Dec. 3, 1963 L. U. EYERLY ETAL 3,112,927

AMUSEMENT RIDE

Filed July 16, 1962 2 Sheets-Sheet 1

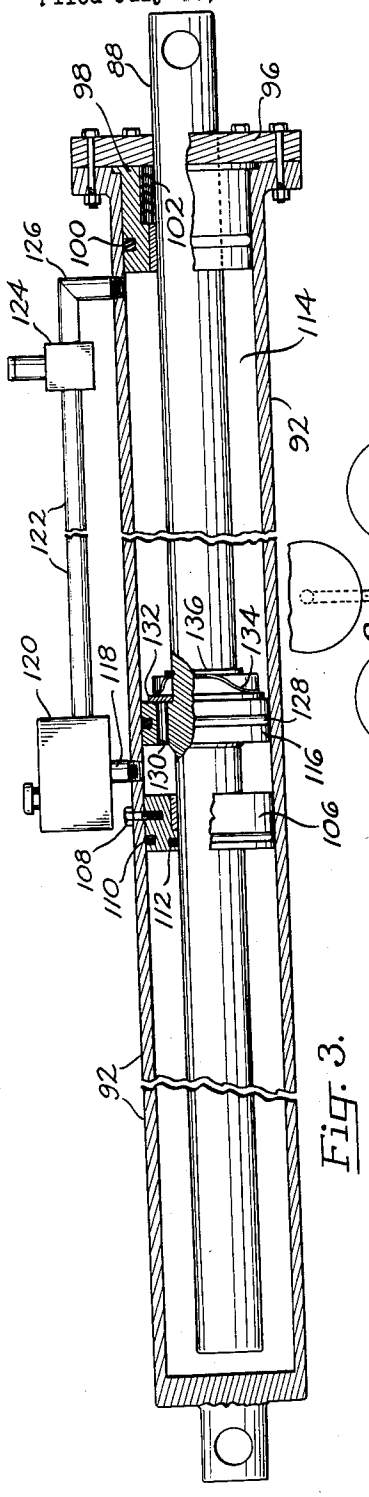

Fig. 3.

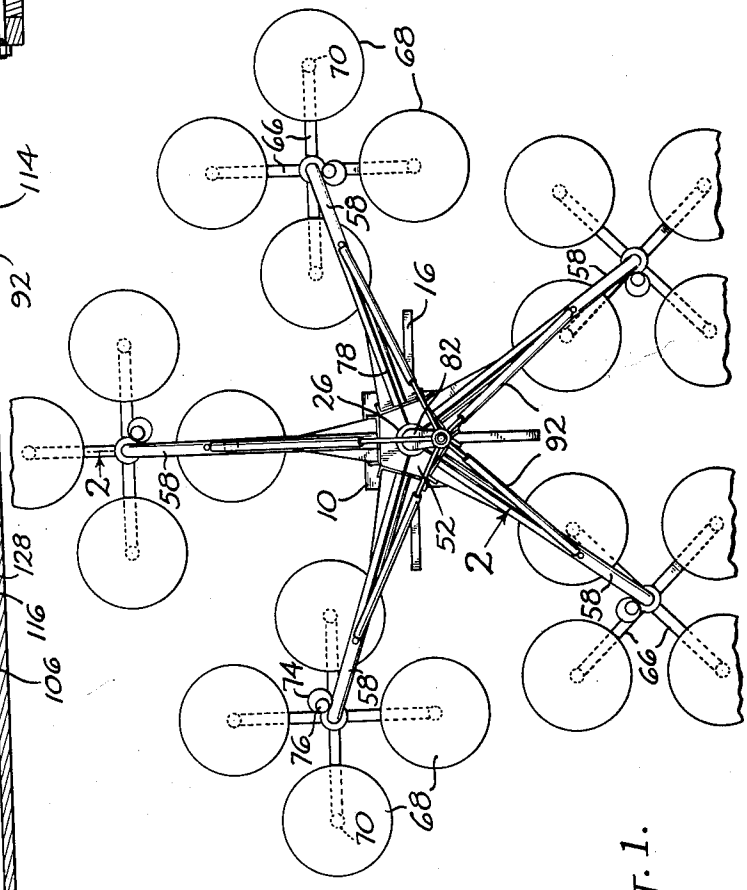

Fig. 1.

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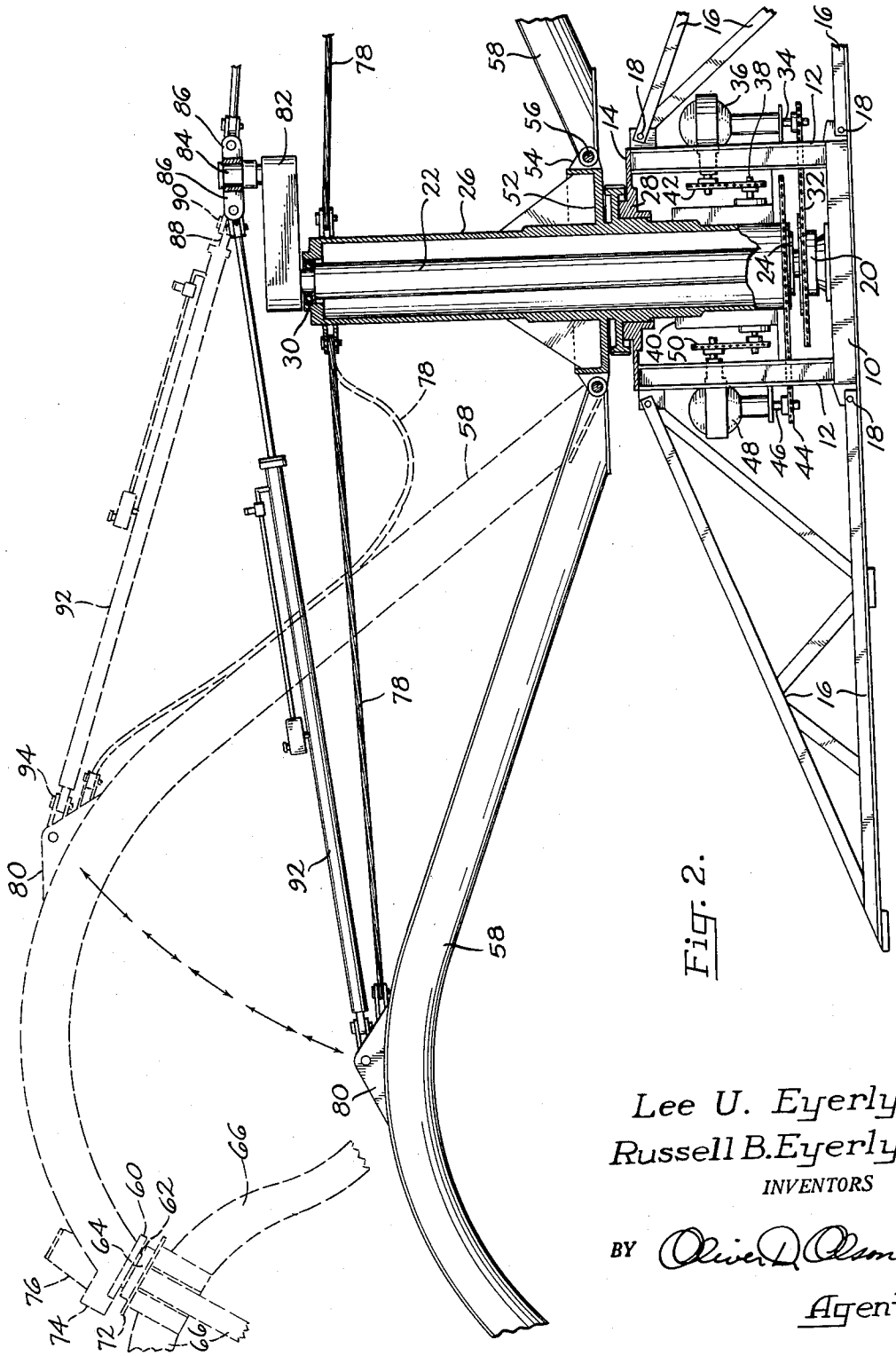

Fig. 2.

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3,112,927

AMUSEMENT RIDE

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This invention relates to amusement rides, and more particularly to an amusement ride of the type which subjects riders to a plurality of motions.

Amusement rides have been provided heretofore in which riders are supported on carriers at the outer ends of a plurality of arms mounted for simultaneous rotation on a vertical axis and pivotal movement on a horizontal axis. One such amusement ride of this type is disclosed in U.S. Letters Patent No. 2,113,131.

The principal disadvantage of the aforementioned ride resides in the fact that, at any given position of rotation only one of the projecting arms is at its lowermost position of pivot, the remaining arms being at various other positions of elevation. Accordingly, the loading and unloading of riders must be done sequentially by an intermittent rotation which brings each successive arm to its lowermost position of pivot. Obviously, this procedure is time consuming and therefore not only economically disadvantageous to the midway operators, but it is also annoying to the patrons.

It is the principal object of the present invention to provide an amusement ride of the class described in which means is provided for lowering all of the arms simultaneously to a level permitting the simultaneous loading and unloading of all rider carriers.

Another important object of this invention is the provision of an amusement ride of the class described in which the rider is subjected to an additional rotary motion about an axis at the outer end of the arm, in addition to the rotational and pivotal movements described hereinbefore.

A further important object of this invention is the provision of an amusement ride of the class described, which is of simplified construction for economical manufacture and maintenance, which is of rugged construction for maximum safety, and which is capable of assembly and disassembly with speed and facility to accommodate practicable portability.

The foregoing and other objects and advantages of this invention will appear from the following detailed description, taken in connection with the accompanying drawings in which:

FIG. 1 is a fragmentary plan view of an amusement ride embodying the features of the present invention;

FIG. 2 is a fragmentary sectional view taken along the line 2—2 in FIG. 1, one of the arms being shown fully elevated in dash lines and fully lowered in solid lines; and

FIG. 3 is a fragmentary foreshortened sectional view of an extensible connector component of the amusement ride of the present invention.

In the amusement ride illustrated there is provided a main frame including the horizontal base 10, the upstanding posts 12 and the top plate 14 secured thereto. A plurality of outrigger frames 16 are detachably connected to the main frame, as by means of the bolts 18, to increase the lateral stability of the apparatus.

Supported upon the base is a pilot bearing 20 which rotatably supports the lower end of the vertical shaft 22. Mounted on the lower end of the shaft and spaced above the pilot bearing is a thrust bearing 24 which supports the lower end of the outer tubular shaft 26. This tubular shaft is supported intermediate its ends by the annular bearing 28 carried by the top plate 14. The upper end

of the tubular shaft carries a bearing 30 which supports the upper end of the inner shaft 22.

A sprocket is secured to the inner shaft adjacent its lower end, and the chain 32 interconnects this sprocket with a sprocket carrier on the output shaft 34 of the gear reduction unit 36. The input shaft of the gear reduction unit is connected to the output shaft 38 of the drive motor 40 by sprocket chain 42.

Similarly, the lower end of the outer, tubular shaft 26 carries the sprocket which is connected by the chain 44 to a sprocket carrier on the output shaft 46 of the gear reduction unit 48. The input shaft of this gear reduction unit is connected to the output shaft 38 of the drive motor 40 by the sprocket chain 50.

Secured to the tubular shaft 26 above the top plate 14 is an arm support plate 52. Peripherally spaced pairs of projecting ears 54 on this plate support horizontal pivot pins 56 each of which, in turn, support the inner end of an outwardly projecting arm 58. In the embodiment illustrated and best shown in FIG. 1, there are five such arms, although it will be understood that the number of arms may be varied as desired.

Each arm is provided at its outer end with a bearing 60 which supports a rotary stub shaft 62, the integral hub 64 of which supports a plurality of radially projecting arms 66. In the embodiment illustrated, there are four such arms on each hub, and it will be understood that the number of arms may be varied as desired. The outer end of each arm rotatably supports a rider carrier 68, as by means of the pivot shaft 70. This shaft may permit free rotation of the carrier, or it may be power driven to rotate the carrier, as desired. Although the shaft 70 extends substantially parallel to the stub shaft 62, it will be understood that other angular arrangements therefor may be provided.

Each stub shaft hub 64 carries a sprocket which is connected by the chain 72 to a sprocket on the output shaft of the gear reduction unit 74 which is coupled to the drive motor 76. This combination gear reduction unit and drive motor is mounted at the outer end of the arm 58.

Each assembly of carrier arm 66 and main arm 58 is so arranged that at a lowered position of pivot of the main arm, about its horizontal pivot 56, all of the carriers 68 supported thereby are positioned uniformly above the ground a distance which accommodates easy entrance to and egress from the carriers. This lowered position of each main arm is fixed by means of a flexible cable 78 which is secured at one end to the tubular shaft 26 adjacent the upper end of the latter and at the opposite end to a bracket 80 secured to the main arm intermediate the ends thereof.

The upper end of the inner shaft 22 supports a cam member 82 for rotation therewith. A stub shaft 84 projects from the cam member, laterally outward from and parallel to the shaft 22, and this stub shaft supports a spider member for rotation thereon. Each of the projecting lugs 86 forming the spider member serves as a connection for the projecting end of a piston rod 88, the connection preferably being made through a universal joint 90. A piston, carried at the opposite end of the rod, is confined within an elongated cylinder 92, and the end of the latter opposite the piston rod is connected through a universal joint 94 to the bracket 80 secured to each main arm 58.

The internal construction of the piston-cylinder unit is best illustrated in FIG. 3. The end of the cylinder 92 through which the piston rod 88 extends is closed by the end cap 96 which also functions to secure the bushing 98 in the cylinder. An O-ring seal 100 is provided between the bushing and cylinder wall, to prevent the escape of fluid from the cylinder. The packing 102

between the bushing and piston rod also prevents the escape of fluid from the cylinder.

Approximately midway between the ends of the cylinder another bushing 106 is secured, as by means of the set screws 108. O-ring seals 110 and 112 between the bushing and cylinder and between the bushing and piston rod, respectively, confine fluid within the operating chamber 114 of the cylinder containing the piston 116. The piston is secured or otherwise formed integral with the piston rod at a point approximately midway between the ends of the latter. Thus, with the piston rod retracted substantially to its maximum limit within the cylinder, as illustrated in FIG. 3, the piston is located adjacent the central bushing 106 but spaced from the latter sufficient to accommodate the bypass conduit 118 at the inner end of chamber 114. This conduit communicates with a fluid reservoir 120 which, in turn, communicates with the conduit 122 connected to the electrically actuated solenoid valve 124. The valve releasably connects conduit 122 to conduit 126 which communicates with the cylinder adjacent the outer end of the fluid chamber 114.

The piston 116 carries a peripheral O-ring seal 128 which prevents the passage of fluid between the cylinder wall and piston. The piston also includes one or more longitudinal openings 130 which extend through the piston. An annular valve member 132 encircles the piston rod on the side of the piston facing the direction of extension of the piston rod, and this valve member is held resiliently against the openings 130 by means of the longitudinally resilient annular spring 134. A lock ring 136 removably received in an annular groove in the piston rod retains the spring in operative position against the valve member.

The piston valve construction is such that as the piston moves inward toward the central bushing 106, during retraction of the piston rod, fluid may pass through the piston openings 130, the fluid pressure on the inner side of the piston being sufficient to overcome the force of the valve spring 134 and thus separate the annular valve member 132 from the openings. However, if the solenoid valve 124 is in the position sealing the conduits 122 and 126 from each other, movement of the piston in the direction of extension of the piston rod is prevented, since the valve member 132 seals the openings 130.

On the other hand, by actuating the solenoid valve 124 to the position interconnecting the conduits 122 and 126, extension of the piston rod may be effected, since the fluid in the cylinder chamber 114 outward of piston 116 then may be bypassed to the inner side of the piston.

In describing the operation of the amusement ride, let it be assumed that the drive motors 40 and 76 are stopped and that the solenoid valves 124 have been actuated to interconnect the conduits 122 and 126. Because of the substantial weight of the carrier assemblies supported at the outer ends of the main arms 58, the latter tend to rotate about their supporting pivots 56 to their downwardmost positions determined by the fixed cables 78. This downward movement of the main arms is permitted because the bypass conduits are open to the opposite ends of the fluid chamber 114, permitting extension of the piston rod. Accordingly, all of the rider carriers, there being twenty illustrated in FIG. 1, are in uniformly lowered position ready to receive riders.

When the carriers have been filled with riders, the solenoid valves 124 are actuated to seal the conduits 122 and 126 from each other. The carrier arm drive motors 76 are energized, as is the drive motor 40 for the concentric vertical shafts 22 and 26. Accordingly, the assembly of main arms 58 rotates with the tubular shaft 26 while the assembly of carriers 68 on each main arm rotates about the stub shaft 60.

Although the central shaft 22 and the attached cam assembly also may be rotating, preferably in the direction opposite that of the tubular shaft 26, let it be assumed for the purpose of this explanation that the central shaft is not rotated. It will be apparent that when each main arm 58 extends outward in the direction diametrically opposite the extending direction of the cam 82, the piston rod 88 associated therewith is at its position of maximum extension. As that arm is rotated through 180°, to the position extending in the same direction as the cam, the piston rod then is at its position of maximum retraction. This retraction is accommodated by passage of the fluid through the piston openings 130 and around the valve member 132, as explained hereinbefore.

However, as the main arm continues to rotate relative to the cam, extension of the piston rod is prevented since fluid cannot flow back through the piston openings 130 and it also cannot flow through the bypass condiuts. Accordingly, the piston rod is retained in its position of maximum retraction, and the main arm is caused to pivot upwardly about its pivot 56 progressively as the main arm rotates through the second 180°, back to its position diametrically opposite the direction of extension of the cam member.

If the cam member is retained in stationary position, each arm will pivot from its lowermost position to its uppermost position and then back to its lowermost position, during one revolution. This rate of vertical oscillation of each arm may be varied by rotating the center shaft at various rates relative to the tubular shaft, either in the same direction therewith or in the direction opposite thereto.

Upon completion of the ride, the drive motors are deactivated and the solenoid valves 124 actuated to interconnect the conduits 122 and 126. The pistons then may move in the direction to extend the piston rods, whereby to lower all of the main arms and the carriers supported thereby to their lowermost positions, permitting all of the riders to leave the carriers simultaneously. The solenoid valve is adjusted, in the open position, to control the speed of lowering of the carriers to safe and comfortable conditions.

From the foregoing it will be apparent that the present invention provides an amusement ride which through a multiplicity of motions, affords many thrills for the participants, while assuring their complete safety. By elimination of the formerly required stepwise loading and unloading of the carriers supported by each arm, tiresome waiting by the patrons is avoided. Elimination of this factor also contributes advantageously to the midway operators, by affording a greater number of ride periods per hour of operation.

It will be apparent to those skilled in the art that various changes may be made in the details of construction described hereinbefore without departing from the spirit of this invention and the scope of the appended claims.

Having now described our invention and the manner in which it may be used, what we claim as new and desire to secure by Letters Patent is:

1. An amusement ride comprising first and second coaxial vertical shafts, means mounting at least the first shaft for rotation on a vertical axis, a plurality of outwardly projecting arms mounted pivotally at their inner ends on the first shaft for rotation therewith and for pivotal movement on substantially horizontal axes, fixed connector means interconnecting the first shaft and each arm for limiting the downward pivoting thereof, rider carrier means at the outer end of each arm, cam means mounted on the second shaft, anchor means mounted pivotally on the cam means on an axis displaced laterally from the axis of the second shaft, extensible connector means interconnecting the anchor means and each arm, and adjustable control means operatively associated with the extensible connector means and operable in one condition of adjustment to permit shortening of the extensible connector means and to prevent lengthening thereof and in a second condition of adjustment to permit both

shortening and lengthening of the extensible connector means.

2. The amusement ride of claim 1 wherein both first and second shafts are mounted for rotation at different speeds.

3. The amusement ride of claim 1 wherein both first and second shafts are mounted for rotation in opposite directions.

4. The amusement ride of claim 1 wherein the rider carrier means comprises a rider carrier support arm mounted at its inner end on the outer end of the first named arm for rotation on an axis substantially normal to the pivot axis of the first named arm, drive means engaging the rider carrier support arm for rotating the latter, and a rider carrier mounted pivotally on the outer end of the rider carrier support arm.

5. The amusement ride of claim 1 wherein the rider carrier means comprises a plurality of rider carrier support arms mounted at their inner ends on the outer end of each first named arm for rotation on an axis substantially normal to the pivot axis of the first named arm, drive means engaging the rider carrier support arms for rotating the latter, and a rider carrier mounted pivotally on the outer end of each rider carrier support arm.

6. The amusement ride of claim 1 wherein the extensible connector means comprises an elongated fluid containing cylinder, a piston movable longitudinally in the cylinder and having a piston rod extending therefrom through one end of the cylinder, fluid valve means in the piston arranged to pass fluid therethrough in the retracting direction of movement of the piston rod and to prevent passage of fluid therethrough in the extending direction of movement of the piston rod, fluid bypass means interconnecting the opposite ends of the cylinder, and adjustable valve means in the bypass means and operable in one condition of adjustment to seal the bypass means and in the second condition of adjustment to open said bypass means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,113,131	Eyerly	Apr. 5, 1938
2,922,648	Bradley	Jan. 26, 1960
2,983,509	Haug	May 9, 1961