Feb. 24, 1953 N. BARTLETT 2,629,593

OCCUPANT CARRYING ROUNDABOUT

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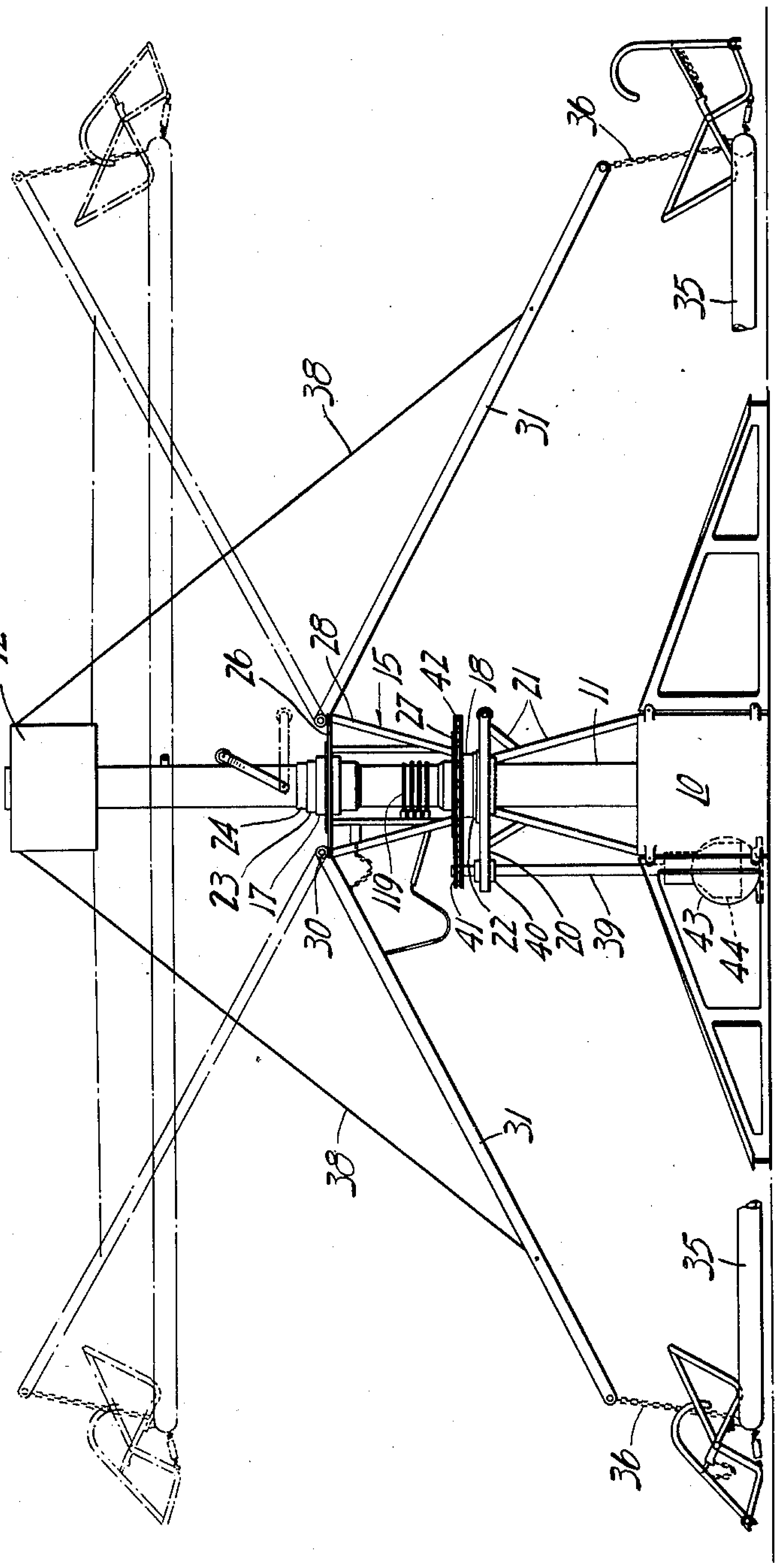

Fig. 1.

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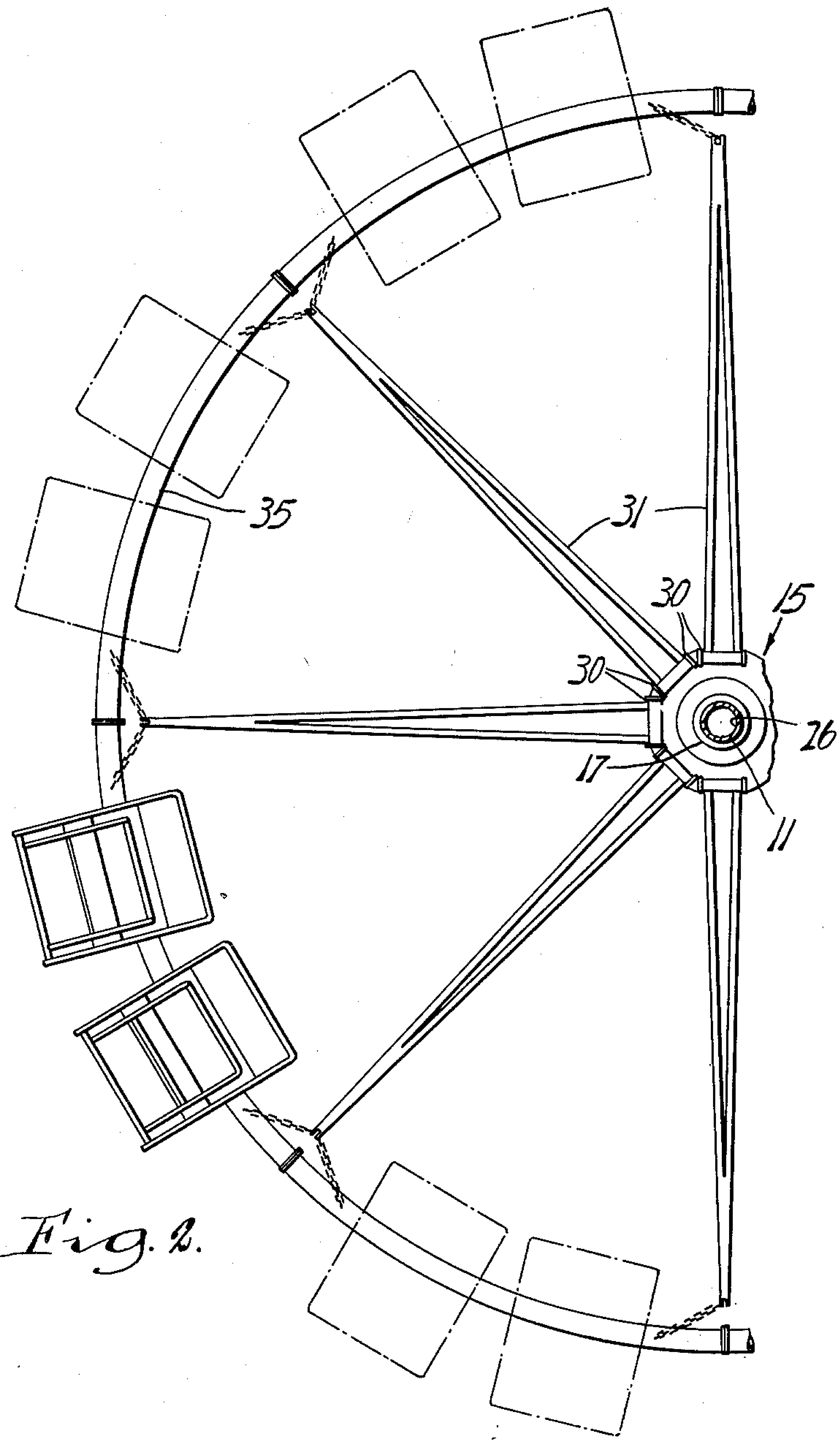

Fig. 2.

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Fig. 3.

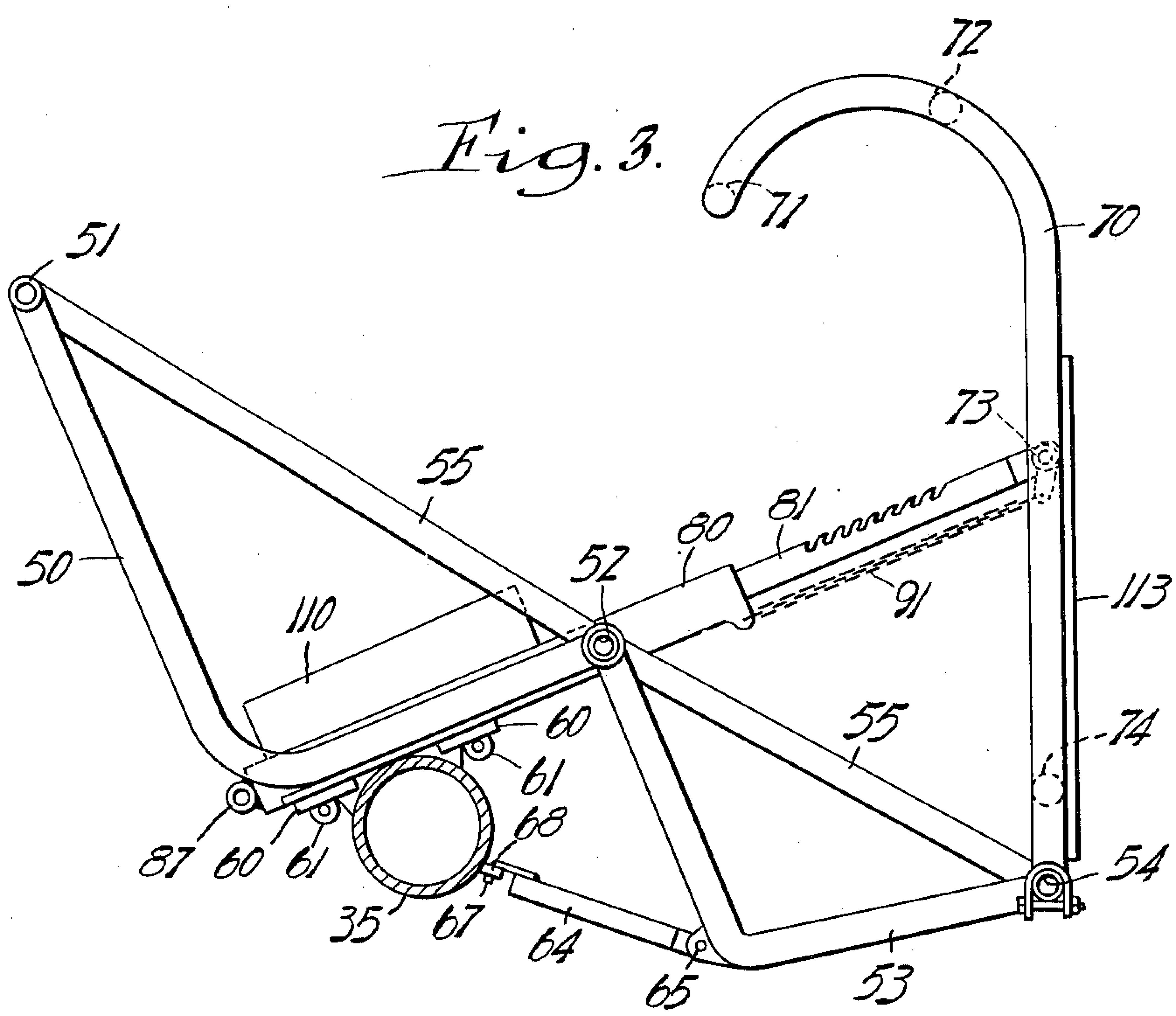
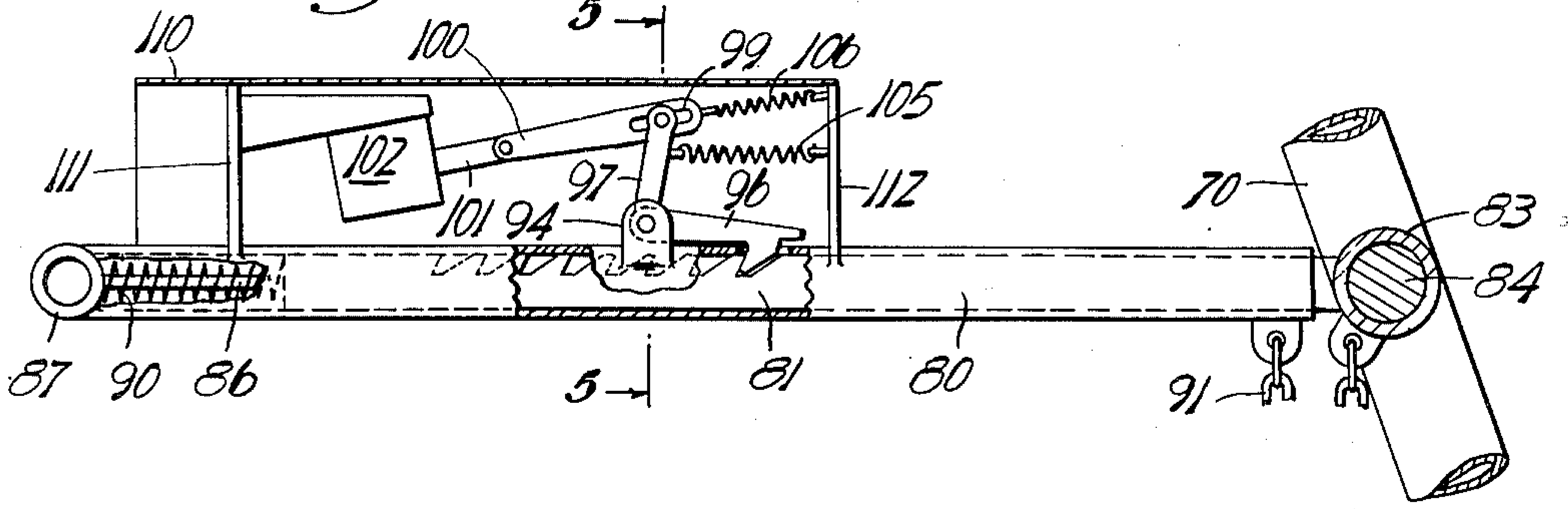


Fig. 4.



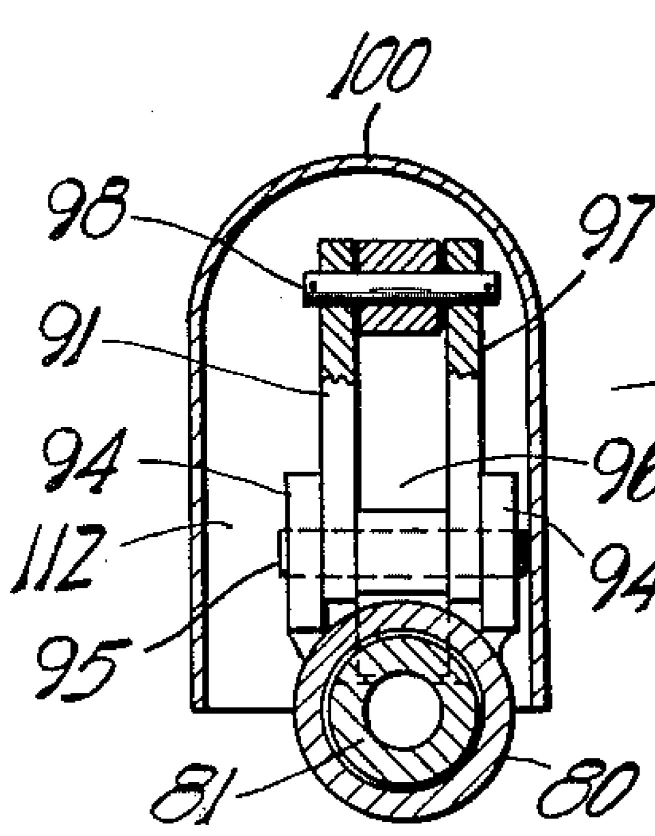


Fig. 5.

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Fig. 6.

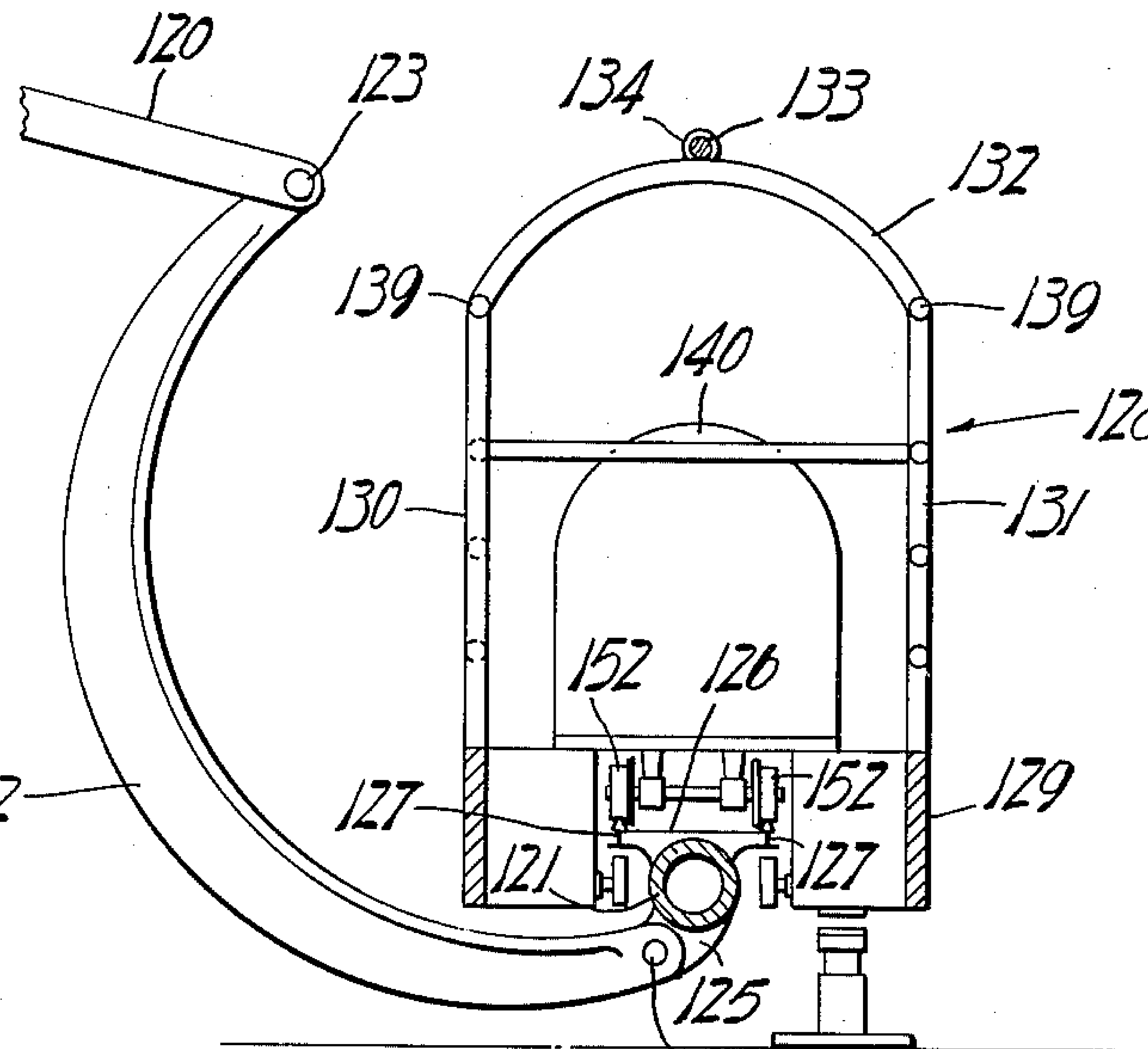
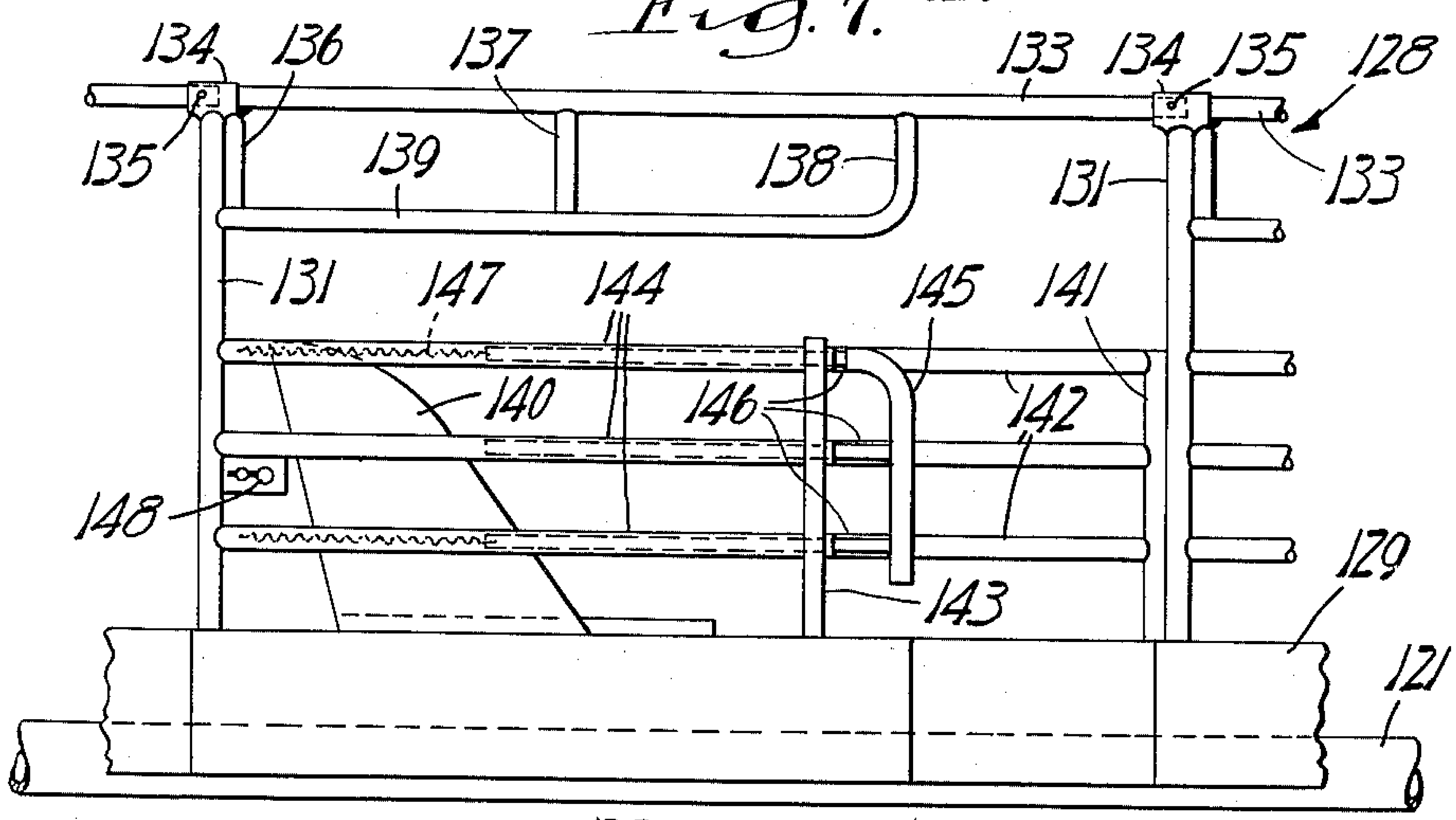


Fig. 7.



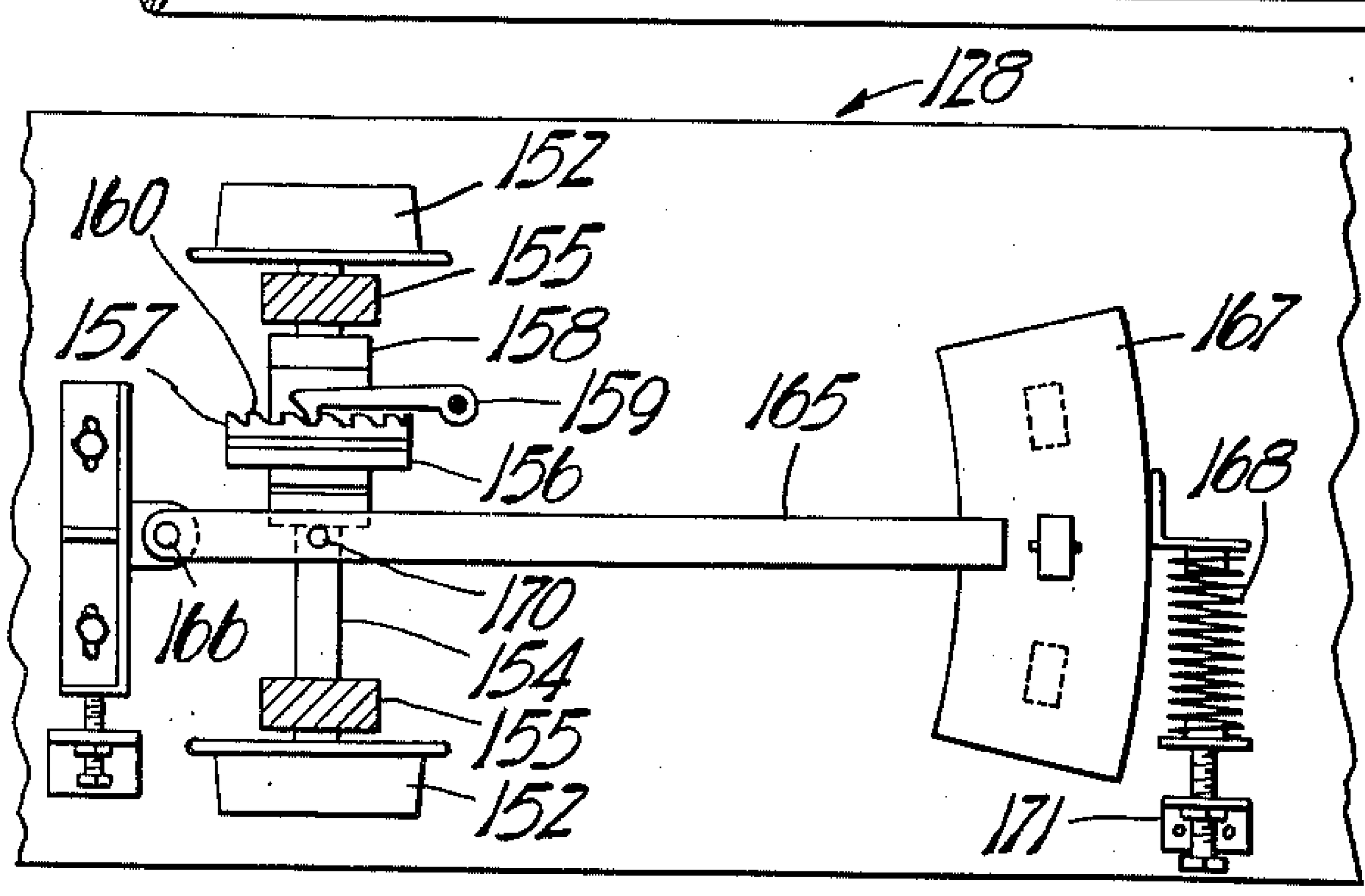


Fig. 8.

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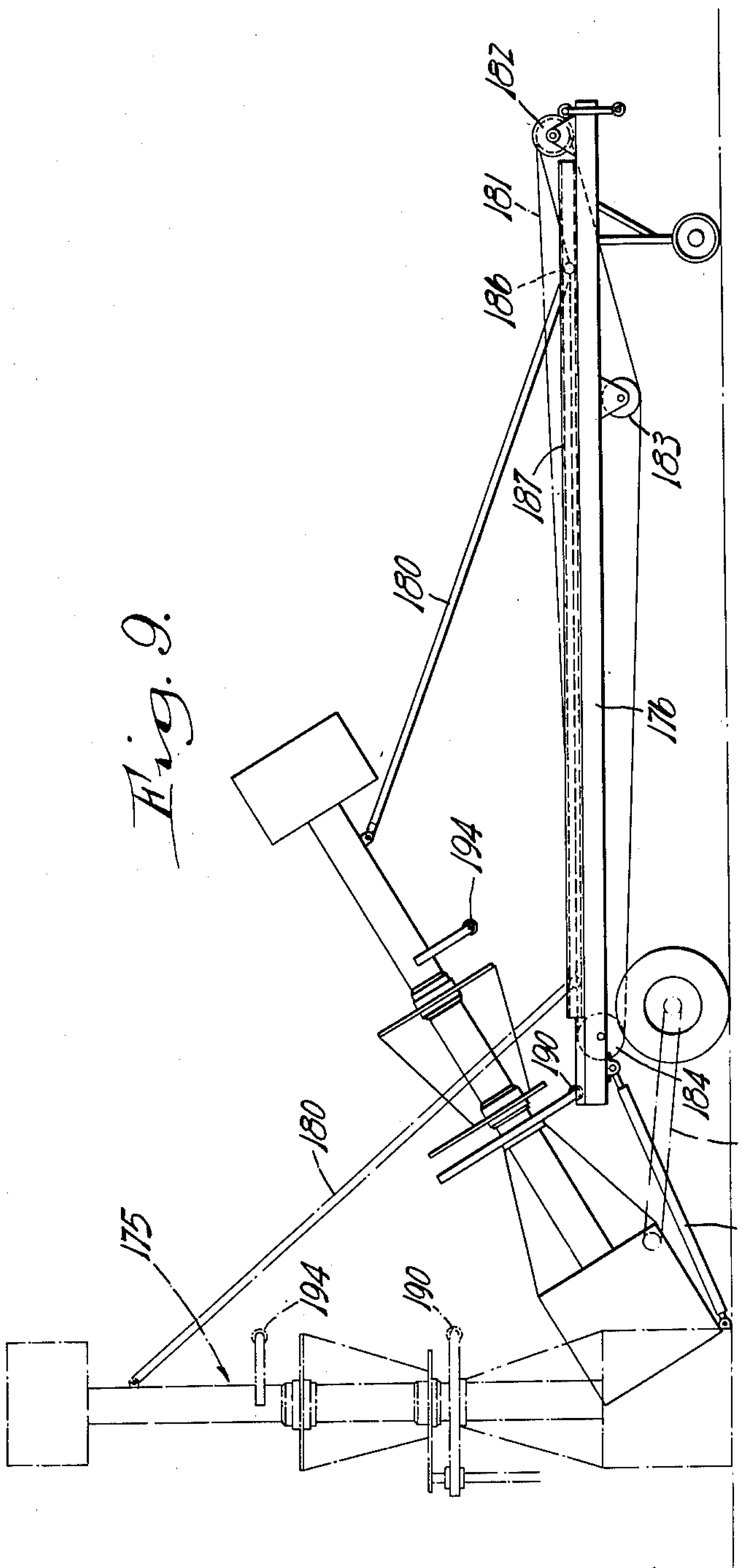

Fig. 9.

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UNITED STATES PATENT OFFICE

2,629,593

OCCUPANT CARRYING ROUNDABOUT

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Application September 30, 1950, Serial No. 187,708

21 Claims. (Cl. 272—48)

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This invention relates to amusement rides and particularly to rides of the kind known as roundabouts where one or more passenger carriers pursues a continuous circular course or an oscillating course about a circular path.

Fundamentally, the present invention provides an annular support, in the form of a ring or the like, the support having fixed therealong a series of passenger-accommodating seats or compartments. The annular support is associated with central supporting means in such manner that its rotative or oscillative movements may be accompanied by concentric rising and falling movement thereof, so that the actual path of the seats or compartments may be an undulating one with a wide range of selective variation as to pitch, amplitude and velocity.

In one form, the amusement ride of the present invention is of the general type shown in United States Letters Patent to Joseph D. Guinn, No. 1,186,185, dated June 6, 1916, although the ride shown and described in the aforesaid Letters Patent could not be operated successfully because of inherent instability and for various other reasons.

A clearer understanding of the novel underlying principles of the present invention will be had from a study of the embodiments thereof described in detail hereinafter and illustrated in the accompanying drawings. It is to be understood, however, that the examples set forth are merely illustrative and that many modifications and variations may be introduced without departing from the teachings of this invention, the spirit and scope of which is limited only as defined in the appended claims.

In the drawings:

Fig. 1 is a general, somewhat schematic, side elevational view of one form of the amusement ride of the present invention;

Fig. 2 is a fragmentary top plan view of the ride shown in Fig. 1 with the uppermost portion broken away;

Fig. 3 is a side elevational view of one of the passenger seats or compartments of the ride of Figs. 1 and 2;

Fig. 4 is a fragmentary view, partly in cross-section, of a safety locking device of the seat or compartment of Fig. 3;

Fig. 5 is a cross-sectional view on the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary end elevational view, partly in cross-section, showing a modified passenger seat or compartment and a modified suspension or support therefor;

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Fig. 7 is a fragmentary side elevational view of the seat or compartment of Fig. 6;

Fig. 8 is a bottom plan view of the seat or compartment of Figs. 6 and 7; and

Fig. 9 is a general side elevational view of apparatus for loading and transporting the central structure or tower of an amusement ride.

Throughout the several figures of the drawing like characters of reference denote like parts, and the number 10 designates a central base member to which is fixed an upwardly extending vertical post 11, and the top of post 11 has fixed thereto a stationary winding drum 12, the function and operation of which will be described later herein.

A rotatable cage which comprises arm-supporting and rotating means is designated generally by the numeral 15 in Figs. 1 and 2 and comprises, in the form there shown, upper and lower bearing or hub elements 17 and 18. A plate or platform structure 20 is fixed to post 11 and suitable bracing may extend between platform 20 and base 10 as indicated at 21 in Fig. 1. The lower bearing 18 of cage 15 rests upon platform 20, there being an intervening thrust ball bearing as indicated at 22.

There is likewise a thrust ball bearing directly above upper bearing 17 as at 23 and an upper retaining collar is fixed to post 11 as at 24 in Fig. 1. An annular plate 26 is fixed to upper bearing 17, and a sprocket 27 or other drive wheel is fixed to lower bearing 18. Brace rods or struts may engage between plate 26 and sprocket 27 as indicated at 28 in Fig. 1.

Plate 26 has arranged about its upper margin a plurality of pairs of spaced bearings 30 which give pivotal support to a series of radiating arms 31. It will be noted by reference to Fig. 2 that arms 31 are in the form of triangular trusses and and that the bearing portions at their inner end are of substantial axial extent to give the arms stiffness in a horizontal direction.

A rigid passenger seat or compartment supporting ring is designated 35 in Figs. 1, 2, and 3 and may be tubular as there shown. For portability ring 35 is preferably made in a series of arcuate sections which may be assembled by means of end flanges and the usual bolt and nut or screw connections. In the form shown in Figs. 1 and 2 the outer end of each arm has a pair of chain portions 36 which extend downwardly to ring 35 and are attached thereto at spaced points along ring 35 as appears best in Fig. 2.

It will be noted that the joint lifting force of each pair of chains 36 is as nearly vertical as the arcuate paths of the outer ends of arms 31 permit, and the manner in which ring 35 is supported from the outer ends of the several arms 31 is such that ring 31 maintains concentricity with post 11 in all phases of operation of the ride and despite unequal or unbalanced loading and other potentially disturbing conditions.

A series of cables, preferably but not necessarily of the usual stranded steel wire type, are each secured at their upper ends to winding drum 12 near the upper edge thereof and connect at their lower ends with the several arms 31 at predetermined points along the arms. The cables are designated 38 in Fig. 1, and it will be noted that the effective lever arm of the lifting force of the cables depends on where the lower ends of cables 38 attach to arms 31.

Reference has previously been had to sprocket 27 which is fixed for rotation with cage 15 and a vertical drive shaft therefor is designated 39 in Fig. 1 and has bearing near its upper end in plate 20 as at 40. The upper end of shaft 39 is provided with a sprocket 41, and a chain 42 establishes driving connection between sprockets 27 and 41. The lower end of drive shaft 39 has driving connection with a motor 43 which has a horizontal drive shaft by means of bevel gearing (not shown) in a casing designated 44. Motor 43 is reversible and the manner of its use in operating the ride will be described more fully later herein.

The passenger seats employed in the particular embodiment illustrated in Figs. 1 through 5 appear best in Fig. 3. As previously stated, portability is an important consideration and the seats shown in Fig. 3 are so arranged as to be readily secured to or detached from ring 35. Each seat may comprise a pair of upper angular side rails 50, a top cross rail 51 and an intermediate cross rail 52, a pair of spaced bottom angular side rails 53 and a bottom cross rail 54.

These several elements are rigidly secured to each other preferably by welding and side brace rods 55 extend from upper cross rod 51 to intermediate cross rod 52 and from the latter to bottom cross rod 54. Besides rigidifying the structure, the brace rods 55 serve as arm rest means and passenger restraining means. Suitable back rest, seat bottom, and floor panel means of any kind may extend between the spaced side rails 50 and 53 to complete the seat proper.

Pads or seats 60 are welded at various points along ring 35, and the bottoms of upper angular side rails 50 are provided with depending lugs 61, which extend through openings in pads 60 and may be secured therein by means of driven tapered pins or the like. Brace rods 64 are hinged at their lower ends to the lower side rails 53 as at 65 and have downwardly projecting end formations 67 which pass through lugs 68 fixed to ring 35. The end formations 67 may likewise be pinned or cotter keyed against separation from lugs 68.

A safety bar device which prevents a passenger from falling from or attempting to leave his seat excepting under proper conditions includes a pair of spaced side rails 70 which are held spaced and rigid with respect to each other by cross brace rails 71, 72, 73, and 74. The lower ends of the side rails 70 of the safety bar are hinged to outward extensions of the lower rigid cross rail 64 of the seat proper as shown in Fig. 3.

Control means for safety bar 70 are shown in detail in Figs. 4 and 5, and such means are mounted at the far side of the seat as viewed in Fig. 3. A tubular member 80 is fixed along the side of the seat proper as by welding or the like and receives a slidable rack bar 81, which in the present instance is tubular in cross-section and whose outer end carries a bearing collar 83. Bearing collar 83 is mounted for rotation on an outward extension 84 of cross brace 73.

Stil referring particularly to Fig. 4, a spring guide rod 86 may be fixed at one end to cross rail 87 which is fixed to tube 80 and likewise to the upper angular side rail members 50 of the seat. A compression coil spring 90 encircles spring rod 86 and acts between cross rail 87 and a suitable internal seat in rack bar 81 to yieldably urge the safety bar means to the open extended position shown in Fig. 3. Such opening movement may be limited by a flexible chain 91 shown in Fig. 3 as extending between the outer end of tube 80 and a lug formed on collar 83.

Referring particularly to Figs. 4 and 5, a pair of bearing lugs 94 are fixed to the exterior of tube 80. A pivot pin 95 is rotatable in bearings 94 and has fixed thereto a latch member 96 and a pair of spaced operating arms 97. The operating arms 97 carry a pivot pin 98 which engages in a slot 99 formed in a link 100 which is pivoted at its opposite end to an armature 101 associated with an electromagnet 102. Latch 96 is normally urged to its latching position in engagement with rack bar 81 by an extension coil spring 105 which acts upon operating arms 97, and armature 101 is normally urged to its outward position by a relatively light extension coil spring 106 which acts against the outer end of link 100.

By virtue of the arrangement just described, armature 101 has a certain amount of free movement to the left as viewed in Fig. 4 upon its being energized so that it overcomes its initial enertia and reaches a more efficient range of operation of the solenoid before link 100 begins to rotate operating arms 97 to release latch 96. When a passenger has been seated, either the passenger or the operator or attendant of the ride moves the safety bar 70 pivotally to the left, as viewed in Fig. 3, until cross bar 72 is fairly close to the upper portion of the passenger's body, latch 96 automatically retaining the bar against outward movement regardless of the degree to which the safety bar is moved, thus accommodating passengers of various size.

The safety bar cannot then be released, excepting by energization of electromagnet 102, but this is under the direct control of the ride operator at a remote or central operating point. The operator will, of course, release the latches by energizing the various solenoids 102 only when the ride is stopped in a safe position, and upon such energization all of the various safety bars 70 will automatically open by operation of springs 90.

Obviously, the various electromagnets 102 of the safety devices will more conveniently be under the control of a single remote operating switch. A casing 110 for the latch mechanism may be removably secured to a pair of end wall elements 111 and 112. In Fig. 3 the numeral 113 designates a panel which extends across the front of and between the side rails 70 of the safety bar to enclose an conceal the lower portion of the passenger compartment.

The operation of the ride thus far described and illustrated in Figs. 1 through 5 is as follows. After the passengers are aboard and the safety bars 70 have been closed, the operator closes a switch to energize motor 43 for operation in one direction and oscillation of the arms 31 in such direction causes cables 38 to wind helically upon fixed drum 12. At the beginning this winding is produced entirely by the torque of motor 43, and it is at a relatively slow rate.

After a certain amount of winding in one direction, the operator reverses motor 43, and the arms 31 are oscillated in the opposite direction. The first part of this reverse oscillation is assisted by the gravitational pull of arms 31, ring 35, and the seat and passenger load, all of which tend to unwind the cables 38 from drum 12.

The return oscillation is thus slightly more rapid and, if the operator applies approximately the same amount of reverse motor impulse as in the first oscillation, the reverse winding of the cables on drum 12 will be to a greater degree than during the first oscillation. This build-up is progressive so that each succeeding oscillation attains a greater speed and is of greater amplitude and carries ring 35 and the passengers to greater heights, even though motor 43 may be capable of exerting only as much force as in the first relatively slow and shallow oscillation.

Ultimately the arms 31 and the ring 35 with its passenger seats may reach approximately the altitude indicated by the dot-and-dash line showing in Fig. 1, all within moderate and practicable power requirement limits. To operate in this manner, a fixed drum of substantial diameter must be employed. The circumference of the drum must be at least greater than the maximum horizontal arcuate swing of the arms and ring in order to produce and utilize the desired inertia forces in the manner contemplated herein.

Electrical energy for illuminating the rotating portion of the ride may be supplied by brush means as at 119 in Fig. 1 but in the degree of oscillation now contemplated the brushes are unnecessary and a mere flexible conductor connection suffices.

In the embodiment illustrated in Figs. 6, 7, and 8 arms 120 correspond to the arms 31 of the first described embodiment and the central support, winding drum, cables and oscillating drive means may all be just as described in connection with the first described embodiment and as illustrated in Figs. 1 and 2. In the present embodiment a ring 121 corresponds to ring 35 of Figs. 1, 2, and 3, but in place of the chain suspension between arms 31 and ring 35 a C-shaped arm 122 is pivoted to the outer end of each arm 120 as at 123. The outer ends of arms 122 are pivoted, as at 124, to lugs 125 fixed to ring 121. Arms 122 are preferably constructed as rigid triangular trusses, when viewed at right angles to Fig. 6, so that the bottom ends thereof comprise a pair of fairly widely spaced coaxial pivots which engage ring 121 at spaced points therealong.

It is to be understood that, if desired, the C-shaped arm suspension may be substituted for the chain suspension without more, but in the embodiment illustrated in Figs. 6, 7 and 8 a further modification is present in that the passengers are in cars or the like which move along ring 121. Ring 121 is provided with a series of rigid brackets 126 which support a pair of rails or tracks 127.

The passenger-carrying means may comprise a train of articulated cars or, as in the instance shown by way of example, may comprise a continuous rigid annular structure which is rotatable on rails 127 and is designated generally by the numeral 128 in Figs. 6, 7, and 8.

The rotatable structure 128 may comprise a circular series of end to end base members 129, each having inner and outer vertical bars or rails 130 and 131, respectively, at its inner and outer rear corners. The base members 129 may be detachably secured to each other in any desired manner. Each pair of bars 130—131 is connected by a transverse arched upper rail 132 and a longitudinal central rail 133 is fixed to cross rail 132 and extends forwardly therefrom. The cross rails 132 have central rearwardly facing socket portions 134 and the forward end of each longitudinal rail 133 is detachably lodged in the socket member 134 of the section immediately ahead and secured by means of a pin 135.

Each pair of vertical rails 130, 131 together with their rigid forwardly extending central rail 133 rigidly support further arched cross rails 136, 137 and 138 which terminate in side rails 139 to form a sort of canopy over the passenger seat, the latter being designated 140 in Figs. 6 and 7. At the forward end of each base section 129 there is an inner vertical rail 141 and a series of horizontal rails 142 extend longitudinally between forward vertical rail 141 and rear vertical rail 130 to form a continuous barrier. At the outer side of each base member 129 a rigid vertical rail 143 is located somewhat to the rear of the forward end of the base member and tubular horizontal rail members 144 are fixedly connected at their opposite ends to vertical rail 143 and the rear vertical outside rail 131.

A gate element to serve as a closure for the passenger entrance opening thus formed comprises a vertical bar 145 having a series of rearwardly extending horizontal bars 146 fixed thereto. The horizontal bars 146 extend into the tubular rails 144 and act as pistons. Extension coil springs 147 normally retract the rods 146 but the application of air pressure projects the rods 146 and closes the gate after passengers have entered. Air pressure may be applied to a central fitting communicating with the tubular members 144 of all of the passenger compartments and in Fig. 7 the numeral 148 designates what may comprise a key-operated relief valve to permit opening the gate of a compartment only by an authorized attendant.

It will be noted from a consideration of Fig. 6 that the lower portion of the rotatable structure 128 is provided with a series of pairs of wheels 152 which roll on tracks 127 and the manner in which rolling movement of the rotatable structure along the trackway is attained and controlled will now be described, reference being had particularly to the bottom plan view, Fig. 8.

One or more of the pairs of wheels 152 of the rotatable structure are fixed as to the axle designated 154 in Fig. 8, the latter being freely rotatable in bearings 155 carried at the base of the rotatable structure. The outer of the pair of wheels 152 may be of slightly greater diameter than the inner wheel to eliminate the necessity for a differential mechanism. A clutch element 156 is slidably keyed to axle 154 and a mating clutch element 157 is loose on axle 154 but is restrained against axial movement by a thrust collar 158. Clutch element 157 is freely rotatable in one direction but is restrained against reverse rotation by a pawl 159 which is pivoted to the bottom of the car in any desired manner and engages ratchet teeth 160 which are formed in a face of clutch element 157.

An arm 165 is pivoted to the bottom of rotatable structure 128 as at 166 and carries a weight in the form of a horizontal plate 167 which is biased by an adjustable compression coil spring 168 in an upward direction as viewed in Fig. 8 which is in a direction radially toward the center of the ride. Arm 165 may have a pin 170 or the like for urging clutch element 156 into driving engagement with clutch element 157. Plate 167 thus acts as a centrifugal weight element for controlling the condition of clutch 156, 157. Below certain speeds, which may be determined and varied by an adjustment 171, spring 168 maintains clutch element 156 in clutching engagement while above the predetermined speed centrifugal force on plate 167 causes arm 165 to move radially outwardly of the center of the ride whereby the clutch elements become disengaged.

The operation of the wheel and clutch mechanism of Fig. 8 is as follows: As ring 121 oscillates successively in forward and reverse directions, the natural tendency of the rotatable wheeled structure 128 is to remain stationary by reason of its inertia. However, because of the mechanism of Fig. 8, the wheeled structure 128 is, in effect, locked with respect to ring 121 during forward oscillation of the latter, by reason of the engaged clutch members 156 and 157 and the ratchet mechanism 159, 160. Upon reverse oscillation of ring 121, the wheels 152 are not locked since pawl 159 rides over the teeth of ratchet 160 in this direction. Accordingly, as the oscillation of ring 121 reverses, the wheeled structure 128 continues to roll forwardly on tracks 127.

Thus, each successive forward oscillation of ring 121 imparts a forward impulse to the wheeled structure 128, and its forward velocity builds up to the point where clutch element 156 releases due to the centrifugal force of weight 167. This velocity is predetermined by the adjustment 171 and when the velocity of wheeled structure 128 again falls below this predetermined maximum, spring 168 automatically swings arm 165 to again engage the clutch elements 156 and 157.

Reference will now be had to Fig. 9 which shows apparatus and a novel method of loading and unloading the central structure or tower of a ride like the one here under consideration whereby the same may be readily transported from place to place on a vehicle trailer or the like. In Fig. 9 the numeral 175 designates generally the central structure of the ride which shall be referred to in this portion of the description as a tower. The numeral 176 designates the flat bed or floor of a trailer or similar vehicle.

In the loading operation, the trailer is moved to the relative position shown in Fig. 9, the tower being still erect as shown in dot and dash lines. At this time a pair of distance bars 177 are temporarily pivotally attached at their opposite ends to the base of tower 175 and to the lower rear portion of trailer bed 176.

An erection lever is designated 180 in Fig. 9 and is now pivotally attached to an upper portion of tower 175 as shown in dot and dash lines, the lower end of lever 180 being attached to an endless cable 181 which runs over a winch 182 and idler pulleys 183 and 184. Lever 180 is preferably of A-frame design and its base portion has lateral projections 186 which ride in a pair of channel shaped tracks 187 which are fixed to trailer bed 176 and thus the lower end of lever 180 is constrained to lineal horizontal movement.

Movement of the lower end of lever 180 either forwardly or rearwardly on trailer bed 176 is

under the control of winch 182 which in the illustrated instance is hand crank operated as indicated at 189. However, the winch may be power operated and arrangement may be made to operate the winch by means of the ride operating motor 43 either by loading the latter on trailer bed 176 before loading the tower or otherwise.

The winch is now operated to pull operating lever 180 from the dot and dash line position of Fig. 9 to the full line position and thus tip the tower 175 to the full line position where wheels 190, which may be more or less permanently associated with the tower structure, come to rest on bed 176. The wheels 190 are then blocked at their front or right hand sides as viewed in Fig. 9 and a block and tackle is connected to the rear axle of the trailer and the base of the tower 175 as shown in dot and dash lines at 192 in Fig. 9. The distance bars 177 may then be removed and the lever 180 may be disconnected from the tower and dropped to the bed of the trailer.

The center of gravity of tower 175 is slightly to the right of wheels 190 as viewed in the full line showing in Fig. 9 and thus paying out line on the block and tackle permits tower 175 to pivot on wheels 190 until it reaches a horizontal position whereupon wheels 194 reach trailer bed 176. The tower is then moved forwardly on the trailer bed on the wheels 190 and 194 either manually or by use of winch 182, and the tower may then be secured for transportation in any desired manner.

In the alternative, the center of gravity of tower 175 may be arranged to be to the left of wheels 190 as viewed in the full line showing in Fig. 9. Then the block and tackle 192 will be dispensed with and a jack may be applied to the base of tower 175 for raising and lowering the same from the full line position of Fig. 9 to a horizontal position.

A simple reversal of the foregoing procedure is employed in unloading the tower, excepting that blocks are first applied to the rear of trailer bed 176 to limit horizontal rearward movement of wheels 190 in the unloading operation, the front blocks being applied to wheels 190 only after they have reached their full line illustrated position in the course of the unloading operation.

What is claimed:

1. In an amusement ride, an annular passenger support, rotatable drive means including radiating arms extending to points generally above said support, suspension means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with and disposed above said drive means, and cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon winding of the cables on the drum due to rotation of the arms relative to the drum.

2. In an amusement ride, an annular passenger support, rotatable drive means including radiating arms extending outwardly toward said support, connection means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with and disposed above said drive means, and cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon

winding of the cables on the drum due to rotation of the arms relative to the drum.

3. In an amusement ride, an annular passenger support, rotatable drive means including radiating arms extending to points generally above said support, suspension means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with said drive means, and cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon winding of the cables on the drum due to rotation of the arms relative to the drum.

4. In an amusement ride, an annular passenger support, rotatable drive means including radiating arms extending outwardly toward said support, connection means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with said drive means, and cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon winding of the cables on the drum due to rotation of the arms relative to the drum.

5. In an amusement ride, an annular passenger support, rotatable drive means including radiating arms extending to points generally above said support, suspension means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, and means for synchronously pivoting said arms to raise and lower said support while the arms are being rotated by said drive means.

6. In an amusement ride, an annular passenger support, reversely rotatable drive means including radiating arms extending to points generally above said support, suspension means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, and means for synchronously pivoting said arms to raise and lower said support while the arms are being intermittently rotated in opposite directions by said drive means.

7. In an amusement ride, an annular passenger support, oscillating drive means having a generally vertical axis and including radiating arms extending to points generally above said support, suspension means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, and means for synchronously pivoting said arms to raise and lower said support while the arms are being oscillated by said drive means.

8. In an amusement ride, an annular passenger support, rotatable drive means including radiating arms extending outwardly toward said support, connection means between the outer ends of said arms and said support, said arms being pivoted to said drive means for generally vertical movement, and means for synchronously pivoting said arms to raise and lower said support while the arms are being rotated by said drive means.

9. In an amusement ride, a rigid ring and passenger supporting means disposed thereabout, a rotatable member concentric with said ring and having a plurality of radiating arms extending to approximately the radius of the ring, and suspension means between the outer ends of said arms and said ring, said arms being pivoted at their inner ends for generally vertical pivotal movement, and means for synchronously pivoting said arms to raise and lower said ring and for simultaneously rotating said ring by rotation of said rotatable member.

10. In an amusement ride, a rigid ring and passenger supporting means disposed thereabout, a rotatable member concentric with said ring and having a plurality of radiating arms extending outwardly toward the ring, and connection means between the outer ends of said arms and said ring, said arms being pivoted at their inner ends for generally vertical pivotal movement, and means for synchronously pivoting said arms to raise and lower said ring and for simultaneously rotating said ring by rotation of said rotatable member.

11. In an amusement ride, an annular trackway, reversely rotatable drive means including radiating arms extending to points generally above said trackway, suspension means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, means for synchronously pivoting said arms to raise and lower said trackway while the arms and trackway are being rotated by said drive means, and passenger car means mounted on said trackway for movement therealong.

12. In an amusement ride, an annular trackway, reversely rotatable drive means including radiating arms extending to points generally above said trackway, suspension means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, means for synchronously pivoting said arms to raise and lower said trackway while the arms and trackway are being rotated by said drive means, passenger car means mounted on said trackway for movement therealong, and a unidirectional driving connection between said trackway and said car means whereby rotary movement of the trackway causes the car means to rotate with the trackway in one direction.

13. In an amusement ride, an annular trackway, reversely rotatable drive means including radiating arms extending outwardly toward said trackway, connection means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, means for synchronously pivoting said arms to raise and lower said trackway while the arms and trackway are being rotated by said drive means, and passenger car means mounted on said trackway for movement therealong.

14. In an amusement ride, an annular trackway, reversely rotatable drive means including radiating arms extending outwardly toward said trackway, connection means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, means for synchronously pivoting said arms to raise and lower said trackway while the arms and trackway are being rotated by said drive means, passenger car means mounted on said trackway for movement therealong, and a unidirectional driving connection between said trackway and said car means whereby rotary movement of the trackway causes the car means to rotate with the trackway in one direction.

15. In an amusement ride, an annular trackway, reversely rotatable drive means including radiating arms extending to points generally above said trackway, suspension means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, means for synchronously pivoting said arms to raise and lower said trackway while the arms and trackway are being rotated by said drive means, passenger car means mounted on said trackway for movement therealong, drive means between said trackway and said car means for driving the latter through rotation of the arms, and means responsive to centrifugal force on the car means for interrupting said drive means when the car means reaches a predetermined velocity.

16. In an amusement ride, a rigid circular trackway and car means mounted for movement thereabout, a reversely rotatable member concentric with said trackway and having a plurality of radiating arms extending to approximately the radius of the trackway, connection means between the outer ends of said arms and said trackway, said arms being pivoted at their inner ends for generally vertical pivotal movement, and means for synchronously pivoting said arms to raise and lower said trackway and for simultaneously rotating said trackway by rotation of said rotatable member.

17. In an amusement ride, a rigid circular trackway and car means mounted for movement thereabout, a reversely rotatable member concentric with said trackway and having a plurality of radiating arms extending to approximately the radius of the trackway, connection means between the outer ends of said arms and said trackway, said arms being pivoted at their inner ends for generally vertical pivotal movement, means for synchronously pivoting said arms to raise and lower said trackway and for simultaneously rotating said trackway by rotation of said rotatable member, and a unidirectional driving connection between said trackway and said car means whereby rotary movement of the trackway causes the car means to rotate with the trackway in one direction.

18. In an amusement ride, an annular trackway and car means mounted for movement thereabout, reversely rotatable drive means including radiating arms extending outwardly toward said trackway support, connection means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with and disposed above said drive means, and cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon winding of the cables on the drum due to rotation of the arms relative to the drum.

19. In an amusement ride, an annular trackway and car means mounted for movement thereabout, reversely rotatable drive means including radiating arms extending outwardly toward said trackway support, connection means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with and disposed above said drive means, cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon winding of the cables on the drum due to rotation of the arms relative to the drum, and a unidirectional driving connection between said trackway and said car means whereby rotary movement of the trackway causes the car means to rotate with the trackway in one direction.

20. In an amusement ride, an annular trackway and car means mounted for movement thereabout, reversely rotatable drive means including radiating arms extending outwardly toward said trackway support, connection means between the outer ends of said arms and said trackway, said arms being pivoted to said drive means for generally vertical movement, a relatively fixed drum coaxial with and disposed above said drive means, cables connected at one end with said drum for winding thereon and at their other ends with said arms for pivotally raising the same upon winding of the cables on the drum due to rotation of the arms relative to the drum, drive means between said trackway and said car means for driving the latter through rotation of the arms, and means responsive to centrifugal force on the car means for interrupting said drive means when the car means reaches a predetermined velocity.

21. In an amusement ride, rotatable means including an annular passenger support, and reversely rotatable drive means therefor, a relatively fixed drum coaxial with and disposed above said rotatable means, and cables connected at one end with said drum for winding thereon and at their other ends with said rotatable means for raising the annular passenger support upon winding of the cables on the drum due to rotation of the arms relative to the drum, said drum being of sufficient diamenter to raise the annular passenger support through substantially its full range of movement by a fractional winding of each of the cables on the periphery of the drum.

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