

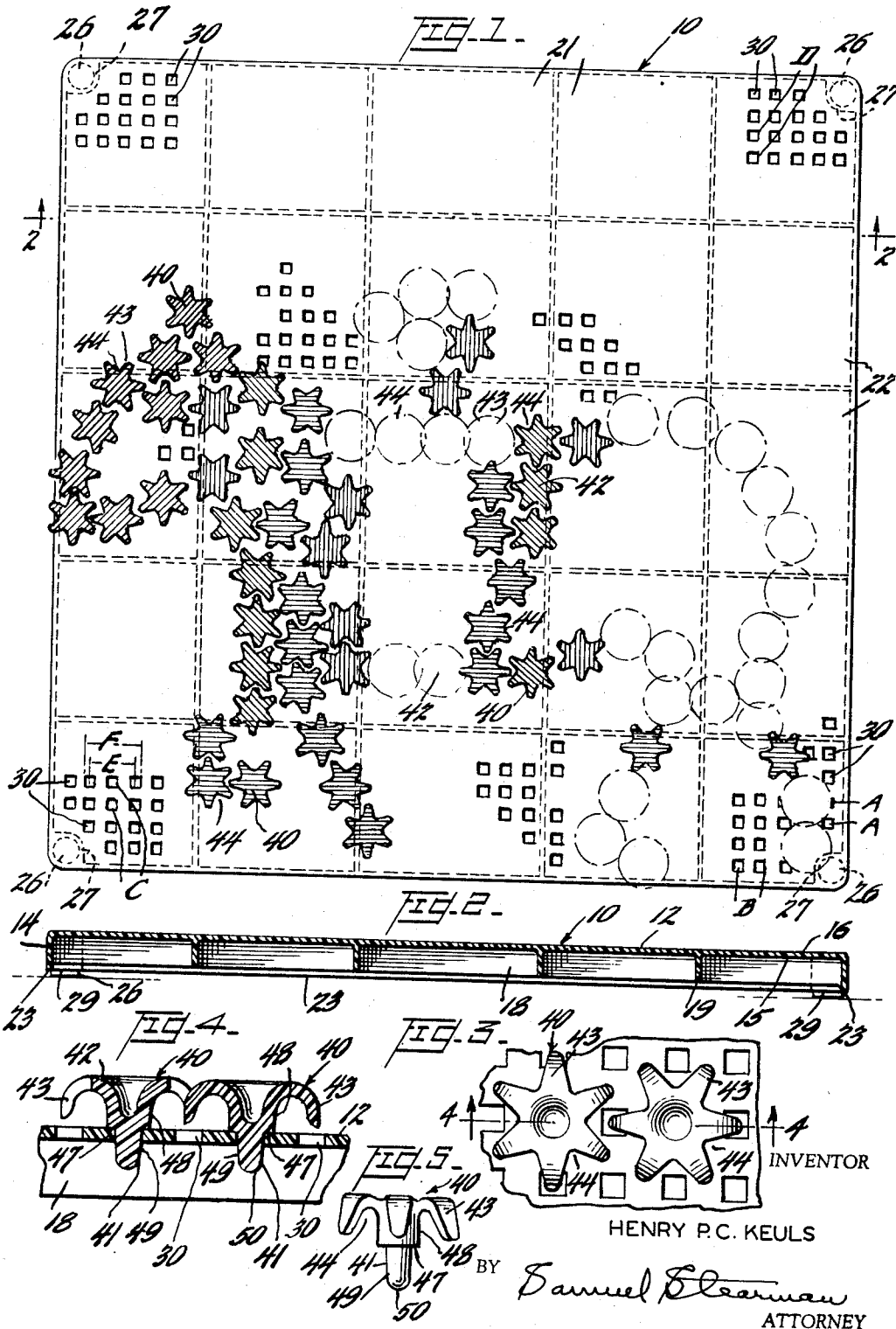
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DESIGN FORMING TOY

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DESIGN FORMING TOY

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This invention relates to a toy or like device intended for amusement of children as well as adults, and for like purposes.

More particularly, the invention relates to a toy or device of the character indicated, constructed to enable the user to form an infinite variety of designs or figures, embodying more especially three-dimensional as well as multi-color effects.

An object of the invention is to provide a toy or like device of the character indicated which can be used not only for amusement, but also for occupational therapy, for decorative and for other purposes.

Still another object is to provide a toy or like device capable of use as aforesaid, so constructed as to make possible the formation thereby of a substantially unlimited number of composite multi-colored designs wherein differently colored portions of the design adjoining one another will be characterized by an attractive interblending of the different colors, and wherein the designs as a whole will be characterized by desirable three-dimensional effects.

Still a further object of the invention is to provide a device of the character set forth above, which may readily be utilized as changeable decorative units for use in the home, as table center-pieces, or the like.

In accordance with the invention, the toy hereof comprises a supporting surface in the form of a board formed with a plurality of uniformly-arranged apertures which are adapted to receive the stem portions of any one of a plurality of design-creating elements, the latter differing from one another in color, and having at the upper end of the stem portion thereof, a head portion comprising a plurality of radially-extending projections and intervening recesses which permit the elements to be arranged on the supporting surface in inter-engaging or interfitted relationship.

In the particular form of the invention shown and described herein, the projections and intervening recesses comprising the head portion formed at the upper end of the stem portion of the design-creating elements are preferably formed in simulation of the petals of a flower, such as the hyacinth.

By constructing the design-creating elements with the head portion thereof in the form of radially-extending projections and intervening recesses it becomes possible to form designs in which the lines of demarcation or border areas between adjoining differently colored portions of the design will present a desirable and attractive blending of the different colors, not obtainable in design-forming toys known prior to my invention.

More specifically, by constructing the head portion in a shape resembling a flower, such as the hyacinth, i. e., with the projections thereof arched concavely upwardly and outwardly away from the stem portion and then downwardly and outwardly from the stem portion, the above-mentioned three-dimensional effects may readily be obtained.

The board comprising the base of the toy is formed

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with apertures arranged in parallel rows longitudinally and transversely of the base, the rows extending preferably at right angles to one another, the apertures being of a size and spaced from one another in each of the rows on centers such that the elements disposed in any one of the rows will have at least one of the projections thereof extending into and loosely interlocking with the space between adjoining projections of an element disposed in an alternately adjacent aperture. This result is achieved by having the apertures in the base spaced on centers at a distance calculated in mathematical relation to the diameter of the most remote peripheral portions of the projections with which the elements are formed.

According to the invention, the base may be, and preferably is, made from a suitable plastic material molded into a board of relatively small cross-sectional thickness. The board, however, is constructed in a form such that the depth-wise dimension of the base is substantially in excess of the cross-sectional thickness of the board and in excess of the axial dimension of the stems of the design-forming elements to be used with the base in creating the desired designs. Thus, the stem portions extend entirely through the thickness of the board from the upper or working surface thereof, so as to project a substantial distance beyond the opposite surface of the board. This projection of the stems beyond the opposite surface affords the additional advantage of facilitating removal of the elements from the apertures when desired, as will be hereinafter explained.

While a variety of materials may be used in thus forming the base, it has been observed that low cost, commercially available materials that can be molded or otherwise formed as sheets of relatively small cross-sectional thickness possess an objectionable degree of flexibility or resilience. Thus, in a board say 9 inches square or larger, this flexibility or resilience manifests itself by the sagging and resultant failure of the working surface to lend adequate resistance against the pressure necessary for inserting the stems of the design-forming elements into the apertures of the base. The normal flexibility of the material is accentuated by the presence of the multiplicity of apertures necessary for using it as the base of the toy. This property of the board, especially when made from certain types of plastics, causes excessive flexing thereof in handling or use.

According to the invention, it becomes possible to form the base from these normally flexible materials in sheets or layers of relatively small cross-sectional thickness, compared to the over-all height of the base made therefrom. This result is achieved by forming the base at the periphery thereof and at suitably spaced intervals with ribs extending in a downward direction from the lower face of the board to function as supports for resting the board on a surface, and as reinforcements for the board to stiffen the same and prevent sagging and injury under the effects of pressure.

The foregoing and other features and advantages of the invention will be more readily apparent from the detailed description herebelow and from the accompanying drawings, in which.

Fig. 1 is a view in plan, of an educational toy embodying the invention, illustrating one design formed therewith;

Fig. 2 is a view, in cross-section taken along line 2—2 of Fig. 1, looking in the direction indicated by the arrows;

Fig. 3 is a fragmentary view on an enlarged scale of a portion of Fig. 1;

Fig. 4 is a view in cross-section taken along line 4—4 of Fig. 3, looking in the direction of the arrows; and

Fig. 5 is a view, in elevation, of one of the design-forming elements embodying the invention.

Referring now in detail to the drawings, the numeral

10 indicates generally the base member embodying the invention. The base 10, in the illustrative embodiment shown, is of substantially square outline. As will be obvious, however, this base may be of rectangular, circular, or other geometric configuration.

The base is preferably made from a plastic material such as a suitable mixture of polystyrene resin and acrylonitrile.

In accordance with the invention, the base comprises a horizontal member 12 formed at the periphery thereof with flanges or ribs 14 extending downwardly at right angles from its lower surface 15, the upper or exposed working surface of the member 12 being indicated at 16. The lower surface 15 of the base is provided with downwardly extending parallel ribs 18 spaced from each other a distance of two to three inches and running longitudinally of the base, and with similar spaced ribs 19 running transversely of the base. The ribs 18, 19 are preferably of a slightly lesser height than the flanges or ribs 14, and all of the ribs are preferably formed integrally with the member 12. The ribs 14 serve to support the member 12 at a desired elevation above the surface of a table or the like, upon which the base may be placed. If desired, the thickness of ribs 14 may be somewhat greater than that of the ribs 18, 19.

Thus, the base as thus far described, may be said to be in the form of an inverted, relatively shallow pan construction, subdivided by the ribs on its lower face into a plurality of longitudinal and transverse rows of compartments or cells 21, 22; and at each of these cells, the portion of the supporting member 12, constituting the top wall thereof, will be rigid notwithstanding the normal flexibility of the material of which the base is composed.

The bottom edges 23 of flanges 14 constitute the supporting surface for base 10 when rested on a table, desk, easel or the like, the ribs 14, 18 and 19 serving as reinforcements to prevent sagging of the member 12 under pressure that may be exerted upon the upper face 16 thereof.

If desired, the base may be formed at the corners thereof with walls 27 extending inwardly from the flanges 14 to provide pockets 26 for receiving removable rubber or similar inserts 29 serving as feet for the base to prevent injury to any surface upon which the base may be used.

In specific terms for purposes of illustration, the base 10 may be made by well-known methods of injection molding from a resin plastic of the type above-mentioned. The molding dies may be formed so that the member 12 will be of a thickness of approximately 0.075 inch, the flanges or ribs 14 will be of a height of approximately 0.375 inch and of a thickness of approximately 0.088 inch, and the ribs 18, 19 will be of a height of approximately 0.25 inch, and of a thickness of approximately 0.070 inch. If desired, the flanges 14 and the ribs 18, 19 may be formed of slightly tapering cross-sectional thickness, with the taper extending downwardly from the member 12.

In order to utilize the base 10 for forming designs thereon, the member 12 is provided with a multiplicity of square-shaped apertures 30 arranged in equi-spaced, parallel longitudinal rows A and in equi-spaced parallel transverse rows B, these rows being arranged intermediate the ribs 14, 18 and 19. This arrangement of the apertures 30 thus also provides oblique rows C of apertures and similar oblique rows D extending at right angles to rows C, the rows C and D lying at an angle of 45° with respect to rows A and B. As will be noted particularly from Fig. 4, the apertures 30 extend through the entire thickness of the member 12. These apertures are designed and intended to receive the stems of novel elements 40 constructed as herein set forth, for forming any one of an unlimited variety of designs on the base 10.

The design-forming elements 40, as illustrated in the drawings, are each formed with a central stem portion 41 of substantially round cross-section, and adapted to

be received in any one of the apertures 30. At the upper end of the stem portion, each element is formed with a head portion 42 constructed and arranged to define a plurality of spaced radially-extending projections 43 and intervening recesses 44. Intermediate the head portion 42 and the lower end 50 of the stems 41, the elements 40 are formed so as to define an annular shoulder 47 extending in a plane at right angles to the vertical axis of the stem portion. The outer diameter of the shoulder 47 is somewhat greater than the maximum dimension of the apertures 30, thus enabling these shoulders to rest upon the upper surface 16 of the base when the elements 40 are fully received in the apertures 30. Preferably, the upper portions 48 of the stems are made so as to taper slightly in the downward direction, and similarly, the lower portions 49 of the stems are made so as to taper slightly in the downward direction and to have the lower ends thereof somewhat rounded as indicated at 50.

As will be seen, the recesses 44 are of the same general shape as the projections 43 and are sufficiently large to permit free reception of the projections of adjacent design-forming elements, in loosely interlocking relationship.

Each of the elements 40 of the embodiment shown in the drawing has the head portion thereof in the form of a flower, as for example, that of the hyacinth, with projections 43 extending radially with respect to the stem. As shown more particularly in Fig. 4, the elements 40 provide a substantial and desirable three-dimensional effect by reason of the vertically arcuate configuration of projections 43, these being formed so as to curve or be arched upwardly and outwardly away from the stem portion 48 and then downwardly and outwardly with respect thereto.

Moreover, by thus forming the projections 43 in the upwardly arched concave configuration described, the central cone-like depression 51 in the head portion 42 of each element lends itself readily to the incorporation of further decorative effects, for example, by suitably mounting in these depressions any desired material such as a rhinestone or the like for embellishing the over-all design with qualities of vivid reflection or brilliancy.

The dimensions and spacing of the apertures in the base 10 and the dimension of the elements 40 are, in accordance with the invention, related to one another in such manner as to enable adjacent elements 40 to be positioned on the base with the projections 43 of one of the elements to be received and interfitted or loosely interlocked within a recess 44 of the other element. The distance between the centers of alternately adjacent apertures 30 in each row A and B is indicated at E in Fig. 1, and the distance between the outermost or most remote peripheral edges of such alternately adjacent apertures is indicated at F in Fig. 1. The diameter of the circle upon which the outer ends of the projections 43 of the elements 40 lie should have a value in the range between the distance E and the distance F.

As a specific illustration of the dimensioning and spacing of the apertures 30 and the dimensioning of the elements 40, it may be stated that with the square apertures shown, measuring approximately 0.15 inch along each side of the square, and with a distance of say 0.195 inch between adjacent apertures, the distance E will be approximately 0.69 inch, and the distance F will measure approximately 0.84 inch. With the aforesaid dimensioning and positioning of the apertures 30, the elements 40 may be formed with the projections 43 thereof so that the circle upon which the outermost ends of the projections 43 lie may have a diameter of approximately 0.80 inch.

The distance from the uppermost surface of the head portion 42 to the lower ends of the projections 43, when measured in a vertical plane may be approximately 0.25 inch. The shoulder 47 may be spaced a distance of approximately 0.32 inch below the uppermost surface of the head portion and may be of an outside diameter of approximately 0.19 inch. The lower portion 49 of the

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stem may have a diameter of approximately 0.15 inch at its upper end and may taper to a diameter of approximately 0.11 inch at its lower end. The height of this stem portion 49, measured from the shoulder 47 to the lower end 50 may measure approximately 0.22 inch.

If desired, the upper portion 48 of some of the elements 40 may be of a greater length than that of others, i. e., the distance between the shoulder 47 and the uppermost surface of the head portion 42 may be different among the elements 40, whereby in the designs formed on the base by the use of such elements, the three-dimensional effect may be enhanced or accentuated.

The design-forming elements 40 are made of different colors, so as to enable the composite designs made with a multiplicity of such elements to be composed of two or more colors. Preferably, each design-forming element is of a single color, although multicolored or variegated color elements may be employed, if desired. In other words, the projections 42 of each or some of the elements may be colored differently from one another, those of some of the elements likewise differing from those of others. Preferably, in a predetermined number of elements 40, one group comprising a plurality thereof may be of one color; another group thereof may comprise a plurality of another color; a third group may comprise a plurality of still another color, etc. Thus, for example, in a set wherein the base 10 is approximately twelve inches square, and formed with apertures 30 spaced and dimensioned as above illustrated, so that there will be approximately twelve hundred apertures in the base, a supply of two hundred to two hundred forty elements 40 may be furnished, the supply being composed of ten to twelve different colors, twenty of the elements being of each of the selected colors. Similarly, in a set in which the base 10 measures approximately nine inches square, formed with apertures 30 therein spaced as aforesaid, so as to provide a total of approximately six hundred apertures in the base, there may be furnished eighty to one hundred elements, among which there will be twenty elements of each of four or five different colors.

Any desired colors may be used, although when the elements 40 are formed in simulation of a flower, such for example as the hyacinth, the colors, hues or tints in which they are furnished may desirably be like those of the natural flower. In certain cases, if desired, some of the elements 40 may be black. In Fig. 1, differently colored elements are shown by the different cross-hatchings.

The elements 40 may be made of a relatively rigid material, such as wood, metal, as for example aluminum, or from a plastic material, as for example, a phenol-formaldehyde resin, a ureaformaldehyde resin, or a suitable mixture of polystyrene and acrylonitrile resin. The color may be applied by any convenient means, as for example, as a surface coating or film of pigmented paint or enamel or, particularly in the case of plastic material, by integral inclusion of coloring matter in the material of which the element is formed, employing a conventional coloring technique.

In lieu of the plastic above-mentioned for forming the base 10, polyacrylic resins, such as those sold commercially under the names "Plexiglas" and "Lucite" may be employed.

In use, the elements 40 are positioned on the base 10 with the stems 41 inserted in the apertures 30 so that the portions 49 thereof extend substantially below the surface 15 of member 12. By reason of the alternate projection and recess construction of the head portions 42 of the elements, and by reason of the above-mentioned dimensional relationship between the elements 40 and the apertures 30, adjacent elements 40 may be interengaged and loosely interlocked with one another, the elements being rotated on their stems, if necessary, to effect the desired positioning of the elements. As will be seen from the drawings, adjacent elements thus inter-

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engaged or loosely interlocked with one another are positioned in alternately adjacent apertures of the rows A and B. That is to say, the stems of these elements are located in every other aperture of the rows A and B in the area or portion of the design formed by these elements. The ends 50 of the elements, as will be noted, extend downwardly a substantial distance below the surface 15 of the base. Thus, removal of the elements from their firmly held position in any of the apertures 30 is made easy, simply by exerting a slight pressure against the lower ends 50.

The interfitted or loosely interlocked engagement of the elements serves not only to retain them in position in the desired design, but by reason of the disposition of the projections 43 of one element within the recesses of an adjacent element also serves, when such adjacent elements are of different colors, to present a desirable blending of the colors so as to enhance greatly the over-all design created. It will be apparent that designs of various combinations of colors and shapes may be created, depending upon the will and desires of the user of the device.

While the device shown in the drawings is fully illustrative of the invention and clearly shows a preferred embodiment thereof it will be apparent that various changes and modifications may be made therein without departing from the spirit and scope of the invention. Thus, for example, the base 10 may be of curved or other arcuate configuration, or in the form of solid geometrical figures, such as pyramidal, tetrahedral, spherical and the like.

Likewise, as already indicated, the member 12 may vary from the geometric outline shown. Thus, for example, it may be made of circular outline whereby to adapt it particularly for use as a centerpiece for a table, the elements 40 being arranged in the apertures 30 in any desired manner to form a design which can be changed periodically to add variety to the table decoration. Or, it may be of other polygonal outlines such as hexagonal, pentagonal and the like. If desired, the base with any design formed thereon may be mounted in a suitable frame or on an easel or the like for display.

In all such modified embodiments, the apertures may be arranged so as to be spaced from one another in rows spaced from and extending at desired angles with respect to one another.

While square apertures are particularly suitable and preferably employed, circular apertures or apertures having other polygonal outlines may be formed in the base for reception of the stems of the elements 40. Square apertures are, however, preferred when the stems of the elements are of circular cross-section, for the reason that they thus facilitate rotatability of the elements therein and removal of the elements from the apertures.

There is thus provided a toy and design device which affords amusement to the user and at the same time may arouse his talent and ability, and serve for the creation and study of ornamental designs in color and in three-dimensional effect.

It will also be evident to those skilled in the art that various changes and modifications in the embodiments of the invention herein described and illustrated, in addition to those already mentioned, may be made without departing from the scope of the invention as defined in the appended claims, and all matter contained in the foregoing description and in the drawings is to be interpreted as illustrative only.

Having fully described my invention, what I claim is:

1. A base for a design-forming device comprising a supporting member made of relatively thin flexible material, said member being formed with a plurality of rows of spaced apertures extending therethrough for receiving the stems of design-forming elements to be supported by the base, said member being provided along each of its bounding edges and along interior spaced lines longi-

tudinally and transversely thereof intermediate predetermined rows of said apertures with ribs extending at an angle thereto from one face thereof, said ribs serving to reinforce said member against sagging when pressure is applied to the opposite face thereof, said ribs being of a height greater than the cross-sectional thickness of said member.

2. A base as defined in claim 1, wherein the ribs along the bounding edges of said member extend a greater distance from said member than do the other of said ribs.

3. A base as defined in claim 1, wherein said ribs form cells at said first-named face of said supporting member, said cells being of an area such that the portion of the supporting member constituting the top wall of each of said cells will be substantially rigid, notwithstanding the normal flexibility of the material of which said supporting member is made.

4. A toy or the like device comprising, in combination, a design base formed with a plurality of regularly spaced-apart, aligned apertures arranged in a plurality of spaced longitudinally and equally spaced transverse rows, and a plurality of substantially identically-formed design-creating elements each comprising a stem receivable in each of said apertures in said design base in selected relative relationships, and a head portion formed with a plurality of radially-extending projections having ends lying on a circle whose diameter is greater than the distance between the centers of alternately adjacent ones of said apertures and less than the distance between the outermost edges of alternately adjacent ones of said apertures, said projections being spaced from one another by intervening recesses for loosely interlocking engagement of projections of adjacent elements positioned in alternately adjacent apertures in said rows.

5. A toy or the like device comprising, in combination, a design base formed with a plurality of regularly spaced-apart aligned apertures arranged in a plurality of spaced longitudinally and equally spaced transverse rows, and a plurality of substantially identically-formed design-creating elements in the form of flowers each comprising a stem receivable in each of said apertures in said design base in selected relative relationships, and a head portion formed with a plurality of radially-extending projections in the form of petals having ends lying on a circle whose diameter is greater than the distance between the centers of alternately adjacent ones of said apertures and less than the distance between the outermost edges of alternately adjacent ones of said apertures, said projections being spaced from one another by intervening recesses for loosely interlocking engagement of projections of adjacent elements positioned in alternately adjacent apertures in said rows.

6. A toy or like device comprising, in combination, a design base formed with a plurality of regularly spaced-apart aligned apertures arranged in a plurality of spaced longitudinally and equally spaced transverse rows, and a plurality of substantially identically-formed design-creating elements each comprising a stem receivable in each of said apertures in said design base in selected relative relationships, and a head portion formed with a plurality of radially-extending projections having ends lying on a circle whose diameter is greater than the distance between the centers of alternately adjacent ones of said apertures and less than the distance between the outermost edges of alternately adjacent ones of said apertures, said projections arching concavely upwardly and outwardly from said stem and then arching downwardly toward said stem and being spaced from one another by intervening recesses for loosely interlocking engage-

ment of projections of adjacent elements positioned in alternately adjacent apertures in said rows.

7. A toy or like device comprising, in combination, a design base formed with a plurality of regularly spaced-apart aligned apertures arranged in a plurality of spaced longitudinally and equally spaced transverse rows, and a plurality of substantially identically-formed design-creating elements each comprising a stem receivable in each of said apertures and in said design base in selected relative relationships, a shoulder portion adapted to rest on the surface of said base, a head portion formed with a plurality of radially-extending projections having ends lying on a circle whose diameter is greater than the distance between the centers of alternately adjacent ones of said apertures and less than the distance between the outermost edges of alternately adjacent ones of said apertures, said projections arching concavely upwardly and outwardly from said stem and then arching downwardly toward said stem and being spaced from one another by intervening recesses for loosely interlocking engagement of projections of adjacent elements positioned in alternately adjacent apertures in said rows.

8. A toy or like device comprising, in combination, a design base formed with a plurality of regularly spaced-apart aligned apertures arranged in a plurality of spaced longitudinally and equally spaced transverse rows, and a plurality of substantially identically-formed design-creating elements each comprising a stem receivable in each of said apertures in said design base in selected relative relationships, and a head portion formed with a plurality of radially-extending projections having ends lying on a circle whose diameter is greater than the distance between the centers of alternately adjacent ones of said apertures and less than the distance between the outermost edges of alternately adjacent ones of said apertures, said projections arching concavely upwardly and outwardly from said stem and then arching downwardly toward said stem and being spaced from one another by intervening recesses for loosely interlocking engagement of projections of adjacent elements positioned in alternately adjacent apertures in said rows, said arching concave configuration of the projection forming a relatively shallow cone-like depression in the head portion in vertical alignment with said stem.

9. A toy or like device as defined in claim 4, wherein said apertures are of square-shaped outline and said stems are of circular cross-section.

10. A toy or like device, as defined in claim 4, wherein said plurality of design-creating elements is composed of a number of groups differing in color from one another, to provide an interblending of the colors by said loosely interlocking engagement of said projections and recesses.

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