March 26, 1929. S. V. DAWSON ET AL 1,706,998

DESIGN MAKING DEVICE

Filed July 20, 1925 2 Sheets-Sheet 1

Fig. 1

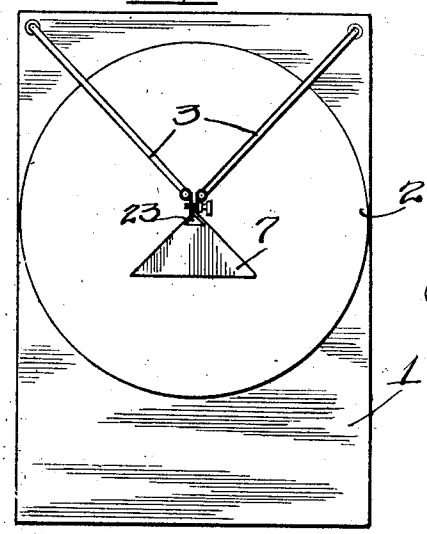


Fig. 3

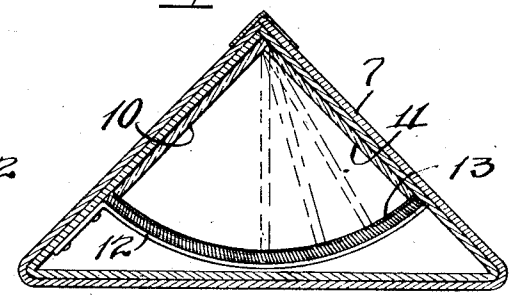


Fig. 5

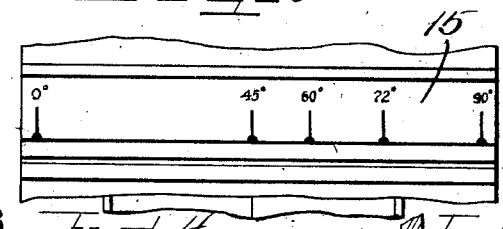


Fig. 2

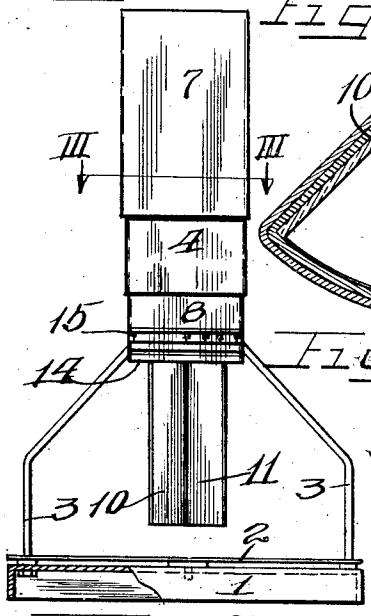


Fig. 6

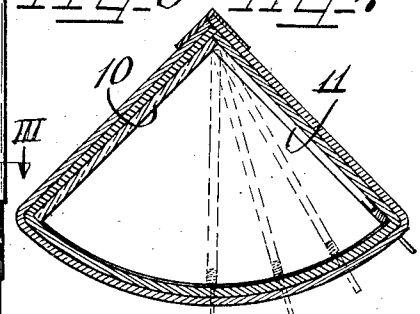


Fig. 4

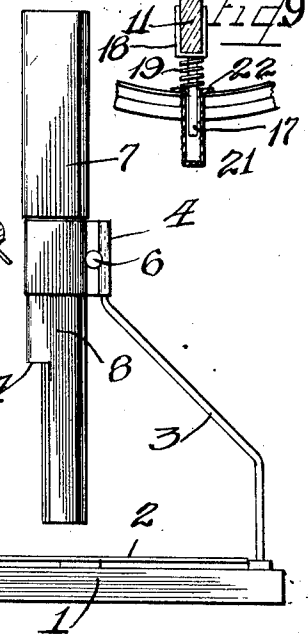


Fig. 9

Fig. 8

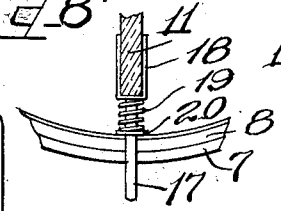
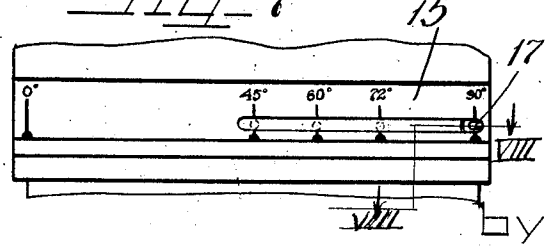


Fig. 7



Inventors
Stuart V. Dawson
John Gilbert Hilkins
Edward H. Dawson
by Charles W. Hill Attys

March 26, 1929. S. V. DAWSON ET AL 1,706,998

DESIGN MAKING DEVICE

Filed July 20, 1925 2 Sheets-Sheet 2

Fig. 10

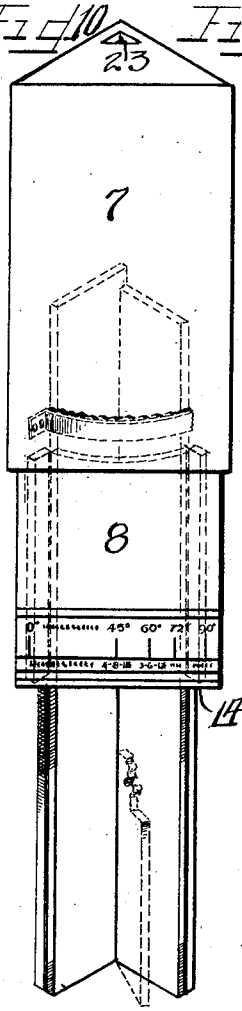


Fig. 11

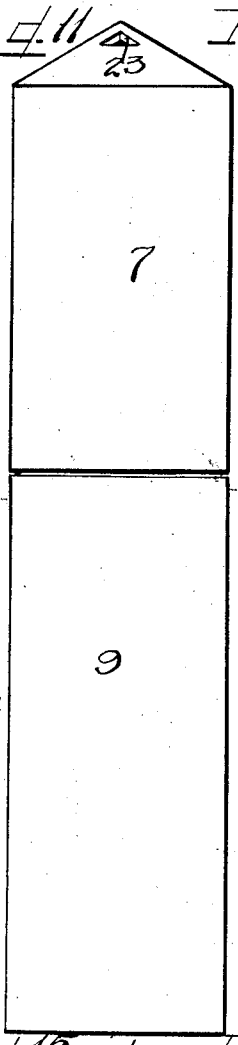


Fig. 12

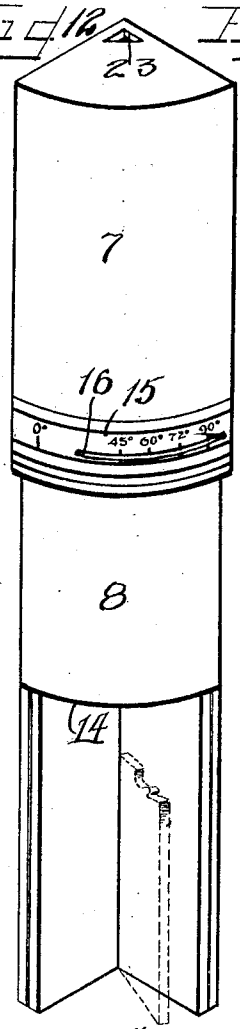


Fig. 13

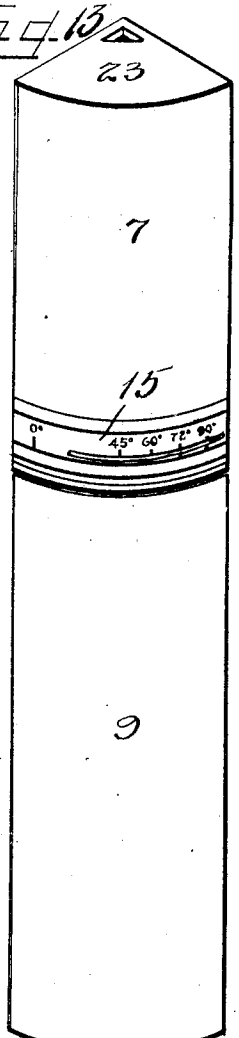


Fig. 14a



Fig. 15



Fig. 16a"

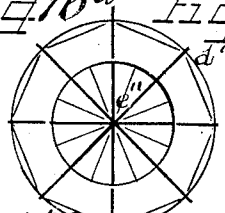


Fig. 17

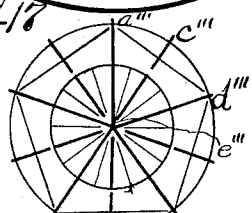


Fig. 18

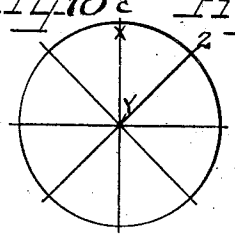


Fig. 19

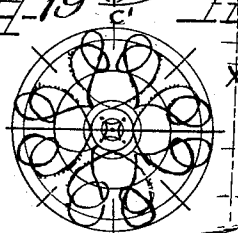
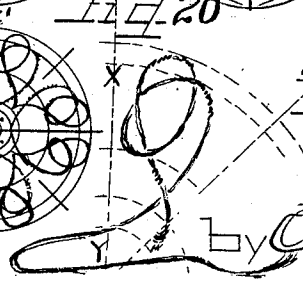


Fig. 20



Inventors
Stuart V. Dawson
John Gilbert Hilkins
Edward H. Dawson.
by Charles W. Nichols Attys

Patented Mar. 26, 1929. 1,706,998

UNITED STATES PATENT OFFICE.

STUART V. DAWSON, JOHN GILBERT WILKINS, AND EDWARD H. DAWSON, OF CHICAGO, ILLINOIS.

DESIGN-MAKING DEVICE.

Application filed July 20, 1925. Serial No. 44,734.

This invention relates to design making devices and has for its object the provision of a device which will make an ornamental design from a single unitary element.

It is further an object of this invention to provide a design making device which will make a symmetrical design from either a symmetrical or unsymmetrical element.

It is also an object of this invention to provide a design making device which may be adjusted to make a plurality of symmetrical combinations from a given unitary symmetrical or unsymmetrical element.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a plan view showing a device embodying this invention.

Figure 2 is a front elevational view of the same showing a fragment of the base removed.

Figure 3 is an enlarged horizontal section with parts omitted taken at the line III—III of Figure 2.

Figure 4 is a side elevational view of the device.

Figure 5 is a fragmentary elevational view with parts omitted showing the graduated scale by which to adjust the device.

Figure 6 is a horizontal section similar to Figure 3 of a modified form of the device.

Figure 7 is a fragmentary view similar to Figure 5 showing the scale and appurtenances therefor of the modified form of the device.

Figure 8 is a detail horizontal fragmentary section with parts omitted taken at the line VIII—VIII of Figure 7.

Figure 9 is a section similar to Figure 8 showing a modified form of the mirror adjusting handle.

Figure 10 is a front perspective view of the device with parts removed.

Figure 11 is a view of the device of Figure 10 showing in addition the cover for protecting the device when being transported.

Figure 12 is a perspective view similar to Figure 10 of the modified form of the device, a horizontal section of which was shown in Figure 6.

Figure 13 is a perspective view of the device of Figure 12 showing in addition the cover therefor.

Figure 14 is a plan view of a design reflected by the device when the two mirrors are placed at an angle of 90° apart.

Figure 15 is a plan view of a design reflected by the device when the two mirrors therein are placed at an angle of 60° apart.

Figure 16 is a plan view of a design reflected by the device when the two mirrors therein are placed at an angle of 45° apart.

Figure 17 is a plan view of a design reflected by the device when the two mirrors therein are placed at an angle of 72° apart.

Figure 18 is a plan view showing the field of the device when the mirrors thereof are placed at an angle of 45° apart.

Figure 19 is a plan view of the field of Figure 18 showing in addition a design reflected therein.

Figure 20 is a detail plan view with parts omitted showing the element from which the design of Figure 19 was reflected.

As shown on the drawings:

Referring to Figure 1 there is shown a rectangular flat base 1 on which is mounted a flat circular support 2. The support 2 has a light colored surface on the upper side thereof. A pair of radially extending brackets 3 secured at adjacent corners of the base 1 extend inwardly toward the center of the support 2. A clamp 4 engages the inner ends of the brackets 3 and has a vertically extending hollow cylindrical portion 5 and an adjustable screw 6 at the edge of said portion for removably and adjustably holding a casing 7. The casing 7 has substantially a triangular cross section as viewed in Figure 3 and has a smaller portion 8 on the lower end thereof which extends through the clamp 4. When the casing is desired to be transported without the base, the portion 8 is adapted to receive thereover a cover 9.

The casing 7 is constructed of an opaque material such as card board and the like and has mounted therein a pair of rectangular flat mirrors 10 and 11 having their reflecting surfaces facing each other and their edges at one side thereof in juxtaposed relation with each other in the apex of the casing 7. One of the mirrors 10 and 11 is adapted to pivot about the other of said mirrors to form a variable angle therewith between the surfaces of said mirrors. An arcuate spring 12 is mounted in said casing and has one end

secured thereto and is adapted to be flexed in a horizontal plane. The spring 12 is positioned adjacent the edges of the mirrors 10 and 11 opposite the apex of the casing 7 and is provided with a relatively soft and pliable member 13 on its inner surface to frictionally engage said edges of the mirrors 10 and 11 to hold them in position in said casing. The lower portion 8 of the casing 7 is horizontally cut to form an edge 14 intermediate of the upper and lower ends of the casing, said edge extending into the casing as far as the edges of the mirrors 10 and 11. The portion of the casing below the edge 14 is removed. A graduated scale 15 is provided along the edge 14, the scale reading in angular degrees to indicate the angularity of the mirrors 10 and 11 and to permit an adjustment thereof to any desired degree of angularity.

In the modification shown in Figures 6, 7, 8, 12 and 13 the vertical surface of the casing 7 opposite the apex thereof is semi-cylindrical instead of flat as in the previous embodiment. In this modification the spring 12 and member 13 thereon are dispensed with and the inner surface of the casing 7 opposite the apex thereof comes practically to the forward edges of the mirrors 10 and 11. The scale 15 is provided at the lower edge of the upper portion of the casing 7 instead of at the edge 14 and the casing at said scale has a horizontally extending slot 16 therein. The slot 16 forms a guide for a pin 17. The pin 17 extends outwardly from the vertical edge of the mirror 11 and is clamped thereto by a clamp 18. A spring 19 surrounds the pin 17 within the casing and abuts a washer 20 also on said pin for pressing the latter against the inner edges of the slot 16.

In the modification shown in Figure 9 the pin 17 does not extend so far out of the slot 16 and has a tubular member 21 surrounding the outer end thereof and coaxial therewith. The member 21 has integral therewith on the inner end thereof a flange 22 which takes the place of the washer 20 in the previous embodiment. In this latter embodiment the tube 21 functions as a handle and may be pressed inwardly to release the friction caused by the spring 19 between the flange 22 and the inner edge of the slot 16. In the modification shown in Figure 8 the friction between the washer 20 and the inner edge of the slot 16 cannot be alleviated while moving the mirror 11 to adjusted position. It will be seen by reference to Figure 7 that the pin 17 or the tube 21 as the case may be, may be used as an indicator in conjunction with the scale 15 in adjusting and determining the angular position of the mirror 11 with respect to the mirror 10.

The top of the casing 7 is provided with an aperture 23 extending therethrough. The aperture 23 is positioned as near as practicable at the apex of the casing 7 and has sides which are substantially parallel to the sides of said top. The aperture 23 may take any shape, however. In Figure 14 is shown a field as viewed through the aperture 23 when the mirrors 10 and 11 are placed at an angle of 90°, said mirrors being assumed to be occupying the position of the angle *aed*. The lines *ac*, *bd*, merely represent the intersections of the various planes of reflection and form no part of the design. The line *ad* is caused by the inner edge 14 when said edge is a straight edge as in the first embodiment shown in Figure 10. The arc *ad* is caused by the inner edge 14 when said edge is curved as in the embodiment shown in Figure 12. The mirrors 10 and 11 will reflect and rereflect the line *ad* when the embodiment shown in Figure 1 is used so that it appears in every quadrant forming square *abcd*. When the embodiment shown in Figure 12 is used the square *abcd* will not occur but instead thereof the design will be outlined by the circle *abcd*. Assuming that a bisecting line *eh* be drawn on the object support 2 when the mirrors 10 and 11 are in the position of the angle *aed*, and assuming the arc *fhg* be struck and the lines *gh* and *ih* be drawn, these lines and arc will be reflected in every quadrant and a design as shown within the square *abcd* excluding the lines *ac* and *bd* will appear through aperture 23.

Now suppose that the angle between the mirrors 10 and 11 be adjusted to 60° and the device be positioned over support 2 with the mirrors occupying the angle *a' e' d'* of Figure 15 and bisecting line *e' h' i'*, line *f' h'* and line *h' g'* be drawn, a design will appear in which the aforementioned lines will reappear in a corresponding position in every 60° sector. The outline of the design will be the polygon of which *a' d'* is one side if the embodiment of Figure 10 is used and the outline will be the circle of which *a' d'* is a portion if the embodiment of Figure 12 is used. The heavy black lines for example *a' e'* and *b' d'* will not form a part of this design but in this case as before they merely represent the intersections of the various planes of reflection.

In Figure 16 assuming the mirrors to occupy the position of *a'' e'' d''*, the angle between the mirrors being in this case 45° and the portion of the design shown between the angle *a'' e'' d''*, excluding the large circle and the outer polygon, be placed in said angle, a complete design as shown will result.

In Figure 17 is shown a design obtainable when the mirrors are placed in the position *a''' b''' d'''* of 72°. In this case as before the polygon represents the outline if one embodiment is used and the outer circle represents the outline of the design if the other embodiment is used. In this case the lines in the various 72° sectors corresponding to the broken line *b''' e'''* will appear in design symmetrically positioned in the other 72°

sectors, but the full black lines as before merely represent intersections of the various planes of reflection.

In Figure 18 is shown a field as would appear when looking through the aperture 23 of the embodiment shown in Figure 12 when the mirrors are adjusted to an angle of 45°, the black lines representing intersections of the various planes of reflection. Now assuming that the mirrors are in the position of *xyz* on Figure 18 and a piece of string is placed on the support 2 to occupy the relative position shown in Figure 20 within the angle *xyz*, a design will result through the reflections and rereflections in the mirrors such as appears in Figure 19, the image of the string as shown in Figure 20 within the angle *xyz* occurring in the design as shown in Figure 19 eight times in a group of four pairs, each pair consisting of an inverted image and an erect image of said string.

It will be obvious that this device may be used to great advantage by people in various occupations as for instance artists, designers of lace, etc.

We are aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we therefore do not purpose limiting the patent granted hereon, otherwise than necessitated by the prior art.

We claim as our invention:

1. The combination with a casing having angularly related walls and an arcuate wall, a stationary mirror associated with one of the angularly related walls, a movable mirror pivotally associated with said stationary mirror, means secured to said movable mirror said means projecting through a slot in the arcuate wall whereby said mirror is adjusted, and yielding means associated with said projecting means within the casing to maintain said mirror in any desired position.

2. The combination with a casing having angularly related walls and an arcuate wall, a stationary mirror associated with one of the angularly related walls, a movable mirror pivotally associated with said stationary mirror, means secured to said movable mirror, said means projecting through a slot in the arcuate wall whereby said mirror is adjusted, yielding means associated with said projecting means within the casing to maintain said mirror in any desired position, and indicating means associated with the slot in said arcuate wall to render said movable mirror adjustable to any predetermined angle.

3. The combination with a casing having angularly related walls and an arcuate wall, a stationary mirror associated with one of the angularly related walls, a movable mirror pivotally associated with said stationary mirror, means secured to said movable mirror, said means projecting through a slot in the arcuate wall whereby said mirror is adjusted, and yielding means associated with said projecting means within the casing to maintain said mirror in any desired position, said yielding means comprising a helical spring interposed between said movable mirror and arcuate wall.

In testimony whereof we have hereunto subscribed our names.

STUART V. DAWSON.
JOHN GILBERT WILKINS.
EDWARD H. DAWSON.