

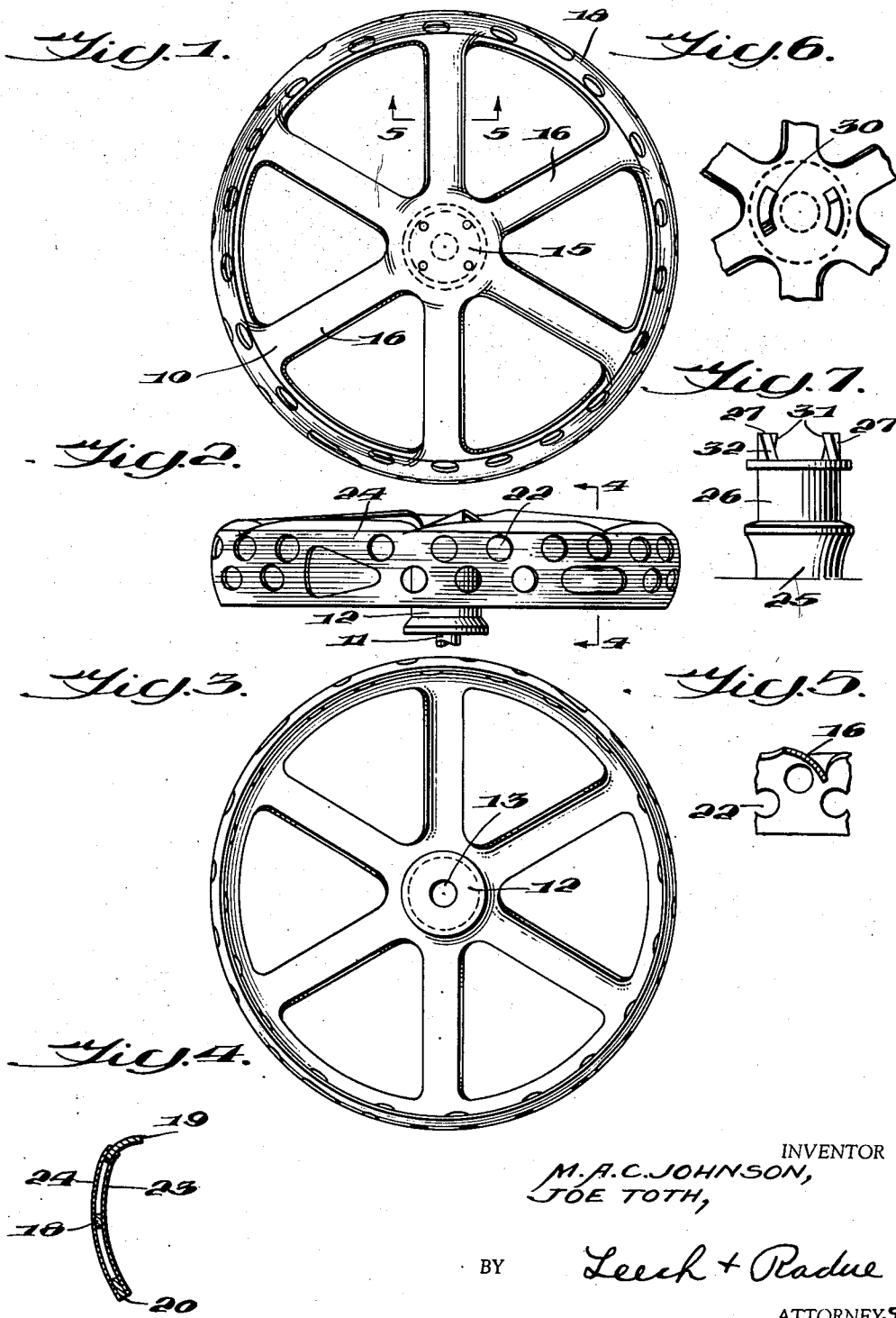
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FLYING SAUCER TOY

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FLYING SAUCER TOY

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This invention relates to toys and more particularly, to aerial spinning or flying toys.

It is a general object of the present invention to provide a novel and improved flying rotor type of toy adapted to simulate a flying disc or flying saucer.

In particular it is an object of the invention to provide, in a flying saucer type of toy, a rotor adapted to be spun on and launched from a rotation imparting device, adapted to be held by the operator, and including substantially radially-disposed, pitched blades attached to a peripheral shroud ring which depends therefrom and is shaped to improve the hovering characteristics of the rotor.

Another object of the invention consists in the provision of a rotor of the type described wherein the shroud ring or skirt is concave toward, and in a radial plane containing the axis of rotation and has an inner diameter at the top less than that at the bottom to cause the trapping of the vortex air column delivered by the vanes to slow the sinking of the rotor as the speed of rotation decreases.

One of the important features of the invention resides in the use of a skirt or shroud ring of considerable depth formed from an opaque material and provided with a number of relatively large perforations through which light passes during the rotation to improve the appearance of the device and produce the sensation of fire jets as supposedly used to propel the controversial "flying saucers."

Another important feature resides in the provision of numerous large perforations in the shroud ring of a rotor of a flying saucer type of toy together with the use of transparent or translucent closure means for these openings to achieve the air confining effects of the shroud while permitting the passage of light and effecting vari-colored displays during rotation.

Other and further objects and features of the invention will be more apparent to those skilled in the art upon consideration of the accompanying drawing and following specification wherein is disclosed a single exemplary embodiment of the main portion of the invention with the understanding that such changes and modifications may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

Fig. 1 is a top plan view of a flying saucer toy constructed in accordance with one embodiment of the invention;

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Fig. 2 is a side elevation thereof;

Fig. 3 is a bottom plan view of the rotor unit;

Fig. 4 is a radial section taken through the rim of the rotor unit as on line 4-4 of Fig. 2;

Fig. 5 is a section through one of the blades taken on line 5-5 of Fig. 1;

Fig. 6 is a fragmentary plan view of a modified rotor hub as mounted on a different type of launching device; and

Fig. 7 is a side elevation of the upper portion of the launching device of Fig. 6.

Heretofore numerous flying toy devices have been proposed and used, each comprising in general a vane or bladed rotor formed of thin metal, cardboard, plastic or the like and adapted to be given a spinning motion about a substantially vertical axis by one form or another of launching devices held in the hand of the operator. This rotary motion was imparted by a pull string, a wound helical spring or even the spinning action of a small stick rotated between the palms of the hands as one is slid over the other. These devices in general have suffered from one or more defects which are now more apparent as the devices are used in congested areas. If imparted a sufficiently high speed of rotation to remain in operation for a satisfactory time, the rotors travel rapidly and to a considerable height and because their flight is erratic and uncontrolled they are often lost. They were restricted to outdoor use because of the height of flight and in some cases the unprotected ends of the rapidly rotating blades injured youthful users.

In accordance with the present invention, a rotor is provided which is arranged to produce more of a hovering action with less climbing so that flights may be effected in restricted areas and the article remain within the line of vision for a long time, thus giving more pleasure to the small children. At the same time, because it does remain more closely within the range of vision, characteristics are imparted to it whereby it produces novel color and light effects enhancing its value and decorativeness. All this is achieved with but minor changes and without any additional or supplemental parts.

Referring now to the drawing and first to Figs. 1 to 5 inclusive, the device will be seen to comprise two separable parts, a soaring rotor 10 and a stick 11 adapted to be held in the operator's hand. The rotor includes a spool-like device 12, centrally bored at 13 for a loose fit over the end of the stick. A string wrapped around the spool, before the device is placed on the stick, and afterwards rapidly withdrawn imparts the spin-

ning action necessary to cause the rotor to take off in flight. The type of mechanism used to achieve the rotation and consequent launching forms no important part of the present invention. The improvements reside wholly in the form and construction of the rotor or flying saucer.

The novel features of the invention reside in the construction of the rotor which is preferably formed from some light metal such as sheet aluminum or from a suitable moulded plastic. The rotor takes the form of a unitary wheel having a central hub disc 15 which may be attached in any suitable manner to the spool 12 or otherwise arranged to cooperate with a launching device. Integral with the hub are a plurality of blades 16 which in the preferred embodiment of the invention extend radially and are of substantially uniform width. They are transversely curved as shown in Fig. 5 to provide lifting pitch and as best appreciated from Fig. 2 are graduated in pitch throughout their length from a maximum adjacent the hub to a minimum at the outer end. The exact shape transversely and the amount of average pitch will assist in controlling the type of flight.

The tips of the blades are connected together by a shroud ring 18 depending as a skirt from the blade tips as clearly seen in Fig. 1, and having a convex outer surface to heighten the saucer or disc appearance. The thin shroud ring is concave facing the axis of rotation in a radial plane in which this axis lies as clearly seen in Fig. 4. Here and in Fig. 2 it will be noted that the shroud has a generally squat, barrel shape but the portion adjacent the upper edge 19 is given an increased curvature and the diameter at this edge is the minimum. The maximum diameter occurs near mid-height and the diameter of the lower edge 20 is intermediate that at 19 and at mid-height.

This arrangement enhances the confining effect on the vortical air column which is forced downwardly by the rotation of the blades and guides it in a relatively straight path preventing erratic lateral flight and insuring lift almost directly in the line of the axis at the time of launching. By giving the blades their maximum pitch at the center, this effect is increased and leakage below the edge of the shroud minimized. The overhang at the top edge of the shroud contributes materially to the effect and the overall result is that the rotor is caused to hover rather than climb rapidly or to rise or descend more slowly and over a much longer period of time than with the unshrouded rotor or with shrouds of different shapes.

The above results have been proven in tests by perforating the shroud with a large number of large openings such as shown at 22 in the drawings. With these openings unobstructed the operation is much like that of an unshrouded rotor but when they are covered by strips of cellophane or the like as shown at 23 and 24 in Figs. 2 and 4, then the hovering characteristic is materially improved and even after the rotational speed begins to drop off materially there is no rapid descent.

The holes 22 are not primarily for the purpose of permitting changes in the operational characteristics, although they can be used for that purpose. They achieve a lightening of the rim or shroud and where the latter is made of opaque material permit the passage of light rays giving a novel effect as the rotor spins in the air and particularly against a bright sky. Such

effect is considerably augmented if the openings are closed by transparent, translucent or colored material such as the previously mentioned bands of adhesive cellophane. More simply the rim can be dipped in a self-hardening colored plastic which forms a film over the openings. The openings may be individually covered by different colored fillers and as shown, they may be of various shapes and sizes to achieve the desired decorative and luminous effects.

In Figs. 6 and 7, is shown a modified launching device including a handle 25 having a spool 26 fixed thereto and rotatable thereon. This spool is provided with a pair of upwardly projecting driving lugs 27 having their forward and rear faces inclined in the direction of rotation. These lugs are adapted to pass through properly shaped slots 30 in the hub disc. During the spinning operation, which is achieved by drawing a wound string off the spool, the inclined forward faces 31 of the lugs hold the hub down against the flat top of the spool, but as the spool tends to slow down after the string is drawn off it the increased relative speed of the rotor causes the rear edges of the openings in the hub to climb up the rear inclined surfaces 32 of the lugs and separate the rotor from the launching device.

One important feature of a curved shroud not mentioned heretofore is the considerable added stiffness which it imparts to the whole rotor because of its curvature in two directions. The rotor can thus be made extremely light and quite rugged. It is also strengthened by dishing, i. e., having the hub portion somewhat elevated above the rim of the shroud as shown.

The device as described is a safe, easily used toy, satisfactory for use indoors or out and one that will give unusual pleasure to children of all ages.

We claim:

1. A rotor unit for a flying saucer toy including a hub, a plurality of pitched blades radiating therefrom and an annular shroud ring depending from and having its upper edge integrated with the ends of said blades, said upper edge being inturned and merging smoothly with the blade ends, the lower edge of said ring being of greater diameter than the upper but less than that of intermediate portions thereof.
2. The rotor unit of claim 1 in which the shroud ring is formed of opaque material and is provided with large perforations throughout its area to spill air there-through.
3. The rotor unit of claim 1 in which the shroud ring is formed of opaque material and is fitted with large perforations throughout its area, said perforations being closed by translucent material to prevent air leakage and to provide for light transmission.
4. A rotor unit for a flying saucer toy including a hub, narrow blades of uniform width throughout their length radiating therefrom and a shroud ring, said ring depending from and having its upper edge integrated with said blades, the vertical cross-section of said ring being concave toward said hub and of less diameter at the top than at the bottom to confine the airstream from the blades and promote hovering when the unit is rotated.
5. The rotor unit as defined in claim 4 in which the said blades are tilted to provide uniformly increasing pitch from ring to hub to improve the hovering characteristics.
6. A rotor unit for flying toys comprising an

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integral metal structure including a hub having means for attachment to a rotatable launching means, a plurality of narrow, uniform width blades radiating from said hub and each transversely curved to present a concave lower surface of maximum pitch adjacent the hub and decreasing uniformly to a minimum at the outer end, a shroud ring depending from said ends and being of uniform depth and concave on the inner face in a radial plane in which lies the axis of the rotor, the upper edge of said ring being of maximum curvature to merge with the blades.

7. The rotor of claim 6 in which the shroud ring is opaque and is provided throughout most of its area with large perforations for the passage of light.

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8. The rotor of claim 7 in which the perforations are closed by translucent material to prevent the escape of air and improve the hovering qualities of the device.

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