

[54] **VIBRATORY TOY**

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273/86 E

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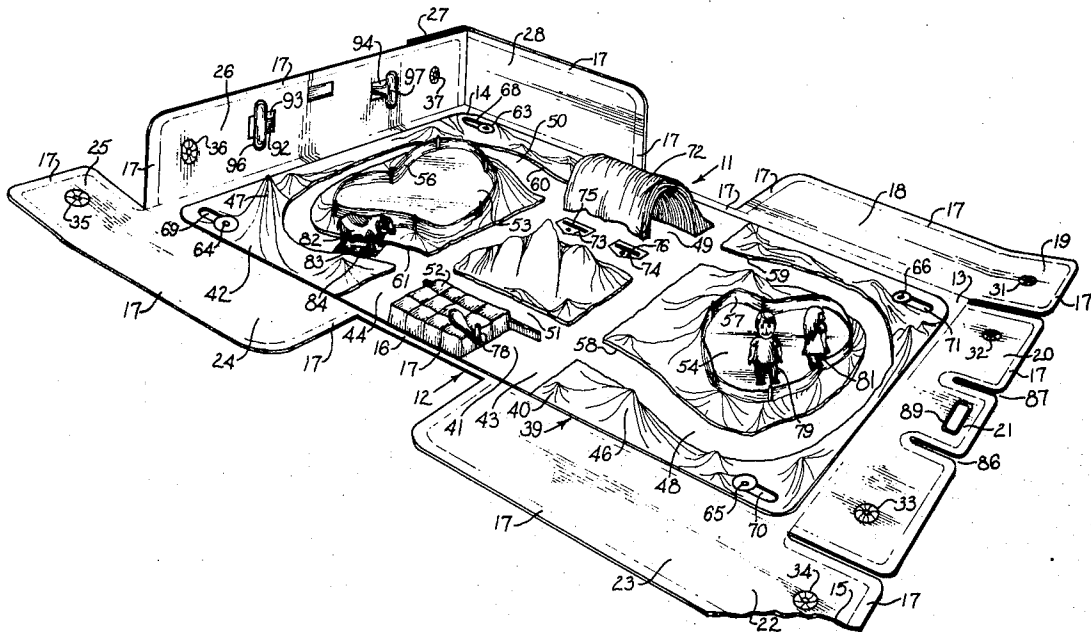
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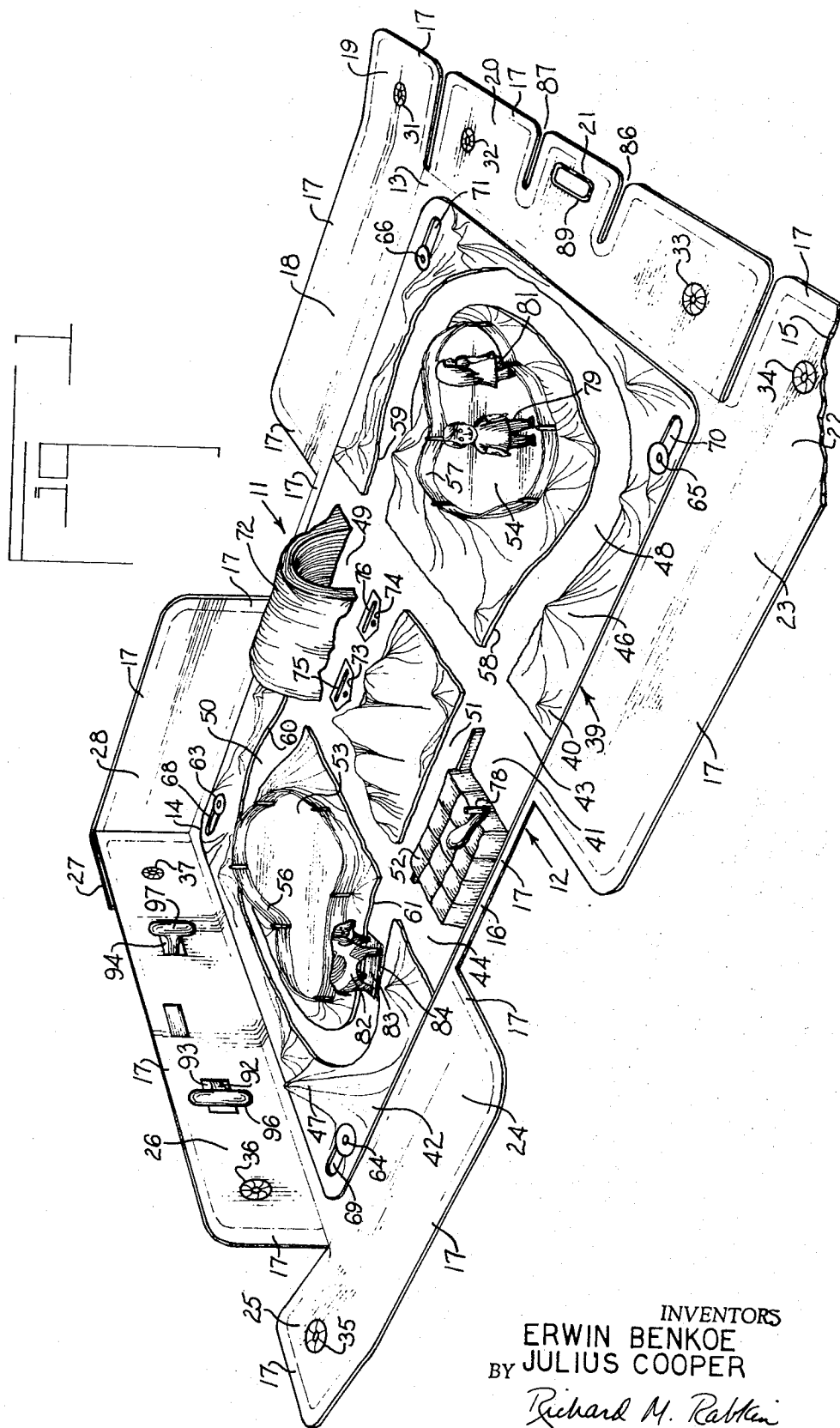
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[57] **ABSTRACT**

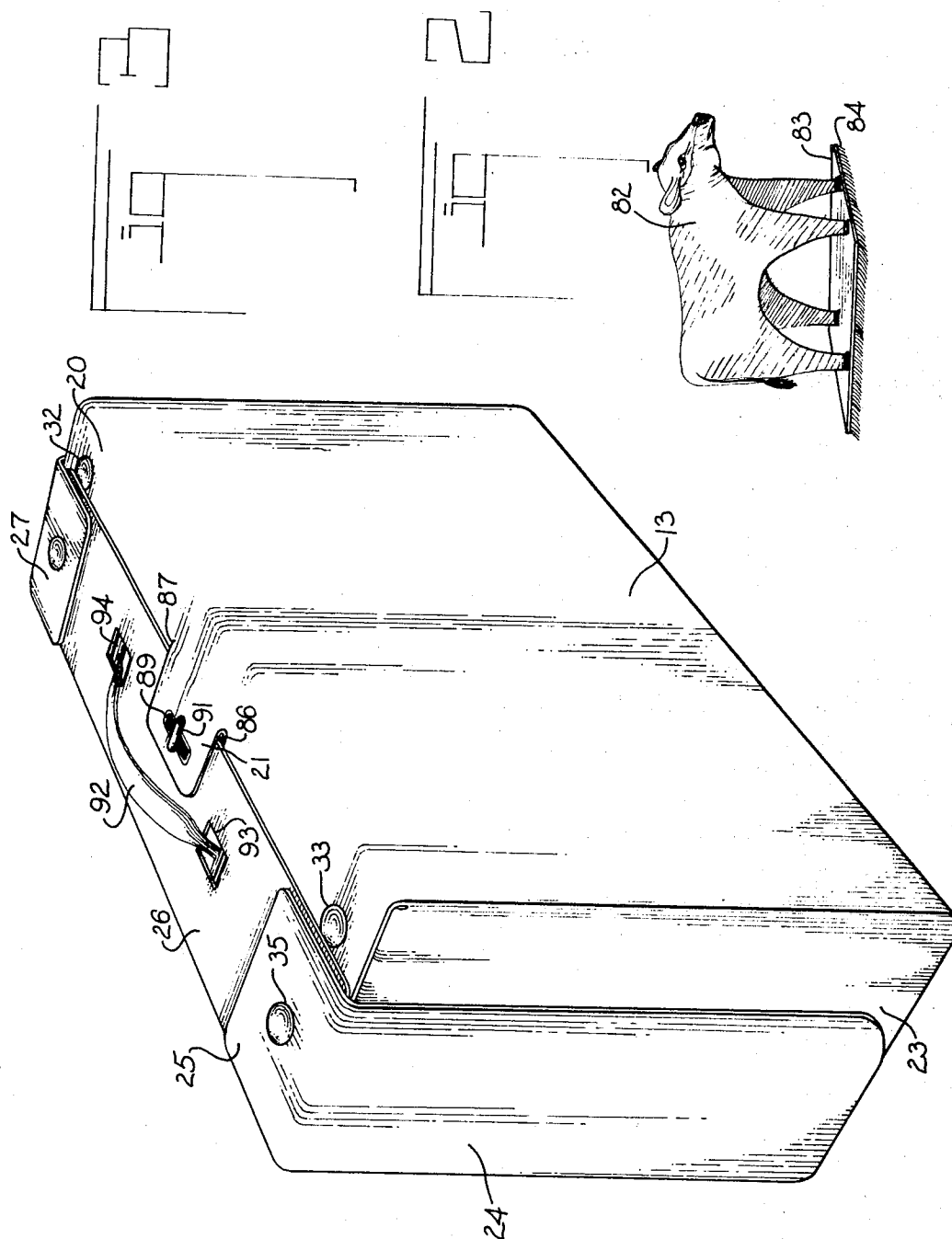
A toy comprising a support structure of panels joined together by hinge sections to be laid out flat or folded and fastened together to form an enclosure. Attached to the support structure and on the interior surface thereof when the support structure is folded to form an enclosure is a separate operative member having sufficient freedom to permit vibratory motion relative to the support structure. A vibrator supported on the support structure comprises a power input device, such as a rotatable crank handle; a power transmission section, such as a step-up gearbox; and an output device, such as an eccentric shaft, connected to the operative member to vibrate the latter with rapid translatory motion when the handle is turned. The operative member has bounded areas, such as an open area or a closed track, and figurines are placed thereon to move in response to the vibration. Figurines to move along the track have support platforms with downwardly and rearwardly extending fibers of plush or the like to move the figurines in one direction along the track.

14 Claims, 7 Drawing Figures





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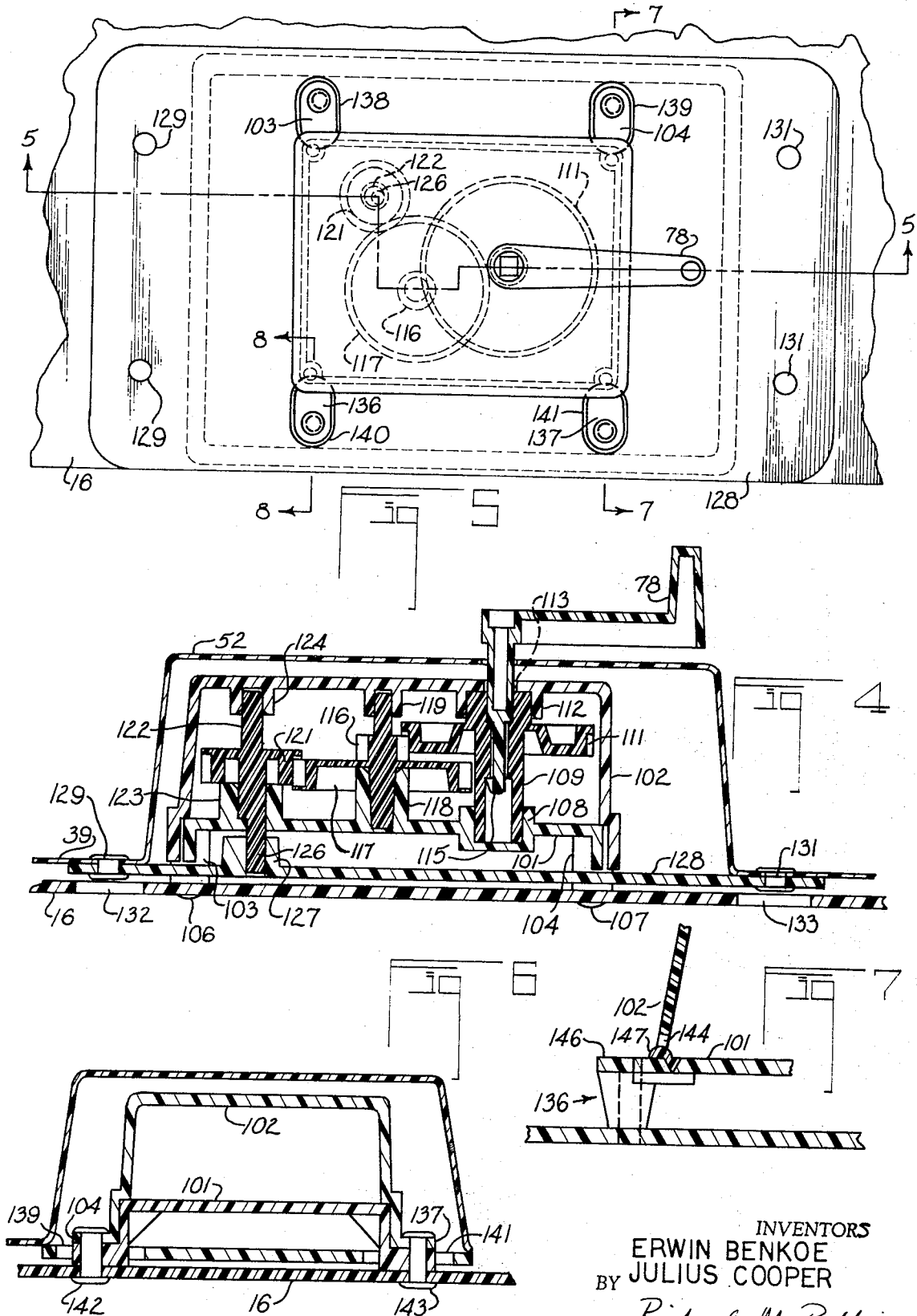


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VIBRATORY TOY

BACKGROUND OF THE INVENTION

This invention relates to the field of toys having moving components and capable of being folded into a self-contained enclosure, the moving components being propelled by vibrating part of the surface of the toy by means attached to the surface and to a support structure therefor.

Toys that have separately movable parts have a special fascination for small children and when the toys are simple enough to allow the child to provide or control the power to move the parts, the child's interest is increased. In order to simplify the operation of a child-actuated toy, it is desirable that the toy be self-contained as well as being simple to operate. Being self-contained is also an advantage in making the toy easy to store after it has been used. Another factor that is of particular importance in the case of toys to be used by extremely young children is that the toy be as nearly absolutely safe as is possible. This means no high voltage and no sharp corners or edges and no dangerous parts that can be easily removed.

It is a principal object of the present invention to provide an improved toy which is capable of being folded into a self-contained package and is operated by manual force within the capability of a small child.

A further object is to provide a toy of the foregoing type that has movable component parts capable of moving in a random way or at least in a way that is not rigidly repetitious.

A further object of the present invention is to provide an improved toy structure capable of either being folded into a complete enclosure or being laid out flat for use by a child.

A still further object of the present invention is to provide movable figures for a vibrating toy in which the figurines derive motive power from the vibration to cause them to move in a specific direction along a bounded track area.

BRIEF DESCRIPTION OF THE INVENTION

The toy of the present invention is built upon a support structure in the form of a multi-panel, substantially two-dimensional base, the panels of which are hinged to each other in such a way as to permit them to be folded up to form a box-like enclosure. Attached to the surface of the support structure that is on the inside of the box-like structure when it is folded up is an operating member in the form of an embossed plastic sheet, the embossments of which divide the sheet in the relatively rigid panels joined by flexible sections. The embossments also serve to give the surface of the sheet the resemblance of a landscape having several bounded areas on which movable objects, such as figurines, can move about. One of the bounded areas may be in the form of a closed loop track along which certain of the figurines may progress and another one or more of the bounded areas may be enclosed sections representing ice-skating rinks or the like. The toy components moving along the track preferably comprise figurines having fibrous material on the bottom, the fibers of which extend downwardly and toward the rear of the figurine to cause the figurine to move in a forward direction when the operating member is vibrated.

The operating member is secured to the support structure by connectors, such as rivets or the like, that

hold the operating member close enough to the surface of the support structure so that it is relatively in contact with the support structure at all times but loosely enough to allow the operating member to vibrate laterally relative to the support structure. Power to cause the operating member to vibrate is provided by an eccentric shaft which is rotated by a step-up gear mechanism capable of being operated by hand by a small child. The gear mechanism is attached to the support structure and the eccentric output shaft is connected to the operating member to cause the latter to vibrate with a translatory motion when the crank handle at the input end of the gear box is turned.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a toy according to the present invention, opened up for use;

FIG. 2 is a perspective view of a typical figurine to be used in the toy of FIG. 1;

FIG. 3 shows the toy of FIG. 1 folded up to make an enclosure;

FIG. 4 is a cross-sectional side view of a gear box for vibrating the operating member in the toy of FIG. 1;

FIG. 5 is a top view of the gear box in FIG. 4;

FIG. 6 is a cross-sectional end view of the gear box in FIGS. 4 and 5; and

FIG. 7 is a partial cross-sectional view showing fastening means to hold the gear box of FIGS. 4-6 together.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows a toy generally indicated by reference numeral 11 that includes a base, or support structure, 12. The base is divided into a number of panels of which the main ones are panels 13 and 14. These are the largest panels, and they are joined together by a central panel 16 that has the same length as the panels 13 and 14 but not necessarily the same width. The support structure 12 may be formed of two sheets of polyvinyl chloride heat-sealed together around the entire perimeter, as indicated by reference numeral 17, and extending not only across the ends of the panel 16 but around additional panels, such as the panels 18-28. Polyvinyl chloride is a particularly suitable material because it is tough enough to withstand the usage of a child and yet inexpensive enough to permit the toy to be made for a reasonable cost. Furthermore, it is flexible enough so that it can act as an integral hinge between adjacent panels. In order to provide stiffness for the panels, a suitable stiffening material 15, such as cardboard, may be sealed into appropriate areas by the perimeter heat seal 17 and by other heat seals that may be used to define the integral hinges between panels.

As shown in FIG. 1, most of the panels are laid out flat, or substantially so, except for the panels 26-28, which are folded up to form one corner of a box-like enclosure. As may be seen, several of the panels have snap fasteners. These are indicated by reference numeral 31 for the panel 19 and 32 for the adjacent end of the panel 20. At the other end of the panel 20 is another half of a snap fastener 33 that engages a snap fastener part 34 in the panel 22. Similar snap fastener components 35 and 36 are shown in matching parts of the panels 25 and 26, respectively, and the final snap fastener component shown in FIG. 1 is the component 37 at the other end of the panel 26. This snap fastener component 37 is already engaged with a correspond-

ing, but unshown, snap fastener component in a matching part of the panel 27. When the four pairs of snap fasteners are joined together, all of the panels 18-28 will be in the vertical position, as indicated in FIG. 1 only by the panels 26-28.

An operative member 39 may be embossed by a vacuum-forming technique or the like so as to be divided into three panels 40-42. These panels are joined to each other by hinge sections 43 and 44. Section 40 of the operating member 39 is slightly smaller than the panel 13 of the support structure but is almost coextensive therewith. Similarly, the section 42 is substantially coextensive with the panel 14 and the section 41 is substantially coextensive with the panel 16.

The embossments on the operating member give it the appearance of a simulated landscape. These embossments may include 46 and 47, a closed loop track made of sections 48-51, a structure 52 apparently built of blocks and a pair of enclosed flat surfaces 53 and 54. If the operating member 39 is made of white plastic, all of the topographical features on it may be made to look as if they were snow covered or, in the case of the flat surfaces 53 and 54, ice-covered skating rinks. The ice-covered skating rinks are enclosed by raised perimeters 56 and 57, respectively. The closed loop track may be formed in such a way as to look as if it were dug out of a relatively thick layer of snow so that it has vertical walls 58-61 all around.

At the four corners of the operating member 39 are four connectors 63-66, each of which has a stem (not shown) of relatively narrow cross-section and an enlarged head. The stems of the connectors 63-66 extend through slots 68-71, respectively, and are attached at their lower ends to the support structure 12. The enlarged heads prevent the operating member 39 from being pulled off of the connectors 63-66 but allow the operating member to move slightly relative to the support structure 12.

Another topographical feature of the simulated landscape is a tunnel 72 that has connecting supports (not shown) that extend through four openings in the operating member 39. Only two of the openings 73 and 74 are shown in the drawing. Below these openings are slots 75 and 76 located in the support structure 12 to permit the tunnel 72 to be attached directly to the support structure without affecting the mobility of the operating member 39.

The block structure 52 houses the actuating mechanism that vibrates the operating member 39 and will be described in greater detail hereinafter. Basically, the actuating mechanism has a handle 78 which, when turned, causes the operating member 39 to vibrate laterally with a translatory motion with respect to the support structure 12. This vibration is transmitted to movable toy figurines resting on the operating member 39. These may include a figurine 79 representing a small boy and a figurine 81 representing a small girl, both located in the area 54 that represents an ice-skating rink. These figurines preferably are so constructed that they readily stand erect, even when the operating member 39 vibrates. This vibration causes the figurines to move in such a way as to appear to skate across the surface of rink 54. Because of the raised perimeter 57 they are held within the skating area and normally do not go beyond that area. These same figurines or others may be placed on the other skating rink section 53, if desired.

Another figurine 82, which may be of any configuration but in the example shown is a simulation of a cow, is arranged to move on the closed loop track. The cow 82, which is shown in greater detail in FIG. 2, has a support platform 83 the lower surface of which is covered with a fibrous material 84 such as a plush. The fibers of this material extend downwardly and toward the rear of the animal and when the operating member 39 is vibrated, the vibratory motion acts upon the fibers 84 and causes the figurine 82 to move forward along the track. The platform 83 is rectangular and has a width somewhat less than the width of the various track sections 48-51 so that this figurine cannot turn around in the track but must continue in one direction around the loop. In so doing the figurine crosses the two hinged sections 43 and 44 of the operating member 39, which are coplanar with the track sections 48-51. The platform 83 of the figurine 82 is made long enough so that the figurine cannot get twisted in crossing the hinge sections 43 and 44 but continues straight across and on to the next track section.

When it is desired to put the toy 11 away, the first step is to fold the panels 18-25 and snap them together in the same manner as the panels 26-28. When this has been done, the support structure 12 forms a tray that is closed except for the two gaps at the ends of the center panel 16. As a matter of fact, the toy may be used in this manner without unsnapping any of the side panels. After the panels 18-28 have all been folded up and snapped together, the main panels 13 and 14 may be folded to an upright position with respect to the center panel 16. As shown in FIG. 3, the side panel 24 partially overlaps the panel 23 when the main panels 13 and 14 have been folded to an upright position. Although not shown in FIG. 3, the side panel 28 overlaps the side panel 18 in the same manner as the panel 24 overlaps the panel 23.

In addition, panel 26 partially overlaps the panel 20 except for the small central panel 21 at the center of the panel 20. The purpose of the small central panel 21 is two-fold. For one thing, the side slits 86 and 87 that define the central panel 21 limit the extent to which the panels 13 and 14 can be pressed toward each other. In addition, the panel 21 has part of the catch by which the enclosure is held in a closed condition. This part of the catch is a metal window 89 that defines a rectangular opening in the panel 21 through which a rotatable bar 91 can pass. After passing through the opening, the bar is twisted to the position shown in FIG. 3 to lock the enclosure.

The enclosure also has a carrying handle 92 that extends through two openings 93 and 94 in the panel 26. Referring back to FIG. 1, it will be seen that the handle 92 has integral transverse holding bars 96 and 97 that keep it from being pulled out of the openings 93 and 94.

FIGS. 4-7 show the actuating mechanism for the toy and the way in which it is attached to the center panel 16 of the support structure. As is particularly shown in FIG. 4, the actuating mechanism has a base 101 and a cover 102. Both of these parts are made of molded plastic, and the base includes several support posts of which only the posts 103 and 104 are shown in this figure. These posts are attached directly to the center panel 16 by means of suitable fasteners 106 and 107.

The base 101 has a shallow cup 108 formed in it as a journal for the axle 109 of a gear 111. The cover 102

has a matching cup 112 aligned with the cup 108 as a journal for the other end of the axle 109. An opening 113 in the center of the cup 112 permits a shaft 114 of the handle 78 to extend through the cover 102 and engage the axle 109 to rotate it and thereby to rotate the gear 111 when the handle 78 is turned. The shaft 114 has a square cross-section to assure that the gear 111 does not slip. In addition, there is a lateral projection 115 at the lower end of the shaft 114 to engage an inner shoulder in the shaft 109, and the upper end of the shaft 109 has a bore large enough to allow the lower end of the shaft 114 and the projection 115 to be pressed therethrough when the handle 78 is being assembled to the rest of the actuating device.

A gear set comprising a pinion 116 and a gear 117 connected thereto is mounted in suitable journals 118 and 119 in the base 101 and the cover 102, respectively. The pinion 116 meshes with the gear 111 to be driven thereby. The gear 117, in turn, meshes with another gear 121 on a shaft 122 journaled in a support 123 in the base 101 and another support 124 in the cover 102. The shaft 122 extends through the base and has an offset, or eccentric end, 126 that engages connector means in the form of an upwardly extending projection 127 integral with a plate 128. This plate is connected by suitable means such as rivets 129 and 131 to the operating member 39 to transmit eccentric movement of the end 126 of the shaft 122 directly to the operating member. Because of the step-up gear ratio between the first gear 111 and the last gear 121, relatively slow rotation of the handle 78 will cause rapid rotation of the eccentric end 126 and, therefore, rapid vibration of the operating member 39. Openings 132 and 133 are provided in the center panel 16 to allow access to the rivets 129 and 131. As may be seen, the block-shaped structure 52 embossed on the operating member 39 provides an outer cover for the actuating device. The shaft 114 extends through an aperture 134, which is large enough so that its edges do not strike the shaft 114 when the operating member 39 is vibrated by rotation of the handle 78.

FIG. 5 shows a top view of the actuating device and particularly the supports 103, 104, and 136, 137 for the actuating member. These supports pass through openings 138-141, respectively, in the plate 128 to allow the actuating device to be attached directly to the center panel 16 of the support structure without coming into contact with the plate 128 that will be vibrated by rotation of the handle 78.

FIG. 6 shows more clearly the way the supports 104 and 137 extend through the openings 139 and 141 in the plate 128 and are riveted to the center panel 16 by rivets 142 and 143.

FIG. 7 shows a slightly enlarged fragment of one corner of the actuating device to illustrate the way in which the cover 102 is attached to the base 101. The cover 102 has a slot 144 in its lower side adjacent a flange 146 that forms part of the support 136. The base 101 has a latch 147 that extends from it and engages a slot 144. The upper surface of the latch 147 is semi-cylindrical so that it is easy to force the base 101 directly upwardly to engage the cover 102. However, the lower projecting surface of the latch 147 is straight, and it is difficult to expand the cover 102 far enough to allow the latch to become disengaged. Thus, the actuating device can be manufactured as a complete separate item and later assembled with the center panel 16 of

the support structure and with the plate 128 and the operating member 39.

What is claimed is:

1. A toy comprising, an operative member, a support structure, means for loosely attaching said operative member to said support structure to permit relative vibratory movement therebetween, and actuator means for vibrating said operative member, said actuator means including a coupling member operatively connected to said operative member and means for supplying rapid movement of said coupling member, thereby to vibrate said operative member; said support structure including a plurality of operatively interconnected panels selectively foldable into an enclosure for said operative member and said actuator means.

2. The toy of claim 1 in which said support structure comprises a plurality of integral hinge sections, each joining a pair of said panels flexibly together.

3. The toy of claim 2 in which said support structure comprises two sheets of polyvinyl chloride heat-sealed together around the perimeter thereof, and said panels include stiffening sheets between said polyvinyl chloride sheets and sealed therebetween.

4. The toy of claim 2 including, snap fastening means mounted in selected ones of said panels for interconnecting said selected panels, whereby said support structure forms said enclosure.

5. The toy of claim 1 in which said operative member includes flexible hinge sections to dividing said operative member into panels substantially coextensive with some of said panels of said support structure.

6. The toy of claim 4 in which said operative member is a plastic sheet having landscape-simulating embossments, said embossments dividing said plastic sheet into a plurality of panels, said flexible hinge sections being between said embossments.

7. The toy of claim 1 in which said operative member comprises a bounded surface area to permit restrained movement of figurines upon said bounded surface.

8. The toy of claim 7 in which said bounded surface area is an open area comprising raised boundries around its perimeter and being substantially flat within said perimeter.

9. The toy of claim 7 in which said bounded surface is a closed loop track.

10. The toy of claim 9 in which said operative member has a plurality of apertures formed therein adjacent one portion of said track and said toy includes,:

A. A tunnel; and

B. Individual mounting means extending through said respective apertures for attaching said tunnel to said support structure.

11. The toy of claim 1 in which said operative member has a plurality of elongated slots therein and said toy comprises, in addition, a plurality of connectors attached to said support structure and comprising stem portions extending through said slots, the dimensions of said stem portions being less than the widths of said slots whereby said operative member is free to move with respect to said connectors and said support structure within the limits of said slots, said connectors also comprising enlarged heads to hold said operative member close to said support structure.

12. The toy of claim 11 in which said operative structure has a generally rectangular perimeter and said slots are located near the corners thereof.

13. The toy of claim 5 in which said support structure comprises:

- A. A first substantially rectangular main panel;
- B. A second main panel having substantially the same shape and size as said first main panel;
- C. A base panel hinged to corresponding edges of said first and second panels and having substantially the same length as said edges;
- D. A first end panel extending from the edge of said first main panel opposite said base panel and having substantially the same length as said base panel;
- E. A second end panel extending from the edge of said second main panel opposite said base panel and having substantially the same length as said base panel;
- F. A first pair of side panels extending from the two remaining edges of said first main panel and comprising end flaps extending from said side panels in the same direction as said first end panel;
- G. Snap fastening means on each of said flaps and on said first end panel to snap said first end panel and said first pair of said panels together to form one end of an open box structure;

- H. A second pair of side panels extending from the two remaining edges of said second main panel and comprising end flaps extending from said side panels in the same direction as said second end panel;
 - I. Snap fastening means on each of said flaps and on said second end panel to snap said second end panel and said second pair of side panels together to form the other end of said open box structure;
 - J. An additional panel formed in the edge of said first end panel facing away from said first main panel and defined by slits extending from said last-named edge toward said first main panel in the central region of said first end panel to receive the edge of said second end panel facing away from said second main panel; and
 - K. Locking means attached to said additional panel and said second end panel to lock said support structure together to form an enclosure.
14. The toy of claim 13 in which said slits defining said additional panel are substantially parallel to each other and extend only part way across said first end panel.

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