United States Patent

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[54] BLOCK STRUCTURE WITH A REINFORCING FILLER

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[22] Filed: **Nov. 3, 1970**

[21] Appl. No.: **86,507**

[52] **U.S. Cl.** ..... **35/69**, 46/24, 108/56, 229/15, 229/28 R

[51] **Int. Cl.** **A63h 33/04**

[58] **Field of Search** ..... 35/69; 46/1 L, 24, 31; 229/28 R, 14 R, 14 C, 42, 15; 108/56; 206/60 A; 217/30, 31

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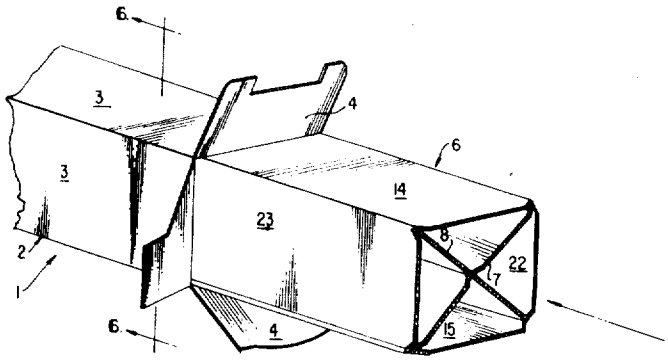
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Primary Examiner—Harland S. Skogquist
Attorney—Charles P. Bauer

[57] **ABSTRACT**

An educational block is formed by providing a light weight enclosed carton into which a reinforcing filler is inserted to give the block the necessary rigidity. The filler is formed by two blanks intersecting along an axis formed by the interfitting slots in the blanks, the filler presenting a cross-section of cruciform shape. The length of the filler is equal to the length of the carton. Each arm of the blank is folded along a score line extending from one end of the filler to the other end and parallel to the intersecting axis to form an end panel. The width of each end panel is so dimensioned that the panel extends from its score line to the score line of the adjacent arm when in folded position. The final cross-sectional shape of the assembled and folded blanks is that of a quadrilateral with its two intersecting diagonals. The end panels are dimensioned to be coextensive with the respective sides of the carton, whereby the sides of the carton maintain the folded portions of the blanks in their reinforcing position to form the filler formation which gives rigidity to the carton and block structure.

1 Claim, 10 Drawing Figures



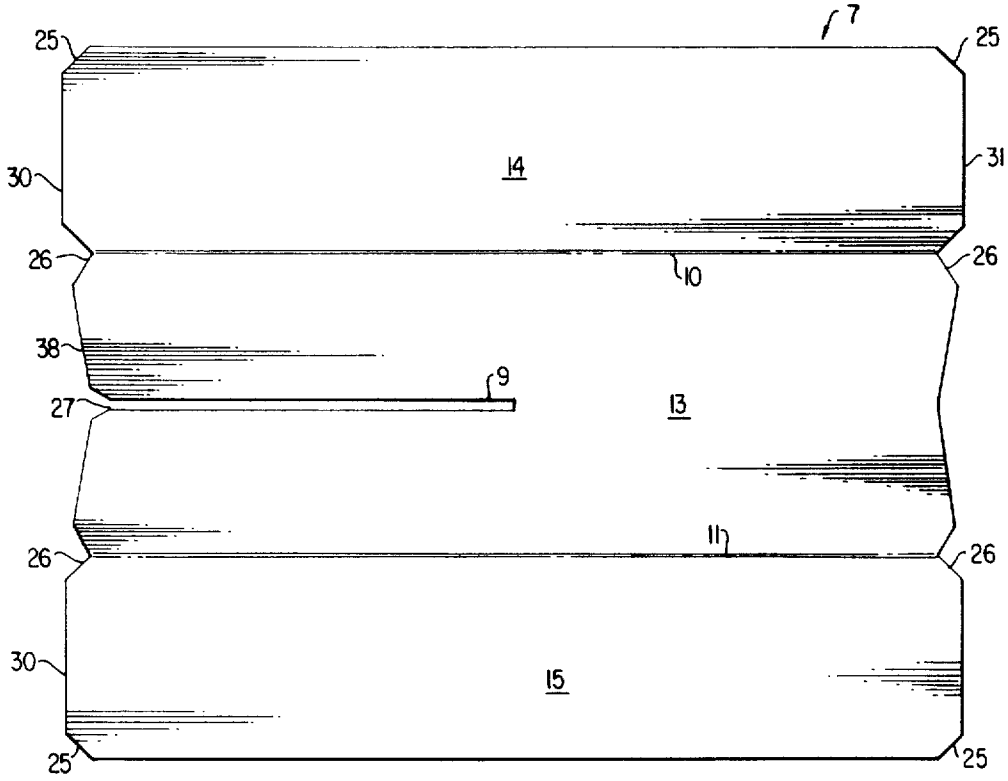


FIG. 1

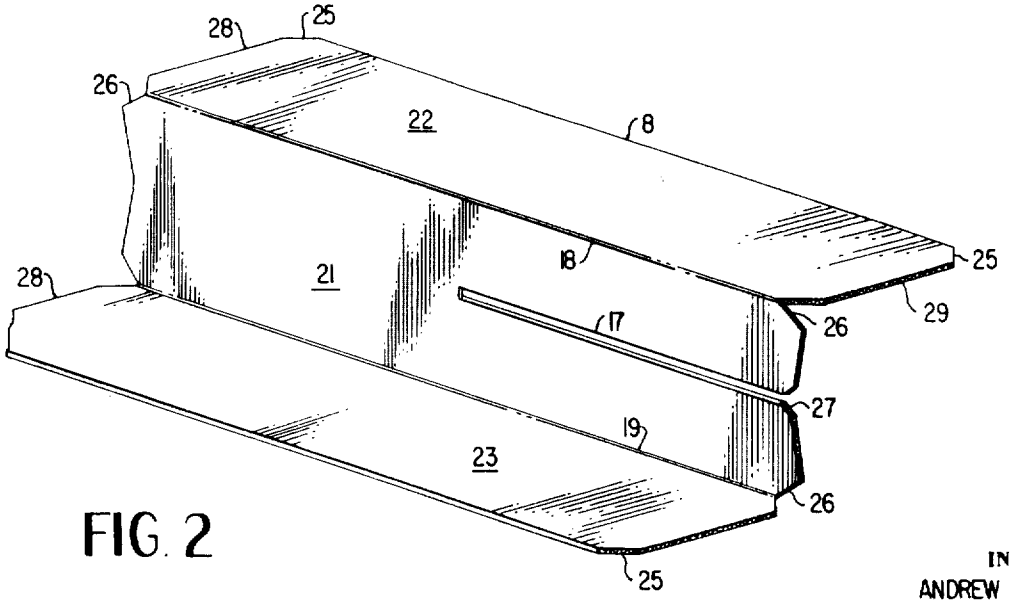


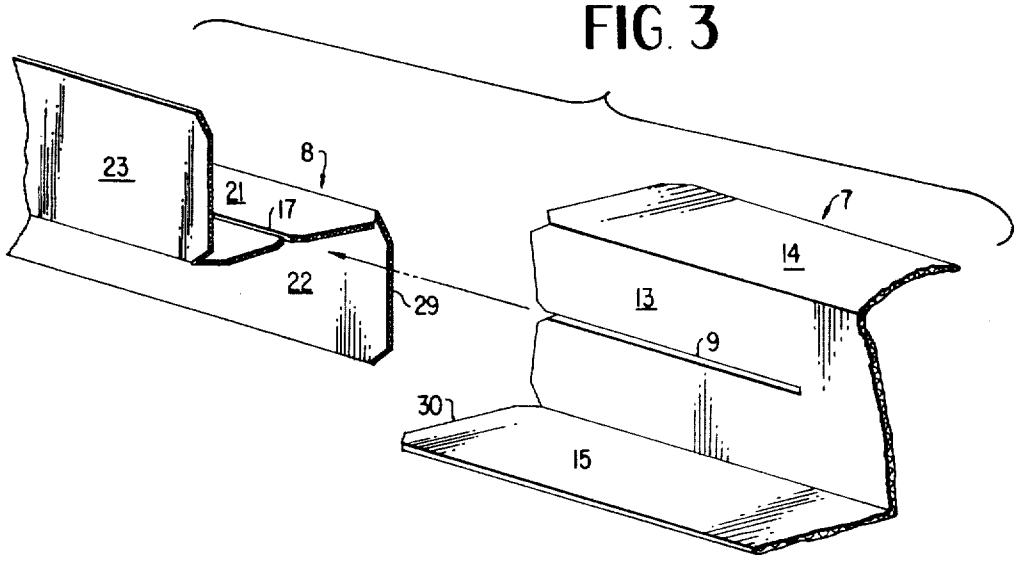
FIG. 2

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FIG. 3



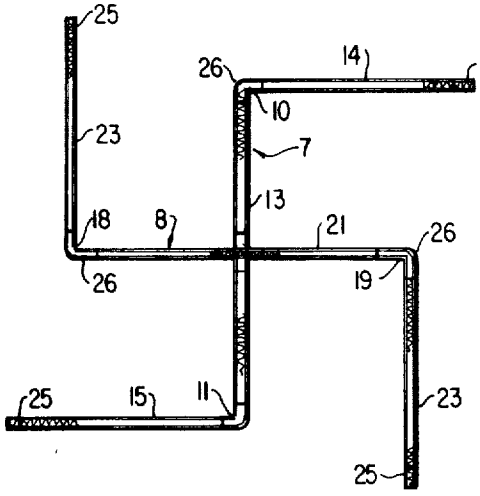
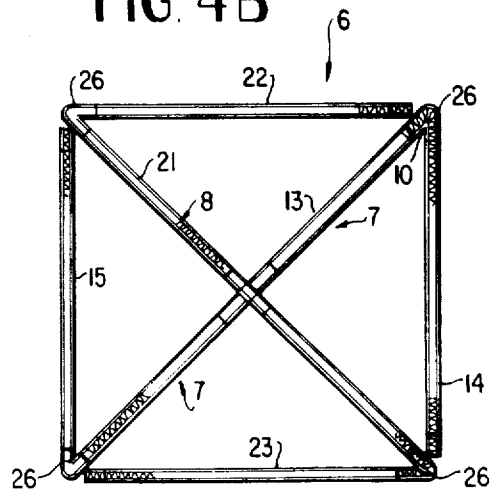


FIG. 4A

FIG. 4B



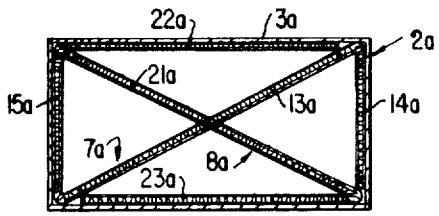


FIG. 8

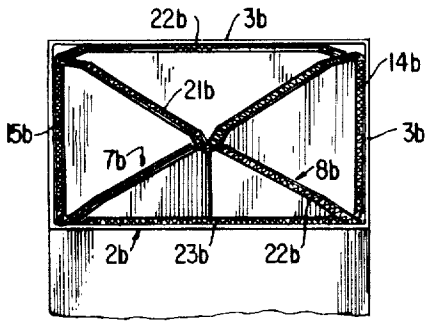


FIG. 9

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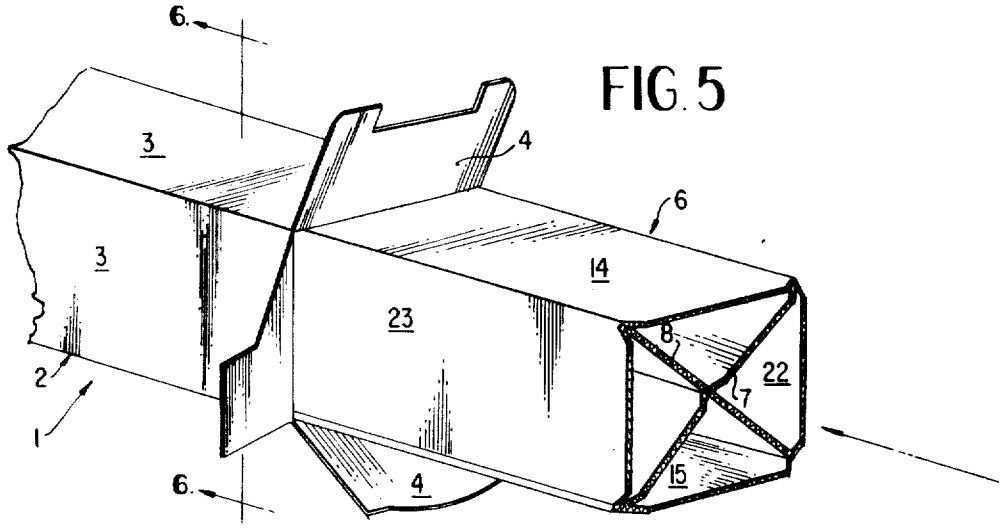


FIG. 5

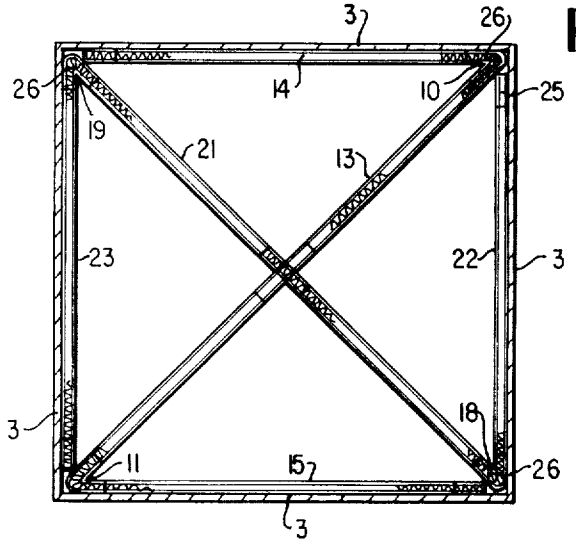


FIG. 6

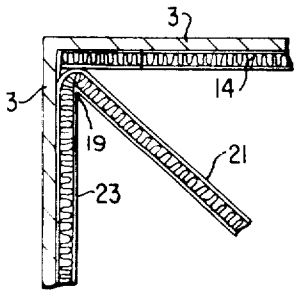


FIG. 7

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BLOCK STRUCTURE WITH A REINFORCING FILLER

This invention relates to a block structure, particularly to educational or alphabet blocks.

The prior art formed such blocks out of solids of wood or plastic, or hollow structures fabricated by securing the six sides thereof by bonding, nailing or similar methods. Such construction is expensive, and the formed blocks take up a relatively large space, requiring large shipping and storage boxes.

An object of this invention is to provide a block which can be shipped in knock-down form and then assembled.

A further object is to provide a block which is light weight but of sufficient rigidity to withstand normal use.

Another object is to provide a knock-down block kit comprising a thin walled folded carton and a reinforcing filler insertable therein to give it the required rigidity. The filler comprises two flat blanks, properly scored and slotted whereby the blanks may be assembled to form the filler.

A further object is to provide a reinforcing filler for a light weight carton, the filler being formed by two intersecting blanks, each blank infolded to form a Z-shaped cross-section. Upon assembly of the two blanks in their intersecting relation to form a filler, their infolded position presents in cross-section a simple quadrilateral with its diagonals. Such shaped filler, when maintained in folded position by the walls of the carton, offers rigidity to the carton and results in a light weight block structure having great rigidity.

Further objects and advantages will be apparent from the following description and accompanying drawing, wherein:

FIG. 1 is a top view of a filler blank;

FIG. 2 is a perspective view of the other filler blank which is illustrated in its folded position;

FIG. 3 is a perspective view of the two blanks positioned for assembly to form the filler;

FIG. 4*a* is an end view of the filler illustrating the cruciform cross-section thereof with the end panels partially folded along their score lines;

FIG. 4*b* is similar to FIG. 4*a* and illustrates the final folding of the filler end panels to form a quadrilateral;

FIG. 5 is a perspective view illustrating the insertion of the filler into the carton;

FIG. 6 is a cross-sectional view of the assembled block along line 6—6 of FIG. 5;

FIG. 7 is a detailed partial view of the corner of a modified filler assembly;

FIG. 8 is a cross-sectional view of a modified filler, shaped for a block having a rectangular cross-section; and,

FIG. 9 is similar to FIG. 8, but illustrates a cross-section of a block having an irregular, simple quadrilateral cross-section.

The block 1, as illustrated in FIG. 5, comprises an outer light weight casing represented by a carton type container 2 made of relatively thin paper stock of suitable weight and strength. The carton may have lithographed sides 3 and ends 4 showing pictures, letters, numbers or similar educational symbols. The ends 4 can be formed in any conventional manner.

A reinforcing filler 6 is inserted in the carton to furnish the necessary rigidity to maintain the shape of the thin walled carton under normal usage. As illustrated in FIGS. 5 and 6, the carton and its filler form a block of rectangular cross-section. The block may be in the form of a cube, as in conventional alphabet blocks, or it may be in the form of an oblong parallelogram having selected dimensions.

The reinforcing filler 6 is preferably assembled from two substantially similar blanks. FIGS. 1 and 2 illustrate the configurations of the two blanks. Blanks 7 and 8 are formed of suitable material having the desired rigidity, such as the commercially available corrugated paperboard. Along the horizontal center of blank 7, a slot 9 is formed, the slot extending from a vertical edge 30 to substantially half-way the overall horizontal dimension of the blank. The blank is further provided with two score lines, 10 and 11, each parallel to slot 9 and spaced symmetrically therefrom on each side thereof. The score lines divide the blank into center panel 13 and end panels 14 and 15.

Similarly, blank 8 is provided with slot 17 and score lines 18 and 19 parallel thereto and symmetrically spaced on each side therefrom. The score lines define center panel 21 and end panels 22 and 23 on the blank.

For ease of assembly, it is preferred to bevel or curve the corners of the blanks, as illustrated at 25. Further, at the ends of each score line, V-shaped cutouts 26 are formed. A V-shaped cutout 27 is also provided at the edge end of each slot 9 and 17.

As illustrated in FIGS. 1 and 2, the vertical edges of panels 13 and 21 from which slots 9 and 17 are cut to form edges extending angularly and inwardly from the V-shaped cutouts 26 and 27. Likewise, the vertical edges opposite the slots 9 and 17 are cut to form edges extending angularly and inwardly corresponding to the opposite vertical edges. The entire opposite vertical edges 28 and 29 of blank 8 conform in shape except for the slot 17 and the V-shaped cutout 27. Likewise, the entire vertical edges 30 and 31 of blank 7 conform in shape except for the slot 9 and the V-shaped cutout 27. The edges 29 and 30 of the two blanks correspond as do the edges 28 and 31 of the two blanks.

In assembling the reinforcing filler, each blank may be left flat or may be partially or fully folded along its horizontal fold lines before bringing the two blanks together. The angle is not critical and it is merely a matter of convenience in handling. As illustrated in FIG. 3, each blank is folded along the score lines wherein each outer or end panel is at right angles to the center panel, which may be termed the diagonal panel for it will form a diagonal after final assembly. Thereafter, blanks 7 and 8 are assembled by sliding each into the other along the full length of the cooperating, mutually receiving slots 9 and 17. Thus, the blanks intersect along an axis formed by the slots to present the cross-section illustrated in FIG. 4*a*, that is, a cross with the outer ends of its arms bent or folded along the score lines. Thereafter, the end panels 14, 15, 22 and 23 are further folded until their outer edges contact the edge of the diagonal panel of the other blank, that is, along a score line defining the panel, as illustrated in FIG. 4*b*. As shown in the figure, the edge of end panel 22 contacts the edge of diagonal panel 7 along the vicinity of score line 10. Similarly, the outer edges of the other end panels connect the corresponding edges of the diagonal panels.

The cross-sectional shape of the assembled reinforcing filler assumes the shape of a rectangle, the sides formed by the end panels 15, 22, 14 and 23, with diagonals formed by diagonal panels 13 and 21, as illustrated in FIGS. 4*b*, 5 and 6. Since the score lines 10, 11, 18 and 19 are equally spaced from the center of the slots, or the center of the blank, the cross-sectional shape is that of a square.

After the reinforcing filler block 6 is assembled, it is inserted in the casing or carton 2, as illustrated in FIG. 5. After the filler is fully inserted, the carton flaps may be permanently bonded or merely infolded. Infolding is necessary in applications wherein it is desirable to disassemble the block for storage. The angular edges adjacent and opposite the slots 9 and 17 of panels 13 and 21 provide relief behind the end flaps when such flaps are pushed in for locking.

As illustrated in FIG. 6, the several panels of the reinforcing filler are mutually supported and form rigid sides coextensive with the sides of the carton. The filler is held in its assembled shape by being confined by the walls or sides of the carton. Thus, the walls prevent the collapse of the assembled filler and the filler maintains the walls of the carton rigid and reinforces the carton against forces tending to collapse the carton.

While FIG. 6 illustrates the panels 14, 15, 22 and 23 extending to the score lines of their respective adjacent diagonal panels 21 and 13, which form the cruciform shape, the end panels may be dimensioned to overlap the score lines. This arrangement is illustrated in FIG. 7, wherein the outer edge of end panel 14 is dimensioned to overlap score line 19 and is supported by end panel 23 and diagonal panel 21 at the score line. It is preferable that all corners by the same.

The block may be in the form of a cube, or oblong as illustrated in FIG. 5. Filler block 6 is dimensioned so that its length is coextensive with the length of carton 2.

The cross-sectional shape of the block may be varied. In lieu of the square cross-section illustrated, it may be rectangular, as illustrated in FIG. **8**. The principle of construction is the same as disclosed in FIGS. **1–7**. The dimensions of end panels **14***a*, **15***l*, **22***a* and **23***a* would be determined by the dimensions of sides **3***a* of the carton **2***a*. Diagonal panels **13***a* and **21***a* would be provided with center slots, as in the arrangement of FIGS. **1–6**, to permit the intersection of the panels.

The concept of the formation of the cruciform shaped filler may be applied to any block having a simple quadrilateral cross-section. FIG. **9** illustrates a cross-section of a reinforcing filler for a carton **2***b* having an quadrilateral cross-section. The slots in blanks **7***b* and **8***b* in the case of an irregular quadrilateral would not be in the center of the blanks but would be determined by the geometry of the quadrilateral shape of the cross-section of the carton.

It should be further noted that the final assembly of the reinforcing filler comprises two blanks, each folded to present a Z-shaped cross-section and each having a slot complementary to each other, whereby the two blanks may be assembled in a cruciform shape, the slots forming a mortise type joint along the axis of intersection. The above is illustrated by panels **22**, **21**, **23** of blank **8** and panels **14**, **13**, **15** of blank **7** in FIG. **4***b*.

It is apparent that the disclosed reinforced block may be applied to fields other than that of educational blocks. It may be used as a packing medium to maintain packed merchandise in position during shipment. It may also be used as a structural or support block in various fields.

Although certain preferred embodiments of the invention have been disclosed, for purpose of illustration, it will be evident that various changes and modifications may be made therein without departing from the scope and spirit of the invention.

What is claimed is:

1. A reinforced block having a carton formed of paper material and a reinforcing filler insertable therein to give the desired rigidity to the block, said filler comprising two intersecting corrugated paper blanks, each blank comprising a flat sheet with beveled corners having horizontal edges and vertical edges, two spaced horizontal score lines with V-notches at the ends, said score lines formed across the blank and spaced from said horizontal edges to divide said blank into a center diagonal panel and two end panels, a horizontal slot in said diagonal panel intermediate said two score lines at the center of each blank and equally spaced from the score lines and extending from a vertical edge to about midway of the blank, said horizontal edges, the score lines and the slot in each blank being parallel to each other, said end panels foldable along their score lines relative to the diagonal panel to give the folded blank a Z-shaped cross-section with the end panels forming the top and the bottom of the Z, ad the end panels being dimensioned to substantially co-extend with the respective sides of the carton, the filler being formed by mutually interfitting the two blanks along their slots to form their intersecting relationship, the assembled filler having a cross-section wherein the folded blanks form a quadrilateral with diagonals therein.

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