United States Patent

Lemkin et al.

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[45] **June 20, 1972**

[54] CONSTRUCTION ELEMENT TOY

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[22] Filed: **March 4, 1971**

[21] Appl. No.: **121,053**

[52] **U.S. Cl.** **46/23**, 46/25

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

[58] **Field of Search** 46/16, 23, 24, 25, 29

[56] **References Cited**

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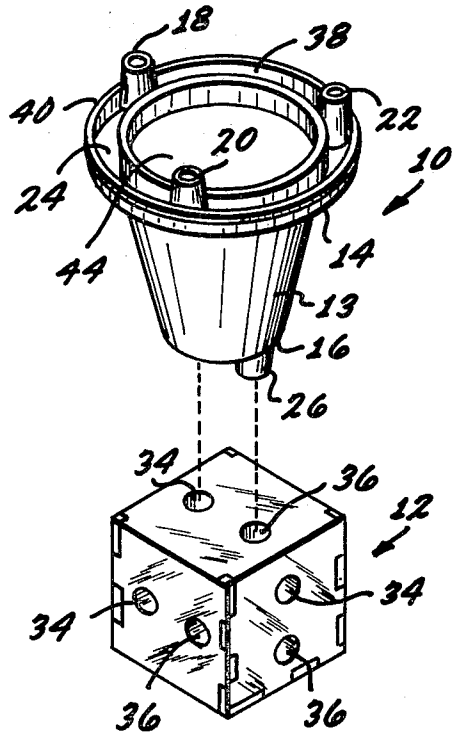
[57] **ABSTRACT**

Toy construction elements including a cone-shaped element and block-shaped element that can be readily joined into interesting shapes. Both the narrow and wide ends of the cone-shaped element have projections, and have recesses for receiving projections, the recesses at the wide end being formed by a pair of concentric flanges. The block-shaped element is formed from a substantially flat member divided by living hinges into six face portions that can be folded into a block. Each free edge of a face portion has an inwardly-extending rib and a stepped recess so that when the pair of ribs of adjacent edges are received in corresponding recesses the face elements are locked together.

12 Claims, 17 Drawing Figures



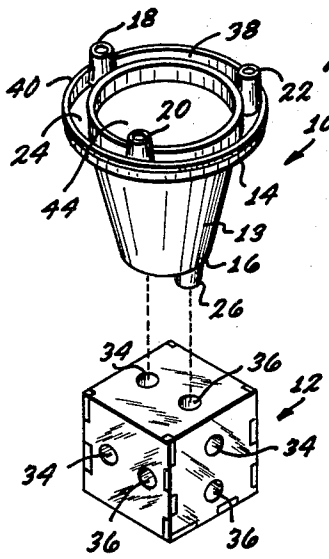


FIG. 1

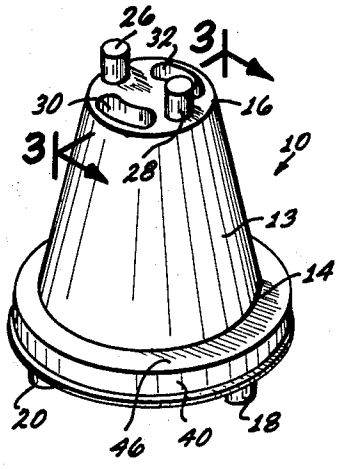


FIG. 2

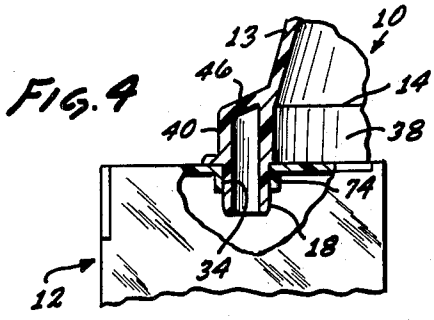


FIG. 4

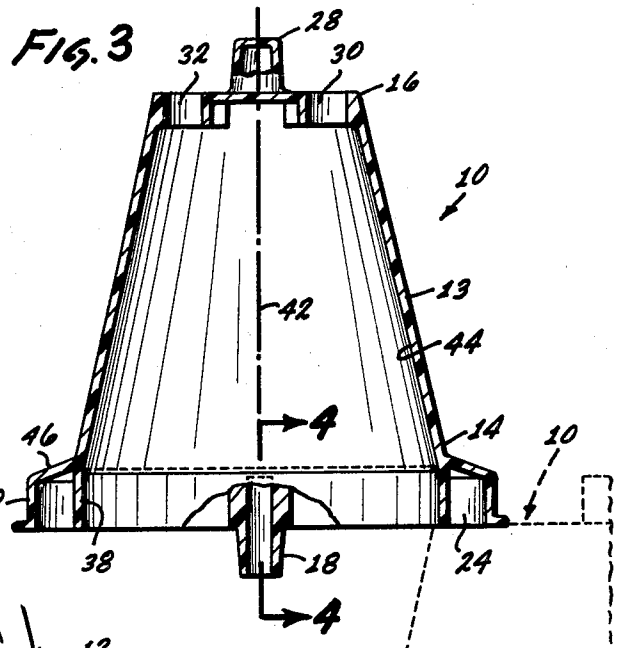


FIG. 3

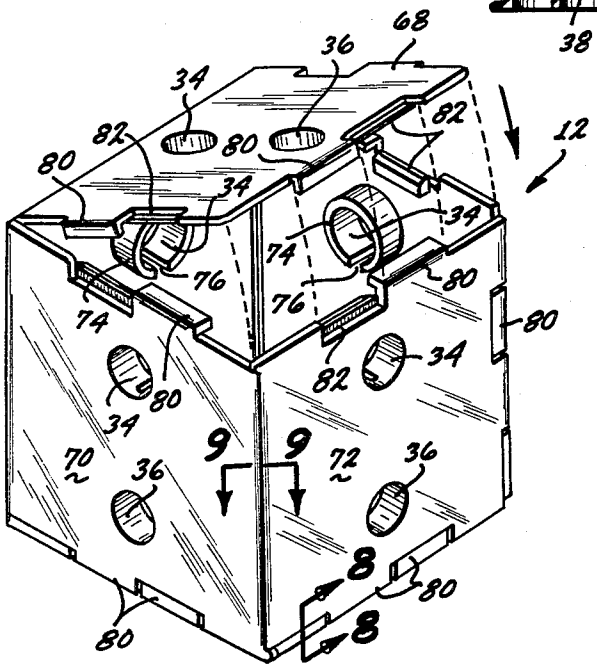


FIG. 6

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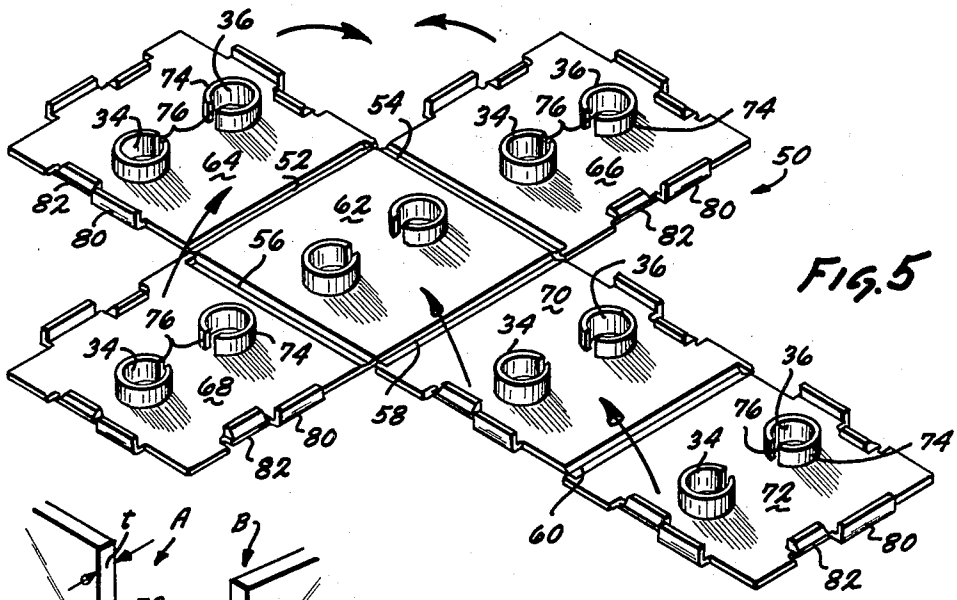

FIG. 5

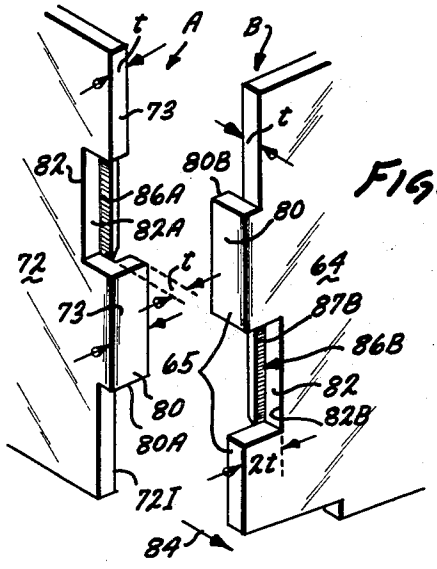

FIG. 7

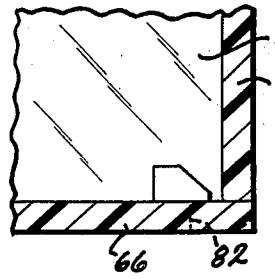

FIG. 8

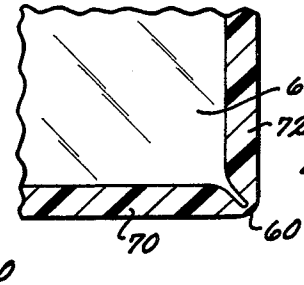

FIG. 9

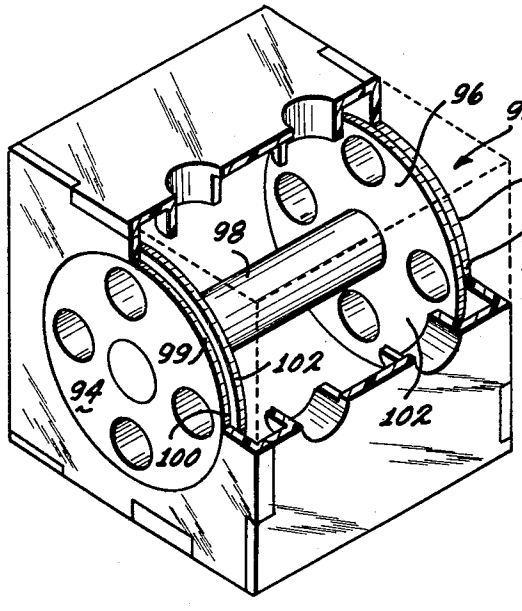

FIG. 10

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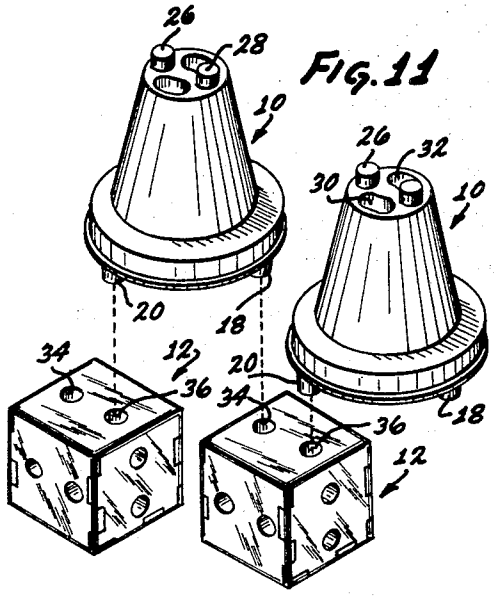

FIG. 11

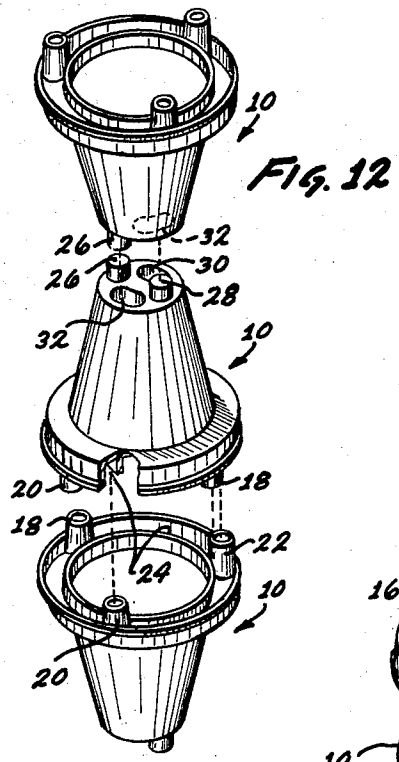

FIG. 12

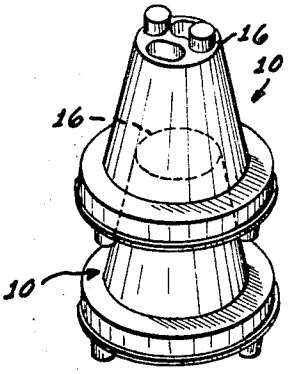

FIG. 13

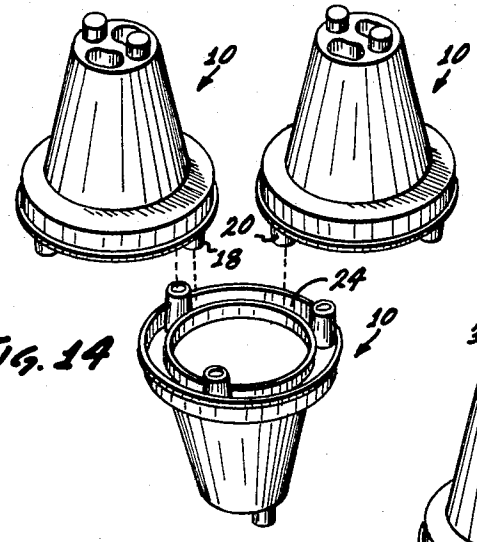

FIG. 14

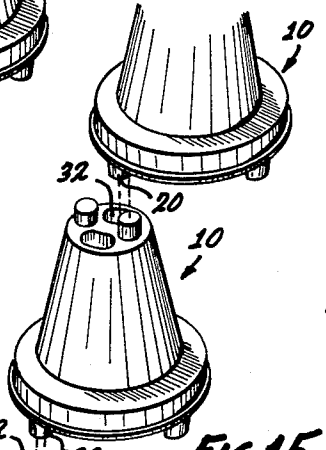

FIG. 15

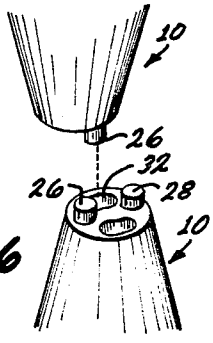

FIG. 16

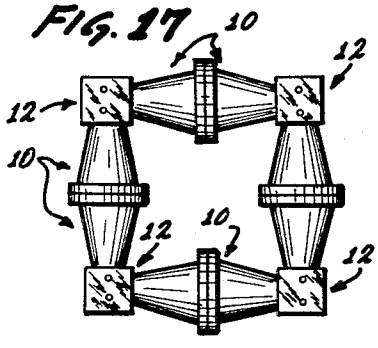

FIG. 17

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CONSTRUCTION ELEMENT TOY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to construction toys.

2. Description of the Prior Art

Construction elements that can be fitted together in a variety of manners make educational and interesting toys. Generally, construction elements designed for small children have been in the form of blocks that can be stacked or otherwise joined. Construction elements of other than block shapes can provide novelty that makes them especially interesting. However, such elements should be versatile to enable their joining in a variety of different manners and configurations. The elements preferably should be easily joinable to one another or to another type of element such as a block.

Block type elements generally can be easily formed by injection molding of plastic type materials. Economical shipment and storage is facilitated if the blocks can be originally formed in a substantially flat configuration and if they can be readily assembled by a child to a block form. If the assembly of the substantially flat device into a block form can be performed in an entertaining manner, as by the different parts easily snapping together into a sturdy block without unsightly overhanging portions, then the entertainment value of the construction element can be further enhanced.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide construction elements which are of a novel, versatile and highly entertaining form.

Another object is to provide a construction element that can be molded in a substantially flat shape and assembled by a child in an entertaining manner into a solid-appearing object.

In accordance with the invention, cup or cone-shaped and block-like toy construction elements are provided which can be joined into interesting shapes. The cup-shaped construction element has a tapered body with a narrowed end and a wide end, each end having recesses and projections for coupling to other construction elements. The recesses at the wide end are formed by a pair of concentric flanges that extend axially from the wide end to form a groove that can receive projections. The cup-shaped elements can be joined together by inserting a projection at either end into a recess at either end of another element, or by stacking the cups in the same manner as paper cups are stacked.

The block-shaped construction element is formed from a substantially flat member divided by living hinge areas into six face portions, the member being foldable at the hinges into a block. In order to allow the edges of the face portions to lock onto one another, each edge has an inwardly extending rib at one region and a recess at another region. When a pair of face portions is maintained perpendicular and with adjacent edges, and the rib of each edge is engaged in the recess of the other edge, the edges cannot readily separate and the block is locked in configuration.

The novel features of the invention are set forth with particularity in the appended claims. The invention will be best understood from the following description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a cone-shaped construction element and block-shaped construction element showing their manner of joining;

FIG. 2 is a perspective view of the cone-shaped construction element of FIG. 1;

FIG. 3 is a view taken on the line 3—3 of FIG. 2;

FIG. 4 is a view taken on the line 4—4 of FIG. 3, shown engaged with a block-type construction element;

FIG. 5 is a perspective view of a block construction element in a substantially flat shape;

FIG. 6 is a perspective view of the construction element of FIG. 5 after assembly into a block configuration;

FIG. 7 is a partial perspective view showing a pair of edge portions of the construction element of FIG. 6;

FIG. 8 is a view taken on the line 8—8 of FIG. 6;

FIG. 9 is a view taken on the line 9—9 of FIG. 6;

FIG. 10 is a perspective view of a toy construction element constructed in accordance with another embodiment of the invention;

FIG. 11 is a perspective view of a pair of cone-shaped elements and block-shaped elements, showing one possible manner of coupling thereof;

FIG. 12 is a perspective view of three cone-shaped elements, showing a manner of coupling them together;

FIG. 13 is a perspective view of a pair of cone-shaped elements showing another manner of coupling them together;

FIG. 14 is a perspective view of three cone-shaped elements showing still another manner of coupling them together;

FIG. 15 is a perspective view of three cone-shaped elements showing yet another manner of coupling them together;

FIG. 16 is a partial perspective view of a pair of cone-shaped coupling elements showing still another manner in which they can be coupled together; and

FIG. 17 is a plan view of a group of elements joined to form a window.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates a cone-shaped or tapered cup-shaped toy construction element **10** and a block-shaped toy construction element **12** made in accordance with the invention, showing one manner in which they can be joined together. The cone-shaped element has a hollow body **13** in the form of a truncated cone with a wide end **14** and narrow end **16**. The wide end **14** has three projections **18, 20** and **22** and a recess **24** divided into three parts by the projections. The narrow end **16**, also shown in FIG. **2**, has a pair of projections **26, 28** and a pair of recesses **30, 32**. Each of the five projections and all of the recesses are formed so that when a pair of identical cone-shaped elements are to be coupled, any projection of one construction element can be received and tightly held in any recess of the other element. The block **12** is constructed with a pair of recesses **34, 36** in each face for receiving the projections of a cone-shaped element. The block recesses or apertures **34, 36** are spaced apart by the same distance as the projections **26, 28**, at the narrow end of the cone-shaped element so that a strong coupling can be made to a single cone element.

The cone-shaped element is designed for very versatile coupling. The recess **24** at the wide end is formed by a pair of axially extending flanges **38, 40** which are concentric with the axis **42** of the cone-shaped body. Each of the projections **18, 20, 22** at the wide end lie in the recess **24** formed by the two flanges **38, 40** and they project axially therefrom. The two ring-like flanges **38, 40** provide a large region where projections can be received, to facilitate joining of construction elements in a wide variety of configurations. The two recesses **28, 30** at the narrow end of the cone-shaped element are elongated, which allows a pair of cone-shaped construction elements that are joined at their narrow ends to pivot a limited angle, such as 30° relative to one another. The cone-shaped construction elements can be joined not only by inserting a projection into a recess, but also by stacking, wherein the narrow end of one element is inserted into the hollow space **44** of the body **12** of another element, as illustrated in FIG. **13**. In order to avoid binding during stacking, which could prevent a child from easily pulling one element off of another, the elements are provided with a step **46** near the wide end that limits the distance that one element can be received in another. The step **46** also stabilizes one stacked element on the other so that a large number of elements can be stacked without readily toppling over.

FIG. 5 illustrates a flat member 50 that can be assembled into a block-shaped construction element of the type shown in FIG. 6. The substantially flat member 50 has five linear folding regions 52, 54, 56, 58 and 60 of reduced thickness that essentially divide the flat member 50 into six face members or face portions. The six face portions 62, 64, 66, 68, 70 and 72 can be moved into the position shown in FIG. 6 to form the block. Each of the face portions has a pair of apertures 34, 36 with an inwardly extending flange 74 about each aperture to provide a greater area of contact with a projection to hold it therein. Each of the flanges may be provided with a break 76 to facilitate deflection to more tightly engage a projection, although such a break is not necessary. The member 50 may be constructed of a material such as polypropylene which forms a durable hinge at narrowed areas thereof, such a hinge generally being referred to as a living hinge.

In order to hold the six face portions of the member 50 in a cube configuration, the edges of the face portions are designed to tightly coupled or lock to each other. Each of the free edges is provided with an inwardly extending rib 80 and a recess 82 for receiving the rib from another edge. FIG. 7 illustrates the manner in which two edge portions A and B of face portions 72 and 64 are locked together, edge portion A having a straight outer edge boundary 73 within which all parts are contained and the edge portion B having an outer edge boundary 65 within which all of its parts are contained. The rib 80A lies even with the boundary 73 and extends inwardly from the inner surface 72I of the face portion 72 by a distance approximately equal to the average thickness *t* of the face portion 72. The other edge portion B has a recess 82B which is designed to receive the rib 80A. The recess has a maximum depth 2t equal to the length of the rib 80A as measured from the outer face of the face portion 72. Thus, when the rib 80A is received in the recess 82B, a neat corner is formed wherein the rib 80A is flush with the outer surface of the face portion 64.

In order to prevent the face 64 from swinging out in the direction of arrow 84, a step or flange 86B is provided which extends along the inside of the recess 82B and which can be engaged by the rib 80A. The flange 86B has an outermost surface 87B which is substantially even with the inner surface of the face portion 64. If the rib 80A is thicker or thinner than the face portion thickness *t*, then the surface 87B should lie slightly behind (inward) or in front (outward) of the inner surface of face portion 64, respectively. In a similar manner, a rib 80B of the face portion 64 is received in a recess 82A of the face member 72. When the two ribs 80A and 80B are engaged in the recesses 82B and 82A, respectively, the two face portions 72 and 64 cannot be readily separated. Separation generally requires that the ribs 80A and 80B bend slightly to pass over the steps 86B and 86A. While such disengagement can be performed by pulling hard on the face portions, the face portions tend to remain locked together. Thus, once the construction element is assembled, it tends to remain in a block shape.

The substantially flat member 50 which contains the six face portions, can be injection molded in a flat configuration, and shipped and stored in this configuration to conserve space. The child or an adult can assemble the member into a block shape. Not only is space conserved, but the clicking sounds produced during assembly and the ease of folding from a flat to a block shape makes the assembly an entertaining activity. The substantially flat member 50 can be formed with face portions that are of unequal length, to form an elongated instead of cube box-shaped construction element. It is also possible to provide triangular shaped face portions to form a pyramid, or other shaped portions to form a variety of other solid appearing objects.

FIG. 10 illustrates a construction element 90 which utilizes a rotatable device 92 to further its versatility. The member 90 is similar to the construction element shown in FIG. 5, but two faces thereof have large apertures 100 for receiving discs 94 and 96 of the rotatable device. The two discs 94 and 96 are held together by an axle 98 to which they are fixed. It may be noted that each disc has an outer portion 99 of a diameter approximately equal to that of the aperture 100 in a face portion, and a larger diameter portion 102 that bears against the inner surface of a face portion of the cube. The rotatable device 92 can be installed prior to snapping the face portions of the cube together, and it thereafter remains in place.

FIGS. 11–17 illustrate many ways in which cone-shaped construction elements 10 can be coupled to one another or to block-like construction elements 12. The cone-shaped elements can be coupled to the block-shaped elements by reception of any of their projections in the holes 34, 36 formed in each face portion of the block-shaped elements. The cone-shaped elements can be coupled together either by reception of a projection in a recess or by stacking in the manner shown in FIG. 13. The fact that each cone-shaped element has three projections 18, 20, 22 at one end enables it to be removed, rotated 120°, and reinstalled, to rotate the projections 26, 28 at the opposite end so they are perpendicular to their original position. This permits construction of a window of the type shown in FIG. 17.

Although particular embodiments of the invention have been described and illustrated herein, it is recognized that modifications and variations may readily occur to those skilled in the art and, consequently, it is intended that the claims be interpreted to cover such modifications and equivalents.

What is claimed is:

1. A toy construction element comprising:

a substantially truncated cone-shaped body having a narrow end and a wide end, each end having at least one projection of predetermined shape and at least one recess shaped to receive a projection of said predetermined shape, said body having a hollow tapered interior for receiving the entire narrow end of another similar body;

said narrow end of said body having a pair of said projections equally spaced from the axis of said body and a pair of recesses equally spaced from the axis of said body, each of said projections being substantially cylindrical and each of said recesses extending arcuately about the axis of said body by a distance greater than the diameter of one of said projections, to permit a pair of elements joined at their narrow ends to pivot relative to one another.

2. A toy construction element comprising:

a substantially truncated cone-shaped body having a narrow end and a wide end, each end having at least one projection of predetermined shape and at least one recess shaped to receive a projection of said predetermined shape, said body having a hollow tapered interior for receiving the entire narrow end of another similar body;

said body having a pair of flanges at said wide end which extend substantially axially therefrom, said pair of flanges radially spaced from one another by approximately the diameter of one of said projections to grippingly receive one of said projections.

3. The toy construction element described in claim 1 wherein:

said narrow end of said body has a pair of said projections equally spaced from the axis of said body and a pair of recesses equally spaced from the axis of said body, each of said projections being substantially cylindrical and each of said recesses extending about the axis of said body by a distance greater than the diameter of one of said projections, to permit a pair of elements joined at their narrow ends to pivot relative to one another.

4. A toy construction element comprising:

a tapered cup-shaped body having a narrow end and a wide end, said wide end having a pair of axially extending flanges, said flanges extending circumferentially about said wide end and radially spaced from each other by a predetermined distance, and said narrow end having at least one projection extending axially therefrom and of a width approximately equal to the spacing of said flanges of said wide end for reception between the flanges of another identical element.

5. The toy construction element described in claim 4 wherein:

said wide end has an outstepped region, whereby to prevent binding when stacking the elements.

6. The toy construction element described in claim 4 wherein:

said wide end of said body has a plurality of projections located in the space between said pair of flanges and extending axially past said flanges.

7. A toy construction element comprising:

a plurality of face members having a plurality of first edge portions joined by hinge means for folding into a substantially solid-appearing shape, and a plurality of second edge portions for joining to one another to hold said plurality of face members in said solid-appearing shape, each of said second edge portions having a rib-receiving portion and having a rib for extending inwardly from the inner face of one face member and against the rib-receiving portion of the other face member.

8. The toy construction element described in claim 7 wherein:

each of said second edge portions has a straight outer boundary, at least one recess in said outer boundary, said recess forming one of said rib-receiving portions, and a step portion extending partially along said recess, and each of said ribs lies even with the outer boundary of the edge portion from which it extends, whereby to provide a smooth corner where second edge portions are joined.

9. The toy construction element described in claim 7 wherein:

said face members are joined so that first and second of said members lie on opposite sides of said solid-appearing shape, said first and second members having circular apertures therein; and including

a shaft having discs fixed at opposite ends thereto, each of said discs rotatably mounted in one of said apertures, and each disc having attaching means for attaching to another toy construction element, whereby to allow rotatable coupling of toy construction elements.

10. The toy construction element described in claim 7 wherein:

a plurality of said face members have a pair of apertures therein.

11. A toy construction element comprising:

a substantially flat member having a plurality of linear joint regions of reduced thickness which form living hinges and which separate said flat member into a plurality of face portions joined by said living hinges, said face portions being substantially rectangular to enable folding into a solid-appearing shape with each of said face portions having inner and outer surfaces with respect to said solid-appearing shape;

a plurality of said face portions having edges which are formed to lock into engagement with edges which lie adjacent thereto when said member is in a solid-appearing shape, each of a plurality of said edges having a rib extending inwardly from the inward surface of the face portion, a recess for receiving the rib of another face portion, and a flange extending near the bottom of the recesses, said flange having an outermost flange surface substantially even with the inner surface of the face portion.

12. The toy construction element described in claim 11 wherein:

said flat member has five linear joint regions and six face portions, and forms a box-like object when said face portions are folded and said edges are locked to one another.

* * * * *