May 1, 1973 R. V. SALINARI 3,730,818

EXPANDABLE NOVELTY DEVICE

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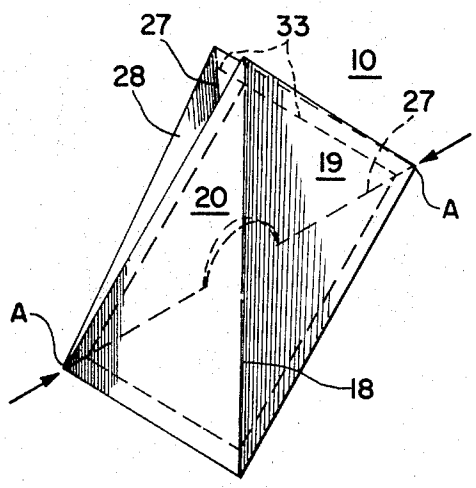


Fig. 1.

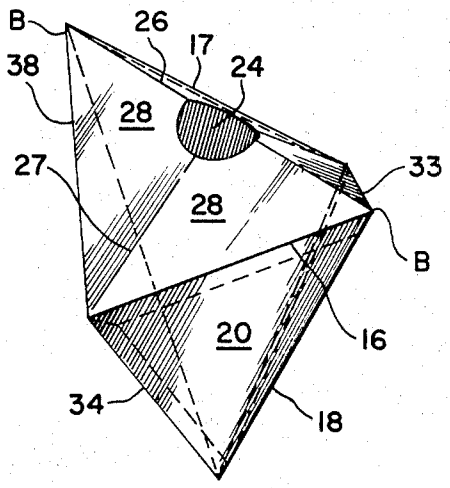


Fig. 2.

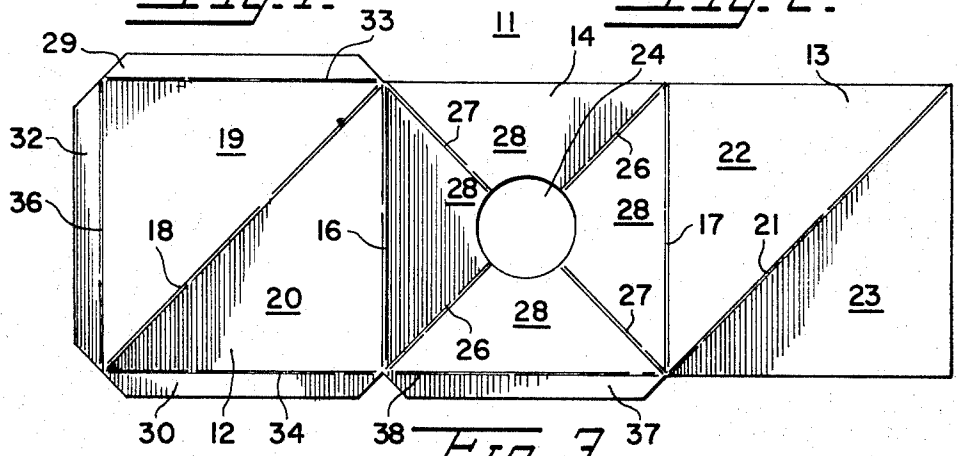


Fig. 3.

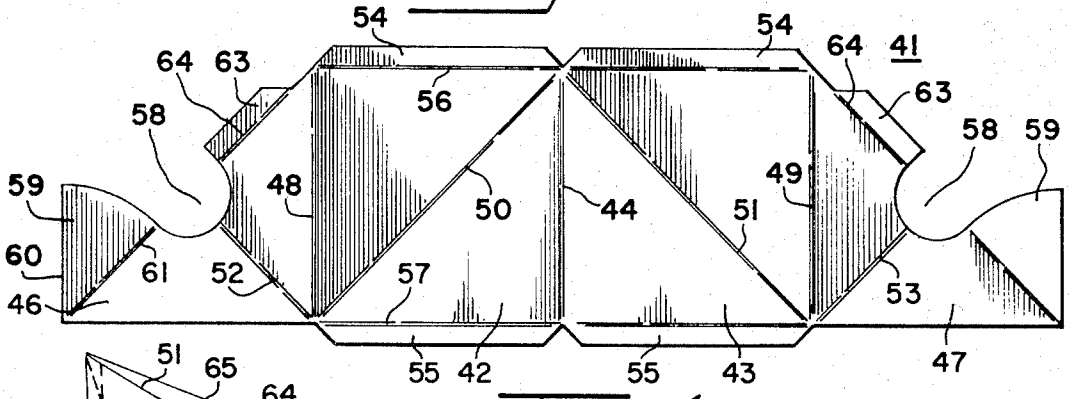


Fig. 4.

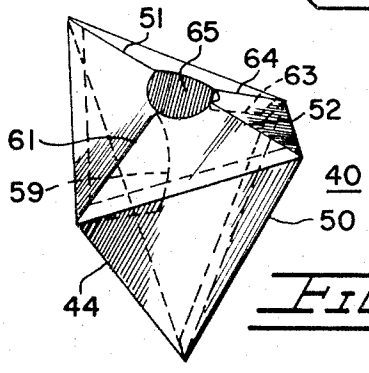


Fig. 5.

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EXPANDABLE NOVELTY DEVICE

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ABSTRACT OF THE DISCLOSURE

A pop-up device collapsible to a flat state and expandable to a pyramidal shape is formed of a unitary blank and includes three square panels, each of the first and second panels having a diagonal fold line extending from the device apex and the third panel having fold lines extending between opposite corners. The edges of the first and second panels extending from the apex are defined by fold lines and the other edges of the first and second panels are joined to respective edges of the third panel along corresponding edges to define fold lines. In the device collapsed condition, the third panel is folded flat along a diagonal and is sandwiched between the flattened superimposed first and second panels. By applying pressure to the opposite corners of the folded third panel, the device is expanded by unfolding the third panel to a base member and the first and second panels to pyramidal walls.

BACKGROUND OF THE INVENTION

The present invention relates generally to improvements in collapsible, pop-up devices, and it relates more particularly to an improved structure, which is rapidly transferable between a flat, collapsed condition and a three dimensional expanded condition and which is highly suitable for use as a greeting card or the like.

The conventional greeting card or book type collapsible foldable structure includes a pair of hinged panels and an associated structure, which pops up with the opening of the panels and collapses into a sandwiched position upon closing of the panels. Such structures are of limited application, do not produce a truly three dimensional structure when expanded and are relatively expensive to produce. On the other hand those available and proposed pop-up devices which expand to a three dimensional structure are generally bulky and awkward in their collapsed condition, expensive and not generally suitable for use as greeting cards and the like. Thus, pop-up structures, heretofore available and proposed, possess numerous drawbacks and disadvantages and leave much to be desired.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide an improved expandable, contractable device.

Another object of the present invention is to provide an improved device which is transferable between a contracted flat condition and an expanded three dimensional state.

Still another object of the present invention is to provide an improved expandable contractable device which is highly suitable for greeting cards and the like and, in its collapsed condition, is flat and readily enclosed in a mailing envelope.

A further object of the present invention is to provide an improved device, which is simply contractable to a flat rectangular state and expands upon squeezing into a self-supporting three dimensional condition, and which could contain indicia or design on the interior surface.

Still a further object of the present invention is to provide a device of the above nature characterized by its ease of operation, simplicity, reliability, low cost, versatility and adaptability and ease of fabrication.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drwaing which illustrates preferred embodiments thereof.

In a sense the present invention contemplates the provision of an expandable collapsible device comprising first, second and third qaudrilateral panels, the first and second panels being joined along coinciding pairs of first edges diverging from corresponding apex defining corners and being delineated by fold lines diverging from the apex, the third panel being joined along the edges thereof to corresponding second edges of the first and second panels opposite the first edges and delineated from the first and second panels by fold lines along the third panel edges, the first and second panels having fold lines formed therein extending diagonally from the apex corners to the opposite corners of the first and second panels and the third panel having fold lines formed therein coinciding with both diagonals of the third panel and in the collapsed condition of the device the first and second panels being in substantially flat superposed condition and the third panel being folded along one diagonal thereof and sandwiched between the first and second panels and in the expanded condition the first and second panels being folded along the fold lines to form respective triangular peripheral walls and the third panel unfolding along a diagonal thereof to form a base.

The panels are advantageously squares of equal dimensions and the third panel has an opening formed in the center thereof. The device is advantageously formed of a precut, prescored unitary flat blank, in one form of which the blank includes the three panels in side by side relationship and in another form of which the first and second panels are side by side and are provided with triangular side wings which in assembly are joined to form the third panel. The edges of the respective panels and wings are joined along appropriate fold forming edges to fabricate the finished device.

The improved device, which may be decorated and contain any desired information, in its collapsed state is flat and square and readily snugly insertable in a conventional square mailing envelope, and is easily snapped into an expanded condition or returned to its collapsed condition. The device is highly attractive, inexpensive and versatile.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a device embodying the present invention illustrated in a slighly expanded condition;

FIG. 2 is a front perspective view thereof shown in a fully expanded condition;

FIG. 3 is an inside plan view of a lay flat blank employed in forming the device of FIGS. 1 and 2;

FIG. 4 is an inside plan view of a lay flat blank employed in constructing another embodiment of the present invention; and

FIG. 5 is a view similar to FIG. 2 of the embodiment of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawing and particularly FIGS. 1 to 3 thereof which illustrate a preferred embodiment of the present invention, the reference numeral **10** generally designates the improved device which is formed of a precut, prescored, unitary blank **11**. The blank **11** is formed of any suitable somewhat flexible, stiff sheet material such as carboard, stiff paper, thermoplastic polymeric resin sheet or the like.

The blank 11 includes three side by side square panels, outer first and second panels 12 and 13 and an intermediate panel 14, the panels 12 and 14 being delineated from each other by a transverse fold line 16 and the panels 13 and 14 being delineated from each other by a transverse fold line 17. A fold line 18 extends diagonally from the lower outer corner of panel 12 and divides the panel 12 into triangular peripheral walls 19 and 20 and a fold line 21 extends diagonally from the lower inner corner of panel 13 and divides the panel 13 into triangular peripheral walls 22 and 23. A circular opening 24 is centrally located in intermediate panel 14 and a pair of diagonally extending fold lines 26 and 27 divide the panel 14 into similar triangular sections 28.

Each of the top, bottom and end edges of first panel 12 is provided with a narrow flap 29, 30 and 32 respectively, which extends for the full length of the corresponding panel edge and is beveled at opposite ends thereof. Flap 29 is delineated from panel 12 by a fold line 33, flap 30 is delineated therefrom by a fold line 34 and flap 32 is delineated therefrom by a fold line 36. A flap 37 extends along the bottom edge of intermediate panel 14 and is delineated therefrom by a fold line 38. Advantageously the inner and outer surfaces of device 10 contain indicia or designs.

In assembling the device 10 from blank 11 the flaps 29, 30, 32, and 37 are folded inwardly to overlie the corresponding borders of panels 12 and 14 and the exposed faces of flaps 29, 30, 32, and 37 are brought into engagement with and secured to in any suitable manner such as by gluing respectively to the top border of third panel 14, the outer end transverse border of panel 13, the top border of panel 13 and the bottom border of panel 13. The flaps and panel borders are brought into superimposition in the above manner by underfolding third panel 14 about fold line 27 to bring the underfaces of the halves of panel 14 delineated by fold line 27 into superposition, folding the folded panel 14 about fold line 17 to overlie the lower left half of panel 13 and then folding panel 12 upwardly about fold line 16 to overlie panel 13 and folded panel 14. With the flaps secured to the panel borders, as aforesaid, the finished device 10 results in a substantially flat collapsed state as shown in FIG. 1.

The device 10 is snapped from its collapsed condition as shown in FIG. 1 to its expanded condition as shown in FIG. 2 merely by squeezing the corners A—A at the ends of fold line 27 toward each other. As a result panels 12 and 13 fold outwardly along fold lines 18, 21, 33, and 36 by pyramidal relationship of walls 19, 20, 22, and 23 and panel 14 unfolds about fold line 27 to an extended position outwardly convex about fold line 26. The device is easily collapsed to a flat condition merely by pressing the opposite corners B at the opposite ends of fold line 26 upwardly and toward each other, such movement being expedited by depressing the panel 14 at fold line 26. The design or message on the inside surfaces of device 10 can be viewed through opening 24 in panel 14.

In FIGS. 4 and 5 there is illustrated another embodiment of the present invention which differs from that first described primarily in the shape of the blank employed in fabricating the device. Specifically the device 40 is similar in overall shape and operation to the device 10 earlier described and is formed of a unitary blank 41 including two side by side square panels 42 and 43 separated by a transverse fold line 44 and triangular wings 46 and 47 projecting laterally from panels 42 and 43 respectively and separated therefrom by transverse fold lines 48 and 49. The bottom edges of panels 42 and 43 and wings 46 and 47 are colinear and of equal lengths and the hypotenuses of wings 46 and 47 extend from the outer ends of their bottom edges to the top outer corners of panels 42 and 43, so that, if wings 46 and 47 are joined along their hypotenuses, they

form a square panel similar to panels 42 and 43. Diagonal fold lines 50 and 51 are formed in panels 42 and 43 respectively and diverge from the upper end of fold line 44 and fold lines 52 and 53 extend from the inner corners of wings 46 and 47 respectively and are perpendicular to their hypotenuses.

Each of the panels 42 and 43 is provided along its top and bottom edges with narrow elongated flaps 54 and 55 respectively, which are separated from the corresponding panels by fold lines 56 and 57. Medially formed in the inclined edge of each wing 46, 47 is a semicircular recess 58. Triangular flaps 59 having vertical end edges extend from the lower inclined edges of wings 46 and 47 and are separted therefrom by fold lines 61, and narrow flaps 63 extend along the upper sections of the inclined edges of wings 46 and 47 and are separated therefrom by fold lines 64.

In assembling the device 40 from the blank 41, flaps 54 and 55 are folded inwardly along fold lines 56 and 57 to overlie the adjacent borders of panels 42 and 43 respectively and wings 46 and 47 and their connected flaps 59 and 63 are folded inwardly to overlie panels 42 and 43 and flaps 54 and 55. Thereafter, the blank is folded inwardly about fold line 44 to bring the opposite halves into superposition with the respective flaps 54, 55, 59 and 63 of each pair thereof being in coinciding engagement and being joined to each other by gluing or the like to complete the device 40 which is provided with a circular opening 65 defined by recesses 58.

As previously discussed, the surfaces of the inner and outer faces of flaps and panels may be provided with cut-outs, appliques, designs, messages, or the like to provide pleasing, decorative and/or desired effects.

While there have been described and illustrated preferred embodiments of the present invention it is apparent that numerous alterations, omissions and additions may be made without departing from the spirit thereof.

What I claim is:

1. An expandable collapsible device comprising first, second and third quadrilateral panels, said first and second panels being joined along coinciding pairs of first edges diverging from corresponding apex defining corners and being delineated by fold lines diverging from said apex, said third panel being joined along the edges thereof to corresponding second edges of said first and second panels opposite said first edges and delineated from said first and second panels by fold lines along said third panel edges, said first and second panels having fold lines formed therein extending diagonally from said apex corners to the opposite corners of said first and second panels and said third panel having a fold line formed therein coinciding with a diagonal of said third panel and in the collapsed condition of said device said first and second panels being in substantially flat superimposed condition and said third panel being folded along said diagonal fold thereof and sandwiched between said first and second panels and in the expanded condition said first and second panels being folded along said fold lines to form respective triangular peripheral walls and said third panel unfolding at said diagonal fold line thereof to form a base.

2. The device of claim 1 wherein said third panel has fold lines formed along both diagonals thereof.

3. The device of claim 2 wherein said panels are of square configuration of substantially the same dimensions.

4. The device of claim 3 wherein said third panel has a centrally located aperture formed therein.

5. The device of claim 1 wherein said third panel has a centrally located aperture formed therein.

6. The device of claim 2 wherein said third panel in the device expanded condition is delineated by the fold lines therein into four triangular sections which diverge upwardly from one of said diagonal fold lines and

diverge downwardly from the other of said diagonal fold lines.

7. The device of claim 2 formed of a unitary blank including three side by side square panels delineated from each other by transverse fold lines and defining said first, third and second panels respectively, said first and second panels having parallel fold lines formed therein and said third panel having fold lines formed therein extending between opposite corners thereof, and hinge defining means respectively joining the top edges of said first and third panels, the outer transverse edge of said second panel and the bottom edge of said first panel, the top edge of said second panel and the outer transverse edge of said first panel, and the bottom edges of said third and second panels.

8. The device of claim 7 wherein said second panel has a central opening formed therein.

9. The device of claim 2 formed of a unitary blank including a pair of side by side square panels defining said first and second panels separated by a transverse fold line, and right angle triangular wings extending from the side edges of said first and second panels and delineated therefrom by transverse fold lines, said triangular wings having bottom edges colinear with the bottom edges of said first and second panels, said first and second panels

having diagonal fold lines converging to a common medial point, and means respectively joining the hypotenuses of said triangular wings to form said third panel with diagonal fold lines, the top edges of said first and second panels, the bottoms of said first panel and an adjacent triangular panel, and the bottoms of said second panel and the adjacent triangular panel.

10. The device of claim 9 wherein each of said triangular panels has a recess medially formed in the hypotenuses thereof.

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29—8; 35—72; 40—126; 46—1; 161—13, 14