United States Patent [19]

MacBride

[11] **3,757,430**

[45] **Sept. 11, 1973**

[54] **FLEXIBLE MODULE**

[76] Inventor: **Robert MacBride,** 41 Glen Byron Ave., Nyack, N.Y.

[22] Filed: **Apr. 18, 1972**

[21] Appl. No.: **245,128**

[52] **U.S. Cl.** **35/16,** 46/31, 52/81, 52/DIG. 10

[51] **Int. Cl.** **G09b 25/04**

[58] **Field of Search** ..... 35/16; 46/30, 31; D34/15 GG; 52/81, 574, DIG. 10

[56] **References Cited**

UNITED STATES PATENTS

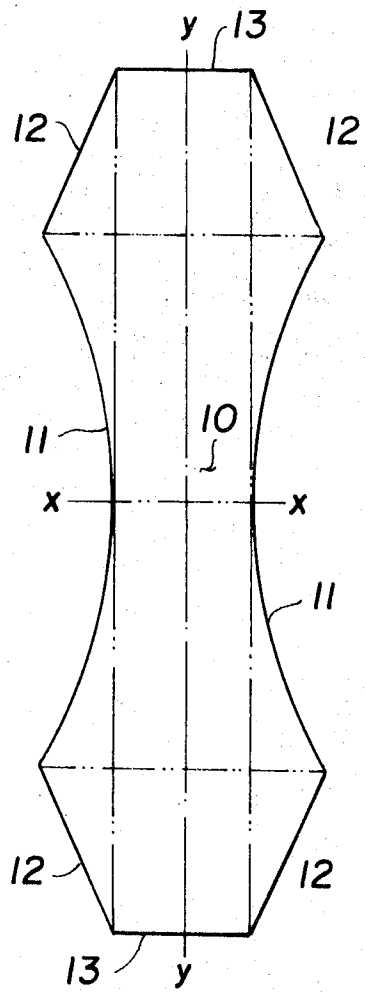
1,771,783	7/1930	Greene	46/30
2,905,113	9/1959	Fuller	52/81
3,597,858	8/1971	Ogsbury	35/16
3,654,052	4/1972	Rye	46/31 X

Primary Examiner—Harland S. Skogquist
Attorney—Howard I. Podell

[57] **ABSTRACT**

A flexible module for the construction of three dimensional hollow objects, consisting of a flat sheet of semi-rigid elastic material, the edges of which may be joined to the edges of forms of similar shape, by means of coupling pins or integral clips. The form of each module is symetrical about both horizontal and vertical axes, being characterized along the longitudinal axis by a middle section and an end section. The middle section is formed of sides in the form of concave arcs, with the end sections consisting of straight converging sides which approach each other as the sides approach the end of the module. Modules are joined together by joining the edge of one straight side to the similar edge of another unit.

5 Claims, 10 Drawing Figures



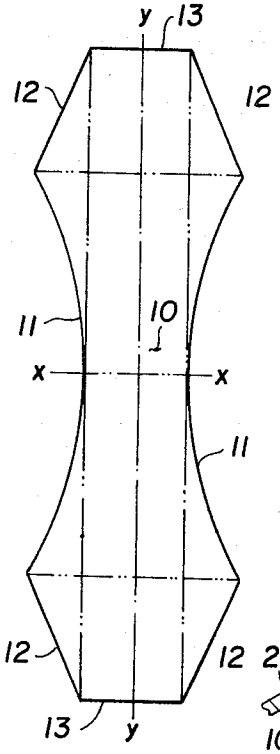


FIG. 1

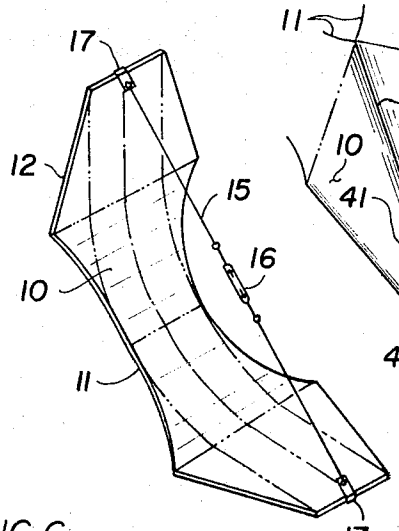


FIG. 2

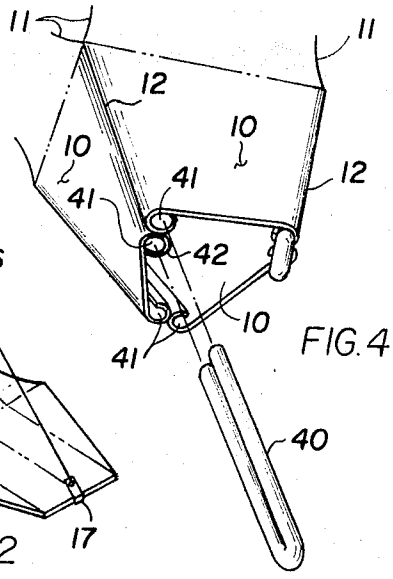


FIG. 4

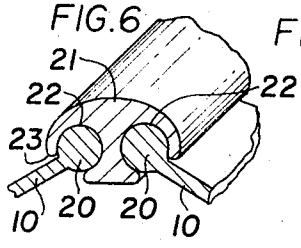


FIG. 6

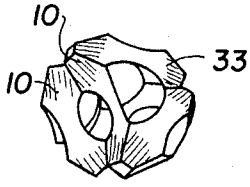


FIG. 3c

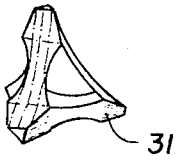


FIG. 3a

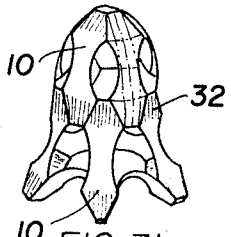


FIG. 3b

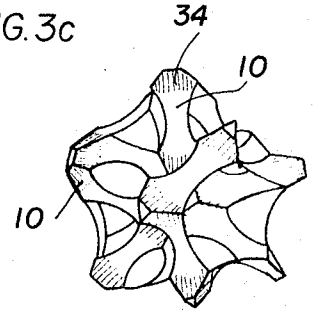


FIG. 3d

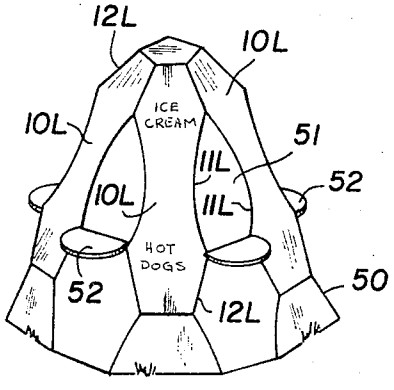


FIG. 5

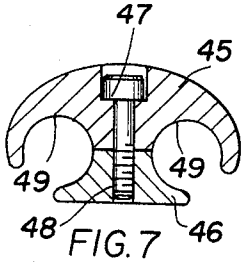


FIG. 7

FLEXIBLE MODULE

SUMMARY OF THE INVENTION

The object of this invention is the forming of three dimensional shapes of a free flowing characteristic, using a uniform module shape of flat semi-rigid material.

A further object of this invention is as an educational game to stimulate an understanding of shape and sculpture by the construction of various unusual shaped objects.

A further object of this invention is the construction of hollow building units of unusual shape from sheet materials of a uniform form.

In this invention, a flat shaped module is joined along straight sides to other similarly shaped units by means of coupling pins or formed clips. By virtue of the distinct shape of each module, the sheet becomes a curved non-planar surface, when modules are joined together.

The shape of each module unit is symetrical about both the longitudinal and lateral axis. The shape is characterized by sides consisting of concave arcs along the mid-longitudinal section, such arcs being joined to straight converging tapered sides along the end longitudinal sections of the member. The ends of the module unit may be the pointed apex formed by the intersection of the converging sides, or the ends may be formed of straight parallel lines truncating the otherwise pointed end apices.

BRIEF DESCRIPTION OF THE DRAWING

The objects and features of the invention may be understood with reference to the following detailed description of an illustrative embodiment of the invention taken together with the accompanying drawing in which:

FIG. **1** is a plan view of a module;

FIG. **2** is a perspective view of a module which is stressed into a curve by a tension member;

FIG. **3***a* is a perspective view of an example of a shape formed by joining several modules together;

FIG. **3***b* is a perspective view of a second example of such a formed shape;

FIG. **3***c* is a perspective view of a third example of such a formed shape;

FIG. **3***d* is a perspective view of a fourth example of such a formed shape;

FIG. **4** is an isometric view of the joining of modules;

FIG. **5** is a perspective view of an example of a beach stand formed by such joined modules;

FIG. **6** is a cross-section of the joint of two modules by a clip; and

FIG. **7** is an alternate form of a clip for joining modules.

DESCRIPTION OF THE PREFERRED EMBODIMENT:

Turning now descriptively to the drawing in which similar reference characters denote similar elements throughout the several views, the module **10** is illustrated in FIG. **1** in the form of a sheet of semi-rigid material. The form is symetrical about the longitudinal Y-axis and the lateral X-axis, with concave longitudinal arcs **11** forming the boundaries of the mid-section of the module **10**, and tapered converging sides **12** meeting end sides **13**. End sides **13** are shown perpendicular to the longitudinal Y-axis, but modules **10** may be

formed without such ends **13**, where tapered sides **12** are permitted to meet at an apex.

When the module **10** is joined to other such modules **10** along end sides **12**, the result is to bow the sheet **10** as shown in FIG. **3***a*, **3***b*, **3***c* and **3***d* to form composite forms **31**, **32**, **33**, and **34** respectively. Some of the stress of this bowing action may be taken up as shown in FIG. **2** by a tension member **15**. The tension member **15** fastened by hooks **17** to the end sides **13** of the module sheet **10**, said stress being regulated by the adjustment of turnbuckle **16**.

The edges of the tapered sides **12** may be formed in the shape of longitudinal ribs **20** as shown in FIG. **6** so as to permit joining of the sides of adjacent modules by coupling unit **21** which is preferably made of a flexible rubber or plastic material. The coupling unit **21** may be formed with longitudinal holes **22** and slots **23** to mate with the ribs **20** of the edges of the module **10**. Slots **23** may be so shaped and located as to align two adjacent joined modules at particular angles to each other such as 60°, 90°, 108° or 120° in forming objects of three, four, five, or six sides respectively.

Alternately, the adjacent edges **12** of the module **10** may be formed with a rib containing a longitudinal hole and slot so as to permit the use of a coupler with a double ribbed edge for joining the modules. Alternately some of the edges **12** of the module may be formed with longitudinal rib **20**, and others formed with a longitudinal hole and slot so that modules may join directly to each other along converging sides **12**.

As shown in FIG. **4** edges of the converging sides **12** may be bent in the form of a continuous hollow rib with continuous hole **41** serving to mate with U-shaped coupling pin **40**.

A two-piece coupling member **45** is illustrated in FIG. **7** for use with modules **10** in which the edges of the sides are formed with a circular rib **20**. The two piece coupler **45**, when bolted together, by screw **47** mating in threaded hole **48** of coupler member **46**, serves as a means of directly fastening modules **10** together so as to assure adequate tightness of joint.

FIG. **5** illustrates a refreshment vending booth **50** formed by joining appropriate size modules **10L** along sides **12L**. The opening **51**, formed by the concave arcs **11L** in the mid-section of each module **10L**, serve as open windows **51** for the booth **50**. A shelf **52** may be placed in one such opening **51** to serve as a counter as shown. Such structures may be made of materials which will give adequate service for the length of one season and then be readily disposed of.

Since obvious changes may be made in the specific embodiment of the invention described herein without departing from the scope thereof, it is indicated that all matter contained herein is intended to be interpreted in an illustrative and not a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A module construction unit adaptable to being joined to similar shaped module units so as to form hollow three dimensional objects and buildings,

said module being formed of sheet material of flexible semi-rigid nature, with the shape of said module unit being characterized as symetrical about both longitudinal and lateral axes, the mid-longitudinal section of said module being bounded on each side

by a concave longitudinal circular arc which joins at each end of the circular arc

straight sides, said sides being oriented at an angle to the longitudinal axis of less than 180°, such that the lateral width of the module progressively decreases as the straight sides approach the ends of the module.

2. The device as described in claim **1** in which the end sides of the module are perpendicular to the longitudinal axis, said end sides meeting each of the straight sides at an angle of greater than 90°.

3. The device as described in claim **2** in which the edges of said straight sides are formed in the shape of a hollow rib, so as to be joinable to the sides of other similar shaped modules by use of a U-shaped coupling pin fitting in the hollow ribs of two adjacent sides.

4. The device as described in claim **2** in which the edges of said straight sides are formed in the shape of a rib, said rib being of greater thickness than the thickness of the module, together with a coupling unit which mates with the two adjoining ribs of two adjacent modules.

5. The device as described in claim **2** in which some of the edges of the straight sides are formed in the shape of a rib of greater thickness than thickness of the module, and some of the edges of the straight sides of the module are formed in the shape of a hollow rib, with a slot along the outer edge of said hollow rib, said slot being of the same or greater thickness than the thickness of the modules, such that the edge of a side of a module bearing the solid rib will mate with the edge of a side of another module bearing the hollow slotted rib.

* * * * *