ABSTRACT: A building block formed from folding a sheet of cardboard or other similar material into a hexahedron. The block structure gains structural strength from foldable extensions on the exterior sides of the hexahedron that fold inwardly of the completed block thereby forming a cell-like network of interior load-supporting walls. The inherent strength of the building block is unaffected regardless of which of the six sides of the block are used as the base or supporting side. The assembly of the building block is simplified in that all folding along the fold lines is done in a relative upward direction.
1. Field of the Invention

The invention relates to a building block, that may be used as a toy, that possesses inherent strength and load-supporting ability not normally associated with a folded cardboard structure.

2. Description of the Prior Art

In the prior art lightweight building structures, such as toy blocks, were more than ordinary packaging cartons scaled down to the proper size, or simple interlocking structures providing the necessary exterior shape for use as a building unit. As such, the structure provided was relatively weak since the strength of the entire unit depended essentially upon the thickness of the board used to fabricate the block. As such, the blocks were relatively limited in their scope unless they were constructed of extremely heavy, and therefore expensive, material so as to provide some weight-supporting ability. Thus, if the building block was lightweight so as to be convenient for use by a child, it was not rugged enough to withstand use to which toys are subjected and the weight-supporting ability was almost nil.

Where building blocks have been provided of sufficient strength to support the weight of a child or for general use as children's playthings, the building blocks have been fabricated of wood or other such material that is expensive and requires much labor in the fabrication of the finished block. In addition, these blocks are heavy, and therefore difficult to use as a toy while being prone to cause injury to the child using them should they fall or be struck by such blocks.

Heretofore, there has not been a building block that is both inexpensive and lightweight and yet capable of supporting a great amount of weight and withstand abuse given toys.

SUMMARY OF THE INVENTION

This invention employs inner folding subassemblies attached to the exterior sides of the building block to provide cell-like inner structure of additional load-supporting walls. A single blank used for the building block can be cut from a substantially rectangular sheet of material. The assembly of the block is relatively simple since all folds made along the predetermined fold lines are made in a generally upward direction. The block when assembled is inherently strong regardless of whatever side the block may be positioned on for support. Also, the interconnection of all of the folds of the block, including the final locking like folding of the top surface, prevents the block from becoming disassembled during use.

The unusual load-carrying ability of the building block of this invention, allows it to be used to build up structures which may hold great weights, such as the weight of the child playing with the blocks. The outer surface of the sides of the building block may be given a decorative appearance, such as bricks and mortar, that would make the block more attractive to the child using it and stimulate the imagination when using it.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the building block in its assembled condition.
FIG. 2 is a plan view of the building block in its assembled condition.
FIG. 3 is a perspective view of the building block in its assembled condition.
FIG. 4 is a perspective view of the building block in a more advanced state of assembly than FIG. 3, showing the interior structure almost completely formed.
FIG. 5 is a perspective view of the building block with the final or top side being folded into position.
FIG. 6 is a view taken substantially along the line 6-6 of FIG. 3.
FIG. 7 is a sectional view taken substantially along the line 7-7 of FIG. 4.

DESCRIPTION OF THE INVENTION

Referring now to the drawings, a building block 10 according to the invention is shown in FIG. 1. The block 10 is assembled from a blank 12, such as shown in FIG. 2, that is cut from a flat sheet of cardboard or other such flat stock that is capable of folding. The predetermined fold lines are represented in the drawing as being solid lines or dash lines. The solid lines represent a crease upon which the fold is made, while the dash lines represent an intermittent scoring or perforation of the board for convenience where more severe folds are to be accomplished.

The blank 12 is provided with creases that divide the central or main portion of the blank into panels including a bottom 14, opposed sides 16, ends 18, and top sections 20. When the block is folded into the block 10 as shown in FIG. 1, these panels form the exterior surface of the block. It would then be convenient, during the manufacturing process, to provide the outside surfaces, of these panels, with an attractive indicia pattern, such as bricks and mortar, to make the assembled building block more attractive.

The panels 14 through 20, forming the exterior of the building block, are joined together along crease lines with the bottom 14 determining the horizontal extent of the side panel 16 by a crease sides 16 are attached along one side thereof to the bottom and extend the entire length of the building block. The ends 18 are connected to the ends of bottom panel 14 and extend across the width of the building block. The top panels 20 are attached along a long edge to the outer edge of the opposed sides 16 and extend the length of the building block, and are of a width of approximately one-half the width of the bottom 14.

Thus, when all of the creases joining the exterior sides of the building block are folded upwardly, the panels 16 and 18 are perpendicular to the bottom 14, defining the vertical sides and ends of the block, and the top sections 20 fold over perpendicular to the sides 16, and hence parallel to the bottom 14, to provide the top surface of the building block.

To provide strength, ruggedness and additional load-carrying ability to the building block structure, I have included means in the form of additional panels within the rectangular outline of the blank which are foldable to provide an internal cell-like structure. To provide this inner structure, four corner cell panel assemblies 22 are attached to each end edge of the opposed sides 16. Similarly, two end cell panel assemblies 24 are attached to the outer edge of the ends 18 of the building block. In addition to performing the function of a cell-like load-supporting structure, the end panel assemblies also interlock the four corner cell panel assemblies 22. The two top panels 20 of the building block are provided with tongue panels 26 that when folded extend vertically downward into the interior of the building block to provide an additional load-supporting wall, as well as to interlock the two end cell panel assemblies 24 which in turn interlock the four corner cell panel assemblies 22.

The corner assemblies 22 are generally rectangular in plan form and are connected to the sides 16 by an intermediate panel 28. The intermediate wall 28 is slightly shorter than the side 16 so that when the blank is folded with the lower edge of the panel 28 resting on another folded member of the block, the exterior shape thereof will not be distorted. The intermediate panel 28 is connected to the side panel 16 by a crease on one side, and a perforated line on the other side connects a flap 30 which in turn is connected on one side to another flap 32. An end flap 34 is connected to the flap 32 by means of a perforated crease line and a slot 36 partially divides these flaps. An elongated flap 38 extends along the length of the sections 30 through 34, with the flap 38 being connected thereto along a crease, to the flap 30. A slot 40 is formed between the flap 38 and the ends of the flaps 32 and 34 to separate them. Another slot 42 is provided parallel to the slot 36 and extends across the width of the flap 38 and over halfway across the width of the flap 30. An enlargement 44 is of the same longitudinal extent as the flap 38, and has substantially the same width as the flaps 28 through 34. The flap 44 is connected to
the flap 38 along a crease line with a slot 46 at the outermost end that extends parallel to the slot 40. Another slot 48 extends perpendicularly inward from the outer edge of the flap 44 at its midpoint, and extends approximately halfway across its width. While one corner assembly 22 and the intermediate wall 28 that connects it to the vertical edge of the opposed sides 16 has been described herein, it is noted that the four corner assemblies 22 are identical with longitudinally or horizontally opposed pairs thereof being mirror images on one another.

Since all of the folds to be made in the subassembly 22, and throughout the building block, are vertically upward and at a right angle to the next adjacent surface, the operation of folding the corner assembly is relatively simple and straight forward. Thus, flaps 32 and 34 are folded upwardly, and at right angles to the flap 30 which remains temporarily in the plane of the rest of the blank. The elongated end flap 44 is then folded relative to flap 38 which is in turn folded relative to the flap 30. This presents the slots 36 and 46 in opposition with one another for engagement as shown in the upper left corner assembly in FIG. 3. With the corner assembly thus formed, the entire corner assembly is folded upwardly relative to the intermediate panel 28, which in turn is folded relative to the sides 16. This positions the corner assembly 22 as shown in the upper right corner assembly of FIG. 3, wherein the elongated flap 44 is juxtaposed along the side 16. When the subassembly 22 at the opposite end of the sides 16 is folded into a similar position, the slots 46 are presented in opposition to one another for engagement therebetween, as shown by the lower left and lower right corner assembly 22 in FIG. 3. Note that the vertical height of the flaps 30, 32, 34, and 44, as well as the intermediate wall 28, are identical and slightly less than the overall vertical height of the brick so that when the interlocked corner assemblies 22 and their juxtaposed side 16 are folded into a vertical position relative to the bottom 14, all of the vertically positioned panels provide additional vertical load-bearing surfaces. The opposed pairs of interlocked corner assemblies are shown in their assembled position in FIG. 4.

The end assemblies 24 have an intermediate flap 50 that is connected along an outer edge of the end 18. A flap 52 is connected on an outer side of the intermediate flap 50 and on the other side thereof is a tongue flap 54. A slot 56 is provided across the width of the flaps 50 and 52 at their midpoint. A pair of slots 58 extend inwardly from the free edge of the tongue flap 54 to divide the tongue into three separate sections. The tongue flap 54 and the tongue 56 is slightly less than the overall transverse width of the building block, as represented by the width of the bottom 14 and end 18, so that the assembly may be folded into the interior of the block.

With the opposed interconnected pairs of corner assemblies in position as shown in FIG. 3, the tongue flap 54 and flap 52 are folded vertically upward relative to the flap 50, which is in turn folded vertically upward relative to the end 18, see the left end of FIG. 4. With the end assembly thus folded, the end 18 is folded vertically upward, relative to the bottom 14, thus placing the tongue flap 54 in vertical alignment with the slots 42 on each of the opposed corner assemblies. The two outermost tongues of the tongue flap 54 are then received in the corner assembly with the pair of slots 58 engaging the slots 42 of each corner assembly. The end assembly is shown in its fully folded position engaged with the opposed corner assemblies on the right end of FIG. 4. The end assemblies, which have previously been interlocked form an interior network, providing a cell-like structure of vertically extending load-supporting walls.

The side panel tongues 26 that are attached to the top sections 20 of the building block provide the final interlocking members to be folded to present a complete interlocking subassembly of the block during use, and also to add an additional vertical load-supporting wall down the center of the building block. Since the width of the tongue 26 is the same as the width of panels 28 through 34 and 44, as mentioned hereinabove, the lower edge of the tongue will bear against the bottom 14 of the block. To accomplish the interlocking of the various subassemblies of the building block, the tongue 26 has two slots 60 extending vertically inward from the long free edge of the tongue 26. The slots 60 are spaced from the ends of the tongue 26 at distance that is substantially the same as the portion of the slot 56 that extends across the flap 50 of the end assembly 24. In this manner, when the top panel 20 is folded at a right angle to the side 16, and the side panel tongue 26 is folded at a right angle to the top panel 20, the tongue 26 is then aligned with the center of the block with the slots 60 aligned to engage the slot 56. When the tongues 26 are inserted into the center of the block engaging the slots 56, the end cell-like assemblies are interlocked with one another. These cell-like end assemblies had in turn interlocked the opposed pairs of corner assemblies, and the corner assemblies had been originally interlocked with one another on the same side of the block.

As can be seen from the above description of the building block, and its assembly, this invention provides an extremely durable building block which by virtue of its cell-like inner structure is capable of supporting a great amount of weight. In addition to the weight-supporting ability, the interlocking features provide ruggedness to withstand abuse by children and prevent any inadvertent unfolding of the block. The block being fabricated from lightweight cardboard or other such material, is lightweight and easy for a child to handle even with the intricate internal cell structure. This building block because of its weight-supporting ability, ruggedness, resistance to unfolding, will find utility in other applications aside from the building block or toy described as the preferred embodiment.

What I claim is:

1. A building block formed from a foldable blank, comprising: a bottom panel, a pair of side panels each foldably attached on one edge to a longitudinal edge of the bottom panel, a pair of end panels each foldably attached on one edge to a transverse edge of the bottom panel, a pair of top panels each foldably attached on one edge to an outer edge of the side panels, means foldable to provide an internal cell-like structure, said means including corner panel assemblies each foldably attached to an end edge of the side panels and each foldable upwardly and inwardly with respect to the side panels to form a cell-like box structure with sides of each box structure in juxtaposition with the side panels, top panel and bottom panel of the building block when the building block is folded, slots in each said corner panel assembly and positioned so that the two corner panel assemblies on each side panel mutually interlock by means of the slots into an interior bracing structure, said means further including end panel assemblies each attached on one edge thereof to the edges of the end panels opposite to said first recited end panel edges, with tongue forming slots in the other, opposite, edges thereof, the end panel assemblies interlocking the corner panel assemblies when the end panels are folded with respect to the bottom panel, and a tongue flap connected to the outer edge of each top panel and having slots to engage the end assemblies in interlocking relationship.

2. The building block of claim 1, wherein each corner panel assembly includes four adjoining flaps extending outwardly of the end of one of said side panels and a pair of outer flaps connected to a middle one of the four adjoining flaps, a slot extending through the innermost of the outer flaps and said middle flap for interlocking with the end panel assembly.

3. The building block of claim 2, wherein each end panel assembly includes three adjoining flaps extending outwardly of the end panel, a slot extending through the center of the innermost two of the three flaps to form a locating slot for cooperation with the tongue flaps connected to the top panels for interlocking the end panel assemblies.