July 22, 1958 J. G. GARDELLIN 2,843,971

CONSTRUCTION TOY BLOCK

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FIG. 2

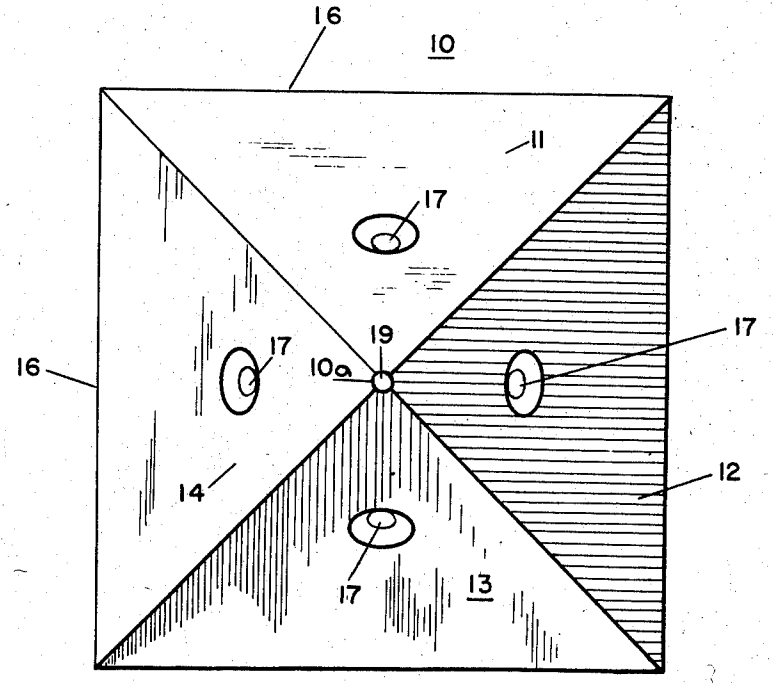
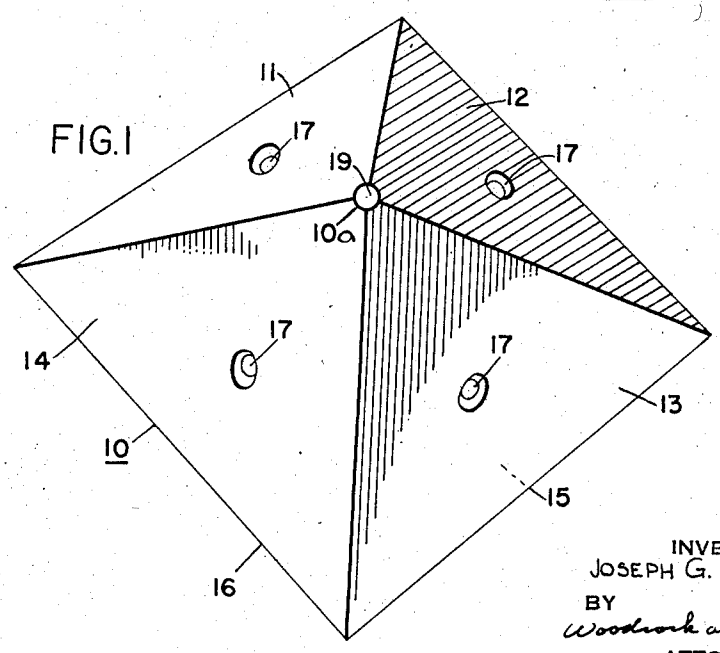


FIG. 1



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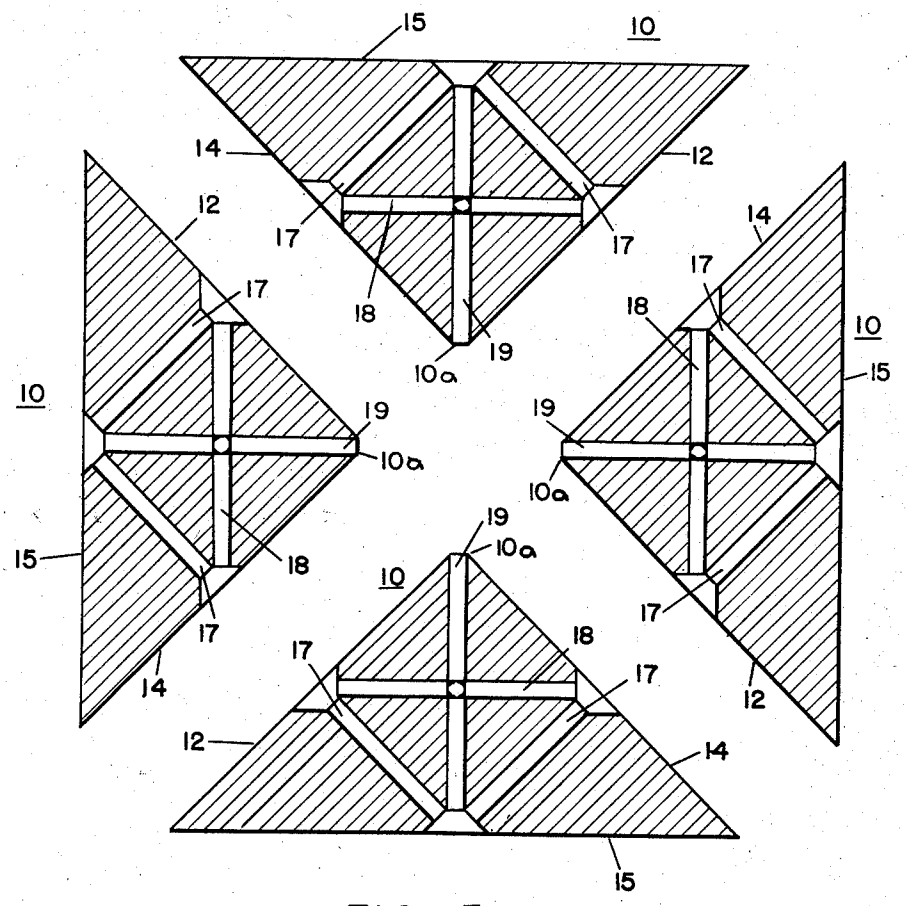

FIG 3

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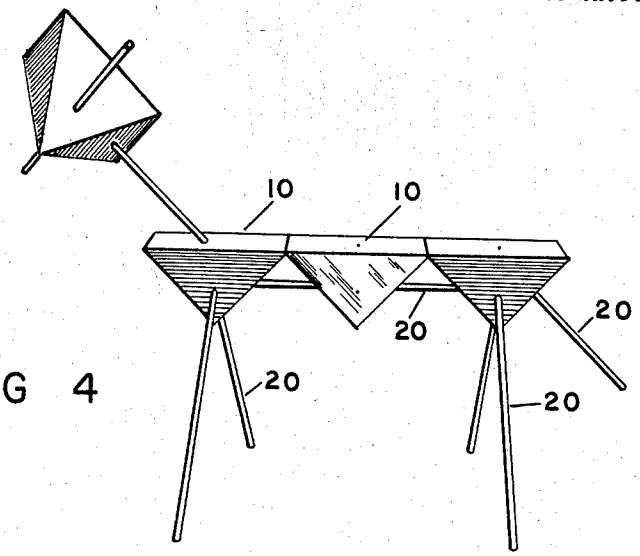

FIG 4

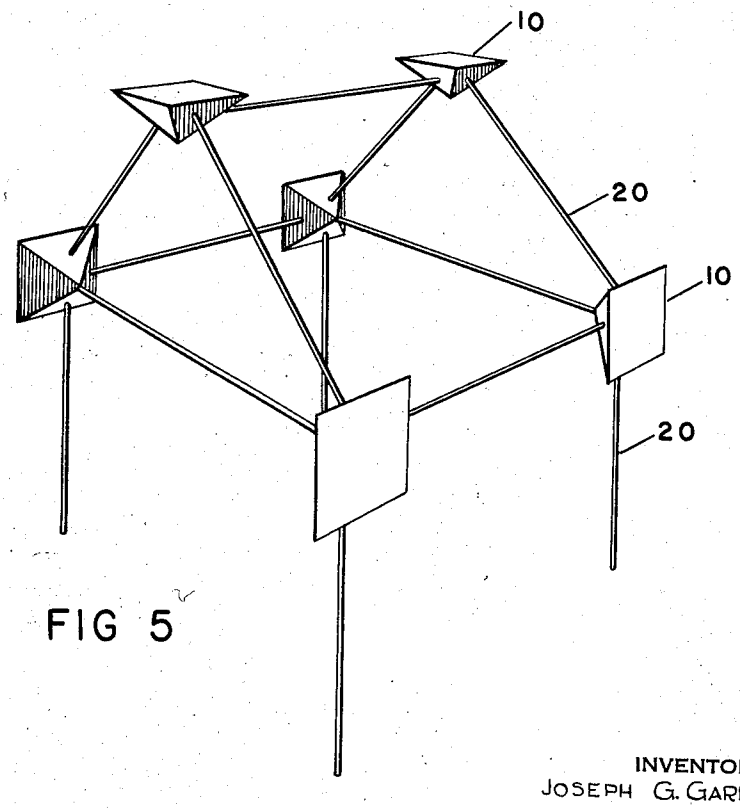

FIG 5

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CONSTRUCTION TOY BLOCK

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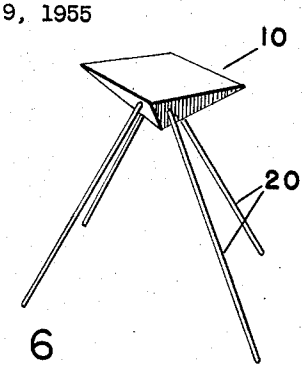

FIG 6

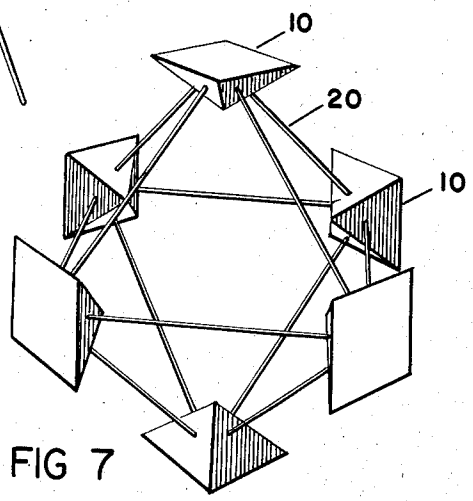

FIG 7

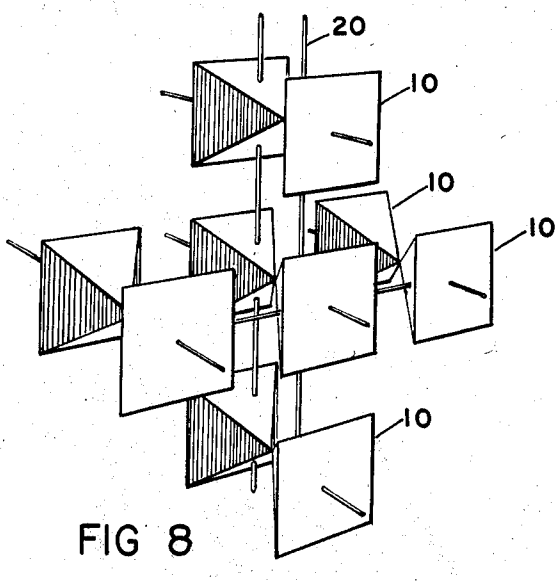

FIG 8

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2,843,971

CONSTRUCTION TOY BLOCK

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Application August 9, 1955, Serial No. 527,335

2 Claims. (Cl. 46—26)

This invention relates to a construction toy block, and more particularly to a plurality of identical construction blocks for the assembly of artistic displays and children's toys and has for an object the provision of construction blocks of identical and unique configuration, permitting the construction of a wide diversification of patterns and shapes without resorting to heterogeneous supplemental elements.

It is a further object of the present invention to provide a plurality of identical construction blocks of a unique configuration which imparts to the objects constructed a modernistic appearance to make them suitable in the representation of modernistic abstractions and designs.

In accordance with the present invention, there is provided a plurality of identical pyramidal pentahedrons. Each of the pentahedrons is possessed of four identical triangular sides or surfaces and a square side or surface and is so dimensioned that six of the pentahedrons, when assembled with their apexes meeting at a common point, will form a perfect cube.

Further in accordance with the present invention, there is provided a plurality of pyramidal pentahedrons which alone or together with identical pentahedrons will form with plane surfaces substantially all the angles necessary for facilitating the visual display of geometric figures to aid students in the understanding of three dimensional problems in geometry.

More particularly and in accordance with the present invention, each of the pyramidal pentahedrons has an altitude equal to one-half the length of the edge of the square side or surface. Each of the pentahedrons is further provided with means for assembling the pentadedrons in geometric array.

In a preferred embodiment of the present invention, a plurality of pentahedrons are provided, each of which is provided with a plurality of bores extending from the center of the base through the pentahedron and to a triangular side thereof. Each of the bores is directed at right angles to its respective triangular side and intersects the triangular side at a half-altitude point thereof. In addition the apex of each pentahedron is interconnected with the center of the base side by a bore, and opposite triangular sides are similarly interconnected by bores, each extending parallel to said base side and terminating at the vertical half-altitude points of the triangular sides. Also provided are interconnecting pins or rods to be received by said bores for rigidly assembling the pentahedrons in juxtaposition or in spaced array for the construction of imaginative toys and artistic displays.

For other objects and advantages of the invention, reference may be had to the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of a pyramidal pentahedron embodying the present invention;

Fig. 2 is a top plan view of the pentahedron of Fig. 1;

Fig. 3 is a cross-sectional view of a plurality of pentahedrons arranged to form a square;

Figs 4 and 5 illustrate examples of construction possible when the invention is used as a children's building block; and

Figs. 6, 7 and 8 illustrate the invention as being applied in the construction of artistic or geometric displays.

Referring now to the drawings, there is illustrated in Figs. 1 and 2 a block **10** for a construction kit and embodying the features of the present invention. More particularly, the construction block **10** is in the form of a pentahedron of novel configuration so as to afford maximum flexibility of construction. I have found that a kit including identical pentahedrons possessed of specific geometrical configuration will be useful in many and varied expressions of construction. Well-known geometrical forms may be assembled with the kit, for example, a perfect cube may be constructed by interconnecting six identical blocks **10** with their apexes **10***a* directed to a common point. In addition the kit may be used to construct modern artistic expressions.

Each kit includes a plurality of identical pyramidal pentahedrons having five sides **11–15**. Four of the sides **11–14** are triangular, and the fifth side **15**, forming the base portion, is square. The sides **11–14** define identical isosceles triangles. Each of the triangular sides has a vertical altitude equal to 0.707 times the dimension of one of the edges **16** of the square side **15**. Another way of mathematically expressing the configuration of the pentahedron is in terms of its altitude which is equal to one-half the dimension of one of the edges **16** of the base side **15**. Accordingly, with such construction each of the triangular sides **11–14** forms with the base side **15** an angle of 45°.

A large number of angular relationships may be constructed with the kit, for example, by placing the plane sides or surfaces of one pentahedron adjacent another plane surface, such as a table top. Still other combinations of angular relationships may be formed by placing two or more identical pentahedrons adjacent each other. A pentahedron resting on its base side **15** forms a plurality of 45° angles which are measured along the triangular sides of surfaces **11–14** and the base portion or side **15**. By supporting a pentahedron on one of its triangular sides there may be formed with the supporting surface a right angle. A right angle may also be formed by arranging two identical pentahedrons with adjacent triangular sides in contact. So arranged, two pentahedrons also form an angle of 180° or a straight line. The straight line thus formed by the two adjacent pentahedrons is actually a diagonal of a cube, and the right angle formed by the two pentahedrons is the included angle of two adjacent sides of a cube. In Fig. 3 there are illustrated four pentahedrons **10** in proper array to be assembled in juxtaposition with their apexes meeting at a common point. The addition of two more pentahedrons **10** to this construction, making a total of six pentahedrons, will form a perfect cube.

Although many geometrical figures and forms of different configuration may be constructed by placing the pentahedrons in juxtaposition, it is desirable to provide means for mounting the pentahedrons in spaced relation one to the other so as to afford maximum flexibility in construction. To this end each of the pentahedrons **10** is provided with a plurality of bores which extend from the plane sides or surfaces thereof into the pentahedrons for receiving interconnecting rods or pins **20** useful in assembling the pentahedrons in various relations as illustrated in Figs. 4–8.

More particularly, in the preferred arrangement each pentahedron **10** is provided with four bores or passage-

ways **17**, one extending from each of the triangular sides **11–14** to a common point at the center of the square side **15**. Each of the bores **17** is arranged at right angles to its associated side or surface **11–14**, and each terminates at one end at the vertical half-altitude point of its associated triangular side or surface of the pentahedron. In addition, opposite triangular sides **11**, **13** and **12**, **14** are interconnected by bores **18** which extend parallel to the base side **15** and which open onto the triangular sides or surfaces at the same points as the bores **17**. The apex of the pentahedron is interconnected by a bore **19** extending perpendicularly to the square surface **15** and opening at a point common with the bores **17**.

Although the various bores **17–19** have been illustrated as passing through the pentahedron **10**, it will be understood that the bores may only extend part way into the pentahedron, terminating short of the center of the pentahedron.

In order to facilitate the insertion of connecting rods or pins into the various bores **17**, **18** and **19**, the bores are counterbored at the surfaces of the pentahedron **10** to provide enlarged openings to guide the pins or interconnecting rods into place.

A kit comprised of the novel blocks **10** and interconnecting pins **20**, the latter being of different lengths and varied hues, lends itself to the construction of eye-appealing, artistic designs as illustrated in Figs. 6–8. These designs are in the nature of modern abstractions.

In Figs. 4 and 5 there are illustrated arrangements employing the present invention which might be constructed by a child, Fig. 4, for example, being representative of an animal, and Fig. 5 being representative of a house. The arrangements of Figs. 4–8 clearly illustrate the many combinations and geometric relations possible with a kit comprised of a plurality of building blocks of the present invention.

To enhance the appearance of the geometric constructions, the pentahedrons may be colored with bright enamel, or where they are made of plastic, they may be impregnated with iridescent colors. In some arrangements, each pentahedron may be multi-toned, the adjacent triangular surfaces **11–14** having harmonizing and contrasting colors. Since the parts comprising the kit lend themselves to modern designs, it can be understood that by providing the pentahedrons with eye-appealing color, the kits employing such elements lend themselves to the construction of fanciful mobiles, home decorations and interior displays.

If desired, the square sides or surfaces of the various pentahedrons may each be imprinted with a large bold-faced letter of the alphabet. The various lettered pentahedrons may be joined together by use of the interconnecting rods or pins passing through the recesses **18** to form simple words. Alternatively, the pentahedrons may be constructed to form a cube and thus form an alphabet block. The examples exemplify the possible use of the present invention as an educational device.

The sides or surfaces of the pentahedrons may also be imprinted with small numerals, and instructions may be provided referring to the numbered sides for the construction of more complex constructions.

What is claimed is:

1. A building block comprsing a pentahedron having four isosceles triangular surfaces and a square base surface, the altitude of said pentahedron being equal to one-half the dimension of the side of said base surface, each of said surfaces having at least two bores extending from a common point at the center of the respective surfaces into the interior of said block toward opposite surfaces, and said block having an additional bore extending into the interior thereof along the altitude of said pentahedron, each of said bores providing means for receiving an elongated element.

2. A building block comprising a pentahedron having four isosceles triangular surfaces and a square base surface, the altitude of said pentahedron being equal to one-half the dimension of the side of said base surface, a first group of bores extending from a central counterbore in each of said triangular surfaces through said pentahedron to a counterbore at the center of said base surface, a second group of bores extending from each of the central counterbores in said triangular surfaces through said pentahedron to intersect on the altitude of said pentahedron, and a third bore extending from the central counterbore of said base surface along the altitude of said pentahedron and through the apex thereof, each of said bores providing means for receiving a pin.

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