ABSTRACT

A flying toy has a rim and a plurality of discontinuous airfoils that are coupled to the rim such that a plurality of openings are formed between the airfoils and the rim. Most preferably, the total area of the airfoils is less than 40% of an area enclosed by the rim and the airfoils have a weight of less than 40% of the rim.
FREE FLYING SPINNING HOOP TOY

[001] This application claims priority to our copending provisional application with the Ser. No. 60/810319 filed Jun. 1, 2006.

FIELD OF THE INVENTION

[002] The field of the invention is flying toys, and especially flying rings.

BACKGROUND OF THE INVENTION

[003] Lining rings are well known in the art and some examples for such toys are described in U.S. Pat. Nos. 4,075,781; 4,560,358; 4,906,007; 5,275,417; 5,522,753; 6,739,954; and published Pat. App. 2002/0111105. While these toys provide fun for games of catch, various difficulties remain. Among other things, all or almost all of the known ring-shaped flying toys fail to provide sufficient lift to allow for a “floating” effect, which has heretofore only been achieved using a disk shape. Moreover, the trajectory of currently known ring-shaped flying toys is typically not stable, and the toys tend to tilt and crash readily, especially when wind or gusts are present. Still further, the flight of many known ring-shaped toys is often difficult to control and once such toys are flying, they often lack dynamic audio and/or visual effects during flight. Finally, known ring-shaped flying toys do not provide alternative modes of use to throwing the ring back and forth and are therefore often perceived as quickly diminishing in entertainment value.

[004] Therefore, while numerous toy flying rings are known in the art, all or almost all of them suffer from one or more disadvantages. Consequently, there is still a need to provide improved devices and methods for flying rings, and especially for free flying ring-shaped toys.

SUMMARY OF THE INVENTION

[005] The present invention is directed to flying rings in which a rim and a plurality of airfoils are arranged such as to allow a stable flight over large distances.

[006] In especially preferred aspects, the flying toy has a circular or polygonal rim to which at least two discontinuous airfoils are coupled such that respective openings are formed between the rim and the airfoils, wherein a total area of the airfoils is less than 40% of an area enclosed by the rim and wherein the airfoils have a weight of less than 40% of the rim.

[007] Moreover, it is generally preferred that the toy comprises between two and six airfoils, and that the rim is circular. Where desired, at least one of the airfoils may have additional openings, and the total area of the airfoils is less than 30% (and more preferably less than 25%) of the area enclosed by the rim. Additionally, suitable toys will also include a tail that is typically centrally coupled to a plurality of radially extending elements or centrally coupled to at least one of the airfoils.

BRIEF DESCRIPTION OF THE DRAWING

[008] FIGS. 1A-1E depict exemplary illustrations of various contemplated flying toys.

[009] FIGS. 2A-2D depict exemplary illustrations of further contemplated flying toys with a tail.

DETAILED DESCRIPTION

[010] The inventor has discovered that a free flying ring toy can be manufactured in a relatively simple and effective manner, wherein the toy has exceptional lifting and floating characteristics, increased stability in flight, attractive pinwheel flight patterns, dynamic audio and visual effects as well as increased play value by optional incorporation of one or more tethers (e.g., to allow for “yo-yo like” tricks and a wide variety of throwing and catching techniques).

[011] Most typically, contemplated flying toys comprise a generally ring-shaped or polygonal rim that is spun to impart rotational momentum and at least two discontinuous airfoils to thereby allow floating of the rotating toy in the air in a free-flying manner. Preferred rims have a circular, elliptic, polygonal, or irregular-shaped cross section, but other shapes are also deemed suitable. It is further generally preferred (but no necessary) that the rim is relatively thin (i.e., less than 2 cm in height/width) as it is thought that a thin rim will reduce drag. It is further typically preferred that the rim has a weight sufficient to generate a significant gyroscopic force as it spins. Thus, rims are preferably manufactured from a material comprising plastic, metal, and/or other rigid materials. With respect to the diameter, it is typically preferred that the rim has an outer diameter of between 24 to 34 inches. However, larger (e.g., 34-40 inches, and even more) or smaller diameters (e.g., 12 to 24 inches, or even smaller) are also contemplated herein. Where desirable, the rim can be foldable or collapsible for easier portability. Similarly, suitable ring width (measured as outer to inner diameter distance) may vary and will typically depend on the particular configuration of the rim. However, in most cases the rim width will be between about 5 mm to 4 cm).

[012] It is further especially contemplated that the rim have at least two discontinuous airfoils coupled to the rim. The term “discontinuous airfoil” as used herein refers to an airfoil that includes at least one opening sufficient to permit air to pass through the airfoil such that the rim with the airfoils will exhibit a floating flight characteristic. While in some aspects the opening is formed between the airfoil and the inner diameter of the rim (with an appearance of a gap between the rim and the airfoil), the opening may also be formed in other additional or alternative aspects by one or more openings within the airfoil (which could be characterized as semi-porous airfoil, or an airfoil with one or more holes).

[013] The discontinuous airfoils generally provide lift of the flying rim and their configuration provides stability of flight. Exemplary airfoil configurations are depicted in the attached FIGS. 1 and 2. It should be noted that the airfoils can be made of numerous materials, and among other parameters, the particular configuration will dictate the appropriate material, which includes plastic, cloth, TYVEK™ (high-density polyethylene fiber material from DuPont), or other light weight and durable materials. It should be especially pointed out that contemplated airfoils are air permeable to maximize the floating characteristics of the flying rim, and/or have an opening within the airfoil and/or between the foil and the rim. To that end porous cloth such as spandex is especially preferred. Alternatively, and especially where the airfoil comprises plastic or rip-stop nylon, holes can be placed in the material to increase
permeability. Among other suitable methods, the discontinuous airfoils can be taped, glued, sewn, or other wise directly or indirectly coupled to the ring. Such discontinuous airfoils provide superior floating characteristics as well as dramatic "pinwheel" effects when spun. An especially preferred configuration has the airfoils made of spandex since it can be stretched which allows the airfoils to remain taught (not to flap) when thrown through the air.

[0014] FIGS. 1A-1E exemplarily depict various embodiments of flying rings, each having a rim 100A-100E, and discontinuous airfoil portions 100A-100E. Openings 112A-112E of the ring are defined between the rim and the airfoil portion, and additional openings 114A, 114C, and 114D may be present. The number of discontinuous airfoils may vary between at least 2 and 20, but is more preferably between 2 and 10, and most preferably between 2 and 6. FIGS. 2A-2D exemplarily depict further embodiments of flying rings having elements as depicted in the FIGS. 1A-1E above. Additionally, each of the rings has a tail, which is centrally coupled to the rim either via radial elements 222B or 222C, or via airfoil 210A or 210D.

[0015] With respect to suitable configurations of airfoils and rim, the inventors discovered that the proportion of the entire area of the toy (i.e., the circular area enclosed by the outer diameter of the rim) relative to the area defined by the total area of the airfoils is important as it provides stability of flight, keeps the overall weight of the toy light. In especially preferred aspects, the total area of the airfoils is equal or less than 60%, more typically equal or less than 50%, even more typically equal or less than 40%, and most typically equal or less than 30% of the entire area of the toy. Similarly, the weight ratio of the airfoils to the weight of the rim is of significance. In most preferred aspects, the airfoil weight is equal or less than 50% of the weight of the rim, more typically, more than or equal to less than 40% of the weight of the rim, and most typically equal or less than 25% of the weight of the rim. In further preferred aspects, the ratio of the average thickness of the rim to the average thickness of the airfoil is at least 2:1, more typically at least 5:1, and most typically at least 10:1.

[0016] Airfoils are most preferably straight-edged, however, curved-edged airfoils are not excluded herein. Moreover, where the airfoils have openings, it is preferred that the ratio of airfoil openings to the entire area of the toy is between about 100:1 and 5:1, and more preferably between 50:1 and 10:1.

[0017] For increased visual interest and play value, it is further contemplated that a ribbon-like tether (tail) is attached to the center of the ring by means of a radial webbing or spokes by at least one string or strap that goes across substantially the midpoint of the ring. It is especially preferred that the tether should extend past the rim. This tether not only increases the visual effect of the free flying spinning rim but also makes a flapping or vibrating sound while flying. Still further, using the tether, the flyer can also be thrown and caught by a player. In addition, when the ring is spun and not thrown, a player can hold the tether and execute many spinning yo-yo type tricks with the spinning ring. This will greatly improve the play value of the free flying spinning ring. To this end it is generally preferred that the tether be attached by non-fixed mechanism (e.g., gimbal) by which the tether will allow the ring to spin while remaining untwisted. Suitable tethers may have any lengths, however, especially preferred lengths include those of at least the radius of the rim, more preferably at least 1.5 times the radius of the rim, and most preferably at least 2 times the radius of the rim.

[0018] It should be noted that the radial webbing, spokes, or straps to which the tether is attached should intersect at about the midpoint of the rim and can be made of string, cloth, plastic, TYVEK™, or other durable material. The spoke or spokes may be threaded, glued looped sewn or taped to the rim or discontinuous airfoils or be part of the airfoils themselves. In the case of a plurality of spokes or of especially wide straps, the flying toy can approximate a disk. It is further contemplated that the flying toy may also contain any variety of light making devices for night time play or electronic or mechanical sound-making devices.

[0019] Thus, specific embodiments and applications of free flying spinning hoop toys have been disclosed. It should be apparent, however, to those skilled in the art that many more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the present disclosure. Moreover, in interpreting the specification and contemplated claims, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms “comprises” and “comprising” should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced. Furthermore, where a definition or use of a term in a reference, which is incorporated by reference herein is inconsistent or contrary to the definition of that term provided herein, the definition of that term provided herein applies and the definition of that term in the reference does not apply.

What is claimed is:

1. A flying toy, comprising a circular or polygonal rim to which at least two discontinuous airfoils are coupled such that respective openings are formed between the rim and the airfoils, wherein a total area of the airfoils is less than 40% of an area enclosed by the rim and wherein the airfoils have a weight of less than 40% of the rim.

2. The flying toy of claim 1 wherein the toy comprises between two and six airfoils.

3. The flying toy of claim 1 wherein the rim is circular.

4. The flying toy of claim 1 wherein at least one of the airfoils has additional openings.

5. The flying toy of claim 1 wherein the total area of the airfoils is less than 30% of the area enclosed by the rim.

6. The flying toy of claim 1 wherein the airfoils have a weight of less than 25% of the rim.

7. The flying toy of claim 1 further comprising a tail.

8. The flying toy of claim 7 wherein the tail is centrally coupled to a plurality of radially extending elements.

9. The flying toy of claim 7 wherein the tail is centrally coupled to at least one of the airfoils.

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