

[54] DESIGN DEVICE

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[52] U.S. Cl. 35/77, 35/27, 40/68

[51] Int. Cl. G09b 1/20

[58] Field of Search.....35/15, 27, 35 H, 77; 40/28 C, 40/68; 235/144 PN, 144 S

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[57] ABSTRACT

The invention is a design device in which the beads have keyways, and the axles on which they are mounted have keys engageable and disengageable from the keyways.

4 Claims, 13 Drawing Figures

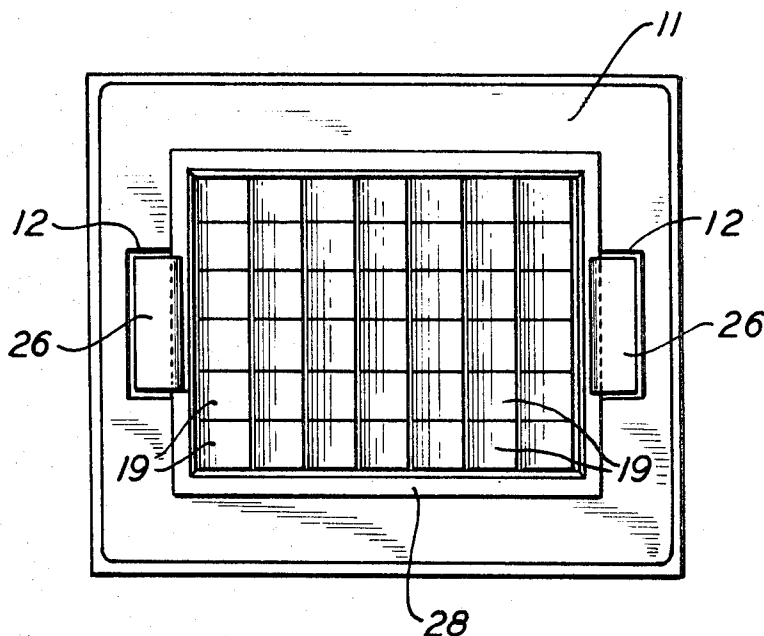


FIG. 1

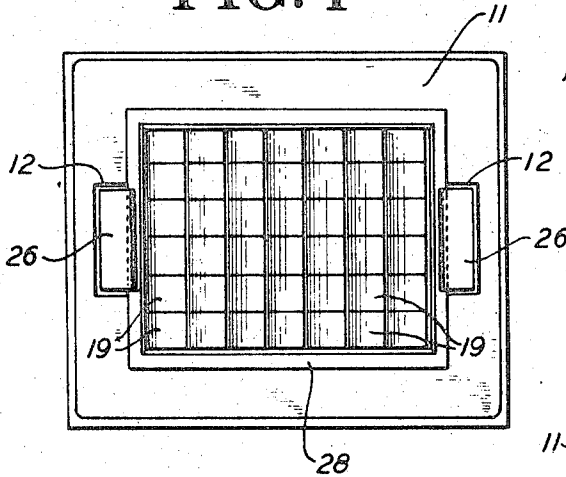


FIG. 2

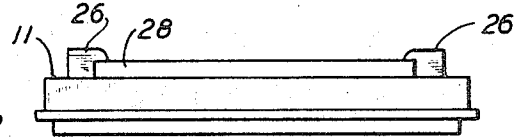


FIG. 3

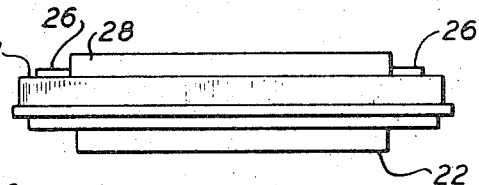


FIG. 4

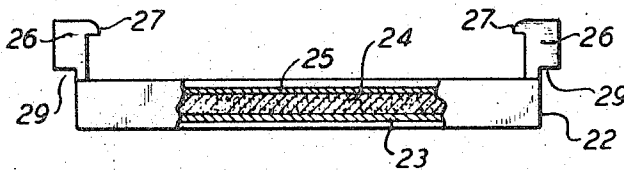


FIG. 5

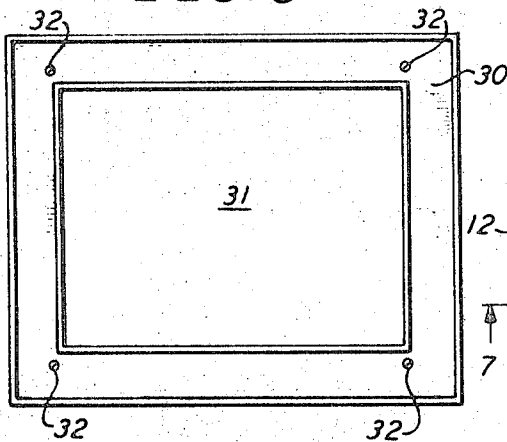


FIG. 6

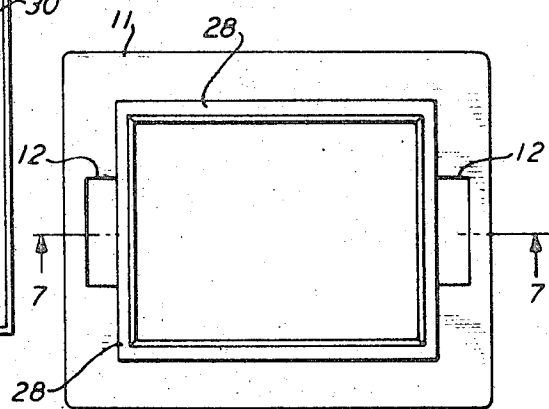
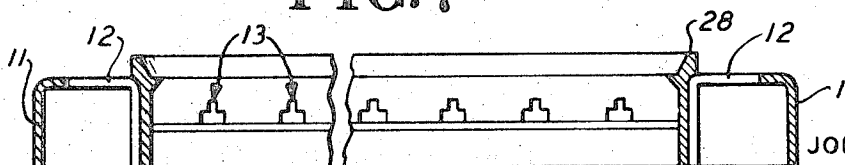


FIG. 7



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FIG. 8

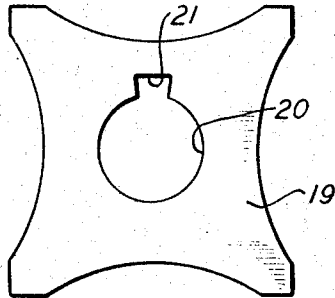


FIG. 9

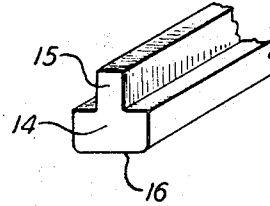


FIG. 13

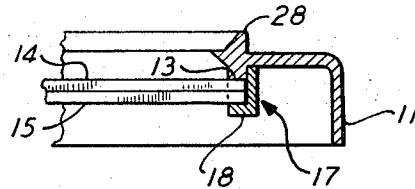


FIG. 10

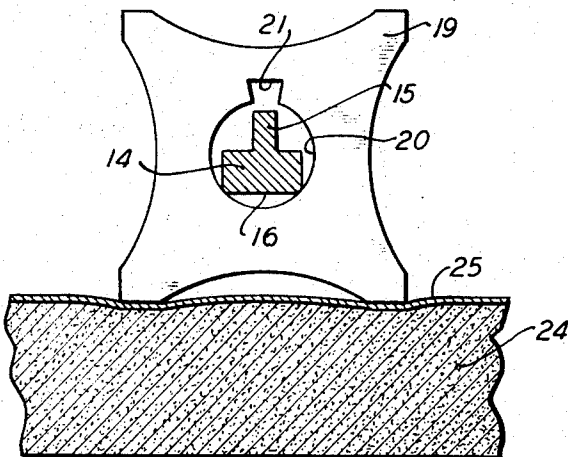


FIG. 11

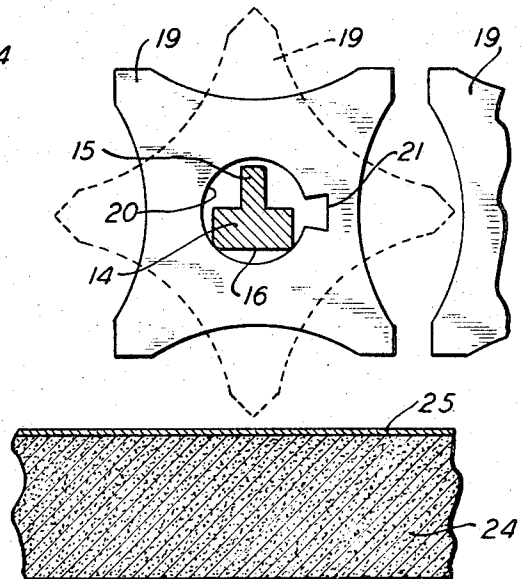
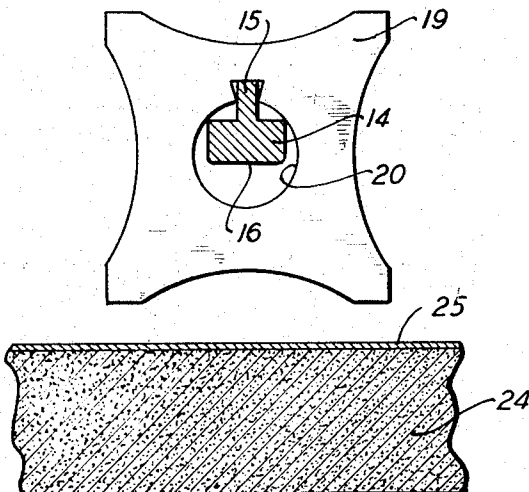


FIG. 12



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DESIGN DEVICE

PRIOR ART

This invention relates generally to design devices, and particularly to design devices in which a plurality of multi-faceted axially mounted beads may be rotated to form designs, the design of which may be wiped clean by rotating the beads at random to keyed positions.

BACKGROUND OF INVENTION

Design devices have been made in which a frame with an opening has a plurality of axles mounted across the frame, and a plurality of multi-faceted beads are rotatably mounted on the axles. Usually these beads are moved to chosen positions to display a particular facet, by rotating them, and once having been rotated to display that particular facet, a compressible pad behind the beads maintains them in a chosen position. When it is desired to restore the beads to normal position in which no display is shown, each individual bead must be carefully rotated until such time as the chosen facet without a design feature is displayed and this becomes an exceedingly laborious task, detracting from interest in the display device as a learning device or an amusement device. The rotation of dozens of individual multi-faceted beads in order to normalize them frequently results in adjacent beads being disturbed so that they have to be repositioned.

SUMMARY OF INVENTION

It has been found that a design device may be prepared wherein a few sweeps of the hand or fingers will not only restore the multi-faceted beads to normal position, but will lock them in that position until such time as it is desired to release them and embark upon the formation of a new design. By reason of the provision of a means to lock the beads in a non-display, uniform facet position, the interest in the design device is not mitigated by the laborious task of restoring each individual multi-facet bead to its normal non-displayed position. This can be accomplished rapidly, and with ease, and the display device in a few seconds is ready to function again as a learning device or as an amusement device.

Restoration of multi-faceted beads is achieved by mounting them upon keyed axles, and providing the bore of each bead with a keyway. Thus a sweep of the hand or fingers across the surface of the display device will cause the beads to rotate until the keyway is in registration with the key of the axles, whereupon the bead will be locked in a normal position, and may be released when it is desired to proceed with the formation of a new design.

DRAWINGS

Referring now to the drawings in detail;

FIG. 1 is a top plan view of the display device;

FIG. 2 is a side elevational view thereof in unlatched position;

FIG. 3 is a side elevational view thereof in latched position;

FIG. 4 is a partial side elevational view;

FIG. 5 is a top plan view of the base alone;

FIG. 6 is a top plan view of the frame without the tray;

FIG. 7 is a vertical sectional view taken on the line 7-7 in FIG. 6, looking in the direction of the arrows, showing the locating channels;

FIG. 8 is a perspective view of a bead showing the keyway;

FIG. 9 is a perspective view of an axle, showing the key;

FIG. 10 is a vertical sectional view of a bead on an axle, with the pad maintaining the bead in disengagement from the key on the axle;

FIG. 11 is a vertical sectional view of a bead on the axle with the pad disengaged from the bead to permit locking upon rotation; the bead in phantom illustrates clearance from the adjacent bead;

FIG. 12 shows the bead in FIG. 11 locked onto the key;

FIG. 13 is a vertical cross sectional view showing the retainer to keep the axles in place.

PREFERRED EMBODIMENT

Referring now to the drawings in detail, the design device is provided with an open top frame 11. At opposite ends of the frame 11, there are slots 12 to receive portions of a bead release device which will here and after be referred to. Under the frame 11 there are a plurality of locating channels 13 on opposite sides of the frame for receiving axles 14. The axles 14 are provided with top keys 15 which fit into the locating channels 13. The slots are also broadened laterally to receive the main body of the axles 14. The bottom 16 of the axles 14 is arcuate so as not to snag the keyway of the beads as hereinafter set forth. In order to retain the axles 14 in the locating channels 13, a generally L-shaped retainer 17 is attached to the frame so that a flange 18 extends over the bottom of the axles 14 and captures them in the locating channels 13. A plurality of multi-faceted beads 19 are mounted on the axles. These beads 19 may have numerous shapes, but it is preferred that whatever the number of sides they may have, the top and bottom surfaces be in general parallelism with each other. By way of illustration, the drawings show beads 19 which are generally cubical, but with concave surfaces. Each bead 19 is preferably formed with identical surface displays arranged successively on each of its four concave surfaces. Thus, for example one concave surface may be white, the next may be blue, the next may be red and fourth display surface may be yellow. In lieu of coloration, various designs may be applied such as crosses or circles or pictures of various objects. The beads 19 may have four sides, six sides or eight sides. Their surfaces may be flat or concave or even somewhat convex although a large degree of convexity will defeat the normalizing capacity of the compressible pad hereinafter referred to.

Each of the beads 19 is provided with a central bore 20 and opposite one of the faces of the beads which may be considered the normal face, there is provided a keyway 21 which dimensionally corresponds with the keys 15 on the axles. Thus, when the beads 19 are rotated, they will gravitationally engage the keyway 21 with the key 15 on the axles 14, and will then lock the beads 19 against further rotation, until they are released as will be hereinafter described.

A generally rectangular back 22 is provided for the frame 11. The back has a seat 23 in which a pad 24 of compressible expanded plastic foam or similar material

is located. Since such pads 24 are generally characterized by a high coefficient of friction, the pad is covered by a coextensive plastic sheet 25 which is smooth and has a low coefficient of friction. By this means, beads 19 engage with the sheets 25 and can smoothly ride over the sheet 25 and depress it to compress the underlying pad 24, and the slickness of the sheet 25 will cause the facets of the beads 19 to assume normal position, i.e., with a facet against the sheet 25. The back is provided with a pair of upstanding arms 26 which extend through the slots 12 of the frame 11. The arms 26 are formed integrally with the back. The back 22 is made preferably of a resilient plastic material so that the arms 26 may be deflected. The arms 26 are provided with inwardly extending flanges 27. The frame 11 is provided with a raised border 28. The flanges 27 engage the border 28 and will hold the frame 11 in raised position with the sheet 25 engaged with the bottom of the beads 19. The pad 24 will normally urge the beads 19 to such a position that the keyway 21 will not engage the keys 15 of the axles and the beads 19 may be freely turned.

The arms 26 are manipulated to withdraw the inwardly extended flanges 27 from engagement with the raised border 28 thereby dropping the back 22, the pad 24, and the sheet 25 from engagement with the bottom of the beads 19, so that the beads 19 may have their keyways 21 engaged with the keys 15 (see FIG. 12). When the back 22 is in this lowered position, it extends out of a base 30 which is attached to the frame 11. A central opening 31 in the base 30 permits the application of pressure by the fingers to the bottom of the back 22 enabling it to be pushed up, so that the sheet 25 again engages the bottom of the beads 19 and permit them to rotate freely on the axles, with the keyways 21 beyond the reach of the keys 15 on the axles. In addition, the base 30 will engage the outward flanges 29 of the back 22, to prevent the back from disengaging itself from the frame 11. The base 30 may be attached to the frame 11 in any suitable manner. By way of illustration, four screws 32 are shown for attaching the base 30 and the frame 11 together.

When the back 22 is lowered by means of pressure on the arms 26, sliding them in the slots 12 of the frame 11, the pad 24 and its covering sheet 25 are disengaged from contact with the bottom of the beads 19. The back 22 is held in this position by the outward flanges 29 being seated on the border 28 of the frame 11. In this position, a sweep of the hand or the fingers over the beads 19 will cause them to rotate only until the keyways 21 are in registration with the keys 15 whereupon, then the bottom of the beads 19, being out of contact with the sheet 25, drop gravitationally and lock in place, by the keyways 21 embracing the keys 15. The coloration of the facets of the beads may be, if desired, when such locking engagement takes place, all of the same kind, i.e., white or black or any other chosen color. A few sweeps of the hand or fingers will impart complete uniformity of coloration to the entire field of beads, and they will be locked in place and cannot be turned beyond the point of such uniformity. Then pressure is applied by the fingers to the back 22 under the frame 11, thereby raising the outward flanges 29 from engagement with the frame 11, and bringing the inward flanges 27 into an engagement with the raised border

28. Since the arms 26 are resilient, the inward flanges 27 will lock with the raised border 28, and will hold the back 22 in raised position. In this position, the pad 24 and the sheet 25 bear lightly on the bottom of the beads 19, and permits them to be rotated manually yet sustaining them in a normal position by reason of the compressibility of the pad. The low friction surface of the sheet permits the beads to rotate easily, and various beads may thereby be manipulated until a chosen design is displayed in the frame by reason of the coloration of the selected facets of the beads 19, which are exposed in the frame. As soon as a design has been completed, the entire group of beads 19, rather than being individually and laboriously restored to normal position, are now restored to starting position and are locked in starting position by the back 22 being returned to lower position as in FIG. 3. This is accomplished by deflecting the arms 26 to disengage the inward flanges 27 from the raised border 28, permitting the arms 26 to slide in the slots 12 of the frame 11, until the outward flanges 29 are seated on the border of the frame. Then the hand or finger manipulation restores the beads to their normal locked position with the keyways 21 engaged with the keys 15. In this position, the beads 19 are not movable until the back 22 is once more raised. A design device is thereby provided, which may be wiped clean of any designs with the greatest to facility.

I claim:

1. A design device comprising:

- a. an open frame,
- b. a plurality of axles attached across the frame and locked against rotation,
- c. a plurality of multi-faceted beads mounted on the axles in interior bores in the beads,
- d. keys on the top of the axles,
- e. keyways corresponding to the keys in the interior bore of the beads, whereby the keyways in the beads gravitationally engage the keys on the top of the axle,
- f. a back at the bottom of the frame,
- g. a compressible mat on the back,
- h. a flexible, low-friction sheet covering the mat,
- i. means to position the back with the sheet engaged with or disengaged from the bottom of the beads,
- j. the compressible mat normally urging the sheet to position the beads with the keyways disengaged from the keys, when the back is latched and the sheet is engaged with the bottom of the beads,
- k. an arcuate bottom on the axles to avoid snagging engagement with the keyways, when the back is latched and the sheet is engaged with the bottom of the beads,
- l. the beads rotatable on the axles when the back is latched and the sheet is engaged with the bottom of the beads,
- m. the compressible mat normally urging a facet of the beads to flatly engage the sheet when the back is latched and the sheet is engaged with the bottom of the beads,
- n. the mat sufficiently compressible, when the latch is raised to engage the sheet with the bottom of the beads, to yield to the beads as they rotate.

2. A design device according to claim 1 comprising:

- a. a plurality of locating slots on the bottom of the open frame,

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- b. the locating slots having enlargements to receive the keys of the axles,
- c. covers for the locating slots, attached to the frame, to secure the axles against discharge from the locating slots.

3. A design device according to claim 1 in which the means to position the back with the sheet engaged or disengaged from the bottom of the beads comprises:

- a. slots in the frame at opposite sides thereof,
- b. upwardly extending deflectable arms on the back, extending slidably through the slots in the frame whereby the back may be raised and lowered with respect to the frame,

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- c. enlargements on the arms defining latches,
- d. a seat on the frame for receiving the latches when the back is raised and the mat is compressed by the engagement of the sheet with the bottom of the beads.

4. A design device according to claim 3 comprising:

- a. a base attached to the bottom of the frame,
- b. a central opening in the base for providing access to apply pressure to the back to raise it to latched position,
- c. a portion of the base engagable with the deflectable arms to retain the back within the frame.

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