(No Model.) 2 Sheets—Sheet 1.

C. S. BURTON.

CHILD'S BUILDING BLOCKS.

No. 604,708. Patented May 24, 1898.

Fig. 1.

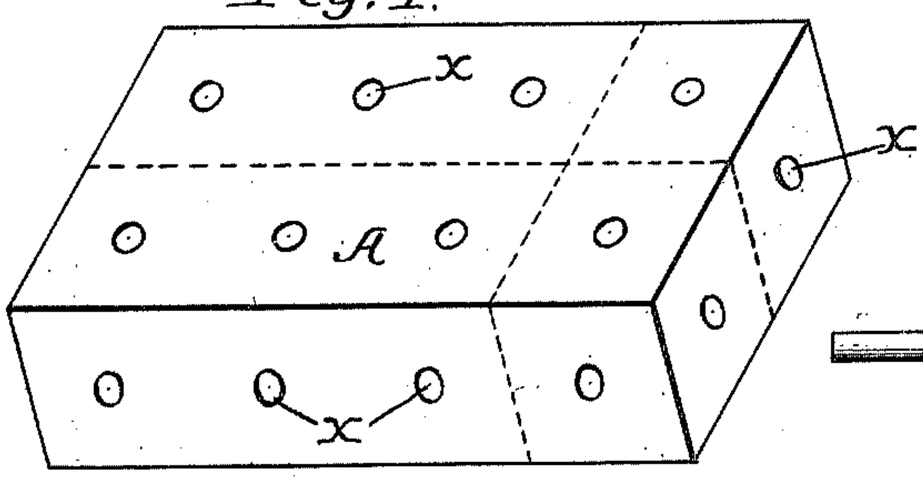


Fig. 2.

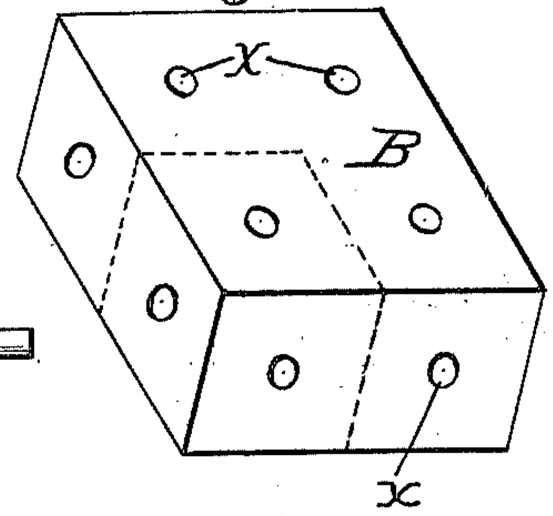
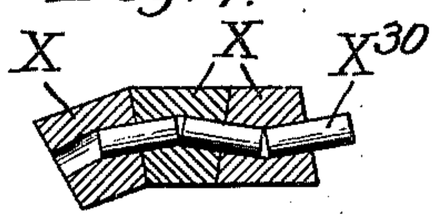


Fig. 4.



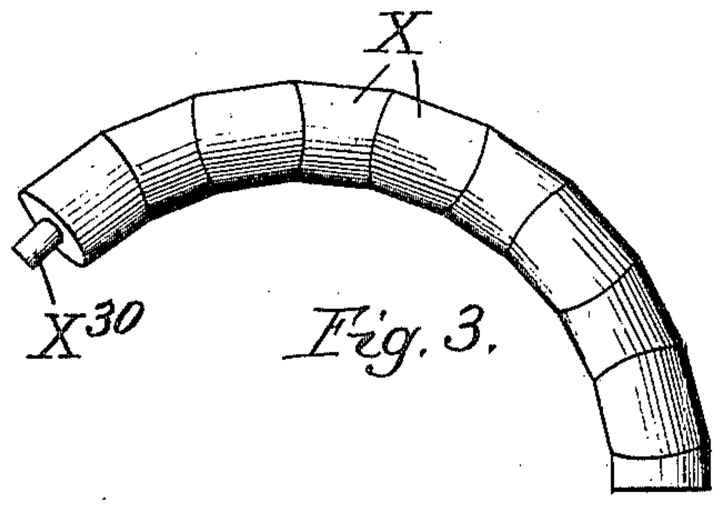
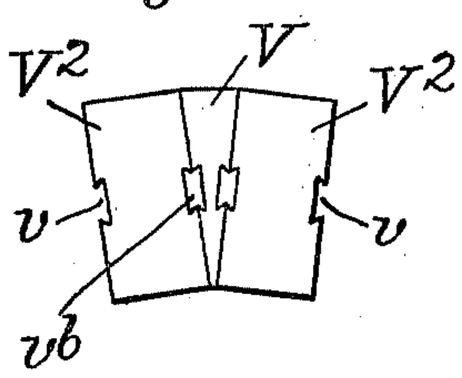


Fig. 3.

Fig. 6.



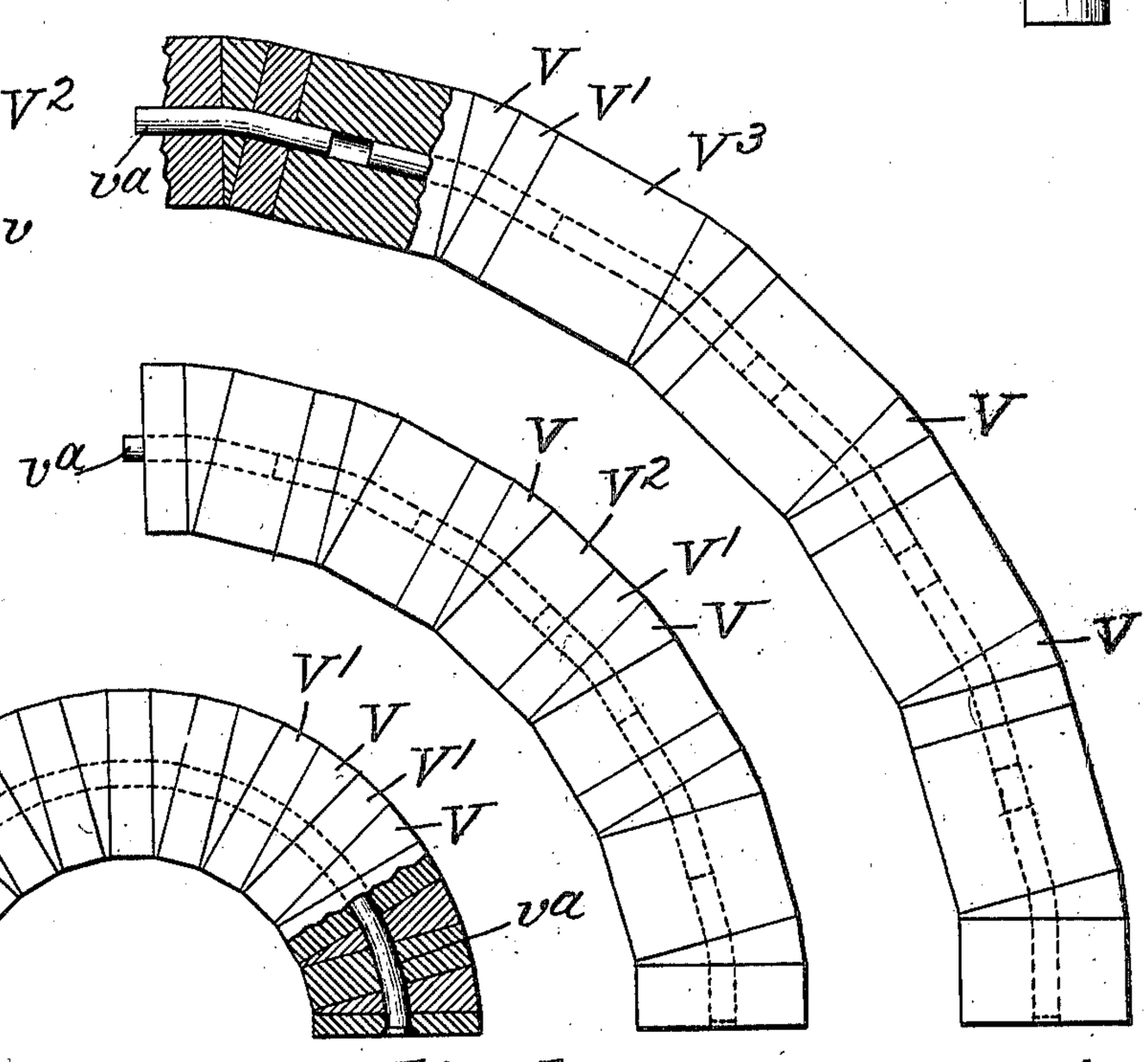


Fig. 5.

Witnesses.
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Jean Elliott.

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(No Model.) 2 Sheets—Sheet 2.

C. S. BURTON.

CHILD'S BUILDING BLOCKS.

No. 604,708. Patented May 24. 1898.

Fig. 7.

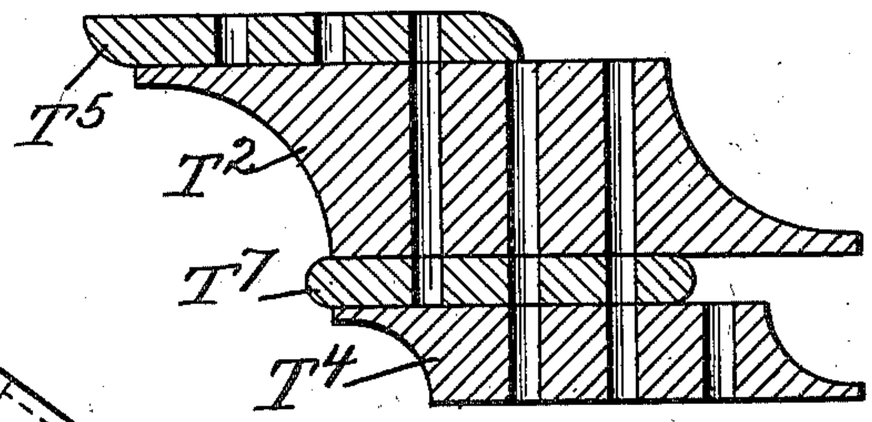

Fig. 11

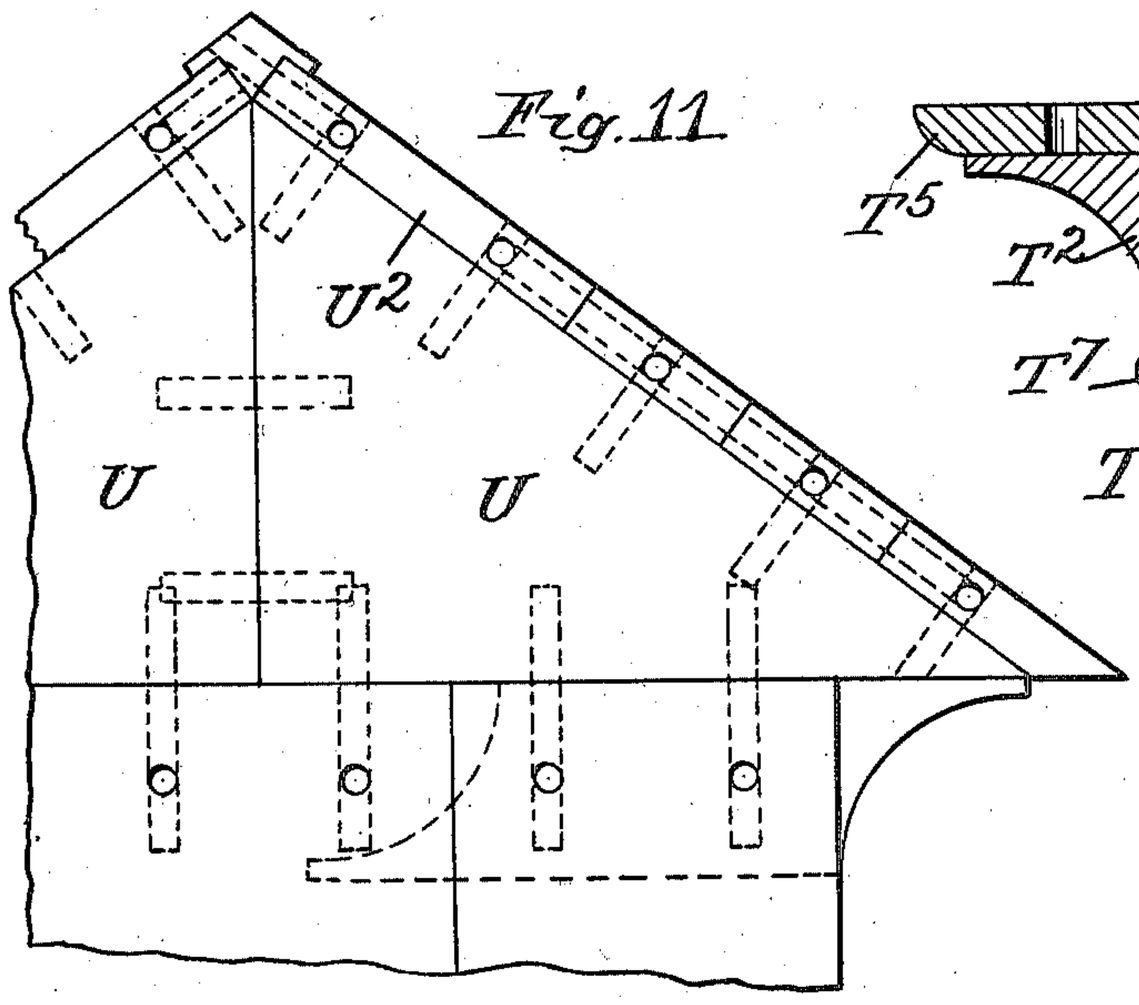

Fig. 10.

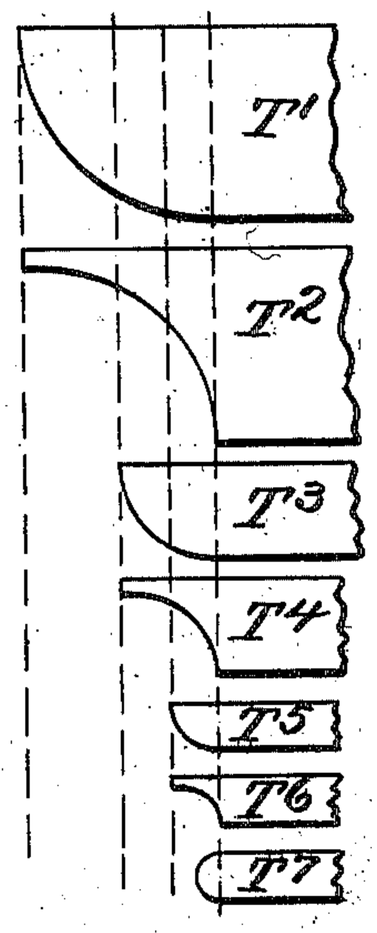

Fig. 9.

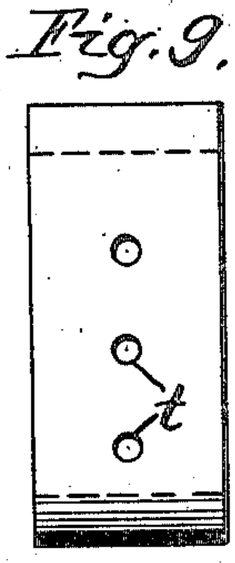

Fig. 12

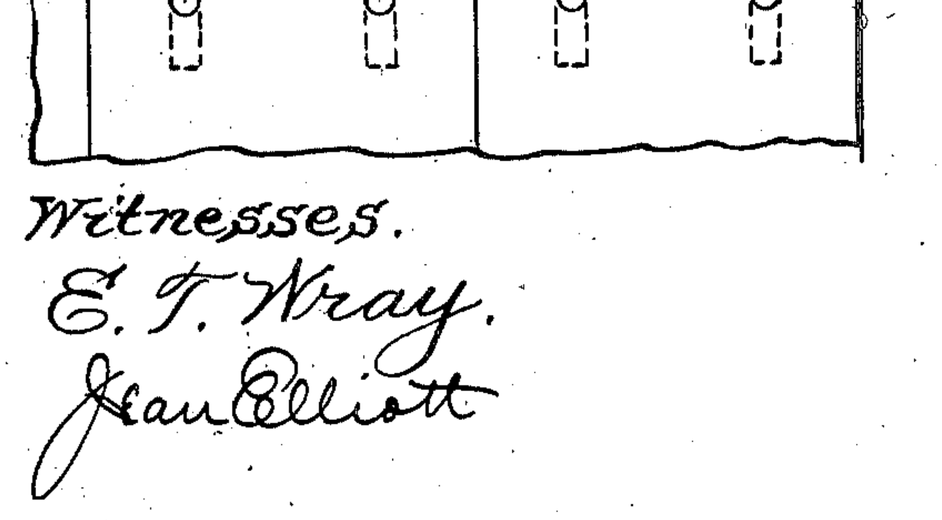

Fig. 8.

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UNITED STATES PATENT OFFICE.

CHARLES S. BURTON, OF OAK PARK, ILLINOIS.

CHILD'S BUILDING-BLOCKS.

SPECIFICATION forming part of Letters Patent No. 604,708, dated May 24, 1898.

Application filed May 27, 1896. Serial No. 593,245. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. BURTON, a citizen of the United States, residing at Oak Park, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Children's Building-Blocks, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings, Figure 1 is a perspective of a form of rectangular building-block adapted for use with my invention. Fig. 2 is a similar block of a size which would be formed by dividing the block shown in Fig. 1 transversely at the middle point of its length. Dotted lines on both these figures indicate fractional or divisional elements corresponding to which other blocks of the set are made. Fig. 3 is a front elevation of a partial arch formed of blocks adapted to be adjustable in respect to the spread or radius of the arch. Fig. 4 is a section through three of the blocks shown in Fig. 3, illustrating the variations in adjustment from that which produces a straight shaft to that which produces the most convex arch. Fig. 5 represents a group of arches formed by means of a special form of block which is represented in them all and is adapted by various combinations with rectangular blocks to produce arches of any span or radius. Fig. 6 is a detail elevation showing a modification in respect to means for securing together blocks of the form shown in Fig. 5 in the construction of arches therewith. Fig. 7 is a section of a cornice made up of the several molding elements, showing the manner of assembling and securing such elements. Fig. 8 is a typical plan of the molding elements, the edge pattern being that of the upper element of Fig. 7. Fig. 9 is a plan of the shortest length of the molding element provided for piecing out. Fig. 10 is a group of cornice molding-blocks broken away back of their molded edges, said blocks being of the general type which are combined in Fig. 7, but including other forms. Fig. 11 is a front elevation of the gable end of a building designed to show a form of block adapted for that specific purpose. Fig. 12 is a similar view showing blocks of the same shape arranged to produce a gable for a roof of a different pitch.

For wall building I provide blocks of the customary rectangular forms, each dimension being a multiple of a selected unit of measure, the cube of which I term the "unit" cube, the full-sized block being of the usual proportions of building-bricks—that is, the breadth twice the thickness and the length twice the breadth—and equivalent to eight unit cubes. Such a block (indicated by the letter A) is shown in Fig. 1. Other blocks of this series may be respectively half, quarter, and eighth of the block A, produced by dividing the length, making a square block having the unit of thickness shown in Fig. 2 and indicated by the letter B, or by dividing the width, producing an oblong rectangular block having the unit of width and thickness and the length of the block A, such a block being shown in Fig. 3 and indicated by the letter C, and other blocks being produced by dividing these again transversely to either dimension. The entire series would include simple cubes and any form which might be produced without reëntrant angles by assembling such cubes. Such rectangular blocks have the customary forms and proportions in building-blocks, and in specifying them I have not described anything peculiar to my invention. For the purpose of securing such blocks in any relation in which they will most naturally be assembled in building walls, rectangular columns, stairs, &c., I make these blocks with sockets in their several faces adapted to receive keys, preferably in the form of round pins, whereby the contiguous blocks may be detachably joined. The sockets are distributed over the several faces, so that such a socket is found on every face, which is provided with sockets at a distance from each edge equal to half the dimension of the unit cube and at distances apart equal to said dimension. As illustrated, the sockets are in the form of pin-holes located at the center of each square corresponding to the face of the unit cube into which the face of the block can be divided. The rule for the location of the pin-holes may be otherwise expressed thus: that their distance apart is the greatest common divisor of the three dimensions of the block and their distance from the edges is half that greatest common divisor. Thus if the least dimension of the block is seven-eighths

of an inch, which is the customary size, these sockets or pin-holes *x* will be located in rows seven-sixteenths of an inch from every edge of every face and at intervals of seven-eighths of an inch in such rows. For greater variety of arrangement in assembling such blocks the pin-holes may be made seven-sixteenths of an inch—that is, half the unit of measure—apart in the rows, as well as at that distance from the edges, respectively; but the utility of these additional pin-holes is comparatively slight. These pin-holes may be of as little depth as considered necessary to cause the pins M, intended to be inserted in them to join the blocks together, to obtain sufficient hold.

In practice with blocks of the dimensions above stated I have made the pin-holes three-quarters of an inch deep, which in case of the least dimension makes the holes from opposite faces meet and become one hole, the block being penetrated. There is certain utility in this construction in binding the building together with tie-rods, as hereinafter explained.

For the purpose of cornice-moldings I provide elemental forms T T′ T^2 T^3 T^4 T^5 T^6 T^7, &c., adapted to be used individually and separately, but also adapted to be combined to produce any desired edge outline, the principle being similar to that involved in formation of columns from the elemental forms of rotation. In order to adapt these elemental molding-forms to be combined and secured together in all the combinations which may be required in building up cornices and to adapt them also to be secured by the pins to the other building-blocks of the set wherever they may be applied, I make these molding-blocks T with pin-holes *t*, located, so far as the distance from the ends and distance apart in the length of the molding-blocks is concerned, precisely according to the rule governing the form of the pin-holes in the rectangular blocks—that is to say, at a distance from the end one-half the unit of measure or greatest common divisor of the dimensions of the rectangular blocks and a distance apart equal to that unit of measure or greatest common divisor; but I make the molding-blocks with both lateral edges molded, but with the molding pattern reversed, as seen in Fig. 7, (the reversion of the pattern obviously is of no effect in the case of half-round forms, whether concave or convex,) and, considering the mold as comprising a body portion and an edge portion, the body portion being the rectangular portion which would be left after cutting off by planes at right angles to the face the entire molded portion and the edge portion consisting of that which would be cut off by such plane, I locate the pin-holes at a distance from one edge equal to one-fourth of the unit of measure and at a distance from the other edge equal to one-half such unit. This one-fourth of the unit of measure, for convenience, I term the "unit of measure of molding" or "unit of thickness," because, as will be understood from inspection of Fig. 7, the simple elemental forms of molding which most conveniently be employed are in three thicknesses—first being the full thickness of the standard rectangular block—that is, having the unit of measure of said block for such thickness—and the second half and the third one-fourth of that thickness. All three thicknesses are shown in Fig. 7 with differently-molded edges. It will be understood upon inspection of these forms that in combining these elements they will retreat or advance from any fixed line in steps corresponding to the thickness and that these steps therefore will be multiples of the quarter-thickness, which may therefore be taken as the unit of measure or adjustment in combinations of the moldings. The width of the body therefore of the moldings is the unit of measure or side of the unit cube of the system plus three-fourths of that unit. In order to make it possible to combine these moldings in every required relation or order, I provide, in addition to the pin-holes located as already described, holes midway between each transverse pair of holes, so that there are in the molding-blocks transverse rows of holes, containing three in each row, the rows being distant from the ends half the unit of measure and from each other once that unit. A little inspection will make it apparent that by using one edge or the other of the molding every possible combination and arrangement of these molding elements can be made and coinciding pin-holes found at which they may be secured.

For the purpose of constructing arches of different spans by means of blocks of the same type by different combinations of such blocks I provide the wedge-shaped block V of small angle, which is an aliquot part of one hundred and eighty degrees, and preferably an aliquot part of ninety degrees, so that a certain number of such blocks, assembled by their oblique faces, constitute a span of one hundred and eighty degrees. I have represented, for example, these blocks V as having an angle of fifteen degrees, so that twelve blocks make one hundred and eighty degrees span. The smallest arch that can be formed with them evidently is made by combining them without other blocks. For a larger span they may be alternated with parallel-sided blocks V′ of the least dimension found in the set—as, for example, the unit of thickness of the moldings or one-fourth the unit of measure. So combined the smallest arch shown is produced. For larger arches more of the blocks V′ or thicker blocks, as V^2 or V^3, (which is the unit cube,) may be interposed between the wedge-shaped blocks V to any extent, producing thereby an arch of any desired span, since whenever twelve of the wedge-shaped blocks have been introduced one hundred and eighty degrees will have been covered.

I have shown two methods of securing the

blocks in such an arch together, the simplest method involving the use of flexible pins or wire v^a, which in the case of an arch made entirely of small pieces, as the shortest span is preferably continuous throughout the entire arch, being made of copper or other comparatively soft wire, which has nevertheless sufficient stiffness when bent to hold the arch in form. Another method, and in some respects superior, is shown, the oblique faces of the wedges and the parallel faces of the interposed blocks being provided with transverse furrows v, adapted to receive a wooden key v^b. Preferably the furrow is dovetailed and the key a double dovetail in form. The parallel-sided blocks V' V^2 V^3, &c., which are adapted to be used in such arch building, are also adapted for the ordinary combinations with the other rectangular blocks.

I have shown another form of adjustable arch, which, however, is adapted for purely ornamental purposes and not calculated to sustain weight as an arch. This form of arch consists of an assemblage of pieces cut from a cylinder by planes oblique to the axis, making cylindrical segments symmetrical about a plane transverse to the axis. Pin-holes being bored to the center of each block-face at right angles to that block-face it will be seen that a succession of such segments may be assembled so as to form either a perfect cylinder or an arch of any curvature up to the maximum, which will depend upon the angle of divergence of the oblique faces and the length of the segment at the shortest side. These cylindrical segments are indicated by the letter X, the pin-holes in them by the letter x, and the pins by the letter X^{30}, since they are the same as will be used in other connections—as, for example, those shown in Fig. 10. In the drawings two of the segments at the right hand are assembled so as to produce a cylinder, while the one at the left hand is placed in relation to the next one in position to produce the greatest curvature.

In making gables for sloping roofs it has been customary in building-blocks to make right-angled triangular blocks of the form produced by dividing diagonally the standard oblong block of the system, twice as long as its width, and by similarly dividing the square block, which is half that oblong. This gives triangular blocks whose slant side is not commensurate with the other two sides—that is, has no simple divisor common to the other sides. This form therefore cannot be employed where roof-boards are to be applied to such slant sides and secured by pins in sockets which are spaced according to the law which obtains in the remainder of the system. To meet this requirement, I make gable-blocks U in right-angled triangular form, whose sides are respectively three, four, and five times the unit of measure and which may be arranged to support roofs of different pitch, and for Gothic roofs I make right-angled triangular blocks U', whose sides are respectively five, twelve, and thirteen times the unit of measure. Roof-boards U^2 may be made of half the thickness of the standard wall-blocks and with sockets spaced as in the standard blocks.

I claim—

1. In child's building-blocks, molding-strips of different thicknesses, which are multiples of a selected unit of thickness, having at opposite edges similarly-molded face portions corresponding in extent to the thickness, the body portion intermediate said face portions having pin-holes in three longitudinal rows, one outer row being distant from the lateral boundary of the body once the unit of thickness, the other outer row being distant from the other lateral boundary twice said unit, and the middle row being distant from the outer rows twice said unit of thickness.

2. In child's building-blocks, in combination with blocks whose dimensions are all multiples of a selected unit of measure, and which have pin-holes in their faces distant from each other once said unit and from the edges respectively of the blocks half such unit; molding-strips of different thicknesses which are all multiples of a unit of thickness which is an aliquot part of said unit of measure, said molding-strips having at opposite edges similarly-molded face portions corresponding in extent to the thickness, the body portion intermediate said face portions having pin-holes in three longitudinal rows, one outer row being distant from the lateral boundary of the body once the unit of thickness, the other outer row being distant from the other lateral boundary twice said unit, and the middle row being distant from the outer rows twice said unit of thickness.

3. In child's building-blocks, in combination with rectangular blocks whose dimensions are all multiples of a selected unit of measure, and which have sockets in their several faces distant from their edges respectively half the unit of measure and from each other once such unit; right-angle triangular gable-blocks whose three sides are all multiples of the unit of measure, and whose edges at said three sides are provided with sockets at the middle point of each such unit into which said edges can be divided.

4. In child's building-blocks, in combination with rectangular blocks whose dimensions are all multiples of a unit of measure, and which have sockets in their several faces distant from the edges respectively half the unit of measure and from each other once such unit, right-angle triangular gable-blocks whose sides are respectively three, four and five times the unit of measure and whose edges are provided with sockets at the middle point of each such unit into which said edges can be divided.

5. In building-blocks for arch construction, wedges of small angle which is an aliquot part of one hundred and eighty degrees, in combination with blocks having their two oppo-

site faces parallel, said wedges having their oblique faces and said other blocks having their opposite parallel faces provided with sockets adapted to receive connecting devices, whereby the parallel-face blocks in different numbers or dimensions may be interposed and secured between the wedges to form arches of different span and radius.

6. In building-blocks for arch construction, wedges of small angle which is an aliquot part of ninety degrees, in combination with blocks having their two opposite faces parallel, said wedges having their oblique faces and said other blocks having their opposite parallel faces provided with furrows at corresponding positions, and keys adapted to enter said corresponding furrows to unite the edges to the parallel-faced blocks at their said parallel faces.

7. In building-blocks for arch construction, wedges of small angle which is an aliquot part of ninety degrees, in combination with blocks having their two opposite faces parallel, said wedges having their oblique faces and said other blocks having their opposite parallel faces provided with dovetailed furrows at corresponding positions and double dovetail keys adapted to enter said corresponding furrows to unite the edges to the parallel-faced blocks at said parallel faces.

8. In child's building-blocks for decorative arch construction, blocks which are cylindrical segments with equal oblique bases, provided with sockets at the center of such oblique bases and entering the block at right angle to such bases respectively, and pins adapted to enter such sockets, whereby the span and radius of an arch formed by a series of such oblique cylindrical segments may be varied at will.

9. In child's building-blocks, keystone blocks for arch building comprising two pieces hinged together at one edge and having each a row of perforations; a staple adapted to have one leg inserted in a pin-hole of each block, whereby the spread of the blocks from their hinge edge may be varied by the selection of the perforations used for the staples: substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 23d day of May, 1896.

CHAS. S. BURTON.

Witnesses:
JEAN ELLIOTT,
E. T. WRAY.