

1,087,207.

J. A. AUSTIN.
DESIGNING APPARATUS.
APPLICATION FILED DEC. 2, 1912.

Patented Feb. 17, 1914.

2 SHEETS—SHEET 1.

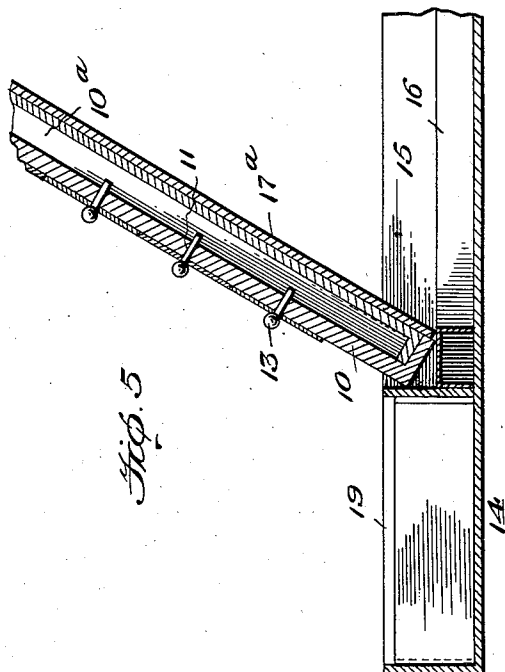


Fig. 5

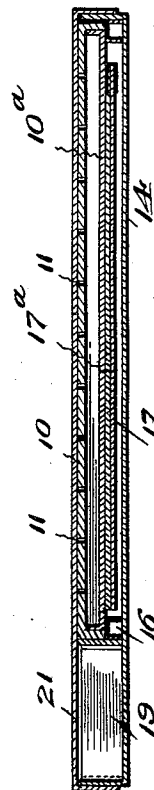
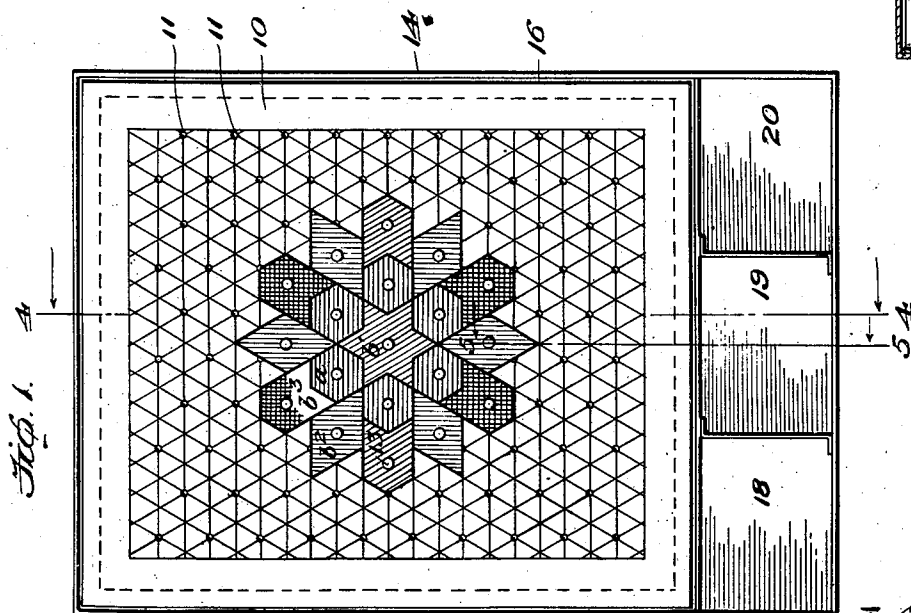


Fig. 4.



Witnesses

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Fig. 6.

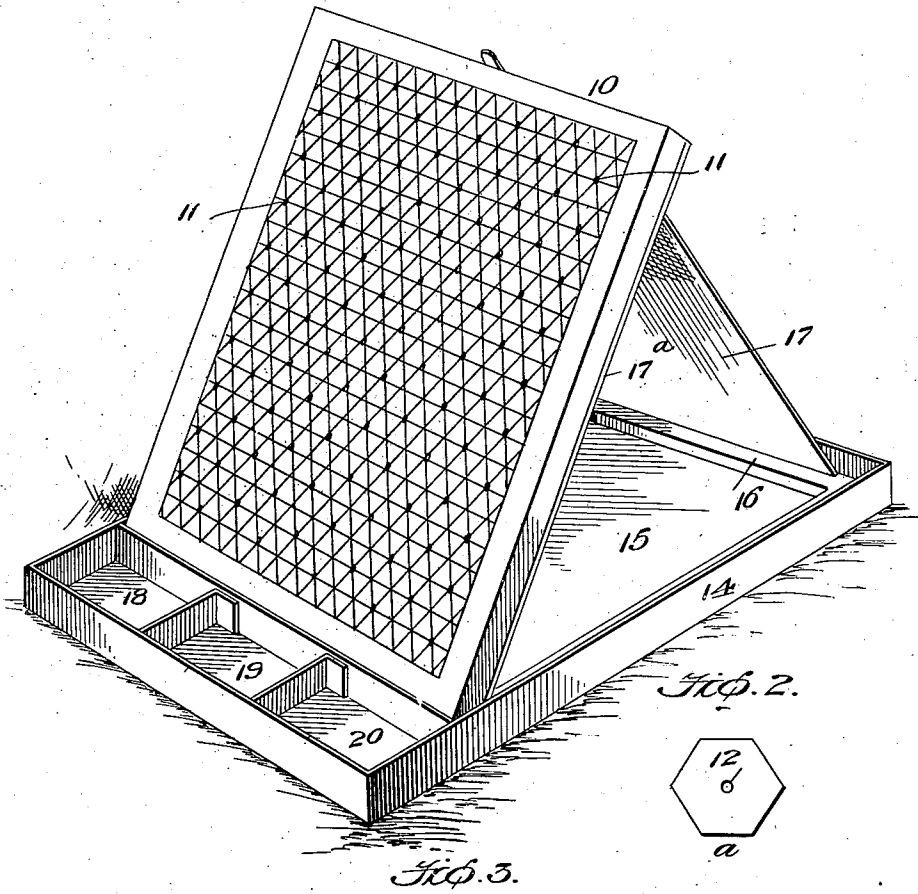
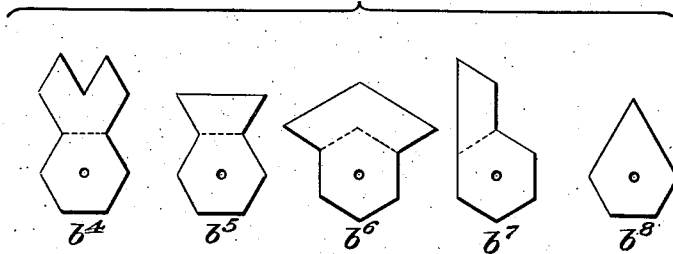


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES ALMON AUSTIN, OF CHICAGO, ILLINOIS.

DESIGNING APPARATUS.

1,087,207.

Specification of Letters Patent.

Patented Feb. 17, 1914.

Application filed December 2, 1912. Serial No. 734,642.

To all whom it may concern:

Be it known that I, JAMES ALMON AUSTIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Designing Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention pertains to apparatus for use in the designing of geometrical patterns; and it is the principal object of my invention to provide apparatus whereby various geometrical patterns may be readily designed, such patterns being made up of a number of units, each of which units is a figure including a hexagon with or without one or more equilateral triangles added thereto.

In carrying my invention into effect, I provide what may be termed a designing board, this board having the surface thereof divided into hexagonal spaces, each of which spaces is provided with means for attaching a pattern unit. In connection with the designing board, I employ a number of pattern units, each of which consists of an entire hexagon with or without one or more triangles added thereto. The units which consist of a hexagon with the addition of one or more triangles may be conveniently termed "intermediates"; and they may take a variety of forms, provided that the portion added to the hexagon does not itself constitute in form another hexagon. These pattern units may be detachably secured to the designing board by the aid of securing means disposed centrally thereof, and, in the case of the intermediates, centrally of the hexagonal portions of said intermediates. The pattern units, both hexagons and intermediates, are of different colors; and many ornamental and interesting patterns may be designed by placing different colored and different shaped units in juxtaposition on the board.

The device is of great use in the designing of mosaic patterns; it further forms interesting and instructing forms of amusement, and is useful in school work for giving demonstration in geometrical design and the like. Other uses of the invention will appear from the following specification.

A set of apparatus embodying my invention is described, by way of example, in the following specification and shown in the ac-

companying drawings. My invention may, however, take other forms than that shown and described, without exceeding the scope thereof as defined in the appended claims.

In the drawings—Figure 1 is a plan of a box, containing a designing board constructed in accordance with my invention, having a plurality of pattern units arranged in pattern thereon; Fig. 2 is a plan of a unit in the form of a hexagon; Fig. 3 shows a plurality of different forms of intermediates; Fig. 4 is a section on the line 4—4 of Fig. 1, showing the construction of the box for containing the designing board, pattern units, etc.; Fig. 5 is an enlarged sectional view, showing the designing board in its tilted position ready for use, the section being taken on the line 5—5 of Fig. 1; and Fig. 6 is a perspective view of the designing board supported in a tilted position, ready for use.

Like reference characters refer to like parts throughout the following specification and the several figures of the accompanying drawings.

Referring now particularly to Fig. 1, the designing board 10 has the face thereof divided by a series of lines crossing the same at an angle of sixty degrees, a second series of lines crossing the same at an angle of sixty degrees in the opposite direction of the first series, and a third series of lines drawn horizontally through the intersections of the first two series of lines. The surface of the board is thus divided into a number of hexagons of equal size, each of which, in turn, is divided into six equilateral triangles. Securing means for a pattern unit is provided for each hexagon, such securing means being constituted, in the embodiment of my invention now being described, by holes 11 adapted to be entered by pegs passing through the pattern units.

In connection with the designing board, there are used a number of pattern units of equal size, including hexagon units and intermediates. A hexagon unit *a* is shown in Fig. 2; and a number of them are shown, in position on the board, in Fig. 1. The intermediate units may take various forms. The intermediate unit *b*¹ (Fig. 1) consists of a hexagon having an equilateral triangle, the base of which is equal to one of the sides of the hexagon, added to each of its sides. The intermediate units *b*² each consist of a hexagon with an equilateral triangle added

to two opposed sides thereof. The intermediates b^3 (Fig. 1) each consist of a hexagon having equilateral triangles added to two of its adjoining sides. Other forms of intermediate are shown in Fig. 3 of which—
 b^4 consists of a hexagon having five equilateral triangles (in the form of a hexagon, less one triangle) added to one of its sides; b^5 consists of a hexagon having a half-hexagon added to one of its sides; b^6 consists of a hexagon having a half-hexagon added to two of its adjoining sides; b^7 consists of a hexagon having three triangles, superposed on each other to form a half-hexagon, added to one of its sides; and b^8 consists of a hexagon having an equilateral triangle added to one of its sides. It will be observed that each of the intermediates consist of a hexagon with one or more triangles added thereto, such addition in no case, however, amounting to a hexagon in form. It is obvious that the form of the intermediates may be varied considerably beyond what has been shown; but it is believed that those forms which have been shown and described are sufficient to enable the nature of the intermediates to be understood. Each of the pattern units is formed, at its center, with a hole 12, through which a peg 13 may be passed into one of the holes 11 of the designing board 10, to secure the unit temporarily in position on the designing board.

In the use of the designing board, a unit is secured to the board by means of one of the pegs 13, and other units are built up around it, the shapes, colors and disposition of the units being chosen in accordance with the user's artistic taste and imagination. For instance, in the pattern shown, as an example, in Fig. 1, a star-shaped intermediate b^1 was employed as a base upon which to build a pattern, such intermediate being colored black. Around this were placed a number of hexagonal units a , colored red. Fitted into the triangular spaces between the units a were a series of diamond-shaped intermediates b^2 , colored blue; and a series of intermediates b^3 , black in color, were placed in the spaces between the intermediates b^2 , thus completing an attractive geometrical design. The design shown is of a simple nature; but, of course, much more intricate designs, involving the use of many different shapes of intermediate, may be produced, according to the creative powers and imagination of the person using the apparatus.

It will be noted that as soon as intermediates have been used, it becomes necessary, if the pattern is to be continued or if the pattern is to be fitted to a field made up of hexagons, that other intermediates, of a nature complementary to those which have been already used, be employed. The choosing of such intermediates, which is facilitated by the manner in which the designing

board is divided, adds a great deal of interest to the use of the device.

In placing my apparatus on sale, it is my intention to supply, together with the board and pegs, a number of hexagonal units of different colors, and also a number of intermediates of shapes which experience shows to be most frequently used. In addition, I shall supply a number of different colored sheets of cardboard, ruled in the same manner as the designing board is ruled; so that intermediates of any desired shape and color may be cut out by the user of the apparatus, to suit his requirements. I shall further provide a number of sheets of drawing paper or the like ruled in the same manner as the designing board is ruled. This paper forms the subject matter of my copending application Serial No. 734,643, filed December 2nd, 1912, and may be used for copying off the designs produced on the designing board, so as to record the same. The paper has other uses, which are fully described in the said copending application and do not need description here.

It will be seen that, by the use of my invention, it is possible to design mosaic patterns very conveniently; and the patterns may, by the use of surrounding intermediates of the same color as the field in which the pattern is to be used, be fitted readily for insertion in a mosaic field made up of hexagons. Thus the use of the intermediates enables the designer to break into a hexagon field, form a pattern, and return again to the hexagon field. This may, in many cases, be done by the use of intermediates alone, not a single hexagon unit being employed. When a design has been completed, it may be copied on the drawing paper. In this way records of the more valuable designs may be kept. The invention is of great use in schools, where the scholars may, with its aid, obtain a practical acquaintance with many geometrical forms based on the hexagon and equilateral triangle; moreover, its use stimulates the imaginative and creative faculties. Besides its use for designing and educational purposes, the invention is serviceable as an amusement device, providing a pleasant form of entertainment in the designing of various patterns, and the choosing and fitting of various shapes of intermediates to produce them.

The set of apparatus shown in the drawings is designed to permit the invention to be placed on the market at a reasonable cost, and to be used by the purchaser with convenience to him. In this apparatus, the designing board is hollow, being preferably formed of two shallow trays fitted together so as to leave a space between the front tray 10 and the rear tray 10^a. This provides accommodation for the ends of the pegs 13 projecting through the holes 11 of the front

tray. The designing board is contained in a shallow box 14 divided across one end so as to produce a compartment 15. Around the lower part of the side wall of the compartment 15 is placed a ledge 16, upon which the designing board is adapted to rest when the apparatus is not in use, a space being thus left between the designing board and the bottom of the compartment 15 for the reception of ruled cardboard for cutting up into intermediates, drawing paper, pencils and the like.

A stand is provided for supporting the designing board 10 in an inclined position (Fig. 5) with its lower edge resting on the front part of the ledge 16. When the designing board is so supported, it is in a very convenient position for use. This stand preferably consists of two flaps 17 and 17^a, hinged together at their top edges. When in use, the board 10 rests upon the flap 17^a, which is supported in an inclined position by the flap 17 (Fig. 5), the lower edges of the flaps resting on the ledge 16. The stand is separate from the board 10, which latter may be used with or without the stand, as desired. When not in use, the stand lies in the space beneath the board 10.

The part of the box 14 situated in front of the compartment 15 is divided into three trays 18, 19 and 20, for receiving the pegs 13, the hexagon units and the intermediate units respectively, these materials being thus kept in a very accessible position. When the designing board 10 is laid down on the ledge 16, it lies flush with the top of the box 14, which latter may be conveniently closed by means of a cover 21.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. Apparatus for use in designing geometrical patterns, comprising a plurality of hexagonal units of equal size, and a plurality of intermediate units, each of said intermediate units including a hexagon of equal size to said hexagonal units with the addition of one or more equilateral triangles, the bases of which are equal to a side of said hexagon.

2. Apparatus for use in designing geometrical patterns, comprising a plurality of hexagonal units of equal size, and a plurality of intermediate units, each of said intermediate units including a hexagon of equal size to said hexagonal units with the addition of a figure composed of one or more equilateral triangles, the bases of which are

equal to a side of said hexagon, said figure being less than a hexagon in form.

3. In apparatus for use in designing geometrical patterns, a support member divided into contiguous hexagonal spaces of equal size, a plurality of pattern units of the size and shape corresponding with such spaces, a plurality of other pattern units, each including a hexagonal portion of corresponding size to such spaces with the addition of one or more equilateral triangles, and a series of means for attaching said pattern units to said support member.

4. In apparatus for use in designing geometrical patterns, a support member having the face thereof divided into hexagons, a series of pattern units of geometrical form corresponding in size to the hexagons into which said support is divided, a second series of pattern units each including a hexagon in form, of corresponding size to the said first-named pattern units, with or without the addition of one or more equilateral triangles, the bases of which are equal to a side of said hexagon, and means for attaching said pattern units to said support with their hexagonal portions corresponding in position with the hexagons into which said support is divided.

5. In apparatus for use in designing geometrical patterns, a board having the surface thereof divided by a series of equidistant parallel lines, a second series of equidistant parallel lines crossing the board at an angle of sixty degrees to said first-named series, and a third series of lines crossing the board through the intersections of said first and second-named series, whereby the board is divided into hexagons, each of which hexagons is divided into equilateral triangles, a series of pattern units of hexagonal form, and of corresponding size to the hexagons into which said board is divided, a second series of pattern units, each including a hexagon in form, said hexagon corresponding in size with said first-named units, with the addition of one or more equilateral triangles, the sides of which are equal to a side of said hexagon, and means for securing said pattern units to said board.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

JAMES ALMON AUSTIN.

Witnesses:

MABEL REYNOLDS,
CHARLES G. COPE.