Jan. 20, 1959 J. E. MITCHELL 2,869,871

AMUSEMENT RIDE DEVICE

Filed Jan. 16, 1957 4 Sheets-Sheet 1

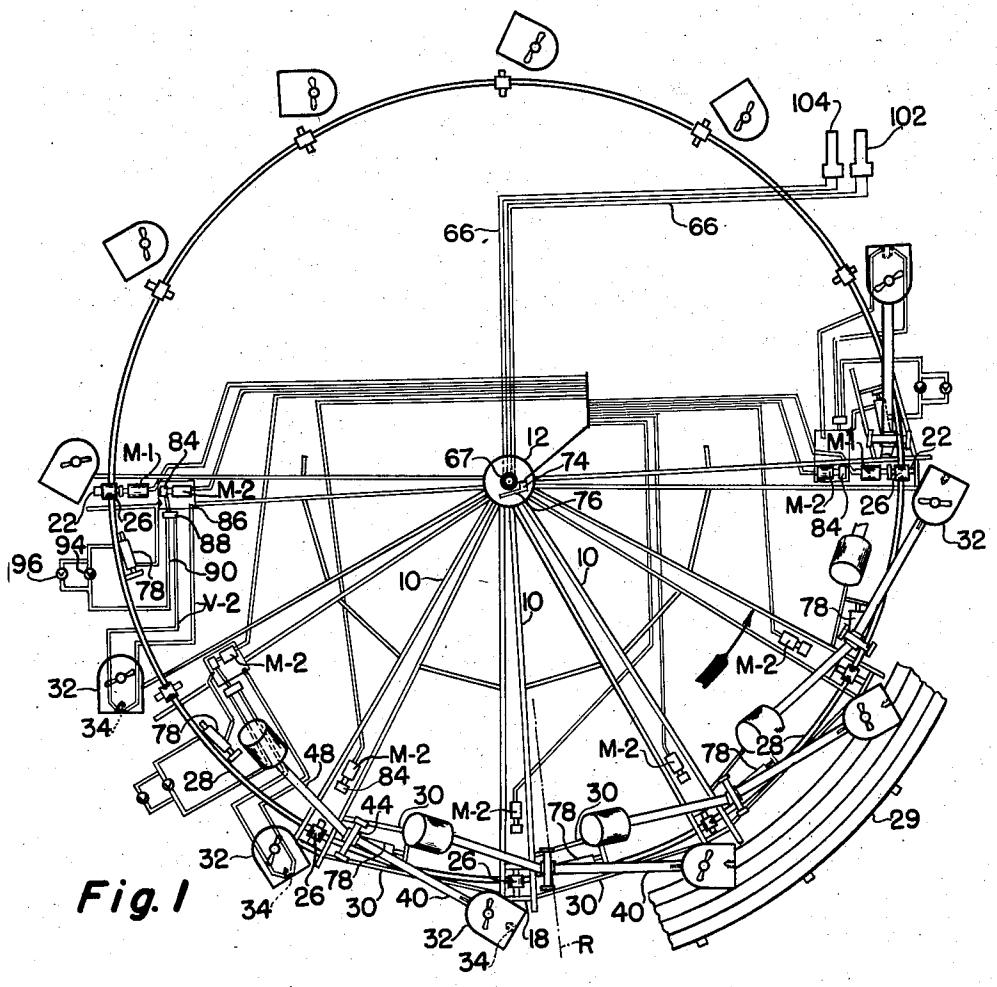

Fig. 1

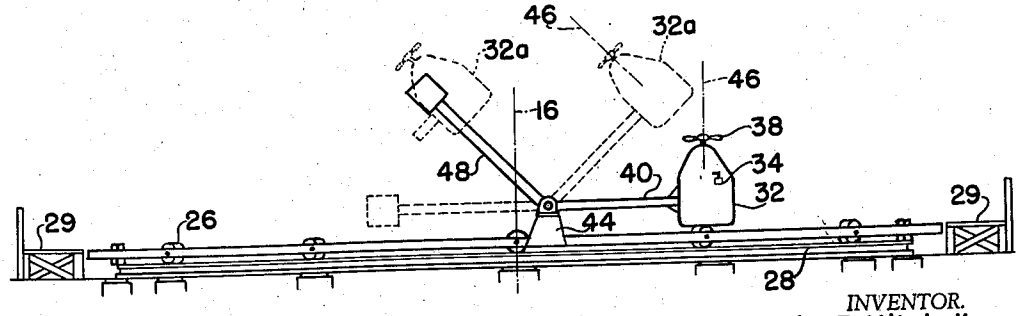

Fig. 2

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AMUSEMENT RIDE DEVICE

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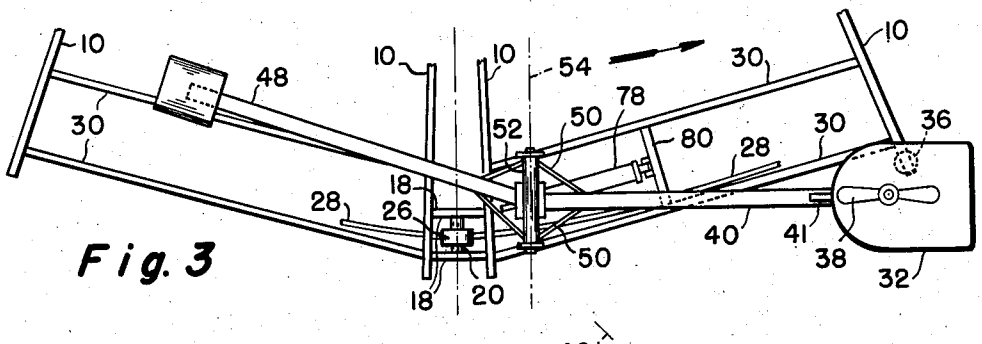

Fig. 3

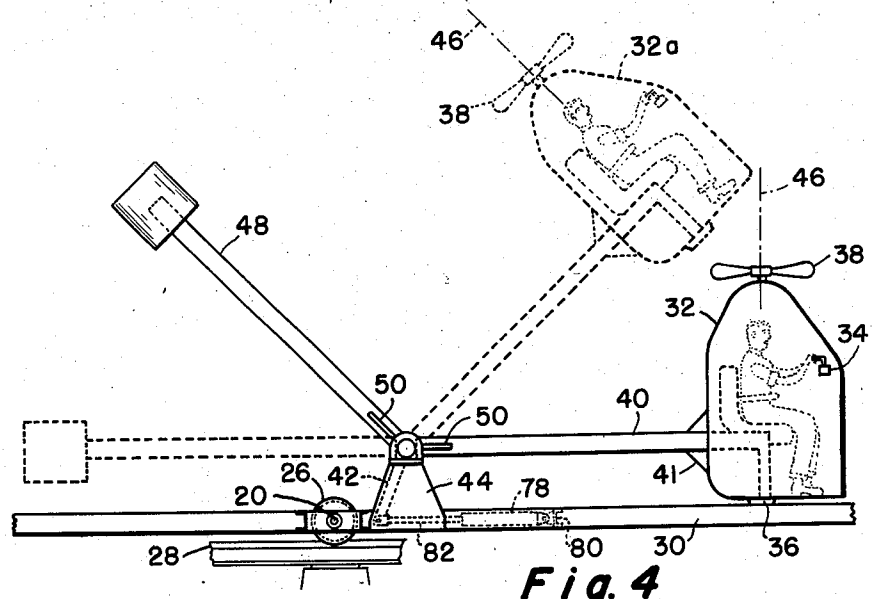

Fig. 4

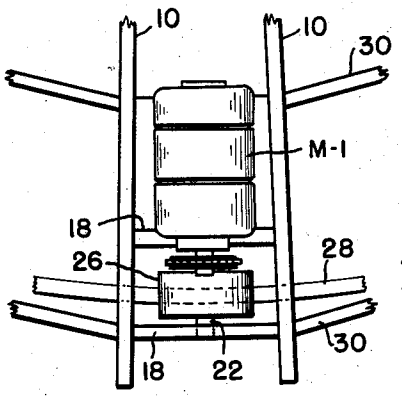

Fig. 5

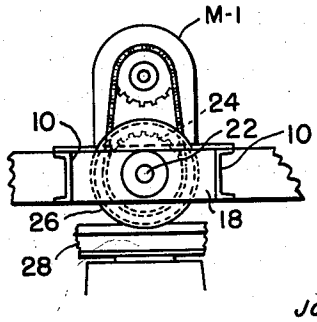

Fig. 6

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AMUSEMENT RIDE DEVICE

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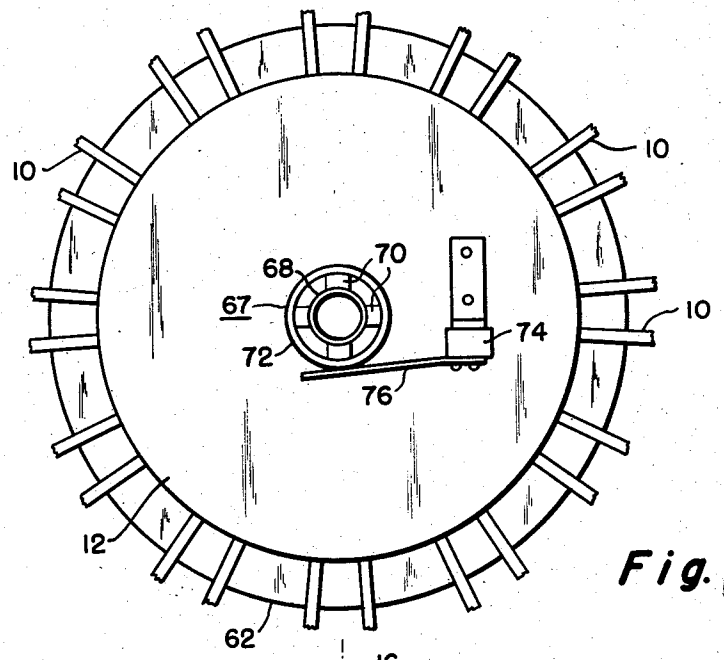

Fig. 7

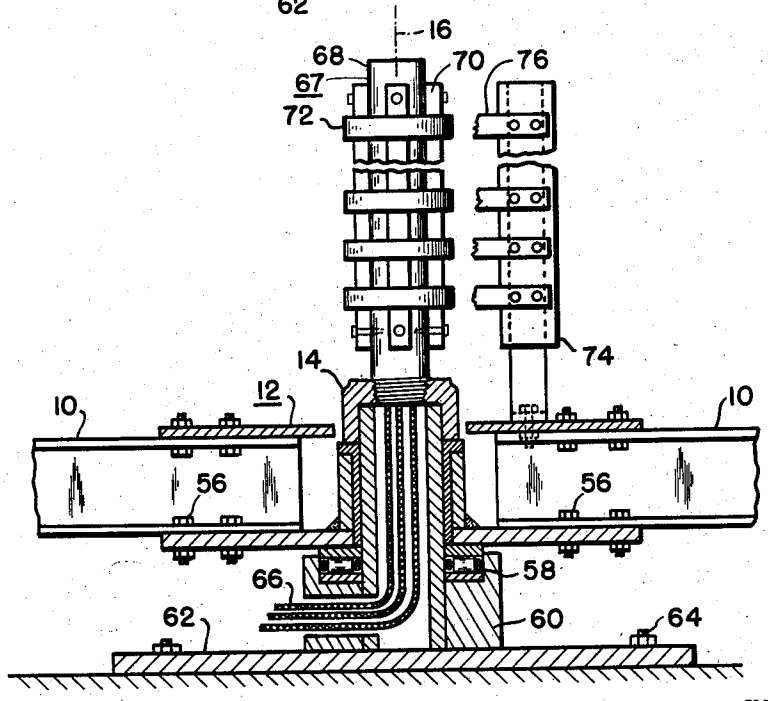

Fig. 8

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AMUSEMENT RIDE DEVICE

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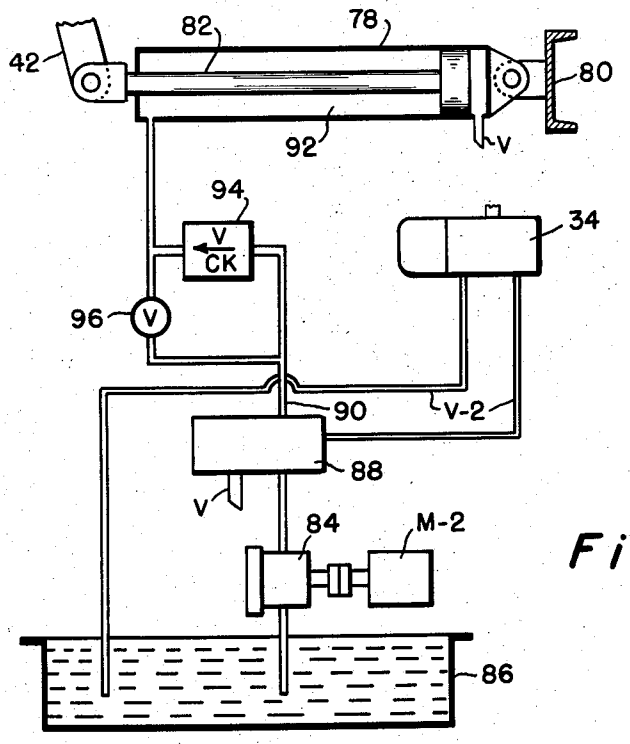

Fig. 9

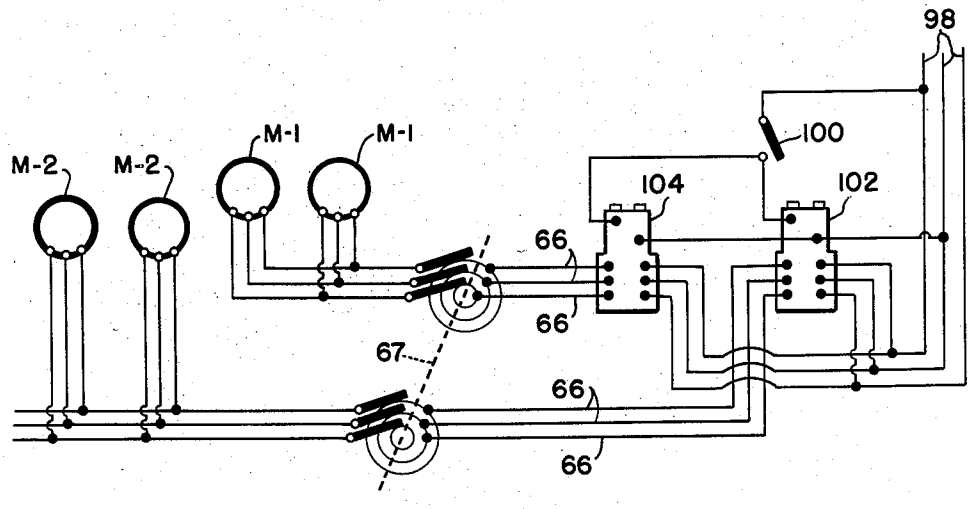

Fig. 10

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AMUSEMENT RIDE DEVICE

John E. Mitchell, New Brighton, Pa.

Application January 16, 1957, Serial No. 634,542

12 Claims. (Cl. 272—36)

This application relates to an amusement ride device embodying cars which simulate flying saucers, helicopters, or the like to seat the passengers and which are mounted on a rotor frame or platform for revolving therewith as it turns and which can be raised and lowered under the control of the passenger in each car.

In ride devices according to the present invention, a rotor frame is employed that turns in a fixed horizontal plane in the basic fashion of the rotors of merry-go-rounds and of similar whirling apparatus but which further provides individual cars suspended from the rotor at its periphery. In the latter case, it is the present practice to use suspending slings, cables, or links for such cars and to secure the slings to the head or to the periphery of the rotor in a manner that they will swing outwardly on axes which inherently stay parallel to the revolving movement of the rotor. As the rotor moves, the cars individualy reach a state of balance where they satisfy the centrifugal displacing force and establish orbits at levels which usually coincide under mutual rotational speed.

In the present invention independent support booms are provided on the rotor which bodily carry and motivate the cars separately and these booms are connected to pivot on fixed horizontal axes about which they swing the cars and which are normal to the revolving movement of the cars. Therefore, car movement due to the boom is a function free from interfering with or interference from centrifugal influences due to the rotor. By isolating the control of one motion from the force and effects of the other, I am thus able to produce new movements possible from the amusement ride standpoint, providing materially different and entirely novel sensations and thrills for the rider to experience.

In accordance with a feature of my invention, underframe rollers are provided on the rotor, each substantially aligned with the resting point of one car to carry the load at that point. In addition, I limit the length of each car supporting boom and arrange it tangentially to the rotor so that its pivoted terminal will introduce and concentrate the reaction load of the car being lifted to a point on the rotor relatively close to the underframe roller for the next car. The underframe rollers ride directly on a ground-laid rail with the result that distortion loads on the rotor frame are held to a minimum regardless of the operating position of the cars and these loads are fed in essentially a direct path for loading the underframe rollers.

In the accompanying drawings, I have shown a preferred embodiment of my invention in which:

Figures 1 and 2 are respective plan and elevation views of an amusement ride device embodying the present invention;

Figures 3 and 4 are large scale views corresponding to Figures 1 and 2 respectively, and showing a portion thereof in the vicinity of one of the idler rollers;

Figures 5 and 6 are larger scale views in plan and elevation in the vicinity of one of the drive rollers;

Figures 7 and 8 are plan and elevational views to the scale of Figures 5 and 6 and in the vicinity of the roller hub spindle;

Figure 9 shows a hydraulic circuit employed in the operation of the device; and

Figure 10 is a wiring diagram showing the control circuits.

In the drawings, a twelve-car ride device embodying my invention includes a proportionate number of A-frames **10** forming a rotor having a hub **12** at the apex of the A-frames and turning on a dead spindle **14** (Figure 8) defining a vertical rotational axis **16**. Pairs of short parallel spacer bars **18** (see Figure 5) rigidly join adjacent A-frames together at their outer end and the bars **18** carry different roller axles which are fixed radial axes on the rotor and which constitute dead axles **20** except for two diametrically opposed ones thereof which are live traction axles **22**. The live axles **22** each carry a sprocket **24** (Figure 6) and are driven by a traction motor M1 through a conventional chain and sprocket drive in a manner whereby idler rollers **26** coast on the axles **20** on which they are carried while driven rollers **26** on the live traction axles **22** drive them on a common circular ground-laid track **28**.

A loading platform **29** slightly above ground level is disposed at one or more points about and slightly above the level of the circular track **28**.

Lengths of structural channel which may be aluminum for lightness, are fabricated together to form the A-frames **10** which include spaced pairs of additional channels **30** on which adjacent cars **32** for the patrons of the ride are supported. The cars **32** are partially enclosed cages preferably holding two passengers side by side so as to face forwardly and having a common pilot control valve device **34** controllable by the passengers.

At the bottom each car carries a rubber bumper **36** which is vertically aligned with and seats upon one of the projecting legs or sweeps of the adjacent A-frame **10** to support the weight of the car and at the top the car carries a captive propeller **38** which is driven simply by air motion to freely spin and which simulates a lifting rotor.

A boom **40** made rigid at the free end with the rear of the cage of each car **32** through appropriate gusset plates **41** and bracket connections forms the car connected arm of a car lifting bell crank which rigidly carries a depending crank arm **42** and which fulcrums at the juncture between the arms on a pedestal **44** defining a fixed pivot therefor. Due to the rearward disposition of each car-lifting bell crank relative to its individual car, the passenger of such car **32** (Figure 4) faces away from the supporting boom **40** therefor throughout all of its operating positions.

Each pedestal **44** is mounted at one end of one pair of car links **30** adjacent one of the underframe rollers **26** and the associated boom **40** pivots on the pedestal to raise the car **32** with center line **46** thereof assuming different angles to a vertical plane common to the vertical rotor axis **16** and to a reference radius R (Figure 1) drawn to intersect that axis from the pivot on the mounting pedestal **44**.

A weight connected third arm **48** rigid with the bell crank on the opposite side of the mounting pedestal **44** counters the load of the car-connected arm or boom **40**. From Figures 1–4 it can be seen that the arm **48** is inwardly offset from alignment with the boom **40** and arranged to extend diagonally upwardly therefrom. Pairs of side braces **50** (see Figure 3) rigidly maintain the arms **48** and **40** in this attitude securing them to a pipe **52** to which they are further secured by butt plates at their ends and which turns on a cross rod which is fixed at its opposite ends to the top of the pedestal **44**.

For uniformity of alignment during manufacture, the

rocking axis of each pipe 52 indicated at 54 (Figure 3) is made parallel to the fixed axis of the adjacent rail engaging roller 26. The side braces 50 thereon and the substantial length of the pipe 52 accentuate the long effective bearing span thereof giving proper lateral stability to each car 32 in addition to the normal rocking function thereof. The car weight (empty) is greater than the counterweight of the arm 48 and the counterweight actually shown thereon is preferably a concrete cylinder cast with one end of the arm 48 permanently embedded therein and being approximately 50 pounds lighter than the car 32. This inherent unbalance of dead weight makes each car 32, whether loaded or unloaded seek to move away from the pivoted position shown by the dotted lines 32*a* (Figures 2 and 4) and be restored under gravity into its normally settled position shown by solid lines in Figures 1–4.

In Figures 7 and 8, the hub 12 comprises vertically spaced plates bolted at 56 to the inner ends of the A-shaped rotor frames 10 and turning on the spindle 14 with the lower plates resting on a thrust bearing 58 carried at the top of a short cylindrical block 60 surrounding the spindle. A common circular anchoring plate 62 is welded to the base of the spindle 14 to support the block 60 and carries hold-down bolts 64 to be anchored in concrete or other suitable support at ground level for the plate 62.

Conductors 66 pass upwardly through the spindle 14 to supply current to an electric slip ring 67 including a mounting post 68 threaded into a socket in the spindle 14. The post 68 is a stator post of conventional construction carrying insulating strips 70 of wood or the like to which spaced stationary conductor rings 72 of metal are fixed. A rotor post 74 on one of the A-frames 10 carries current collector brushes 76 which slidably contact the conductor rings 72 on the stator and deliver current along the A-frames 10 through an electrical wiring harness, not shown.

Power means is provided to crank the cars 32 to selected elevations at the ends of their booms 40. Illustrative of an example of a hydraulic power means is a series of hydraulic cylinders 78 (see Figure 4) each pivoted at one end to a cross bar 80 between each pair of car links 30 and having a piston rod 82 protruding at the opposite end and pivotally connected to the crank arm 42 of the bell crank on each pedestal 44.

An electric motor M2 (Figure 9) for each cylinder drives hydraulic pump 84 which draws hydraulic fluid from a reservoir tank 86 at the outer end of each A-frame 10 and delivers the fluid under pressure to a relief valve 88. Each relief valve 88 has a customary vent V which leads back to the tank 86 and which automatically relieves excessive pumping pressure above a predetermined value. The valves 88 further have another vent V2 leading back to the tank 86 and each including one of the pilot control valve devices 34 which are normally open to by-pass hydraulic fluid from the valve 88 directly back to the tank 86. The relief valve 88 has a discharge outlet 90 through which it delivers hydraulic fluid under pressure to a working chamber 92 surrounding the piston rod 82 in the cylinder 78. A nonworking chamber on the opposite side of the piston from the working chamber 92 is constantly vented through a vent V back to the tank 86. The discharge outlet 90 includes a check valve 94 which unseats to deliver fluid to the cylinder 78 and a needle valve 96 which is connected hydraulically in parallel with the check valve and which returns hydraulic fluid from the cylinder at a flow rate considerably slower than the rate at which the check valve 94 delivers it.

At the running speed of the pump motors M2, a push on the device 34 in any car so as to block the by-pass vent V2 causes the relief valve 88 to deliver a stream of hydraulic fluid under pressure in the discharge line 90

and move the piston rod 82 to the right (viewing Figure 9) so as to lift that car 32. As soon as the passenger releases the control valve device 34 the by-pass vent V2 reopens adjacent the pump 84 and the pump flow freely by-passes to the tank 86. Consequently, hydraulic fluid trapped in the working chamber 92 can then escape from the cylinder through the needle valve 96 and the relief valve 88 vents back to the tank 86 at a predetermined rate determined by the setting for the needle valve 96. Appropriate control of the valve device 34 which develops with a little experience on the part of the passenger enables him to make his car 32 jump rapidly upwardly to any position, to maintain it so that it virtually hovers without excessive hunting at that position, and then to change the car to a different position upwardly or downwardly which he does at will by fully releasing the device 34 or by pushing it open under finger pressure.

In Figure 10, two traction motors M1 and the pump motors M2, two of which are shown, receive current from the slip ring joint 67 which is energized through suitable controllers leading from a three-wire line conductor 98. A master switch 100 controlled by the ride operator is closed so as to energize a pair of magnetic controllers 102 and 104, each providing current conducting means connected on the input side to the three-wire line conductor 98 and having stop and run buttons for controlling the respective pump motors M2 and the drive motors M1.

To start the ride, the operator after closing the master switch 100, pushes the run buttons on the magnetic controllers 102 and 104 for starting the pump motors M2 to run and for starting the traction drive on the rotor so as to set it in motion. Thereafter, the cars 32 can be individually controlled by their occupants who, consistent with the desired relation of facing opposite from the direction in which the individual boom 40 extends from each car, thus revolve facing in the direction of movement of the rotor as it turns and who also are enabled to have vertical movement to individually selected levels. The push buttons on the magnetic controllers 102 and 104 of Figure 10 form an over-riding control over the device such that the ride operator, without tripping the master switch 100, can push the two stop buttons on these magnetic controllers to stop the rotor and disable the electrically driven pumps 84 on the individual cars 32. The weight of the car and passengers is sufficient to force oil trapped in the working chambers 92 through the needle valve 96 and the vented relief valve 88 back to the tank 86 and thus the rubber bumper 36 on each car settles therewith on the associated A-frame 10 at a point convenient to unload the passengers.

In the operation of the booms 40, it is to be noted that the relative shift of the load of each car 32 as the weight transfers between the supporting point below the bumper 36 and the mounting pedestal 44 is in each case close to one of the track engaging rollers 26 thereby freeing the A-frames from unnecessary distortion that the jumping action of the cars might otherwise produce.

Following is an example of the general dimensions, capacity, and operating speed of my device:

Diameter of track 28—50 ft.
Rotor speed—6 R. P. M.
Adult passenger capacity—24 (2 per car)
Child capacity—36 children (3 per car)
Car weight empty—200 pounds
Designed for average passenger weight of 400 pounds
Counterweight on arm 48 weighs 150 pounds
Total loading and unloading time from platform simultaneously—3–4 minutes
Vertical travel of car—10 ft.
Platform height above ground—10 in.

It is apparent that drive cranks 42 can be raised with pneumatic cylinders in place of the hydraulic cylinders

78 and that the cylinders in each case can be of the double acting type instead of single acting as disclosed. It is further evident that the booms **40** can equally well be raised by means of straight mechanical linkage or gearing of the rack and pinion type, in each case driven by means of a chain and sprocket drive having an individual drive motor to operate the same.

I have shown a preferred embodiment of the present invention, but it is to be understood that the principles thereof may be otherwise embodied without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. In an amusement ride device, a rotor having a passenger carrying car at the periphery to revolve therewith, a tangentially disposed support boom connected at one end to said passenger carrying car at a point so that the passenger faces away from said boom, said boom being tangent to the rotor periphery and having its other end connected to said rotor for up and down swinging movement with respect thereto, and means to raise and lower said boom about its swing connection causing said car to move in a plane tangent to the periphery of the rotor in a direction so as to assume different elevations above said rotor.

2. In an amusement ride device, a rotor having a passenger carrying car at the periphery to revolve therewith, a support boom rigid with said car so as to extend in a direction opposite to that faced by the car passenger and tangentially disposed to the periphery of said rotor, and means to pivot the boom on said rotor on an axis normal to the revolving movement of the car causing its center line to assume different angles to a vertical plane common to the rotational axis of the rotor and to a reference radius drawn thereto from said boom pivot means.

3. In an amusement ride device having a ring of cars capable of traveling about a common vertical rotational axis at selected elevations, a rotor mounted on said axis to carry the cars, a pedestal and a car seat supported by the rotor a predetermined measurement apart at its periphery, and car mounting means comprising a bell crank connected at the apex in a tangential disposition to said rotor to fulcrum on a fixed axis in the pedestal and having one arm with a length equal to said predetermined measurement for attachment to a car at a point so that the passenger faces in the opposite direction from said bell crank, said fixed fulcrum axis being normal to the traveling motion of said ring of cars.

4. In an amusement ride device having a fixed curved track closing on itself, a rotor carrying a ring of circumferentially aligned rollers for rolling along the track as the rotor revolves, a plurality of cars riding the rotor as it revolves each at a point adjacent a different roller, and rearwardly extending booms connected to pivot each car to different elevations from a supporting point of swing closely spaced to the roller adjacent the next car to the rear, the swing axis through said supporting point being normal to the revolving movement of the car, said booms being tangent to said rotor and each extending rearwardly in the described manner from the car so that the passenger thereof rides at all times facing away from the boom in a defined path of motion in which he is carried by that car in a plane tangent to the periphery of said rotor in assuming the different elevations aforesaid.

5. In an amusement ride device, the combination of a rotor frame mounted to revolve on a vertical axis and carrying a ring of supporting rollers including idler rollers coasting upon dead axles as rollers on live axles on the rotor drive them in revolving the rotor, cars riding at the periphery of the rotor to revolve therewith at normally supported locations each approximately above a roller, each said location including a supporting perch leg for the car and affixed to the rotor, and means including a car-connected arm and power means to individually pivot each car from an offset point effective to crank that car-connected arm upwardly thereabout thereby making each car jump from its normal location on its perch leg and concentrating the load of that car to the supported location and roller below the next car, the pivot axis through said offset point being normal to the revolving movement of the ring of cars, said car-connected arms being tangent to said rotor at the periphery thereof and having a connection to a car each at a point extending rearwardly therefrom so that the car passenger faces away from that arm.

6. In a plural car ride device for carrying passengers for amusement and having a fixed curved track closing on itself, a rotor carrying a ring of circumferentially aligned rollers for rolling along the track as the rotor revolves, tangentially disposed support booms connected at one end to the rotor adjacent different ones of the rollers in said ring for up and down swinging movements of which the swing axis is normal to the revolving movement of the rotor and the cars, and having the free terminal thereof extending in a tangential direction to said rotor and disposed adjacent the next roller for attachment to a passenger car at a point at the rear thereof so that the passenger faces in the opposite direction from the boom, and power means individual to said booms for independently cranking the cars thereon in a manner such that one car may rise from the rotor while another car is settling thereon.

7. In an amusement ride device having a ring of cars capable of traveling about a common vertical rotational axis at selected elevations, a rotor mounted on said axis to carry the cars, a pedestal at the periphery of the rotor, car mounting means comprising a bell crank connected at the apex in a tangential disposition to said rotor to fulcrum on a fixed axis in the pedestal and having one arm for attachment to a car, at a point so that the passenger faces in the opposite direction from said bell crank, said fixed fulcrum axis being normal to the traveling motion of said ring of cars and means operatively connected between said bell crank and the rotor to crank the car about said axis through a curving path of motion in a plane tangent to the periphery of said rotor into positions in said plane with its center line at different angles to the radial plane between said vertical rotational axis and said fixed fulcrum connection.

8. In an amusement ride device, the combination of a rotor frame mounted to turn on a dead spindle, a circular track fixed beneath the periphery of the rotor frame, a ring of axle mounted underframe rollers on said rotor frame engaging the track and including rollers to drive the rotor and idler rollers mounted thereto on dead axles, traction motors connected to drive the axles of the drive rollers, said idler rollers coasting upon said dead axle as the axle connected motors drive the drive rollers, passenger cars riding at the periphery of the rotor to revolve therewith at normally supported locations each approximately above a roller, a swinging boom having the free end rigid with each car with the boom extending from its point of rigid connection to that passenger car in a direction so that the passenger of the latter faces away from that boom, and with said boom being mounted to fulcrum adjacent the supported location of the next car, said fulcrum axis being normal to the revolving movement of said cars and said booms being tangent to the periphery of the rotor frame, a hydraulic cylinder effective to crank each car connected boom upwardly thereby making each car jump upwardly from its normal location and concentrating the load of that car to the supported location and roller below the next car, a weight connected arm on the opposite side of the fulcrum of each car connected arm and cooperating therewith to form a counterweighted bell crank structure, hydraulic circuit means including valve devices individual to the hydraulic cylinders and controllable

from within each car for controlling the application of hydraulic pressure thereto for controlling the bell crank structures in a manner such that the center line of the car assumes different angles to a pair of mutually perpendicular planes one consisting of the plane of the rotor and the other being the mutual plane of the spindle axis and a reference radius drawn thereto from the bell crank fulcrum, said circuit means further including individual pumps and pump drive motors therefor having a common source of electrical supply current, and a single operating member forming an over-riding control for the pump drive motors enabling the cars to return under their own weight to their normal supported locations irrespective of the operation of said individual valve devices.

9. An amusement ride device having a rotor, cars in which passengers ride arranged at spaced locations on the periphery of the rotor to revolve with the rotor, and means to pivot the cars to selective elevations at their individual locations, comprising swinging booms tangentially disposed to said rotor with their free end rigid with the different cars at a point of support thereto from which each car boom extends in a direction opposite to that faced by the passenger of that car for concealing the conspicuousness of that boom to that passenger so as to impart a detached feeling of buoyancy to him as the car in which he rides swings with the boom, and means on said rotor to pivot each of the tangentially disposed booms on an axis normal to the revolving movement of the cars.

10. In a plural car ride device for carrying passengers for amusement and having a fixed curved track closing on itself, a rotor carrying a ring of circumferentially aligned rollers for rolling along the track as the rotor revolves, a plurality of cars provided with a like number of individual car carrying arms each secured thereto so as to extend in an opposite direction than faced by the passenger of that car and each connected to the rotor in tangency thereto at a point adjacent one roller to swing a car up and down with respect thereto, the swing axis through said point of connection being fixed normal to the path of movement of the ring of cars so that the curving path of motion of each car up and down is in a plane tangent to the periphery of the rotor whereby the passenger experiences a jumping action operating at right angles to the centrifugal force exerted on him due to movement of the rotor, a car seat for that car mounted adjacent a different roller which is the next one thereto, at least one roller in said ring comprising an idler roller, and traction means enabling said rotor to move with a self-propelled action comprising a prime mover carried adjacent and connected to drive another roller in said ring.

11. In a plural car ride device for carrying passengers for amusement and having a vertical rotational axis, a rotor mounted to turn on said rotational axis, means to carry the cars at selective elevations on the rotor comprising individual bell crank structures at the periphery of the latter and each tangent to said periphery and having the common juncture between its opposite arms connected to fulcrum at a point of support on the rotor, an underframe roller adjacent each point of support aforesaid for carrying the rotor at the periphery, one of said arms on each bell crank structure being attached to a car and extending in a direction therefrom so that the passenger of that car faces away from that arm and being of a length sufficient to deposit that car at a point on the rotor adjacent the next underframe roller, the fulcrum axis of said bell crank structure arm being normal to the revolving movement of said car whereby a passenger experiences a jumping action operating at right angles to the centrifugal force exerted on him due to turning movement of the rotor, and the other arm carrying a counterweight and disposed in tangentially overlapped radially spaced relationship to the car carrying arm on the adjacent bell crank so as to operate in spaced apart relation without interference therewith.

12. In a roundabout, a revolvable rotor, crank means thereon tangent to the rotor periphery, said crank means comprising plural-arm bell cranks arranged with individual pedestals on which they are fulcrumed at spaced apart points to said rotor and each provided with an individual passenger car supported by means of a rigid connection between the free end of one of said plural arms and the rear end of that car so that the passenger faces away from said bell crank, another arm of each bell crank carrying a member to counter the weight of the car-connected arm and tangentially overlapped with the car-connected arm of another following bell crank, and power means carried by said rotor operative to crank said bell crank means independently for raising and then causing said cars to come down toward a position of rest on said rotor, the axis of each of said plural arm bell cranks through its fulcrum point as aforesaid being normal to the revolvable travel of said cars with said revolvable rotor, and said weight countering arm of each bell crank being closely spaced in the aforesaid tangentially overlapped relation with the car-connected arm of another following bell crank and its car so as to operate without interference therewith and to heighten the illusion of relative movement from standpoint of the passenger of that car.

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