all tongues belonging to one and the same cutting are folded simultaneously, but two adjacent tongues (of two different cuttings) may, of course be folded simultaneously, if desired. In the embodiment shown the tongues 7, 7′ are formed with undercut lateral flaps 8 so as to give a double wall in the corners of the box but those lateral flaps may obviously be cut away at the same time as the portion 6 so as to give the end-walls of the box a more constant thickness.

What I claim is:—

1. A method of manufacturing, from a continuous web of material, cuttings for open rectangular boxes to be finished by folding a single cutting, said boxes having double walls and corners formed of folded lateral flaps of the walls, comprising cutting double T-shaped cuts in said web at right angles to the longitudinal direction thereof, to form tongues adjacent to each other in pairs, and folding said tongues down on adjacent portions of said web to form, together with said portions, double walls in the boxes.

2. A method of manufacturing, from a continuous web of material, cuttings for open rectangular boxes to be finished by folding a single cutting, said boxes having corners formed of folded lateral flaps of the walls and double walls, comprising cutting double T-shaped cuts partially in one working position in said web at right angles to the longitudinal direction thereof to form tongues adjacent to each other in pairs, moving said web to another working position, completing said double T-shaped cuts in said latter working position, and folding said tongues down on adjacent portions of said web to form, together with said portions, double walls in two consecutive cuttings.

3. A method of manufacturing, from a continuous web of material, cuttings for open, rectangular boxes to be finished by folding a single cutting, said boxes having double walls and corners formed of folded lateral flaps of the walls, comprising cutting double T-shaped cuts transversely in said web to form tongues adjacent to each other in pairs, cutting two additional transverse cuts on each side of said double T-shaped cuts to extend inwards to the corner-points of the bottom of the box, and folding said tongues down on adjacent portions of said web to form, together with said portions, double walls in two consecutive box cuttings.

4. A method of manufacturing, from a continuous web of material, cuttings for open, rectangular boxes to be finished by folding a single cutting, said boxes having double walls and corners formed of folded lateral flaps of the walls, comprising cutting double T-shaped cuts transversely in said

web to form tongues adjacent to each other in pairs, cutting two additional transverse cuts on each side of said double T-shaped cuts to extend inwards to the corner-points of the bottom of the box, all of said cuts being placed in such positions that the web remains uncut to a certain width at its edges, and folding said tongues down on adjacent portions of said web to form, together with said portions, double walls in two consecutive cuttings.

5. A method of manufacturing, from a continuous web of material, cuttings for open, rectangular boxes to be finished by folding a single cutting, said boxes having double walls and corners formed of folded lateral flaps of the walls, comprising cutting double T-shaped cuts transversely in said web to form tongues adjacent to each other in pairs, cutting two additional transverse cuts on each side of said double T-shaped cuts to extend inwards to the corner-points of the bottom of the box, all of said cuts being placed in such positions that the web remains uncut to a certain width at its edges, folding said tongues down on adjacent portions of said web to form, together with said portions, double walls in two consecutive cuttings, and separating each of said cuttings from said web by punching away the edges of said web to a length substantially corresponding to the distance between the bottoms of two consecutive boxes.

6. A method of manufacturing, from a continuous web of material, cuttings for open, rectangular boxes to be finished by folding a single cutting, said boxes having double walls and corners formed of folded lateral flaps of the walls, comprising cutting double T-shaped cuts transversely in said web to form tongues adjacent to each other in pairs, cutting two additional transverse cuts on each side of said double T-shaped cuts to extend inwards to the corner-points of the bottom of the box, and folding all of said tongues belonging to one and the same cutting down simultaneously on adjacent portions of said web to form, together with said portions, double walls in the box.

7. A method of manufacturing, from a continuous web of material, cuttings for open rectangular boxes to be finished by folding a single cutting, said boxes having corners formed of folded lateral flaps of the walls and double walls, comprising cutting double T-shaped cuts transversely in said web to form tongues adjacent to each other in pairs, making folding lines in said web, applying an adhesive in spots on said web, and folding said tongues down on adjacent portions of said web to form, together with said portions, double walls in the box.

8. A method of manufacturing, from a continuous web of material, cuttings for open rectangular boxes to be made by folding a single cutting, said boxes having double walls and corners formed by folding lateral flaps of the walls, comprising cutting double T-shaped cuts transversely in said web partially in one working position, to form tongues adjacent to each other in pairs, moving said web to another working position, completing said double T-shaped cuts in said latter working position, making folding lines in said web, applying an adhesive in spots on said web, cutting two additional transverse cuts on each side of said double T-shaped cuts to extend inwards to the corner-points of the bottom of the box, all of said cuts being placed in such positions that the web remains uncut to a certain width at its edges, folding all of said tongues belonging to one and the same cutting down simultaneously on adjacent portions of said cutting to form, together with said portions, double walls in said box, and separating said cutting from said web by punching out the edges of said web to a length corresponding to the distance between the bottoms of two consecutive boxes.

In testimony whereof I have signed my name.

PAUL WILHELM DIETMANN.