Dec. 21, 1965 D. C. MORYL 3,224,136

TAKE-APART TOY FIGURE

Filed Nov. 3, 1961 2 Sheets-Sheet 1

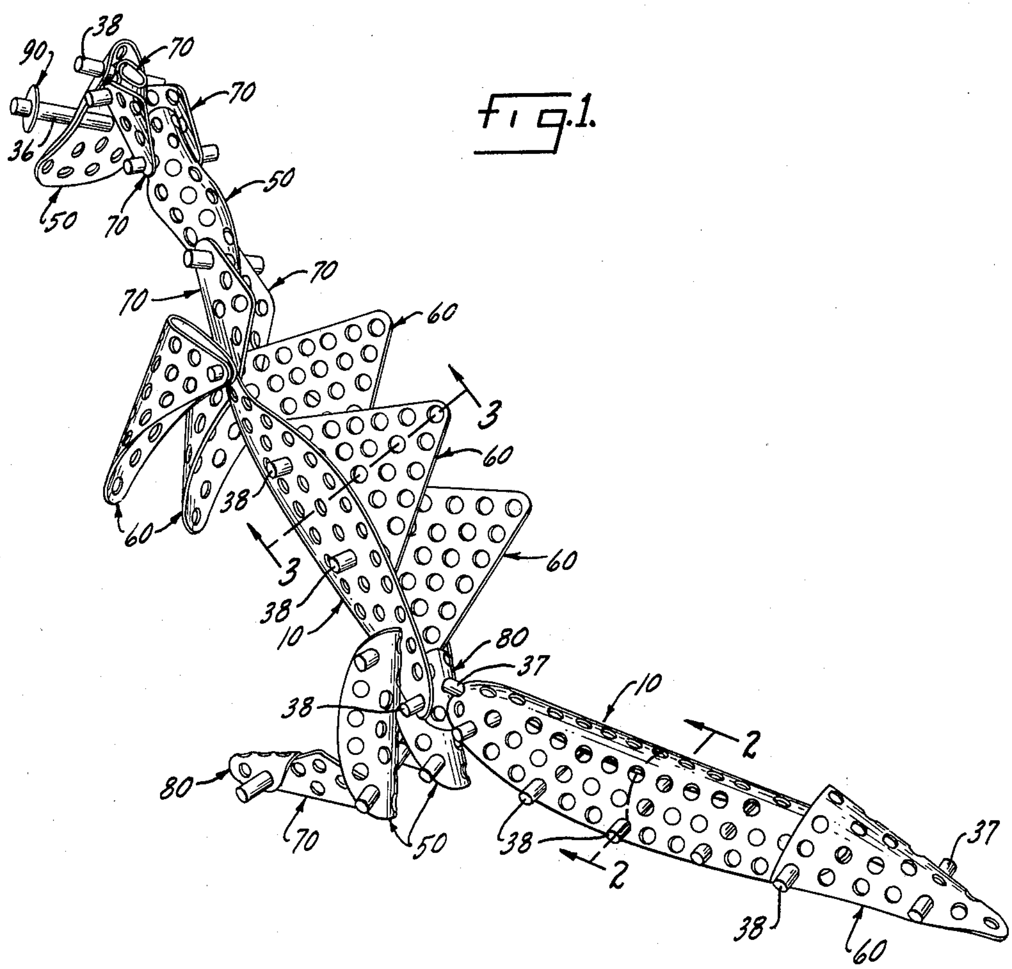


Fig. 1.

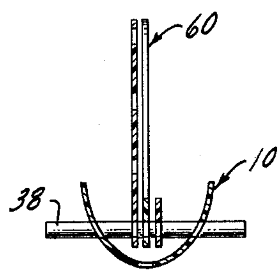
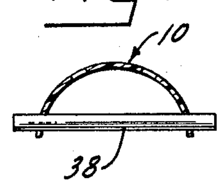


Fig. 3.

Fig. 2.



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TAKE-APART TOY FIGURE

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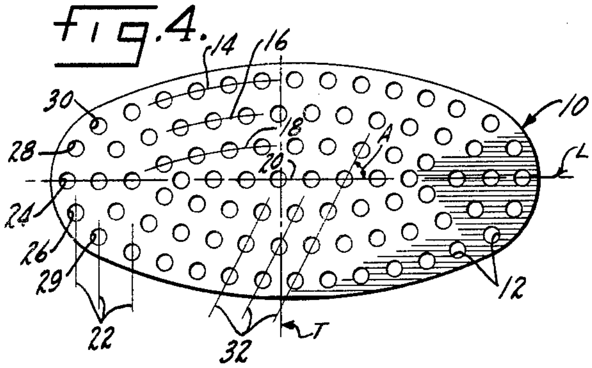

fig.4.

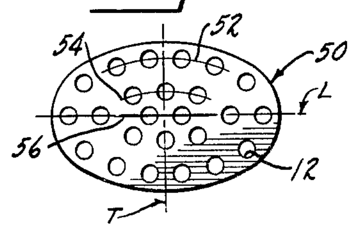

fig.5.

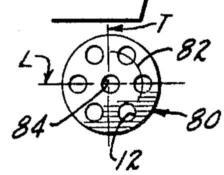

fig.8.

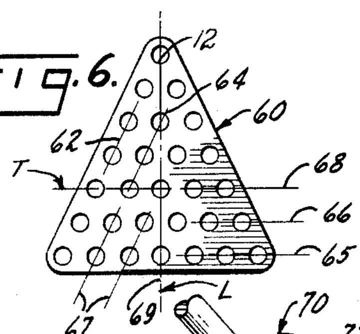

fig.6.

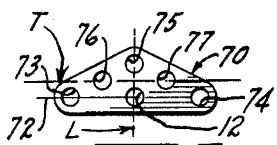

fig.7.

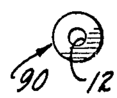

fig.9.

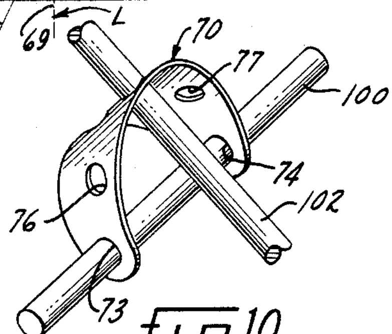

fig.10.

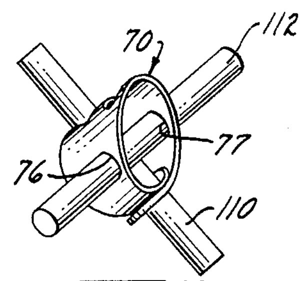

fig.11.

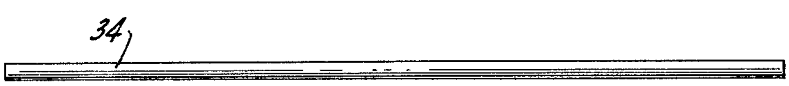

fig.12.

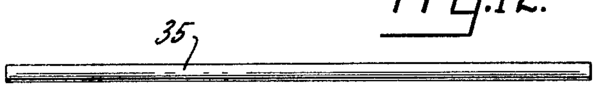

fig.13.

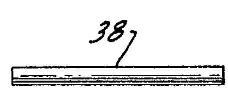

fig.15.

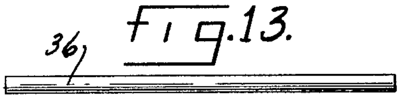

fig.14.

fig.16.

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TAKE-APART TOY FIGURE

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4 Claims. (Cl. 46—22)

This invention relates to a toy construction set and has particular, but not exclusive utility as applied to a construction set having elements adapted to be shaped into animate objects possessing form suggested by natural animals or distinct objects. A further object is to provide elements for such a set which are made of durable, deformable material that may be shaped to take many different forms and are usable over and over again.

A related objective is to provide such a set having great versatility whereby a wide variety of animate figures or objects may be assembled with the elements of the set.

A further objective is to provide a construction set having play value for both children and adults and also having educational value by stimulating the imagination to create animal figures or other objects.

These and other objects will become apparent from the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of a monster animal constructed with elements of a construction set embodying this invention;

FIG. 2 is a sectional view taken substantially in the plane of lines 2—2 in FIGURE 1, through the tail of the monster;

FIG. 3 is a sectional view taken substantially in the plane of lines 3—3 of FIGURE 1, through the body of the monster;

FIG. 4 is a plan view of an apertured large oval part or element of the construction set of this invention;

FIG. 5 is a plan view of an apertured small oval part or element;

FIG. 6 is a plan view of an apertured large triangular part or element;

FIG. 7 is a plan view of in apertured small triangular part or element which also serves the function of a connector;

FIG. 8 is a plan view of an apertured circular part or element;

FIG. 9 is a plan view of an apertured small circular part or element;

FIG. 10 is an enlarged perspective view of the small triangular element shown in FIG. 7 bent and with rods passing through its apertures by means of which the element forms a connector allowing right-angle connections between rods;

FIG. 11 is an enlarged perspective view of the element shown in FIG. 7, bent in a different manner than in FIG. 10 and with rods passing through its apertures by means of which this element forms a connector to connect rods at right angles; and

FIGS. 12 through 16 are plan views of different length rods comprising other elements of the construction set of this invention.

Referring to FIGS. 1–3, the elements of a construction set made according to this invention, comprising flexible apertured sheets of different geometric shapes and rods of different lengths, are shown assembled into the figure of a monster, which figure was contrived to illustrate the type of animate figure or object which may be made with the set. Referring to FIGS. 4 through 9 in connection with the animal figure of FIGURE 1, it will be seen that the various sheet elements of the set, which are shown in flat condition in the group of figures mentioned, have been bent or otherwise shaped into curved form to serve

as portions of the body of the animal figure of FIGURE 1, and then held in such curved form by means of rods inserted through the apertures in the sheets. The various shaped elements are then connected or assembled by means of rods of the set.

It has been found that thin polyethylene of about .050" thickness provides a suitable material for the sheet elements, which material is deformable yet resilient or springy enough so that the sheets tend to return to the flat condition after the rods are removed and can be readily pressed flat, although it appears other materials would be suitable. Each sheet element is provided with a plurality of holes or apertures of the same size as the rods so that the rods inserted through the apertures are tightly held. By providing a multiplicity of apertures in each of the elements shown in FIGS. 4–8, each of the sheet elements may be selectively shaped into any desired one of many different kinds of simple and compound bends. It is to be noted that the apertures are arranged in all elements of FIGS. 4 through 8, symmetrically about longitudinal and transverse center lines designated L and T, and such apertures are arranged substantially equally spaced with a multiplicity in each quadrant of such elements defined between said center lines. With the apertures so arranged, the elements can be bent double along either center line and held in curved form by means of rods. It is possible, moreover, to bend the larger sheet elements in two directions simultaneously, due to their flexibility, and to hold the shapes by means of rods.

Turning now particularly to FIGS. 4 through 9, in each of the sheet elements of these figures, the apertures **12** are of equi-diameter and are arranged in an ordered manner which experience has shown best accommodates the rods to hold the elements in curved form. Referring first to the large, oval part or element **10** shown in FIG. 4, the apertures **12** are arranged in three concentric geometrical arrays or patterns **14, 16, 18** which conform in geometrical outline to the oval shape of the element **10**. A row of apertures **20** also extends along the longitudinal center line. The apertures are generally staggered in relation to the apertures in the adjacent array (for example, arrays **14, 16**) but the apertures in the same array on the opposite sides of the part are aligned along axes **22** generally parallel to the transverse axis of the outline ellipse. After the left aperture **24**, the first and second pairs of apertures **26, 28, 29, 30** are aligned transversely. Apertures in adjacent arrays are generally aligned along parallel axes **32** arranged at a more or less uniform angle A to the longitudinal axis of the outline ellipse. A large oval part having a length of 7½" and a width along the transverse axis of 3½" has been found satisfactory.

For cooperation with the apertured sheet elements, the present construction set provides a plurality of rigid rods **34–38** of different length, shown in FIGS. 12–16. Wooden dowels with a circular cross section and a diameter of ¼" (.250") have been used for the rods with satisfactory results. The apertures in the sheet elements are the same size as the rods. This provides, with the particular materials above described, a tight, sldiing fit which, because of the deformability and flexibility of the sheet material, allows the rods to be readily slid into any aperture yet be tightly gripped.

Returning to the sheet elements, the smaller oval **50** shown in FIG. 5 has two instead of three concentric geometrical arrays **52, 54** of apertures **12** which conform in geometrical outline to the element **50**. This smaller oval **50** as herein shown has a length of 3½" and a width along its transverse axis of 2¼" and is made of polyethylene of the thickness above described. The apertures **12** are ¼" in diameter. It will be noted that the same general ordered arrangement for the apertures **12**, described in connection with the larger oval for its apertures, is followed. Thus the apertures **12** in each array **52, 54** are transversely aligned and staggered with relation to the apertures in the adjacent array. A row **56** of apertures is also formed along the longitudinal or central axis of the part.

The large triangular part **60** shown in FIG. 6 has many uses in constructing animal figures and other objects. Thus it is used in the animal monster of FIG. 1 in forming the tiny upper arms, the tip of the tail, as well as the bony plates along the back of the animal. As shown in FIG. 6, the large triangular element **60** includes concentric geometrical arrays **62, 64** of apertures **12**. As herein shown, the arrays **62, 64** are of triangular configuration so as to conform with the geometrical shape of the part. The apertures **12** form rows **65, 66** parallel to the base of the part as viewed in FIG. 6. The apertures **12** in adjacent concentric rings **62, 64** are staggered. When viewed as separate rows **65, 66** it will also be seen when the part is examined from the base in FIG. 6, that the apertures **12** in adjacent rows are aligned along parallel axes **67** inclined to the base. The apertures in alternate rows **65, 68** are, on the other hand, aligned along parallel axis **69** normal to the base of the part, viewed from the bottom in FIG. 6. As described above in connection with the large oval, a suitable material for the sheet elements is polyethylene about .050″ thick, and the triangular part has been made with an outer dimension 3½″ along the base of the triangle as viewed in FIG. 6, and a 3½″ altitude.

The connector element **70** shown in FIG. 7 which may be used in the manner shown in FIG. 10 or in the modified manner of FIG. 11, also has substantial utility in the construction set made according to this invention. Thus this connector **70** is adapted to connect two rods as shown in both FIGS. 10 and 11, although it will be understood that other elements such as the circular element **80** of FIG. 8 may also be used for connection purposes as shown, for example, in the animal figure of FIGURE 1 where such a circular element **80** is used to connect the tail to the main body portion. Referring to FIG. 7, the connector element **70** is shown in the form of a triangular piece having a row **72** of three apertures **12** extending parallel to the base of the triangle as viewed in FIG. 7. These apertures are aligned along a common axis and, as shown in FIG. 10, are thus disposed to receive a rod **100** passed through two of said apertures **73, 74** when the connector is bent into curved form. The connector element **70** also includes an aperture **75** adjacent the apex of the triangle and thus equidistantly between the outer apertures **73, 74** along the base and laterally spaced from the axis including such outer apertures. With the connector bent into curved form as shown in FIG. 10, this laterally spaced aperture **75** near the apex is located to receive a rod **102** extending normal to the first rod **100** received through the apertures **73, 74** near the ends of the base of the connector.

The triangular connector element **70** also includes a pair of apertures **76, 77** forming a row intermediate the row **72** along the base and the aperture **75** adjacent the apex. It will be observed upon inspection of FIG. 7 that the various apertures **12** formed in the part **70** occupy a geometrical array which is concentric with, and conforms to, the geometrical outline of the part **70**—here a triangle. A rod **110** may be passed through the apertures **73, 74** and **75** when the connector **80** is bent into a circle and the ends overlapped and secured by a second rod **112** passing through apertures **76, 77** as shown in FIG. 11. Used in the manner shown in FIG. 11, the connector provides for connecting rods at an angle. When used as a flat element **70** and not bent as, for example, in the articulated neck structure of the animal figure in FIGURE 1, rods may be passed transversely through any of the apertures in the triangular connector **70**. This part has been made 2½″ along the base and with a ¾″ altitude and found satisfactory.

As mentioned hereinbefore, the circular element **80** shown in FIG. 8 may provide a connector and also may be used as a wheel structure or in any other desired manner. It includes an outer array **82** of apertures **12** and a central aperture **84**. Like the other flexible sheet elements, a suitable material therefor is sheet polyethylene about .050″ in thickness and a satisfactory part of this type has been made with a diameter of 1½″ and having proportions illustrated in FIG. 8.

A further circular element **90** is shown in FIG. 9 and comprises, in this case, a part having a diameter about ¾″ and one aperture **12** in the center. This part **90** has many uses, for example, for wheels or other like structures or for horns, eyes, or the like as in connection with the animal figure shown in FIGURE 1.

Again turning to FIGURE 1, the monster is shown as an example of an animal figure which may be contrived using construction set elements embodying the invention. This figure is suggested by a prehistoric dinosaur, and the form is quite realistic because each element has been shaped to form a portion of the figure and then connected in the assembly. Thus this figure is somewhat less abstract than that which might be constructed using other types of construction sets, such as sets including apertured blocks which cannot be individually and differently shaped to a suggested form and connecting pieces for the blocks such as rods.

While it is believed that relatively few instructions are required to make the animal figure once the features set forth in the preceding description are understood, a brief, detailed description of the procedure followed to erect the figure in FIGURE 1 will be set forth.

To form the tail portion of the monster which extends to the right in FIGURE 1 and is shown in section in FIG. 2, the large oval part or element **10** shown in FIG. 4 is used. A number of short rods **38** of the length depicted in FIG. 15 are inserted transversely through the bent, large oval **10**, and are placed at spaced locations along its length so that the oval piece retains its shape and forms the curved configuration required for the tail as shown in the sectional view of FIG. 2. The tip of the tail in the present case is formed by using the large, triangular piece **60** of FIG. 6 and, similarly to the main portion of the tail, bending the large triangular piece into curved shape and securing it to the main section of the tail by one of the transverse rods **38**. This latter rod **38** also serves to maintain the curved configuration of the end of the tail. A short rod **37** such as one of the length shown in FIG. 16, may be used to further secure the shape of the triangular piece by placing it near the end as depicted in FIGURE 1, thereby providing a spiked tail.

The main body portion of the animal which stands erect on massive hind legs, is formed in a like manner. Thus, as shown in FIGURE 1, the main body portion comprises a large oval **10** (FIG. 4) which is bent and held in its bent shape by transverse rods **38** of the length as shown, for example in FIG. 15, which spear transversely through the apertures **12** of the oval element **10**. To provide a row of bony plates extending up from the back, large triangular elements **60**, as shown in FIG. 6, are used, which elements are held in place by the same transverse rods **38** that maintain the curved shape of the large oval element forming the main body section. The sectional view of FIG. 3, taken through the body section and one of the plates, also shows the manner in which the three plates **60** are carried on rods so as to simulate the back of the monster.

The tail is secured to a small circular element **80** (FIG. 8) by means of a short length of rod **37** which is pushed through the central aperture **84** of the circular element and through one of the apertures in the element forming the tail. The circular element is bent double and secured in curved form by a transverse rod **38** which passes through apertures in the circular element and in the large body oval **10**.

The body of the animal is supported on massive hind legs which are hinged about a transverse rod **38** that extends across the body near the lower end. Each leg is formed of several elements including a small oval part **50**, such as shown in FIG. 5, which forms the upper part of the leg and a lower leg portion including the small triangular member **70** of FIG. 7 which is held in the main leg part by a transverse rod. A circular element **80** such as shown in FIG. 8 is bent into curved form and held to the triangular part to form a foot.

The head of the monster shown in FIGURE 1 is also, as appears in that figure, formed from the small oval **50** which is bent into an irregular contour and held in such form by two rods **36**, **38**. One of the rods **38** provides a set of horns and the other rod **36** provides eyes by placing at each end one of the small circular element **90**. The head is supported on the body portion of the animal figure by an articulated neck comprising three sections. The lower section of the neck is formed by parallel, spaced triangular elements **70** which are connected by transversely extending rods, one extending through the top of the main body large oval element **10** and the other extending through the end openings of the triangular elements **70** and through a pair of apertures in the small oval element **50**, as shown in FIG. 5 which forms the intermediate section of the neck. That intermediate section **50** is joined to another pair of triangular elements **70** which straddle the head and are joined thereto by means of a cross rod, one of the short rods **38** as shown, for example, in FIG. 15.

The upper arms are formed in a simple and expedient manner by bending triangular members **60** double and securing them by means of a transverse rod, both arms passing through apertures in and extending through the upper end of the oval part **10** forming the body.

It will be seen that the animal figure in FIGURE 1 uses every one of the sheet elements shown in FIGS. 4 through 9. Not all of the different length rods of FIGS. 12–16 are used in this particular animal figure, but it will be clear that the unused lengths will be employed in other figures or objects.

It shall be clearly understood that the animal figure in FIGURE 1 is shown by way of example only, and the fact that the form of this figure is suggested by a prehistoric beast is not to be taken as a limitation on the different figures or objects which might be contrived using the elements of the construction set which forms the subject of this invention. For a further example, it is possible to shape elements and assemble them to form machines, such as automobiles or trains, as well as natural figures or objects. The circular sheet parts **80**, **90** provide wheels for such machines and the other flexible sheet parts may be bent or twisted to shapes suggested by the body portions of autos or locomotives. One of the main advantages and features of the invention is that a set constructed in the manner set forth herein provides for imaginative creation of a large variety of different objects and figures.

To carry forward this description, and to illustrate some of the varieties of shapes and forms that may be contrived, the monster shown in FIGURE 1 can be changed to a kangaroo by removing the bony plates and reconstructing the tail.

A four-legged animal, such as a horse or dog, can be made from the animal figure shown in FIGURE 1 by removing the bony plates, and reconstructing the legs and tail to provide a four-legged animal using, for example, rods for legs.

Winged animals or figures can be made, such as a duck, by altering the tail and adding wings to the body section. The duck can be changed to another bird by reconstructing the head and by other suitable alterations in the legs, particularly the hind legs. This bird can be modified to a plane or helicopter by adding a tail and propellers for blades. Thus, it will be seen that a variety of figures, objects or machines and the like may be made as limited solely by the imagination.

This provides a toy having educational value since the construction set stimulates the imagination and also requires the coordinated use of the hands to move and shape the flexible sheet elements into forms suggested by concrete objects. In this aspect the objects or figures that can be made represent a more or less abstract art form. In this sense, the construction set elements are pictorial or sculptural elements which may be used to contrive abstractions suggested by distinct objects.

While the invention has been shown and described in some detail with reference to particular embodiments, there is no intention that it be limited to such detail. On the contrary, it is intended here to cover all modifications, alternatives, and equivalents falling within the spirit and scope of the invention as defined in the appended claims.

I claim as my invention:

1. A take-apart toy figure comprising: a plurality of differently shaped flexible, deformable plastic sheets, each having a plurality of equi-diameter apertures formed therein, said differently shaped sheets having triangular, elliptical and circular geometrical outlines with the apertures formed in each of said sheets being arranged in at least one geometrical array concentric with and conforming to the geometrical outline of said sheet, with at least one of said sheets bent into curved formation, and with all of said sheets representing portions of the figure; and a plurality of rigid rods having a common dimension with said apertures, with at least some of said rods passed through at least two apertures in each curved sheet and holding each curved sheet in such curved form, and with at least some of said rods passed through apertures in each of two adjacent sheets and interconnecting all of said sheets.

2. A take-apart toy figure comprising: a plurality of differently shaped flexible, deformable plastic sheets, each having a plurality of equi-diameter apertures formed therein, said differently shaped sheets having circular and elliptical geometrical outlines with the apertures formed in each of said sheets being arranged in at least one geometrical array concentric with and conforming to the geometrical outline of said sheet, with at least one of said sheets bent into curved formation, and with all of said sheets representing portions of the figure; and a plurality of rigid rods having a common dimension with said apertures, with at least some of said rods passed through at least two apertures in each curved sheet and holding each curved sheet in such curved form, and with at least some of said rods passed through apertures in each of two adjacent sheets and interconnecting all of said sheets.

3. A take-apart toy figure comprising: a plurality of differently shaped flexible, deformable plastic sheets, each having a plurality of equi-diameter apertures formed therein, said differently shaped sheets having elliptical and triangular geometrical outlines with the apertures formed in each of said sheets being arranged in at least one geometrical array concentric with and conforming to the geometrical outline of said sheet, with at least one of said sheets bent into curved formation, and with all of said sheets representing portions of the figure; and a plurality of rigid rods having a common dimension with said apertures, with at least some of said rods passed through at least two apertures in each curved sheet and holding each curved sheet in such curved form, and with at least some of said rods passed through apertures in each of two adjacent sheets and interconnecting all of said sheets.

4. A take-apart toy figure comprising: a plurality of differently shaped flexible, deformable plastic sheets, each having a plurality of equi-diameter apertures formed therein, said differently shaped sheets having circular and triangular geometrical outlines with the apertures formed in each of said sheets being arranged in at least one geometrical array concentric with and conforming to the geometrical outline of said sheet, with at least one of said sheets bent into curved formation, and with all of said sheets representing portions of the figure; and a plurality of rigid rods having a common dimension with said apertures, with at least some of said rods passed through at least two apertures in each curved sheet and holding each curved sheet in such curved form, and with at least some of said rods passed through apertures in each of two adjacent sheets and interconnecting all of said sheets.

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JAMES B. LOVE, *Examiner.*