2 Sheets—Sheet 1.

J. U. MUELLER.

BLOCKS FOR DESIGNING INLAID WORK.

No. 191,167. Patented May 22, 1877.

Fig. 1.

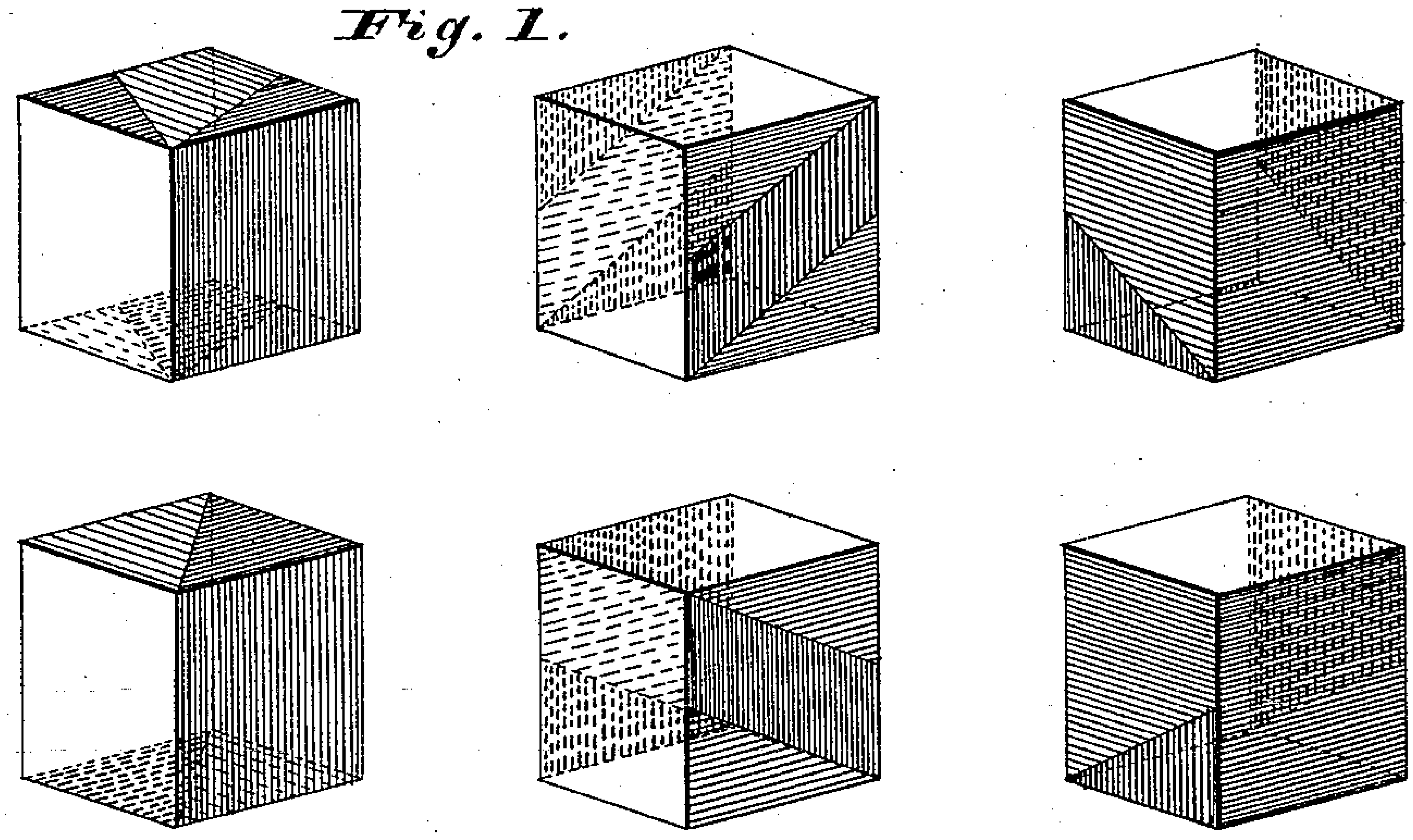


Fig. 2.

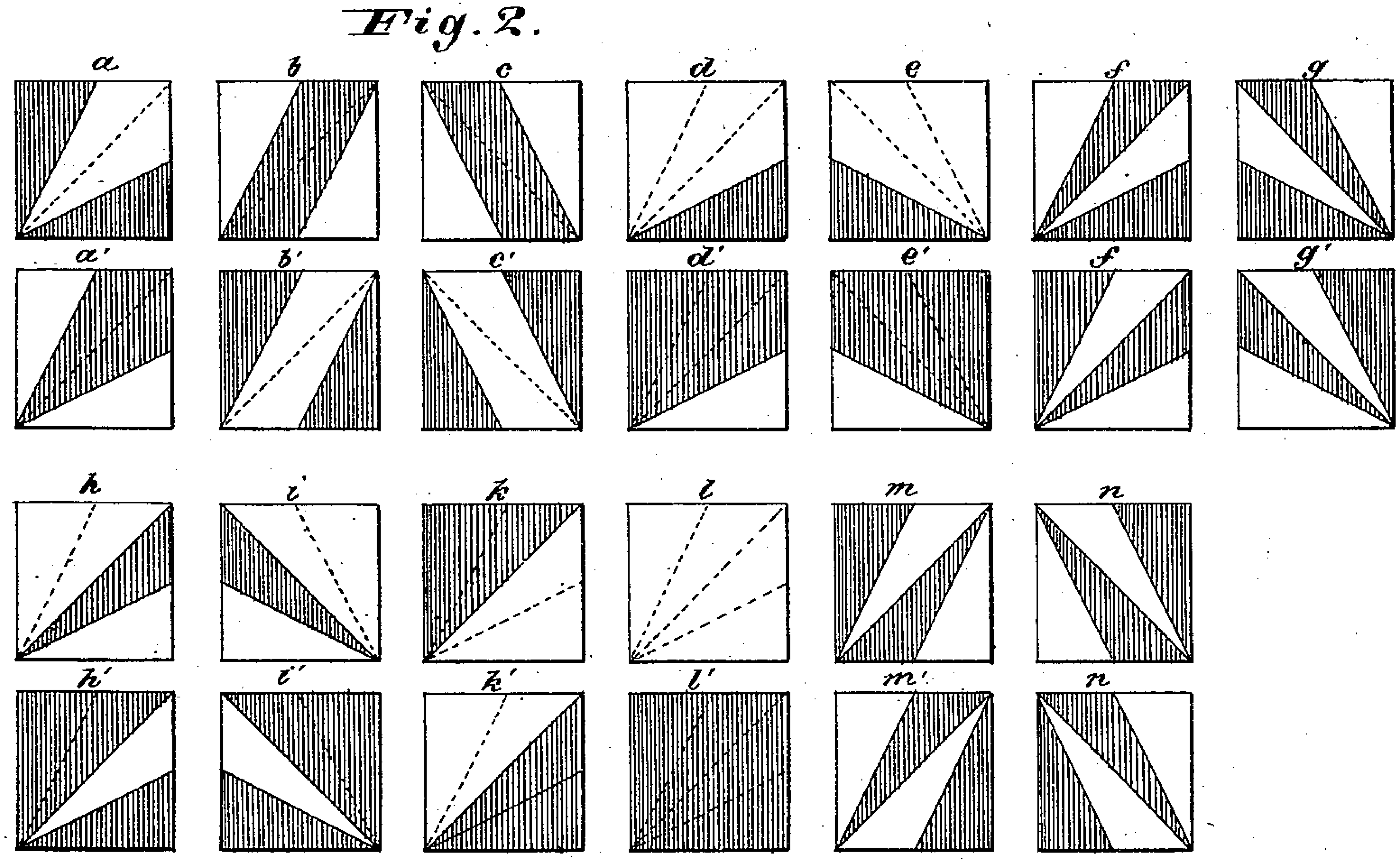


Fig. 3.

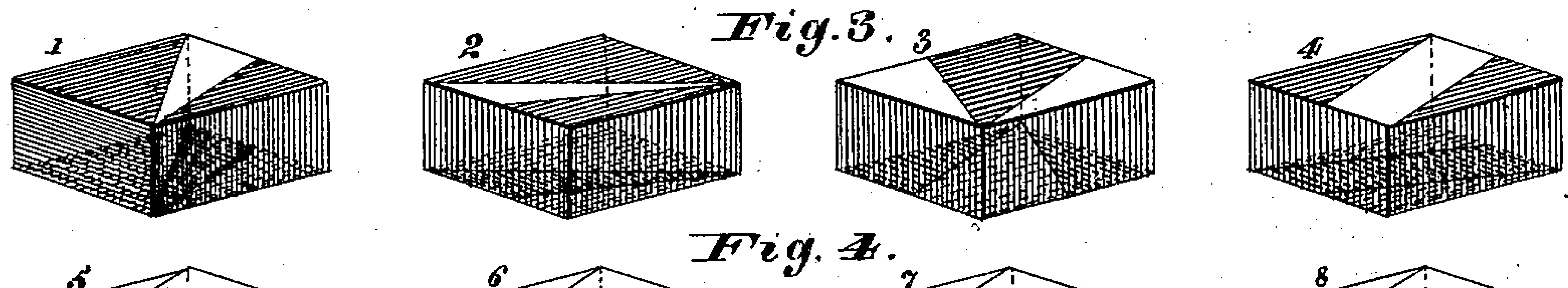
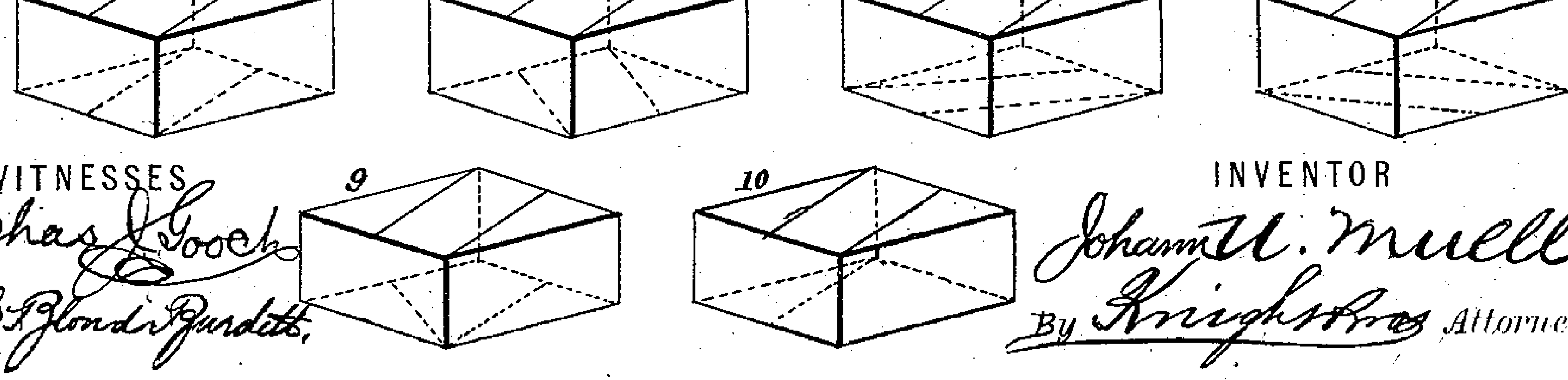


Fig. 4.



WITNESSES

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[illegible]

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J. U. MUELLER.

BLOCKS FOR DESIGNING INLAID WORK.

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Fig. 5.

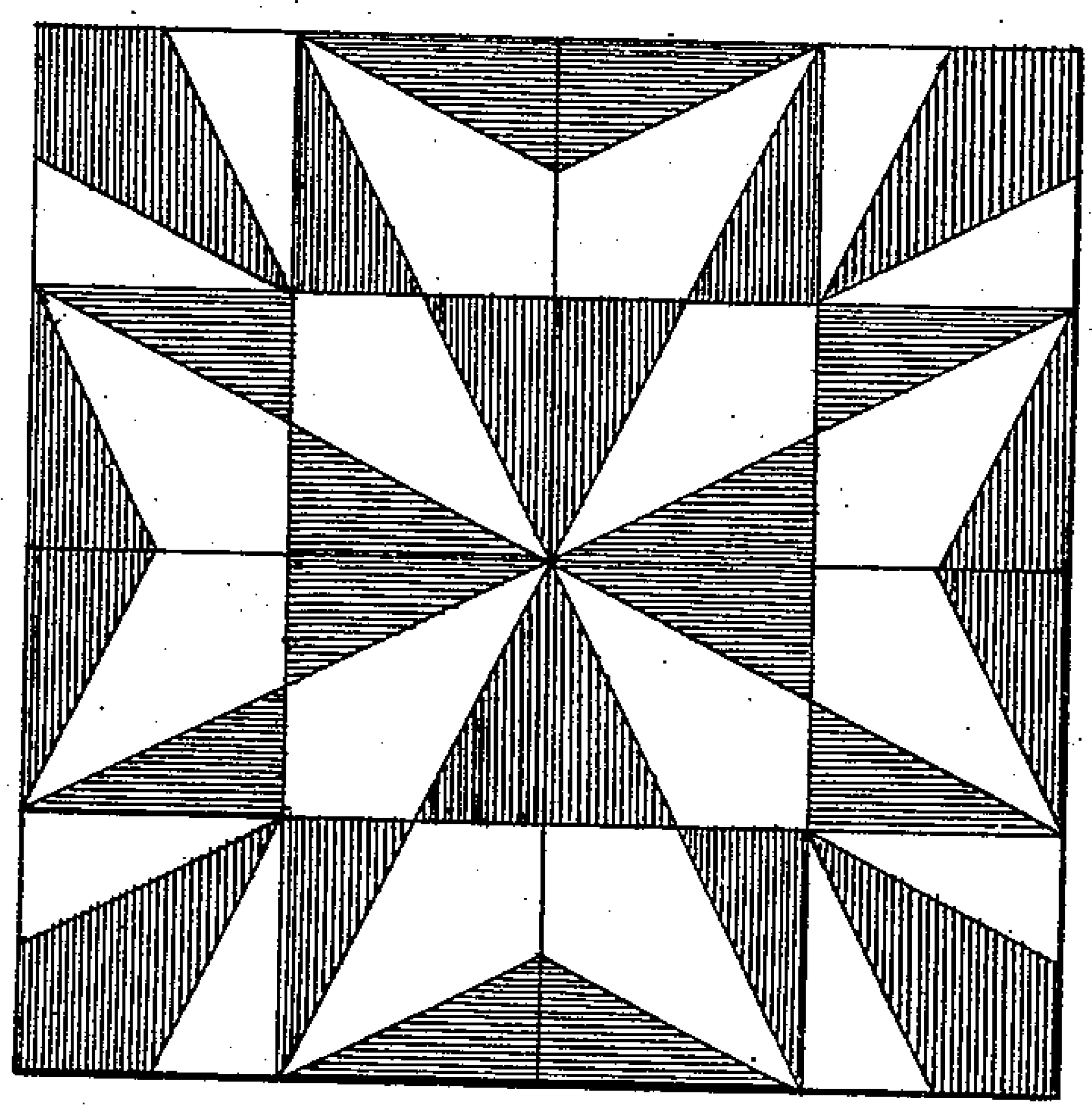


Fig. 6.

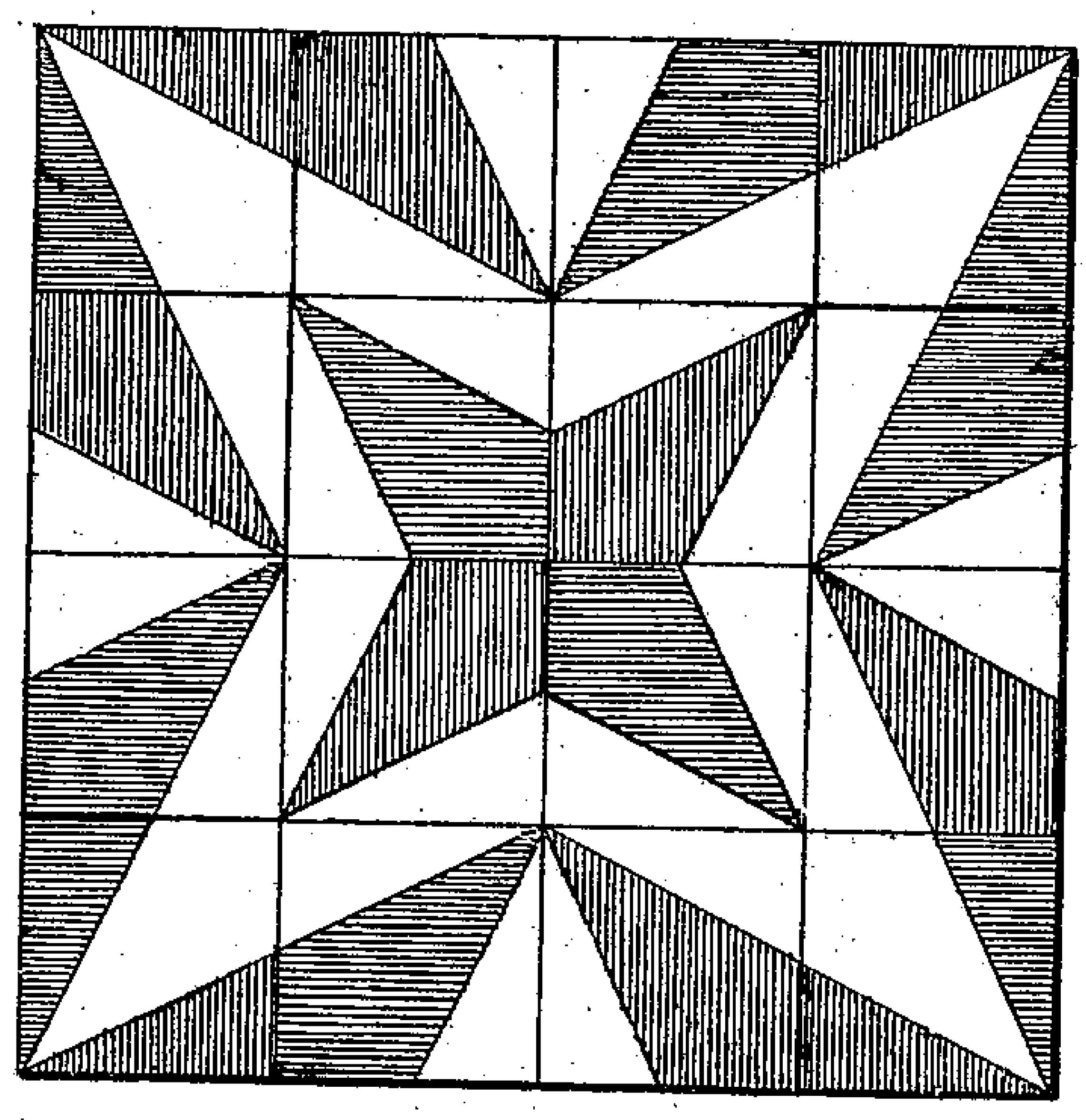


Fig. 7.

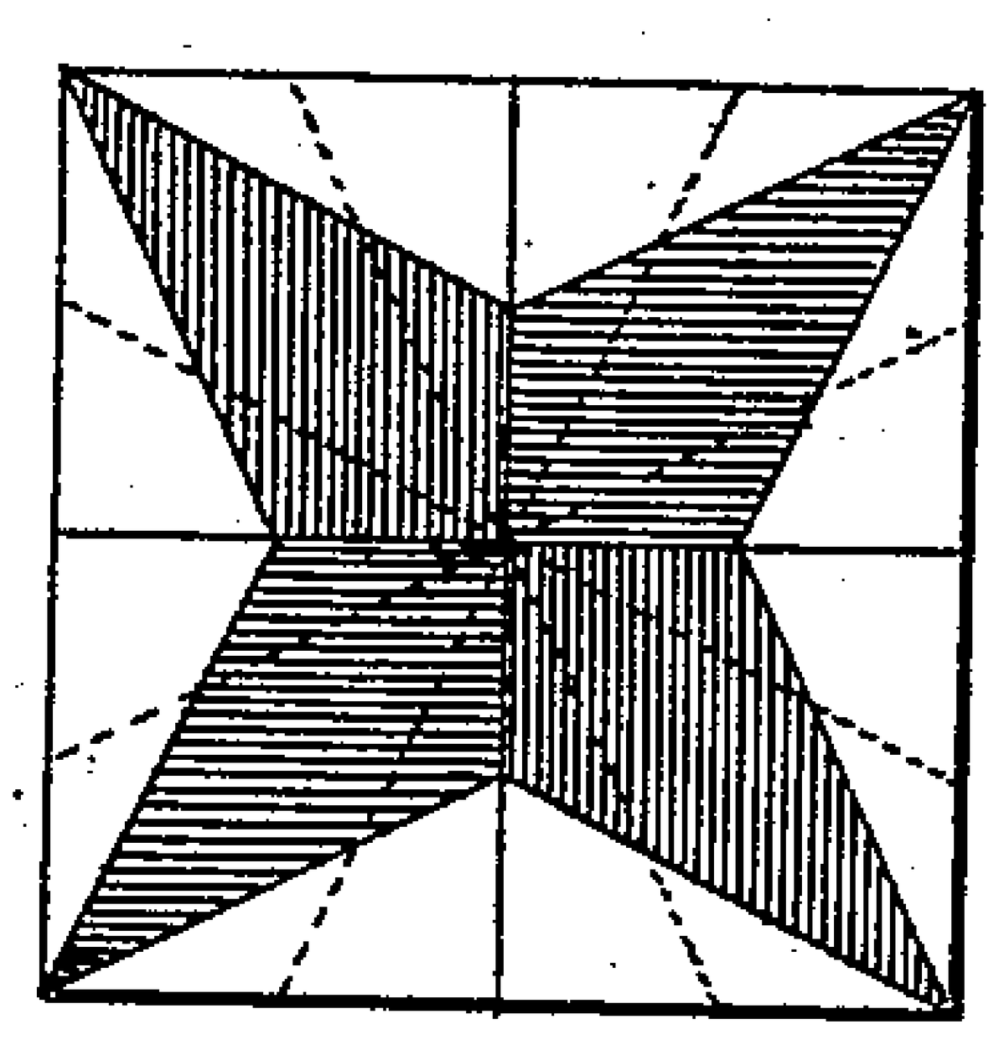


Fig. 8.

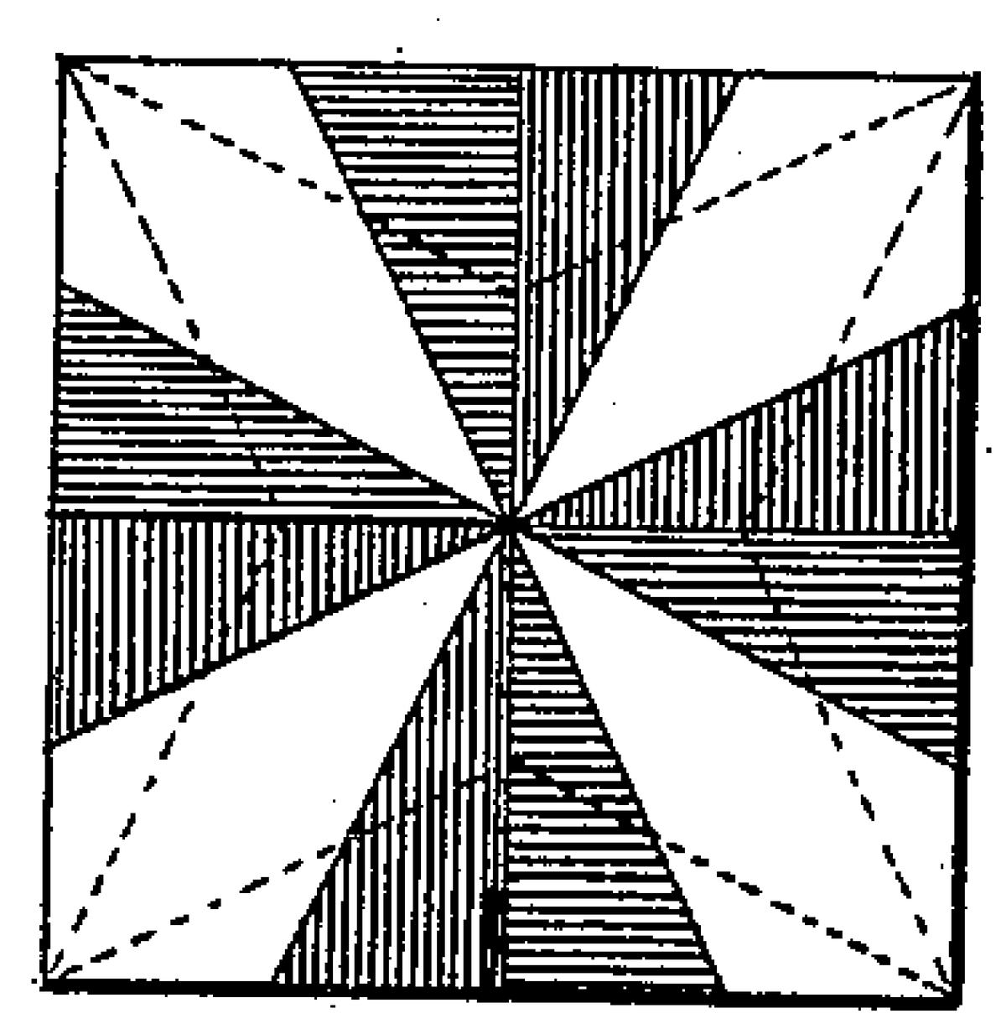


Fig. 9.

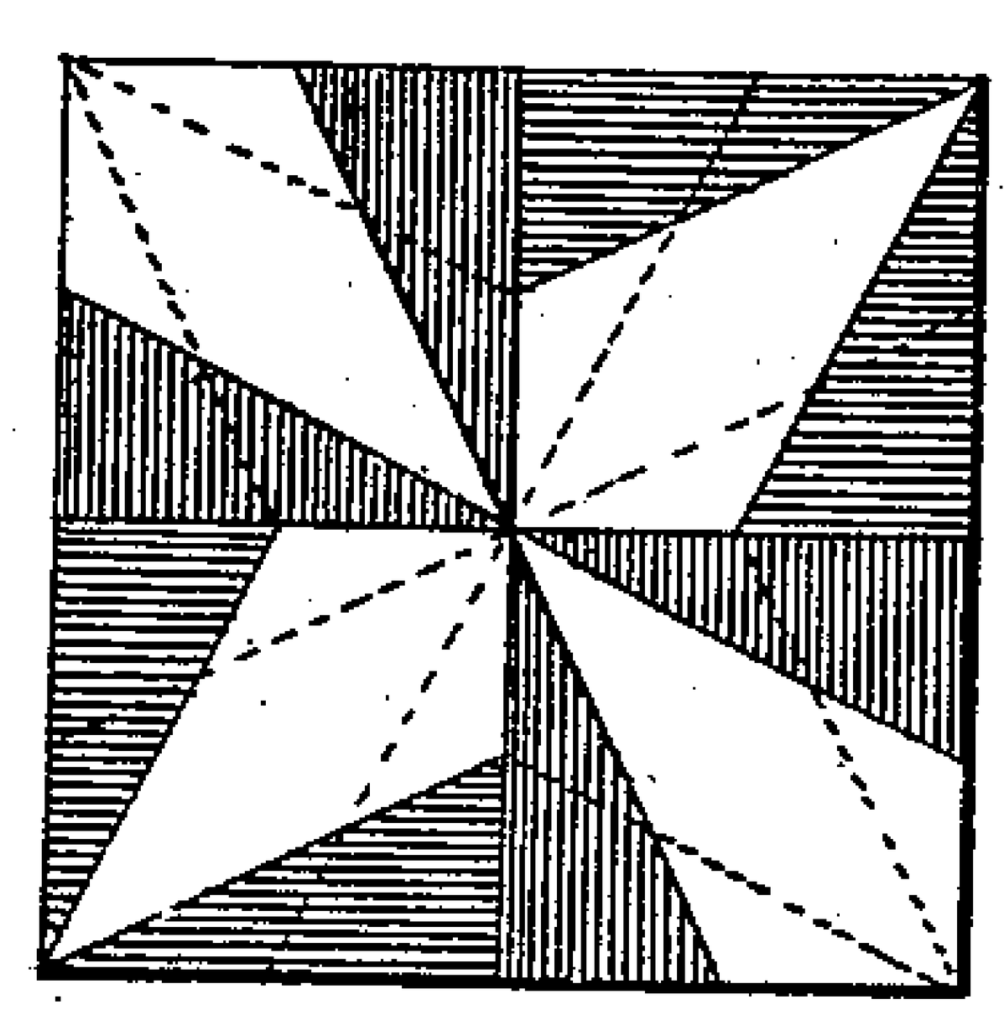
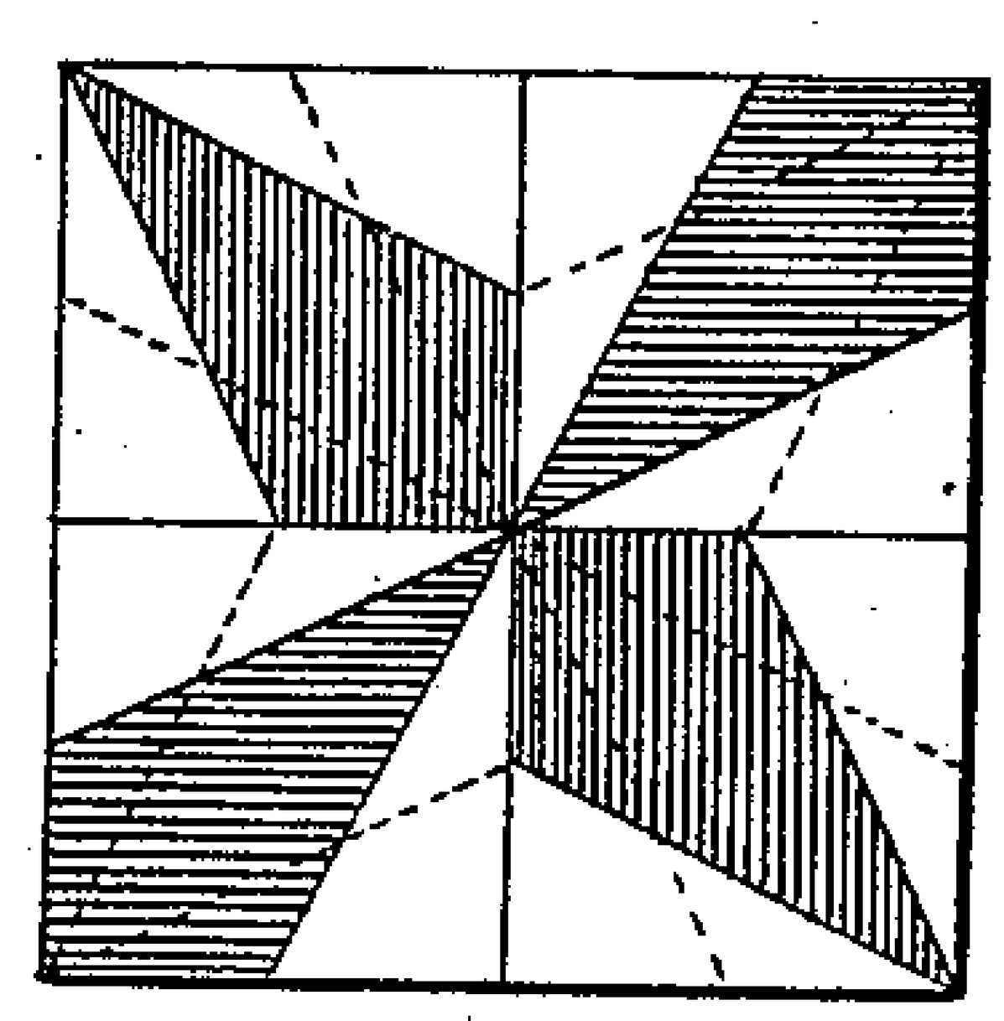


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHANN U. MUELLER, OF DETROIT, MICHIGAN.

IMPROVEMENT IN BLOCKS FOR DESIGNING INLAID WORK.

Specification forming part of Letters Patent No. **191,167**, dated May 22, 1877; application filed April 5, 1877.

To all whom it may concern:

Be it known that I, JOHANN ULRICH MUELLER, of Detroit, in the county of Wayne and State of Michigan, have invented an Improved Apparatus for Designing Kaleidoscopic Mosaic or Inlaid Work, of which the following is a specification:

My invention relates to an improvement on the apparatus for which Letters Patent No. 37,763 were granted to me on the 24th day of February, 1863. In said Letters Patent I described two different sets of triangles, which are of such a shape that two sides of each triangle of one set are equal to two sides of each triangle of the other set, and the three angles of the triangles of one set are different from those of the other set.

My improvement consists in the employment of equilateral tablets or cubes, the equilateral surfaces of which are laid out in various shaded, tinted, or colored figures, composed of triangles formed by dividing the equilateral or square into two right-angled isosceles triangles, said isosceles being subdivided into two concurrent triangles by a line from the half of one of the isosceles sides to the opposite angle, so that the whole square is divided into four concurrent triangles of two kinds, in such a manner that two sides of each kind are equal to two sides of the other kind, and that the three angles of each triangle are different from each other; and, furthermore, the angles of the triangles of the one kind are all different from the angles of the triangles of the other kind.

In the accompanying drawings, Figure 1 is a perspective view of a series of cubes or blocks used in carrying out the invention. Fig. 2 is a top view of a series of tablets, showing different positions of the triangulations. Figs. 3 and 4 are perspective views of tablets having triangulations in different positions. Fig. 5 is a plan view of a design formed by means of tablets or cubes, having the triangulated figures; and Fig. 6 is a view of the reverse side thereof. Figs. 7, 8, 9, and 10 are obverse and reverse views of blocks having same triangulations, the reverse view of Fig. 5 being shown in Fig. 6, and the reverse of Figs. 7 and 9 in Figs. 8 and 10.

Fig. 1 represents cubes or square blocks, having their surfaces laid out in various shaded, tinted, or colored triangular forms, of such proportion or shape as to be composed of triangles, which are derived by dividing the sides of the square into two right-angled isosceles triangles, and subdividing again each of the said isosceles triangles (from the half of one of the isosceles sides to the opposite angle) into two concurrent triangles. The whole square is thus embodied into four concurrent triangles of two kinds, in such a manner that two sides of each kind are equal to two sides of the other kind, and that the three angles of each triangle are different from each other, and, furthermore, the angles of the triangles of the one kind are all different from the angles of the triangle of the other kind.

Some of the triangulations possible to be laid out on an equilateral square with the two above-described triangles are shown by Fig. 2. These triangulations have the advantage (beside the number of positions in which they may be placed) that when more tablets or cubes are joined together the lines of one triangulation on one tablet will meet and be in line with a line of a triangulation on another tablet or cube, or will meet it at the corner or at the center of one of its sides. The result is that, with a little system and still less thinking or combining, a multitude of beautiful, symmetrical, and other trigonometrical designs may be formed by joining the proposed tablets or cubes, having the above combined figures thereon together. Thus the designing is accomplished with a great deal more ease than if the same mosaic figures had to be constructed with triangular-shaped tablets, or if the same figures had to be constructed by head-work.

The triangulations on the obverse side of a tablet or cube are repeated on the reverse side in the same manner as at 1 and 2, Fig. 3, with a change of color, or 6, 7, and 8, Fig. 4, with a change of position, or 3 and 4, Fig. 3, with a change of both position and color, or substitute another combination of triangulations, as shown by Fig. 2, and at 9 and 10, Fig. 4, (all in a systematic way and with a view of light and shade or of harmony of colors by contrast or blending, as taste may decide,) so that in case tablets or cubes of the top com-

bination and color are set aside they will harmonize with some of the under or reverse combination.

Operation: A set of four cubes or tablets are placed in such a position as to represent Fig. 7. The cubes or tablets are next turned over together, so as to bring the reverse side of the four blocks or tablets to the top, and Fig. 8 will be represented. Change the position of two corner-blocks, and Fig. 9 will be represented, when by turning over the set together Fig. 10 will be represented. Thus almost indefinite number of designs can be formed by the use of merely four blocks, and it will not be necessary to hunt for the blocks, as each cube contains the needed triangular figure.

Fig. 5 is constructed with sixteen such blocks, and Fig. 6 is the reverse view of the same—that is to say, if the top of the sixteen blocks make a mosaic like Fig. 5, the under side of the sixteen blocks will, by the here-adopted combination, invariably look like Fig. 6. The combinations used on these blocks are only those of *a a'* and *k k'* of Fig. 2, and of four colors, reversed-position combination 3, Fig. 3. If more blocks, more colors, and more combinations are used, it will be clear that the making of mosaic patterns will be indefinite. It is very easy to get up such patterns when tablets or blocks are provided. Any of the designs shown in Figs. 7, 8, 9, and 10, four times repeated and properly arranged, will give a complete pattern.

Having once a symmetrical figure, say, of sixteen blocks, revolve it; then change color or position, or both, of the four corners or the four centers, or the two intermediate blocks on each side, or change the position of all the sides or halves, &c., only remembering that the changes must always be symmetrical; revolve again, and so on, and there can be formed in a little time a variety of very different but still tasty-looking patterns, which the most inventive genius could not have constructed or combined in such a short time.

The device will certainly cultivate taste in drawing, in combining colors; assist manufacturers in designing their patterns; assist the housewife in planning her quilts, and will also form a genteel pastime for young and old.

Forty-eight tablets may form a set having the combination of *a a'*, *b b'*, *c c'*, *d d'*, and *e e'*, Fig. 2, the reverse-position combination being shown at 1 2, Fig. 3, or 5, Fig. 4. The forty-eight tablets have ninety-six square sides laid out with triangulated figures. A set of sixteen blocks has also ninety-six squares laid out, but, in fact, in mosaic, only sixteen sides can be shown by them at once; but with the tablets having the same number of square sides, forty-eight squares can be shown at once.

If not more than sixteen tablets are laid out, card-board, with turned-up edges, will be handy for laying and revolving. For having variegated and nice large figures, the tablets are preferable. The blocks are perhaps more handy, and can also be used for showing figures on the perpendicular plane and building up. The apparatus will form a splendid toy for children, and will be found useful in kindergarten schools.

I am aware that the surfaces of square blocks or tablets have been divided and colored so as to represent isosceles triangles, and such, therefore, I do not claim; but

What I do claim as new, and desire to secure by Letters Patent, is—

The apparatus for designing mosaic or inlaid work, consisting of square blocks or tablets having marked on one or more of their sides or surfaces, in varying shades, tints, or colors, divided isosceles triangles, so as to form two triangles of unequal sides, substantially as described and shown, for the purpose set forth.

J. U. MUELLER.

Witnesses:
WILHELM SCHMIEDING,
KARL SCHMEMANN.