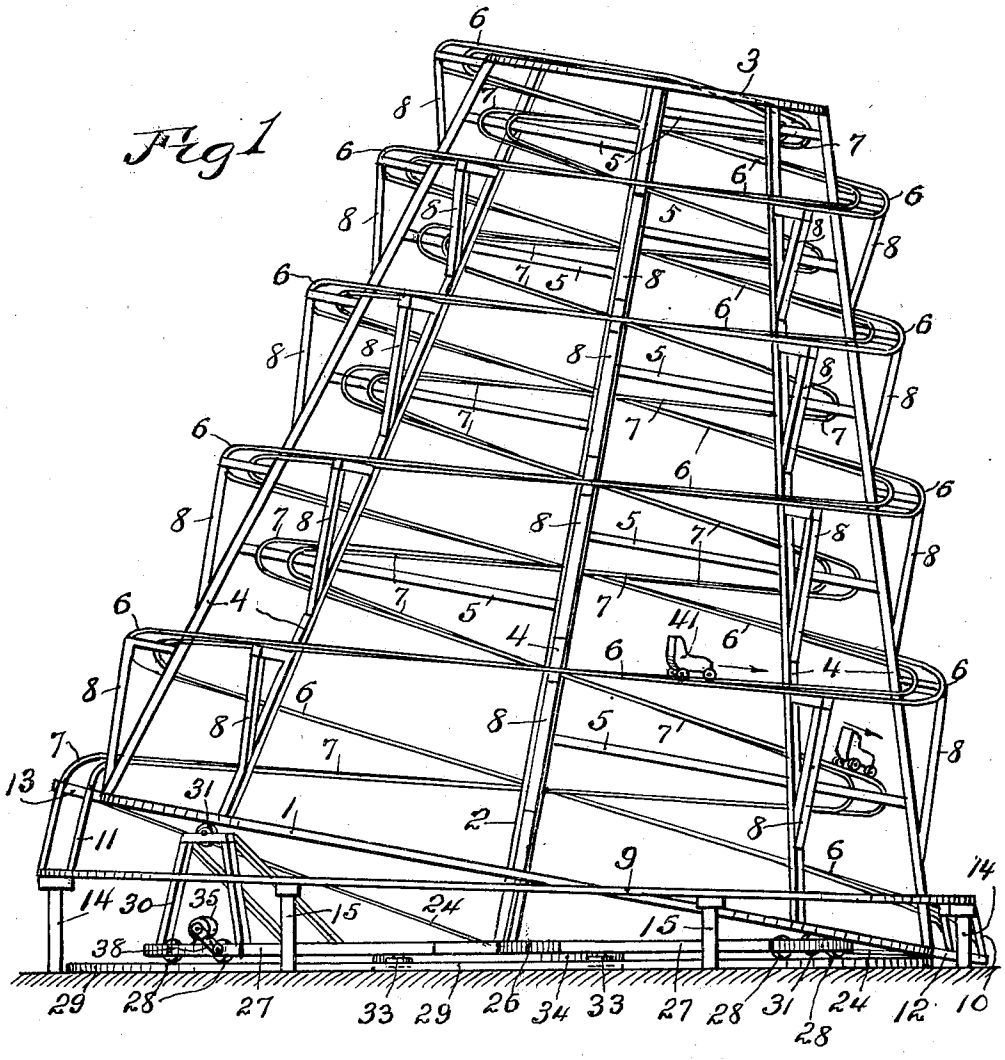
March 18, 1930. C. E. MORRIS 1,751,096

COASTING APPARATUS

Filed March 10, 1927 3 Sheets-Sheet 1

Fig 1



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BY
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Witness:
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COASTING APPARATUS

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Fig 2

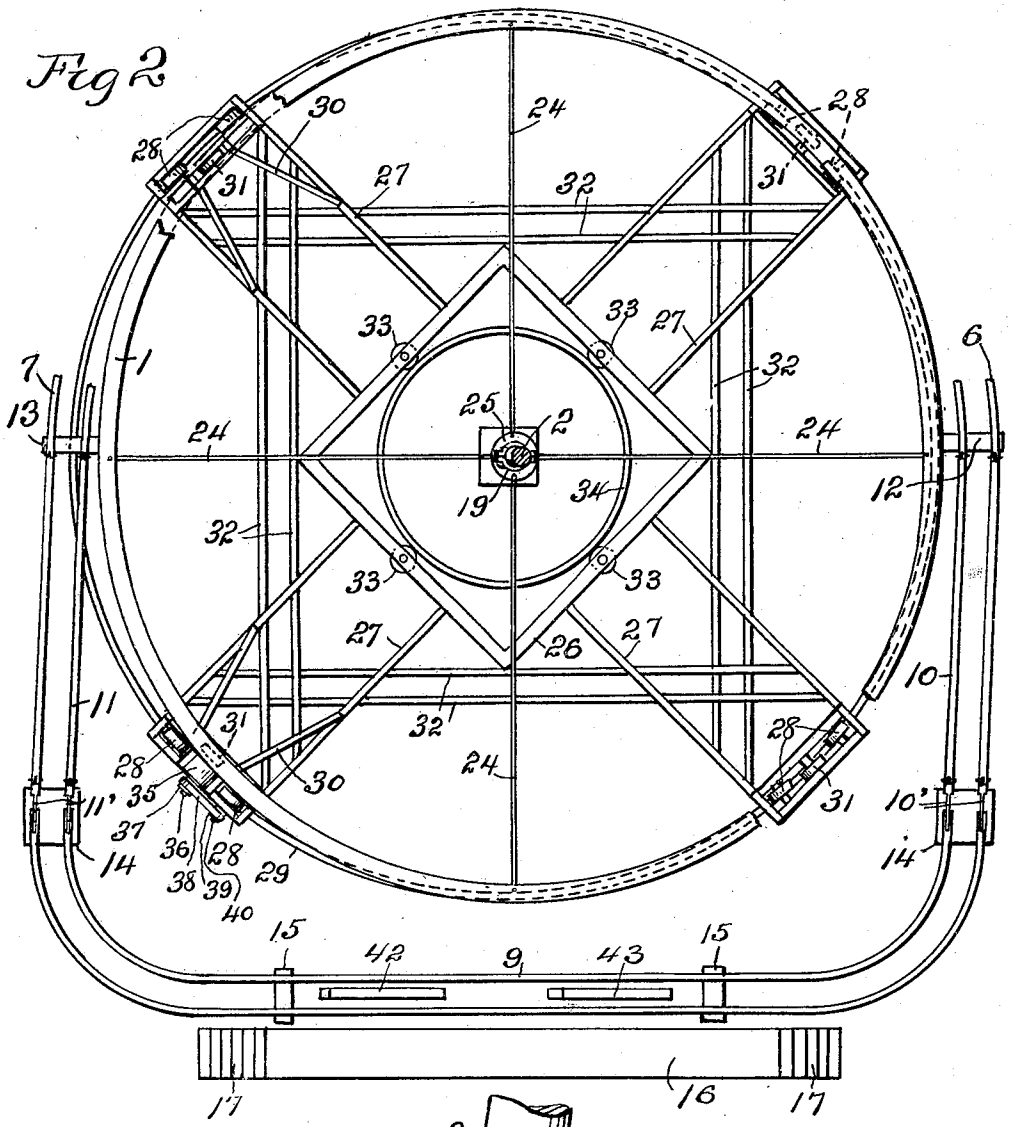

Fig 3

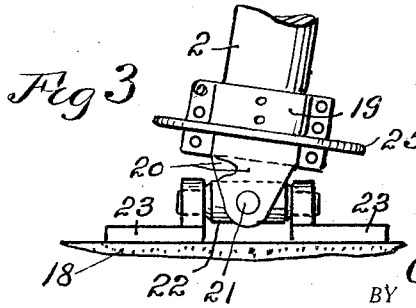

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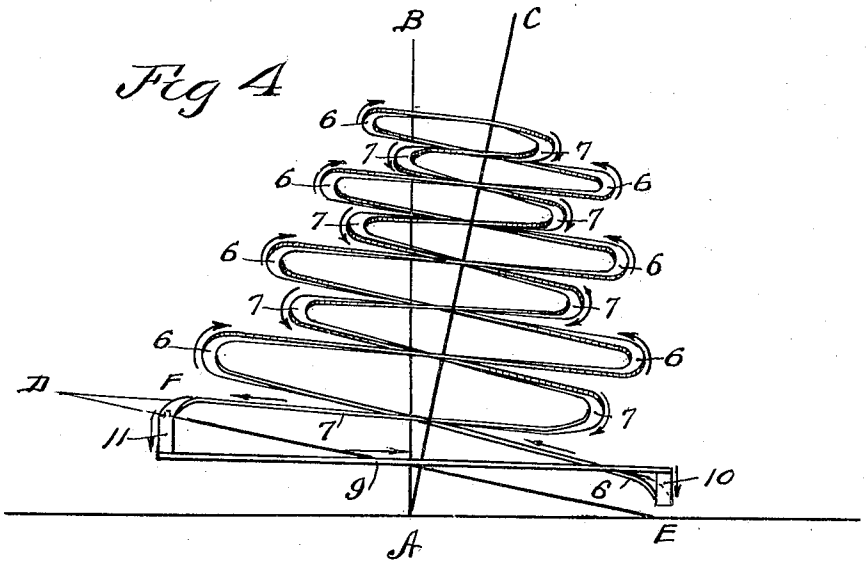
Fig 4



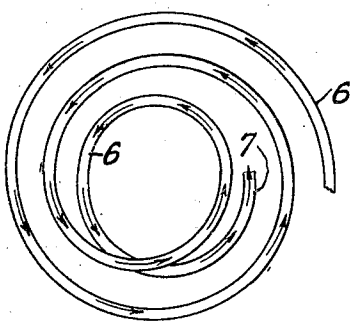


Fig 5

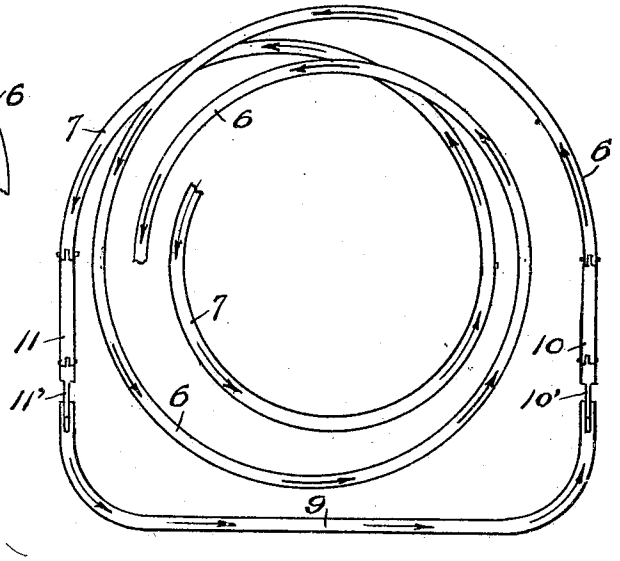


Fig 6

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Patented Mar. 18, 1930 1,751,096

UNITED STATES PATENT OFFICE

CHARLES E. MORRIS, OF LEAVENWORTH, KANSAS

COASTING APPARATUS

Application filed March 10, 1927. Serial No. 174,235.

My invention relates to improvements in coasting apparatus.

One of the objects of my invention is to provide a novel coasting apparatus of the kind described having a track adapted to be traveled over by vehicles or pedestrians, the track being so arranged and so adapted for tilting and oscillation as to propel the vehicles by their gravity from a lower elevation to a higher one, and imparting to the pedestrians on the track and to the occupants of the vehicles the novel and entertaining sensation of going up hill while constantly going down hill, and of apparently going up hill while actually going down hill.

A further object of my invention is to provide a novel support for a track, a novel arrangement of the track on said support, and novel means by which the support has imparted to it a gyratory movement which effects a traveling movement to vehicles mounted on the track.

Still another object of my invention is to provide a novel apparatus of the kind described, which is relatively simple and cheap to make, which is strong, durable, not liable to get out of order, which is safe, which occupies a relatively small area of ground space, which is economical to operate, and which will afford great entertainment to pedestrians and riders using the apparatus.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings, which illustrate the preferred embodiment of my invention,

Fig. 1 is a side elevation of my improved coasting apparatus, the landing platform and track brakes being removed.

Fig. 2 is a view partly in plan, partly broken away, the mast being shown in horizontal section, and a portion of the super-structure of the gyratory member being removed.

Fig. 3 is an enlarged side elevation of a portion of the mast and the anchoring means therefor.

Fig. 4 is a diagrammatic view in elevation of the tiltable and landing tracks.

Fig. 5 is a diagrammatic plan of the upper portion of the tiltable track.

Fig. 6 is a diagrammatic plan view of the landing track and the lower portion of the tiltable track.

Similar reference characters designate similar parts in the different views.

My improved apparatus comprises a support, preferably conoidal, arranged to oscillate, preferably in a gyratory manner, and carrying a track encircling the axis of the support and adapted to be traversed by vehicles or pedestrians, operating means being employed for oscillatably tilting the support, whereby the vehicles on the track will be propelled by gravity. In the preferred embodiment of my invention, shown in the drawings, a track which leads upwardly on the support is so arranged, as will be described, so that as the support is gyrated, a car will travel upwardly from the lower end thereof to the top thereof and thence downwardly to the bottom thereof.

In its preferable form, shown in the drawings, the support at its lower end is provided with bearing means comprising a flat ring 1 concentric with a central axial mast 2, and disposed in a plane perpendicular to said mast.

At its upper end the gyratory support is provided with a ring 3, smaller in diameter than the ring 1, and which is concentric with and in a plane perpendicular to the mast 2.

Converging, preferably equally spaced supporting beams 4 have their lower ends rigidly fastened to the lower ring 1 and their upper ends rigidly fastened to the upper ring 3.

Cross beams 5 have their outer ends respectively attached to the beams 4, their inner ends being attached to the mast 2.

The track carried by the support comprises, preferably, two spiral portions 6 and 7, having respectively opposite leads from the bottom of the support to the top thereof, said portions being spiral and encircling and substantially concentric with the mast 2. The two spiral portions 6 and 7 of the track have leads respectively corresponding to the right and left leads of reversely threaded screws.

The convolutions of the two spiral track portions 6 and 7 diminish upwardly in di-

ameters, the upper ends of the two spiral portions being connected together to form one track which gyrates with the support.

Each of the beams 4 has fastened to its outer side a series of brackets 8 disposed one above the other and on which respectively rest and are supported the convolutions of the spiral portion 6 of the track.

The spiral portion 7 of the track is disposed within the spiral portion 6, and its convolutions rest upon and are supported by the cross beams 5, a plurality of the cross beams 5 being attached to each beam 4 one above the other at spaced intervals, as shown in Fig. 1.

The ends of the spiral track portions 6 and 7 are respectively connected to the ends of a landing track having a stationary slightly inclined portion 9, the ends of which are respectively longitudinally slidably engaged by one set of ends of two tiltable track sections 10 and 11, the opposite ends of which are respectively loosely pivotally connected with the spiral track portions 6 and 7.

The lower ends of the spiral portions 6 and 7 are respectively mounted on and fastened to two diametrically opposite peripheral radial bars 12 and 13.

Two pedestals 14 respectively support the ends of the track portion 9 and the adjacent track sections 10 and 11. Pedestals 15 support the middle portion of the track portion 9.

At the outer side of and adjacent to the track portion 9 and parallel therewith is a landing platform 16, which at opposite ends may be provided with stairs 17.

The lower end of the mast 2 may be anchored to a suitable base, such as a body of concrete 18, Fig. 3, by a universal joint comprising a collar 19 encircling and fastened to the lower end of the mast 2 and having two arms 20 which embrace and are pivoted, by a transverse pin 21, to a member 22, the ends of which are respectively pivoted on an axis at right angles to the pin 21, to two supporting members 23, which are anchored to the concrete base 18.

The mast 2 projects below the plane of the ring 1, and the latter is spaced from the mast 2, by guy rods 24, the outer ends of which are fastened to the ring 1 and the inner ends of which are fastened to a peripheral annular flange 25 with which the collar 19 is provided, Figs. 2 and 3.

For tiltably oscillating the track support, so as to effect a gyratory movement thereto, any suitable means may be provided.

For effecting gyration of the support, I have shown the following described mechanism, of which there is provided a horizontal frame 26, which is provided with four radial horizontal arms 27 which are equally spaced, and which are each provided with carrying wheels 28 mounted and adapted for travel on a circular track 29, which is concentric with the lower end of the mast 2.

Two of the adjacent arms 27 are respectively provided with two towers 30 upon the upper ends of which are respectively mounted two rollers 31 which bear against and support and are adapted for traveling engagement with the under side of the ring 1. The other two arms 27 are also respectively provided with two similar rollers 31 adapted for traveling engagement with the under side of the ring 1.

Adjacent arms 27 may be connected to each other by transverse brace bars 32.

For retaining the frame 26 in its concentric position, it may be provided with rollers 33 having vertical axes and bearing against and adapted for traveling engagement with the periphery of a horizontal anchoring ring 34, which is concentric with the track 29 and which is stationary. The frame 26 with its arms 27, and parts carried thereby, constitute revolving means, which, when revolved on its axis, by means of the towers 30 and rollers 31 carried thereby effects a tilting oscillatory movement of the ring 1, whereby the track support and its mast 2 and the track portions 6 and 7 have imparted to them a gyratory movement.

For effecting revolving movement of the frame 26, any suitable means may be provided, such as an electric motor 35, Figs. 1 and 2, mounted on one of the arms 27 and having fastened to its armature shaft 36 a pulley 37 which is connected by a belt 38 with a pulley 39, which is mounted on a shaft 40 fastened to one of the carrying wheels 28, Fig. 2.

The track portions 6, 7, 9, 10 and 11 may be constructed so as to be adapted to be traversed by wheeled vehicles or pedestrians, or both. In Figs. 1 and 2, these track sections are each shown as consisting of the usual parallel rails adapted to support the usual flanged carrying wheels of a vehicle.

In Figs. 4, 5 and 6 the track sections shown are adapted for easy use by pedestrians or by wheeled vehicles.

The angle of tilt provided the gyratory track support is, of course, dependent upon the diameter of the ring 1 and the height of the rollers 31 carried by the towers 30.

In Fig. 4 the line A—B represents the vertical and the line A—C the angle of tilt from the vertical of the mast 2. The line D—E in Fig. 4, represents the plane of the ring 1, and the line D—F the angle of lead of the track 7 from the plane D—E, and which is also the angle of lead, with respect to the plane D—E, of the track portion 6.

In order to effect the function of causing a wheeled vehicle to run by gravity on the track portion 6 from the lower end thereof to the upper end thereof, the angle of lead F—D—E of the gyratory track, must be less

than the angle of tilt B—A—C of said track from the vertical, as shown in Fig. 4, in which the angles represented are substantially eight degrees and 12 degrees respectively.

The rails of the track portions 10 and 11 are respectively loosely pivoted on transverse axes to the rails of the track portions 6 and 7, so that the track portions 10 and 11 can accommodate themselves to the tilting movement of the gyratory support. The opposite ends of the track portions 10 and 11 are provided respectively with connecting rails 10′ and 11′ which are respectively slidably connected with the rails of the track 9, and are respectively pivotally connected to the rails of the track portions 10 and 11.

In the operation of the invention, referring to Figs. 1 and 2, if a wheeled vehicle, such as the wheeled vehicle 41, shown in Fig. 1, is run from the landing track 9 down the tilting track portion 10 and onto the lower end of the track portion 6, when the gyratory support is in the position, shown in Figs. 1 and 4, and the frame 26 is revolved counter clockwise, the rollers 31 on the towers 30 carried by the arms 27 of the frame 26, will impart to the gyratory support a gyratory movement, in a counter clockwise direction, thereby tilting the track portion 6 so as to raise such portion at the rear of the vehicle 41 and to lower the track immediately at the front of the vehicle, upon which the vehicle will be impelled by gravity along the track portion 6 in a forward direction.

Upon each gyration of the track support, the vehicle 41 will be impelled by gravity to travel over one convolution of the track portion 6. As there are four and one half convolutions in the spiral portion 6, when the support has been gyrated four and one half times, the vehicle 41 will have traveled on the track portion 6 to the upper end thereof, and upon continued gyratory movement in the same direction of the track support, the vehicle will travel downwardly upon the inner spiral track portion 7. The latter has five convolutions, as shown in Figs. 1 and 4, so that by the time that the vehicle has traveled over five convolutions of the track portion 7, it will have reached the lower end of said portion, which at this time it will be at its lowermost position, the track support being pivoted at this time in a position diametrically opposite that occupied by it in Fig. 1.

Continued gyratory movement in the same direction will cause the vehicle to run from the track portion 7 over the tilting track portion 11 and onto the stationary track portion 9, where it may be stopped for unloading, as by a track brake 42, Fig. 1, of any usual type, adapted to engage and hold the vehicle.

After the vehicle has been unloaded, it may be moved downwardly on the track portion 9 to a position for re-loading over another track brake 43, which may also be of any of the usual types. After re-loading the vehicle, it is released from the track brake 43, upon which it will run by gravity onto the track portion 10, when the latter lowers, and, upon continued gyration of the track support, the vehicle will again enter upon the track portion 6 and will be moved by gravity forwardly on said track portion to the top thereof and onto and down the track portion 7 until it again runs onto the stationary track portion 9 to the unloading position, as before described.

Thus the operation may be made a continuous one, automatically conducted, with the exception of the operation manually of the track brakes 42 and 43, the speed of operation being limited only by the time required to load and unload the vehicles, and the physical limitations of the mechanism.

By proper relationship of the angles of tilt of the track support and lead of the gyratory track, the desired speed of the vehicles with relation to the track may be obtained with absolute safety to the occupants of the vehicles, as due to the upward inclination of the track a short distance in advance of a vehicle, the vehicle can not run for any material distance at a speed greater than the speed permitted by the speed of gyration of the track support.

As many vehicles may be run on the tracks as there is space thereon to accommodate them.

By employing a track, such as is shown in Figs. 4, 5 and 6, having a suitable surface to be walked upon, and corresponding in other particulars to the tracks shown in Figs. 1 and 2, the device may be utilized for the entertainment and amusement of pedestrians, as well as for use as a vehicle track.

By reversing the direction of inclination of the stationary track portion 9, and by reversing the direction of gyration of the track support to a clock-wise movement, the vehicles may be started at the lower end of the track portion 7 and made to go up this track portion and down the track portion 6, the operation otherwise being the same as hereinbefore described.

The skeleton support shown in Figs. 1 and 2, may be dressed or camouflaged in any desired manner, not shown, so as to have it represent a hill or mountain, and thereby impart to the pedestrians or occupants of the vehicles, the novel and amusing sensation that they are climbing the hill or mountain by constantly going down hill. With the use of vehicles, gravity automatically controls the positions of the vehicles with relation to the track, so that the vehicle will always be in a dip between two rising portions of the track.

Owing to the constantly upwardly decreasing diameters of the convolutions of the track, a pedestrian in going up the track portion 6, must always regulate his speed of

walking to correspond with the speed of gyration, if he desires to keep in a dip or substantially level portion of the track. If he walks too fast, he will soon be walking up hill. In going down the track portion 7, he will have to constantly increase his speed in order to keep walking on a substantially level portion of the track. By regulating his speed, he can have the novel sensation of constantly walking up hill while going down the hill or mountain.

I do not limit my invention to the structure shown and described, as many modifications, within the scope of the appended claims, may be made, without departing from the spirit of my invention.

What I claim is:

1. In a coasting apparatus, a gyratory support, a track carried thereby having two upwardly leading spiral portions of opposite leads, connected at their upper ends and encircling the axis of said support and having each an angle of lead less than the angle of said axis to the vertical, and a landing track comprising two swinging portions having one set of ends respectively connected to the lower ends of said spiral portions and a stationary portion having its ends respectively connected to the other set of ends of said swinging portions.

2. In a coasting apparatus, a gyratory support, a track carried thereby having two upwardly leading spiral portions of opposite leads, connected at their upper ends and encircling the axis of said support, each of said portions having an angle of lead less than the angles of said axis to the vertical, means for gyrating said support, and a landing track comprising a stationary intermediate portion and two swinging portions respectively connecting with the lower ends of said spiral portions.

3. In a coasting apparatus, a gyratory support, a track carried thereby having two spiral portions of opposite leads encircling the axis of said support, connected at their upper ends and having each an angle of lead less than the angle of said axis to the vertical, a landing track comprising a stationary intermediate portion and two end portions respectively slidably connected to the ends of said stationary portion and respectively pivotally connecting with the lower ends of said spiral portions, and means revoluble around said axis and having traveling supporting engagement with said support for imparting a gyratory movement to the latter.

4. In a coasting apparatus, a gyratory support having bearing means concentric with and in a plane perpendicular to the axis of said support, a track carried by said support having two upwardly leading spiral portions of opposite leads encircling said axis and connected at their upper ends, and each portion having an angle of lead less than the angle of said axis to the vertical, a landing track comprising a stationary intermediate portion and two end portions respectively movably connected to the ends of said intermediate portion and respectively movably connecting with the lower ends of said spiral portions, and means revoluble around said axis and having traveling supporting engagement with said bearing means for gyrating said support.

5. In a coasting apparatus, a continuous track comprising two upwardly leading spiral portions of opposite leads and connected at their upper ends, a stationary landing portion, two movable portions respectively connected to the ends of said stationary portion and respectively connecting with the lower ends of said spiral portions, and means for gyrating said spiral portions.

In testimony whereof I have signed my name to this specification.

CHARLES E. MORRIS.