Oct. 8, 1940. E. T. JOHNSON 2,216,915

PUZZLE

Filed April 26, 1939

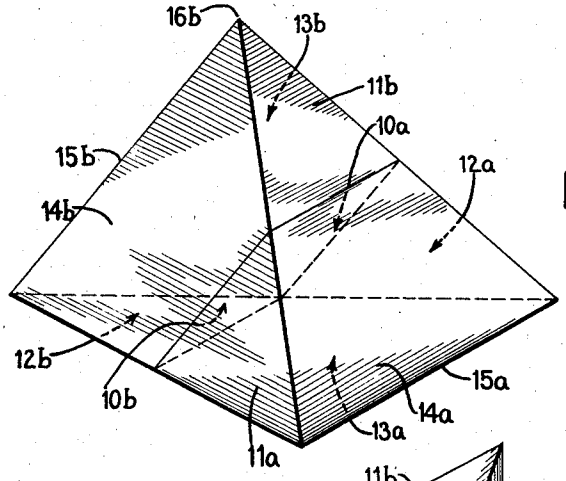


FIG. 1.

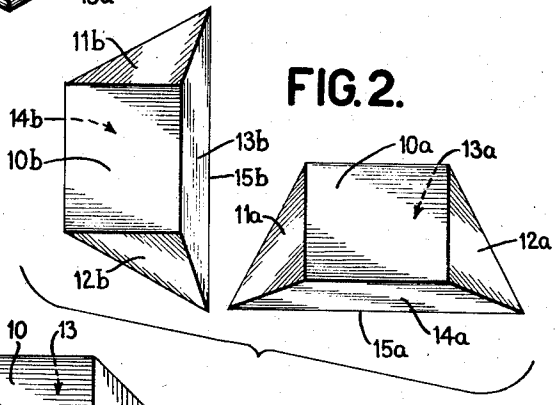


FIG. 2.

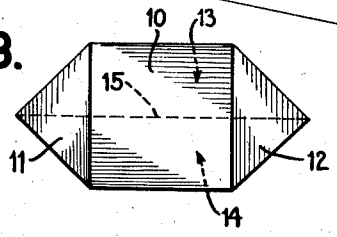


FIG. 3.

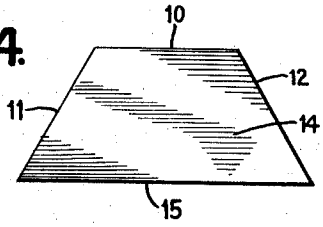


FIG. 4.

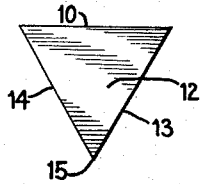


FIG. 5.

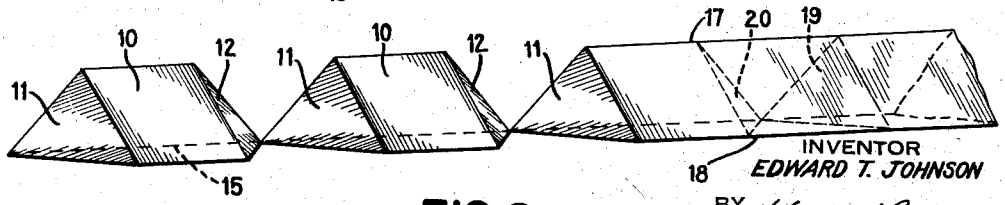


FIG. 6.

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PUZZLE

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Application April 26, 1939, Serial No. 270,118

7 Claims. (Cl. 273—157)

This invention relates to puzzles and more particularly to the type in which pieces of wood or other material are adapted to be assembled to form a solid of a predetermined configuration.

An object of the invention has been to provide a simple and small puzzle of the character mentioned, involving few parts which may be readily carried in the pocket and which may be readily produced in large quantities and at a small cost.

In its preferred form the puzzle of this invention consists of only two parts which are identical in shape and which, when properly assembled, will form a pyramid with a triangular base. Each part of the puzzle is a wedge-shaped, five-sided solid of symmetrical form, two of the sides being isosceles triangles, two being regular trapezoids, and one being substantially square. When so constructed the pyramid formed upon the assembly of the parts will have four triangular surfaces of the same size, each of the triangles being isosceles.

The preferred form of the puzzle lends itself readily to large-scale production, the individual parts being capable of rapid production as sections from a long strip.

Other objects and advantages of the invention will appear from the detailed description of an illustrative form of the same which will now be given in conjunction with the accompanying drawing, in which:

Figure 1 is a perspective view of the two parts of the illustrative puzzle in assembled relation.

Figure 2 is a perspective view of the two parts separated.

Figures 3, 4 and 5 are a bottom view, side view and end view, respectively, of one of the parts, and

Figure 6 is an isometric view of a continuous bar from which the parts may be cut, several of the sections removed in forming the parts being indicated as cut out and one being shown in broken lines.

Referring now particularly to Figures 3 to 5, inclusive, each part of the puzzle comprises a flat base surface 10 which is preferably square. Triangular surfaces 11 and 12 extend diagonally from the ends of the surface 10 while trapezoidal surfaces 13 and 14 extend from the sides of surface 10 and intersect along an edge 15. Thus each part is a wedge of symmetrical form, as more clearly illustrated in the perspective view (Figure 2).

The two parts of the puzzle are preferably of identical form. In Figures 1 and 2 the surfaces of one part are identified by the numbers mentioned above but with the sub-script "a" while the surfaces of the other part are correspondingly numbered but with the sub-script "b" appended to each number. To assemble the parts to produce the pyramid it is simply necessary to place the surface 10*a* of one against the surface 10*b* of the other, with the axes of the two parts twisted at 90° with respect to each other. This places the surface 12*a* on one part in alinement with the surface 13*b* on the other, surface 14*a* in alinement with surface 11*b* on the other, surface 11*a* in alinement with surface 14*b* of the other, and surface 13*a* in alinement with surface 12*b* of the other. The base of the pyramid is thus formed by the surfaces 13*a* and 12*b* of the two parts while the apex of the pyramid is formed by the end 16*b* of the edge or ridge 15*b* of one part.

It will be apparent that the surfaces 11 and 12 of each part should be disposed at the same angle with respect to each other as the surfaces 13 and 14. This angle may be varied as desired, depending upon the shape of the pyramid which it is desired to form. The surfaces 11 and 12 should preferably be isosceles triangles, the length of the base of which in relation to the side edges may be varied. In one satisfactory form the two surfaces 13 and 14 may form an angle of 60° at the ridge 15. Correspondingly the planes of the surfaces 11 and 12 should then form an angle of 60° with respect to each other. It has been found that if the surface 10 has a dimension of about one inch square, pieces of convenient size for the purpose will be formed.

If it is desired to form a pyramid having all of its sides in the shape of equilateral triangles, the angle between the surfaces 13 and 14 and between surfaces 11 and 12 should be increased slightly so that a plane intersecting these surfaces at the appropriate angle to form such a pyramid will form angles of 60° at each of the points of the triangular surfaces 11 and 12 and at each of the corners of the trapezoidal surfaces 13 and 14 at the ends of the edge 15. On the other hand, if it is desired to form the pyramid with triangular surfaces having bases smaller in relation to the altitude than in the form illustrated, the angle between the sides 11 and 12 and between sides 13 and 14 should be decreased. If the distance between the edge 15 and the base 10 remains the same as in the illustrated construction, the sides of the square forming the surface 10 will, in this modification, be somewhat smaller.

Referring to Figure 6, there is illustrated a simple method of producing the parts of the puzzle. A continuous rod or bar 17 may be formed

in a planing mill with a triangular cross-section. For the preferred construction the cross-section should be an equilateral triangle. The advantage of this particular form is that the width of the surface 10 is the same as the width of the surfaces 13 and 14, thus rendering the puzzle somewhat more difficult of solution since the parts will appear to match up to a certain extent in more different positions. From this bar of triangular cross-section it is then simply necessary to remove sections 18 having walls 19 and 20 disposed at an angle of 60° to each other. This may be accomplished by simply taking a saw cut at an angle of 30° from each side of a plane perpendicular to the side of the rod which is to form the base 10. By similarly removing a series of sections 18 at intervals adapted to leave surfaces 10 of a length equal to the width of the base of the stock 17, a series of the puzzle parts may be formed. This method of forming the parts will eliminate the grain structure of the wood as a possible clue to the solution of the puzzle.

If desired the parts of the puzzle may be used in their rough-cut state or they may be finished in any appropriate manner. They may be sandpapered, for example, stained and varnished or they may be painted. In lieu of forming the parts of wood, they may be cast or molded of any suitable material, such as metal, rubber, glass, or any other appropriate composition; they may be molded, for example, of any suitable plastic or semi-plastic material which will harden into the desired form. However, an extremely light and inexpensive puzzle is provided by constructing the parts of wood.

While the prefered form of the invention and certain variations have been described in considerable detail, and various ways of producing the puzzle have been explained, it should be understood that other variations are permissible. The terms employed herein have been used as terms of description and not of limitation.

I claim:

1. A puzzle comprising two parts of substantially identical form constructed to produce a triangular pyramid when properly placed together, each part having five flat sides one of which is square, two of which are triangular, and two of which are regular trapezoids, said triangular sides being disposed at the same angle to each other as the two trapezoidal sides.

2. A puzzle comprising a triangular pyramid divided into two substantially identical sections by a plane parallel with two of the edges of the pyramid and bisecting the remaining four edges thereof.

3. A puzzle comprising a triangular pyramid having sixty degree angles between its adjacent sides and which is divided into two substantially identical sections by a plane parallel with two of the edges of the pyramid and bisecting the remaining four edges thereof.

4. A puzzle comprising two parts of substantially identical form constructed to produce a triangular pyramid when properly placed together, each part having five flat sides one of which is square, two of which are substantially identical isosceles triangles, and two of which are substantially identical regular trapezoids.

5. A puzzle comprising two wedge shaped parts of identical form, each part having a square base and triangular ends and trapezoidal side surfaces extending from the base, the triangular surfaces being disposed at the same angle to each other as the trapezoidal surfaces.

6. A method of making a puzzle which comprises forming an elongated bar whose cross section is an isosceles triangle and dividing said bar into identical units by removing therefrom rectangular pyramidal sections having their apexes in one of the edges of said bar and their bases in the side of the bar opposite said one edge and forming the base of said isosceles triangle, said units being removed at intervals leaving squares in the side forming said bases.

7. A method of making a puzzle which comprises forming an elongated bar whose cross section is an isosceles triangle, and dividing said bar into identical units by cutting the same along planes having the same angle to each other as the apex of said isosceles triangle, said cutting being effected in such directions and at such intervals as to leave a series of squares in the side of said bar opposite the edge forming the apex of the isosceles triangle.

EDWARD T. JOHNSON.