Nov. 17, 1953 C. H. VAN HARTESVELDT 2,659,178

TOY FLYING SAUCER

Filed Dec. 30, 1950 2 Sheets-Sheet 1

Fig. 1

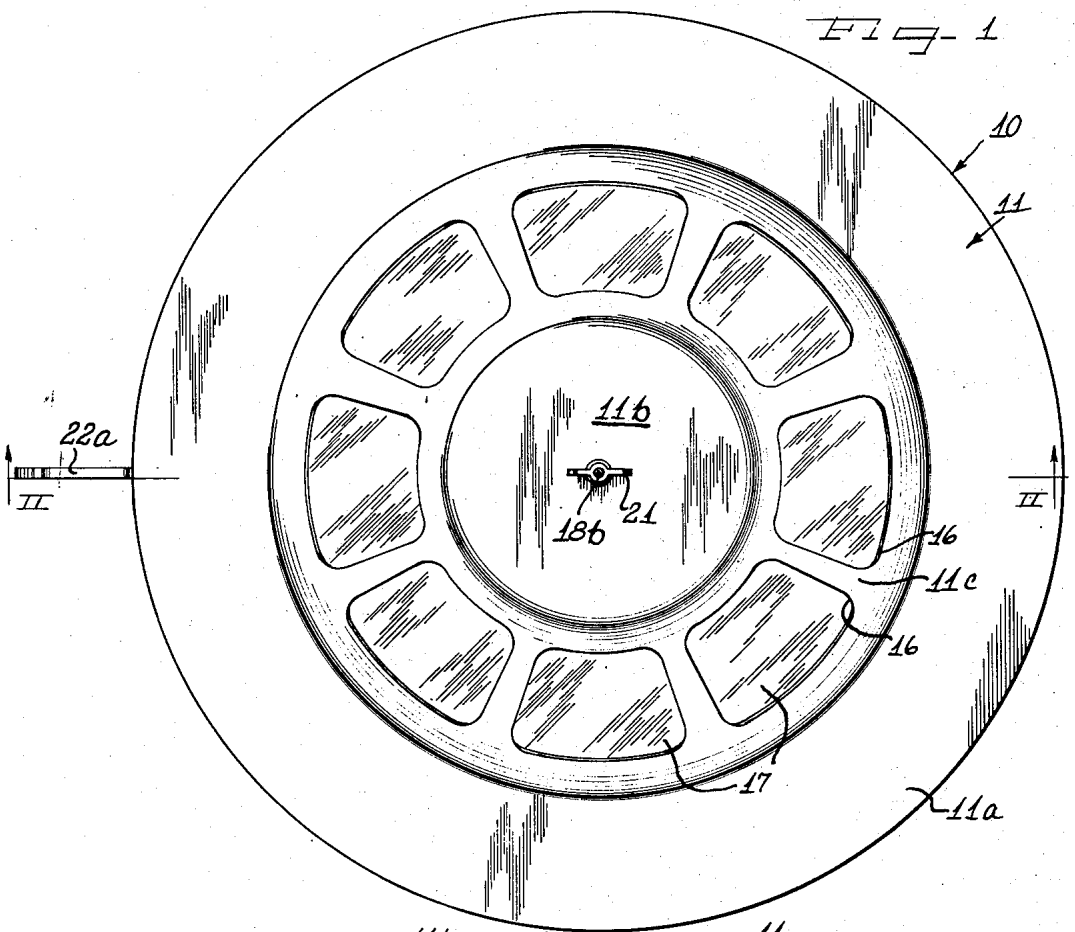

Fig. 2

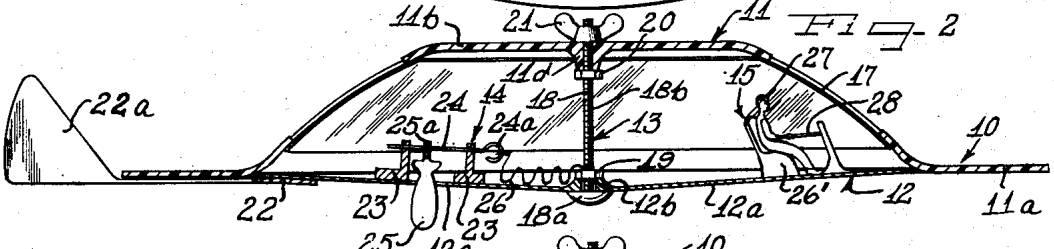

Fig. 3

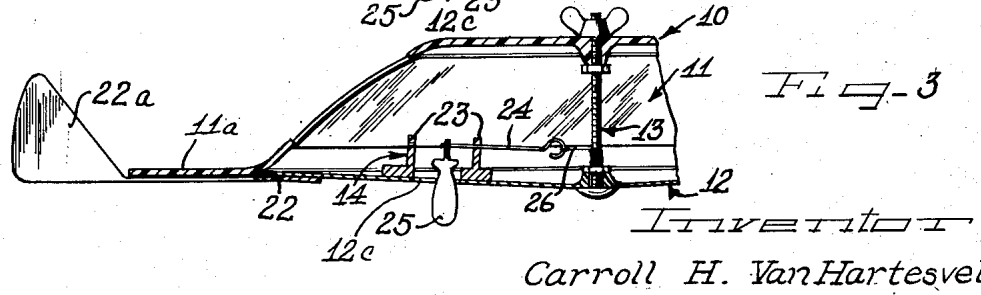

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Fig. 4

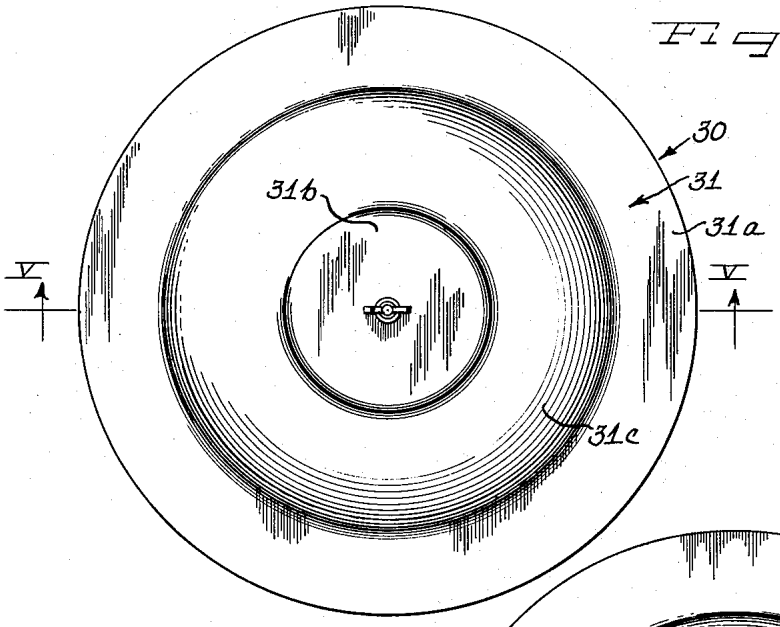


Fig. 6

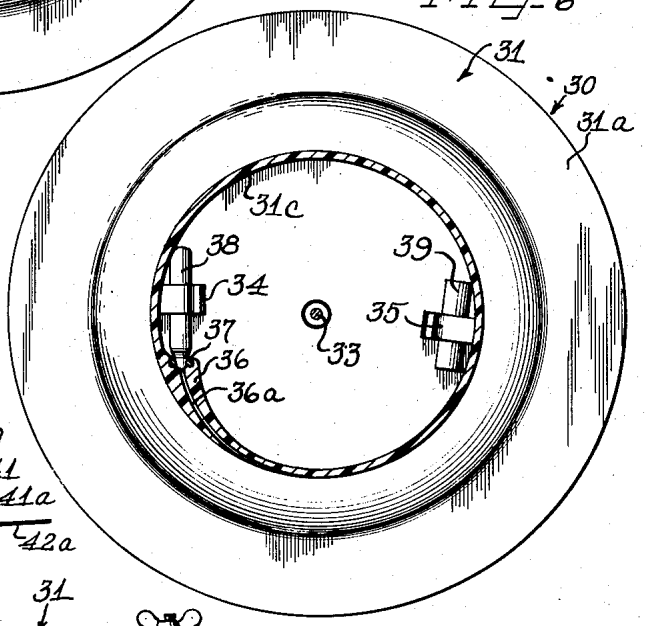


Fig. 7

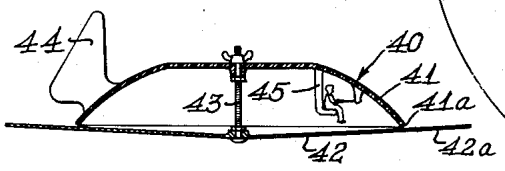
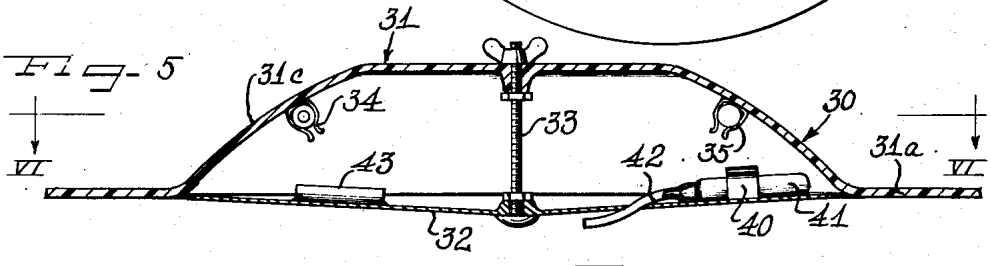


Fig. 5



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TOY FLYING SAUCER

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15 Claims. (Cl. 46—76)

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This invention relates to aircraft of the rotating wing type, and particularly deals with a toy having a rotatable disk and a cooperating non-rotating disk, which coact to produce an air foil section of good aerodynamic shape which is capable of gyroscopic stabilized flight when the rotatable disk is rotated with a forwardly applied thrust.

In one embodiment of this invention, the toy aircraft is composed of a circular radially flanged inverted bowl-shaped wing member and a floor disk of inverted cone shape spanning the open bottom of the bowl and equipped with a tail rudder to hold the floor disk against rotation when the bowl is spinning in flight. In this form, the toy is operated by flinging it into the air with a forward spinning motion that will rotate the bowl. As the bowl advances in the air, the air stream flowing past the tail will hold the floor against rotation. The bowl and conical floor cooperate to provide a good aerodynamic shape which will lift the toy into the air. In addition, the conical shape of the floor provides stability in flight in a manner analogous to the dihedral angle in airplane wings. This stability is significant when gyroscopic stability decreases as the rotation of the bowl slows down.

If desired, the toy can be equipped with a simulated bomb or parachute that will be automatically released through the floor upon rotation of the bowl through a predetermined number of revolutions. The floor may also be equipped with a simulated pilot station and the like.

In another embodiment of the invention, the bowl is equipped with a removable compressed air cartridge discharging tangentially to effect high speed rotation of the bowl. The floor, in this form of the invention, is equipped with a removable compressed gas cartridge discharging toward the rear of the toy for creating a forward thrust. The two cartridges are easily mounted in clips or other carriages respectively provided on the floor and in the bowl.

If desired, the floor member can be equipped with a radial flange projecting beyond the bowl and the bowl can then be stationary in flight while the floor rotates. In this form, a simulated pilot station and the like can be suspended from the non-rotating bowl.

The toy of this invention can be made of metal, plastic, pressed cardboard, or the like lightweight rigid sheet material.

To permit access to the interior of the toy, the relatively rotating floor and bowl members are preferably easily separated. A wing nut and bolt assembly affords a convenient demountable connection member holding the bowl and floor in detachable relatively rotating relation.

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It is, then, an object of this invention to provide a toy flying saucer.

Another object of the invention is to provide a toy rotary ring aircraft composed of a hollow domed top disk and a second relatively rotatable disk spanning the hollow dome and connected therewith wherein the two disks cooperate to provide an airfoil section having good aerodynamic lift to provide prolonged stabilized flight when the circular domed member is rotated under forward thrust.

Another object of the invention is to provide a toy flying saucer composed of a circular inverted bowl and a disk spanning the open bottom of the bowl in relatively rotatable relation with the bowl.

A specific object of this invention is to provide a toy flying saucer composed of an inverted circular bowl, a frusto-conical floor spanning the open bottom of the bowl, and a spindle rotatably carrying the floor and detachably anchored in the top of the bowl.

Another specific object of the invention is to provide a toy flying saucer composed of a circular inverted bowl with a flat radial rim flange, a substantially flat domed top, and an aerodynamically shaped lift surface between the flange and top together with an inverted frusto-conical floor disk having a periphery flush with the rim flange and a central hub at a level beneath the rim flange receiving a spindle assembly carried by the top of the bowl to connect the bowl and floor in relatively rotatable relation.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheets of drawings which, by way of preferred examples, illustrate three embodiments of the invention.

On the drawings:

Figure 1 is a top plan view of one form of flying saucer according to this invention.

Figure 2 is a diametric vertical cross-sectional view taken along the line II—II of Figure 1.

Figure 3 is a fragmentary view similar to Figure 2 illustrating another position of the bomb-release mechanism.

Figure 4 is a top plan view of another form of flying saucer according to this invention.

Figure 5 is a diametric vertical cross-sectional view taken along the line V—V of Figure 4.

Figure 6 is a horizontal cross-sectional view, with parts in top plan, taken along the line VI—VI of Figure 5.

Figure 7 is a view similar to Figures 2 and 5 but

showing another embodiment wherein the bowl member is stationary and the floor rotates.

As shown on the drawings:

In Figures 1 to 3, the reference numeral 10 designates a toy flying saucer of a type to be manually propelled. The device 10 is composed of an inverted circular bowl 11, an inverted frusto-conical floor disk 12, a spindle assembly 13, a bomb and release assembly 14, and a counterbalancing pilot station 15.

The inverted bowl 11 has a circular flat radially extending rim flange or lip 11*a*, a substantially flat top dome 11*b*, and an annular bowed side wall portion 11*c* between the lip and dome. To obtain increased stability in flight the rim flange 11*a* alternately may be flared upward at an angle which will make the flange a section of a cone as in the embodiment of Fig. 7. The angle may be selected to make the rim flange appear to be an extension of the conical floor 12 or even steeper depending upon the degree of flight stability desired. The annular portion 11*c* has a good aerodynamic shape. Ports 16 are preferably provided in the section 11*c* and these ports are covered with a transparent sheet material 17 to provide windows for the device. Alternately, the bowl 11 may be composed of transparent plastic material which is made translucent or opaque in the rim and dome areas thereof so as to provide a transparent annular portion 11*c* producing a continuous window.

The floor 12 has a circular flat cone portion 12*a* with a periphery substantially flush with the rim flange 11*a*. The flat cone 12*a* spans the open bottom of the bowl and has a thickened central boss portion 12*b* affording a bearing. The central portion of the floor 12*a* extends beneath the level of the rim flange 11*a* to coact with the bowl for producing a good aerodynamic air foil section.

The spindle assembly 13 is composed of a headed bolt 18 having a rounded head 18*a* and a threaded shank 18*b*, a first nut 19 threaded on the shank 18*b* into closely spaced relation with the head 18*a*, a second nut 20 threaded on the shank 18*b* in spaced relation from the first nut, and a wing nut 21 threaded on the end of the shank. The shank 18*b* projects freely through the boss 12*b* of the floor 12. The head 18*a* underlies the boss portion 12*b* of the floor and the nut 19 overlies this boss portion and is spaced relative to the head so that the floor rotates freely on the bolt.

The central portion of the dome 11*b* preferably has a thickened boss 11*d* receiving the shank 18*b* therethrough. The nut 20 is positioned on the shank 18*b* so that when it is bottomed against the boss 11*d*, the bolt 18 will hold the floor 12 so that its periphery is flush with the rim flange 11*a*.

The wing nut 21 is threaded on the shank 18*b* on top of the dome 11*b* so that the bolt 18 will be tightly clamped to the bowl.

In operation of the flying saucer 10, the bowl rotates to carry the bolt 18 therewith, while the floor 12, being freely rotatable relative to the bolt, will remain in non-rotatable relation. For this purpose, the floor 12 is equipped with a tail-piece 22 which extends under the lip or flange 11*a* in closely spaced relation and has an upturned vertical rudder 22*a* on the outer end thereof. This rudder lies in the slipstream of the bowl and holds the floor against rotation.

The bomb and release assembly 14 includes a pair of upstanding apertured lugs 23 on top of the floor 12 between the boss portion 12*b* and the outer periphery of the floor. A pin 24 is slidably inserted through the apertures in the lugs 23 and spans the space between the lugs. This space between the lugs registers with an aperture 12*c* in the floor 12. A weight 25 simulating a bomb has an apertured ear 25*a* on the upper end thereof freely receiving the pin 24 therethrough. The bomb projects between the lugs 23 and through the aperture 12*c*.

The pin 24 has an eye end 24*a* to which is tied a thread or string 26. The other end of the string or thread is tied to the shank 18*b* of the bolt 18.

As illustrated in Figure 3, when the bowl 11 rotates, the thread or string 26 is wound up on the shank 18*b* and eventually is made taut to pull the pin 24 out of the lugs 23 and ear 25*a*, whereupon the bomb 25 will be released to drop through the aperture 12*c*.

In order to properly balance the floor 12, a pilot station 15 is provided on the floor in diametric opposed relation relative to the tail assembly 22. The bomb assembly 14 may then be located to provide the best balance of the entire floor assembly around the central boss 12*b*. This pilot station 15, as shown in Figure 2, may be composed of a pilot seat 26', a figure 27 simulating a pilot, and means 28 simulating a mechanism for guiding the flying saucer.

The wing nut 21 is readily removed from the bolt 18 to separate the floor from the bowl, thereby giving access to the bomb release mechanism for reassembling the same.

The device 10 operates by being manually thrown into the air with a flinging motion causing the bowl 11 to spin. The air foil defined by the bowl and floor affords a good lift surface without appreciable drag, since the area 11*c* of the bowl has a good aerodynamic shape while the inverted cone shape of the floor portion 12*a* coacts therewith to afford good air flow properties. In addition, the frusto-conical shape imparts rigidity to the floor, so that it can be made of relatively light gauge material. As the bowl rotates in flight, the thread 26 is wrapped up on the spindle assembly to release the bomb, and, after the bomb has been released, the light pin 24 can rotate with the spindle. The floor is held against rotation by the slip stream action on the tail rudder 22*a* and the floor is balanced by the diametrically opposed arrangement of the bomb release and pilot station. If desired, the bomb release could be replaced with a parachute-equipped figure.

In the embodiment shown in Figures 4 to 6, the flying saucer 30 is composed of an inverted bowl 31, a floor disk 32, and a spindle assembly 33 substantially similar to the bowl, floor, and spindle assembly of the flying saucer 10 shown in Figures 1 to 3. Thus the bowl 31 has a flat radial lip or rim flange 31*a*, a substantially flat domed top 31*b*, and an annular bowed portion 31*c* affording a lift surface. The floor 32 is in the form of a flat inverted cone and has its outer periphery substantially flush with the flange 31*a*. The spindle assembly cooperates with the floor and bowl in the same manner described in Figures 1 to 3.

The bowl 31 has a pair of diametrically opposed clips 34 and 35 on the inner face of the lip portion 31*c* thereof. The clip 34 is adjacent a thickened boss portion 36 on the inner face of this lip portion 31*c*. This boss portion 36 has a passageway 36*a* therethrough which opens

tangentially on the outer face of the lip portion 31c as best shown in Figure 6. The boss portion 36 carries a seal ring 37 at its inner end. A compressed gas cartridge 38 of the type commonly used for charged water bottles is conveniently snapped into the clip 34 with its nose end sealed against the seal 37 to discharge through the passageway 36. Gas released from the cartridge will be discharged tangentially from the lip surface 31c thereby causing the bowl to rotate.

The opposed clip 35 is equipped with a weight 39 to counterbalance the weight of the cartridge 38.

A clip 40 is also provided on the floor 32 to carry a second compressed gas cartridge 41 which discharges through a tube 42 extending through the floor and facing in a radial direction so that compressed gas discharged therethrough will have a forward propelling effect on the assembly. The floor 32 is preferably equipped with a thickened portion or counterweight 43 in diametric opposite relation to the cartridge 41 to counterbalance the weight of the cartridge.

The flying saucer 30 of Figures 4 to 6 operates by puncturing the nozzles of the cartridges 38 and 41, whereupon compressed gas discharged tangentially through the passage 36 will cause the inverted bowl 31 to rotate, while gas discharged radially through the tube 42 will create a forward thrust. Since the floor and bowl coact to provide a good air foil section having a lift effect on the unit, the device will soar in the air under stable flight conditions until the gases from the cartridges are exhausted.

In the embodiment of Figure 7, the toy 40 has a non-rotating inverted bowl 41, a rotating floor 42, a spindle assembly 43 similar to 13 and 33 connecting the bowl and floor, a rudder 44 on the outside of the bowl 41, and a pilot and station 45 on the inside of the bowl. The bowl 41 does not have a rim flange, but is equipped with a tail rudder 44 and is otherwise the same as the bowl 11 or 31. The floor 42 is a flat cone like the floor 12 or 32, but underlies the bottom edge 41a of the bowl and projects therebeyond to form a rim flange 42a. The toy 40 operates in the same manner as the toy 10, but the floor rotates while the rudder holds the bowl against rotation.

From the above description it will be understood that the invention provides a toy flying saucer or rotating wing aircraft having gyroscopically stabilized flight capacity induced by relatively rotating bowl and floor members.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A toy flying saucer which comprises an inverted bowl having a circular radial rim flange, a substantially flat dome, and a lift surface of aerodynamic shape between the flange and dome, a floor disk flush with the rim flange around the inner periphery of the flange and spanning the open bottom of the bowl, and means connecting the center of the floor disk and the dome of the bowl in relatively rotatable relation.

2. A toy rotary wing aircraft which comprises an inverted bowl, a floor disk spanning the open bottom of the bowl, means connecting the floor disk and bowl in relatively rotatable relation, and said bowl coacting with said floor to provide an air foil section adapted to lift the assembly when propelled while the bowl rotates relative to the floor to stabilize flight of the assembly.

3. A toy flying saucer which comprises an inverted bowl having a circular rim flange extending radially therefrom and a hollow dome portion with a side face affording an aerodynamic lift surface, a disk spanning the bottom of the hollow dome, and means detachably connecting the disk and dome in relatively rotatable relation.

4. A toy flying saucer which comprises an inverted saucer-shaped circular sheet member having an aerodynamic shape affording a lift surface, a circular disk on the bottom of said member, and means connecting the disk and member in relatively rotatable relation, whereupon the member may rotate relative to the disk to provide therewith a gyroscopically stabilized air foil section of aerodynamic shape.

5. A toy flying saucer which comprises an inverted bowl having a circular periphery, an inverted flat conical disk spanning the open bottom of the bowl in substantially flush relation with the periphery of the bowl, said disk extending downwardly to a level at the center thereof below the periphery of the bowl for coacting with the bowl to form a bottom air foil surface with low drag characteristics, and means connecting the floor disk and bowl in relatively rotatable relation.

6. A toy flying saucer which comprises an inverted circular bowl having a radial lip, an annular bowed portion affording a good lift surface, and a substantially flat dome, said annular lift surface having transparent portions simulating windows, a spindle assembly fixedly carried by the dome, a circular disk rotatably mounted on the spindle assembly and spanning the open bottom of the bowl, and a tail member on said disk having a rudder for holding the disk against rotation.

7. A toy flying saucer comprising an inverted saucer, a disk spanning the open bottom of the saucer, a spindle assembly connecting the saucer and disk in relatively rotatable relation, said spindle assembly adapted to rotate with the bowl, a bomb release mechanism actuated by the rotating spindle assembly, and a rudder member on said floor holding the floor against rotation.

8. A toy flying saucer which comprises an inverted saucer member having a hollow interior, a circular disk spanning the hollow interior of the saucer, bomb support mechanism on said disk, a pilot station on said disk, a spindle assembly rotatably connecting the saucer and disk, mechanism operated by said spindle assembly for releasing the bomb support mechanism, and a rudder on said disk projecting into the slipstream beyond said saucer to hold the disk against rotation.

9. A toy flying saucer which comprises an inverted bowl member, a circular disk spanning the open bottom of the bowl member, a spindle assembly rotatably mounting the disk and bowl, first compressed gas means carried by the bowl for rotating the bowl, second compressed gas means carried by the disk for imparting a forward thrust to the assembly, and detachable means on the spindle assembly for separating the bowl and disk to give access to said compressed gas means.

10. A toy flying saucer comprising a bowl, a disk spanning the bowl mouth and projecting therebeyond said bowl and disk cooperating to

provide an aerodynamic airfoil, means rotatably mounting the center of the disk on the bowl, and a rudder on the bowl for holding the bowl against rotation when the disk rotates and the toy soars in the air.

11. A toy flying saucer comprising an inverted bowl-shaped member, a floor member spanning the open bottom of the bowl-shaped member, means connecting said members in rotatable relation, and said members coacting to provide an aerodynamic airfoil adapted to soar through the air whereby one member may rotate relative to the other member to gyroscopically stabilize the airfoil as it soars through the air.

12. A toy flying saucer comprising an inverted bowl-shaped member, a floor member spanning the open bottom of the bowl-shaped member, means connecting said members in rotatable relation, said members coacting to provide an aerodynamic airfoil adapted to soar through the air, and a rudder on one member restraining said one member against rotation as the assembly soars through the air while the other member rotates to gyroscopically stabilize the flight.

13. A toy flying saucer comprising an inverted saucer-shaped member, a floor member spanning the open bottom of the saucer-shaped member, means connecting said members in rotatable relation, said connected members coacting to provide an aerodynamic airfoil with a circular radially extending rim flange and a hollow dome portion with a side face affording an aerodynamic lift surface, and said rotatably connected members adapted to soar through the air with one

of the members rotating about the axis of the other member to gyroscopically stabilize flight.

14. A toy flying saucer comprising an inverted bowl member, a disk spanning the open bottom of the bowl member, means connecting said members in rotatable relation, said members coacting to provide an aerodynamic airfoil adapted to soar through the air, and motor means for rotating one member about the axis of the other member to gyroscopically stabilize flight of the assembly.

15. A toy flying saucer which comprises an inverted bowl member, a floor member spanning the open bottom of the bowl member, means connecting said members in rotatable relation, said members coacting to provide an aerodynamic airfoil adapted to soar through the air with one member rotating relative to the other member for gyroscopically stabilizing the flight, and a motor means for imparting a forward thrust to the assembly.

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