This invention relates to building elements or blocks, more particularly to building blocks adapted to interfit each other to form walls and partitions of building structures, and has for an object to provide improved blocks of this type.

Building blocks that interfit each other to form toy or miniature buildings are generally well known in the art and are made in a variety of sizes to permit erection of building walls having window openings and door openings of different heights and widths. Also, some blocks heretofore proposed purport to permit erection of scale model building structures.

However, since the scales that are usually employed are necessarily small, for example, a scale in which ½ inch equals a foot, a great number of different size blocks must be provided to permit faithful adherence to a predetermined scale and still permit complete freedom in erection of a building of any predetermined design.

The building industry in the U.S.A. is generally well standardized and 4", 8", 16", 32", 48" and 96" are substantially standard dimensions employed by architects in designing a building. For example, walls are usually about 8" in thickness, studs in walls are usually spaced 16" from center to center, ceilings are about 96" above the floor, etc. Accordingly, at first blush, it appears that blocks of a few well chosen dimensions will suffice to permit considerable latitude in scale model building, thereby permitting economies in the manufacture of a kit or set of such blocks and resulting selling of the set of blocks at competitive prices.

The above is not, however, the entire criterion for, in the horizontal dimensioning of building walls, both internal and external, and door and window openings widths of complete freedom is usually desired by the designer. That is, deviations of ½", 1", 1½", and similar small increments from the above-listed standards are often employed. For example, door openings having widths ranging from 36 inches to 28 inches in increments of ½ inch or even ¼-inch are often employed.

In view of the above, it is an object of this invention to provide building blocks that are interlockable or interfittable, but translatable or slidable with respect to each other to take up small increments in horizontal dimensions of a building wall formed of the blocks.

Another object is to provide building blocks of the above type in which the blocks are frictionally interfit and are frictionally slidable with respect to each other to a limited degree, whereby to impart coherence to a building wall formed of the blocks.

Also, buildings such as silos, smoke stacks and wall portions of some buildings are of circular horizontal cross-sectional shape. It has heretofore been proposed to provide blocks of suitable arcuate cross-sectional shape to permit erection of such building models. However, here again, a large number of different radii are encountered, requiring arcuate blocks of many radial dimensions for faithful adherence to a predetermined scale.

In view of the above, it is a further object of the invention to provide building blocks that are frictionally interfittable but rotatable with respect to each other to permit employment of the blocks in erection of curved walls of various radial dimensions.

Still another object of the invention is to provide building blocks of parallelepiped form that are frictionally interfittable, yet slidable and rotatable with respect to each other to permit faithful adherence to scale in the erection of buildings having planar and/or curvilinear walls, with a minimum of different size blocks.

Briefly, building blocks in accordance with the invention are of parallelepiped shape with open-ended parallelepiped cavities defined by at least two pairs of spaced parallel wall portions and a central wall portion perpendicular to the two pairs of wall portions and integral perpendicular to the two pairs of wall portions and integral therewith. A pair of diametrically opposed arcuate projections extend outwardly from the central wall portion and have an outer diameter of substantially the same size as the spacing between at least one pair of the wall portions. In erecting a wall, the blocks are interlocked by pressing the arcuate projections of one block into the cavity of a superimposed abutting block.

The arcuate extent of each arcuate projection is less than 180°, hence the interfitting blocks are frictionally slidable with respect to each other to a limited degree in a direction parallel to the chord lines of the area. Also, since the projections are arcuate, the blocks are frictionally rotatable with respect to each other.

The foregoing and other objects are effected by the invention as will be apparent from the following description and claims taken in conjunction with the accompanying drawings, forming a part of this application, in which:

FIGURE 1 is an isometric view of a building block formed in accordance with the invention;

FIG. 2 is a plan of the block shown in FIG. 1;

FIG. 3 is a bottom view of the block shown in FIG. 1;

FIG. 4 is a vertical sectional view showing two blocks in interlocked relationship;

FIG. 5 is a vertical elevational view showing a block similar to that shown in FIG. 1, but of double height;

FIG. 6 is a vertical elevational view showing a block similar to that shown in FIG. 1, but of double width;

FIG. 7 is a plan showing a plurality of the blocks shown in FIG. 6 in various interlocked positions;

FIG. 8 is a vertical elevational view of a wall structure employing a plurality of blocks formed in accordance with the invention;

FIG. 9 is a plan of an arcuate wall structure employing a plurality of interlocked blocks; and

FIG. 10 is a vertical elevational view of the wall structure shown in FIG. 9.

Referring to the drawings in details, Figs. 1, 2, and 3 show one form of block 10 of parallelepiped shape formed in accordance with the invention. The block 10 comprises two pairs of parallel side walls 12 and 14 of flat rectangular shape connected to each other at right angles and a central rectangular upper wall 16 joined to the walls 12 and 14 to impart an open box-like shape to the body of the block and define an open-ended cavity 17 of rectangular shape. In this embodiment, the walls 12 and 14 are of equal length and the block is of square shape with the cavity 17 of correspondingly square shape.

A pair of diametrically opposed arcuate ribs 19 of annular shape extend upwardly from the central wall 16 and are formed with an outer diameter of substantially equal dimension with the width of the cavity 17 of the upper block. Since the outer diameter of the ribs is substantially equal to the width of the cavity, a frictional fit is attained. However, since the arcuate extent of the ribs is less than 180°, their chordal length L is less than their diametrical dimension D and thus less than the width of the cavity 17. Hence, the blocks are frictionally slidable in hori-
zontal direction to a maximum degree equal to D minus L. In FIG. 4 the upper block 10 is translated to the extreme right with respect to the lower block.

In FIG. 5, there is shown a double height block 25 that is similar to the block 10 described above, except that its two pairs of side walls 26 and 27 (only one shown) are of twice the vertical height of the walls 12 and 14 and its cavity 28 is also twice the height of the cavity 17. In other words, it is a parallelepiped of twice the height of the same horizontal size and shape as the block 10 and is provided with arcuate ribs 29 of identical size and shape as the ribs 19.

In FIG. 6, there is shown a double length block 30 that is similar to the block 10 in all aspects, except that it has a pair of side walls 31 (only one shown) of twice the horizontal width of the side walls 14, a central integral vertical wall 32 and a pair of cavities 33 of substantially the same horizontal size and shape as the cavity 17. In addition, the double block is provided with two pairs of arcuate ribs 36, similar to the ribs 19, and extending upwardly from a doubly lengthened central wall 37. The ribs 36 are disposed in horizontally or laterally spaced relation with each other and coaxial with the cavities 33 to permit interlocking relation with the blocks 10, 25 or another block 30. In other words, it is a Siamese twin of the block 10 joined by the internal wall 32.

In FIG. 7 there is shown a plan view of a plurality of blocks 10 and 30 in interlocked relationship with each other to illustrate the various positions attainable. The upwardly inclined block 30 is disposed at about 2:30 o'clock or at an upwardly extending angle of 45°. This position provides a press fit attainable by superimposing the uppermost block 30 on the lowermost block 30 in such a manner that only one of the ribs 36 of the lower block is received in the cavity 33 of the upper block as shown by the cut-away portion. The press fit is attainable since the arcuate extent of the ribs 36 is 90° and the adjacent corner of the cavity is also 90°.

The downwardly inclined block 30 is disposed below the adjacent horizontally extending block 30 with a pair of ribs 36 in interfiting relation with a cavity 33 of the superposed block, as shown by the cut-away portion. The downwardly inclined block is disposed at about 4:30 o'clock or at a downwardly extending angle of 45°. The downwardly inclined block 30 may be rotated to any angular position within a range of about 270° with respect to the superposed block 30, while still retaining a frictional fit therewith as explained in conjunction with the paralleling blocks 10 in FIG. 4.

Also, when a pair of the double length blocks 30 are disposed in parallel interfiting relation with each other, either directly above each other or horizontally staggered with respect to each other in the well-known manner of horizontal courses of blocks (not shown), they are relatively slideable in the same manner as the blocks 10 (FIG. 4).

Although only three embodiments of blocks have been shown and described above in detail, namely blocks 10, 25 and 30, larger blocks may be formed in multiple heights and lengths and with multiple sets of cavities and interflocking ribs to reduce the number of blocks required in a kit and to facilitate the formation of scale building walls. However, regardless of the length or height of the block, the cavities are preferably of the same horizontal cross-sectional area as the cavity 17 of the block 10 and spaced apart in a manner similar to the cavities 33 of the block 30. Further, the arcuate ribs are of the same size and shape as the ribs 19 of the block 10 and must be spaced apart in a manner similar to the pairs of ribs 36 of the block 30.

In FIG. 8, there is shown on a slightly smaller scale, a vertical wall structure 50 formed by a plurality of blocks in accordance with the invention, and including a plurality of the blocks 10, 25 and 30. It will be noted that the basic horizontal width and height of block is that of the blocks 10 and that the blocks 25 are of basic width but employ a height multiple of 2. Also, that the blocks 30 are of basic height but employ a width multiple of 2.

A plurality of blocks 52, 54, 56, and 58 may be employed, as illustrated in FIG. 8, to reduce the number of blocks required. It will be now apparent from visual observation that each block 52 equals two blocks 25 disposed one above the other, each block 54 equals two blocks 30 disposed one above the other, each block 56 equals three blocks 25 disposed side-by-side, the block 58 equals two blocks 54 disposed side-by-side, and the block 60 equals a block 58 and a block 25 disposed side-by-side. One of the blocks 52 and an adjacent block 56 have been partially broken away to more clearly show the multiple arrangement. Since the block 52 is a vertical multiple of a basic block, it is provided with a central cavity 62 similar to the cavity 17 of the block 10. Also, since the blocks 56 are horizontal multiples of the block 25, they are provided with three cavities 63, 64 and 65 and three pairs of ribs 66, 67 and 68.

The wall structure 50 is provided with a door opening 70 of odd horizontal width that is not a multiple of the basic block width, but slightly smaller than the length of block 30. However, the vertical height of blocks 25, 54, 52 and 56 forming the left side of the opening 70 have been translated to the right with respect to their adjoining blocks to permit obtaining the accuracy required. In so doing, a plurality of vertical spaces 52a, 54b, 52a and 56b are caused to appear. However, these spaces are not objectionable in scale model work. If, for any reason, they are objectionable the width of the above spaces may be reduced by shifting all of the other blocks to the left of the door opening 70 to a smaller degree to take up the space widths required.

It will be noted that in the uppermost row or course of blocks (30, 54, 60 and 54), the interfacing ribs are not illustrated, since a suitable number of blocks may have the ribs omitted to impart a flat upper surface 50a to the wall structure 50, if so desired.

FIGS. 9 and 10 illustrate an arcuate wall structure 80 formed by a plurality of the blocks 54 arranged in horizontally staggered courses, like bricks. The circular arc is illustrated in FIG. 9 is of the smallest radius obtainable with the blocks 54, since the blocks are rotated to the maximum degree permitted by abutment of their inner corners 81. It will be noted that the blocks have their ribs 82 and inner walls of their corresponding cavities 83 in frictional interlocking relation to impart coherence to the entire wall structure.

Since the blocks 54 are of parallalelepiped shape, while the wall 80 is arcuate, the outer surface of the wall thus formed has regularly spaced gaps 85 between adjacent blocks. Here again, the gaps are not considered objectionable.

Although the wall 80 is arranged with the blocks 54 in abutment with each other at their inner corners 81, a larger radius of curvature may be imparted to the wall by reducing the gaps 85 and causing small spaces to occur at the inner corners 81, in a manner now readily apparent. Also, other sized blocks, such as the blocks 30, for example, may be employed to form the wall 80.

Although several embodiments of the invention have been shown, it will be obvious to those skilled in the art that it is not so limited, vertical and horizontal changes and modifications, without departing from the spirit thereof.

I claim as my invention:

1. A building block of substantially parallalelepiped shape comprising:
   two pairs of parallel side walls connected to each other at right angles,
   a central rectangular wall joined to said side walls and jointly therewith defining an open-ended cavity of rectangular shape,
3,324,619

5 circular rib structure extending from said central wall and having an outer diameter substantially equal to the internal spacing between at least one pair of said side walls, said rib structure including at least one pair of arcuate ribs of annular shape disposed in diametrically opposed relation with each other, and said ribs having a chordal dimension of lesser extent than the width of said cavities in at least one direction.

2. A building block comprising: a five sided hollow body of parallelepiped shape defining an open-ended cavity of rectangular shape, circular rib structure extending from one of the sides of said body and having an outer diameter equal to the width of said cavity, said rib structure including at least one pair of arcuate ribs of annular shape disposed in diametrically opposed relation to each other, and said ribs having an angular dimension of less than 180°, whereby their chordal dimensions are of lesser extent than the width of said cavity in at least one direction.

3. A dual building block of substantially parallelepiped shape, comprising: two pairs of parallel side walls connected to each other at right angles, a central rectangular wall having a length equal to about twice its width and joined to said side walls, internal wall structure disposed parallel to one pair of side walls and partly defining at least two open-ended cavities of rectangular shape, and dual circular rib structure extending from said central wall and laterally spaced from each other, said dual rib structure being coaxial with said cavities, each of said rib structures having an outer diameter equal to the width of said cavities in at least one direction, each of said rib structures including at least one pair of arcuate ribs disposed in diametrically opposed relation with each other, and said pair of ribs having a chordal dimension of lesser extent than the width of said cavities in at least one direction.

4. At least two blocks in accordance with claim 1, and disposed in mutually interlocking relation with each other, with the rib structure of one of said blocks disposed in interfitting relation with the cavity of the other.

5. At least two blocks in accordance with claim 1, and disposed in mutually interlocking relation with each other, wherein each of said rib structures includes at least one pair of arcuate ribs of annular shape disposed in diametrically opposed relation with each other and having a chordal dimension of lesser extent than the internal spacing between at least one pair of side walls,

with the pair of arcuate ribs of one of said blocks in interfitting relation with the cavity of the other block and slideable in a direction normal to said one pair of walls, and said blocks being angularly movable with respect to each other.

6. At least two blocks in accordance with claim 2, and disposed in mutually interlocking relation with each other, with the rib structure of one of said blocks disposed in frictionally interfitting relation with the cavity of the other block.

7. At least two blocks in accordance with claim 3, and disposed in mutually interlocking relation with each other, with at least one of the rib structures of one of said blocks disposed in frictionally interfitting relation with one of the cavities of the other block.

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