July 7, 1964 A. F. ARNOLD 3,139,698

SET OF BUILDING BLOCKS WHEREIN EACH BLOCK HAS CONNECTING MEANS ON THREE SURFACES THEREOF

Filed May 22, 1961 2 Sheets-Sheet 1

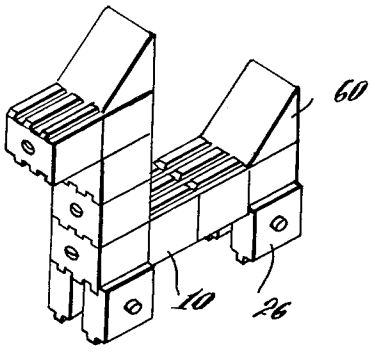


Fig. 1

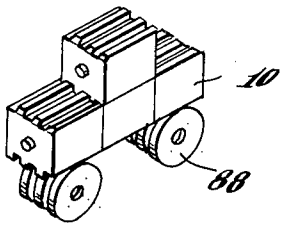


Fig. 2

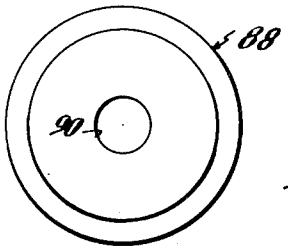


Fig. 4

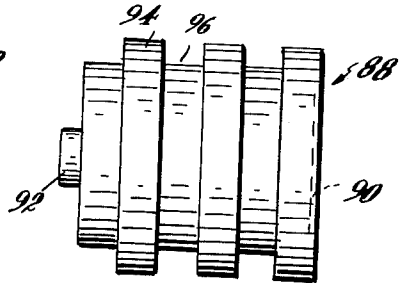


Fig. 3

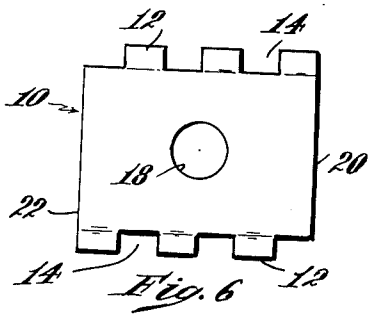


Fig. 6

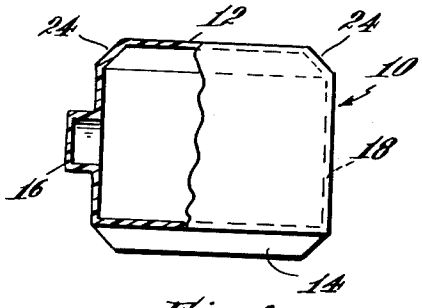


Fig. 5

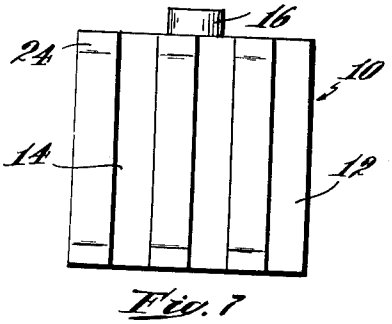


Fig. 7

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SET OF BUILDING BLOCKS WHEREIN EACH BLOCK HAS CONNECTING MEANS ON THREE SURFACES THEREOF

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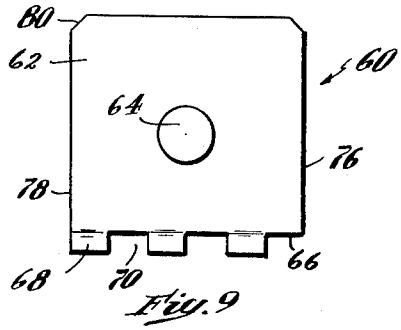


Fig. 9

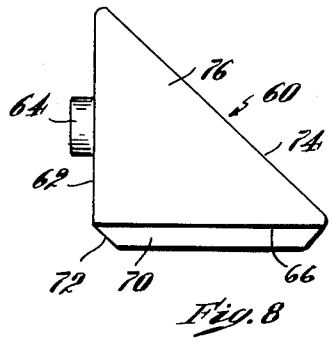


Fig. 8

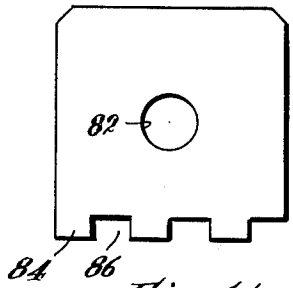


Fig. 11

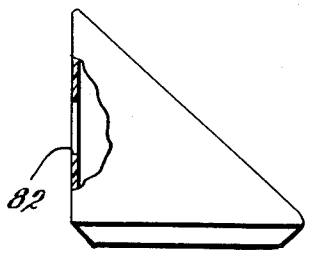


Fig. 10

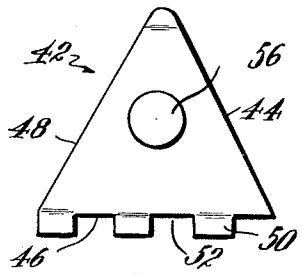


Fig. 13

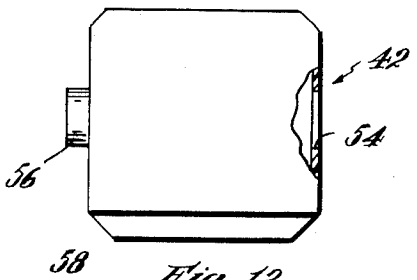


Fig. 12

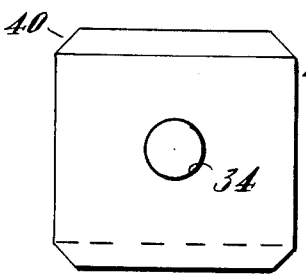


Fig. 15

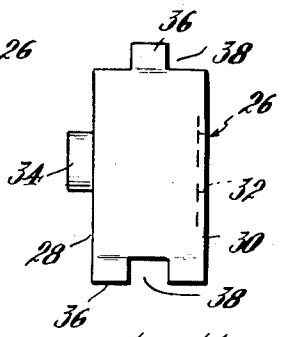


Fig. 14

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SET OF BUILDING BLOCKS WHEREIN EACH BLOCK HAS CONNECTING MEANS ON THREE SURFACES THEREOF

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Filed May 22, 1961, Ser. No. 111,592
6 Claims. (Cl. 46—25)

This invention relates to toy building blocks and has for its principal objects to provide a plurality of blocks of several different basic shapes which can be attached, one to another, in a variety of combinations to produce built-up structures or figures, or to produce fanciful designs; to provide blocks which can be attached to each other easily by direct pressing of a side or end of one against a side or end of another; to provide blocks which are of hollow, light weight construction and yet are sturdy; and to provide blocks which can be manufactured readily and economically.

As herein illustrated, the blocks are furnished in one or more sets, each set containing blocks with not less than three sides and not more than six sides, and each block having, on at least one side, tongues and grooves and, on at least one other side, a hole or pin. Some of the blocks have tongues and grooves on two sides and a hole or pin on at least one other side; others have tongues and grooves on one side and a hole and pin on two other sides; and still others have tongues and grooves on two sides and a hole and pin on two other sides. The blocks are of hollow monolithic construction, being comprised of a hard polyethylene, and the tongues and grooves are also hollow and have resilient walls. Preferably the ends of the tongues and the corners of the blocks are beveled.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

FIG. 1 is a perspective view of a figure comprised of a plurality of blocks assembled to represent a toy dog;

FIG. 2 is a perspective view of a structure comprised of a plurality of blocks assembled to represent a vehicle;

FIG. 3 is an elevation of a cylindrical block showing a pin at one end, a hole at the other end, and tongues and grooves on the cylindrical surface;

FIG. 4 is an end view of the cylindrical block, as seen from the right end of FIG. 3, showing the hole therein;

FIG. 5 is an elevation, partly in section, of a cubical block showing a pin at one end, a hole at the other end, tongues and grooves on two sides, and two smooth sides;

FIG. 6 is an end view taken from the right end of FIG. 5, showing the hole in that end;

FIG. 7 is a plan view of the top side of the block shown in FIGS. 5 and 6, showing the pin projecting from one end;

FIG. 8 is an elevation of a prism of right-triangular cross-section, showing a pin at one right side and tongues and grooves at the other right side;

FIG. 9 is a side elevation taken from the left side of FIG. 8;

FIG. 10 is an elevation, partly in section, of a prism of right-triangular cross-section, showing a hole in one of the right sides and tongues and grooves on the other right side;

FIG. 11 is a side elevation, as seen from the left side of FIG. 10;

FIG. 12 is an elevation of a prism of substantially equilateral triangular cross-section, partly in section, showing a pin at one end, a hole at the other end, and tongues and grooves on one side;

FIG. 13 is an end elevation, as seen from the right end of FIG. 12;

FIG. 14 is an elevation of a rectangular block having a pin at one end, a hole at the other end, tongues and grooves at two sides, and two smooth sides; and

FIG. 15 is an end elevation, as seen from the right end of FIG. 14.

Referring to the drawings, there are shown five units of basic shape, to wit, a cylindrical block (FIGS. 3 and 4); a cubical block (FIGS. 5, 6 and 7); a rectangular, half-a-cube, block (FIGS. 14 and 15); a prismatic block of right-triangular section (FIGS. 8 to 11); and a prismatic block of equilateral triangular section (FIGS. 12 and 13).

In the drawings, FIG. 1 shows a typical figure of a dog embodying, in its fabrication, three of the basic units, to wit, cubical blocks **10**, rectangular blocks **26**, and prisms of right-triangular section **60**. FIG. 2 illustrates a wheeled toy embodying, in its fabrication, two of the basic units, to wit, cubical blocks **10** and the cylindrical blocks **88**. These two figures are simply representative of what can be made by combining the several basic units and are in no way intended to be limiting as to the possible combinations which may be made up.

Each of the units is a hollow monolithic structure comprised of a "linear" or "hard" polyethylene composition which provides rigidity, strength and resilience.

The first basic unit, as shown in FIGS. 5 to 7, is a cubical block **10** which has tongues and grooves **12** and **14** on two of its sides, a pin **16** projecting from one of two other parallel sides, a hole **18** in the side parallel thereto, and two parallel flat sides **20** and **22**. As clearly indicated in FIG. 5, the tongues and pin, as well as the body of the block, are hollow. In order to strengthen the structure and eliminate points of failure, the ends of the tongues **12** are beveled as shown at **24**.

The second basic unit is of quadrilateral construction, as shown in FIGS. 14 and 15, and comprises a block **26** having two sides **28** and **30** which are square and four sides which are oblong. A hole **32** is provided in one of the square sides **30**, a pin **34** on the other of the square sides **28**, tongues and grooves **36** and **38** on two of the oblong sides, and the remaining two oblong sides are flat. The block **26** is substantially half of one of the blocks **10**. The block is hollow, the tongues and pin are hollow and the ends of the tongues are beveled at **40**.

The third unit, as shown in FIGS. 12 and 13, comprises a prism **42** which is triangular in cross-section, the sides **44**, **46** and **48** being substantially equal in length. The side **46** has on it tongues and grooves **50** and **52**. One end has a hole **54** and the other end a pin **56**. The remaining two sides **44** and **48** are flat. Like the preceding units, the tongues and pin are hollow as is the body of the block and the tongues are beveled as shown at **58**.

The fourth unit (FIGS. 8 and 9) comprises a prism **60** of right-triangular section. One of the right sides **62** has on it a pin **64** and the other **66** a plurality of tongues and grooves **68** and **70**. The block is hollow, the tongues are hollow, and the ends of the tongues are beveled at **72**. The corners, at the junction of the right side **62** and the hypotenuse side **74**, with the ends **76** and **78** are beveled at **80**.

The unit shown in FIGS. 10 and 11 is a variation of that shown in FIGS. 8 and 9, in that it is provided with a hole **82** in one of the right sides in place of the pin. The other right side has tongues and grooves **84** and **86**.

The fifth unit (FIGS. 3 and 4) is a right cylinder **88**. One end of the cylinder contains a hole **90**, the other end a pin **92**, and the cylindrical surface has on it tongues **94** and grooves **96**. The pin and tongues are hollow as well as the body of the block.

As previously pointed out, the blocks are comprised of a hard polyethylene which is resilient in contrast to being compressible so that the blocks may be attached to each other by forcing the tongues of one into the grooves of

the other, or the pin of one into the hole of another. The pressure required to effect interengagement displaces the resilient material just enough so that after engagement the parts are held together by constriction of one part on another so that structures can be fabricated from the blocks which are self-sustaining. Self-sustaining units of this kind are preferred to those which require connections such as undercut or so-called dovetail grooves and tongues, ball-type pins and sockets, and/or snap fasteners, and the like, all of which require special techniques in their manufacture, increase the cost, and limit the freedom of association of the parts.

The blocks are monolithic in structure and are made by a process of blow-molding as distinguished from injection molding. The simplicity of their structure makes manufacture by blow-molding economical and involves no difficulties in the manufacture of the molds themselves. Advantage is taken of the fact that the hard polyethylene has a certain amount of inherent shrinkage so that, after the blocks are molded, the small amount of shrinkage which takes place enhances the gripping action of the tongues and grooves and the gripping action of the pins and holes.

It is, of course, within the scope of the invention to make the blocks of the same or different colors to further excite interest in building figures of various kinds. It is contemplated that the blocks will be sold in quantities of six or more units of the five basic units.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. In a set of building blocks, the combination of a plurality of hollow blocks of several predetermined geometrical shapes, each block having walls which delimit its shape, the block with the least number of walls having no less than three walls, the block with the greatest number of walls having no more than six walls, each of said blocks having at least one wall but no more than two walls which embody a plurality of tongues and grooves of right section, enabling joining the blocks wall-to-wall by engagement of the tongues on a wall of one block within the grooves on a wall of another block while permitting relative displacement of the joined blocks in the plane of the adjoining walls, one of the remaining

walls containing a hole perpendicular to its surface, and another mounting a pin perpendicular to its surface, said pin corresponding substantially in diameter to said hole, said hole and pin enabling joining the blocks wall-to-wall by engagement of the pin on a wall of one block within a hole in the wall of another block while permitting relative rotation of the blocks about an axis perpendicular to the plane of the adjoining walls, said tongues and pins being hollow extensions of the hollow interior of the blocks and elastically interengageable with the grooves and holes, respectively.

2. A set of blocks according to claim 1 wherein two of the walls of some of the blocks each embodies a plurality of said tongues and grooves.

3. A set of blocks according to claim 1 wherein one of the blocks is a right cylinder of circular cross-section and the cylindrical wall embodies said plurality of tongues and grooves.

4. A set of blocks according to claim 1, wherein one of the blocks is a prism of triangular section having three side walls parallel to the axis of the prism and two end walls perpendicular to the axis of the prism, one of the side walls embodies said plurality of tongues and grooves, one of the end walls contains said hole, and the other end wall mounts said pin.

5. A set of blocks according to claim 1 characterized in that the ends of the tongues are beveled.

6. A set of blocks according to claim 1, characterized in that the corners of the blocks are beveled.

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