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TOY BLOCKS WITH MEANS PERMITTING GREATER TOLERANCE IN
THE ALIGNMENT OF MALE AND FEMALE CONNECTORS

Filed July 8, 1965

2 Sheets-Sheet 1

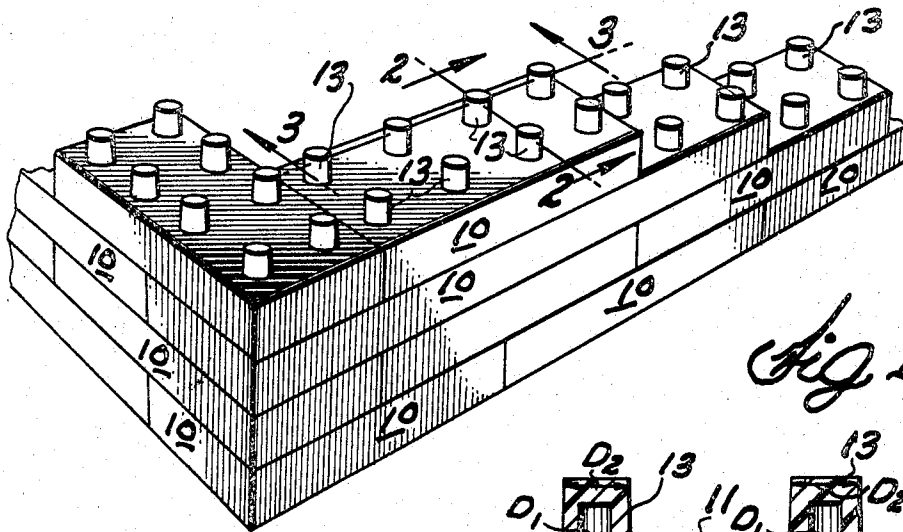


Fig. 1

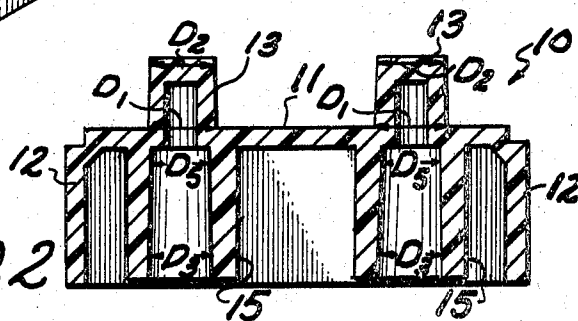


Fig. 2

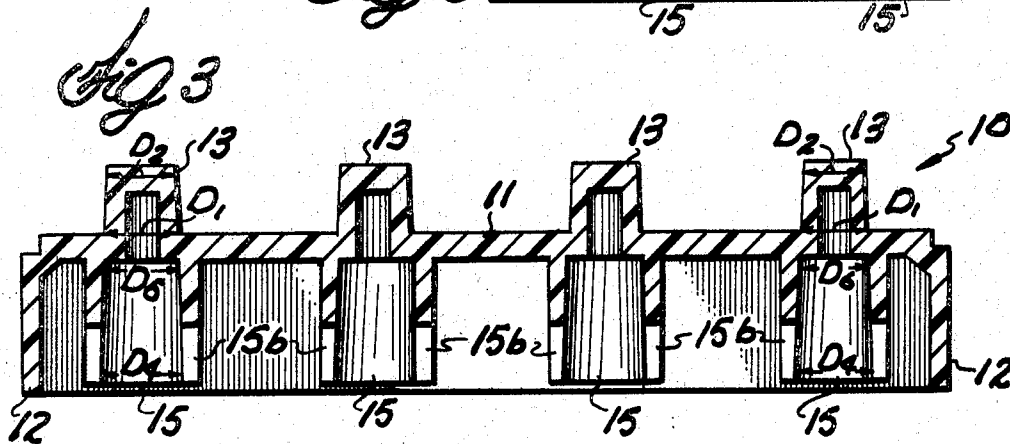


Fig. 3

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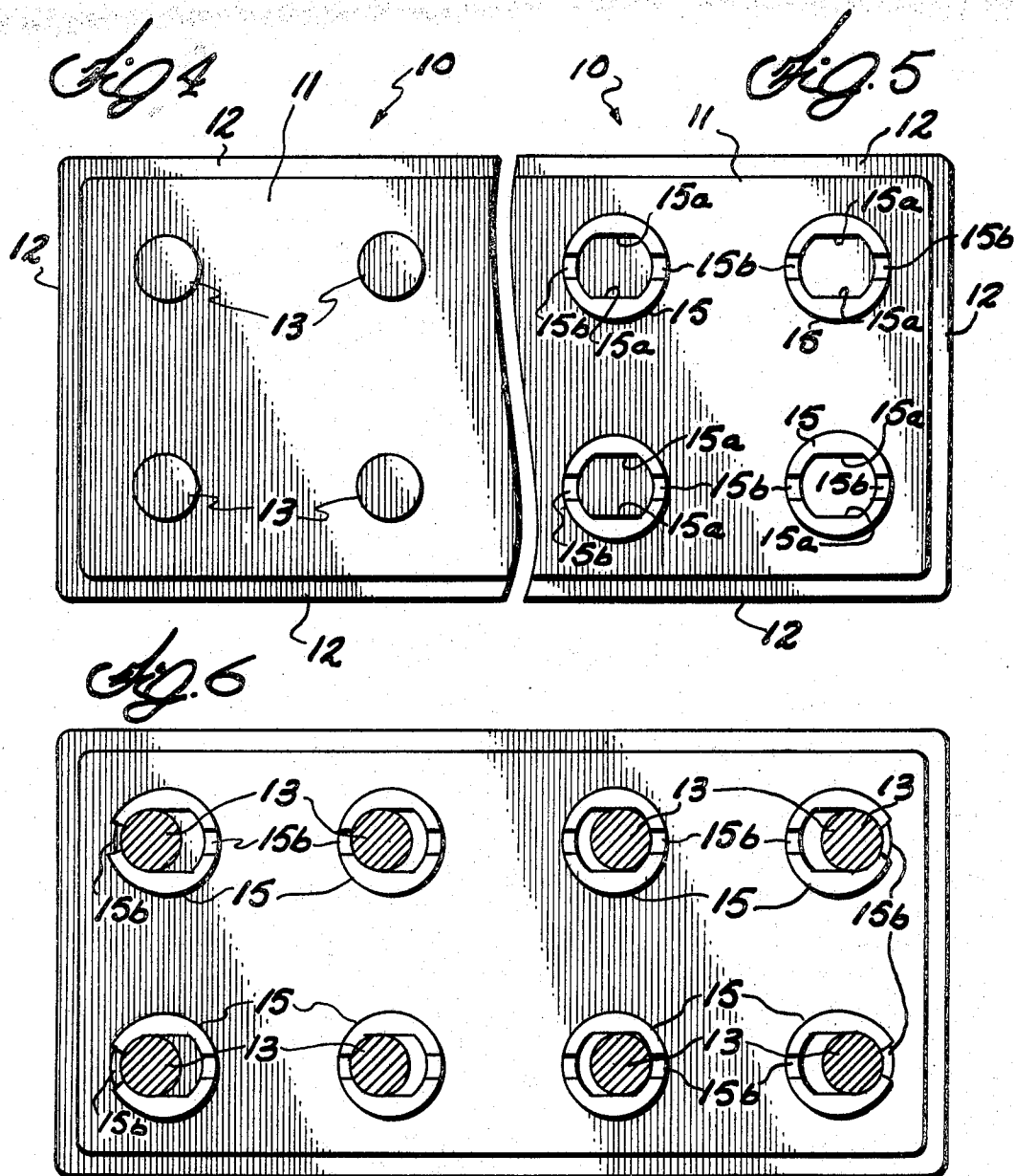
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TOY BLOCKS WITH MEANS PERMITTING GREATER TOLERANCE IN THE ALIGNMENT OF MALE AND FEMALE CONNECTORS

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4 Claims

ABSTRACT OF THE DISCLOSURE

A toy building block having a plurality of similarly constructed uniformly spaced dowels extending from one face and a plurality of similarly constructed sockets extending from a second face, the sockets having substantially the same spacing as said dowels. The sockets are adapted to receive the dowels from another similarly constructed building block to secure the blocks together. Each socket is adapted to receive a single one of the said dowels and has a dimension in one direction which is greater than the corresponding dimension of one of said dowels. Each socket has a transverse dimension substantially the same as the corresponding dimension of one of said dowels so that one of said dowels may be snugly received therein.

The present invention relates to toy building blocks and more specifically to toy building blocks having improved securing means for connecting the blocks together.

Toy building blocks are presently available which have a plurality of dowels extending from one face and a plurality of sockets extending from a second face. The sockets are adapted to receive the dowels so that the blocks may be connected together. The sockets of present conventional units correspond in cross section to the dowels. Because of the nature of the material and the manufacturing methods usually employed, the tolerances of the dowels and sockets are not precisely maintained. Consequently, it has been found that in various instances it is difficult to connect blocks together, and in other instances it is difficult to disassemble connected blocks. The sockets of present blocks may be formed with smaller cross sections than the dowels and may be slotted perpendicular to the block lengths to insure that a tight fit exists between the dowels and the sockets. It has been desirable to provide a toy building block which overcomes these problems.

A primary object of the present invention is to provide new and improved toy building blocks, which overcome the problems encountered with prior art building blocks. More specifically, it is an object to provide toy building blocks having improved means for connecting the blocks together. In this latter connection, it is an object to provide such blocks wherein the blocks may be securely connected together and yet may be readily taken apart once connected together.

Another more specific object is to provide a toy building block having new and improved socket means for receiving dowels of another building block.

Still another object of the present invention is to provide new and improved toy building blocks which are adaptable for use with present conventional building blocks.

Another general object of the present invention is to provide new and improved toy building blocks characterized by their simplicity and economy. Moreover, it

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is another general object to provide new and improved toy building blocks which eliminate any need for maintaining precise tolerances and which thereby reduce manufacturing costs.

Other objects and advantages of the invention will become apparent upon reading the attached detailed description taken in conjunction with the drawings.

In one form of the present invention, a toy building block is provided which has a main body portion. A plurality of dowels having substantially circular cross sections extend from one face of the main body portion. A plurality of sockets having substantially frusto-circular cross sections extend from a second face of the main body portion and are adapted to receive dowels from another building block to connect the blocks together. Each socket has a dimension in one direction which is greater than the diameter of a dowel and has a transverse dimension corresponding to the diameter of a dowel so that a dowel may be snugly received therein. The sockets may be formed with a transverse dimension slightly smaller than the dowel diameter and may be slotted to provide for distortion thereof so that a tight fit is provided between the dowels and sockets.

The invention will now be described in conjunction with the drawings wherein:

FIGURE 1 shows a plurality of toy building blocks constructed in accordance with the teachings of the present invention which are connected together to form a portion of a structure;

FIG. 2 is a cross-sectional view of a toy building block constructed in accordance with the teachings of the present invention taken substantially along line 2—2 in FIG. 1;

FIG. 3 is a cross sectional view of a toy building block constructed in accordance with the teachings of the present invention taken substantially along line 3—3 in FIG. 1;

FIG. 4 is a partial top plan view of a building block constructed in accordance with the teachings of the present invention;

FIG. 5 is a partial bottom plan view of a building block constructed in accordance with the teachings of the present invention; and

FIG. 6 illustrates the mating relationship between portions of a pair of toy building blocks constructed in accordance with the present invention which are connected together.

While the invention has been shown and will be discussed in some detail with reference to a particular exemplary embodiment thereof, there is no intention that it should be limited to such detail. Quite to the contrary, it is intended here to embrace all modifications, alternatives and equivalents falling within the spirit and scope of the invention as defined by the appended claims.

Referring now to FIG. 1, a portion of a structure which is formed from a plurality of toy building blocks 10 constructed in accordance with the teachings of the present invention. As will become readily apparent, the building blocks constructed in accordance with the present invention may have any desired length, width or shape. In the structure of FIG. 1, the building blocks 10 have been connected together to form an angle or corner of a structure such as the corner of a building.

Referring to FIGS. 2 to 5, a substantially rectangular building block 10 constructed in accordance with the teachings of the present invention is shown in detail. However, it will be apparent that this is merely illustrative of one form of the invention and the building block may take any desired form or shape. The building block is preferably formed of a substantially rigid material, such as plastic, having some flexibility. The exemplary building block 10 has a main body portion which includes

a rectangular base plate 11 having four side wall panels 12 extending outwardly therefrom in substantially perpendicular relationship. Consequently, the building block 10 is in the form of a hollow rectangular block having one open face. Two longitudinally extending rows of dowels 13 are provided in the building block 10 which extend outwardly from one face of the base plate 11 and have substantially circular cross sections, four dowels being provided in each row of the exemplary building block. However, the present invention is not intended to be limited to the disclosed exemplary arrangement since it will be readily apparent that any desired number of rows of dowels may be provided, and any desired number of dowels may be provided in each row. As may be seen, the dowels 13 taper inwardly as they extend outwardly from the base plate 11. In other words, the dowels are provided with a diameter D_1 adjacent the face plate 11 and a diameter D_2 at the outer extremity thereof which is less than the diameter D_1 .

In accordance with a principal aspect of the present invention, the building block 10 is provided with new and improved sockets 15 which are adapted to receive dowels 13 of other building blocks so that the building blocks may be connected together. More specifically, new and improved sockets are provided which provide a snug fit with dowels of other building blocks and yet compensate for variations in the dimensions of the other building blocks so that the building blocks may be connected together, when a perfect fit does not exist between the dowels and sockets, and may be readily disconnected once they are connected together. For this purpose, each socket 15 is formed to provide a loose fit with a dowel in the longitudinal or lengthwise direction of the building block 10 and to provide a snug fit with a dowel in a transverse direction.

In the exemplary arrangement two rows of sockets 15 are provided wherein the number of sockets in each row corresponds to the number of dowels 13 in each row and wherein the sockets are in register with the dowels. As may be seen by reference to FIGS. 2 and 3, each socket 15 is tapered inwardly from the extremity thereof so that the outer dimensions D_3 and D_4 are greater than the inner dimensions D_5 and D_6 adjacent the face plate 11 and so that the tapered dowels 13 may be accommodated thereby. Moreover, as may best be seen by reference to FIG. 5, the exemplary sockets 15 have frusto-circular cross sections. In other words, a cross section taken at a selected position along the length of a socket 15 corresponds to a circle with opposite segments removed to define a pair of flat or straight parallel surfaces 15a. Each socket 15 is designed to have dimensions extending in a direction longitudinally of the block, i.e., parallel to the surfaces 15a, which are greater than the cross-sectional diameters of a dowel 13 taken at corresponding positions along the dowel when the dowel is received therein so that a loose fit exists therebetween in the longitudinal direction. On the other hand, each socket 15 has transverse dimensions which correspond to or are slightly smaller than the cross-sectional diameters of a dowel 13 taken at corresponding positions along the dowel when the dowel is received therein so that a snug fit exists therebetween in the transverse direction. Consequently, when dowels 13 of one building block are inserted within the sockets 15 of another building block, as shown in FIG. 6, means are thus provided whereby the dowels are snugly received in the sockets to provide a secure connection and the elongated sockets provide additional tolerance in the longitudinal direction to compensate for errors in the formation of the dowels and sockets, i.e., when a perfect fit does not exist between the dowels and sockets. Moreover, while providing for a secure connection between building blocks, the sockets 15 prevent too snug a fit from existing between the dowels and sockets so that the building blocks may be taken apart once connected together. This

is true since the sockets 15 are free to be slightly distorted due to the configuration thereof.

For the purpose of aiding in providing a tight or snug fit between the dowels 13 and the sockets 15, the sockets may be formed with a transverse dimension slightly smaller than the corresponding dowel dimension and slots 15b may be formed in the sockets in the longitudinal or lengthwise direction of the building block 10. Consequently, the split portions of the sockets 15 are free to be distorted a slight amount so that the dowels may be received therein. As an alternative to forming the slots 15b in the sockets, the sockets may be formed with a softer, more flexible material, although less precision is obtained with such softer materials.

While the exemplary sockets 15 have curved ends and flat or straight sides 15a, the invention is not intended to be limited to such an arrangement. Quite to the contrary, the invention is intended to cover any arrangement wherein the socket has a longitudinal dimension which is greater than a corresponding dimension of the dowel and has a transverse dimension substantially the same as the corresponding dimension of the dowel. Thus, the sockets may be substantially elliptical or rectangular in cross section. In like manner, the dowels may be substantially elliptical or rectangular in cross section. However, each socket preferably has a maximum transverse dimension which is continuous over a predetermined length in the longitudinal direction so that there is no tendency for a dowel to center within the socket.

While the dowels 13a and the sockets 15 in the exemplary arrangement are tapered to aid in aligning the dowels with the sockets and to facilitate connecting building blocks together, it will be readily apparent that the building blocks may be formed with non-tapered dowels and sockets, and the invention is intended to cover either arrangement.

In view of the foregoing, it will be readily seen that a new and improved building block has been provided which facilitates the connecting together of building blocks and which facilitates the taking apart of connected building blocks. Moreover, it will be apparent that a building block has been provided which provides additional tolerance and does away with the need for more precise manufacturing. Consequently, it will be apparent that the building blocks constructed in accordance with the present invention allow for a reduction in manufacturing costs due to the requirement for less precise manufacturing.

What is claimed is:

1. In a toy plastic building block, the combination which comprises an elongated main body portion, a plurality of similarly constructed uniformly spaced dowels protruding from one face of the main body portion and disposed in a row extending longitudinally of said body portion, and a corresponding number of sockets extending from a second face of the main body portion, each said dowel being in substantially axial alignment with a corresponding one of said sockets, said dowels and said sockets having substantially the same uniform spacing, each socket being adapted to receive a single one of said dowels from another similarly constructed building block to secure the building blocks together, each of said sockets including means for securing one of said dowels therein and for providing additional tolerance in the longitudinal direction to compensate for errors in the information of the dowels and sockets, in that each socket defines an elongated recess having a length taken longitudinally of the block which is greater than the corresponding dimension of the mating portion of one of said dowels to receive a dowel therein at any portion within the longitudinal extent of such socket, and each socket having an inside transverse dimension substantially the same as the corresponding dimension of said mating portion, so that one of said dowels may be snugly and releasably received therein at any such position.

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2. The structure of claim 1 wherein said main body portion is in the form of a hollow rectangular member having side walls extending perpendicularly from said second face.

3. The structure of claim 1 wherein slots are formed in the ends of each of said sockets to allow for distortion of said sockets. 5

4. The structure of claim 1 wherein said block is provided with a plurality of such rows of said dowels extending longitudinally of said body portion, and a corresponding arrangement of said sockets extending from said second face of the main body portion, said dowels being of substantially circular cross section. 10

References Cited

UNITED STATES PATENTS

2,949,692 8/1960 Kuhn ----- 46—28

6

FOREIGN PATENTS

700,091	12/1964	Canada.
17,634	7/1909	Great Britain.
676,469	7/1952	Great Britain.
128,398	7/1948	Australia.
1,357,579	2/1964	France.
883,895	12/1961	Great Britain.
890,771	3/1962	Great Britain.
935,308	8/1963	Great Britain.
976,761	12/1964	Great Britain.
996,811	6/1965	Great Britain.

F. BARRY SHAY, Primary Examiner

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U.S. Cl. X.R.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,481,068 Dated December 2, 1969
Inventor(s) N. I. Paulson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 55, after "structure" insert
--is shown--

Column 4, line 70, in claim 1, "portion" should be
--position--

SIGNED AND
SEALED
JUN 9 1970

(SEAL)

Attest:

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