

May 19, 1936.

E. B. STRUTTON

2,041,030

PUZZLE

Filed May 4, 1933

3 Sheets-Sheet 1



Fig. 2.

Fig. 1.

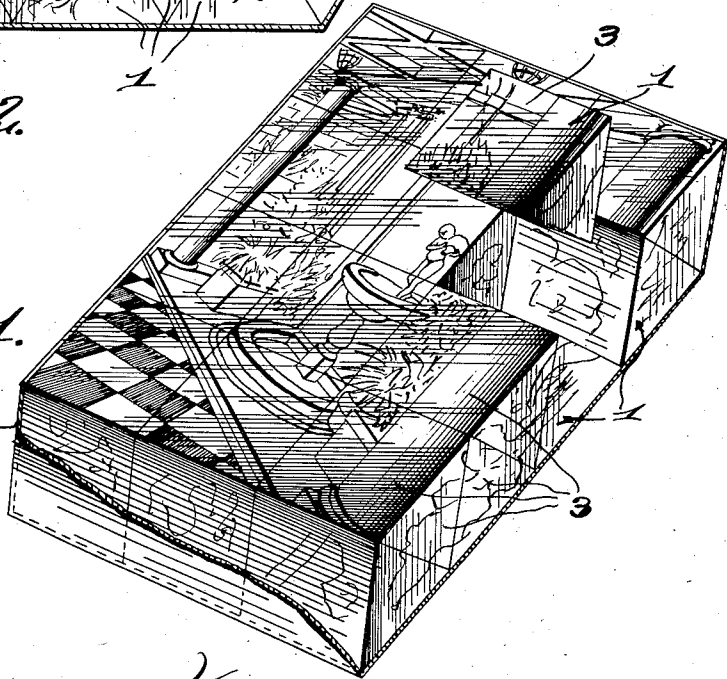


Fig. 10.

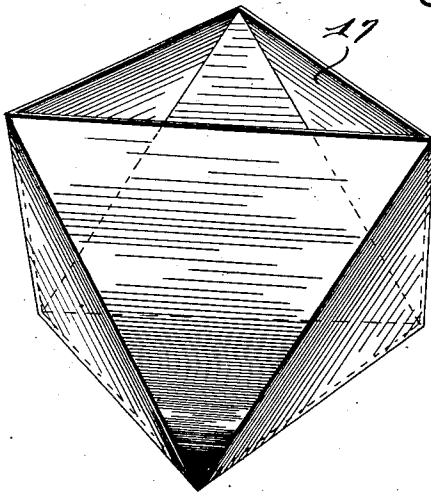
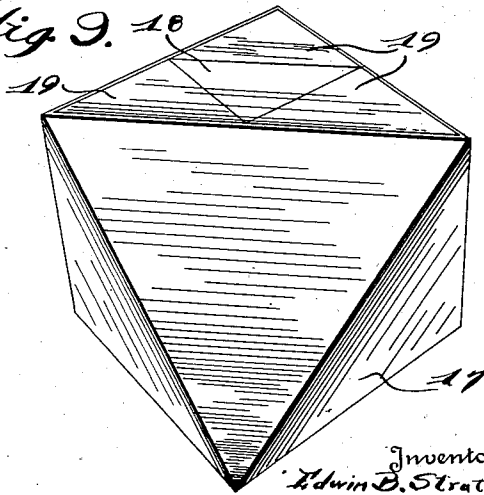


Fig. 9.



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3 Sheets-Sheet 2

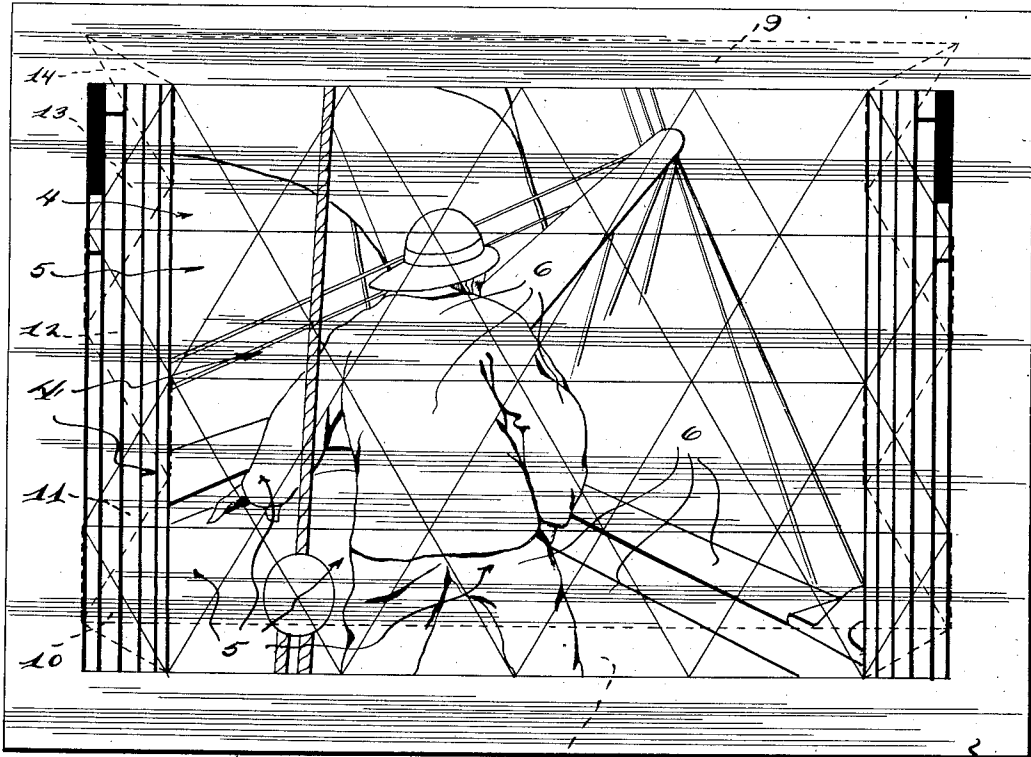


Fig. 3.

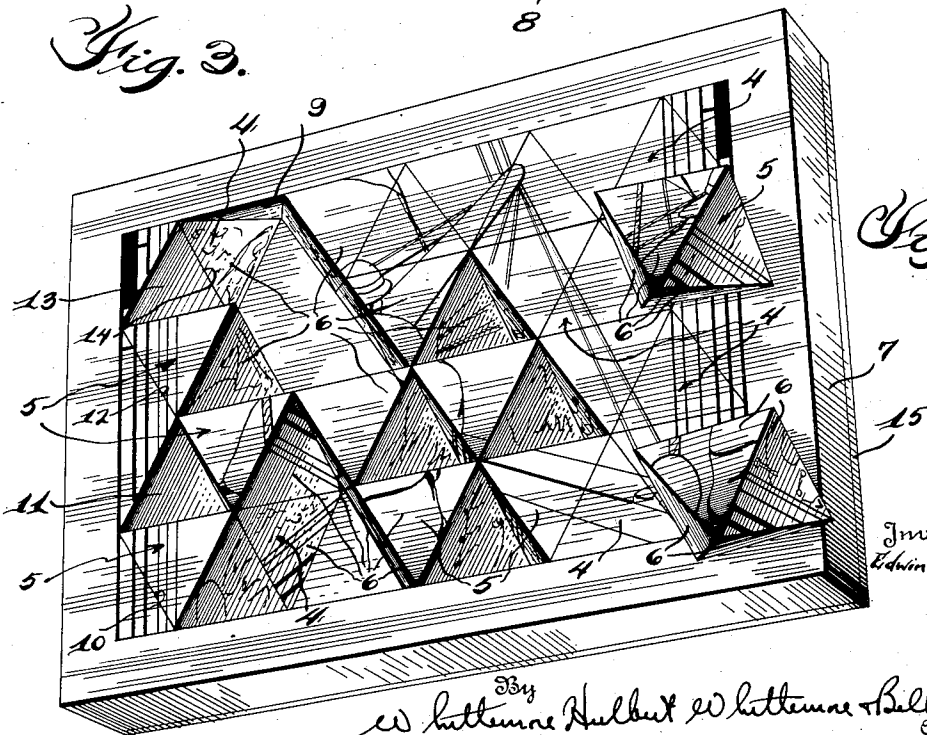


Fig. 4.

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3 Sheets-Sheet 3

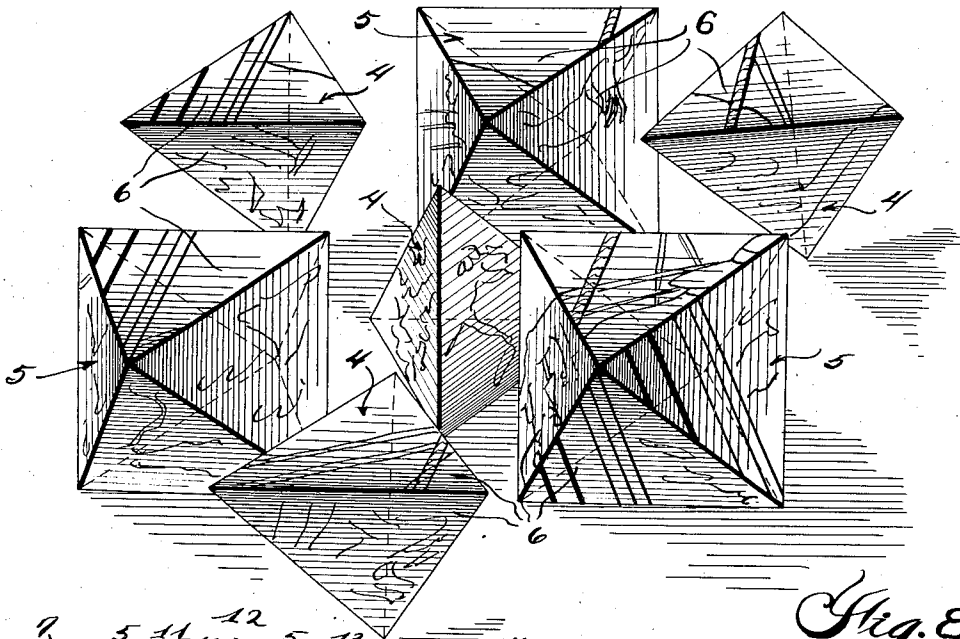


Fig. 8.

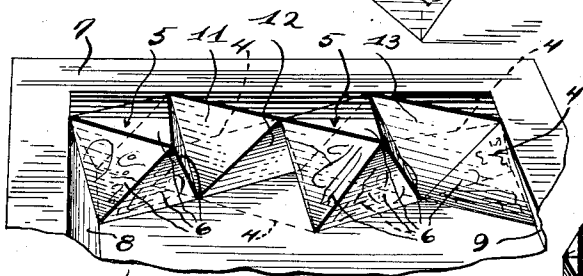


Fig. 6.

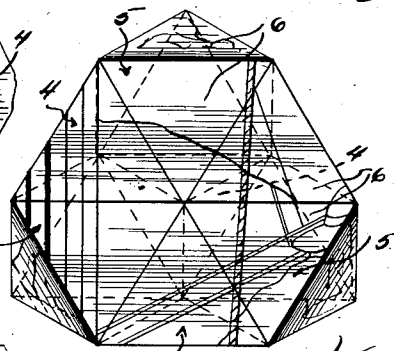


Fig. 7.

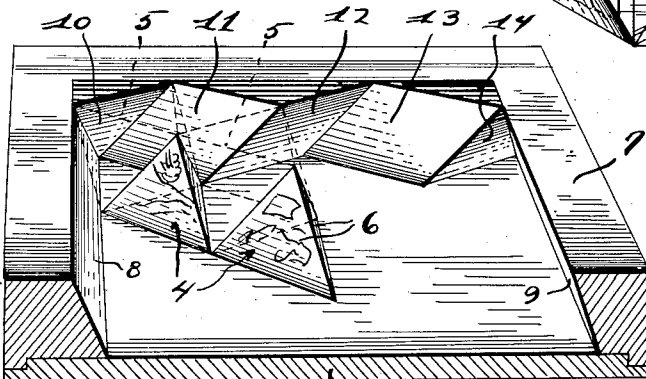


Fig. 5.

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UNITED STATES PATENT OFFICE

2,041,030

PUZZLE

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Application May 4, 1933, Serial No. 669,434

9 Claims. (Cl. 273—157)

The invention relates to an article of manufacture and refers more particularly to a puzzle picture. One of the objects of the invention is to produce as an article of manufacture a plurality of polyhedrons having dihedral angles other than 90 degrees and constructed to be space filling when assembled. Another object is to produce the polyhedrons so that they form a solid plane surface with certain of the polyhedrons concealed. A further object is to form the polyhedrons of a plurality of types which when assembled form a polyhedron of one of the types and to provide a container for receiving and being filled by these polyhedrons. Still another object is to produce a puzzle picture by securing upon different sides of the polyhedrons portions of different pictures, whereby different arrangements of the polyhedrons produce different pictures. A still further object is to produce two puzzle pictures with the same arrangement of polyhedrons by forming the polyhedrons so that they form two solid plane surfaces when assembled and by securing upon different sides of the polyhedrons portions of different pictures.

These and other objects of the invention will become apparent from the following description and claims, when taken in connection with the accompanying drawings, in which

Figure 1 is a perspective view, with a polyhedron separated and the container broken away, of a puzzle picture showing an embodiment of my invention;

Figure 2 is a side elevation thereof, with the container broken away;

Figure 3 is a plan view showing another embodiment of my invention;

Figure 4 is a perspective view thereof, with certain of the polyhedrons removed;

Figures 5 and 6 are perspective views of portions thereof with certain of the polyhedrons removed;

Figure 7 is a plan view of a group of polyhedrons;

Figure 8 is an enlarged perspective view of the separated polyhedrons of Figure 7;

Figure 9 is a perspective view showing another embodiment of my invention;

Figure 10 is a similar view of the container of Figure 8.

As shown in Figure 1, the article of manufacture is a puzzle picture made up of the polyhedrons 1 and the container 2 for these polyhedrons. These polyhedrons are adapted when assembled to be space filling and to form upper and lower solid plane surfaces with certain of

the polyhedrons concealed. More particularly, the polyhedrons have five sides and are adapted to be arranged in columns and rows with alternate polyhedrons in each column having their apices in substantially one of the solid plane surfaces. In the present instance, the polyhedrons have edges of the same length, but it is to be understood that my invention contemplates the use of polyhedrons having edges of different length, but of the same height. The sides of the polyhedrons and particularly the sides which include the dihedral angles other than 90 degrees have secured thereto the portions 3 of different pictures, so that by arranging these polyhedrons with the proper sides in the same solid plane they produce a picture. It is apparent that different arrangements of the polyhedrons produce different pictures. As illustrated, the proper sides of certain of the polyhedrons are arranged to produce a solid upper plane forming a certain picture and between the polyhedrons of each column are alternately arranged the other polyhedrons having their apices terminating substantially in the solid upper plane, but for all practical intents and purposes concealed. The container 2 has its side walls shaped to conform with the sides of the adjacent polyhedrons to thereby firmly hold the polyhedrons when assembled firmly in place, since they are space filling.

In the modification shown in Figures 2 to 8 inclusive, other polyhedrons are employed. These polyhedrons also are adapted when assembled to be space filling and, as illustrated, all of their dihedral angles are other than 90 degrees, but it is to be understood that my invention contemplates the use of polyhedrons having some dihedral angles of 90 degrees and other dihedral angles other than 90 degrees. More specifically, the polyhedrons are of two types, namely tetrahedrons and octahedrons, which, when assembled, form two solid upper and lower plane surfaces, the octahedrons having parallel opposite sides. While the tetrahedrons 4 and the octahedrons 5 may have edges of different length, they are shown in the present instance with edges of the same length. When these polyhedrons are assembled, the octahedrons 5 have their adjacent edges contacting and the tetrahedrons 4 are located between the adjacent octahedrons or alternate therewith, certain of the tetrahedrons having sides in the solid upper plane surface and certain of the tetrahedrons having sides in the solid lower plane surface and the corners of the sides of the adjacent tetrahedrons in the same plane

surfaces being closely adjacent each other. Thus, certain of the tetrahedrons 4 are for all practical intents and purposes concealed from the upper plane surface, while others are to the same extent 5 concealed from the lower plane surface.

Both the tetrahedrons 4 and the octahedrons 5 have secured to their sides portions 6 of different pictures, so that by the proper arrangement of the tetrahedrons and the octahedrons different 10 pictures may be secured in the upper plane surface, the possible number of pictures being eight. Also by properly arranging the tetrahedrons and the octahedrons one picture may be secured in the upper plane surface and another picture may 15 be secured at the same time in the lower plane surface.

The container 7 has its side walls shaped to conform with the side walls of the adjacent polyhedrons, one side wall 8 being inclined downwardly and inwardly, the opposite side wall 9 20 being parallel thereto or undercut and each of the intermediate side walls having the undercut portion 10 conforming to a side of the adjacent octahedron 5, the downwardly and inclined portion 25 11 conforming to the side wall of the adjacent tetrahedron 4, the undercut portion 12 conforming to the sides of the adjacent tetrahedron 4 and octahedron 5, the downwardly and inwardly inclined portion 13 conforming to the side of the adjacent tetrahedron 4, and the undercut 30 portion 14 which with the adjacent portion of the undercut side wall 9 forms a pocket conforming to and receiving the adjacent tetrahedron 4. The container has the removable bottom 15 which 35 may be removed after the assembled puzzle picture has been covered with a suitable supporting top and inverted, so that the tetrahedrons now exposed may be suitably arranged to produce a second picture.

In the modification shown in Figures 9 and 10, 40 the container 17 is an octahedron which is adapted to receive and be filled by the tetrahedrons 18 and the octahedrons 19, which may, if desired, have their sides covered by portions of different 45 pictures in the same manner as shown in the other modifications. All of these polyhedrons, as shown, have their edges of the same length, and the tetrahedrons and octahedrons are adapted to be arranged in the same manner as described in connection with Figures 2 to 8 inclusive. 50 In fact, the lower half arrangement of these polyhedrons is the same as that shown in Figure 7. The container may, if desired, be made of transparent material and has but one 55 open side.

While I have used the term "picture" in describing my invention, it is to be understood that this term should be interpreted broadly to include markings, colors and the like, which may be arranged to secure desired or predetermined 60 objectives.

What I claim as my invention is:

1. An article of manufacture, comprising an assembly of two types of polyhedrons which together are space filling, the polyhedrons of one 65 type having their adjacent edges contacting and the polyhedrons of the other type being located between the adjacent faces of the first mentioned polyhedrons.

2. An article of manufacture comprising an assembly of tetrahedrons and octahedrons having triangular faces of one similar and equal to triangular faces of the other and placed adjacent thereto to form of the assembly a polyhedron 5 similar to one of the assembled units, and a container for the assembly of form similar and equal to said polyhedron.

3. An article of manufacture comprising an assembly of tetrahedron and octahedron elements 10 which together are space filling and have the shape of a larger octahedron, the edges of adjacent octahedron elements being in contacting alignment and the tetrahedrons being located between adjacent faces of the said octahedrons. 15

4. An article of manufacture comprising an assembly of tetrahedron and octahedron elements which together fill space and have the shape of a larger octahedron, the edges of adjacent octahedron elements being in contacting alignment 20 and the tetrahedrons being located between adjacent faces of the octahedrons, and an octahedral container for the assembly of said tetrahedrons and octahedrons completely filled thereby. 25

5. An article of manufacture comprising an assembly of tetrahedron and octahedron elements which together fill space and have the shape of an enlarged tetrahedron, said tetrahedron elements having faces lying adjacent to and registering with faces of said octahedron elements 30 and a tetrahedral container for receiving the assembly of said tetrahedron and octahedron elements, completely filled thereby.

6. An article of manufacture comprising an assembly of a plurality of types of polyhedron 35 elements which together are space filling, said elements of both types having all the sides thereof of similar and equal triangles, two of the sides of adjacent elements of different types being in registration and in contact and the sides of the 40 respective elements extending away from the contacting sides being in the same plane.

7. An article of manufacture comprising an assembly of tetrahedron and octahedron elements 45 which together are space filling, all of the sides of both elements being equal equi-lateral triangles, certain of said sides being registered and in contact with each other, and other of said sides being arranged in spaced parallel planes. 50

8. An article of manufacture comprising an assembly of octahedron and tetrahedron elements, all of the sides of both types of elements being equal equi-lateral triangles, the octahedron 55 elements having their adjacent edges in contacting alignment and the tetrahedrons filling the spaces between the octahedrons and forming therewith continuous parallel opposite faces.

9. An article of manufacture comprising an assembly of tetrahedron and octahedron elements 60 having all the sides thereof equal equi-lateral triangles, said elements being arranged to be space filling and to be assembled into a composite three-dimensional structure having parallel opposite faces and the sides of said elements 65 having portions of a plurality of different pictures, which portions are complementary to each other in certain arrangements of said elements.

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