Sept. 16, 1952 C. M. WELTY 2,610,856

SECTIONAL THREE-DIMENSIONAL PUZZLE

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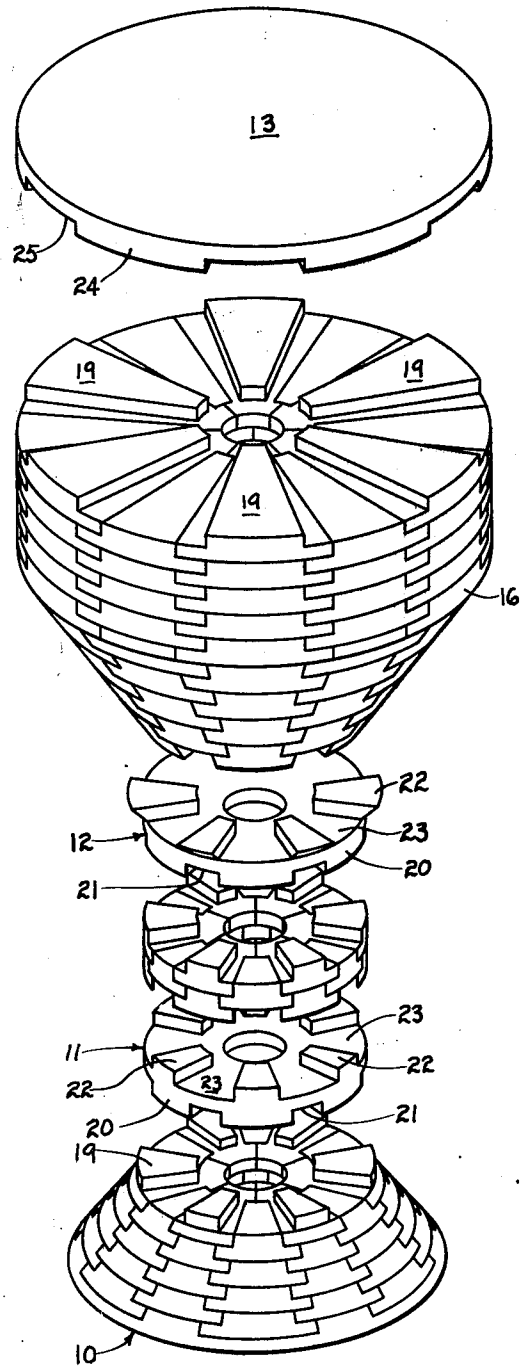


Fig. 5

Fig. 3

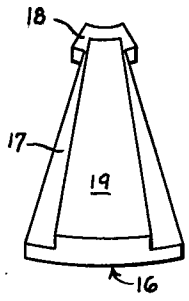


Fig. 4

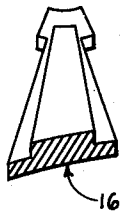
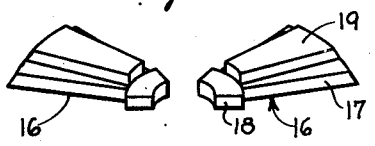


Fig. 2



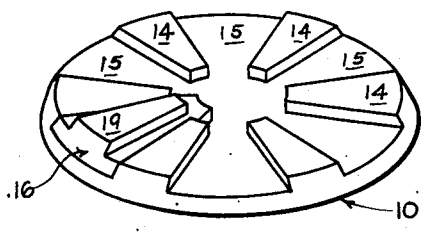


Fig. 1

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SECTIONAL THREE-DIMENSIONAL PUZZLE

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5 Claims. (Cl. 273—160)

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This invention relates generally to the art of sectional puzzles, and more particularly to a puzzle of this type which comprises a plurality of interfitting sections or puzzle pieces of varying shapes which form a three dimensional figurine or the like when fitted together in the proper relative positions.

It is the chief object of the invention to provide a puzzle which is more than a mere amusement device—which is educational in that it teaches a child patience, manual dexterity, and shape perception.

Another important object is to provide sections or puzzle pieces the major portions of which are of like configuration, and all of which are formed to interlock near the center of the figure being formed, yet which vary sufficiently in radial length and in the configuration of their outer, exposed ends to form a figure of almost any predetermined shape, including the heads and faces of people or animals, complete busts, etc. as well as inanimate objects.

The invention, together with other objects attending its production, will be more clearly understood when the following description is read in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a base plate which constitutes a part of the invention;

Fig. 2 is a perspective view of two puzzle sections or riser pieces which also constitute a part of the invention;

Figs. 3 and 4 are also perspective views of riser pieces, and show details of construction, Fig. 4 being shown partially in section; and

Fig. 5 is an exploded perspective view of a figurine showing the manner in which the various pieces are fitted together to complete the puzzle.

For clarity in illustration and ease in drawing, the figure illustrated by the assembled pieces is substantially circular in cross section at any elevational plane. It should be understood, however, that shapes of the outer exposed ends of all the puzzle pieces can be made irregular in shape to form a non-symmetrical figure when they are assembled.

The essential elements of any puzzle embodying this invention are the interfitting riser pieces, such as shown clearly in Figs. 2, 3, and 4. I prefer, however, to include a base plate 10, intermediate locking plates 11 and 12, and a top plate 13, not as absolutely essential elements, but because they improve the assembled puzzle structure.

Base plate

The nether surface of the base plate 10 lies in a single plane, which enables it to rest solidly on a table top or other flat support. The upper surface of the base plate is cut away to form a

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plurality of radially disposed substantially sector shaped upstanding bosses 14, the inner ends of which stop short of the center of the plate. Aside from these bosses, the remaining portion of the upper surface of the base lies in a single plane. The spaces between each adjacent pair of bosses will be referred to as grooves, 15. The outermost ends of the bosses 14 are contoured to aid in forming the outer surface of the figure puzzle.

Riser pieces

The riser pieces 16 include a flat substantially sector shaped portion 17, which is of a size to complementally seat in the grooves 15; an integral arcuate locking section 18 which lies in the same plane and is of the same thickness as the base portion 17, and extends laterally across the inner end of the base portion and beyond each of its side edges; and an integral boss 19 of the same cross sectional size as the bosses 14. The length of these riser pieces and the shape of their outermost ends vary with the contour of the figure being formed.

Intermediate locking plates

The nether surface of the locking plate 11 includes integral downwardly protruding bosses 20 separated by grooves 21. These bosses and grooves are complemental in cross sectional shape to the grooves 15 and bosses 14, respectively, but differ in length and in the shape of their outermost ends according to the contours of the puzzle figure being formed. The upper surface of the plate 11 is provided with integral bosses 22 and grooves 23, which are identical in cross sectional shape to the bosses 14 and grooves 15, and which vary only in their length and in the shape of their outermost ends. The locking plate 12 (Fig. 5) clearly illustrates the mentioned variation in length and shape of the outer ends of the bosses 22, the outer ends of the upper surface bosses being chamfered upwardly and outwardly.

Top locking plate

The top plate 13 has an upper surface of any contour necessary to complete the upper part of the puzzle figure. Its general circumferential size and shape also vary to complete the contours of the figure puzzle. Its nether surface, however, has bosses 24 separated by grooves 25 which are identical in cross sectional size and shape to the bosses 20 and grooves 21 on the nether surfaces of the intermediate locking plates 11 and 12.

Assembly

With the base plate 10 positioned on a flat horizontal support, a riser piece 16 is placed in each of the grooves 15, as shown in Fig. 1. It will be seen that the arcuate locking section 18 extends laterally and lies in contact with the inner

ends of the adjacent bosses 14. Radial outward movement of the riser pieces is thus prevented. Radial inward movement of the riser pieces is prevented by the complemental fit of the converging side walls of the grooves 15 and the complementally converging side walls of the base of each riser piece. Lateral movement of the riser pieces is similarly prevented.

After a full first course of riser pieces is laid on the base 10, their combined upper surfaces form a series of radially disposed bosses 19, separated by radially disposed grooves which are identical in cross sectional size and shape to the grooves 15. This series of bosses and grooves formed by the first course of riser pieces are offset circumferentially with relation to the bosses and grooves in the base plate. In other words the vertical center line of each boss 19 alines with the vertical center line of each groove 15, while the vertical center line of each of the newly formed grooves alines with the vertical center line of each of the bosses 14, the upper surface of these bosses in fact forming the central portion of the bottom of each newly formed groove.

In this manner successive superposed transverse courses of cooperating riser pieces are laid, the assembled upper surfaces of the risers in each course forming a seating surface for the riser pieces in the next course above. Such an assembled surface is clearly shown in the lower portion of Fig. 5, which includes 8 successive riser courses assembled on the base plate 10.

After each 6 or 8 courses of riser pieces have been built up, an intermediate locking plate 11, or 12, having the proper exterior contour, is fitted into position on the upper face of the uppermost course. The next riser course is complementally received on the upper surface of the locking plate, and the laying of successive riser piece courses continues. These intermediate locking plates simply serve to make the assembled figure more rigid—to more firmly lock the previously assembled courses together.

When all the riser pieces and intermediate locking plates have been assembled in their proper relative positions, the upper surface of the uppermost course forms a grooved surface to complementally receive the lower grooved surface of the top locking plate, and when this plate is placed in its proper position, a three dimensional figure or figurine of predetermined shape will have been formed.

As previously mentioned, the various sections of the puzzle may be so formed that their exposed surfaces, when assembled in the proper relative positions will form a figure having almost any desired predetermined shape.

Having described the invention with sufficient clarity to enable those familiar with the art to construct and use it, I claim:

1. A three dimensional figure puzzle adapted to be built up by the laying of puzzle pieces in superposed interlocking transverse courses, comprising: a base plate having a plurality of spaced flat radially disposed substantially sector shaped bosses on its upper surface, the inner ends of said bosses terminating short of the center about

which said bosses are arranged; a plurality of cooperating substantially sector shaped riser pieces adapted to be laid in successive superposed interlocking courses on said base plate, the base portions of said risers being flat and of a size and shape to complementally seat in the respective spaces between bosses on the base plate, and the upper portions of said risers being in the form of substantially sector shaped bosses identical in cross-sectional size and shape to the bosses on said base plate, whereby the upper surface of each assembled course of riser pieces is substantially identical in circumferential cross sectional configuration to the surface of said base plate, the riser pieces of each course being offset circumferentially with respect to the respective riser pieces in the course immediately above and below.

2. The invention described in claim 1, and means carried by the inner end of each riser piece for contacting the inner ends of the adjacent bosses between which the respective risers are laid, said means serving to lock the respective risers against radial outward movement with respect to the contacted bosses.

3. The invention described in claim 1, and a cooperating unitary locking plate having an upper surface identical in circumferential cross sectional configuration to the upper surface of said base plate, and a lower surface contoured to receive the bosses of and to complementally interlock with the upper surface of an assembled course of said riser pieces, said plate being adapted to be inserted between two adjacent courses of said riser pieces and to complementally fit the respective contacting upper and lower surfaces of each of said courses, and to thus increase the stability of the three dimensional figure being formed.

4. The invention described in claim 1, and a unitary top plate having a nether surface contoured to receive the bosses of and to complementally interlock with the upper surface of the uppermost course of riser pieces in the figure being formed, said plate having its upper surface contoured to complete the exterior top surface of the figure being formed.

5. In a sectional puzzle, a unitary puzzle piece or section comprising: a flat base of constant thickness which includes a substantially sector shaped portion and an integral wider transverse arc shaped portion at the small end of the sector; and an integral narrower identically oriented substantially sector shaped boss located atop the sector shaped portion of the base.

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