United States Patent [19]

Adler

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[45] **June 19, 1973**

[54] **AMUSEMENT DEVICE**

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[52] **U.S. Cl.** **352/99,** 46/34

[51] **Int. Cl.** **G03b 25/00**

[58] **Field of Search** 352/98, 99; 40/36, 40/78, 96, 104.18; 46/34; 402/8

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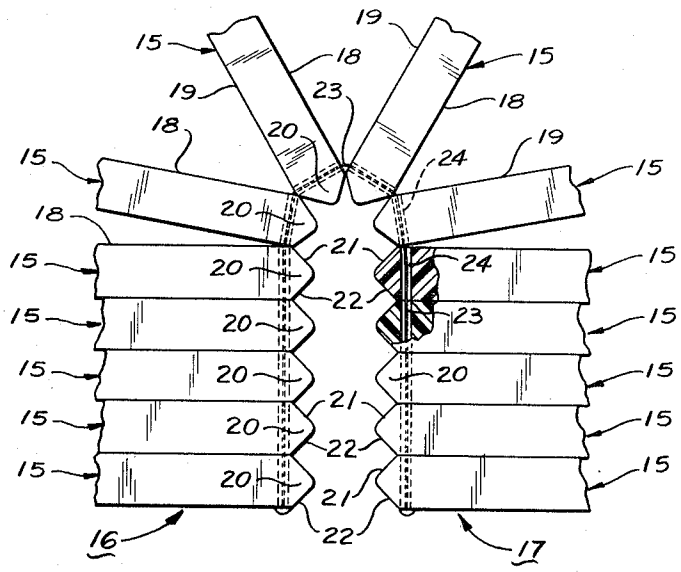
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[57] **ABSTRACT**

A child's toy or amusement device comprising a plurality of thin rigid plaques of generally planar form adapted to be disposed in stacked juxtaposition one upon another with the faces of each plaque in contiguous relation with those immediately preceding and succeeding the same. The plaques are pivotally secured to each other adjacent one end thereof and along each face to both the immediately preceding and succeeding plaques, thereby enabling the plaques to be manipulated so as to articulate sequentially from one stack to another in alternate opposite directions. The faces of the plaques may be provided with indicia of a sequential character so as to depict motion as said plaques are displaced from one stack to another.

17 Claims, 11 Drawing Figures



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SHEET 1 OF 2

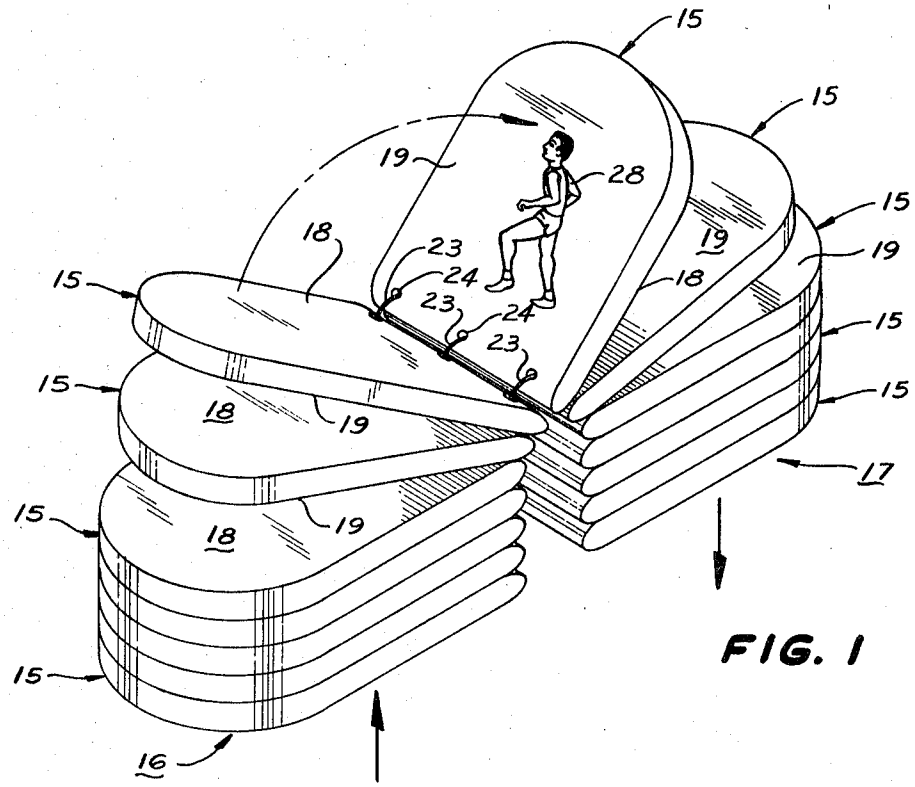


FIG. 1

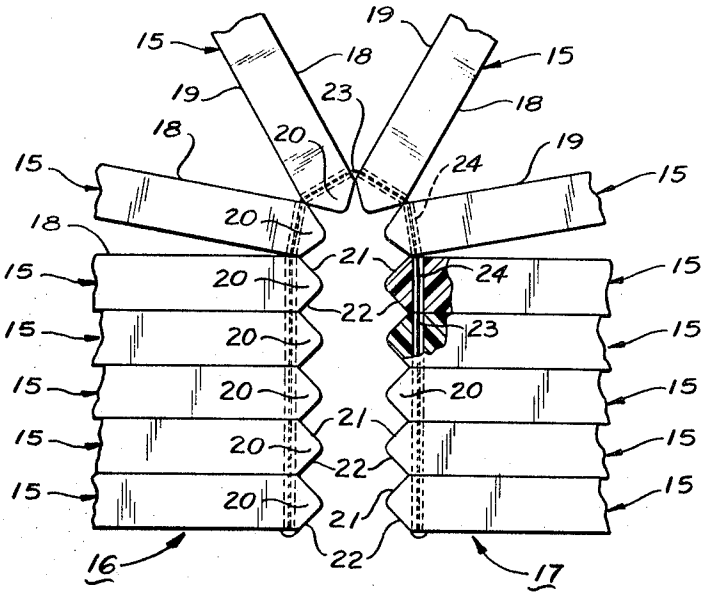


FIG. 2

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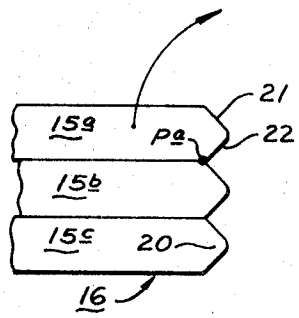


FIG. 3

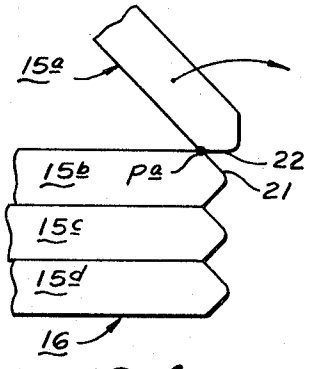


FIG. 4

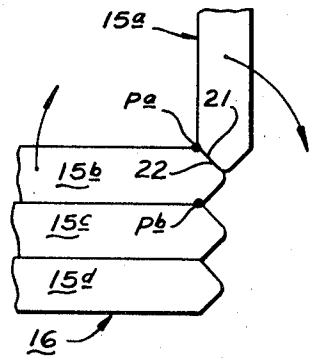


FIG. 5

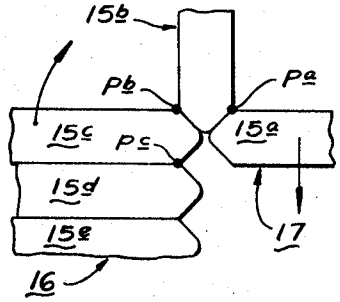


FIG. 6

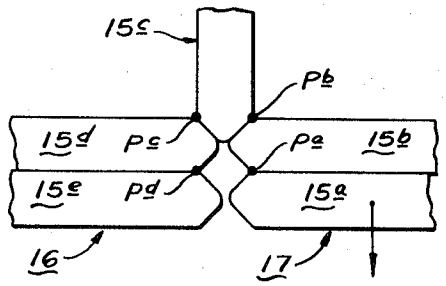


FIG. 7

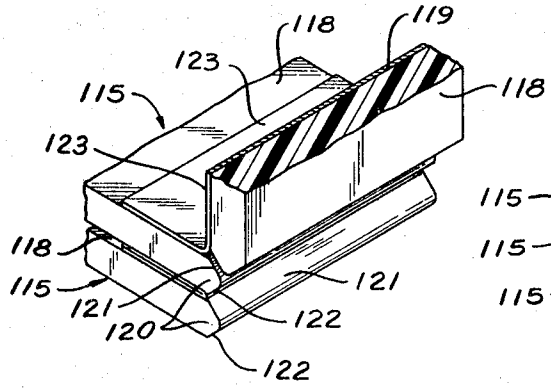


FIG. 8

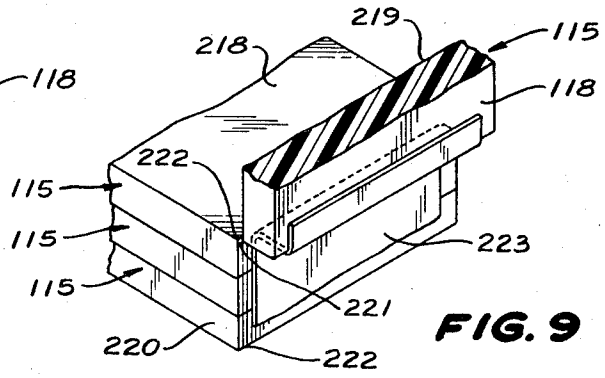


FIG. 9

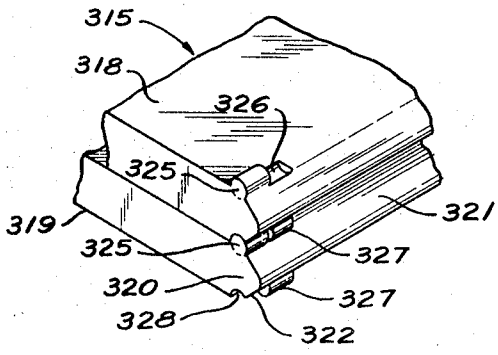


FIG. 10

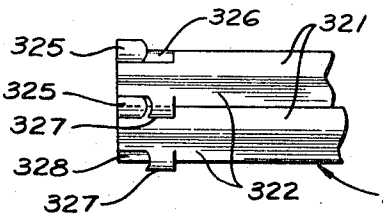


FIG. 11

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AMUSEMENT DEVICE

This invention relates to an amusement device and, more particularly, to a child's toy or educational article adapted to entertain the child and/or convey information thereto during use of the device.

An object of the invention is to provide an amusement device in the nature of a toy or educational article that is safe and easy to use and has universal appeal to children of all ages.

Another object of the invention is in the provision of an amusement device of the character described that is virtually fool-proof, is an action device thereby tending to maintain a greater continued interest therein than is the case with static toys and devices, and is easy and simple to demonstrate and to teach one to use.

Still another object is that of providing an amusement device of the type set forth that is inexpensive to produce because it essentially has one component that is reproduced or repeated to supply all of the components required for the composition of any one device.

Additional objects and advantages of the invention, especially as concerns particular features and characteristics thereof, will become apparent as the specification continues.

In summary form, an amusement device embodying the invention may be said to comprise a plurality of plaques or blocks that may be of substantially identical configuration and are advantageously thin planar components that are essentially rigid or non-flexible. For example, the plaques may be formed of wood, rigid synthetic plastic, and comparable materials that have hard surfaces as well as being rigid so that they create a relatively loud retort when they strike one another. These plaques are adapted to be disposed in stacked juxtaposition one upon another with the opposite faces of each plaque in substantially contiguous juxtaposition with the faces of those plaques immediately preceding and succeeding the same.

All of the plaques are secured one to another along a base edge portion thereof by hinge structure that may take a variety of forms, but in all cases pivotally secures each plaque to those plaques immediately preceding and succeeding the same in a stack thereof. Such pivotal interconnection of the plaques permits the same to be manipulated so as to articulate or flop or sequentially move from one stack to another in alternate opposite directions. The base edges of the plaques may be relieved such as by beveling or curving the same to facilitate articulation of the plaques, and the faces of the plaques may be provided with cartoons or other indicia of a progressive form that imparts motion to one viewing such indicia as the plaques are flopped sequentially from one stack to another.

Embodiments of the invention are illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of an amusement device embodying the invention;

FIG. 2 is an enlarged, broken side view in elevation of the device shown in FIG. 1;

FIGS. 3 through 7 are diagrammatic side views in elevation respectively illustrating successive stages in the articulation of successive plaques from one stack thereof to another;

FIG. 8 is a broken perspective view showing a modified construction;

FIG. 9 is a broken perspective view illustrating another modified construction;

FIG. 10 is a broken perspective view of one plaque illustrating a further modified form of the invention; and

FIG. 11 is an end view in elevation of the plaque shown in FIG. 10.

As heretofore stated, the invention resides in an amusement device which may be taken to be a toy used solely for the pleasure of the child, an educational article to effectively convey information to the child during its use, or a combination thereof. In any case, the device comprises a plurality of plaques, blocks or plates 15 adapted to be disposed in stacked juxtaposition and successively articulated from one stack to another, as shown in FIG. 1. For purposes of identification, the two stacks shown in this Figure are generally denoted with the numerals 16 and 17, and the plaques 15 are being angularly displaced one after another from the stack 16 to the stack 17. In accomplishing such transfer, the stacks 16 and 17 are displaced in opposite vertical directions relative to each other such that the stack 16 is being displaced upwardly with respect to the stack 17 which, therefore, is being moved downwardly with respect to the stack 16. Such relative movement is indicated by the directional arrows in FIG. 1.

The plaques 15 are substantially rigid, non-flexible elements that may be either solid or hollow, of one-piece or multiple-piece construction, and are formed from any of a variety of materials such as wood, synthetic plastic (polystyrene and polyethylene, for example), etc. The plaques 15 are generally planar, and in the form shown are relatively thin and generally rectangular in configuration. Accordingly, each plaque has parallel opposite faces 18 and 19 separated transversely one from the other by the thickness of the plaque. By way of specific example, each plaque 15 may be formed of wood, have a thickness of about one-eighth of an inch, and have longitudinal and lateral dimensions of the order of two inches, respectively. Any suitably convenient or desirable total number of plaques may be used.

As shown best in FIG. 2, each plaque 15 has a base edge 20 that extends between the faces 18 and 19 and is advantageously relieved so as to form at the mergence thereof with each face an included angle greater than 90°. In FIGS. 1 and 2, each plaque 15 has a beveled base edge 20 with the bevel approximating 45° (i.e., each included angle is about 135°) and converging from the faces 18 and 19 toward the median plane of the plaque at which they are rounded slightly. Such relief of the base edges 20 facilitates articulation or angular displacements of the plaques from one stack thereof to the other, as will be described hereinafter. However, the relief of the base edge may take other forms such as the arcuate configuration characterizing the base edges 120 of the plaques 115 illustrated in FIG. 8. The device will function in the absence of relieved base edges along the plaques, as depicted in FIG. 9, in which the plaques 215 have base edges 220 that are normal to the respective faces 218 and 219 joined thereby. The action is somewhat more smooth and positive, however, when the base edges are relieved.

Each of the plaques along each face thereof defines a pivot area generally adjacent the mergence of the face with the associated base edge. The extent of each pivot area depends upon the configuration of the plaque 15 and base edge 20 thereof, and in the case of the beveled edges 20 shown in FIGS. 1 and 2, the pivot

areas extend for substantially the entire longitudinal extent of each beveled edge commencing essentially at the laterally extending line defining the mergence of each face with the associated bevel and terminating along the line defined by the mergence of the two beveled edges along the center plane of the plaque. For identification, the general pivot area associated with each face **18** is identified with the numeral **21** and the area associated with the face **19** is denoted with the numeral **22.** In the case of the base edge being curved or arcuate, as shown in FIG. **8,** the pivot areas are defined along the respective arcuate surface segments of the base edge and are generally denoted with the numerals **121** and **122.** As respects the plaques **215** shown in FIG. **9,** the pivot area is quite restricted and is essentially the laterally disposed line defined by the mergence of the normally disposed base edge **220** with the respective faces **218** and **219.** Such line areas are designated in FIG. **9** with the numerals **221** and **222.**

The device further includes hinge structure pivotally interconnecting the plaques **15** generally adjacent the pivot areas thereof which are disposed in substantial juxtaposition with those immediately preceding and succeeding the same. The hinge structure may take a variety of forms but in any case is effective to pivotally relate the plaques **15** one to another as respects those immediately adjacent thereto so as to enable the plaques to be manipulated in a manner such that they can be articulated sequentially from one stack to another selectively in opposite directions. In the embodiment of the device illustrated in FIGS. **1** and **2,** the hinge structure is continuous and extends completely through the stack of plaques **15** from end to end thereof. In more particular terms, the continuous hinge comprises a plurality of laterally spaced strands or threads **23** that are flexible and respectively extend through transverse openings **24** provided therefor in the plaques. The strands **23** are secured to the outermost plaques **15** (i.e., the lowermost plaques in each of the stacks **16** and **17** shown in FIGS. **1** and **2**) by any suitable means, such as being knotted, stapled to the plaque, adhesively secured thereto, etc. Desirably, each flexible strand **23** is elasticized (elastic thread, for example) so that it assures a tight or compact stack with the adjacent faces of successive plaques in contiguous juxtaposition by being biased theretoward since the elasticized strands will be secured to the plaques under tension.

As heretofore stated, a considerable variety of hinge structures may be used, and in contrast to the continuous hinge structure shown in FIGS. **1** and **2,** hinge structures comprising (structurally or functionally) a plurality of hinge elements respectively interconnecting successive plaques adjacent the pivot areas thereof are illustrated in FIGS. **8** through **11.** In FIG. **8,** such hinge elements comprise a plurality of flexible webs **123** secured to successive plaques along the juxtaposed faces thereof. Thus, in FIG. **8,** a flexible web **123** is secured to the face **118** of one plaque generally along the pivot area **121** thereof and is similarly secured to theface **119** of the next successive plaque along its pivot area **122.** The webs **123** may be tacked, stapled, adhesively secured (a pressure-sensitive adhesive, for example) or otherwise affixed to the plaques, and the web may be formed of cloth, synthetic plastic, or various other fabrics and materials which will accommodate relative angular displacements of the plaques interconnected thereby.

In FIG. **9,** the respective hinge elements are defined by the continuous flexible web **223** adhesively or otherwise secured to each of the plaques **215** along the base edge **220** thereof. Although the web **223** is continuous in a structural sense, functionally it defines a plurality of individual hinge elements respectively defined along the adjacent line-like hinge areas **221** and **222** of successive juxtaposed plaques. It will be apparent that a plurality of individual webs could be substituted for the continuous web **223** with no change in the functional results. Similarly, the relatively wide webs **123** shown in FIG. **8** could be replaced by one or more relatively narrow webs with no change in essential function.

In FIG. **10,** the successive hinge elements are defined by interconnectible hinge components formed integrally with the respective plaques **315.** In the form shown, such hinge components constitute a pair of short cylindrical hinge pins **325** associated with the face **318** and extending upwardly therefrom adjacent its opposite sides in generally overlying relation with the pivot area **321** of the base edge **320.** A pair of short cylindrical sockets **326** is disposed adjacent the pins **325** inwardly thereof and in alignment therewith so as to respectively seat therein a pair of short cylindrical hinge pins **327** associated with the face **319** and extending downwardly therefrom adjacent but spaced inwardly from its opposite sides in generally underlying relation with thepivot area **322** of the base edge **320.** A pair of short cylindrical sockets **328** is disposed adjacent the pins **327** outwardly thereof and in alignment therewith so as to respectively seat the hinge pins **325** therein. The inner edges of the pins **325** and outer edges of the pins **327** are curved in complementary mating configuration to enable thpins to snap together when they are inserted into their respective sockets **326** and **328,** as shown in FIG. **11.** Each pin **325** and **326** is angularly displaceable within the sockets **326** and **328** therefor so as to permit plaques **315** interconnected thereby to articulate relative to each other.

The pin and socket structure shown in FIGS. **10** and **11** is exemplary of a great variety of "snap together" hinge structures that can be formed integrally with the plaques, especially where the plaques are molded plastic elements, including thin flexible webs formed integrally with successive plaques so as to define the hinge structure therebetween. Such integral or one-piece hinge structures are especially suitable where the plaques are of two-piece construction and are formed in pairs each comprising two plaque half-sections integrally interconnected by hinge webs and dimensioned and arranged so as to mate with each other, thereby enabling a plurality of such plaque half-sections to be reversely disposed and secured (e.g., snapped together) to their opposite counterparts in other pairs to form complete plaques integrally interconnected both to succeeding and preceding plaques.

The function of the plaques in articulating sequentially from one stack to another is illustrated in FIGS. **3** through **7,** to which reference will now be made. Assume as a starting condition that all of the plaques **15** are disposed in stacked juxtaposition one upon another to form a composite stack partially shown in FIG. **3** and again denoted with the numeral **16.** If the uppermost plaque **15***a* is grasped and an upwardly and outwardly directed lifting or pulling force is applied thereto, the

plaque will pivot or articulate about the pivot area denoted P*a* in a clockwise direction through the intermediate position illustrated in FIG. **4** into the position shown in FIG. **5** in which the pivot areas **21** and **22** respectively defined by the plaques **15***a* and **15***b* are in abutment throughout substantially their entire facing surfaces.

With the configuration of the base edge **20** shown in which the bevel approximates 45°, the turning moment about the point P*a* has displaced the plaque **15***a* into a substantially vertical orientation when the areas **21** and **22** are in engagement throughout substantially their entire facing surfaces, and a continuation of the force applied to the plaque **15***a* to produce the turning moment tends to rotate the next successive plaque **15***b* in a clockwise direction about the pivot area P*b*. As a consequence, the plaque **15***a* together with the plaque **15***b* rotate generally in unison about the pivot point P*b* until the configuration shown in FIG. **6** obtains, in which the plaque **15***a* has been displaced through an angular distance of the general order of 180° and constitutes the lowermost plaque in the stack **17**. At this time, the force applied to the plaque **15***a* by the hand gripping the same (or by gravity in the case of a free fall as where the plaques are permitted to walk from one stair-step to the next such step disposed therebelow) is oriented in an essentially downward direction as indicated by the arrow, and such force will cause the next successive plaque **15***c* to rotate in a clockwise direction about the pivot area P*c* until it has been displaced angularly through approximately 90° and assumes the generally vertical orientation illustrated in FIG. **7**.

At the same time, the plaque **15***a* is displaced downwardly one step until it substantially parallels the plaque **15***e*, and as it moves downwardly the plaque **15***b* is rotated in a clockwise direction about the pivot area P*a* from the generally vertical orientation illustrated in FIG. **6** into the horizontal configuration shown in FIG. **7**. This process is then repeated sequentially for each successive plaque in the stack **16***a* until all of the plaques are located one above another in inverted orientation in the stack **17**. The process can then be reversed so as to rotate each plaque in a counter-clockwise direction from the stack **17** into the stack **16** by applying a turning moment in a counter-clockwise direction to the uppermost plaque and then to each plaque thereafter seriatim.

Generally, such shifting of the plaques occurs as the lowermost plaque in one stack is held in one hand and the uppermost plaque in such stack is gripped by the other hand and the appropriate turning moment applied thereto. If desired, finger holds can be provided so as to faciliate use by the relatively small hands of a child, and also to remove the fingers from a position intermediate successive plaques where the fingers might be struck as one plaque swings downwardly toward impact with another. This same action occurs irrespective of the configuration of the base edge **20** of any stack of plaques and of the type of hinge structure used to interconnect successive plaques. Thus, with the arcuate base edge **120** shown in FIG. **8**, the initial pivot area about which two successive plaques articulate tends to be a line contact which progressively shifts along the arcuate facing edges **121** and **122**. In the base configuration shown in FIG. **9**, the initial pivot area is essentially a line contact defined by the adjacent edges **221** and **222**, and it tends to remain this same line contact although it may shift slightly in the case of the hinge structure **223** depending upon the accuracy with which it is secured to the plaques and location of such securance.

The plaques in each case tend to strike each other and create a relatively loud sound which can be inceased or decreased as desired through selection of the material defining the plaque faces and by the area over which such plaques impact each other. The sound can also be altered by making the plaques either solid or hollow. The faces of the plaques can also be covered with pictures, words, geometric figures or other indicia or patterns which the child can observe as the plaques articulate from one stack to another, such as the form **28** of a runner shown in FIG. **1**. The patterns create a visual impression and can be of sequential character so that movement is effected as the plaques are displaced from stack to stack. Thus, the sequence suggested in FIG. **1** is an animated runner, and other examples, might be a rotating wheel, a star moving across the horizon, etc.

While in the foregoing specification embodiments of the invention have been set forth in considerable detail for purposes of making a complete disclosure thereof, it will be apparent to those skilled in the art that numerous changes may be made in such details without departing from the spirit and principles of the invention.

What is claimed is:

1. Amusement devices and the like, comprising a plurality of plaques at least certain of which are disposed in stacked juxtaposition, each of said plaques having opposite faces separated transversely one from the other and having also a base edge extending substantially between said faces adjacent one end thereof, each of said plaques along each face thereof defining a pivot area generally adjacent the mergence of the face with the associated base edge, and hinge structure pivotally interconnecting said plaques directly one to another generally adjacent said pivot areas thereof so that each base edge is juxtaposed with an edge immediately preceding the same, each of said plaques being pivotally related by said hinge structure to any immediately adjacent plaque along their facing pivot areas thereby enabling said plaques to be manipulated so as to articulate sequentially from one said stack to another in alternate opposite directions.

2. The device of claim **1** in which each of said plaques is relatively rigid and generally planar.

3. The device of claim **2** in which said plaques are substantially similar structurally.

4. The device of claim **1** in which said hinge structure is essentially continuous and extends from one end of such stack of plaques to the other end thereof while defining a plurality of hinge locations respectively relating successive plaques for angular displacements with respect to each other generally adjacent the pivot areas thereof.

5. The device of claim **4** in which said continuous hinge structure comprises a plurality of laterally spaced strands respectively extending through laterally spaced apertures provided therefor in said plaques.

6. The device of claim **5** in which said strands are elasticized.

7. The device of claim **1** in which said hinge structure comprises a plurality of hinge elements respectively interconnecting successive plaques for relative angular displacements so as to articulate as aforesaid.

8. The device of claim 7 in which said hinge structure comprises a flexible web extending substantially from end to end of such stack of plaques and being secured to each so as to define said plurality of hinge elements respectively interconnecting successive plaques.

9. The device of claim 7 in which said hinge elements are formed integrally with the successive plaques interconnected thereby.

10. The device of claim 1 in which at least certain of said plaques along a face thereof are provided with patterns creating visual impressions as said plaques are displaced from one stack to another.

11. The device of claim 10 in which said patterns are of sequential character and depict motion as said plaques are displaced from one stack to another.

12. Amusement devices and the like, comprising a plurality of plaques at least certain of which are disposed in stacked juxtaposition, each of said plaques having opposite faces separated transversely one from the other and having also a base edge extending substantially between said faces adjacent one end thereof, each of said plaques along each face thereof defining a pivot area generally adjacent the mergence of the face with the associated base edge, and hinge structure pivotally interconnecting said plaques generally adjacent said pivot areas thereof so that each base edge is disposed in adjacency with an edge immediately preceding the same, each of said plaques being pivotally related by said hinge structure to any immediately adjacent plaque along their facing pivot areas thereby enabling said plaques to be manipulated so as to articulate sequentially from one such stack to another in alternate opposite directions, each of said base edges being relieved so as to merge with the associated faces at angles greater than 90°.

13. The device of claim 12 in which each of said base edges is beveled and converges inwardly from each of the associates faces toward the center plane of the associated plaque.

14. The device of claim 12 in which each of said base edges has an arcuate configuration curving outwardly from each of the associated faces toward convergence adjacent the center plane of the associated plaque.

15. The device of claim 12 in which each of said plaques is relatively rigid and generally planar.

16. The device of claim 15 in which said hinge structure is essentially continuous and extends from one end of such stack of plaques to the other end thereof while defining a plurality of hinge locations respectively relating successive plaques for angular displacements with respect to each other generally adjacent the pivot areas thereof.

17. The device of claim 15 in which said hinge structure comprises a plurality of hinge elements respectively interconnecting successive plaques for relative angular displacements as aforesaid.

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