March 26, 1957 U. TORRICELLI 2,786,301

EDUCATIONAL INTERLOCKING BUILDING BLOCKS

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FIG. 2

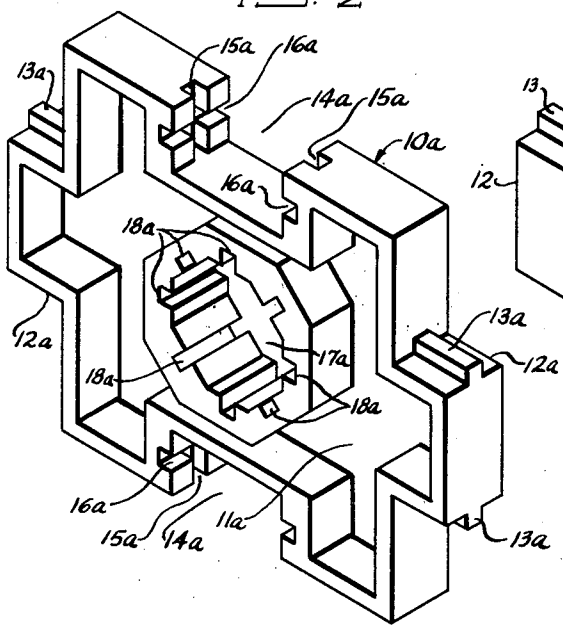


FIG. 1

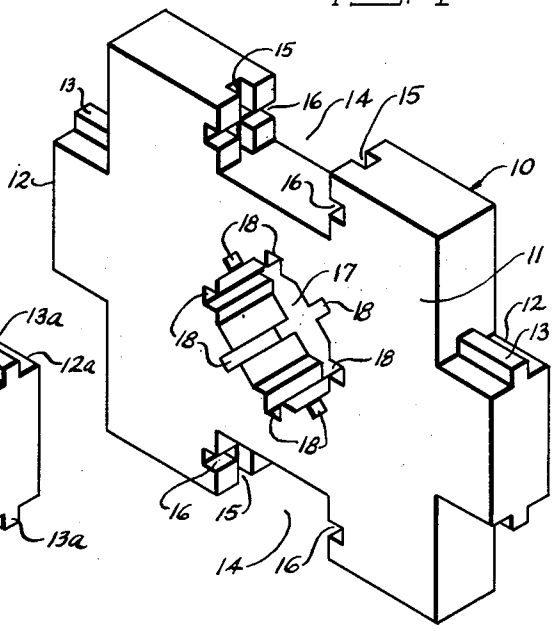
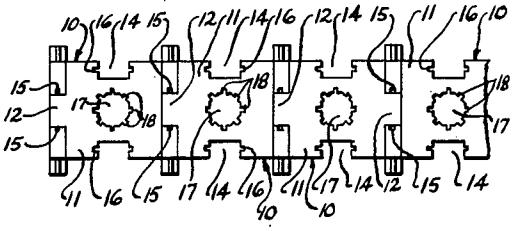


FIG. 5



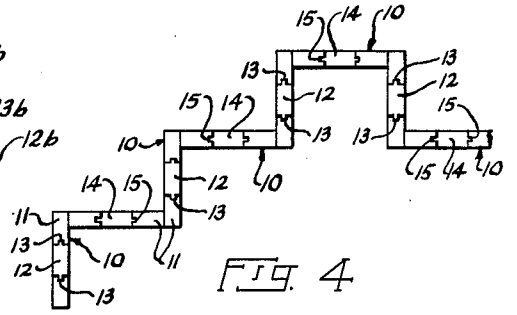


FIG. 4

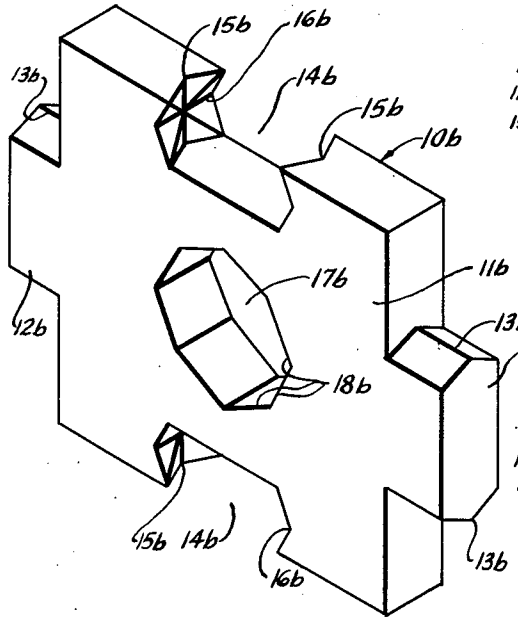


FIG. 3

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FIG. 6

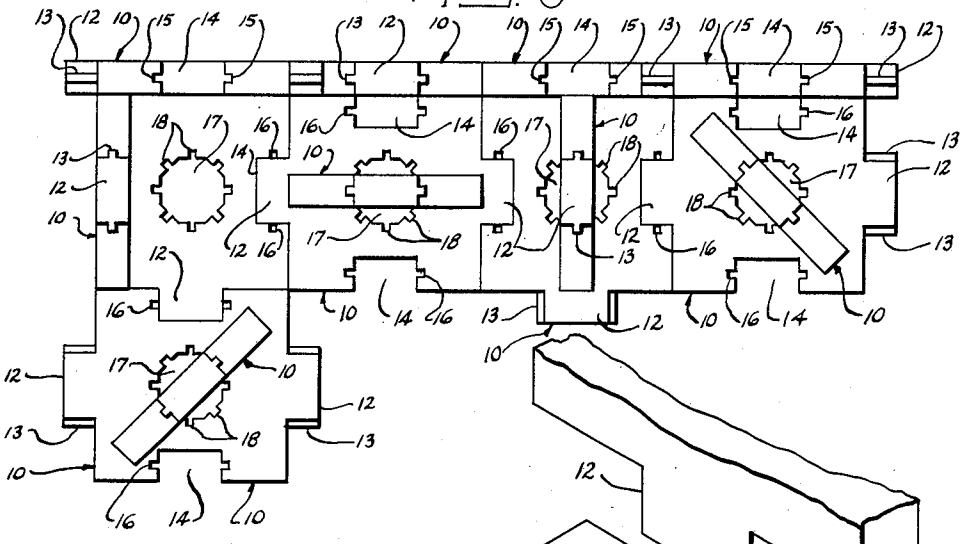
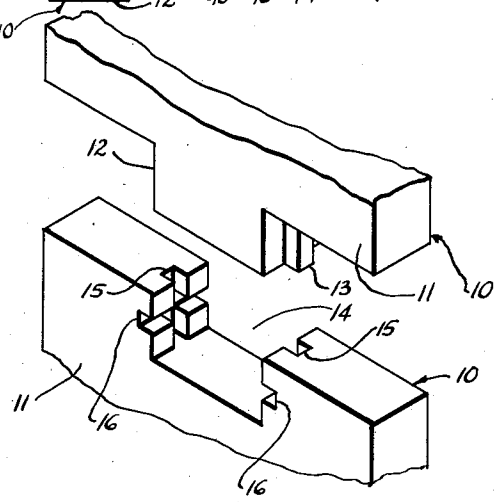


FIG. 8



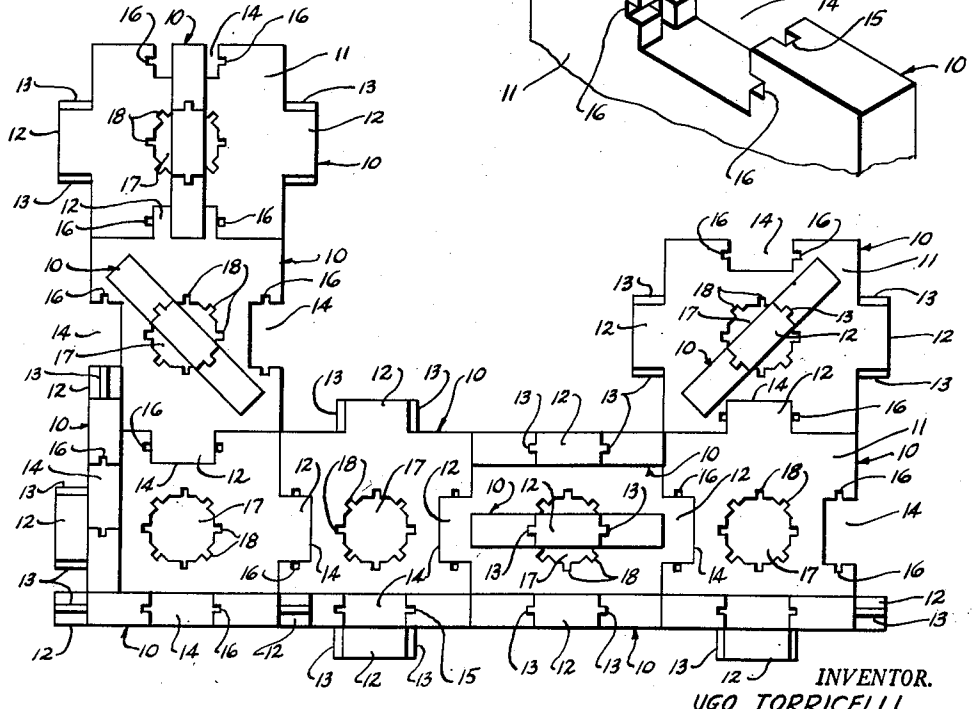


FIG. 7

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EDUCATIONAL INTERLOCKING BUILDING BLOCKS

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Application June 11, 1954, Serial No. 436,092

9 Claims. (Cl. 46—25)

This invention relates to a set of blocks wherein each block is of identical construction and comprises a rectangular body portion having projections at opposite ends, recesses in opposite sides and a central opening therethrough, the said projections and recesses being interfittable and interlockable in a plurality of positions with the recesses and projections of every other block of the set.

Building blocks of many different types are well known and extensively used as children's toys. The practice in producing such sets is to provide a number of different shapes and sizes of blocks so as to make possible the construction of a variety of objects. In some instances, the blocks are smooth-surfaced so that they merely rest upon or alongside one another and in some other instances connecting rod-like members are provided which fit into holes or recesses provided in certain of the blocks. While such block sets have value for use as toys, they are relatively expensive to manufacture and ordinarily do not make it possible to provide objects or structures which can be retained in the built-up form, and it has been found that the necessity for providing several different forms of blocks, together with connecting members, when employed, is disadvantageous and lacks the versatility of enabling permanent or semi-permanent structures to be built in various directions with great choice of block relationship.

It is, accordingly, one of the objects of the present invention to produce a set of blocks of which every block is identical and of which every block is capable of an interlocking fit in a plurality of positions with every other block of the set.

Another object of the invention resides in the provision of a simplified set of blocks wherein all the blocks are identical in construction with consequent economies in production while at the same time imparting unusual versatility for the building of many diverse types of structures some of which cannot be built at all with available blocks.

A more specific object of the invention is to provide a set of blocks wherein all the blocks are identical and wherein each block comprises a rectangular body portion having ribbed projections at opposite ends, multi-grooved recesses in opposite sides and a central multi-grooved opening therethrough so constructed and dimensioned that every block is capable of a plurality of physical interrelationships with every other block of the set.

Other and further objects and advantages will be understood or appreciated by those skilled in this art or will be apparent or pointed out hereinafter.

In the accompanying drawings,

Fig. 1 is a perspective view on an enlarged scale of a preferred block constructed in accordance with the present invention;

Fig. 2 is a similar view of a modified construction of block;

Fig. 3 is a similar view of a further modified block;

Fig. 4 is a side elevational view of a plurality of blocks

according to Fig. 1, showing certain types of connections which can be made with my new blocks;

Fig. 5 is a plan view of Fig. 4;

Fig. 6 is a plan view of a plurality of blocks illustrating the many different relative positions in which the said blocks can be interfitted and interlocked;

Fig. 7 is a side elevational view of Fig. 6 and

Fig. 8 is a perspective view showing two individual blocks in the process of being interfitted in accordance with one mode of effecting connection therebetween.

The block of Fig. 1 shows the details of construction of each and every block of the set of blocks and from which it will be observed, particularly when taken in conjunction with Figs. 5, 6 and 7, that each such block designated as a whole by the numeral **10**, comprises a rectangular body portion **11** of relatively small thickness as compared with its length and width and having an overall length including its projections greater than its width as seen from Fig. 1. This body portion **11** may be composed of any suitable or desired material, such as wood or synthetic plastic, but the particular material of which each block is composed is not intended to constitute a limitation upon the invention. It is, however, desired that the bolcks shall be produced from a material which will faithfully retain over a long period of time and many connections and disconnections the projections, recesses, ribs and grooves hereinafter described so that the useful life of the blocks shall be of long duration.

The body portion **11** of each such block, of which there may be any desired total number in the set, is provided with a projection **12** at each end. These projections **12** are centrally located with respect to the width of the block and each projection is provided on its upper and lower surfaces with a rib or the like **13** disposed centrally thereof and longitudinally of the block. The body portion **11** of each block is provided with a recess **14** in each side thereof and centrally located with respect to the length of the block. The depth of each such recess **14** is equal to the length of a projection **12** and the end walls of each recess are provided with vertical and horizontal grooves **15** and **16**, respectively, the depth of each of which grooves is equal to the height of a rib **13**. The body portion **11** of each block is further provided with a transverse centrally located aperture **17** which has a plurality of diametrically opposed sets of recesses **18** which are also equal in depth to the height of a rib **13**. As will be clear from Figs. 1 and 5, in particular, there are four such sets of opposed recesses in each block and the total distance between them from the bottom of one groove to the bottom of the opposite groove is equal to the distance from the top of one rib **13** to the bottom of the opposite rib **13** on the same projection **12**.

Thus, it will be clear that each block is capable of being interfitted and interlocked with every other block of the set in a plurality of different positions. Consequently, another block of the set may be interfitted with the upper recess **14** of Fig. 1 by inserting the ribs **13** into grooves **15** whereby a planar connection is made or, optionally, the ribs **13** may be inserted at right angles to grooves **15** by sliding them into grooves **16** and, as to the latter arrangement, interconnection may be made from either of two opposite directions. The same is true of the lower recess **14** of the block of Fig. 1 wherein the same interconnections may be made as described for the upper recess **14**. In addition, the ribbed projection of a block may be inserted into any opposed pair of grooves **18** of central aperture **17** and in such manner that the interfitted block may be vertical, horizontal or in either of two diagonal positions relative to the receiving block and such block may be inserted in such opposed sets of grooves from either side of the receiving block. It will,

therefore, be appreciated that successive blocks may be assembled in a great variety of relative positions and that structures may be built up in many different directions.

Due to the fact that all the blocks are identical and that the various ribs and grooves have the dimensions set forth and illustrated, it will be clear that when the blocks are assembled they are firmly held in position and do not become readily or accidentally disassembled so that permanent or semi-permanent objects can be built up which have very considerable strength and rigidity so that they may be handled freely and moved about as may be desired without danger of coming apart. Intentional disassembly may, however, be readily effected by following the reverse operations from those described for the assembly of the blocks. It is to be particularly noted that blocks according to the invention are capable of being assembled to form educational models, particularly architectural models, and that, although there is only a single shape and size for all the blocks, unusual structures can be produced as compared with known blocks. For example, Figs. 4 and 5 illustrate how blocks can be assembled (the showing in these figures being understood as partial or fragmentary) to form ascending or descending stair or step-like structures, and articles of furniture such as chairs may similarly be built. So far as I am aware, this is not possible with existing types of blocks. In Figs. 6 and 7, I have shown how blocks can be interfitted and interlocked in the various relationships above described and, while these figures do not illustrate any specific objects, they do show how the blocks can be assembled in many different directions and angular relationships so as to enable a great variety of structures to be built therefrom. Thus, blocks can be interlocked in planar relationship to any desired length to form horizontal surfaces, such as floors or ceilings, can be interlocked in right angled or other angled relationships to form corners, pitched roofs, enclosures and the like and can be generally built up into a great variety of forms and structures dependent only upon the imagination and ingenuity of the user. Model houses of different designs, furniture, and buildings of many types can, for example, be readily constructed with the new blocks.

As above stated, the body portion of each block may be composed of wood, synthetic plastic or any other suitable material and, in addition, may be made either solid or hollow. The block illustrated in Fig. 1 is preferably solid, whereas the modified form of block, shown in Fig. 2, has essentially the same construction as the block of Fig. 1, as will be appreciated from the use of similar related numerals. In this form of the invention the block **10***a* is preferably composed of a hollow synthetic plastic and, while such block is intentionally shown as having one open or missing side face, it is understood that it may optionally be provided with such side face so that the block will be closed. While the construction of the block of Fig. 2 will be clear from Fig. 1 and the foregoing description thereof, it is pointed out that block **10***a* likewise has the projections **12***a* ribbed at **13***a* and side recesses **14***a* forming walls which are grooved at **15***a* and **16***a*. Block **10***a* likewise is provided with a central aperture **17***a* having the grooves **18***a* arranged in diametrically opposed sets like grooves **18** of Fig. 1. The modified form of block shown in Fig. 2 has the additional advantage that it is extremely light and, therefore, is adapted for the formation of somewhat asymmetrical objects, if desired, without loss of balance or the exertion of undue stresses on the ribs and grooves.

In the further modified form of block illustrated in Fig. 3, block **10***b* is preferably solid like block **10** but has a somewhat different arrangement of ribs and grooves. In Fig. 3 the projections **12***b* are beveled or mitered at their upper and lower surfaces to provide ridges **13***b* which have the same function as ribs **13** and **13***a* heretofore described. The recesses **14***b* in the sides of block **10***b* form side walls having, in effect, grooves **15***b* and **16***b* analogous to those of Figs. 1 and 2 but of different physical construction involving beveled faces, as shown, while still permitting the projections **12***b* and ridges or ribs **13***b* of like blocks to be interfitted either in a planar relationship or in a right-angled relationship, and the right-angled relationship may, as in the case of the previous forms of block, be made from either side of the block. The central aperture **17***b* is provided with octagonally arranged faces so constructed, dimensioned and angled that projections **12***b* and ridges or ribs **13***b* of like blocks may be interfitted in aperture **17***b* in four different ways just as in the case of the blocks of Figs. 1 and 2. The block of Fig. 3 has the advantage of extreme simplicity of design and demonstrates that the structural relationships and effects of the ribs and grooves of Figs. 1 and 2 may be achieved in an appreciably different fashion. The block of Fig. 3 also may be made of a softer or less durable material, if desired, without danger of wear or breakage of ribs and grooves.

It will, therefore, be clear that the invention fully achieves the aims and advantages herein set forth and provides for the first time a set of blocks wherein every block is of identical construction while still permitting great versatility of interconnection so that many and varied structures can be built of a permanent or semi-permanent character which can be transported or moved about whenever desired and, of course, in all the forms of block responding to the invention permanent assemblies may be made, if and when desired or required, by applying a suitable adhesive to the ribs and grooves at the time of assembly. Either permanent or semi-permanent objects or structures can thus be readily produced by means of the invention.

The foregoing is presented as illustrative and not as limitative since within the scope of the appended claims other modifications may be made without departing from the invention or losing the benefits thereof.

I claim:

1. A set of identical blocks each block of which comprises a rectangular body portion having ribbed projections at opposite ends, grooved recesses in opposite sides and a multi-grooved central opening therethrough, the ribs of each such block being interfittable and interlockable in a plurality of positions with the grooves of every other block of the set, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

2. A set of identical blocks each block of which comprises a rectangular body portion having projections at opposite ends, recesses in opposite sides and a central opening therethrough, the said projections and recesses being interfittable and interlockable in a plurality of positions with the recesses and projections of every other block of the set, the said projections being ribbed and the said recesses and central aperture being multi-grooved, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

3. A set of identical blocks each block of which comprises a rectangular body portion having projections at opposite ends, recesses in opposite sides and a central opening therethrough, the said projections and recesses being interfittable and interlockable in a plurality of positions with the recesses and projections of every other block of the set, the said projections being ribbed and the said recesses and central aperture being multiple grooved, the multi-grooving of the central aperture being arranged as a plurality of opposed pairs of grooves disposed in angular relationship to one another, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

4. A set of identical blocks each block of which has a plurality of interlocking positions with respect to every other block and each comprising a rectangular body portion having ribbed projections at opposite ends, recesses

in opposite sides having grooved end walls and a central opening therethrough provided with a plurality of opposed pairs of grooves for the reception, in a plurality of positions, of a ribbed projection of another block of such set, the ribbed projections of one block being also receivable in a plurality of positions in the grooved recesses of any other block, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

5. A set of identical blocks each block of which has a plurality of interlocking positions with respect to every other block and each comprising a rectangular body portion having ribbed projections at opposite ends, recesses in opposite sides having grooved end walls and a central opening therethrough provided with a plurality of opposed pairs of grooves for the reception, in a plurality of positions, of a ribbed projection of another block of such set, the ribbed projections of one block being also receivable in a plurality of positions in the grooved recesses of any other block, the said body portion of each block being solid, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

6. A set of identical blocks each block of which has a plurality of interlocking positions with respect to every other block and each comprising a rectangular body portion having ribbed projections at opposite ends, recesses in opposite sides having grooved end walls and a central opening therethrough provided with a plurality of opposed pairs of grooves for the reception, in a plurality of positions, of a ribbed projection of another block of such set, the ribbed projections of one block being also receivable in a plurality of positions in the grooved recesses of any other block, the said body portion of each block being hollow, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

7. A set of identical blocks each block of which has a plurality of interlocking positions with respect to every other block and each comprising a rectangular body portion having ribbed projections at opposite ends, recesses in opposite sides having grooved end walls and a central

opening therethrough provided with a plurality of opposed pairs of grooves for the reception, in a plurality of positions, of a ribbed projection of another block of such set, the ribbed projections of one block being also receivable in a plurality of positions in the grooved recesses of any other block, the said body portion of each block being hollow and open on one side face thereof, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

8. A set of identical blocks each block of which consists of a flat rectangular body portion having a greater length than width, a pair of projections extending from opposite ends of said body portion and disposed centrally of the width of the block, a rib on each of the upper and lower surfaces of each projection disposed centrally thereof and longitudinally of the block, the opposite sides of the body portion being centrally recessed forming recess walls perpendicular to the recess bottoms and each said wall being traversed by a pair of grooves at right angles to one another and intersecting at the mid-points of such walls, and the said body portion being further provided with a central aperture provided with spaced grooves arranged as a plurality of sets of opposed grooves, all the grooves aforesaid having the same dimensional extent as the said ribbed projections, whereby a plurality of such blocks may be assembled in a variety of relationships to produce different articles therefrom.

9. A set of identical blocks in accordance with claim 8, in which the grooves of the central aperture of the body portion are arranged as four sets of grooves of which each succeeding set is at an angle of 45° to each preceding set.

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