United States Patent [19]

Keith

[11] **3,742,643**

[45] **July 3, 1973**

[54] **FLYING DEVICE**

[76] Inventor: **Charles David Keith,** 17926 N. Shore Estates, Spring Lake, Mich.

[22] Filed: **May 5, 1972**

[21] Appl. No.: **250,657**

[52] **U.S. Cl.** ..... **46/74 D,** 46/220

[51] **Int. Cl.** **A63h 33/18**

[58] **Field of Search** ..... 46/91, 74 D, 220

[56] **References Cited**

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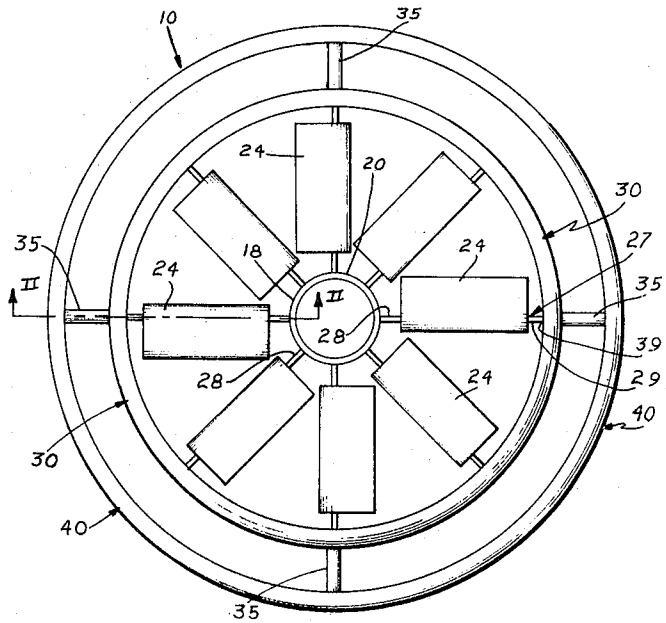
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Primary Examiner—Antonio F. Guida
Assistant Examiner—Robert F. Cutting
Attorney—Peter P. Price, Harold W. Reick et al.

[57] **ABSTRACT**

A flying device adapted to be thrown manually in a spinning fashion includes a hub, an intermediate ring and an outer ring. Between the inner and intermediate rings are a plurality of variable pitch radially extending vanes adapted to be adjusted as desired. The intermediate and outer rings are coupled by support members to allow the user to grasp the device by holding the outer ring.

11 Claims, 8 Drawing Figures



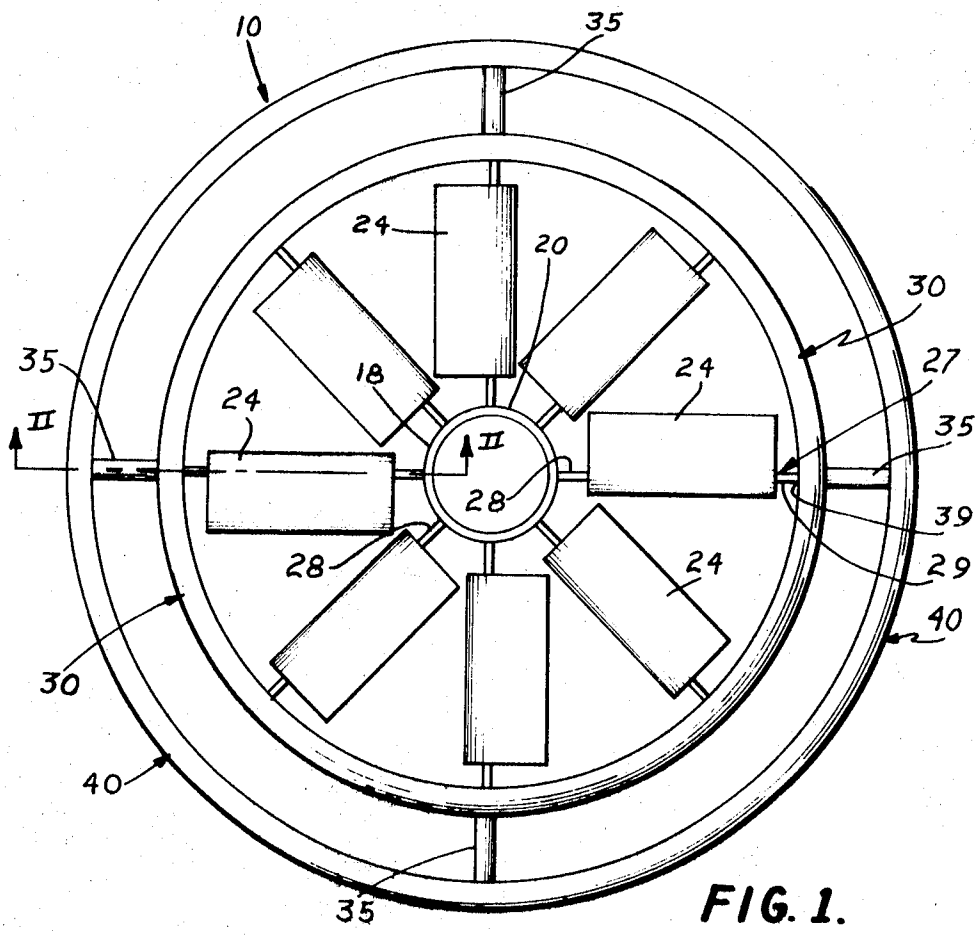


FIG. 1.

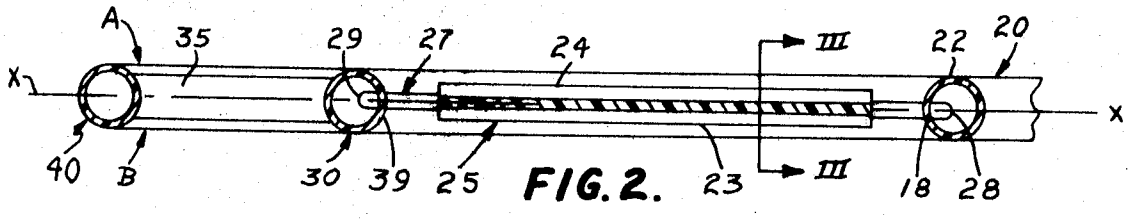


FIG. 2.

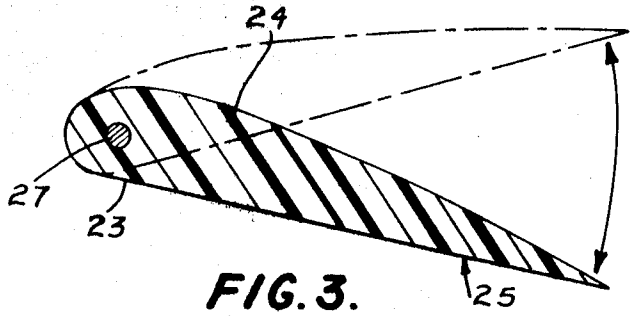


FIG. 3.

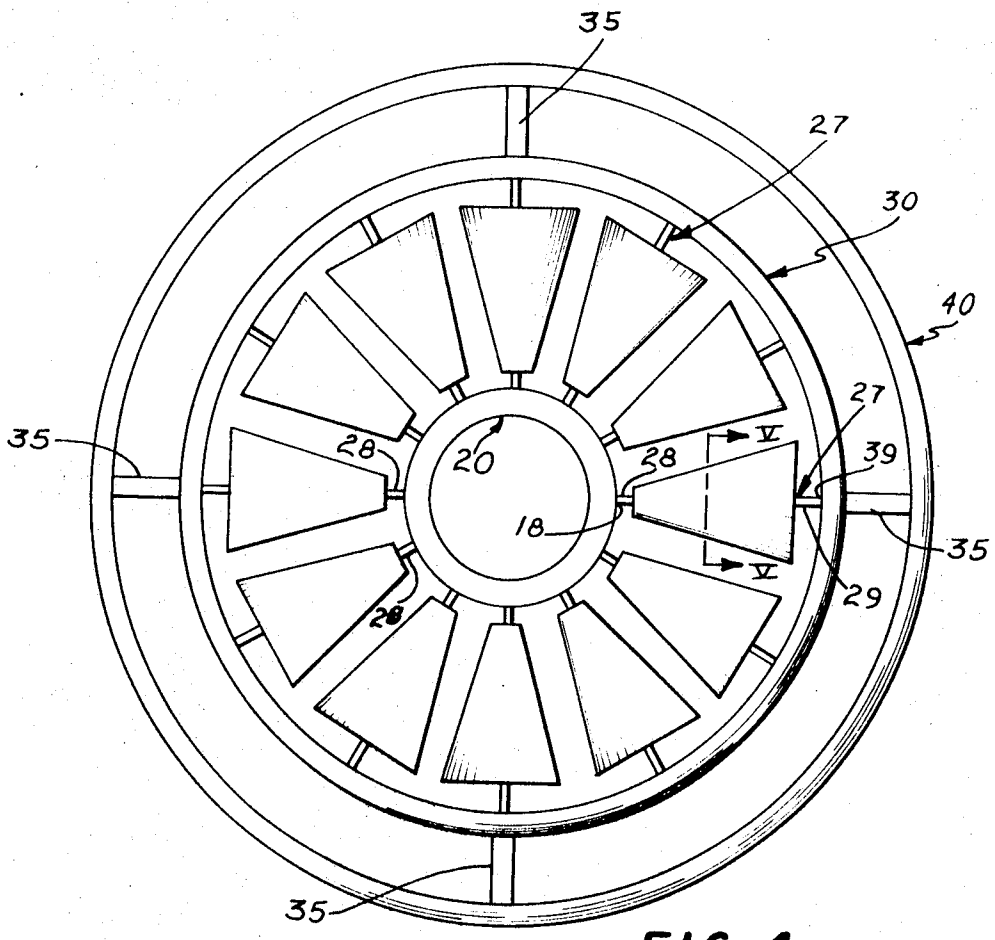


FIG. 4.

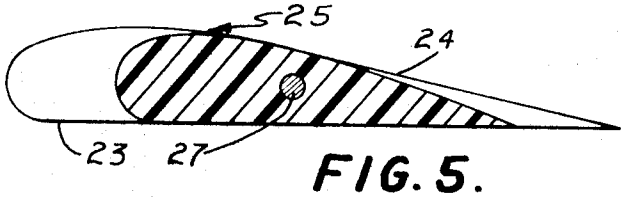


FIG. 5.

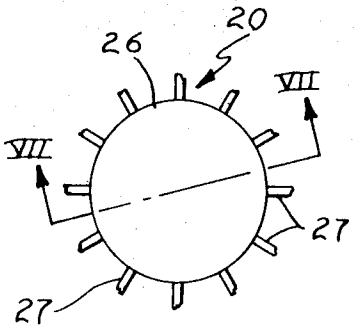


FIG. 6.

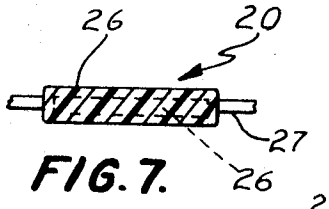


FIG. 7.

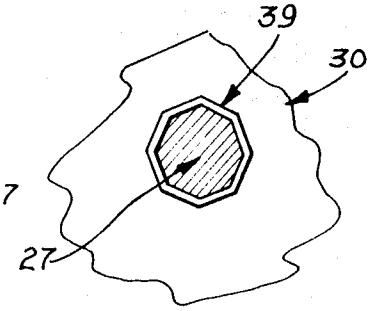


FIG. 8.

FLYING DEVICE

BACKGROUND OF THE INVENTION

The present invention relates to a flying device adapted to be thrown in a spinning motion.

Recreational saucer type of devices (such as a FRISBEE) which are adapted to be thrown in a spinning fashion and which display a "floating" aerodynamic property are well known and have become very popular. Similarly, devices such as flying saucer toys of which U. S. Pat. No. 2,640,296 issued on June 2, 1953, to M. A. C. Johnson et al. is representative, are well known and employ a pair of rings between which extend radial vanes having either a fixed or in some cases, an adjustable pitch. The latter type of toys are generally adapted to be rotated by employing a mechanical device detachably coupled to the hub of the toy. Such devices will generally lift vertically and then float downwardly as the spinning velocity decreases.

Although these various prior art devices display aerodynamic qualities which are suitable for throwing between individuals or alternately for use by a single person, the apparatus of the present invention is adapted to provide the combined aerodynamic features of both. Thus, the device of the present invention is adapted to be thrown in a spinning motion between two persons, and, display lift or drop, not available with prior saucer-type devices.

SUMMARY OF THE INVENTION

By employing an outer ring concentric with and spaced from an inner vane supporting ring, the apparatus of the present invention allows the device to be easily held and manually spun such that it can be thrown between persons. Apparatus embodying the present invention comprises a central hub, an intermediate ring concentric with the hub and supporting a plurality of radial vanes extending between the hub and the intermediate ring. An outer ring is concentrically mounted to the intermediate ring by means of a plurality of radially extending support members.

It is an object of the present invention to provide an improved flying device adapted to be thrown in a spinning fashion.

An additional object of the present invention is to provide a flying device having an outer ring to provide an accessible hand hold.

Still a further object of the present invention is to provide a flying toy adapted to display lift or drop when thrown in a spinning fashion.

These and other objects of the present invention will become apparent upon an examination of the drawings together with the following description thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of one embodiment of the present invention;

FIG. 2 is a partial enlarged cross section view taken along the lines II—II in FIG. 1;

FIG. 3 is a greatly enlarged cross section view of one of the vanes taken along lines III—III of FIG. 2;

FIG. 4 is a plan view of an alternative embodiment of the present invention;

FIG. 5 is an enlarged cross section view of one of the vanes employed in the FIG. 4 embodiment taken along lines V—V in FIG. 4;

FIG. 6 is a plan view of a hub which can be employed in the embodiments of FIGS. 1 and 4;

FIG. 7 is a cross section view of the hub shown in FIG. 6 taken along the lines VII—VII of FIG. 6; and

FIG. 8 is a partial, cross section view of one embodiment of the pins employed to hold the vanes in an adjustable position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 through 3 there is shown a flying device 10 embodying the present invention and comprising a circular hub or inner ring 20. The hub can be formed in the shape of a solid or a hollow ring 22 as shown in FIG. 2. Extending radially outwardly from the hub 20 is a plurality of vanes 25 which are positioned between the hub 20 and a circular concentrically spaced intermediate support member or ring 30. Each vane includes pin means 27 extending from opposite ends thereof. The pin means 27 has one end 28 fitted into a pin receiving aperture 18 of the hub 20 and an opposite end 29 extending into a pin receiving aperture 39 of the intermediate ring 30.

Pins 27 can be molded within the vanes 25 or can be integrally formed as a part of the vanes with projecting ends 28 and 29 extending outwardly therefrom. The ends 28 and 29 of the pins are snuggly fitted into apertures 18 and 39 of the hub and intermediate ring respectively. With this construction the vanes are movable to adjust the pitch as desired but are relatively rigidly positioned once adjusted such that they will not move during use.

As seen in FIG. 3, each of the vanes 25 is generally rectangular shaped with a cross section in the form of an airfoil. The vanes have a relatively flat bottom surface 23 and a curved upper surface 24 and can be adjusted within members 20 and 30 between a downwardly depending position shown in solid lines in FIG. 3 to a horizontal position shown in phantom lines in FIG. 3 or other desired positions. Alternate vanes can be adjusted to a horizontal position while the remaining vanes are positioned downwardly to provide a desired predetermined control effect. Likewise, vanes on one side of the device 10 can be tilted downwardly while the remaining vanes on the opposite side are horizontal or tilted upwardly to impart a turning aerodynamic property to the device when it is thrown. With this device therefore, it is possible to experiment with various vane positions to produce the desired aerodynamic effect.

A circular outer support member or ring 40 is provided as a hand hold and is attached to the intermediate ring by means of a plurality of support ribs 35. In use, the device is held by gripping ring 40 between ribs 35 and throwing the device in a spinning fashion. It is noted that members 20, 30, 35 and 40 can be solid or hollow although the hollow members shown provide an overall reduction in weight of the device and require less material.

An alternative embodiment of the invention is shown in FIG. 4 in which the vanes 25 are wedge shaped. As seen in FIG. 5, the vanes 25 of this embodiment also have a cross-sectional shape corresponding to that of an airfoil. With the wedge shaped configuration, a greater number of vanes 25 can be positioned between the hub 20 and the intermediate ring 30 thereby providing a somewhat smoother operating flying device.

The hollow ring hubs **20** shown in FIGS. **1** and **4** can be replaced with a solid hub **20** comprising a disc of material **26** as shown in FIGS. **6** and **7**. If desired, this disc could be hollowed in its center area **26'** as shown in dotted lines in FIG. **7**.

The device can be manufactured with or without variable pitch vanes. If the vanes are fixed for example, the device can be molded in halves A and B indicated by the dividing center line X in FIG. **2**. In such case the vanes and support members or rings can be hollow as shown, or solid. Also, the pins could be eliminated if desired by molding the vanes directly to the hub and intermediate member. The two molded halves are then joined and sealed. Any suitable material such as polyethylene, P. V. C. or other thermoplastic molding material can be employed for molding the halves. Likewise any suitable sealing means such as heat sealing, cementing or the like can be employed to join the two halves.

When the device is manufactured for variable pitch vanes; the outer ring, intermediate ring and ribs joining these rings can be molded in the same manner described above. Likewise, the vanes and pins can be separately molded as can the hub. The unit is then assembled by inserting the pin ends into the apertures in the hub and then into the apertures of the intermediate ring (or vice versa).

It is important that the pins fit snuggly into the apertures to allow adjustable movement without allowing the vanes to shift in position during flight of the device. To this end, the pins and apertures respectively can be polyhedral in cross section as shown in FIG. **8** at **27** and **39**.

With such construction, the somewhat resilient molding material will allow the vanes to be adjusted incrementally to several vane-holding positions.

In one embodiment, the rings **20, 30** and **40** had a cross section diameter of ⅜ inch and a circular diameter of 1 ¼ inches, 6 ¼ inches and 8 inches respectively. The vanes were approximately 2 inches long by ¾ inch wide. It is apparent that these dimensions can be varied both in relation to one another and in scale.

These and other modifications to the preferred embodiments shown will become apparent to those skilled in the art but will fall within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A flying device comprising:

a central hub including pin receiving means;

a concentric intermediate support member spaced from said hub and including pin receiving means;

a plurality of vanes positioned between said hub and said intermediate support member and extending radially outwardly from said hub, each of said vanes including pin means extending from opposite ends thereof and engaged by said pin receiving means to support each of said vanes between said hub and said intermediate member wherein said vanes are adjustably positioned between said hub and said intermediate member to allow the pitch of said vanes to be adjusted;

an outer support member concentrically spaced from said intermediate member; and

support means holding said outer member to said intermediate member.

2. The apparatus as defined in claim **1** wherein said hub and said intermediate member are circular.

3. The apparatus as defined in claim **1** wherein said hub is a circular ring.

4. A flying device adapted to be thrown in a spinning fashion comprising:

a central hub;

a circular intermediate support member concentrically spaced from said hub;

a plurality of vanes extending radially between said hub and said intermediate member;

an outer member attached to said intermediate member for providing a hand hold for said device, wherein said outer member is a circular member concentrically spaced from said intermediate member and attached thereto by a plurality of support ribs extending radially between said intermediate and outer members.

5. The apparatus as defined in claim **4** wherein said hub and said intermediate and outer members are rings.

6. The apparatus as defined in claim **5** wherein said hub and said intermediate member include apertures therein, and wherein said vanes include means extending from opposite ends thereof adapted to be fitted within said apertures for positioning said vanes between said hub and said intermediate member.

7. The apparatus as defined in claim **6** wherein said means extending from said vanes are pins, and wherein said pins and said apertures are polyhedral to allow said vanes to be adjustably positioned.

8. The apparatus as defined in claim **4** wherein said vanes are rectangular with a cross section being airfoil shaped.

9. The apparatus as defined in claim **4** wherein said vanes are wedge shaped with a cross section being airfoil shaped.

10. The apparatus as defined in claim **4** wherein said hub is a circular ring.

11. The apparatus as defined in claim **4** wherein said hub is a disc.

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