Dec. 8, 1942. H. DENNIS 2,304,341

ROUNDABOUT

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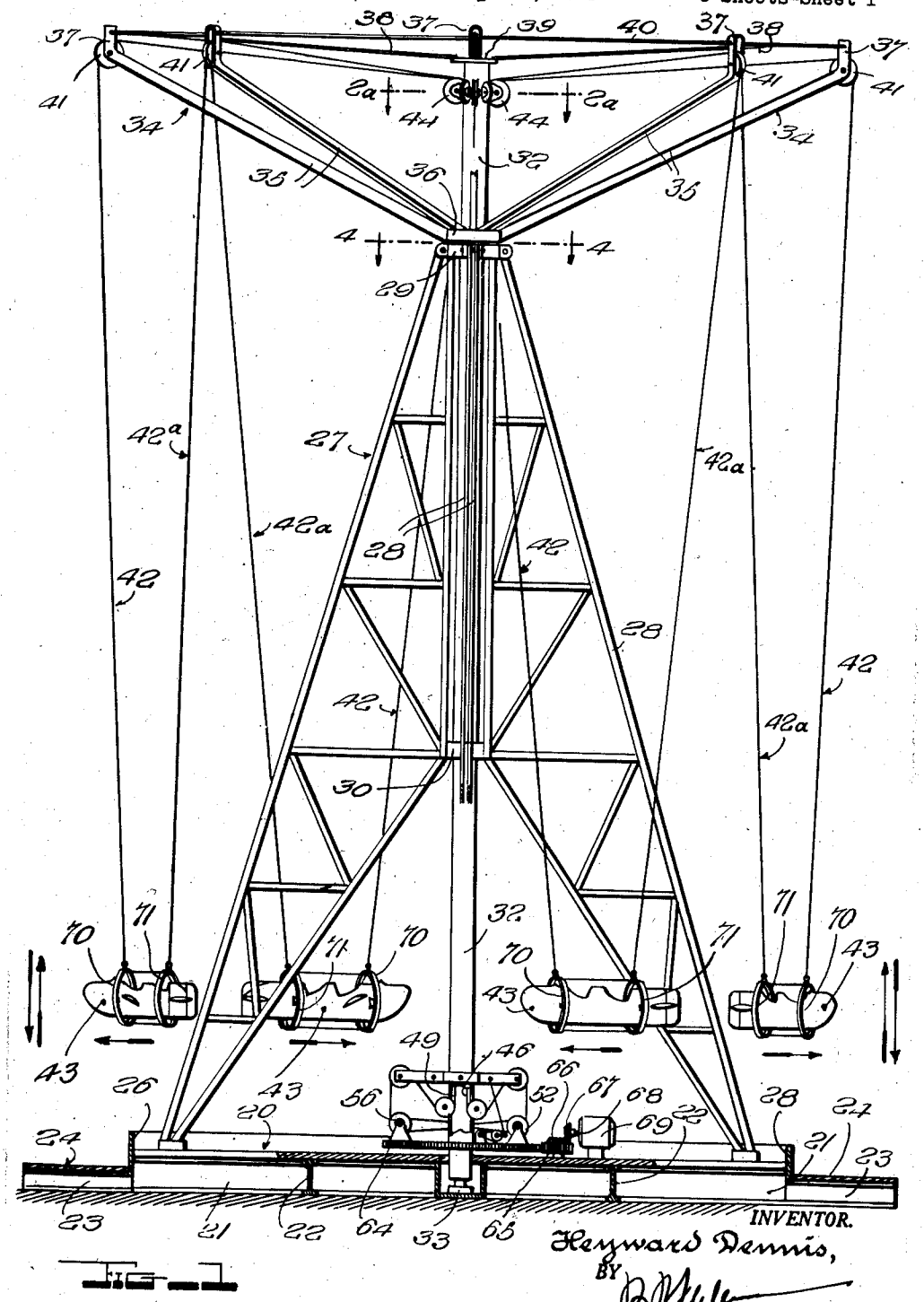

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ROUNDABOUT

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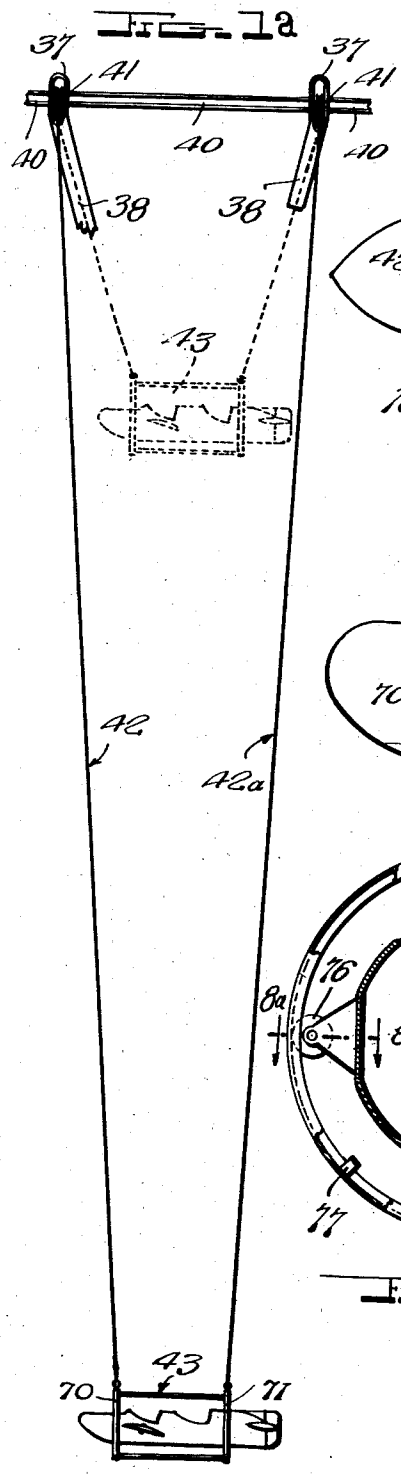

FIG. 1a

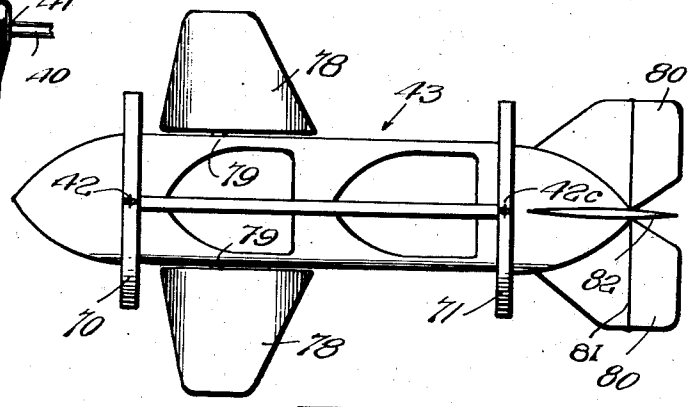

FIG. 6

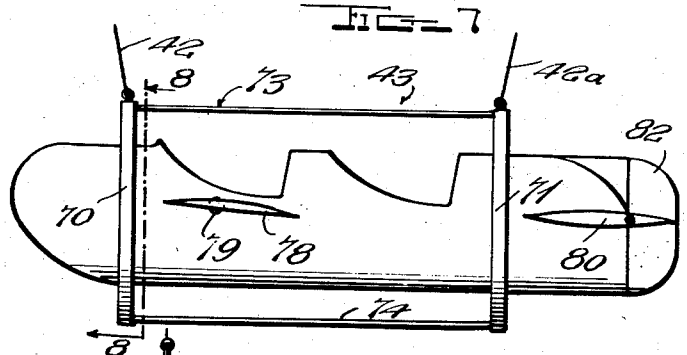

FIG. 7

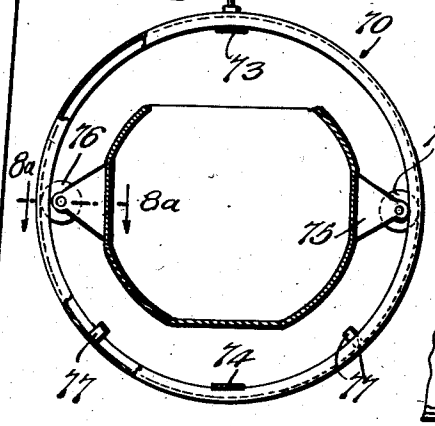

FIG. 8

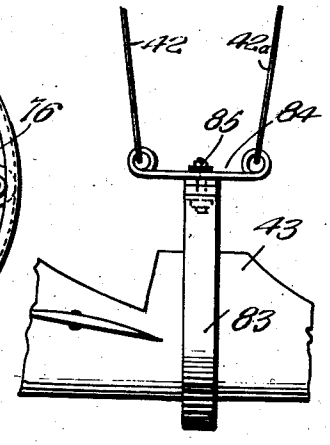

FIG. 9

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FIG. 2

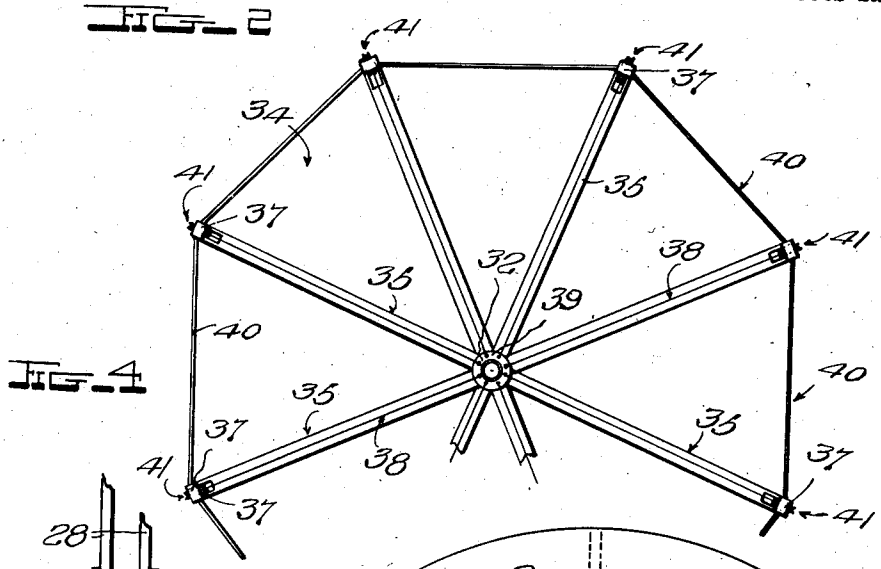
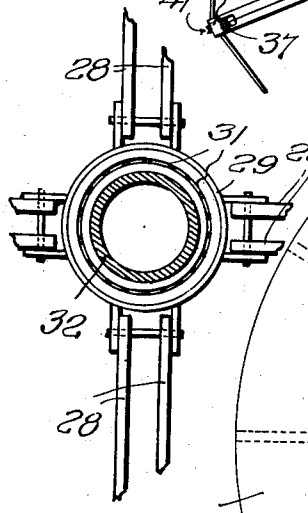


FIG. 4



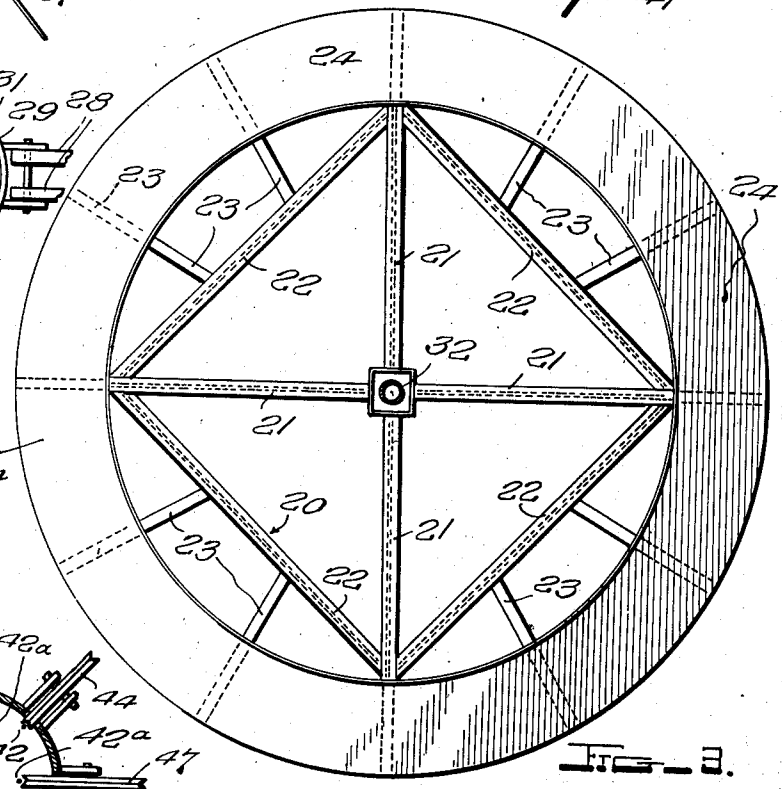


FIG. 3.

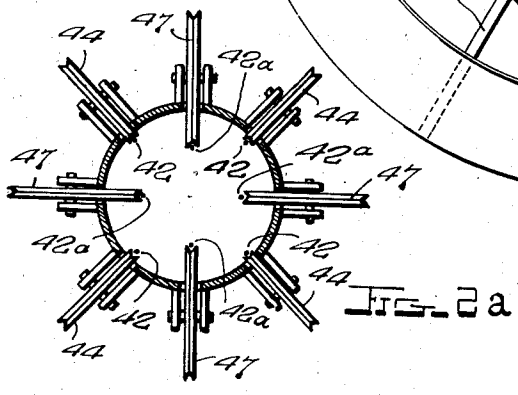


FIG. 2a

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FIG. 5

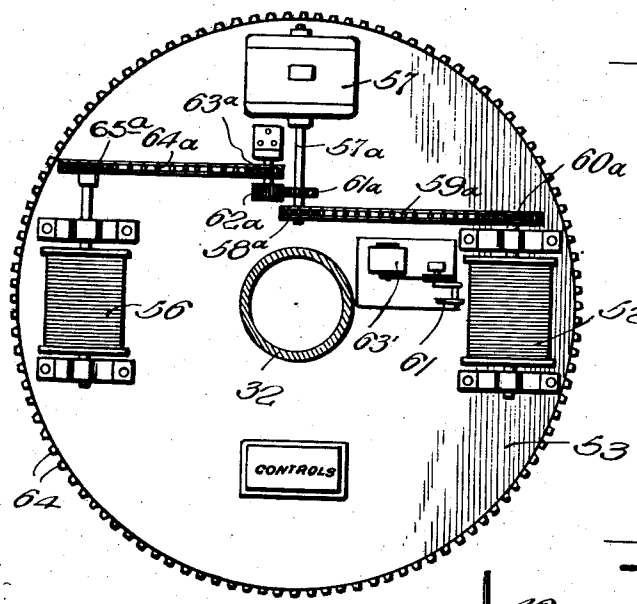
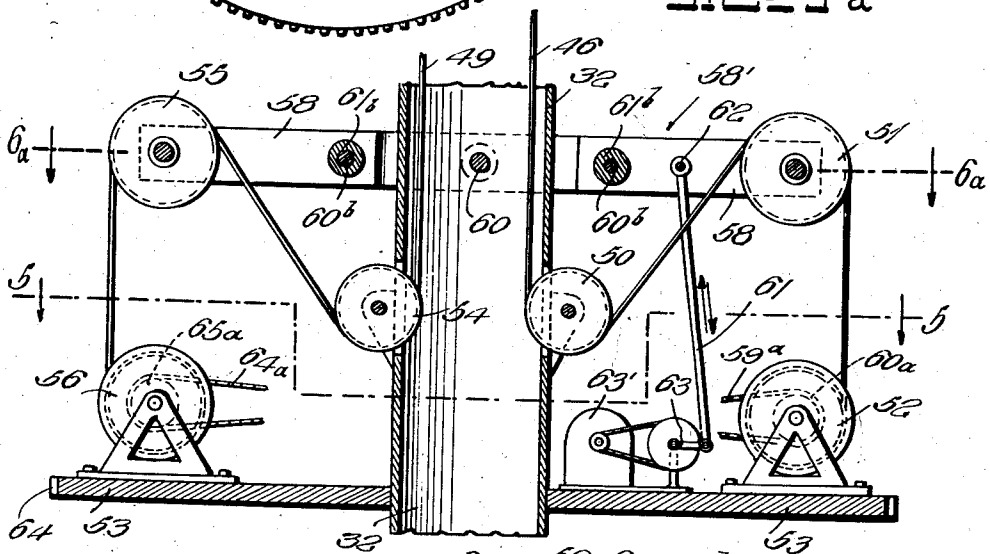


FIG. 5a



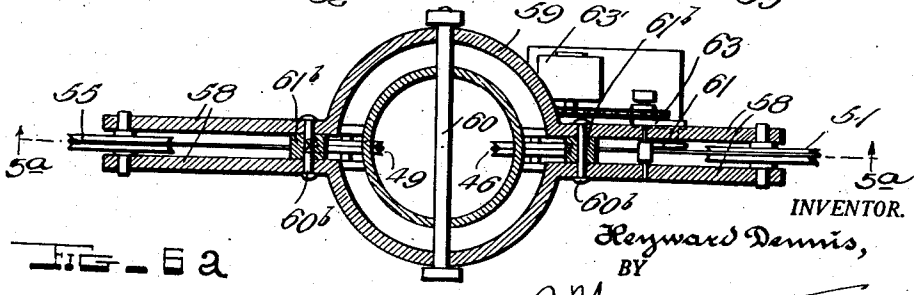


FIG. 5a

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FIG. 10

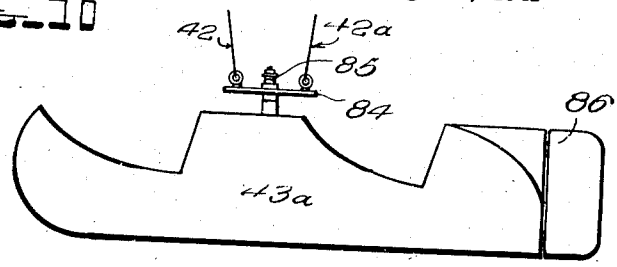


FIG. 8a

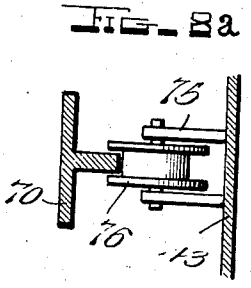
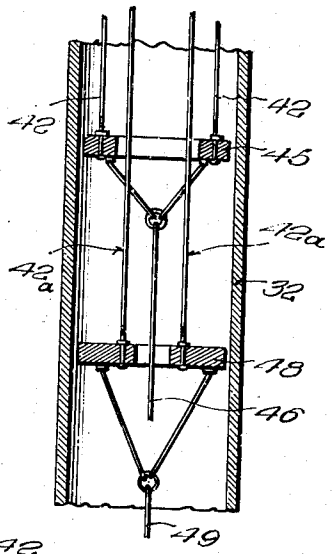


FIG. 11



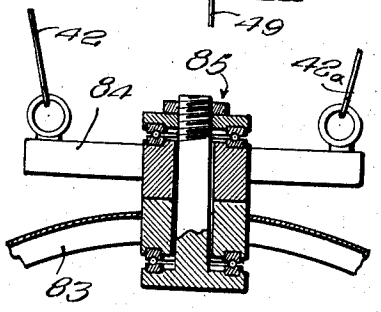


FIG. 9a

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Patented Dec. 8, 1942

2,304,341

UNITED STATES PATENT OFFICE

2,304,341

ROUNDABOUT

Heyward Dennis, Augusta, Ga.

Application August 15, 1941, Serial No. 407,057

10 Claims. (Cl. 272—41)

My invention relates to roundabouts or rotary swings.

An important object of the invention is to provide apparatus of the above-mentioned character which is adapted for use in places of amusement, such as pleasure resorts, parks, exhibition grounds, fairs, circuses, or the like.

A further object of the invention is to provide apparatus of the above-mentioned character which will provide decided thrills for the riders.

A further object of the invention is to provide apparatus of the above-mentioned character having means for raising and lowering the cars, and tipping the same upon their transverse axes.

A further object of the invention is to provide apparatus of the above-mentioned character having means to tilt the car upon its longitudinal axis.

A further object of the invention is to provide means for rotating the car upon its vertical axis as well as tilting the same upon its transverse and longitudinal axes.

A further object of the invention is to provide apparatus of the above-mentioned character which may be constructed in separable units so that it may be rapidly assembled and disassembled.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same.

Figure 1 is a side elevation of apparatus embodying my invention, parts in section and parts broken away,

Figure 1ª is a side elevation of one of the cars or carriers and associated elements,

Figure 2 is a plan view of the rotating frame,

Figure 2ª is a horizontal section taken on line 2ª—2ª of Figure 1,

Figure 3 is a plan view of the base, the tower being removed,

Figure 4 is a horizontal section taken on line 4—4 of Figure 1,

Figure 5 is a similar view taken on line 5—5 of Figure 5ª,

Figure 5ª is a vertical section taken on line 5ª—5ª of Figure 6ª,

Figure 6ª is a plan view of the car tilting lever,

Figure 6 is a plan view of the car or passenger carrier,

Figure 7 is a side elevation of the same,

Figure 8 is a transverse section taken on line 8—8 of Figure 7,

Figure 8ª is a detailed section taken on line 8ª—8ª of Figure 8,

Figure 9 is a side elevation of a further modified form of car or passenger carrier, parts broken away,

Figure 9ª is a detailed section through the swiveled connection shown in Figure 9,

Figure 10 is a side elevation of a further modified form of car or passenger carrier, and

Figure 11 is a detailed section through the collector rings.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, attention being called first to Figures 1 to 5 inclusive, the numeral 20 designates a base which may be formed of radial I-beams 21, suitably connected at their inner ends and connected at their outer ends by I-beams 22, forming a rectangular group. Short radial I-beams 23 are connected with the I-beams 22 and support a loading platform 24, which is preferably annular. This loading platform has a circular guard 26, as shown.

The numeral 27 designates a tower, as a whole, comprising upstanding truss structures 28, preferably corresponding in number and arrangement to the radial I-beams 21. The truss structures 28 diverge downwardly and are preferably arranged in a group of four and are attached to the horizontal I-beams 21 near their outer ends. The upper ends of the truss structures 28 are connected by a horizontal collar 29 and their intermediate portions are connected by a similar collar 30. Held within the horizontal collars 29 and 30 are roller bearings 31, Figure 4.

Extending through the horizontal collars 29 and 30 and centrally arranged with respect to the tower is a vertical tubular shaft 32, engaging the roller bearings 31. The lower end of this tubular shaft engages an end-thrust bearing 33. The tubular shaft extends at its upper end beyond the tower and collar 29 for a substantial distance, as shown.

Mounted upon the upper end of the vertical tubular shaft 32 is a rotating frame 34, including radially extending arms 35, which are inclined upwardly toward their outer ends. These arms are connected at their inner ends with a common hub or ring 36, rigidly mounted upon the tubular shaft 32, and spaced from the collar 29. The arms 35 have upwardly projecting extensions 37, connected with rods or cables 38, extending inwardly for connection with a ring 39, rigidly se-

cured to the top of the tubular shaft 32. The outer ends of the arms 35 are connected by circumferential element or elements 40, which may be a rod, cable, or the like.

Pairs of the radial arms 35 carry grooved pulleys 41 at their outer ends, and these grooved pulleys have flexible elements or cables 42 and 42a passed over the same, which extend downwardly for connection with the ends of a car or passenger carrier 43. The cables 42 are connected with the forward ends of the cars while the cables 42a are connected with the rear ends of the cars, assuming that the frame 34 is rotating clockwise as viewed looking down on top of shaft 32 Figure 1.

The cables 42 connected with the forward ends of the cars are passed about grooved pulleys 44, mounted upon the upper end of the tubular shaft 32 and all of the cables 42 then extend into the tubular shaft and are secured to a collector ring 45, slidably mounted within the tubular shaft. This collector ring has a cable 46 connected therewith which extends downwardly within the tubular shaft. All of the cables 42a which are connected with the rear ends of the cars or carriers 43 are passed about pulleys 47, mounted upon the upper end of the tubular shaft 32 and are connected with a collector ring 48 arranged beneath the collector ring 45 and slidably mounted within the tubular shaft 32 and connected with a cable 49. It is thus seen that if both cables 46 and 49 are wound up to the same extent upon drums, that the cars will be raised and maintained horizontal during the rising movement but if one cable is wound up for a greater extent than the other the cars will be longitudinally inclined or tilted upon their transverse axes. The cable 46 passes to the lower end of the tubular shaft 32 and is then trained about a grooved pulley 50 and then passed about a pulley 51 and then about a winding drum 52 mounted upon the motor platform 53 which is rigidly secured to the tubular shaft 32 to rotate therewith. The cable 49 is passed about a grooved pulley 54, mounted upon the tubular shaft 32 and then extends outwardly to be passed about a grooved pulley 55 and then downwardly about a winding drum 56 mounted upon the motor platform 53. The winding drums 52 and 56 are geared together so that they turn at the same speed and in opposite directions to wind the cables 46 and 49 thereon, respectively, at the same rate. The gearing between the winding drums is driven by a motor 57 mounted upon the motor platform 53. As shown in Figure 5, the motor 57 drives a shaft 57a. This shaft has a sprocket wheel 58a rigidly secured thereto engaging a sprocket chain 59a in turn engaging a sprocket wheel 60a which is connected with the drum 52, to drive it. The shaft 57a has a gear 61a rigidly secured thereto engaging a gear 62a connected with a sprocket wheel 63a. This sprocket wheel engages a sprocket chain 64a engaging a sprocket wheel 65a, secured to the drum 56, to rotate it. The gearing is such that the drums are rotated in opposite directions and at the same speed. The pulleys 51 and 55 are rotatably mounted upon the opposite ends of a vertically swinging lever 58' including arms 58, rigidly mounted upon segments 59, which surround the tubular shaft 32 in spaced relation and are supported upon a horizontal pivot 60 rigidly attached to the tubular shaft 32. The arms 58 are spaced and are rigidly connected by bolts 60b passing through spacing blocks 61b. It is thus apparent that when the lever carrying the pulleys 51 and 55 remains horizontal and the winding drums 52 and 56 are rotated in the proper direction that the cables will be wound upon these drums and the cars raised while being maintained horizontal. However, should the lever be inclined for raising the pulley 51 and lowering the pulley 55, the front ends of the cars would be raised and their rear ends lowered and the cars would be inclined upon their vertical axes in a forward direction, independently of the winding action of the drums 52 and 56. I contemplate automatically swinging the lever 58' upon its pivot 60, and to accomplish this a connecting rod 61 is pivotally connected with the lever 58' at 62 and is pivotally connected with a crank disk 63, which may be connected with and driven by a separate motor 63'. By operating the motor 63', the lever 58' may be swung in a direction to tilt the cars 43 upon their transverse axes and elevate their forward ends. This may be done when the cars are being raised. The motor may also be operated to tilt the cars in an opposite direction so that their forward ends are lowered when the cars are descending. The motor may also be continuously operated and the cars will be continuously tilted upon their transverse axes during their raising or lowering movement. If desired, the crank disk 63 may be connected with the drum 52 to be driven with the same, in which event, the motor 63' will be dispensed with. I also contemplate manually angularly adjusting the lever 58'.

The motor platform 53 may be equipped with an annular gear 64, driven by a gear 65, driven by a bevel-gear 66, driven by a bevel-gear 67, driven by a shaft 68, in turn driven by a motor 69. By this means the tubular shaft 32 and frame 34 is rotated upon a vertical axis and the motor platform 53 turns with the tubular shaft 32, with which it is rigidly secured.

As before stated, the cable 42 is connected with the forward end of the car 43 and the cable 42a with its rear end. I will now describe the manner in which this connection is effected. The cable 42 is connected with a forward ring 70 and the cable 42a with a rear ring 71. These rings are connected at their tops and bottoms by horizontal struts 73 and 74. The rings are much larger in diameter than the car 43 and the car is provided upon its opposite sides, and within each ring, with brackets 75, carrying grooved pulleys 76, which are mounted to travel upon the ring and cannot be removed therefrom. Each ring is provided with stops 77 so that the car cannot turn upon its longitudinal axis for too great an extent whereby the passengers would be thrown from the same.

The turning of the car upon its longitudinal axis within the rings 70 and 71 may be effected by operating pivoted front wings 78, secured to the car. By swinging these wings about the horizontal axes 79, in opposite directions, the car will turn upon its longitudinal axis as it is traveling around the tower. The turning of the car upon its longitudinal axis may also be effected by means of rear wings 80, attached thereto and swinging upon horizontal axes 81. The wings 80 would be swung in opposite directions to turn the car upon its longitudinal axis. The turning of the car upon its longitudinal axis may therefore be effected by the manipulation of the wings 78 alone or the wings 80 alone or by the manipulation of both pairs of wings 78

and 80. The control for the wings 78 and 80 is arranged within the car 43. The car 43 is also equipped with a rudder 82, which may be employed to steer the car during its circular travel about the tower.

By connecting the cables 42 and 42a to the ends of the car, as described, the car will not turn upon its vertical axis while traveling about the tower, but the car is capable of turning about its transverse axis for raising and lowering the forward end of the car.

In Figures 9 and 9a, I have shown a further modification of the invention wherein the car 43 is supported by a single ring 83, identical with the ring 70, and the car is equipped with one pair of rollers 76 to engage within the ring 83. This ring is located at a point substantially equidistantly spaced from the ends of the car. The ring 83 is supported by a carrier 84 and has a swivel connection therewith, as shown at 85, so that the ring 83 can rotate upon a vertical axis. The cable 42 is connected with the forward end of the carrier 84 and the cable 42a with its rear end and hence the carrier 84 and the car 43 may be inclined or tilted upon a transverse horizontal axis as described in connection with the first form of the invention. The mounting for the car 43, Figure 9, may be substituted for the mounting of the car 43, Figure 7, but all other parts of the apparatus will remain identical. The rotation of the car 43 and ring 83 about the vertical axis 85 may be produced or controlled by the rudder 82, Figure 6, it being understood that all parts of the car are otherwise identical with the showing in Figure 6 except for the ring mounting 83.

In Figure 10, a further modification of the invention is shown and in this figure the car 43a has the swivel 85 directly attached thereto, the ring 83 being omitted. The same carrier 84 and cables 42 and 42a are provided. There are no wings 78 and 80 for the car is not turned upon its longitudinal axis but there is a rudder 86 which may be employed to cause the car to turn upon its vertical axis during its circular travel around the tower. The cables 42 and 42a may be manipulated to tilt the car upon its transverse axis.

The operation of the apparatus is as follows: When the shaft 32 is brought to rest the motor 57 is operated to rotate the drums 52 and 56 to pay out the cables 46 and 49 and the cars 43 will be brought to the lower position above and adjacent to the platform 24. The cars are now loaded and the motor 69 is set into operation and the shaft 32 and frame 34 are rotated. The cars 43 rotate in a circular path and tend to move out by centrifugal force. The shaft 32 may be set into rotation before or after the cars 43 are raised in whole or in part. When the drums 52 and 56 are rotated to wind the cables 46 and 49 thereon respectively, the cars 43 are elevated, and while they are being elevated they are swung upon their transverse axes, to elevate their forward ends. The cars are lowered by rotating the winding drums 52 and 56 in an opposite direction to pay out the cables thereof and during the lowering operation the cars are swung upon their transverse axes to lower their forward ends. While the cars are traveling around the tower, the wings 78 or 80 or both may be manipulated to cause the car to turn or tilt upon its longitudinal axis within the rings 70 and 71. The cars may be constantly tilted upon their transverse axes when being raised or lowered, if desired.

It is to be understood that the forms of my invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. In apparatus of the character described, a tower, a supporting structure mounted upon the tower, means to rotate the supporting structure, passenger carriers, a pair of flexible elements connected with each passenger carrier and suspended from the supporting structure, means to take up both flexible elements in each pair to raise the passenger carrier and to take up one flexible element in each pair more than the other flexible element to cause the passenger carrier to be inclined.

2. In apparatus of the character described, a tower, a rotatable supporting structure mounted upon the tower, a passenger carrier, a pair of flexible devices including upper and lower flexible parts, the upper flexible parts being suspended from the rotatable supporting structure and the lower flexible parts being attached to the passenger carrier at spaced points, a member pivoted to swing, means to move the member, pulleys mounted upon the member and engaged by the lower flexible parts, and winding mechanism connected with the lower flexible parts.

3. In apparatus of the character described, a tower, a rotatable supporting structure mounted upon the tower, a passenger carrier, a pair of flexible elements suspended from the supporting structure and having their lower ends spaced and connected with the passenger carrier, winding mechanism for the flexible elements, and means in addition to the winding mechanism to take up only one flexible element in the pair.

4. In apparatus of the character described, a tower, a substantially vertical tubular shaft held in place by the tower and extending above the same, a passenger carrier, flexible elements suspended from the supporting structure and connected with the passenger carrier and extending into the tubular shaft above the tower, pulleys mounted upon the tubular shaft below the top of the tower and having the flexible elements passed above them when the flexible elements extend to the exterior of the tubular shaft, a pivoted member mounted upon the tubular shaft, pulleys mounted upon the pivoted member and having the flexible elements passed about the same, winding mechanism mounted upon the tubular shaft and connected with the flexible elements, and means to reciprocate the pivoted member while the winding mechanism is operating.

5. In apparatus of the character described, a tower, a tubular shaft held in place within the tower and extending above the tower, a frame mounted upon the tubular shaft above the tower, passenger carriers, a pair of flexible elements connected with each passenger carrier near its front and rear ends and suspended from the frame, the pairs of flexible elements passing into the tubular shaft above the tower, a collector element connected with all of the flexible elements which are connected with the front ends of the carriers, a collector element connected with all of the flexible elements which are connected with the rear ends of the carriers, a common flexible element connected with one collector element and passing to the exterior of the

tubular shaft below the top of the tower, a second common flexible element connected with the other collector element and passing to the exterior of the tubular shaft below the top of the tower, pulleys engaging the common flexible elements, means mounted upon the tubular shaft to raise and lower the pulleys, and winding mechanism mounted upon the tubular shaft and connected with the common flexible elements.

6. In apparatus of the character described, a tower, a rotatable support mounted upon the tower, a carrier, a pair of rings arranged near the ends of the carrier, means to mount the carrier within the rings so that the carrier can turn upon its longitudinal axis, flexible elements connected with the rings and suspended from the rotatable support, means to take up the flexible elements to raise the carrier and to take up one flexible element to a greater extent than the other to turn the carrier upon its transverse axis, and means to cause the carrier to turn upon its longitudinal axis.

7. In apparatus of the character described, a tower, a rotatable support mounted thereon, a passenger carrier, a supporting element, a swiveled connection between the passenger carrier and the supporting element so that the passenger carrier can turn upon a vertical axis with relation to the supporting element, and means suspending the supporting element from the rotatable support and raising and lowering the supporting element and inclining the same.

8. In amusement apparatus, a tower, a rotatable support mounted upon the tower, a carrier, means to support the carrier so that it may turn upon its longitudinal axis, means connected with the supporting means to operate the same for turning the carrier upon its tranverse axis and tilting the same longitudinally, the last named means being mounted upon the rotatable support and also serving to bodily raise and lower the carrier, and means to cause the carrier to turn upon its longitudinal axis.

9. In amusement apparatus, a tower, a rotatable supporting structure mounted upon the tower, passenger carriers, a pair of flexible elements mounted upon the supporting structure and having spaced ends which are connected with each carrier so that such pair of flexible elements may be employed to tilt the carrier, a common flexible element connected with corresponding flexible elements of all of the pairs, a second common flexible element connected with the remaining flexible elements of all of the pairs, winding mechanism connected with the common flexible elements, pulleys connected with the two common flexible elements, and means to move one pulley in a direction to take up its common flexible element and the other pulley in a direction to pay out its common flexible element.

10. In amusement apparatus, a tower, a supporting structure mounted upon the tower to turn about a generally vertical axis, a passenger carrier arranged below the supporting structure, flexible means suspending the passenger carrier from the supporting structure and permitting the passenger carrier to travel radially outwardly due to the action of centrifugal force, and means to operate the flexible means to cause the flexible means to tilt the passenger carrier upon its transverse axis to raise its leading end and lower its trailing end and to also bodily move the passenger carrier to different elevations.

HEYWARD DENNIS.