Oct. 6, 1970 M. F. REED 3,532,225

CONVERTIBLE GEOMETRIC STRUCTURE

Filed March 21, 1968

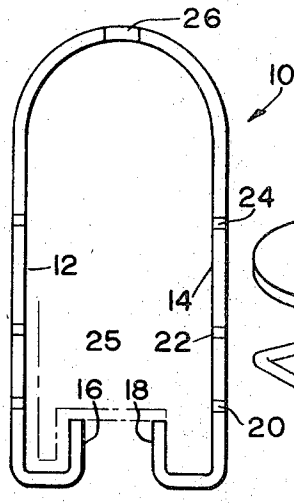


FIG. 1

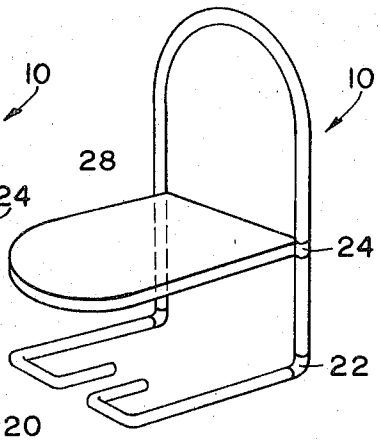


FIG. 2

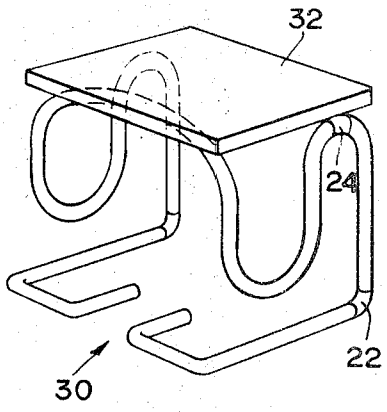


FIG. 3

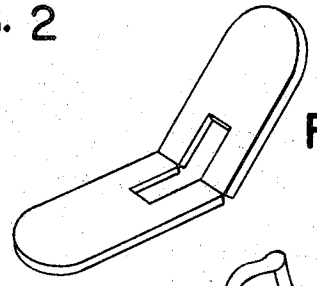


FIG. 6

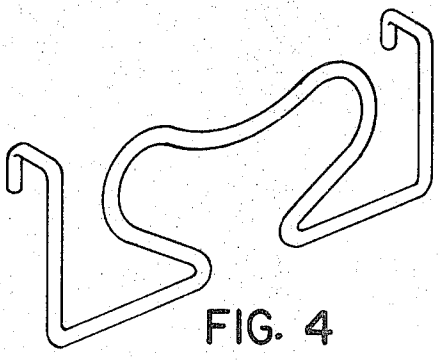


FIG. 4

FIG. 9

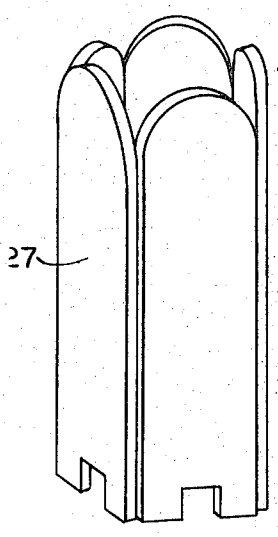


FIG. 5

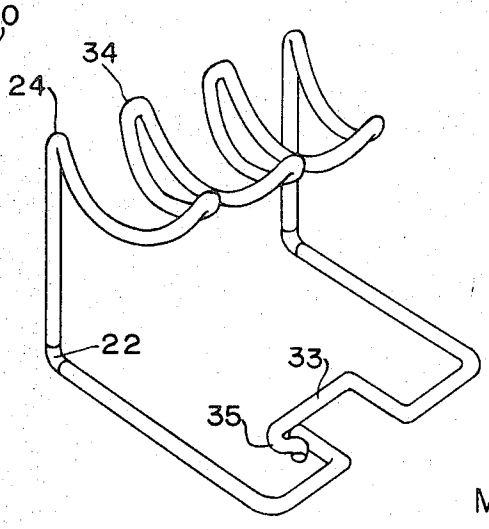


FIG. 7

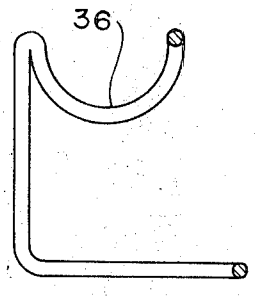


FIG. 8

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CONVERTIBLE GEOMETRIC STRUCTURE

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ABSTRACT OF THE DISCLOSURE

A basic geometric structure is provided in a bendable material such as wire or the like. Its basic form is an open rectangular semielliptical line continuum with generally parallel legs having their end portions bent back into foot portions. The wire structure is marked at selected points as guides for bending the wire at some or all of said points to develop a wide variety of geometrical figures which may be mechanically functional, educational as well as artistic.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to a basic geometrical structure that is convertible into a variety of different related geometrical configurations which not only are useful and artistic but also may be employed for instructional and therapeutic purposes.

Description of the prior art

Iine figures made of wire or similar material have been employed heretofore for a variety of purposes both practical and artisic, but generally speaking the starting material for the artisan has been a straight section or coil of wire which must be bent to the desired configuration and the end result being primarily dependent on the artisan's skill. It is an object of the present invention to provide a basic geometric form of wire, or the like, having reference points at which the form may be bent into a multiplicity of geometrical forms, some useful, some artistic and some useful for instructional purposes.

SUMMARY OF THE INVENTION

This invention features a geometrical line structure basically an open rectangular, semiopen elliptical line continuum, the legs of which are bent back to form foot portions and the legs of which are also marked with reference indicia at predetermined points where the form may be bent into a variety of configurations both useful, such as frames for tables and chairs, and artisic forms, as well as into various geometrical forms useful for instructional purposes for demonstrating basic geometrical forms and for therapeutic applications.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in front elevation of a basic convertible geometrical structure made according to the invention,

FIG. 2 is a view in perspective of a chair, the frame of which has been formed from the FIG. 1 device,

FIG. 3 is a view in perspective of a table the frame of which has also been formed from the FIG. 1 device,

FIG. 4 is a typical three dimensional atristic form made by manipulation of the FIG. 1 device at the reference points,

FIG. 5 is a view in perspective showing a plurality of modifiied FIG. 1 forms clustered in a floral pattern,

FIG. 6 is a perspective view of a folded double component,

FIG. 7 is a view in perspective of a multipurpose wire configuration formed from the FIG.1 form,

FIG. 8 is a view in end elevation thereof, and

FIG. 9 is a view in perspective of a wire form developed from the FIG. 7 device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and to FIG. 1 in particular, the reference character **10** generally indicates a convertible geometric structure which may be fabricated from a variety of materials such as wire or tubing, of metal, plastic or the like which lends itself to be worked into different configurations. The geometric structure **10** is generally in the form of an open rectangular, semielliptical line continuum comprised of two coextensive generally parallel legs **12** and **14** the free ends of which are spaced from one another and bent into the inverted U configuration shown in FIG. 1 to define opposing foot portions **16** and **18**. The structure may be fabricated in any dimension, but for small hand models dimensions would be on the order of six or seven inches in overall height with a two inch spacing between the legs at their widest point. The structure may be in much larger sizes in which it may serve different functions.

The legs of the geometric structure and the apex are provided with markings **20**, **22**, **24** and **26** which are activity points dividing the geometric figure into different segments and serving as guide indicia for converting the basic geometric structure **10** into other configurations illustrated. These reference marks are considered as points of activity since at these points the wire structure is bent to produce the different configurations. In practice, the uppermost segment is of greater length than the lower segments.

In the basic configuration shown in FIG. 1, the device may be used to demonstrate horseshoe magnets with the feet representing opposite poles. By adding a crosspiece **25** a continuum may be demonstrated. Alternatively, the structure may be covered with a web **27** such as paper or the like to provide a plane surface and a number of these covered figures may be grouped to form the artistic floral arrangement shown in FIG. 5. By hinging a pair at their ends as in FIG. 6, the development of a central full rectangle and stretched outer ellipse may be demonstrated.

Referring now to FIG. 2, there is shown a chair fashioned from the geometric structures **10** to FIG. 1. The chair frame comprises the form **10** bent at right angles at the pair of guide markings **22** so that the feet **16** and **18** and the lower segments of the legs below the points **22** lie flat against the floor. The upper segments of the hooped legs form the back of the chair and a seat **28**, of any suitable rigid material, is secured to the legs at the pair of activity points **24** extending outwardly from it at right angles over the feet.

Referring now to FIG. 3, there is shown a table fashioned from the basic geometric structure **10** of FIG. 1. The table shown in FIG. 2 is comprised of a frame **30** and a tabletop **32** with the frame **30** bent from the basic form **10** of FIG. 1. The table frame is formed by bending the geometric form **10** at right angles along the pair of points **22**, in a manner somewhat similar to the chair frame of FIG. 2, and then making additional bends at points **24** bending the legs downwardly and again upwardly in a curving loop with the point **26** extending in the same plane as the points **24** to provide the three points of support for the table top **32** which is secured to the frame.

In FIG. 4 there is shown an artistic form made by manipulation of the basic geometric structure **10**. In the

FIG. 4 embodiment the arms **12** and **14** are manipulated as levers with bends being made at activity points **22** and **24** and with the arm segments between **22** and **24** extending in aligned relation.

Referring now to FIGS. 7 and 8, there is shown a further modification of the invention and in this embodiment the basic geometric structure **10** is in the form of combination clamp and rack. As shown, the U-shaped feet have been bridged by a cross piece **33** and locked by bent end **35**, or, alternatively, they may be overlapped and joined by soldering or the like. Right angle bends are made at activity points **22** and a series of flattened, rounded or blunted loops **34** are originated from activity points **24**. Typically the loops are three in number and form a semi-cylindrical trough **36** as best shown in FIG. 8. When made from spring wire, for example, the FIGS. 7 and 8 device may be employed as a clamp for numerout purposes such as securing a pile of papers between the straight lower leg portions and the semi-cylindrical loops which will yieldably engage the clamped item. Similarly the clamp may be used to clamp a curtain to the sash, or for numerous other applications. When set in the upright position shown in FIGS. 7 and 8, the device may be used as a rack to drain bacon, to support soap, pencil, or numerous other items. In a larger size, the form may serve as a hat or a clothes rack.

Referring now more particularly to FIG. 9 there is shown a configuration taken on by spreading apart the FIG. 7 device using the legs **12** and **14** as lever arms. It will be seen that by bringing the legs into alignment the rounded loops **34** take on the form of a hemisphere and is useful not only for demonstrating geometrical figures to students but also demonstrates such matters as map projections and the like. By matching a pair of the developed forms of FIG. 9, a full sphere may be demonstrated.

It will be appreciated that the basic geometric structure of FIG. 1 is thus readily converted into a variety of different configurations both decorative and useful and as mechanical items in addition to being an educational aid for demonstrating different mechanical, electrical and mathematical including geometrical principles. Furthermore, the basic geometrical structure would have utility for therapeutic purposes and would serve as a useful and instructive activity by the sick and disabled for exercising

their hands and developing dexterity as well as imagination.

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

1. A convertible geometric figure, comprising
   (a) a unitary member of a semirigid bendable rod material,
   (b) said member being formed into multiple coextensive and coplaner re-entrant turns forming a semicylindrical trough,
   (c) said member being further formed with a pair of parallel legs one at each end of said trough and on one side thereof extending generally along a tangent to said trough,
   (d) said legs being formed with base portions extending perpendicularly therefrom parallel to one another and oppositely said trough to define a clearance between said base portions and said trough.

2. A convertible geometric figure according to claim 1 wherein said base portions terminate in reversely extending U-shaped bends coplanar and opositely one another.

References Cited

UNITED STATES PATENTS

251,903	1/1882	Lewis	46—15
1,376,087	4/1921	Fliedner	46—15
2,125,985	8/1938	Bond	297—448
2,276,308	3/1942	Hugh	46—15
2,461,622	2/1949	Alikas	297—439
2,462,991	3/1949	Palinkas.	
2,465,104	3/1949	Kullack	297—447
2,509,451	5/1950	Reinholz	297—287
2,576,883	11/1951	Koski	297—439
3,069,204	12/1962	Vesterholt et al.	297—445
3,276,731	10/1966	Orchard	297—447

FOREIGN PATENTS

541,052 1/1932 Germany.

FRANCIS K. ZUGEL Primary Examiner

U.S. Cl. X.R.

211—69.9; 248—175; 297—119