United States Patent

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[54] **CONSTRUCTION TOY AND A BLOCK CONSTRUCTION THEREFOR**

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[52] **U.S. Cl.** **46/26**

[51] **Int. Cl.** **A63h 33/10**

[58] **Field of Search** 46/25, 17, 26

[56] **References Cited**

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Assistant Examiner—D. L. Weinhold
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[57] **ABSTRACT**

This disclosure is directed to a construction toy made up of a plurality of geometric forms or blocks, each form or block having an integrally formed outer circumscribing wall to define a hollow structure. One or more hollow struts extend inwardly of each block or hollow structure between opposed wall portions of the circumscribing integral outer wall to reinforce the hollow structure. The hollow struts are also integrally formed to the outer wall with the opposed ends of the respective struts defining an opening in the adjacent outer wall portions of the hollow structure. A coupler complementing the openings is provided for detachably securing two or more blocks together in side by side relationship.

17 Claims, 11 Drawing Figures

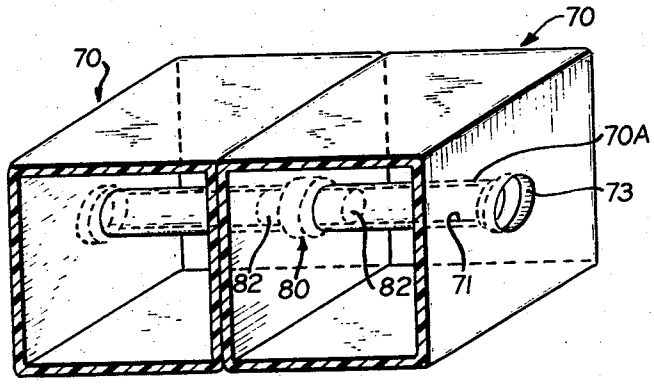


FIG. 1.

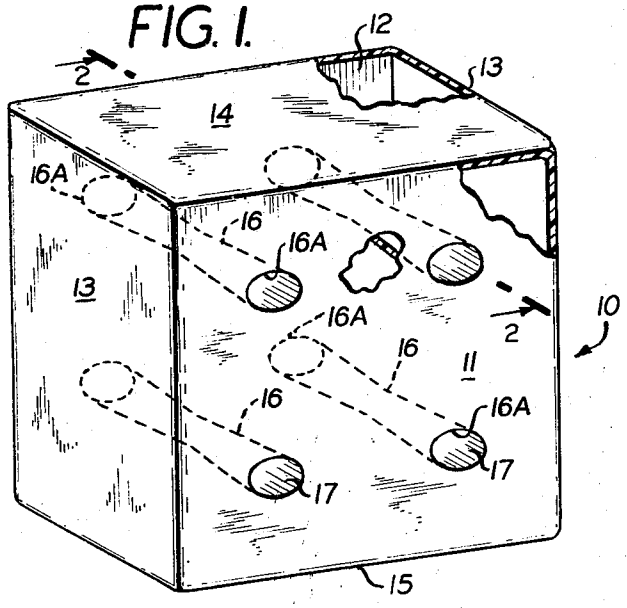


FIG. 4.

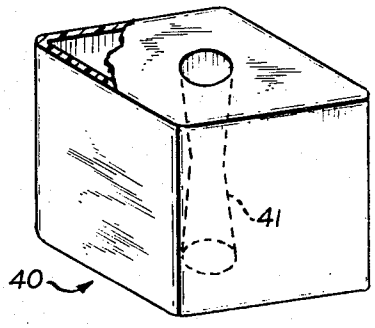


FIG. 5.

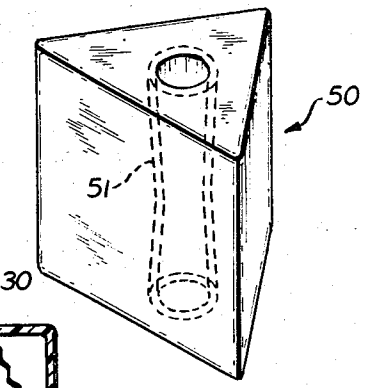


FIG. 2.

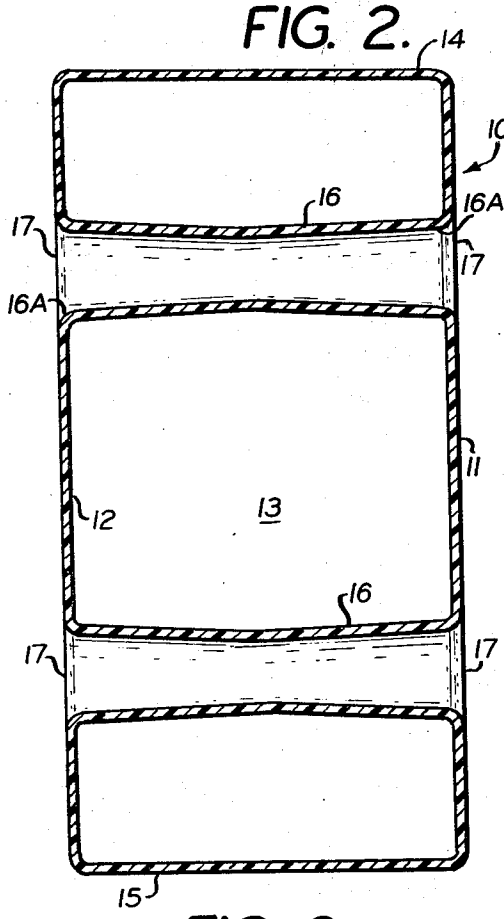


FIG. 3.

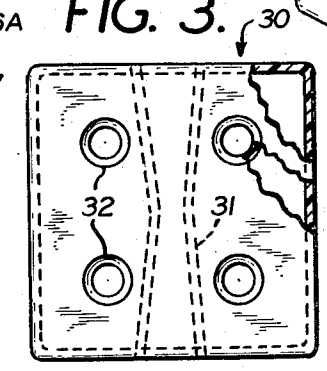


FIG. 6.

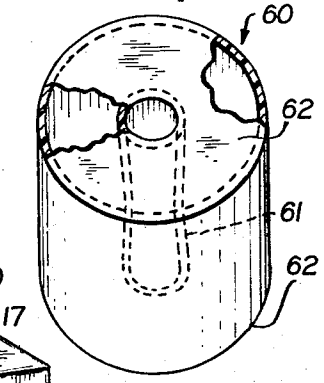


FIG. 7.

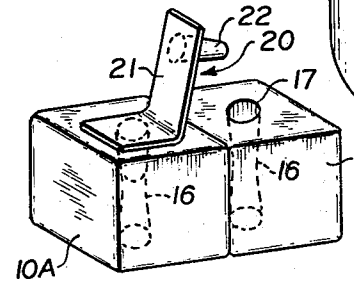
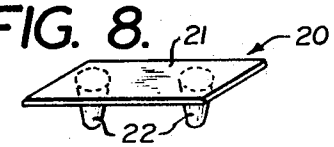


FIG. 8.



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FIG. 9.

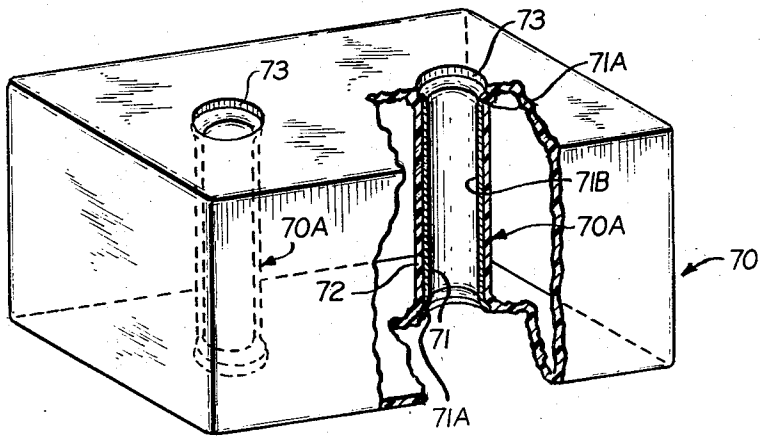
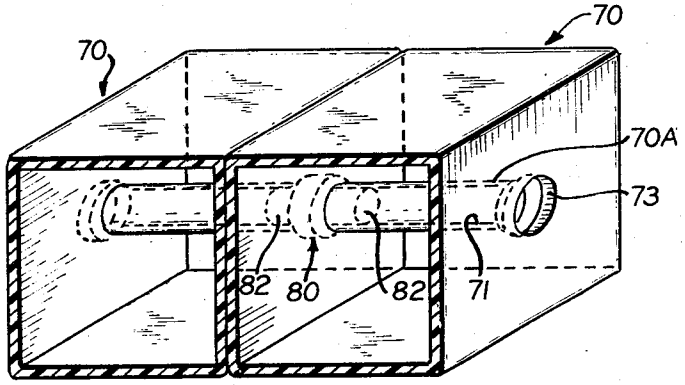


FIG. 10.



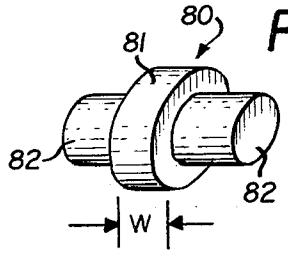


FIG. 11.

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CONSTRUCTION TOY AND A BLOCK CONSTRUCTION THEREFOR

PROBLEM AND PRIOR ART

In the toy field there has existed a long recognized need for a durable, giant size, outdoor type of construction toy or blocks which are required to be relatively light in weight and which could be easily handled by small children. Also the need required such toys or blocks to be impervious to weather and not crack, warp or otherwise cause injury to the children. Heretofore, such giant size construction toys or blocks were formed either of cardboard and/or wood. Generally the cardboard giant sized blocks were not satisfactory in that they were not impervious to weather, and further that they would tend to deteriorate rather rapidly with use. Also there was no practical means by which such giant sized cardboard blocks could be detachably secured in side by side relationship.

Giant size wooden blocks, on the other hand, while rendered more durable, were unsatisfactory due to their initially high cost and the continuing maintenance required thereby. Also the known wooden blocks could only be stacked one on another without any reliable means for detachably coupling adjacent blocks together. Further, the wooden blocks have a tendency to splinter and crack whereby the child could be injured as by picking up splinters. Also wooden blocks require painting. For these reasons the popularity of giant size construction toys or blocks was seriously limited both in use and in play value.

OBJECTS

It is an object of this invention to provide an improved construction toy comprising of a plurality of so-called giant sized geometric structures or blocks which are light in weight, but rendered exceedingly strong and durable, and which blocks will not crack, warp or require any maintenance.

Another object of this invention is to provide an improved hollow block construction which is internally reinforced to provide for maximum strength.

Another object of this invention is to provide a hollow block construction which can be readily fabricated in a simple, expedient and economical manner.

Another object of this invention is to provide a hollow block structure which is internally reinforced by hollow struts integrally formed with the circumscribing defining wall portions of the block in a manner to define means whereby adjacent blocks may be detachably secured in side by side relationship.

Another object is to provide a construction toy comprising a plurality of giant sized hollow structures, each being integrally formed as a unitary mass with means whereby adjacent blocks may be detachably coupled together to form a plurality of variable building structures.

BRIEF DESCRIPTION OF THE INVENTION

The foregoing objects and other features and advantages of this invention are attained by a construction toy comprising a plurality of what is known in the art as giant sized geometric shapes or blocks, each shape or block being of a hollow construction defined by an integrally formed circumscribing outer wall. Interconnected between opposed portions of the integrally formed circumscribing outer wall are one or more hollow reinforcing struts. The arrangement is such that the ends of the hollow struts are integrally formed to an adjacent wall portion of the hollow structure during the manufacturing process with the ends of the strut arranged to define an opening in the adjacent connecting wall portions of the hollow structure. Preferably the hollow strut is arranged so as to taper inwardly from its outer ends toward the center. A coupling means is provided for securing a plurality of adjacent blocks together in side by side and/or stacked relationship to form various constructional forms. Alternately a metal sleeve may be utilized to reinforce the hollow strut.

FEATURES

A feature of this invention resides in the provision of a hollow block construction that is formed as an integral hollow unit or mass.

Another feature of this invention resides in the provision of a hollow block construction which is internally reinforced by a plurality of strut members extending between opposed wall portions of the block.

Another feature of this invention is to provide a hollow block construction reinforced by hollow struts which define an opening in the opposed wall surfaces of the block and define the means by which adjacent blocks may be detachably secured together.

Another feature of this invention resides in the provision of a construction toy comprising of geometric blocks of various shapes that may be detachably secured together.

Another feature of this invention resides in the provision of a construction toy composed entirely of giant sized blocks, each of which is formed as an integral structure to define a relatively strong, light weight, durable toy.

Another feature of this invention resides in the provision that the construction block may assume any desired integrally constructed hollow configuration.

Other features and advantages will become more readily apparent when considered in view of the drawings and specifications in which

FIG. 1 illustrates a perspective view of a typical block construction of a construction toy embodying the present invention and having portions thereof broken away.

FIG. 2 is a vertical sectional view taken along line 2—2 on FIG. 1.

FIG. 3 is a side elevation view of a modified block construction.

FIG. 4 is a perspective view of another modified block construction.

FIG. 5 is a perspective view of still another modified block construction.

FIG. 6 is a perspective view of another modified form of block construction.

FIG. 7 is a perspective view illustrating how the block constructions of the present invention may be detachably secured together.

FIG. 8 is a detailed perspective view of the coupling means by which two or more blocks may be detachably secured together.

FIG. 9 is a sectional view of a modified block construction embodying the present invention.

FIG. 10 illustrates a pair of blocks constructed as shown in Figure 9 coupled together.

FIG. 11 is a detailed perspective view of a modified coupler as employed in Figure 10.

The construction toy of the present invention comprises a plurality of geometric forms or blocks and a plurality of coupling means. The forms or blocks may be similar or different in shape.

Referring to the drawings, there is shown therein in FIGS. 1 and 2 a typical form or block 10 embodying the present invention. As shown, the block construction 10 comprises a hollow geometric shape, defined by opposed front wall 11 and rear wall 12 interconnected by side walls 13—13 and a top wall 14 and a bottom wall 15. Each of the walls are integrally connected to define a unitary, circumscribing outer wall. That is, the adjacent edges of adjacent wall portions are integrally formed to form a block construction completely devoid of any seams or other lines of junction. The geometric form 10 thus defined, as evidenced in FIGS. 1 and 2 comprises a thin walled, hollow structure, of substantially uniform thickness.

While the block 10 may assume any desired shape and/or size, it is preferred that the block be of a so-called giant size, with which children can readily play out of doors.

To effect reinforcement of the blocks 10 to prevent possible collapse, one or more hollow struts 16 are provided internally. As best seen in FIGS. 1 and 2 the hollow struts 16 are defined as a tubular member extending between opposed wall portions 11 and 12 of the block. The ends 16A of the hollow struts 16 are integrally formed with the opposed wall portions 11, 12 of the block so as to constitute an integral, inseparable part. The ends of the hollow struts further define an opening 17 formed in the opposed wall portions 11 and 12 of the block as is clearly evident in Figure 2.

Referring to FIG. 2, it is to be noted that the hollow struts 16 taper inwardly toward the center thereof. It has been discovered that such taper facilitates the removal of the molds utilized in constructing the block, and enhances the strength to the block structure.

In the form of the invention as illustrated in FIGS. 1 and 2, four such hollow struts 16 are illustrated as extending between the front and rear walls 11 and 12 respectively. However, it would be understood that similar hollow reinforcing struts may extend between the opposed side walls 13—13 and/or between the upper and lower walls 14 and 15 and/or any combination thereof.

The block construction 10 embodying the present invention can be readily formed by a process known in the art as rotational molding in which a two-piece mold is filled with a liquid (PVC) or with plastic powders such as PE, PS, buterate, nylon or PB. The mold sections with the plastic material disposed therein, are then subjected to a gentle two-way rotation under temperatures ranging between 750° to 1,000°. The heat to which the molds are subjected causes the plastic material disposed therein to become heated and forms a slow running gelatinous mass which tends to adhere to the configuration of the mold walls. By allowing ample time for this heat process to take effect and by rotating or oscillating the mold, the molten plastic material will adhere to the entire inner wall of the mold. The mold is then automatically moved into a cooling chamber to cause the gelatinous, molten mass of plastic material adhering to the walls of the mold to solidify. Upon solidifying of the gelatinous mass within the mold, the mold is then opened and the solidified mass is removed as a hollow integrally formed structure conforming to the shape of the mold. The arrangement is such that the entire geometric shape is molded as a unitary object or mass, free of any seams or junctions. The object so formed is internally reinforced by the hollow strut 16 which terminates in openings 17 formed in the opposed wall surfaces of the hollow block 10.

A means is provided whereby two or more blocks 10 may be detachably secured together. As best see in FIG. 8 the coupling means 20 for securing two or more of the described hollow structures 10 together comprises a flexible strap 21 formed of a suitable material, e.g., plastic, rubber, fabric, etc. to which there is connected at spaced intervals therealong a plurality of projections or bosses 22. The bosses 22 are sized so as to be frictionally received within the openings 17 formed by the hollow struts in the surface of the blocks 10. It will be noted that the bosses 22 are tapered to complement the strut taper. As seen in FIG. 7 when two blocks 10A, 10A are disposed in side by side relationship, the boss 22 of the coupling member 20 is simply inserted into one of the openings 17 defined by the hollow struts 16 thereby enabling the two blocks to be frictionally secured together. It will be understood that the coupling means 20 may be utilized to create a large number of various block constructions with the various possibilities and arrangements being solely determined by the imagination and ingenuity of a particular child.

FIG. 3 illustrates a modified form of block construction 30. In this form the block construction 30 is similar to that described with respect to FIGS. 1 and 2 with the exception that hollow struts 31 and 32 are extended in the block so as to extend in two different directions.

FIG. 4 illustrates a block construction 40 which is generally cubical in shape with one internal reinforcing hollow strut 41 extending therethrough.

FIG. 5 illustrates a triangularly shaped block 50 having a unitary reinforcing strut 51 extending therethrough.

FIG. 6 illustrates a cylindrical shaped block 60 having a unitary reinforcing strut 61 extending therethrough between the circular end portions 62.

In each of the illustrated forms of the invention the entire circumscribing outer wall is integrally formed with the reinforcing hollow strut likewise being integrally formed with the adjacent wall portions of the block.

FIG. 9 illustrates another modified embodiment. In this form the block 70 while formed of a plastic material is provided with a reinforcing strut 70A comprising of a hollow sleeve 71 extending between opposed sides of the block 70. As shown the sleeve 71 comprises a tubular member which may be formed with a uniform cross-section having outwardly flared flanges 71A formed on the respective ends thereof. As best seen in FIG. 9, the flanges 71A of the sleeve 71, as well as the body 71B, of the sleeve become imbedded in the plastic material 72 from which the block is made. This is attained for example by utilizing the rotational molding process. In this form of the invention the integrally

molded plastic portion **72** of the reinforcing strut is further reinforced by the core sleeve **71**, which may be formed of any suitable reinforcing material as for example, metal.

As further shown in FIG. **9** an indentation or recess **73** may be formed in the exterior side of the block to which the strut opens to define a seat for receiving a coupling means whereby two or more blocks may be detachably connected together. It will be understood that coupler **20** of the type described with respect to FIG. **8** may be used to connect blocks of the type described with respect to Figure **9**. However a modified coupler **80** as shown in Figure **11** may also be employed. As shown in Figure **11**, the coupler **80** comprises a center body portion **81** which is sized to be received in the seat or recess **73**. As seen in FIG. **9**. However a modified coupler **80** as shown in FIG. **11** may also be employed. As shown in FIG. **11**, the coupler **80** comprises a center body portion **81** which is sized to be received in the seat or recess **73**. As seen in FIG. **10** the width W of the central body portion **81** is approximately twice the depth of the seat or recess **73** so that when two blocks are coupled the adjacent sides of the coupled blocks are disposed in contiguous face to face contact. See FIG. **10**.

Projecting to either side of the body portion **81** are extended projections **82** sized to be snugly received within the hollow strut, e.g., strut **70A**. The snug fit between projections **82** and the hollow strut **70A** frictionally detachably connect two blocks in contiguous side to side relationship. It will be understood that coupler **80** may be utilized in coupling any of the block embodiments described in contiguous side by side relationship.

Because the blocks are preferably formed of plastic material, they are light in weight and answer the long recognized need for a durable, giant sized, outdoor type of block which is impervious to weather and which will not crack, warp, or cause injury to the child. The blocks require absolutely no additional maintenance. A means in the form of an efficient coupler is also provided whereby two or more blocks may be detachably secured together in a simple and expedient manner so as to enable rigid structional forms to be created by a child.

While the invention has been described with respect to several embodiments thereof, it will be readily appreciated and understood that variations and modifications may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. A hollow geometric shape comprising an outer circumscribing wall to define a given shape of closed construction,

and means defining a hollow reinforcing strut disposed internally of said shape and extending between opposed wall portions of said closed shape.

2. A hollow geometric shape as defined in claim **1** wherein said hollow strut diverges inwardly from the opposed outer ends toward the center thereof.

3. A hollow geometric shape defined in claim **2** wherein the opposed ends of said hollow strut are defined as an opening formed in the plane of said circumscribing wall.

4. A hollow geometric shape as defined in claim **1** wherein said circumscribing wall comprises an integral, unitary, continuous wall construction devoid of seams.

5. A geometric shape as defined in claim **1** wherein said circumscribing wall and means defining said strut are integrally formed.

6. A geometric shape as defined in claim **5** formed of a moldable plastic material.

7. A construction toy comprising

a plurality of construction forms,

each form being defined by a circumscribing outer wall to form a hollow block having at least six sides,

means defining an opening in a wall portion of each form,

a hollow reinforcing strut extending between opposed wall portions, said strut having its bore in alignment with said opening,

and means adapted to be received in the openings of adjacent forms to couple two or more of said hollow blocks together.

8. A construction toy as defined in claim **7** wherein said strut tapers inwardly toward the center thereof.

9. A construction toy as defined in claim **7** wherein said coupling means includes a flexible strap,

and means connected to said strap at spaced intervals thereon adapted to be frictionally received in the opening formed in the wall of said blocks.

10. A construction toy comprising:

a plurality of relatively large geometric forms,

each of said geometric forms being defined by an integrally constructed circumscribing wall to define a closed, hollow, light weight figure,

each form having at least one hollow thin wall strut extending inwardly thereof between opposed portions of said integral circumscribing wall,

said hollow strut defining an opening formed in the opposed portions of said wall,

and means for detachably coupling a plurality of said forms together in side by side relationship.

11. A construction block comprising a hollow polygonical form having a plurality of connected sides wherein the adjacent edges of adjacent sides are integrally connected to define a continuous integrally formed circumscribing wall to define a closed hollow form,

a hollow reinforcing strut extended between opposed sides of said form,

said strut having its opposed end portions integrally formed to said opposed sides,

and said end portions defining an opening in each of said opposed sides.

12. The invention as defined in claim **11** wherein said hollow strut tapers inwardly from the opposed ends to the center thereof and said strut being formed of the same material of said hollow form.

13. The invention as defined in claim **11** and including a reinforcing sleeve forming a core for said strut.

14. The invention as defined in claim **13** wherein said sleeve comprises a tubular member having outwardly flared end portions,

the flared ends defining the openings formed in the opposed sides of said form.

15. The invention as defined in claim **14** and including a plurality of similarly constructed forms, and

a coupling means for detachably connecting said forms in side by side relationship.

16. The invention as defined in claim 15 wherein said coupling means includes a central body portion and opposed axially disposed projecting portions, said projecting portions being adapted to be snuggly received in the opening of said block.

17. The invention as defined in claim 14 wherein said sleeve is embedded in the material of said strut.

* * * * *