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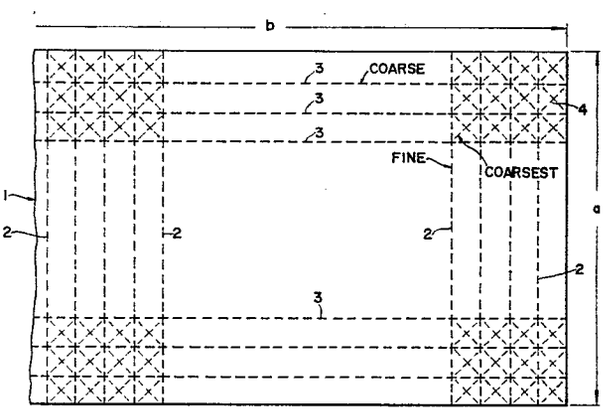
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(54) **Selectable size folding sheet.**

(57) A plurality of longitudinal parallel seam lines (3) and a plurality of lateral parallel seam lines (2) are formed on a sheet in lattice form. By selectably dimensioning and separaing and/or bending the sheet according to the present invention along the longitudinal and lateral parallel seam lines, it is possible to define any desired threedimensional shape, without use of scissors, a knife, or a ruler. The sheet is best applicable to make packing boxes of various sizes or shapes at a store or model (miniature) buildings, animal hobby toys, etc.



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SELECTABLE SIZE FOLDING SHEET

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a folding sheet convenient for making boxes of various sizes or shapes, and more particularly to a selectable size folding sheet by which a clerk can quickly and readily make packing boxes of various shapes at a store where necessary.

Description of the Prior Art

There are many commodities which are sold at a store after packed within a beautiful ordered packing box. However, there are also many commodities which are sold at a store after wrapped with a wrapping sheet or put into a paper bag. Some commodities may be sufficient when wrapped with a wrapping sheet or put into a paper bag. Some commodities may not be sufficient when wrapped with only a wrapping sheet or put into only a paper bag, because they do not look nice in appearance, or they are unsuited for being wrapped, or customers require that the commodity is packed within a packing box. In such case, commodities must be packed within an appropriate packing box, in particular when customers buy commodities of non-uniform size (e.g. bags, stuffed toy dolls, cakes, etc.) as their presents or gifts. Therefore, it has been necessary for store owners to stock many kinds of packing boxes of different sizes and shapes at all times, thus causing waste

of keeping space and money.

SUMMARY OF THE INVENTION

With these problems in mind, therefore, it is the primary object of the present invention to provide a selectable size folding sheet by which it is possible to quickly and readily make packing boxes of any desired sizes and shapes at a store without need of any knives, scissors, or rulers.

To achieve the above-mentioned object, the selectable size folding sheet according to the present invention comprises a plurality of longitudinal parallel seam lines spaced at regular intervals and a plurality of lateral parallel seam lines perpendicular to the longitudinal parallel seam lines and spaced at regular intervals in such a way that the longitudinal and lateral parallel seam lines serve as lines or axes of separation and/or bending and further measures of a box to be folded. The parallel seam lines are formed by a great number of perforations, upward concave notches, double concave notches, or alternating upward- and downward-concave notches. By selectably separating and folding the folding sheet according to the present invention along the parallel seam lines and/or segments, it is possible to define a desired three-dimensional shape, without need of any tools or rulers.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the selectable

size folding sheet according to the present invention will be more clearly appreciated from the following description taken in conjunction with the accompanying drawings in which like reference numerals designate corresponding elements or portions and in which;

Fig. 1 is a plan view showing a first embodiment of the selectable size folding sheet according to the present invention, in which the longitudinal and the lateral parallel seam lines are formed by a great number of perforations of same degree;

Fig. 2(A) is an enlarged cross-sectional view of perforation seams formed in the selectable size folding sheet according to the present invention;

Fig. 2(B) is an enlarged cross-sectional view of upward concave notch seams formed on one surface of the selectable size folding sheet according to the present invention;

Fig. 2(C) is an enlarged cross-sectional view of double upward- and downward-concave notch seams formed in the selectable size folding sheet according to the present invention;

Fig. 2(D) is an enlarged cross-sectional view of alternating upward- and downward-concave notch seams formed on both the surfaces of the selectable size folding sheet according to the present invention;

Fig. 3 is a plan view showing a second embodiment of the selectable size folding sheet according to the

present invention, in which lines of coarse perforations form rigid longitudinal parallel seams and lines of finer perforations form more easily flexible lateral parallel seams in lattice form;

Fig. 4 is a plan view showing a third embodiment of the selectable size folding sheet according to the present invention, in which the lines of the same-degree perforations form easily flexible lateral and longitudinal seams and additionally lines of the coarsest perforations form most rigid oblique parallel seams;

Fig. 5(A) is a plan view showing a development surface of an exemplary box, which is separated from the selectable size folding sheet according to the present invention;

Fig. 5(B) is a perspective view showing the first step of making the exemplary box on the basis of the development surface shown in Fig. 5(A);

Fig. 5(C) is a perspective view showing the second step of making the exemplary box on the basis of the development surface shown in Fig. 5(A);

Fig. 5(D) is a perspective view showing the last step of making the exemplary box on the basis of the development surface shown in Fig. 5(A); and

Fig. 6 is a picture showing a number of animal toys made of the seledtable size folding sheet according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In view of the above description, reference is now made to a first embodiment of the selectable size folding sheet according to the present invention.

In Fig. 1, a folding sheet 1 is made of a thick paper or a plastic laminate. The paper or the laminate must be strong enough to be able to pack a commodity. In the folding sheet 1, there are formed a plurality of lateral parallel seam lines 2 and a plurality of longitudinal parallel seam lines spaced at regular intervals, respectively, in lattice form. These seams are formed with an appropriate size of perforations or notches, along which the sheet 1 can be separated or bent by the hand easily. The intervals of the lateral and longitudinal parallel seam lines formed by perforations or notches are decided on the basis of the minimum dimension on which the sizes or the shapes of boxes are varied. However, in general, the intervals are 10 or 20 millimeters. The lateral dimension a and the longitudinal dimension b of the sheet 1 are decided on the basis of the maximum dimension on which the largest size box can be made. The sheet 1 are stocked at a store by putting one sheet upon the other or by rolling up a long sheet 1 on a rod.

Figs. 2(A), 2(B), 2(C), and 2(D) show the enlarged cross-sections of the lateral and longitudinal parallel seams. In Fig. 2(A), the seams 2 and 3 are defined by a great number of perforations 5 formed in the

sheet 1. In Fig. 2(B), the seams 2 and 3 are defined by a great number of upward-concave notches 6 formed on one surface of the sheet 1. In Fig. 2(C), the seams 2 and 3 are defined by a great number of double upward- and downward-concave notches 7 formed on both the surfaces of the sheet 1 respectively. In Fig. 2(D), the seams 2 and 3 are defined by a great number of alternating upward- and downward-concave notches 8a and 8b formed on both the surfaces of the sheet 1 alternately.

The strength required to bend or separate the sheet 1 depends upon the dimensions of the perforations 5 or the notches 6, 7, 8a and 8b. In more detail, lines of coarse perforations or notches form more rigid seams, while lines of finer perforations or notches form easily flexible seams. This is because in the case of coarse perforations, for instance, the non-perforated distance c (see Fig. 1) between one end of one perforation and the other end of the other perforation is long and in the case of fine perforations, the non-perforated distance c is short, even if the perforation distance d (see Fig. 1) and the perforation width e (See Fig. 1 or Fig. 2A) of the coarse perforations are equal to those of the fine perforations. Similarly, lines of coarse notches form more rigid seams, while lines of finer notches form easily flexible seams. Therefore, the decision of the dimensions of the perforations or notches is important under the consideration of the thickness and the strength of the

sheet. If too large perforations or notches are formed, the sheet will be easily bendable and separatable but the box made of the sheet may not be strong enough. If too small perforations or notches are formed, the box may be strong enough but the sheet will not readily be bendable and separatable, thus causing poor appearance at the separated lines.

The perforations formed in the sheet as shown in Fig. 2(A) are easily bendable in both the directions; the upward concave notches 6 formed on one surface of the sheet 1 as shown in Fig. 2(B) are easily bendable in one direction; the double concave notches 7 formed on both the surfaces of the sheet 1 as shown in Fig. 2(C) are easily bendable in both the directions; the alternating upward-and downward-notches 8 formed on both the surfaces of the sheet 1 as shown in Fig. 2(D) are easily bendable in either direction alternately.

Since the selectable size folding sheet 1 is used for making commodity packing boxes of various sizes, it is preferable to decorate the sheet surface with a pattern which can enhance the charm of packages or effect of advertisement or publicity. For this purpose, checkwise patterns, popular cartoon's characters, catch phrases, or registered trademarks are preferably printed. One of these patterns is printed on one or both the surfaces of the sheet 1 along the lateral and longitudinal parallel seam lines of perforations or notches in turn or in series.

Further, in the case where the upward- and downward-concave notches 8 are formed on both the surfaces of the sheet 1 alternately, it is desirable to print a pattern on the upper surface of the sheet along the upper notches 8a and the same pattern on the lower surface of the sheet along the lower notches 8b.

Further, it is more preferable to repeatedly designate each of the lateral and longitudinal parallel seam lines by one of numerals from 1 to 10, as shown in Fig. 1. Because these numerals serve as marks when separating or bending the sheet along the seam lines and when checking the sizes of the assembled boxes of various shapes.

Fig. 3 shows a second embodiment of the selectable size folding sheet 1 according to the present invention. The feature of this embodiment is to equalize the separating and bending strength along the longitudinal parallel seam lines 3 to those along the lateral parallel seam lines 2A. Usually, paper or sheet has grain in the longitudinal direction. This grain is inevitably formed when manufacturing paper or sheet at a factory. Therefore, paper sheet is easily separated along the paper grain, but is not easily separated perpendicular to the paper grain. In this second embodiment, since lines of relatively coarse perforations 3 are formed along the paper grain, that is, in the longitudinal direction, the seams are more rigid, preventing the sheet from being separated easily along the

paper grain. Similarly, since the lines of relatively fine perforations 2A are formed perpendicular to the paper grain; that is, in the lateral direction, the seams are more easily flexible, allowing the sheet to be separated easily perpendicular to the paper grain. The selectable size folding sheet shown in Fig. 3 is bendable and separatable longitudinally and laterally by applying substantially the same force to the sheet, because the dimensions of lateral and longitudinal perforations or notches are so appropriately decided.

Fig. 4 shows a third embodiment of the selectable size folding sheet 1 according to the present invention. The feature of this embodiment is to form an additional oblique parallel seam lines 4 passing the points of intersections of the lateral and longitudinal parallel seam lines 2 and 3. By forming these oblique seam lines 4, it is further possible to bend or separate the sheet obliquely. In other words, it is possible to make triangular shapes such as a triangular prism, a triangular pyramid, etc. In this embodiment, the oblique parallel seam lines 4 are formed by the coarsest perforations or notches. This is because, when the oblique seam lines are formed by the ordinary or fine perforations or notches, the strength of the sheet or the boxes made of the sheet thus formed is inevitably weakened. Further, in this embodiment, since three degrees of perforations are required all over the surface of the sheet, the sheet must sufficiently be thick.

The strength of the sheet may not be sufficient, if so many kinds of perforations are formed all over the surface of a thin paper sheet.

With reference to Figs. 5(A), 5(B), 5(C) and 5(D), a method of making a packing box by the use of the selectable size folding sheet according to the prevent invention will be described hereinbelow. The size of the box to be made is four segments in width, two segments in length and five segments in height. First, an development surface 10 (shown by solid lines in Fig. 5A) corresponding to the box (4 x 2 x 5) is cut away from the sheet 1 (shown by dot-dot-dashed lines) by the hand. In more detail, the lateral dimension a_1 of the development is seven segments and the longitudinal dimension b_1 of the development is thirteen segments. Secondly, the righthand upper and lower square portions are also cut away. Thirdly, each seam segment 18, 19, 20, 21, 22, or 23 is separated by the hand one by one along the seam lines. Fourthly, each seam line 12, 13, 14, 15, 16, or 17 is bent inwardly by the hand one by one. Fifthly, an adhesive agent is attached to the margin 11 to past up and the margin 11 is sticked to the leftmost portion, as depicted in Fig. 5(B). In this step, it is also possible to wrap a commodity to be packed.

Sixthly, as depicted in Fig. 5(C), the portions 25' and 27' are first bent inwardly and the portions 24' and 26' are bent also inwardly onto the bent portions 25' and 27' to form the bottom of the box. In this step,

usually, a commodity to be packed is inserted into the box from the upper side. Seventhly, the portions 25 and 27 are bent inwardly and the portiosn 24 and 26 are bent inwardly on the bent portions 25 and 27.

Fig. 5(D) shows the state where the box is perfectly formed with a commodity packed therewithin. At this step, it is preferable to fix the separated portions with an adhesive tape 30. Further, in order to cover the bent portions or to increase the strength of the box, it is also preferable to stick the same adhesive tape to each edge of the box as shown in Fig. 5(D). Although a transparent adhesive tape can be used for fixing or covering the box, it is more desirable to use an adhesive tape on which the same pattern as that of the sheet is printed in the same color from the standpoint of appearance.

As described above, developments of any sizes and shapes according to commodities to be packed can readily be cut away or bent by the hand along a number of segments or lines of the longitudinal and lateral parallel seams, while deciding the dimensions of the box in dependence upon the seam lines or upon the numerals printed near the seam lines. The separated development can be formed into a packing box by using an adhesive agent or an adhesive tape without need of a knife, scissors, or a ruler.

Further, the remaining portion of the sheet can be used for making other smaller boxes. Further, by

joining these remaining portions, it is also possible to make other larger boxes.

When the selectable size folding sheet according to the present invention is used for making packing boxes for commodities, there are many advantages as follows:

(1) Various packing boxes of any sizes and shapes according to commodities to be packed can be made readily and quickly by the clerk's hand at a store.

(2) Various non-uniform size commodities such as bags, staffed toy dolls, cakes, etc. can be packed in good appearance, in particular when these commodities are used for presents or gifts.

(3) The packing box can be made simply and conveniently by only separating or bending the lateral and longitudinal parallel seam lines, in dependence upon the number of lines or the numerals indicative of dimensions, by the hand without need of any scissors, a knife, and a ruler.

(4) The stocking space of packing material is approximately half to one-third narrower, as compared with the case where various ordered packing boxes are stocked.

In the above description, boxes for packing commodities are explained as an exemplary case where the selectable size folding sheet according to the present invention is applied. However, without limiting the sheet according to the present invention to the above-mentioned packing boxes, it is also possible to apply the selectable

size folding sheet to various field.

Fig. 6 shows a plurality of animal hobby toys made of the sheet according to the present invention. In this case, the sheet can be used as teaching materials or aids for little children.

Additionally, the sheet according to the present invention can be utilized when an architect makes a model or miniature building or when a sculptor makes a model sculpture.

CLAIMS

1. A selectable size folding sheet which comprises:

(a) a plurality of first parallel seam lines spaced at regular intervals; and

(b) a plurality of second parallel seam lines perpendicular to said first seam lines and spaced at regular intervals, said first seam lines and said second seam lines serving as lines and axes of separation and/or bending,

whereby said folding sheet can be selectively dimensioned and folded to define a desired three-dimensional shape.

2. A selectable size folding sheet as set forth in claim 1, wherein said first and second parallel seam lines are defined by a great number of perforations formed in said sheet.

3. A selectable size folding sheet as set forth in claim 1, wherein said first and second parallel seam lines are defined by a great number of upward concave notches arranged on one surface of said sheet.

4. A selectable size folding sheet as set forth in claim 1, wherein said first and second parallel seam lines are defined by a great number of double upward- and downward-concave notches arranged on both the surfaces of

said sheet.

5. A selectable size folding sheet as set forth in claim 1, wherein said first and second parallel seam lines are defined by a great number of alternating upward- and downward-concave notches arranged on both the surfaces of said sheet.

6. A selectable size folding sheet as set forth in claim 1, wherein said first parallel seam lines are coarse along the paper grain of said sheet and said second parallel seam lines are fine perpendicular to the paper grain of said sheet, whereby said folding sheet can be separated and/or bent by substantially the same separating and/or bending force.

7. A selectable size folding sheet as set forth in claim 1, which further comprises a plurality of third parallel seam lines spaced at regular intervals and passing the points of intersections of said first and second parallel seam lines, said third parallel seam lines are the coarsest.

8. A selectable size folding sheet as set forth in claim 1, wherein the spaced intervals of said first and second parallel seam lines are 10 millimeter.

9. A selectable size folding sheet as set forth in claim 1, wherein the spaced intervals of said first and second parallel seam lines are 20 millimeter.

10. A selectable size folding sheet as set forth in claim 1, where each of said first and second parallel seam lines is repeatedly designated by numerals from 1 to 10 in order.

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FIG. 1

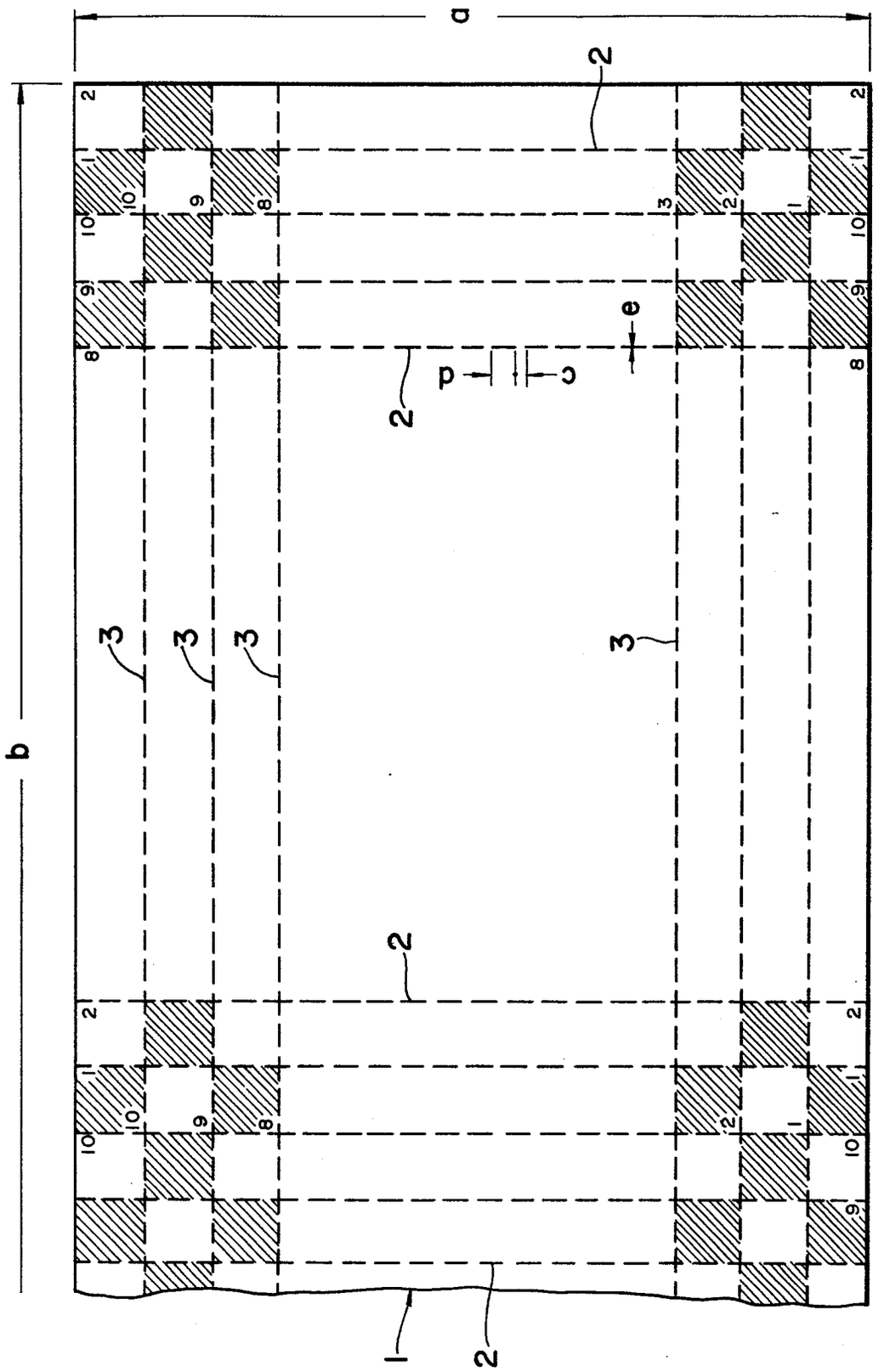


FIG. 2(A)

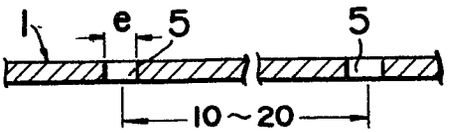


FIG. 2(B)

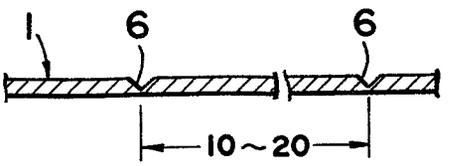


FIG. 2(C)

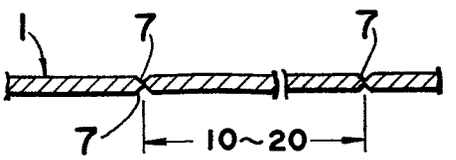


FIG. 2(D)

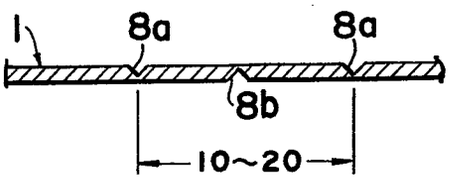


FIG. 3

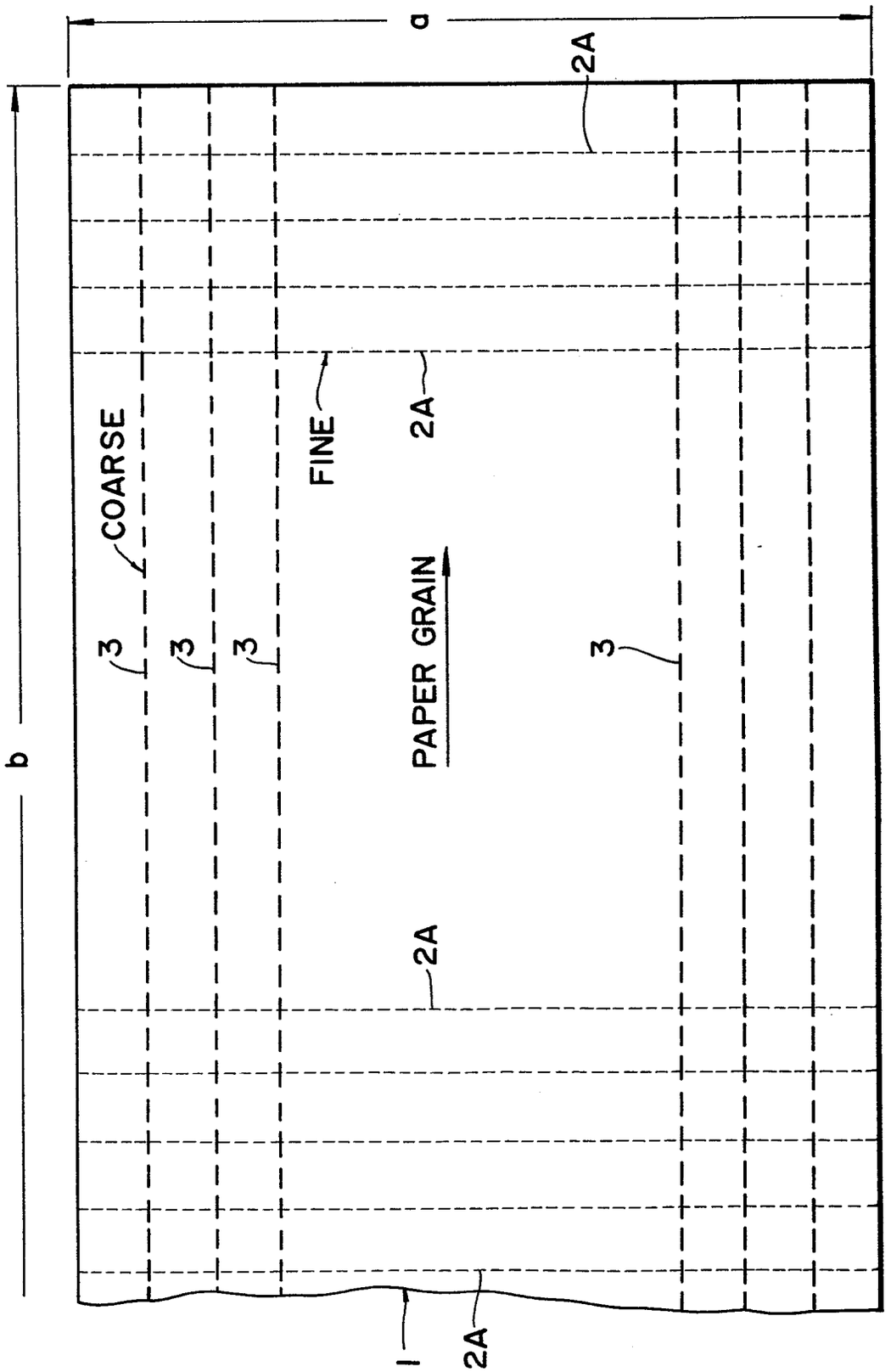


FIG. 4

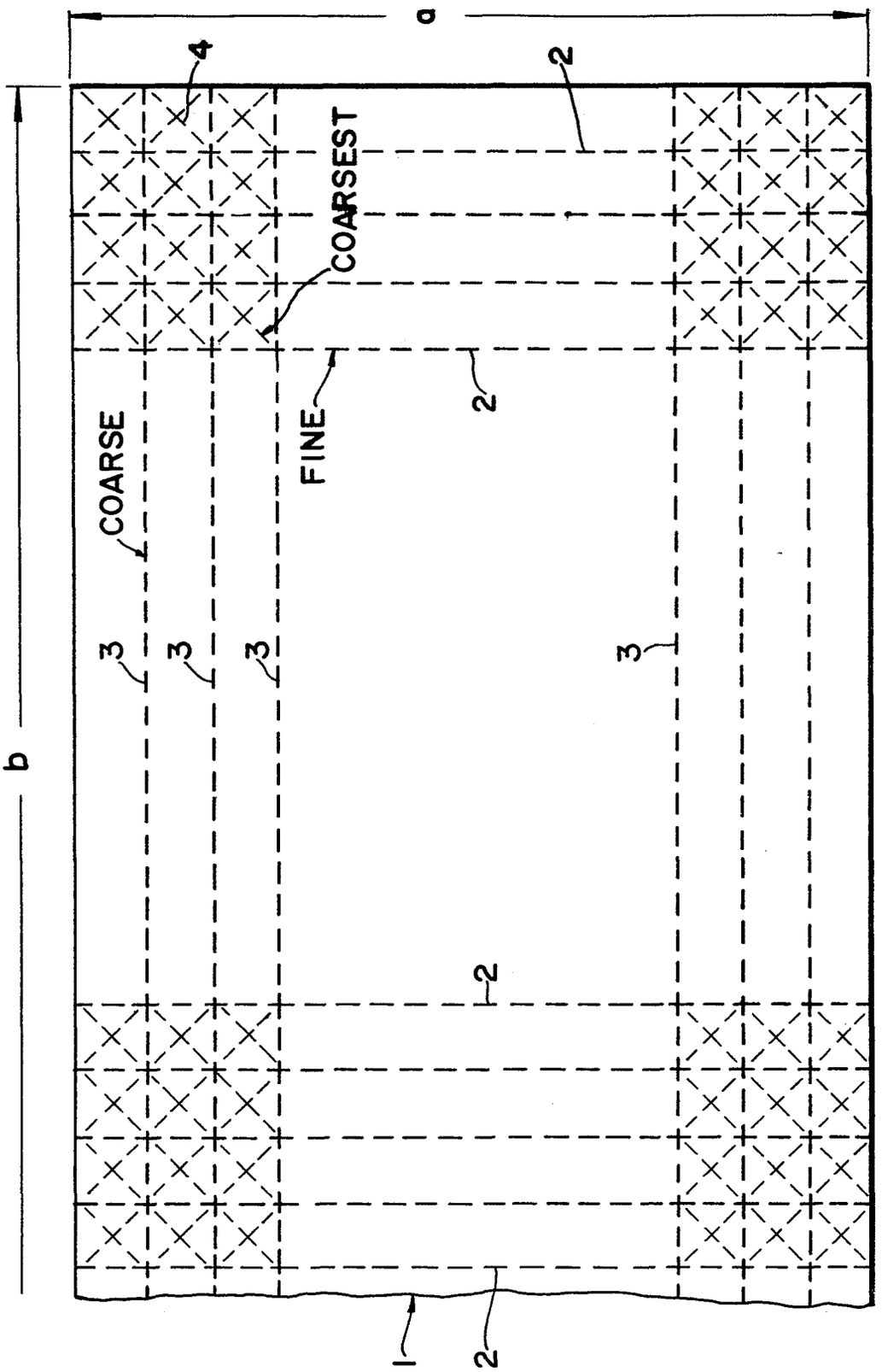


FIG. 5(A)

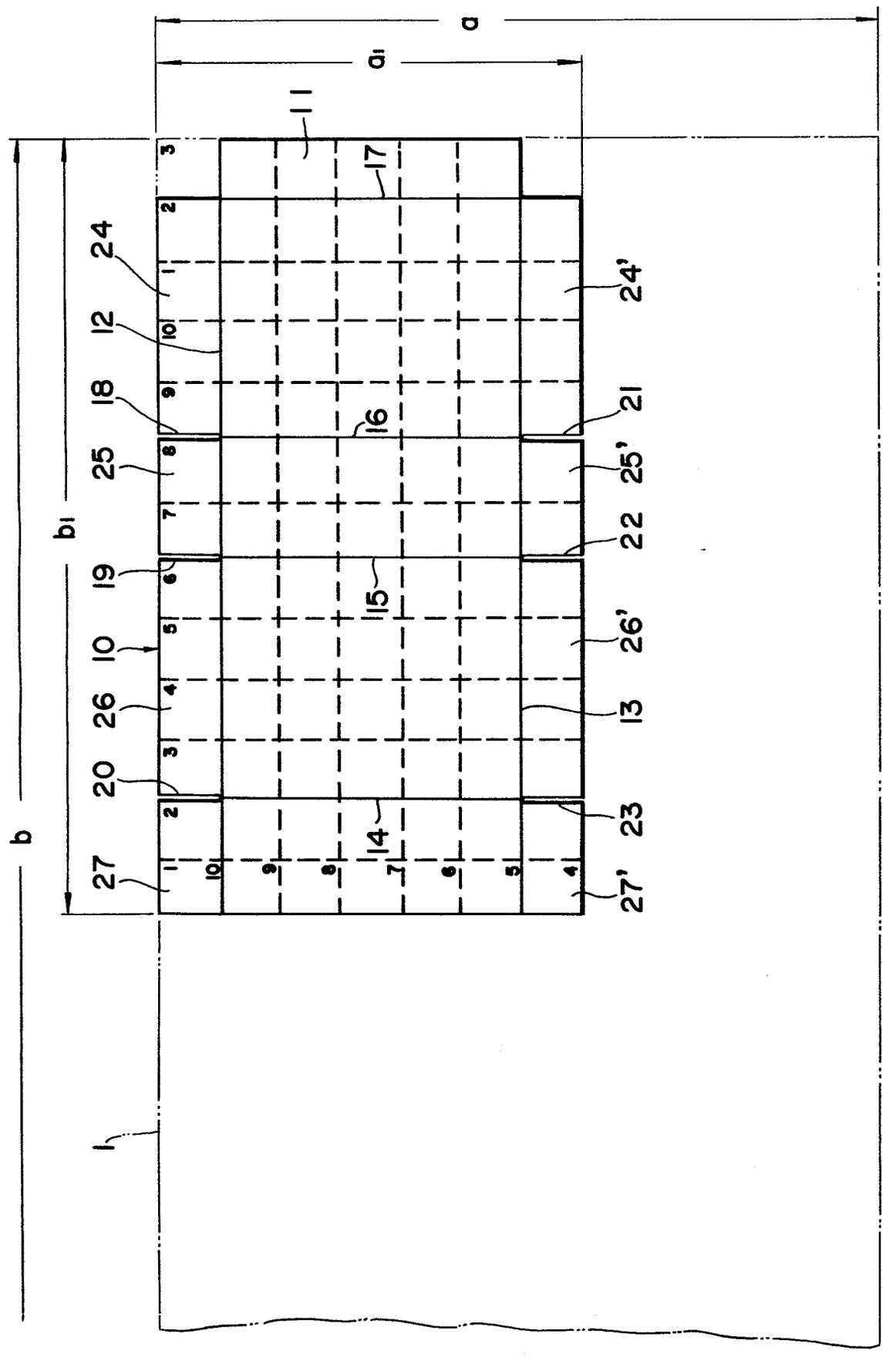

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FIG. 5(B)

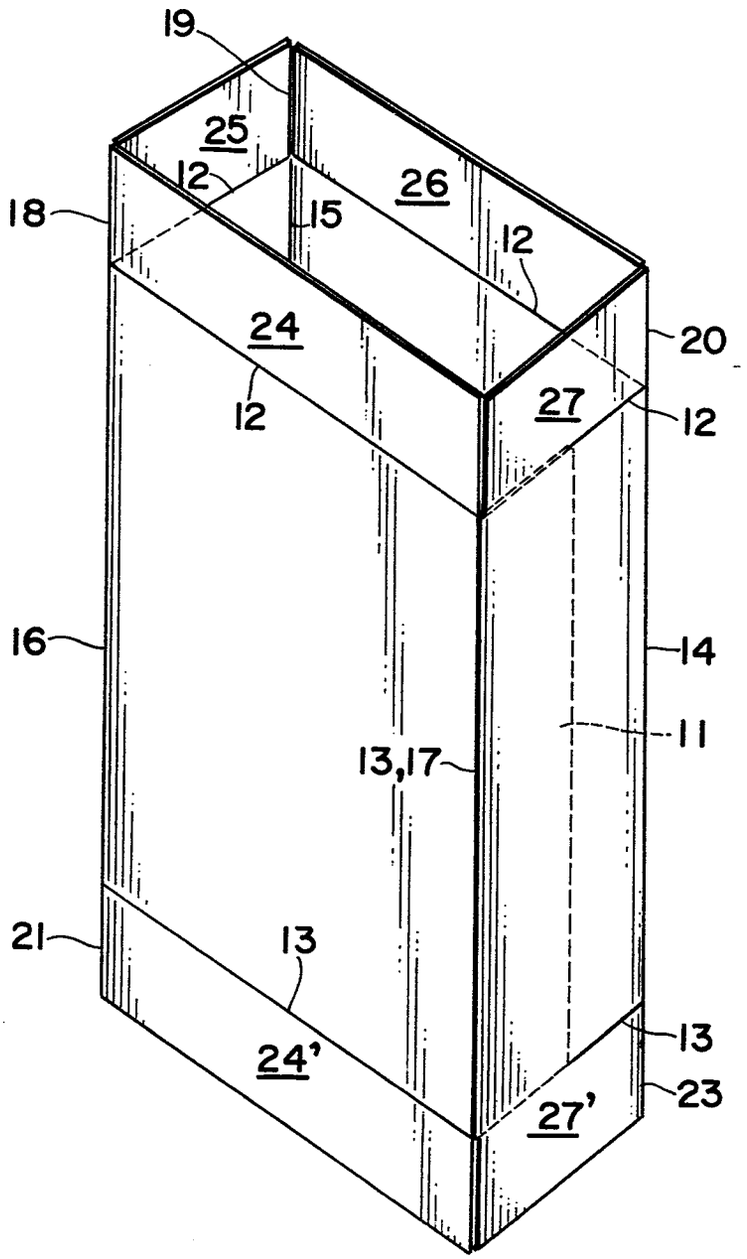


FIG. 5(C)

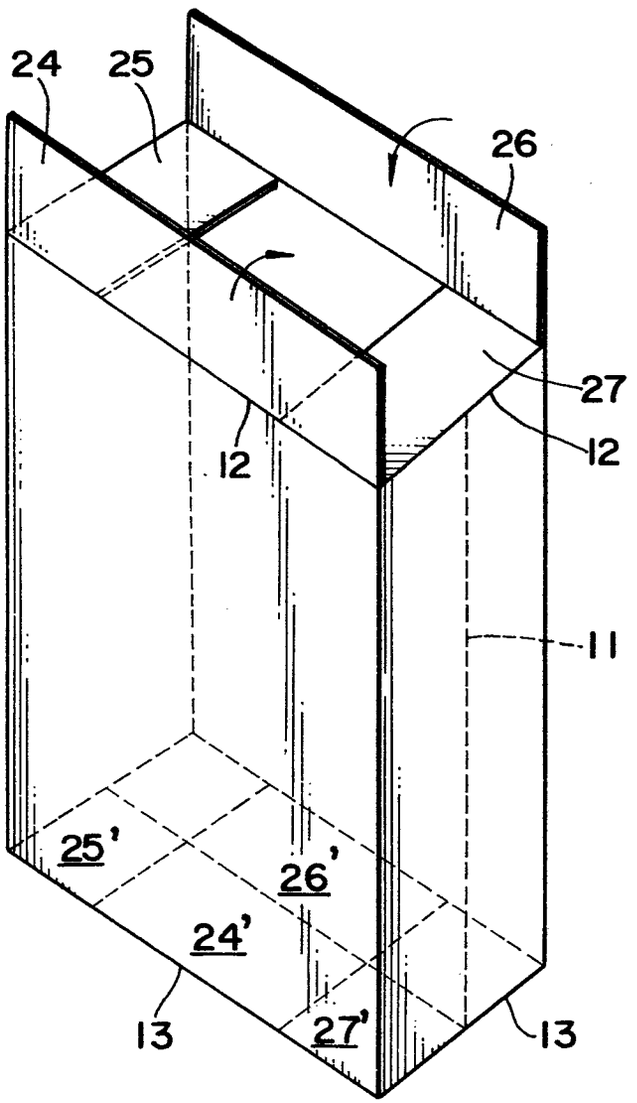
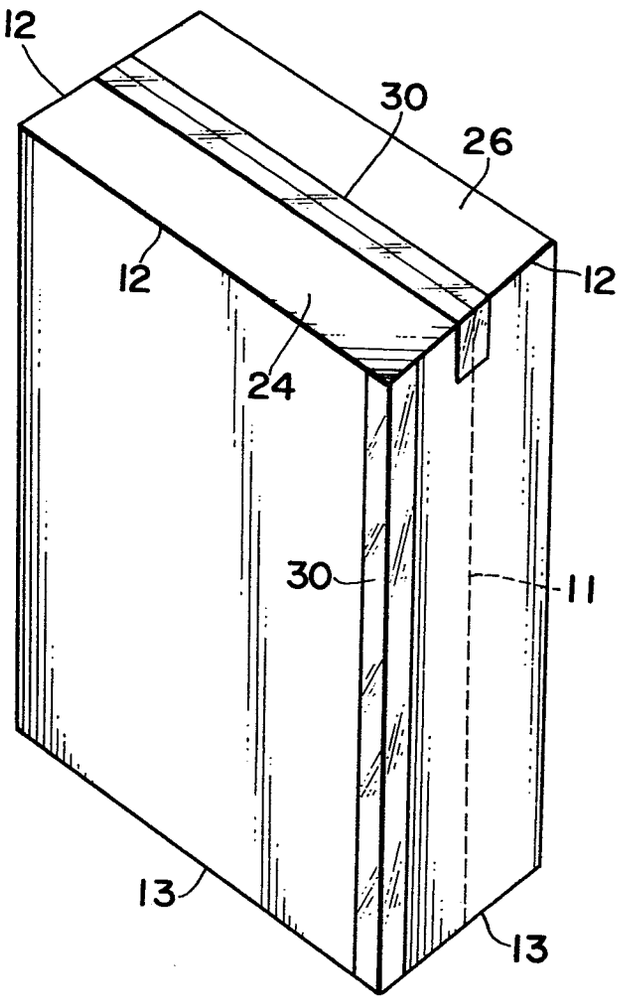
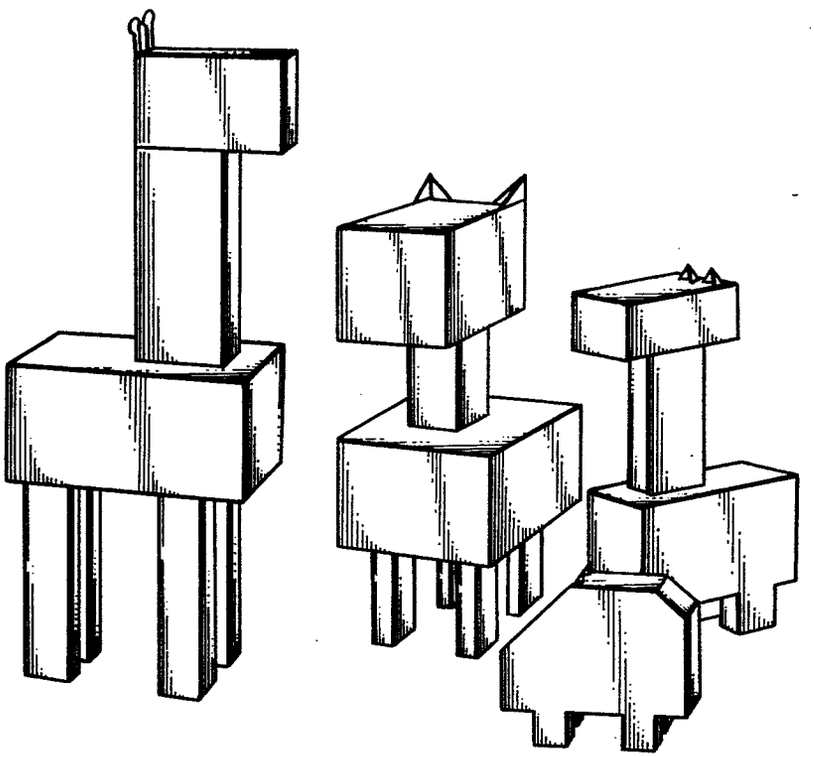


FIG. 5(D)



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FIG. 6



European Patent Office

EUROPEAN SEARCH REPORT

0097022
Application number

EP 83 30 3315

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	US-A-4 235 364 (BAKER) * Figure 2; column 1, lines 23-25,27-52; column 2, lines 10-68 *	1,8,9	B 65 D 5/42 B 65 D 5/00
Y	* Figures 1,2; column 1, lines 23-25 *	2-5	
X	US-A-3 114 492 (ENGSTRÖM) * Figures 1,3; column 1, lines 17-20,50-58,67-70 *	1,8,9	
Y	DE-B-1 243 856 (DIERSBURG) * Figures 1-4,9,10; column 1, lines 1-9; column 2, lines 24-35; column 3, lines 66-68; column 4, lines 1-15,21-30 *	2-5	
A	US-A-1 772 106 (MILLER) * Figures 1,3; page 1, lines 20-23,73-78 *	7	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12-09-1983	ASH R.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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