

[54] **BLOCK CONSTRUCTION**

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[51] Int. Cl. A63f 9/12

[58] Field of Search 273/156, 157 R, 160; 35/72; 34/34; 46/17

[56] **References Cited**

UNITED STATES PATENTS

2,839,841 6/1958 Berry.....273/157 R UX

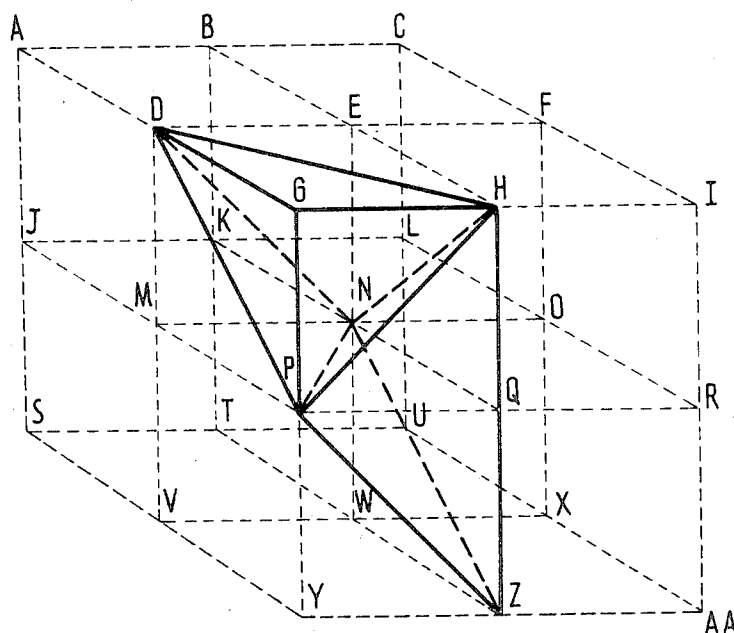
1,471,943 10/1923 Chambers.....273/157 R
595,782 12/1897 Morsell.....35/72
2,041,030 5/1936 Strutton.....273/157 R
639,941 12/1899 Rossi-Diehl.....35/34 UX

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[57] **ABSTRACT**

A block system useful as a puzzle or game consisting of a group of solids adapted to be assembled into a larger regular polyhedron. The solids each have shapes that are determined by an assembly of components that include a tetrahedron and one or more fractional sections of an octahedron. The fractional sections comprises one-eighth and one-fourth sections of a regular octahedron.

8 Claims, 39 Drawing Figures



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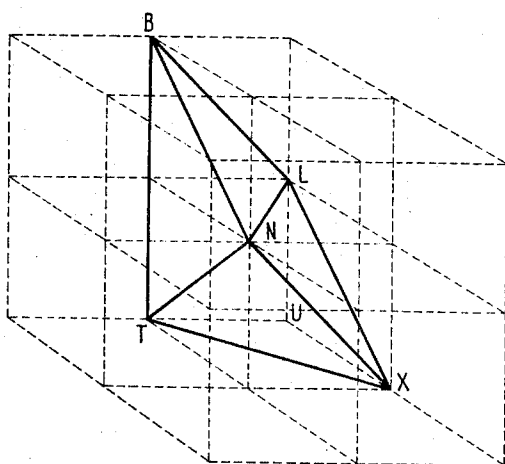


FIG. 7

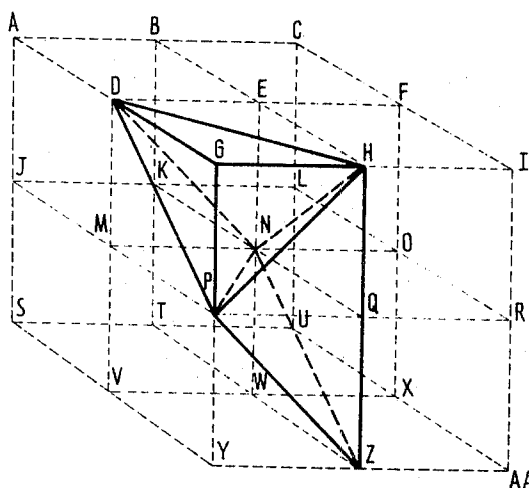


FIG. 6

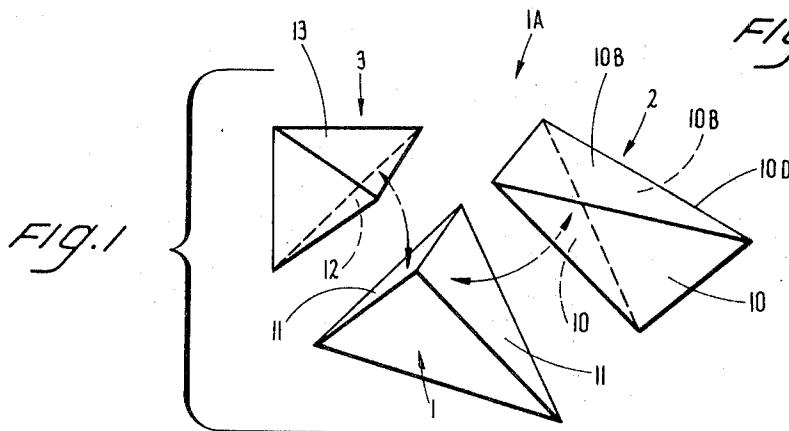


FIG. 1

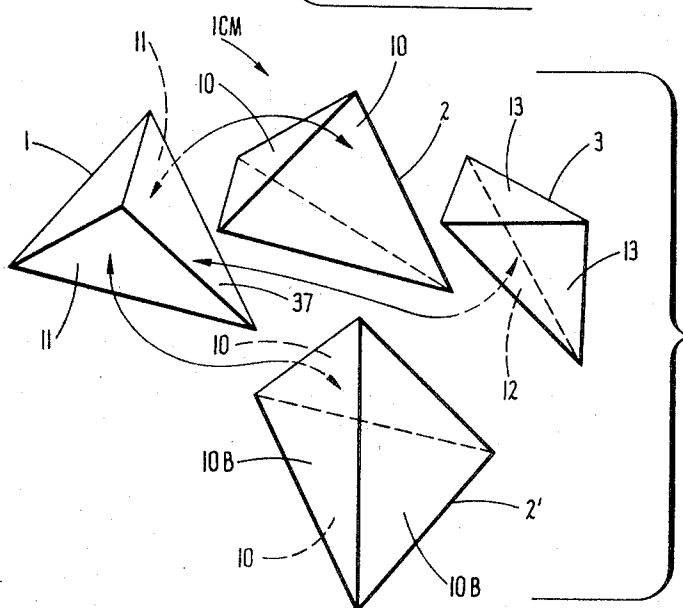
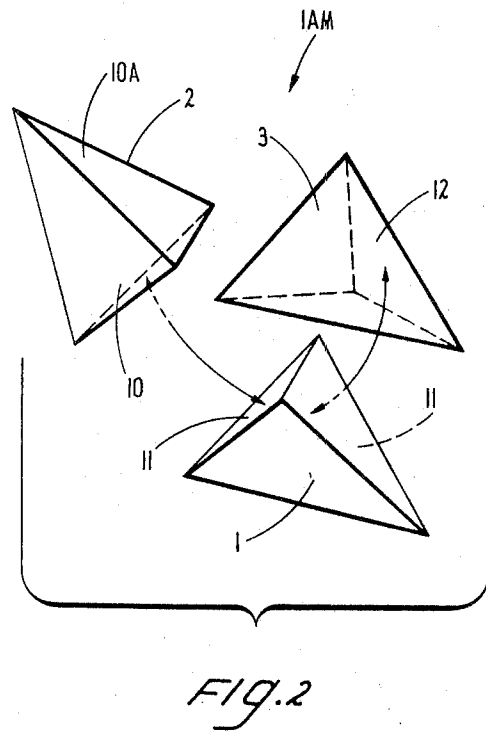
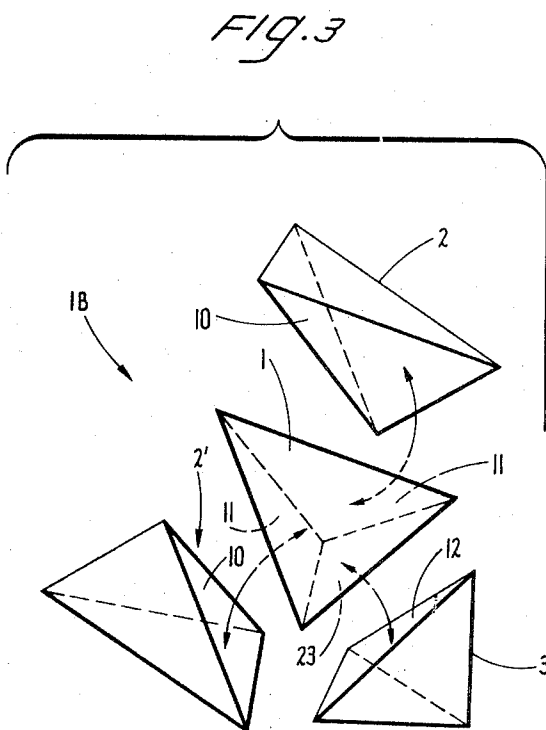
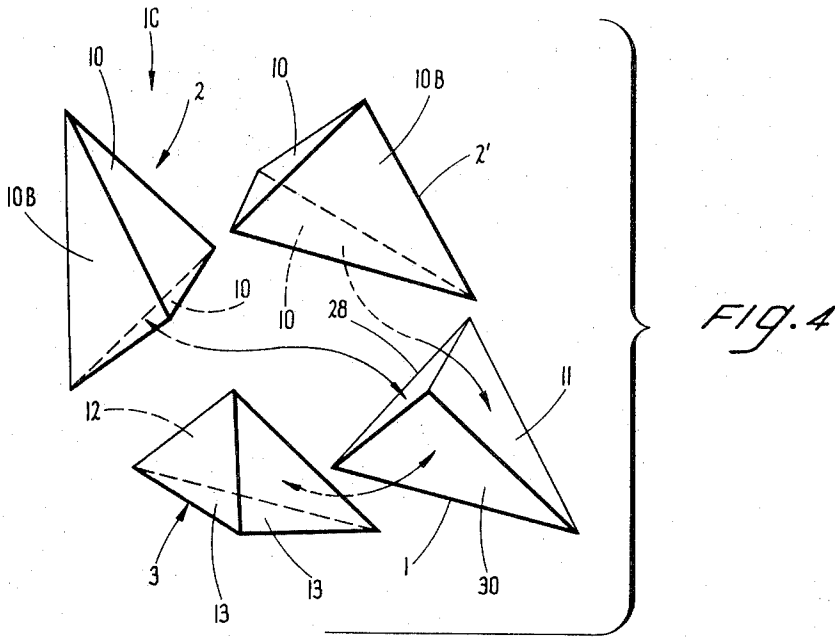


FIG. 5

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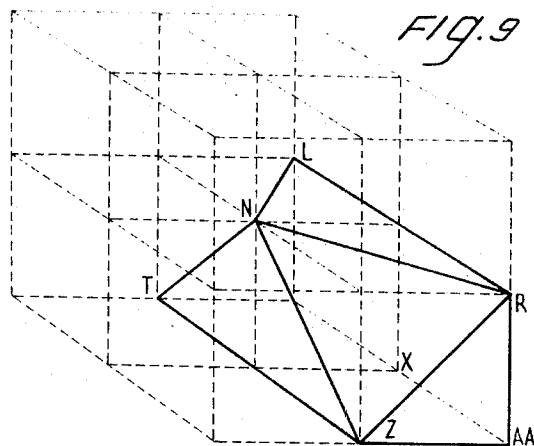
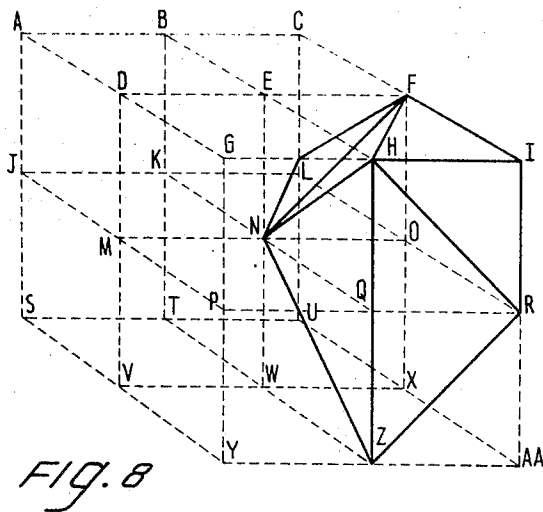
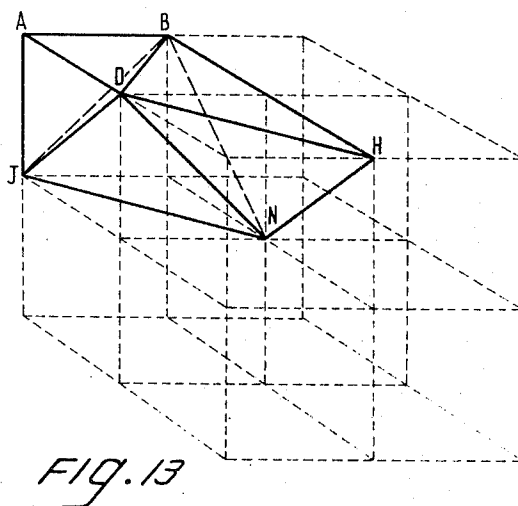
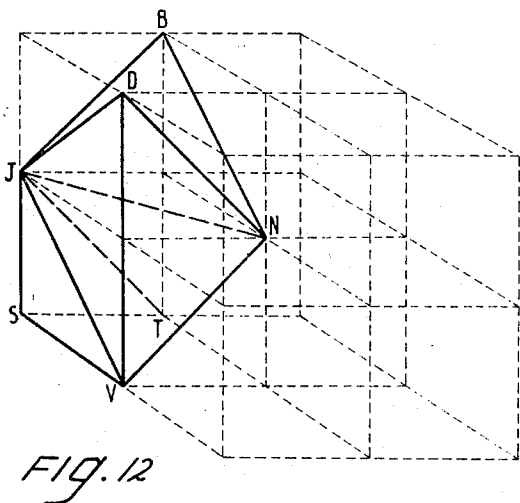
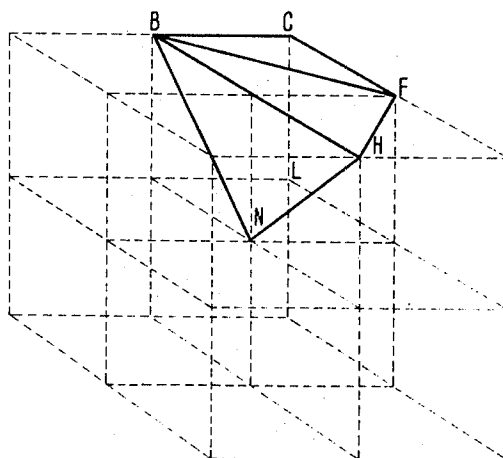
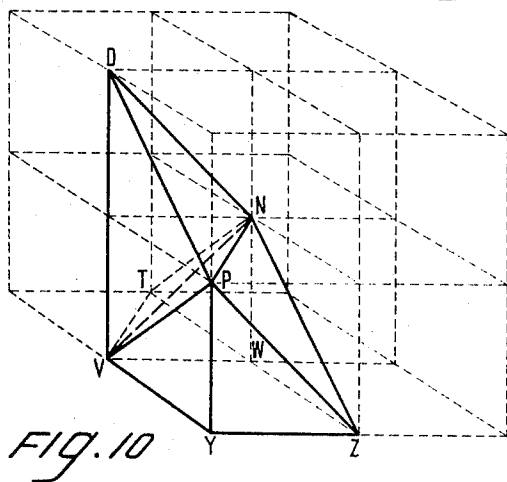
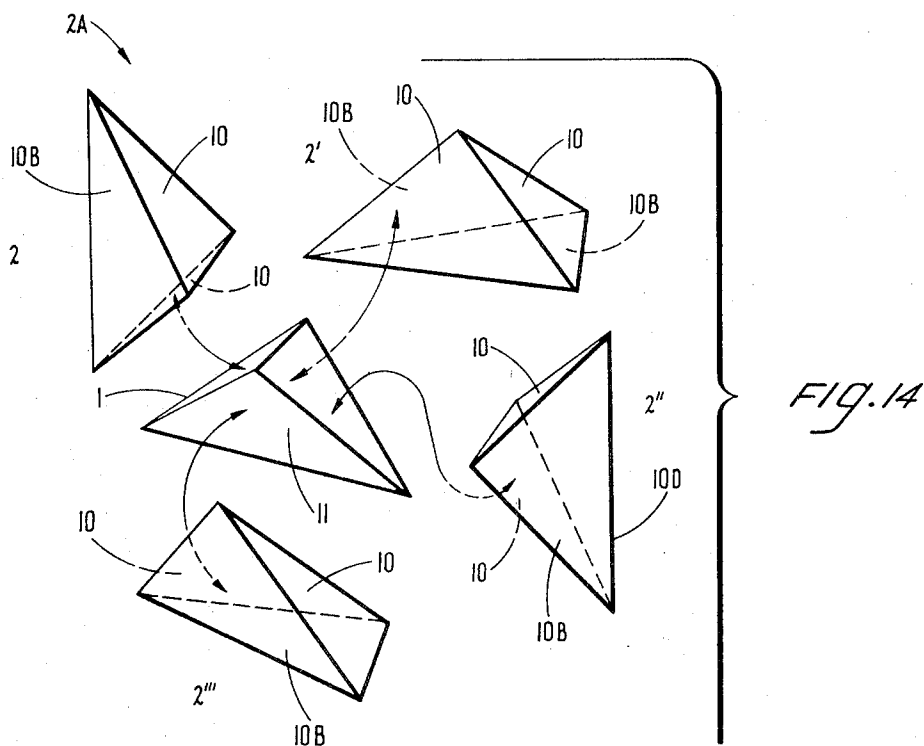
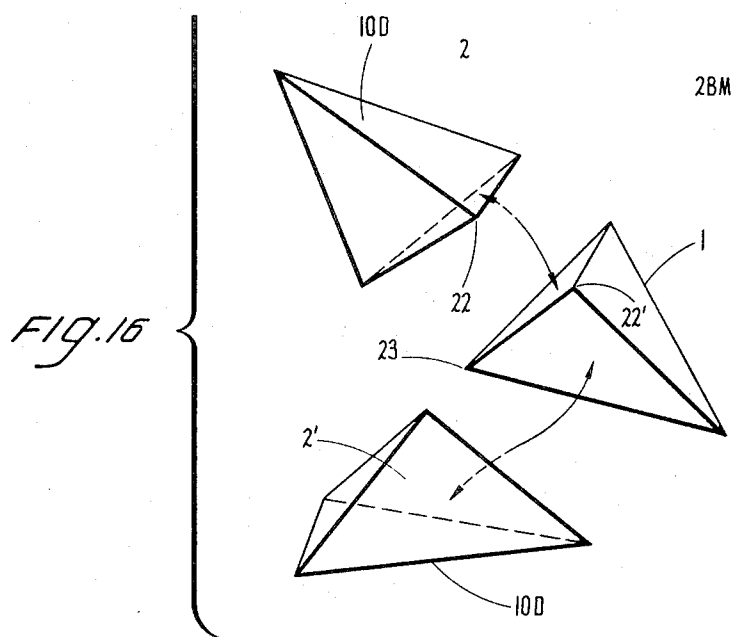


FIG. 11



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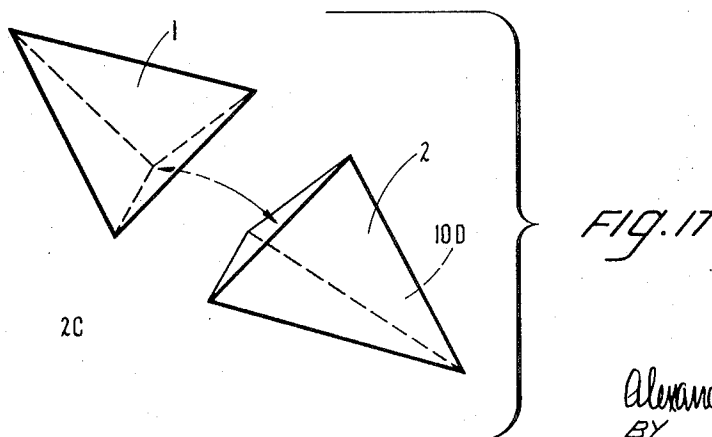
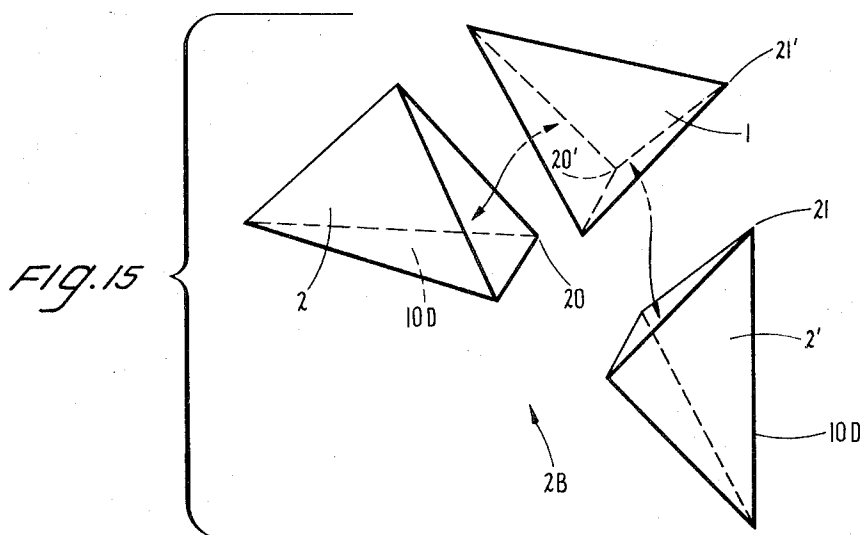
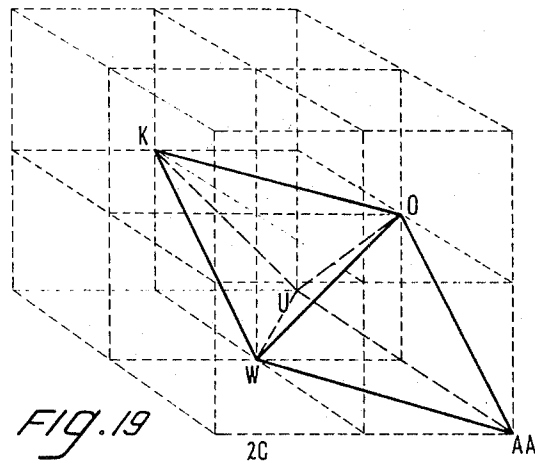
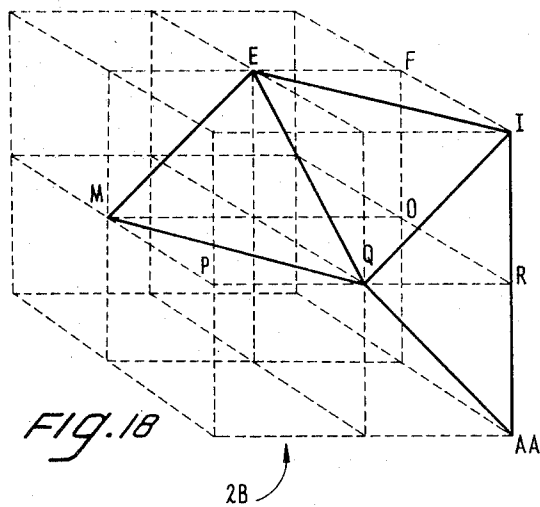


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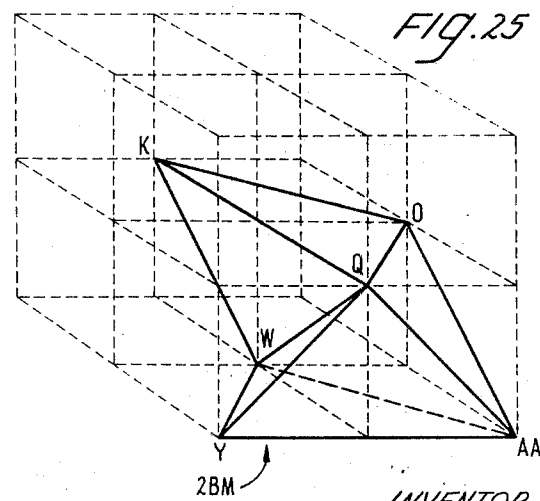
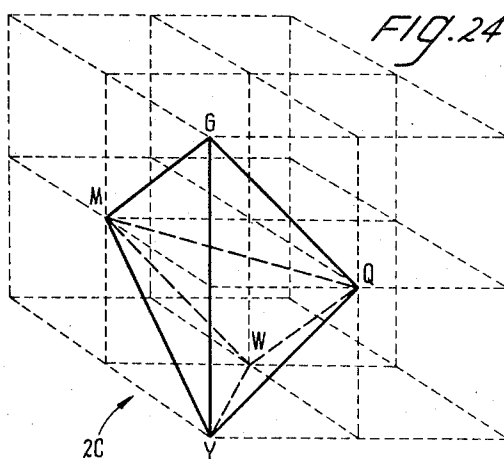
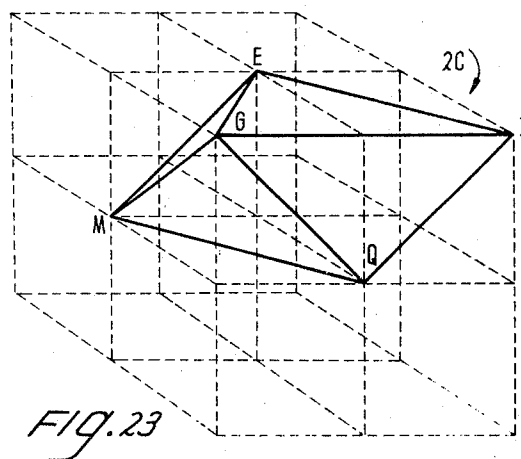
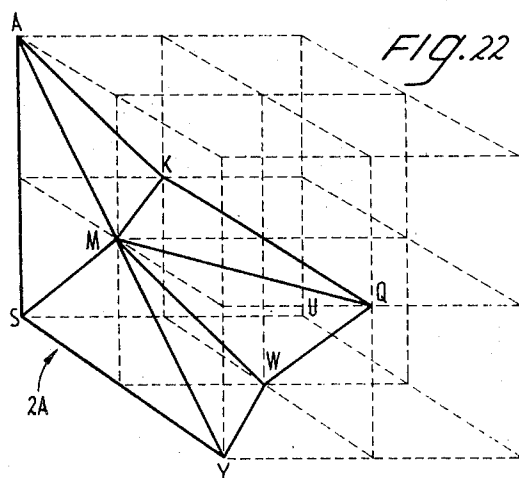
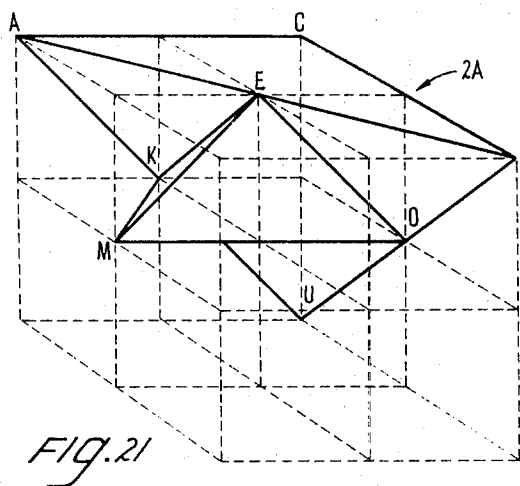
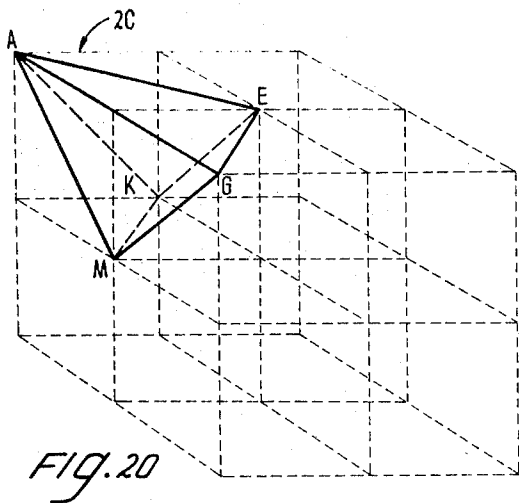
Patented Feb. 29, 1972

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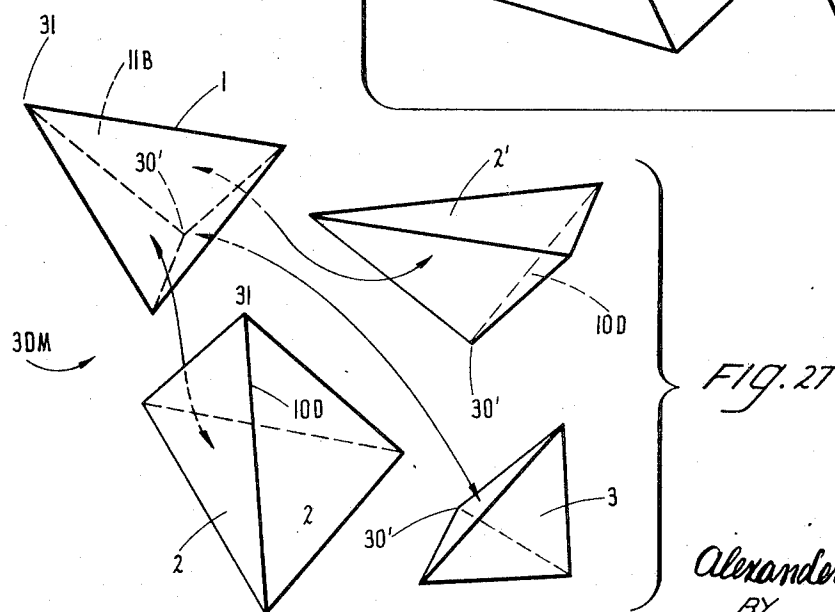
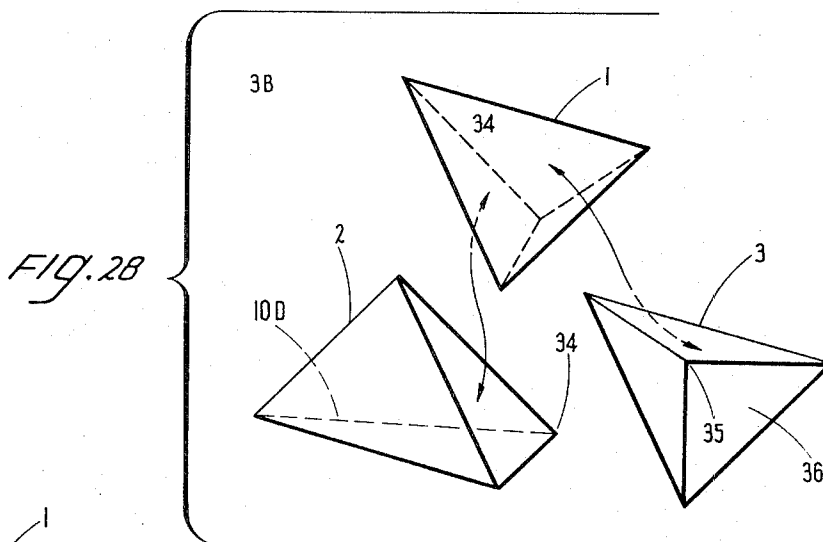
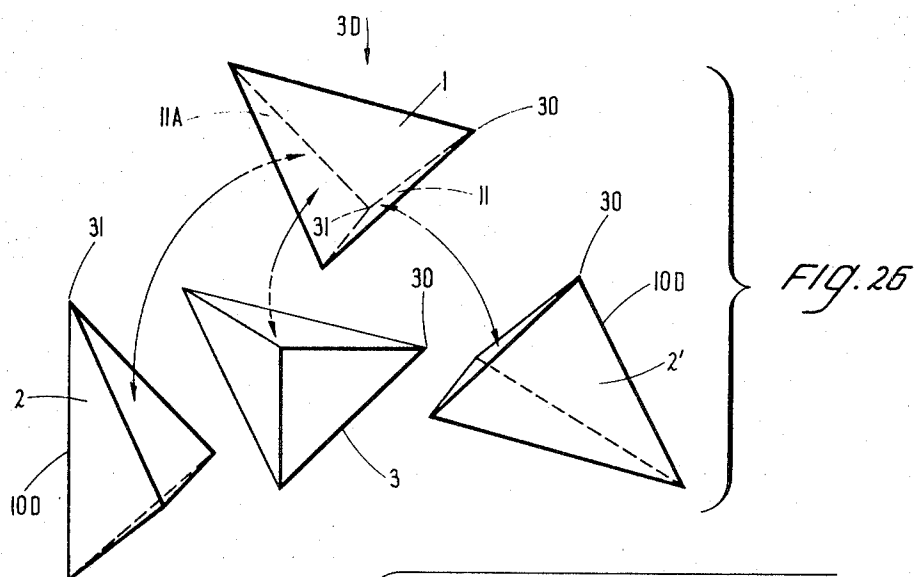
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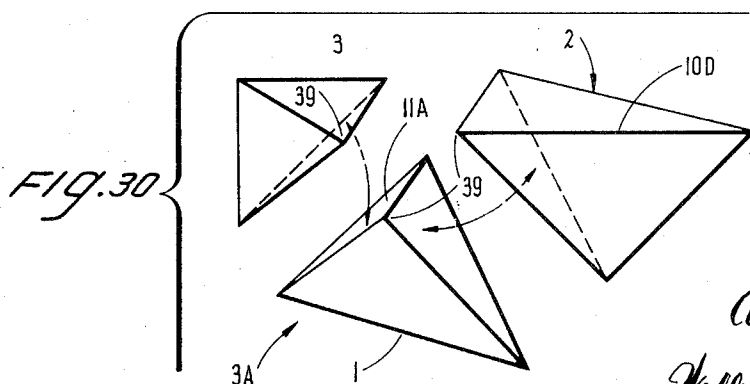
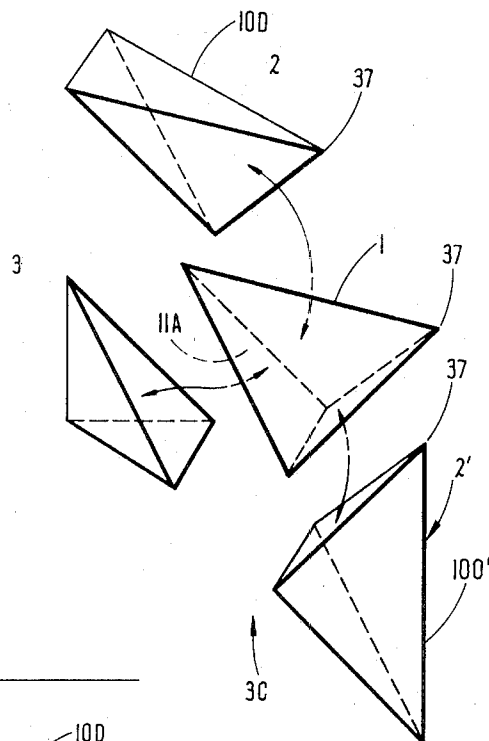
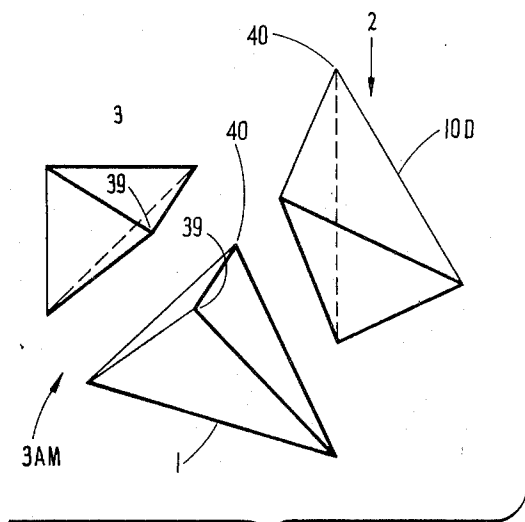
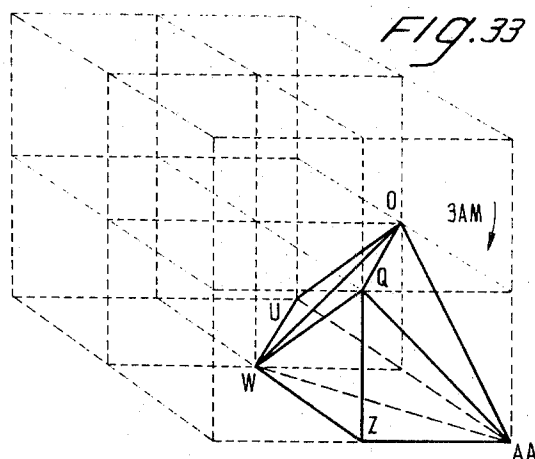
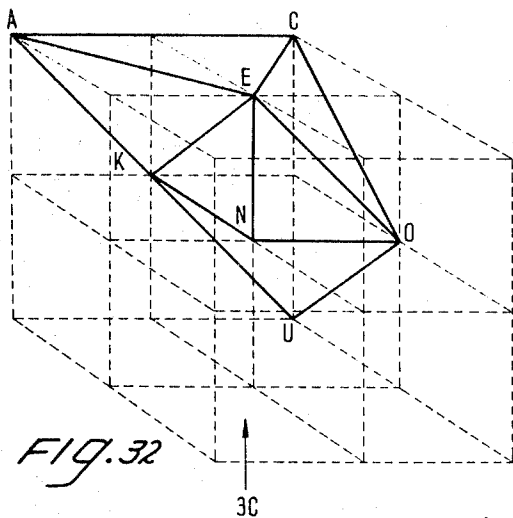


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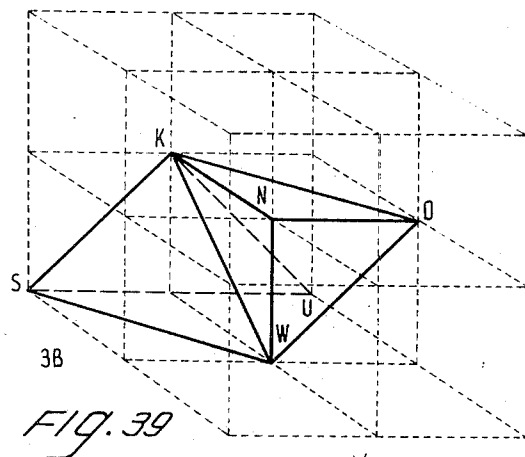
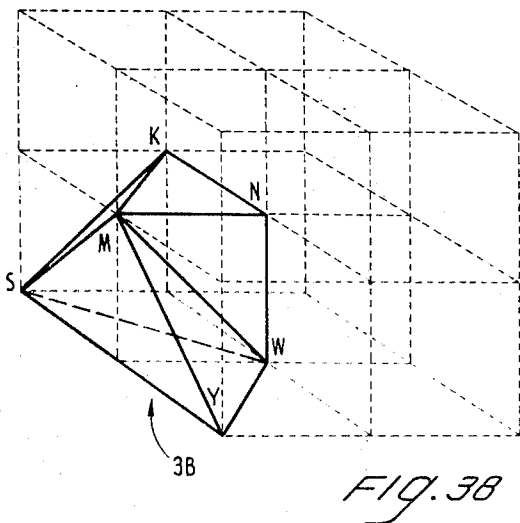
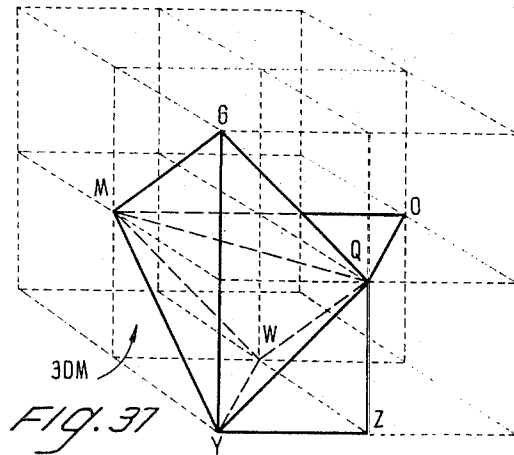
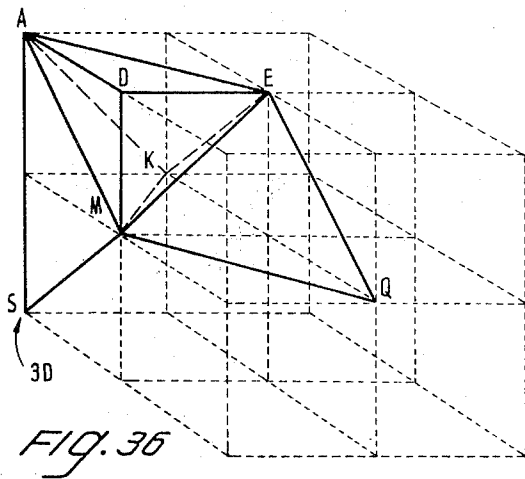
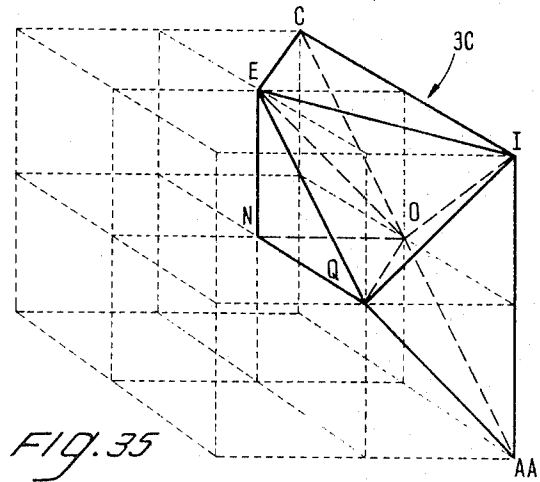
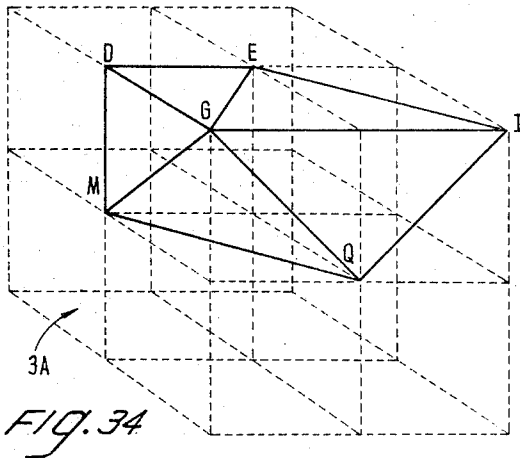


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BLOCK CONSTRUCTION

SUBJECT MATTER OF INVENTION

The present invention relates to a block system useful as a game, puzzle, geometric or sculpture.

BACKGROUND OF INVENTION

Games and toys have been built using a plurality of polyhedral shapes including cubes, rectangular blocks, pyramids, and the like. Some attempts have been made to develop games or toys utilizing the mathematical or geometric interrelationship of various solids. Insofar as known, however, no one has yet devised a block system that makes use of certain geometrical relationship of regular polyhedrons and fractional sections thereof to form a larger regular polyhedron, and in particular, the relationship of polyhedrons herein described. Regular polyhedrons or platonic solids are geometrically interrelated. Thus, the tetrahedron, the cube or hexahedron, and the octahedron are related in a number of interesting ways. These interrelationships, for example, include the fact that diagonals and opposite faces of the hexahedron or cube at right angles to each other form the edges of a tetrahedron. Further, the midpoints of the faces of a cube are vertices of an octahedron; and conversely, the midpoints on the faces of an octahedron are the vertices of the cube. Such interrelationships have heretofore never been utilized in the design of a block system of toys, games or puzzles.

SUMMARY OF INVENTION

It is an object of the present invention to provide a block system which may be used as a game, puzzle, sculpture, or toy. It is also an object of the present invention to provide such a system utilizing a plurality of the platonic solids or regular polyhedrons or fractional sections thereof in a geometrically interrelated fashion that illustrates such relations. It is also the object of the present invention to provide an improved block system comprising a group of solids that are adapted to be assembled into a regular polyhedron with the solids each defined by an assembly of components that include a tetrahedron and a fractional section of an octahedron. One further object of the present invention is to provide an improved game or puzzle defined by a plurality of solids with each solid having a shape defined by an assembly of regular polyhedrons or fractional portions thereof. One further object of the present invention is to provide an improved game or puzzle defined by regular tetrahedrons and quarter and/or eighth sections of a few regular octahedrons. Another object of the present invention is to provide a means wherein eight regular tetrahedrons and quarter and one-eighth sections of four corresponding regular octahedrons may be preassembled or shaped into a plurality of geometric solids that are adapted to be put together into a regular polyhedron in a variety of different configurations. One further object of the present invention is to provide a block system formed of a plurality of solids, each having shapes determined by an assembly of components that include a tetrahedron and fractional sections of an octahedron with the system adapted to be used either as a puzzle or as a sculptured system.

BRIEF DESCRIPTION OF DRAWINGS

These and other objects and advantages of the present invention will be more clearly understood when considered in conjunction with the accompanying drawings in which

FIGS. 1 to 5 inclusive each comprise a perspective exploded view of a different solid which, together with other solids of the shapes illustrated in FIGS. 1 to 5, may be assembled into a cube;

FIGS. 6 to 13 inclusive illustrate the types of solids illustrated in FIGS. 1 to 5 in relative orientations or positions necessary for assembly into a cube;

FIGS. 14 to 17 inclusive each comprise a perspective exploded view of a different solid which, together with other

solids of the shapes illustrated in FIGS. 14 to 17 may be assembled into a cube;

FIGS. 18 to 25 inclusive illustrate the types of solids illustrated in FIGS. 14 to 17 and their relative orientations or positions necessary for assembly into a cube;

FIGS. 26 to 31 inclusive each comprise a perspective exploded view of a different solid which, together with other solids of the shapes illustrated in FIGS. 26 to 31 may be assembled into a cube;

FIGS. 32 to 39 inclusive illustrate the types of solids illustrated in FIGS. 26 to 31 and their relative orientations or positions necessary for assembly into a cube.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Reference is first made to FIGS. 1 through 13 inclusive. Of these figures, FIGS. 1 to 5 illustrate the structure of the different style solids that are used in varying numbers to form a cube, and FIGS. 6 through 13 inclusive illustrate the specific orientation of these solids to form a cube of the size illustrated in the dotted outline.

In this embodiment of the invention, the set consists of eight separate solids having five different configurations. Solid 1A, illustrated in FIG. 1, consists of three components including a tetrahedron 1, a quarter section of a regular octahedron 2, and an eighth section of a regular octahedron 3. Each tetrahedron, quarter and eighth section of an octahedron herein described are the same in size in each solid of each embodiment. The tetrahedrons are, of course, formed with four identical equilateral faces 11. The quarter section of an octahedron 2 has a pair of faces 10B that are identical isosceles triangles having a common edge 10D. The other two faces 10 are identical equilateral triangles. The eighth section of the regular octahedron 3 is formed with a base face 12 that is an equilateral triangle which is dimensioned to the same size in this invention to the faces of the tetrahedron and faces 10, 10A of the quarter section of the octahedron. The other three faces 13 are equally dimensioned right isosceles triangles with the hypotenuses of each defined by an edge of the base face 12. Equilateral face 10 of the quarter section of the octahedron 2 is aligned with an identically shaped face 11 of the tetrahedron 1 while equilateral face 12 of the eighth section of octahedron 3 is aligned with an identical face 11 of the tetrahedron 1. These three components are secured together by suitable means to form a solid 1A. Obviously, the solid may be integrally formed as a single piece having a polyhedral shape consistent with the assemblage of three components illustrated in FIG. 1. This solid, as well as other herein described, may be made of any suitable material and may, for example, be formed by conventional injection molding techniques of a suitable styrene or other plastic material.

Shape 1AM, illustrated in FIG. 2, is the mirror image of shape 1A, illustrated in FIG. 1. In this arrangement, a tetrahedron component 1 is secured or integrally formed with a quarter section of an octahedron 2 and an eighth section of an octahedron 3. A face 11, the hidden face of the tetrahedron in FIG. 2, is arranged in facing relation with the identically shaped face 12 of the eighth section of octahedron 3. A face 10 of the quarter section of the octahedron 2 is integrally secured to a face 11 of identical shape to the tetrahedron 1.

Shape 1B is illustrated in FIG. 3. This shape consists of a tetrahedron 1, two quarter sections of octahedrons 2 and 2' and an eighth section of an octahedron 3. One face 11 of the tetrahedron 1 is secured or formed integrally with an equilateral face 10 of one quarter section of an octahedron 2', while the other quarter section of an octahedron has an equilateral face 10 secured or integrally formed with another face 11 (not shown) of the tetrahedron 1. Equilateral face 12 of the eighth section of octahedron is secured to a third face 11 (not shown) of the tetrahedron 1. As in the case in each solid, the facing or integrally formed faces are each identical in shape and size with their facing or integrally formed face.

Solid 1C is illustrated in FIG. 4. This solid is formed of four components including one tetrahedron 1, two quarter sections of an octahedron 2, 2' and a one-eighth section of an octahedron 3. Equilateral face 10 (not shown) of one quarter section of an octahedron 2' is secured or formed integrally with a face 11 of the tetrahedron 1. An equilateral face 10 (not shown) of the other quarter section of the octahedron is secured or integrally formed with another face 11 of the tetrahedron, while equilateral face 12 (not shown) of the eighth section of the octahedron 3 is secured or integrally formed with a third face 11 of the tetrahedron 1.

Shape 1CM is illustrated in FIG. 5 and comprises four components including a tetrahedron 1, two quarter sections of an octahedron 2, 2' and an eighth section of an octahedron 3. A face 11 of the tetrahedron 1 is secured or integrally formed with an equilateral face 10 (not shown) of one quarter section of an octahedron 2', while the other octahedron 2 is formed with its equilateral face 10 facing or integral with another face 11 (not shown) of the tetrahedron 1. Equilateral face 12 (not shown) of the one-eighth section of the octahedron 3 is secured in facing relation or integral with a third face 11 of the tetrahedron 1.

These five solids illustrated in their relationship in FIGS. 1 to 5 inclusive may be assembled into a cube as illustrated in FIGS. 6 through 13 inclusive. In this set, eight pieces are provided including two solids 1A, two solids 1AM, two solids 1B, one solid 1C, and one solid 1CM. For convenience in understanding the orientation of the solids with relation to one another when oriented to form a cube, the overall outline of a cube divided in eighths is illustrated in FIGS. 6 through 13. For further convenience in identifying the relative positions of each solid when so oriented in this embodiment of the invention as well as in others, intersections of each of these dividing lines in each figure is correspondingly identified by a letter or letters in the alphabetical sequence of A to Z inclusive and AA. In the set illustrated in FIGS. 1 through 5, two solids 1A are used. One of these solids is shown in proper orientation in FIG. 6, and the other is shown in proper orientation in FIG. 13. As illustrated, solid 1A is arranged in FIG. 6 with its one-eighth section of an octahedron occupying points D, G, H and P. The quarter section of an octahedron component occupies points Z, H, P and N. The tetrahedron component occupies points D, H, N and P. In FIG. 13, the other solid 1A is arranged with the one-eighth section of an octahedron component occupying points A, B, D and J. The one-quarter section of an octahedron component occupies points B, D, H and N. The tetrahedron component occupies points B, D, J and N.

Two solids 1AM are provided and are oriented as illustrated in FIGS. 7 and 11. The solid shown in FIG. 7 is arranged with the quarter section of an octahedron component occupying points B, L, N and T. The tetrahedron occupies points L, N, T and X. The one-eighth section of an octahedron component occupies points L, T, X and U. In FIG. 11, the solid 1AM is arranged with the eighth section of an octahedron component occupying points B, C, F and L. The quarter section of an octahedron component occupies points B, H, F and N. The tetrahedron occupies points F, B, N and L.

The two solids 1B are oriented as illustrated in FIGS. 9 and 12. In FIG. 9 the one-eighth section of an octahedron component occupies points Z, AA, R and X. The tetrahedron occupies points Z, R, N and X. One of the two quarter sections of an octahedron component occupies points Z, T, N and X. The other quarter section of an octahedron component occupies points N, R, L and X. The solid 1B shown in FIG. 12 is oriented with the one-eighth section of an octahedron component occupying points J, S, V and T. One of the two one-quarter sections of an octahedron component occupies points J, V, N and D. The other quarter section of an octahedron component occupies points B, J, D and N. The tetrahedron occupies points V, J, T and N.

Component 1C is oriented as illustrated in FIG. 10. The one-eighth section of an octahedron component occupies points V, Y, Z and P. One one-quarter section of an oc-

tahedron occupies points V, P, N and D. The other one-quarter section of the octahedron component occupies points Z, T, V and N. The tetrahedron occupies points Z, P, N and V.

Component 1CM is oriented as illustrated in FIG. 8. The one-eighth section octahedron component occupies points F, I, H and R. One quarter section of the octahedron occupies points H, R, Z and N. The other quarter section of the octahedron occupies points L, R, F and N. The tetrahedron occupies points F, H, N and R.

As indicated above and in FIGS. 6 through 13, at least one edge of each tetrahedron extends from the center of the cube and each such edge abuts the edges of an adjacent tetrahedron.

Although the solids described in this embodiment are illustrated in the form of a puzzle intended to be assembled into a perfect cube, it should be understood that these solids may also be used to form a wide variety of interesting geometric shapes. For example, these solids may be reassembled in the shapes resembling a variety of animals, such as dogs and cats, birds such as owls, and other imaginative shapes. Such shapes as well as a cube may be used as game objectives in a variety of games designed for use with the components.

The second embodiment of the present invention may be formed from solids having the configuration illustrated in FIGS. 14 to 17 inclusive. In this arrangement, one solid 2A is formed of five geometric components as illustrated in FIG. 14 in exploded form. These components include a tetrahedron 1 having identical equilateral faces 11 and four quarter sections of an octahedron 2, 2', 2'' and 2'''. Each of these quarter sections of the octahedron have a pair of equilateral faces 10 and a pair of right isosceles faces 10B having a common edge 10D. Each of the quarter sections of the octahedron 2, 2', 2'' has an equilateral face 10 integrally formed with one of the faces 11 of the tetrahedron 1 as illustrated. In the present embodiment, two of such solids 2A are provided.

In FIG. 15 there is illustrated a solid 2B. This solid is formed with a tetrahedron shape 1 and two quarter sections of an octahedron 2 and 2'. These shapes are integrally formed with an equilateral face of each quarter of a section of an octahedron 2 and 2' integral with similarly shaped faces of the tetrahedron 1. It will be noted in this arrangement the longest edges 10D of each of the quarter sections of the octahedron emanate from different corners of the tetrahedron 1. In this case, the end 20 of one edge 10D of one quarter section of an octahedron is coincident with the corner 20' of the tetrahedron, while the end 21 of the other long edge 10D of the other quarter section of an octahedron is coincident with the corner 21' of the tetrahedron 1.

FIG. 16 illustrates solid shape 2BM, which is made up of the same number of components as FIG. 15 except that they are arranged to form the mirror image of the shape 2B. In this arrangement the configuration of a tetrahedron 1 and one quarter section of an octahedron 2' may be identical as that in FIG. 15. The positioning of the component 2, however, is such that its long edge 10D has an end 22 that is coincident with the corner 22' of tetrahedron 1 rather than corner 23 which would be the corner to which it would be secured or coincident if it were to be arranged identical to shape 2B of FIG. 15.

FIG. 17 illustrates shape 2C. This shape 2C consists essentially of a tetrahedron 1 and a quarter section of an octahedron 2 with a long side 10D of the octahedron extending from one corner of the tetrahedron.

Two shapes 2A, one shape 2B, one shape 2BM and four shapes 2C may be assembled into a cube as illustrated in FIGS. 18 to 25. For convenience in understanding the orientation of these solids or shapes the same cube orientation identification used in FIGS. 6 to 13 are used in FIGS. 18 to 25 inclusive. A shape 2B is illustrated in FIG. 18. Here the quarter section of the octahedron occupies points I, AA, Q and O. The other quarter section of an octahedron occupies points Q, M, E and O, while the tetrahedron occupies points Q, E, I and O.

A shape 2C is illustrated in FIG. 19. The tetrahedron of this shape occupies points W, K, O and U of the cube. The quarter section of the octahedron of this shape occupies points O, AA, U and W.

FIG. 20 illustrates a shape 2C. The quarter section of an octahedron of this shape occupies points A, E, G and M of the cube. The tetrahedron of this shape occupies points A, E, K and M.

FIG. 21 illustrates a shape 2A. One quarter section of an octahedron of this shape occupies points A, C, E and K. A second quarter section of an octahedron of this shape occupies points C, E, I and O. A third quarter section of an octahedron of this shape occupies points C, U, O and K. A fourth quarter section of an octahedron of this shape occupies points C, O, K and E. In FIG. 22 there is illustrated shape 2A. In this shape, one quarter section of an octahedron occupies points A, S, M and K. A second quarter section of an octahedron occupies points K, M, Q and W. A third quarter section of an octahedron occupies points S, U, K and W. A fourth quarter section of an octahedron occupies points S, Y, M and W. The tetrahedron occupies points S, M, K and W.

In FIG. 23 there is illustrated a shape 2C. The quarter section of an octahedron of this shape occupies points G, I, Q and E. The tetrahedron occupies points S, M, K and W.

In FIG. 23 there is illustrated a shape 2C. The quarter section of an octahedron of this shape occupies points G, I, Q and E. The tetrahedron occupies points M, G, E and Q.

In FIG. 24 there is shown another shape 2C. The quarter section of an octahedron of this shape occupies points G, M, Q and Y. The tetrahedron occupies points M, Q, Y and W.

In FIG. 25 there is shown the location of shape 2BM. Here, the tetrahedron occupies points Q, O, AA and W. One quarter section of an octahedron occupies points Q, K, O and W. The other quarter section of an octahedron occupies points Q, Y, AA and W. When assembled in the locations illustrated in FIGS. 18 to 25, the various shapes referred to will form a cube. As previously indicated, the same shapes in the same or fewer numbers may be arranged to form other configurations, including for example animals and birds, such as owls, eagles, bears, dogs, cats, in relatively abstract forms.

Referring now to the embodiment illustrated in the remaining figures, there is illustrated an arrangement wherein eight pieces or six different shapes may also be formed into a perfect cube. One solid illustrated in FIG. 26 comprises a tetrahedron, a single eighth section of an octahedron and two quarter sections of an octahedron integrally formed to form a solid 3D. In this arrangement, the tetrahedron 1 has the eighth section of an octahedron 3 secured or integrally formed to it on commonly sized faces. One quarter section of an octahedron 2' is integrally formed with a second face 11 of the tetrahedron 1 with the long edge 10D' of the quarter section of an octahedron ending in corner 30 common to the tetrahedron 1 and eighth section of the octahedron 3. The other quarter section of an octahedron 2 is integrally formed with face 11A of the tetrahedron 3, but its long edge 10D is formed with its corner 31 common to corner 31 of the tetrahedron 1. This corner 31 is not common with any corner of the eighth section of the octahedron 3. FIG. 27 illustrates the mirror image of shape 3D and is identified as shape 3DM. In this arrangement, the specific arrangement of the tetrahedron 1 and the eighth section of an octahedron 3 and one quarter section of an octahedron 2 may be identical to that of shape 3D. However, the other quarter section of an octahedron 2' is arranged in common facing relation with one of the other of the two remaining faces of the tetrahedron. In this case, this remaining face is identified as 11B. The corners 30' common to the long edge 10D' of the quarter section of the octahedron 2' and a corner of the tetrahedron correspond with corner 30 of shape 3D.

In FIG. 28 there is illustrated a shape 3B. Two of these shapes are used in this embodiment.

As illustrated in FIG. 28, shape 3B comprises one tetrahedron, a one-quarter section of an octahedron and a

one-eighth section of an octahedron. In this arrangement, the tetrahedron 1 has a common face with the eighth section of the octahedron 3. The quarter section of an octahedron 2 is arranged with its long edge 10D common at one end 34 with corner 34 of tetrahedron 1. Corner 34 of tetrahedron 1 is the corner opposite to the corner 35 of the eighth section of an octahedron. Corner 35 is the one that is surrounded and defined by the right triangular faces 36 of the eighth section of the octahedron.

FIG. 29 illustrates solid 3C. This solid consists of a tetrahedron, two quarter sections of an octahedron, and an eighth section of an octahedron. Two of these solids are used in this embodiment. In this arrangement, the tetrahedron 1 is arranged with faces common with the two quarter sections of an octahedron 2 and 2'. The long edges 10D and 10D', respectively, of the quarter sections of the octahedrons 2 and 2', respectively, are coplanar and have ends coincident with the corner 37 of the tetrahedron 1. The eighth section of the tetrahedron 3 is arranged with the face that has a size common with the faces of tetrahedron 1, integral with the face 11A of the tetrahedron 1 that is opposite to corner 37.

In FIG. 30 there is illustrated shape 3A. One such solid is required. This solid consists of a tetrahedron, a quarter section of an octahedron and an eighth section of an octahedron. In this configuration, the tetrahedron 1 has one face 11A common with the similarly size shape face of the eighth section of the octahedron 3. The quarter section of the octahedron 2 is arranged with its long edge 10D having an end 39 common with corners 39 of the tetrahedron and the eighth section of the octahedron.

The shape 3AM is illustrated in FIG. 31. This shape is similar in configuration to FIG. 30, except that it forms a mirror image which is attained by forming the quarter section of a tetrahedron 2 with its long edge having an end 40 coincident with a different corner of the tetrahedron and eighth section of the octahedron.

These shapes or solids are arranged relative to one another to form a cube in one form of the game or puzzle, as illustrated in FIGS. 32 to 39 inclusive. FIG. 32 shows the orientation of one solid 3C. In this arrangement, one quarter section of the octahedron occupies points A, C, E and K. The eighth section of the octahedron occupies points E, K, N and O. The second quarter section of an octahedron occupies points C, U, O and K. The tetrahedron occupies points C, E, O and K.

FIG. 33 shows the orientation of solid 3AM. In this arrangement, the quarter section of an octahedron occupies points O, U, W and AA. The tetrahedron occupies points O, Q, AA and W. The eighth section of the octahedron occupies points Q, AA, Z and W.

FIG. 34 illustrates the orientation of shape 3A. In this arrangement, the eighth section of an octahedron occupies points E, D, G and M. The quarter section of a tetrahedron occupies points G, E, I and O. The tetrahedron occupies points G, M, Q and E.

FIG. 35 illustrates the orientation of solid 3C. One quarter section of the tetrahedron occupies points C, I, E and O. The tetrahedron occupies points E, I, Q and O. The eighth section of octahedron occupies points E, Q, O and N. The other quarter section of an octahedron occupies points I, Q, O and AA.

FIG. 36 illustrates the orientation of shape 3D. Here one quarter section of an octahedron occupies points A, S, M and K. The eighth section of the octahedron occupies points A, D, E and M. The other quarter section of an octahedron occupies points E, K, Q and M. The tetrahedron occupies points A, E, K and M.

FIG. 37 illustrates the orientation of shape 3DM. In this arrangement, one quarter section of an octahedron occupies points G, M, Q and Y. The eighth section of an octahedron occupies points Q, Y, W and Z. The other quarter section of an octahedron occupies points M, Q, O and W.

FIG. 38 illustrates the orientation of shape 3B. In this arrangement, the quarter section of an octahedron occupies

points S, Y, M and W. The eighth section of the octahedron occupies points M, K, N and W. The tetrahedron occupies points S, M, K and W.

FIG. 39 illustrates the orientation of another shape 3B. In this arrangement, the quarter section of a tetrahedron occupies points S, U, K and W. The eighth section of an octahedron occupies points K, N, O and W; and the tetrahedron occupies points K, O, U and W.

I claim:

1. A block system consisting of solids adapted to be assembled in facing relation to form a regular polyhedron, a plurality of said solids, each having shapes determined by an assemblage of components, consisting of eight regular tetrahedrons and fractional sections of four regular octahedrons, at least one said solid comprising an assemblage solely of a tetrahedron, a quarter section of an octahedron and an eighth section of an octahedron.

2. A block system as set forth in claim 1 including at least one solid comprising an assemblage solely of a tetrahedron, two quarter sections of an octahedron and one eighth section of an octahedron.

3. A block system consisting of solids adapted to be assembled in selected relations to form a hexahedron having a line through its geometrical center, a plurality of said solids each having shapes determined by an assemblage of components including a tetrahedron and at least one fractional section of an octahedron, each said tetrahedron having an edge extending from a point on said center line of said hexahedron to an outer edge defining part of said hexahedron.

4. A block system as set forth in claim 3 wherein said hexahedron is a cube and the point from which said edge of each said tetrahedron extends is the center of said cube said edge

extending to the midpoint of an outer edge defining part of said cube.

5. A block system as set forth in claim 4 wherein said plurality of solids consists of eight solids each including a tetrahedron, with pairs of tetrahedrons of said eight tetrahedrons having abutting edges extending from the center of said cube to the midpoint of an edge of said cube, four pairs comprising said eight tetrahedrons, each pair having abutting edges extending from the center of said cube to the midpoint of different edges of said cube.

6. A block system as set forth in claim 3 wherein said hexahedron is a cube and the point from which said edge of each said tetrahedron extends is the center point of an outer face of said cube, said edge extending to a corner defined by three edges of said cube.

7. A block system consisting of solids adapted to be assembled in facing relation to form a polyhedron, a plurality of said solids, each having shapes determined by an assemblage of components, at least one assemblage of components including a tetrahedron, a quarter section of an octahedron, and an eighth section of an octahedron, and at least one other assemblage of components including a tetrahedron, two quarter sections of an octahedron, and an eighth section of an octahedron.

8. A block system consisting of solids adapted to be assembled in facing relation to form a polyhedron, a plurality of said solids, each having shapes determined by an assemblage of components, at least one assemblage of components including a tetrahedron, and two quarter sections of an octahedron, and at least one other assemblage of components including a tetrahedron and four quarter sections of an octahedron.

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