

July 3, 1934.

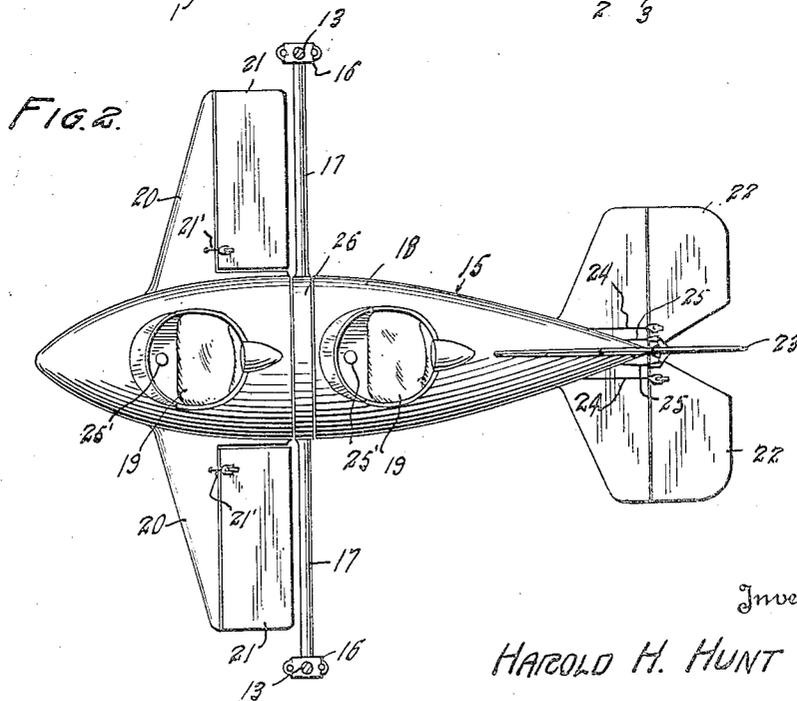
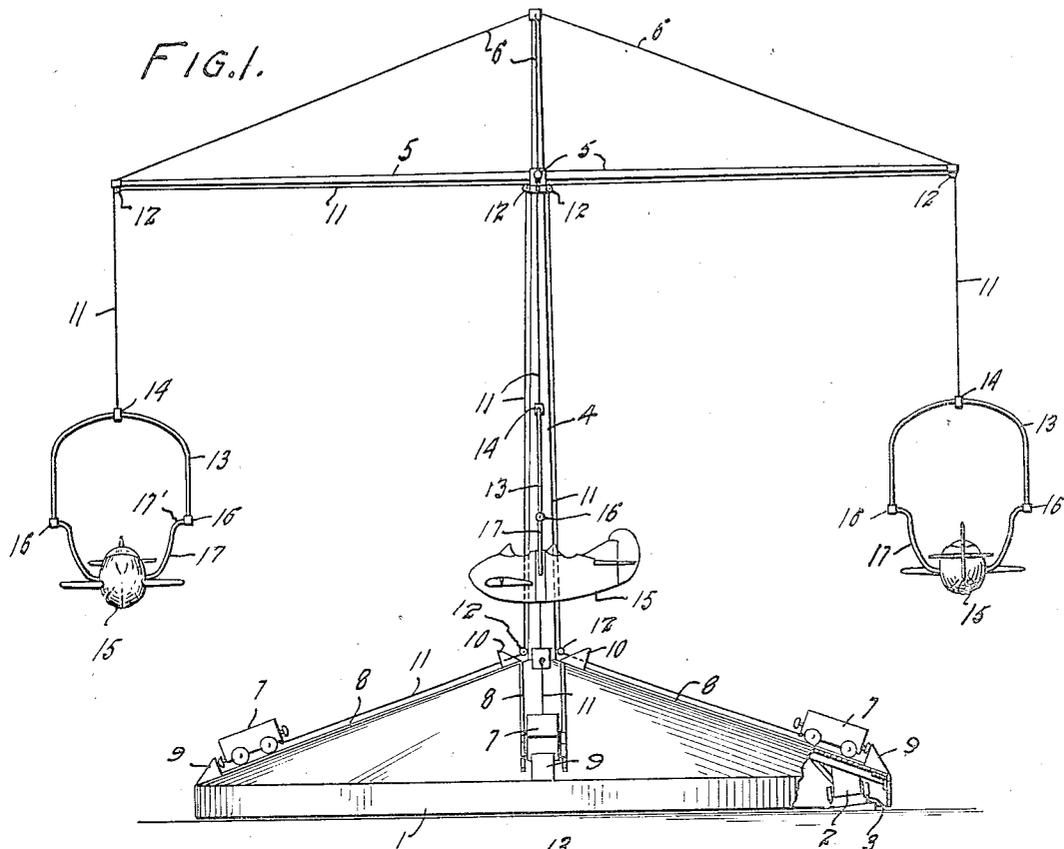
H. H. HUNT

1,965,039

AMUSEMENT DEVICE

Filed Aug. 10, 1931

2 Sheets-Sheet 1



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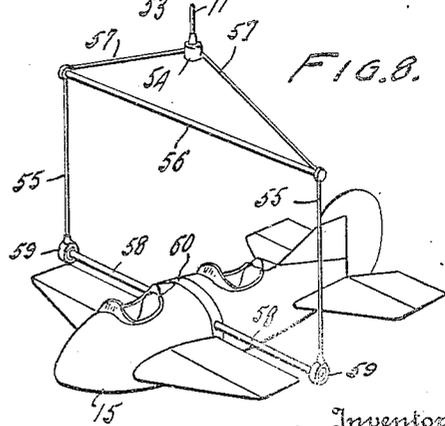
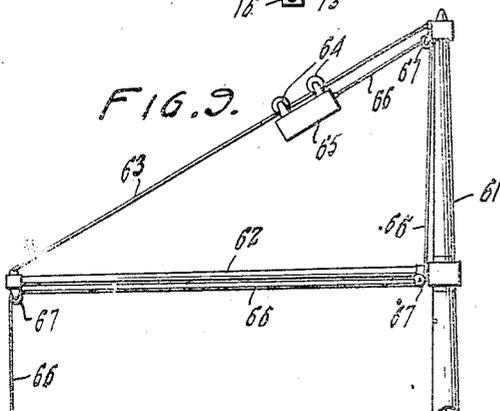
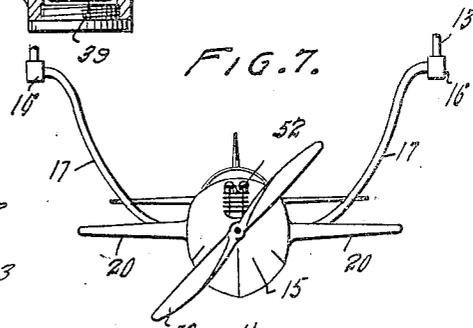
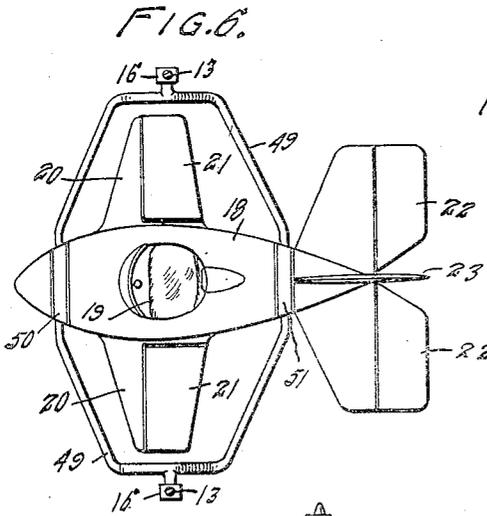
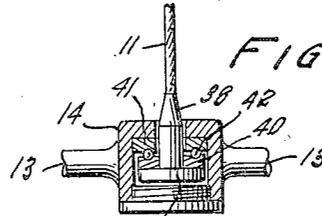
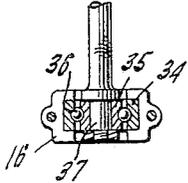
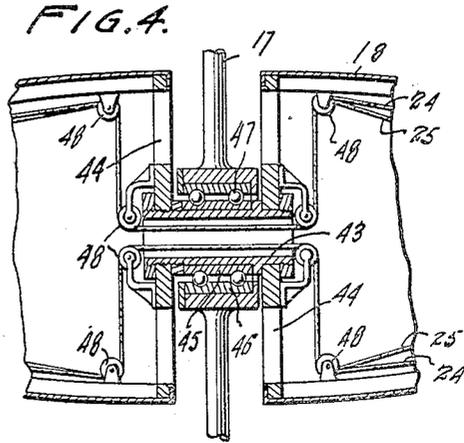
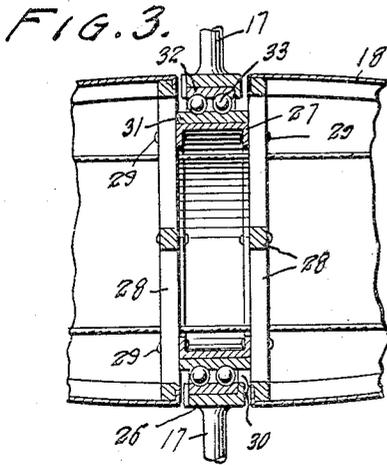
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AMUSEMENT DEVICE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,965,039

AMUSEMENT DEVICE

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19 Claims. (Cl. 272—41)

This invention relates in general to amusement devices, and more particularly to a device for allowing an airplane-like structure, suspended by a cable, to move freely about its three axes.

Amusement devices capable of revolving and carrying suspended carriages have, in general, been limited to revolving motion only, and no device has been advanced which will permit movement of an airplane-like structure about its three axes without interference. Furthermore, no provision has been made for controls within such a structure whereby it may be moved in any direction, and if desired, completely looped.

The major object of my invention is to provide an aero glider capable of free movement about its three axes.

An equally important object of my invention is to provide an aero glider having self contained controls for maneuvering the same.

Another object of my invention is to provide an aero glider capable of being actually looped.

Still another object of my invention is to provide an amusement device in which the weight of the aero glider is counterbalanced in any position.

A still further object of my invention is to provide an amusement device capable of rotation and carrying freely suspended aero gliders adapted to be controlled by a passenger.

Yet another object of my invention is to provide an aero glider having a self contained propelling source of power.

Yet a still further object of my invention is to provide friction reducing means at the points where the aero glider moves about its three axes.

Another object of my invention is to provide an amusement device having a rotatable base with a separate weight movable thereon for counterbalancing the variable pull of each aero glider.

A further object of my invention is to provide a novel type of support for the aero glider to permit free movement about its three axes.

With these and other objects in view, which may be incident to my improvements, the invention consists in the parts and combination to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangement without departing from the spirit and scope of the appended claims.

The invention broadly includes a rotatable conically shaped base carrying a mast having a plurality of arms extending therefrom. Extensi-

bly suspended from each arm is an aero glider having self contained controls for maneuvering it about its three axes. There is also provided friction reducing means at the points where the suspended aero glider moves about its three axes.

A weighted car, or the like, is adapted to move upon tracks mounted on the sloping part of the conically shaped base. Such a car is provided for each aero glider, and the two are connected through cables in such a manner that the variable pull produced by the different movements of the aero glider is counterbalanced.

In order to make my invention more clearly understood, I have shown in the accompanying drawings, means for carrying the same into practical effect without limiting the improvements in their useful applications to the particular constructions which, for the purpose of explanation, have been made the subject of illustration.

Figure 1 is an elevational view of my assembled amusement device.

Figure 2 is a plan view of the suspended airplane-like structure showing a circumferential member for permitting lateral movement thereof.

Figure 3 is a sectional view of a circumferential bearing for allowing movement about the lateral axis.

Figure 4 is a sectional view showing a modified form of means for allowing movement about the lateral axis.

Figure 5 is a detailed view showing the connection between the aero glider frame and the suspending cable for allowing movement about the vertical axis.

Figure 6 is a modified form of aero glider showing a two point support for permitting lateral movement.

Figure 7 is an elevational view of an aero glider provided with a self contained motor and propeller.

Figure 8 is a perspective view of a modified form of support for an aero glider.

Figure 9 is a side view of the upper part of a mast and arms extending therefrom, showing the application of a counterbalancing weight to an existing support structure.

Referring generally to the drawings and more particularly to Figure 1, there is shown a conically shaped base 1, supported by a plurality of trucks 2 adapted to travel on circular tracks 3. The base may be rotated by any suitable means, not shown. Mounted at the apex of the conically shaped base 1 is a mast 4 having a plurality of arms 5 extending therefrom at a point near the top of the mast. A like number of cables or other

reinforcing means 6 are provided between the top of the mast 4 and the ends of each of the arms 5 to lend support to the extending arms, and also assist in maintaining the mast in a vertical position.

As will be noted in Figure 1, a weighted car 7 is adapted to travel upon tracks 8 mounted on the sloping sides of the conically shaped base. In the preferred embodiment there is provided the same number of weighted cars 7 as there are masts 5. A stop 9 is secured to the lower part of the base for each car 7, and a similar stop 10 is secured to the upper part of the base. The reason for the stops 9 and 10 will hereinafter appear.

A suspension cable 11, passing over a plurality of pulleys 12, is pivotally connected to a yoke 13 through a casing 14 for extensibly suspending an aero glider 15. The cable follows each arm 6 and passes over the pulley 12 near the top of the mast 4, down the mast, over the pulley 12 at the bottom of the mast, and is connected to the weighted car 7.

Each aero glider 15 is pivotally connected to the yoke 13 through a casing 16 by means of supporting arms 17. The supporting arms 17 are bent, as at 17', to engage the casing 16 to provide a swinging support. The casings 14 and 16 enclose friction reducing means for the pivotable connections, as will later be described.

An aero glider constructed in accordance with my invention comprises a fuselage 18, having a plurality of cockpits 19 therein. A wing surface 20 extends laterally from each side of the fuselage, and is provided with an aileron 21, suitably controlled by movement of cables 21'. The rear controls of the aero glider include an elevator 22 on each side of the fuselage and a rudder 23 positioned therebetween. The elevators 22 and rudder 23 are connected to cables 24 and 25, respectively, which extend longitudinally of the fuselage 18. The cables connecting the control surfaces are actuated by means of a control device 25' positioned in each cockpit 19 within easy reach of a passenger.

As will be clearly seen from the various views in the drawings, the wing surfaces and control surfaces are narrower than the width of the yoke 13, thereby permitting movement of the aero glider 15 and its supporting arms 17 therein unobstructed.

The supporting arms 17 are connected to the aero glider to the rear of the wing surfaces by means of a circumferential bearing 26. As shown in Figure 3, the fuselage 18 is split to receive suitable bearing means between the two sections. A circular plate 27 is provided between the two sections of the fuselage, and is secured to struts 28 by means of suitable connecting devices 29. The plate 27 is smaller in diameter than the fuselage, and is positioned below the surface thereof. There is provided by this arrangement a groove 30 for receiving a ball race 31, suitably secured to the plate 27, and a ball race 32 suitably connected to each supporting arm 17. A plurality of ball bearings 33 are positioned between the ball races, thereby reducing friction between the moving parts.

While I have shown the preferred embodiment of supporting the aero glider so that easy lateral movement may be accomplished, it is to be clearly understood that I am not limited to the exact structure shown and described, as many variations may be made without departing from the spirit of the invention. A structure like that

shown in Figure 4 may be employed, or if desired any other type of structure may be used.

The casing 16, through which a pivotable connection is provided between the yoke 13 and supporting arm 17, includes ball races 34 and 35, secured within the casing at each end. Positioned between the ball races of each pair is a ball bearing 36 to reduce friction between the moving parts. The supporting arm 17, as before mentioned, is bent at 17', and the bent portion extends through the casing and functions as an axle 37 between the pairs of ball races.

Figure 5 shows in detail the means for providing the pivotal connection between the cable 11 and the yoke 13 within the casing 14. As illustrated, the cable 11 is provided with a member 38 having a circular flange 39 at the bottom thereof. The member 38 extends through the casing 14, and the circular flange 39 supports a ball race 40. A similar ball race 41 is positioned above the ball race 40 within the casing 14, and ball bearings 42 are placed between the two ball races. The above described arrangement will permit rotation of the aero glider about its vertical axis.

In the operation of my device, the base 1 is rotated by any suitable means, and due to the connection between the base and the plurality of aero gliders 15, the entire device moves as a unit. An air blast, produced from any suitable source, is started and the aero gliders will travel into the air blast. By actuating the ailerons 21, the aero glider may be made to roll on its lateral axis about the circumferential bearing 26. It will be appreciated that a roll can be produced in either direction.

When it is desired to turn the aero glider to the right or left, the rudder 23 is moved in the desired direction, and due to the pivotal connection provided within the casing 14, the aero glider may be made to travel upon the desired course. A dive or a complete loop may also be accomplished by the described arrangement. If a slight dive is desired, the elevators 22 may be slightly depressed, and the aero glider 15 will be made to dive, the supporting arms 17 pivoting within the casing 16 during this movement. If it is desired to loop the plane, the elevators 22 are raised to their maximum position and the aero glider 15 and supporting arms 17 will make a complete revolution about the pivotal connection provided within the casing 16. The control surfaces may be actuated separately, or if desired they may be used in combination to produce well known movements of the airplane-like structure.

The weighted car 7, as before described, is adapted to counterbalance any pull exerted by the aero glider 15. When the aero glider 15 is being maneuvered, the pull in some positions will be greater, which will cause the weight 7 to travel upon the tracks 8 to a position where the pull of the aero glider is counterbalanced thereby. By this arrangement it is possible to always maintain the aero glider 15 well above the ground, and as shown the weight 7 cannot extend beyond the stop 10 located at the apex of the conically shaped base. With this arrangement, the cable 11, passing over the pulley 12, is always maintained taut. The weighted car 7 exerts a pull opposite to that produced by the aero glider due to its gravity effect on the sloping sides of the conical base and this opposite force is augmented by the centrifugal force produced by rotation of the base.

Figure 4 illustrates a modified form of circumferential bearing. As shown, the fuselage 18 is split, and a tube 43 is positioned between the two sections of the fuselage. The tube 43 threadedly engages struts 44, extending vertical of the fuselage. A ball race 45 is suitably secured to the tube 43, and a similar ball race 46 is secured to the supporting arms 17. Ball bearings 47 are positioned between the ball races and provide friction reducing means for permitting movement of the aero glider about its lateral axis. In order to pass the cables 24 and 25 for actuating the control surfaces through the fuselage, a plurality of pulleys 48 are provided. As shown, the pulleys 48 allow the cables to pass through the tube 43, thereby avoiding any possibility of the cables becoming inoperative.

Figure 6 shows a single seated aero glider having a two point support for allowing movement about its lateral axis. As shown, a support 49 is pivotally connected to the fuselage to the rear and front of the cockpit by means of circumferential bearings 50 and 51 similar to the bearing 26 previously described. The same maneuverability may be accomplished with the form of support shown in this figure as is the case of the form of support shown in Figure 2.

Figure 7 shows an aero glider having a motor 52 and a propeller 53 attached to the crank shaft of the motor. By providing a self contained source of power, it is possible to increase the speed and also the maneuverability of the aero glider. The propeller may be used advantageously in executing a loop, in that it will exert an additional force to pull the aero glider over near the peak of the loop.

Figure 8 shows a modified form of frame for supporting a two seated aero glider. The cable 11 is attached to the frame by means of a pivotal connection 54, similar to that shown in Figure 5. The supporting frame is rectangular in shape and comprises uprights 55 and horizontal rods 56 and 58 connecting each end of the uprights. Rods 57 extend from the pivotal connection 53 to the upper portion of the rectangular frame and are fixedly secured thereto. The uprights 55 are pivotally connected at their bottoms to the horizontal rods 58 by means of bearings 59 similar to the bearing within the casing 16. A circumferential bearing 60 is positioned to the rear of the wings of the aero glider, and is similar in construction to the circumferential bearing shown in Figure 3. It is to be understood, of course, that the modified form of bearing shown in Figure 4 may also be used.

Figure 9 illustrates how my invention may be applied to an existing support structure. As shown, a mast 61 has extending therefrom arms 62. A rod or any suitable rigid member 63 extends from the top of the mast 61 to the ends of the arm 62. The rod 63 is adapted to act as a track for wheels 64 of a weighted car 65 for travel thereon. A cable 66 is connected to the weighted car 65 and passes over a pulley 67 at the top of the mast, down the upper portion of the mast, over another pulley 67, and follows the arms 59 for extensively suspending an aero glider, not shown.

It will be apparent that the weighted car 52 will exert a force equal and opposite to the variable pull exerted by the aero glider in its various positions as above described in connection with the embodiment shown in Figure 1. By this arrangement it is possible to utilize an existing mast in applying my invention.

From the foregoing it will be apparent that I have provided an aero glider capable of rotation about its three axes. At the points where the aero glider rotates, there is also provided friction reducing means that will permit the aero glider to move freely. By the specific construction of the frame and support for the aero glider, it is also possible to execute a complete loop free from any interference. There is also provided a device in which the aero glider is extensively suspended by a cable and the pull exerted by the aero glider in various positions is counterbalanced.

While this invention has been described as an amusement device, it is to be understood that it is not so limited. Such a device may be very successfully used in the training of airplane pilots in that a simulated airplane is provided having the conventional controls for producing the various movements.

My invention has been described with reference to a single aero glider, but it is obvious that a plurality of aero gliders having the same construction may be used. The number of aero gliders is limited only by the number of arms extending from the mast.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art without departing from the spirit of the invention, or exceeding the scope of the appended claims.

I claim:

1. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, an aero glider for each arm, and means mounted on the base, associated with each aero glider for varying the amount of suspension thereof.
2. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, an aero glider extensively suspended from each arm, and means mounted on the base for radial movement with respect thereto, for counterbalancing the weight of each aero glider.
3. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensively suspended from each arm, an aero glider pivotally connected to each yoke for rotary movement on its lateral axis, and means associated with the base for counterbalancing the weight of each aero glider.
4. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensively suspended from each arm, means to pivot an aero glider for rotation about its three axes, and means associated with the base to counterbalance the variable pull of each aero glider.
5. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensively suspended from each arm, means to pivot a plurality of aero gliders for rotation about the three axes of each, means for supporting each aero glider, and means associated with the base to counterbalance the variable pull of each aero glider.
6. A device of the character described, comprising a conically shaped rotatable base, a mast carried by said base, a plurality of arms extend-

- ing from said mast, a plurality of yokes adjustably suspended from the arms, a plurality of aero gliders pivoted for rotation about the three axes of each, a weight adapted to be moved on said base and counterbalance the variable pull of each aero glider, and means connecting said yoke and weight.
7. A device of the character described, comprising a conically shaped rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a plurality of yokes adjustably suspended from the arms, a plurality of aero gliders mounted for rotation about the three axes of each, a weight adapted to be moved on said base and counterbalance the variable pull of each aero glider, and a cable passing over pulleys for connecting said yoke and weight.
8. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensibly suspended from each arm, an aero glider pivoted to each yoke for movement on its lateral axis, and means associated with the base to counterbalance the variable pull of each glider.
9. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensibly suspended from each arm, an aero glider having a bearing member for permitting movement of the aero glider about its lateral axis, said bearing member being connected between the arms of the yoke, and means associated with the base to counterbalance the variable pull of each glider.
10. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensibly suspended from each arm, said yoke being provided with means for allowing swinging movement, means to mount an aero glider for rotation about its three axes to said yoke, and means associated with the base to counterbalance the variable pull of the glider.
11. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, a yoke extensibly suspended from each arm, an aero glider having conventional operable airplane controls, pivotally connected to said yoke, to permit looping thereof in a plane at right angles to the yoke by conventional operation of the controls, and means associated with the base to counterbalance the pull of each glider.
12. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, an aero glider having a self contained source of power, and a propeller attached thereto, said aero glider being extensibly suspended from each arm, and means mounted on the base for counterbalancing the weight of each aero glider.
13. A device of the character described, comprising a rotatable base, a mast carried by said base, a plurality of arms extending from said mast, an aero glider extensibly connected to each arm, said aero glider having means associated therewith to permit movement about its three axes, and means associated with the base to counterbalance the pull of each glider.
14. A device of the character described, comprising a support, a plurality of aero gliders extensibly suspended from said support, each aero glider having means associated therewith to permit movement about its three axes, and means associated with said support to counterbalance the weight of each glider.
15. A device of the character described, comprising a support, a plurality of aero gliders extensibly suspended from said support and each glider having controls to produce movement about its three axes, means associated with each glider to permit movement about its three axes, and means associated with said support to counterbalance the weight of each glider.
16. A device of the character described, comprising a support, a plurality of yokes extensibly suspended from said support, an aero glider pivotally mounted in each yoke for rotary movement on its lateral axis, and means associated with the support to counterbalance the weight of each glider.
17. An amusement device comprising a plurality of aero gliders suspended for movement about a central mast, each glider being mounted for movement about its three axes and a weight counterbalancing the variable pull of each of the aero gliders in any position.
18. An amusement device comprising a rotatable mast, a plurality of aero gliders suspended for rotary movement about the mast, each glider being mounted for movement about its three axes, and a weight counterbalancing the variable pull of each of the gliders in any position.
19. An orientation device comprising a rotatable base, a mast carried by said base, an arm extending from said mast, an aero glider suspended from said arm, and means mounted on the base and connected to the glider for varying the amount of suspension thereof.
- HAROLD H. HUNT.

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