F. GLYNN.

GRAVITY RAILWAY.

APPLICATION FILED MAR. 24, 1913.

1,085,902.

Patented Feb. 3, 1914.

4 SHEETS—SHEET 1.

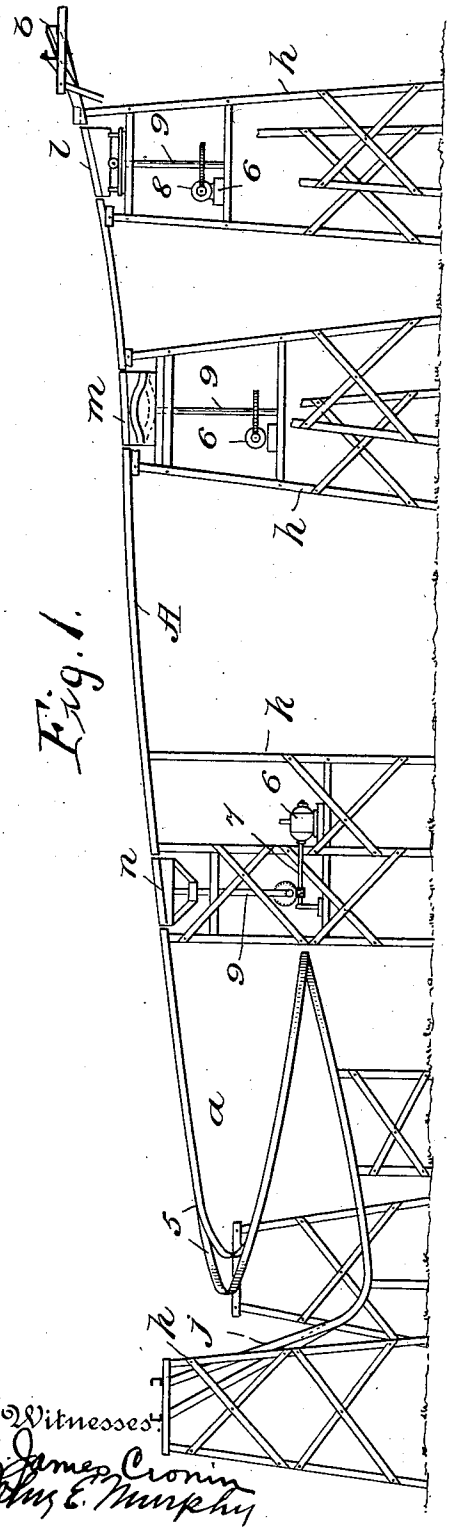

Fig. 1.

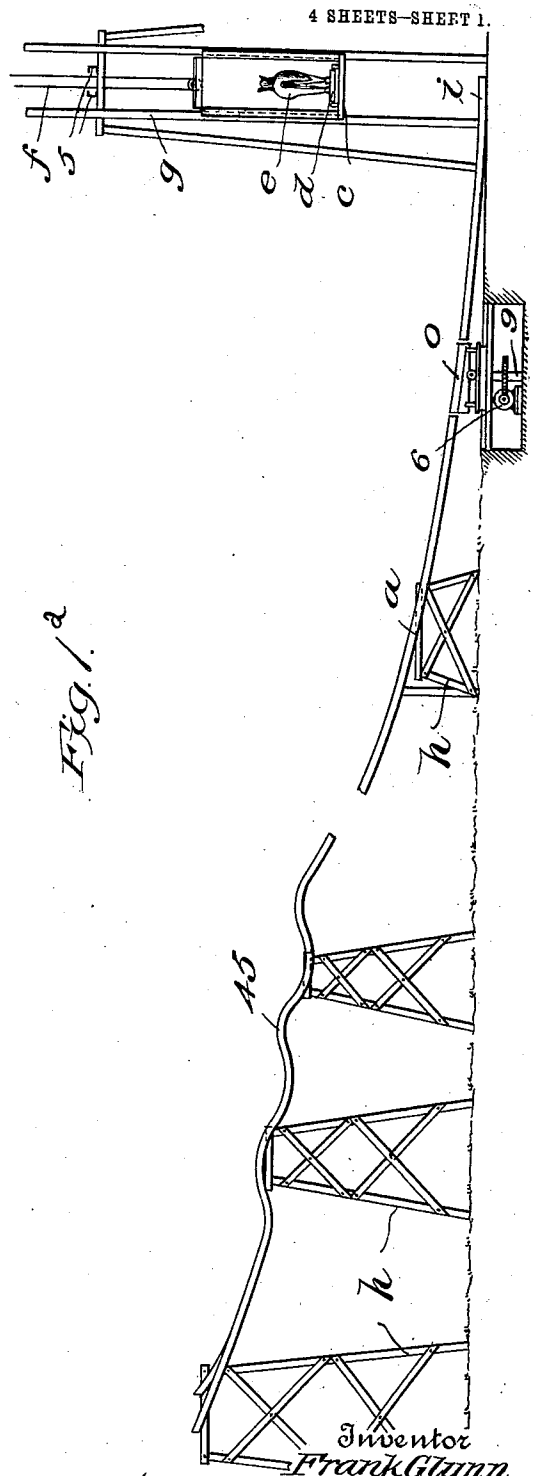

Fig. 1a

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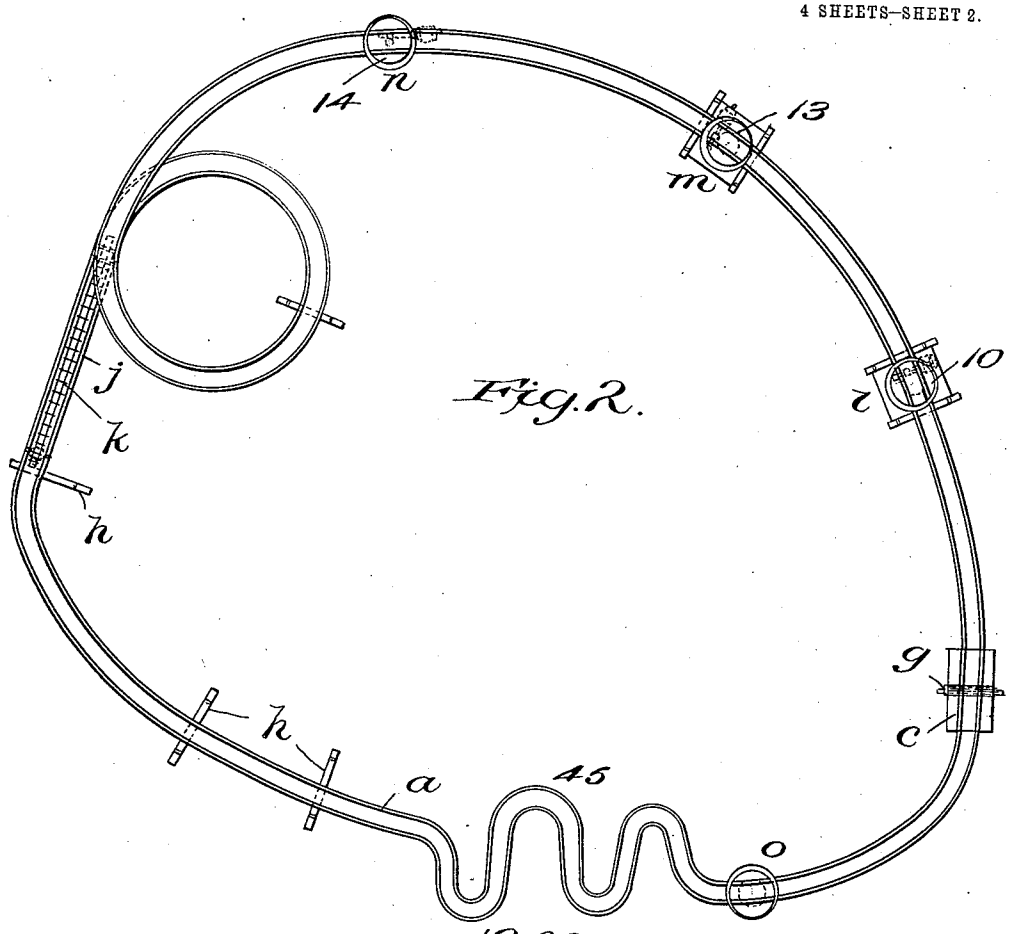
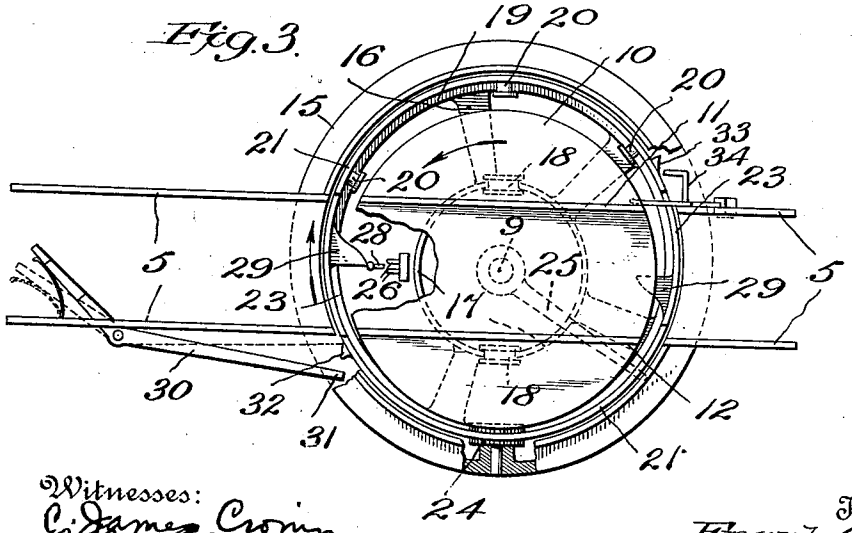


Fig. 2.

Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

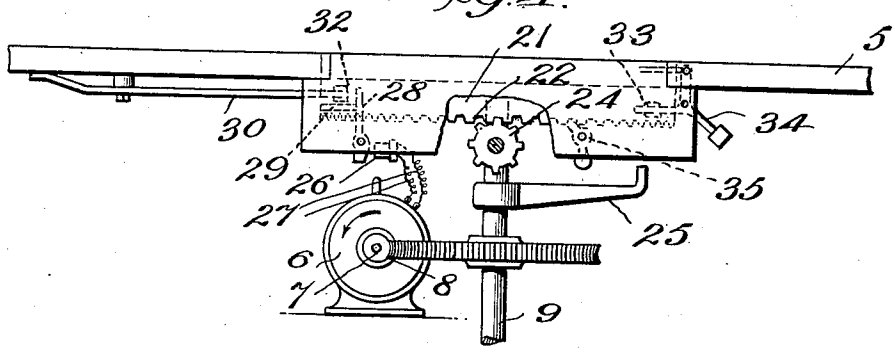


Fig. 5.

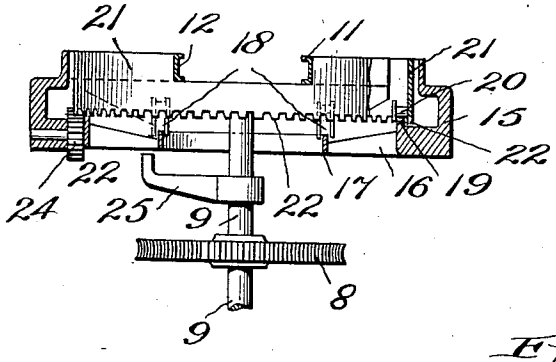
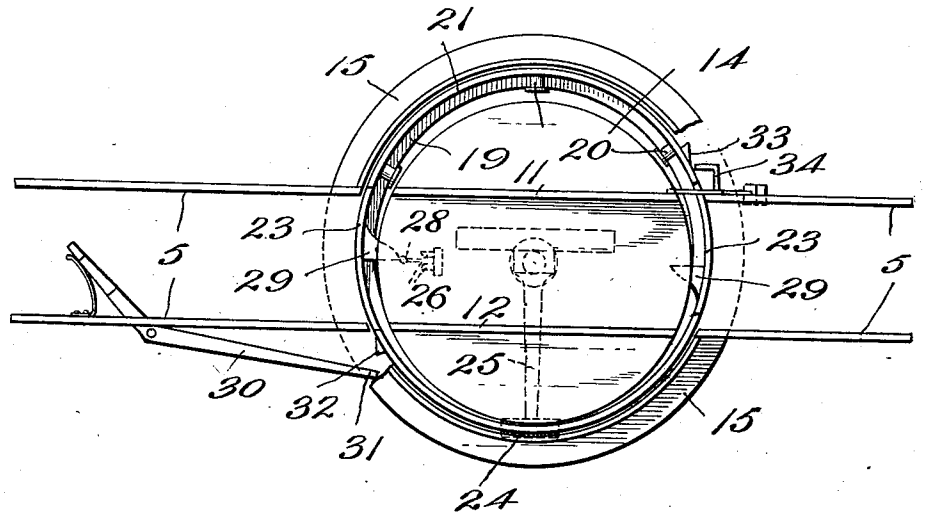


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

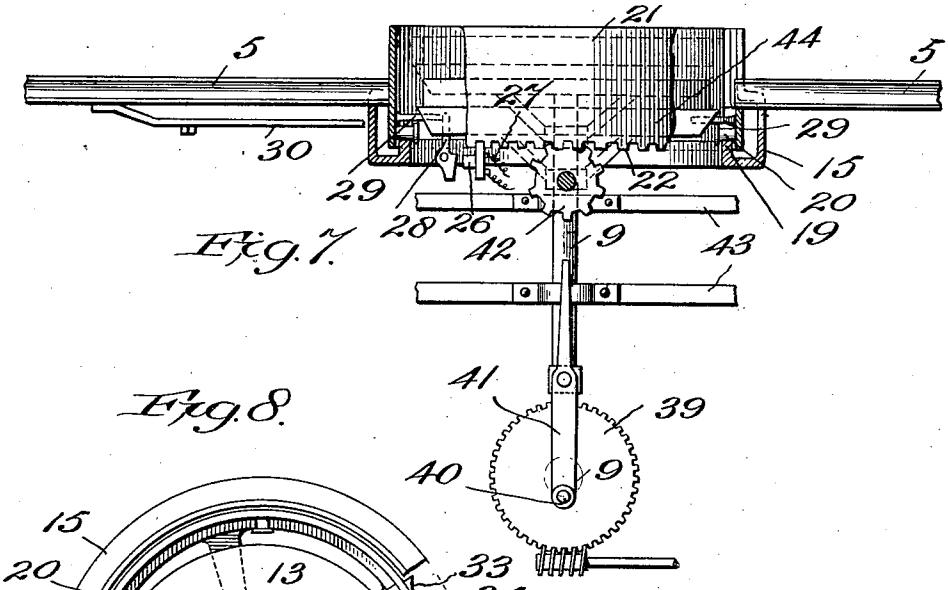


Fig. 8.

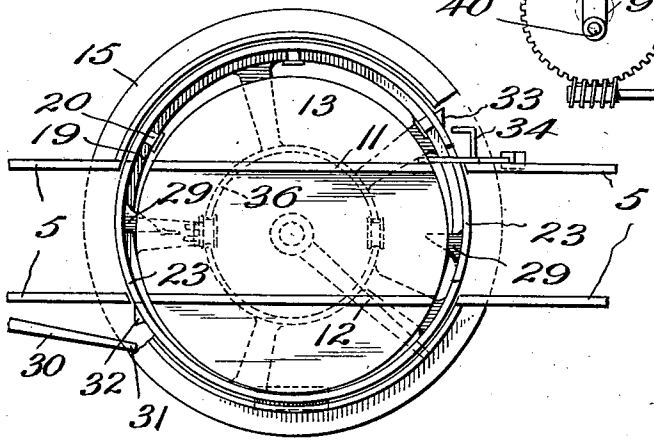
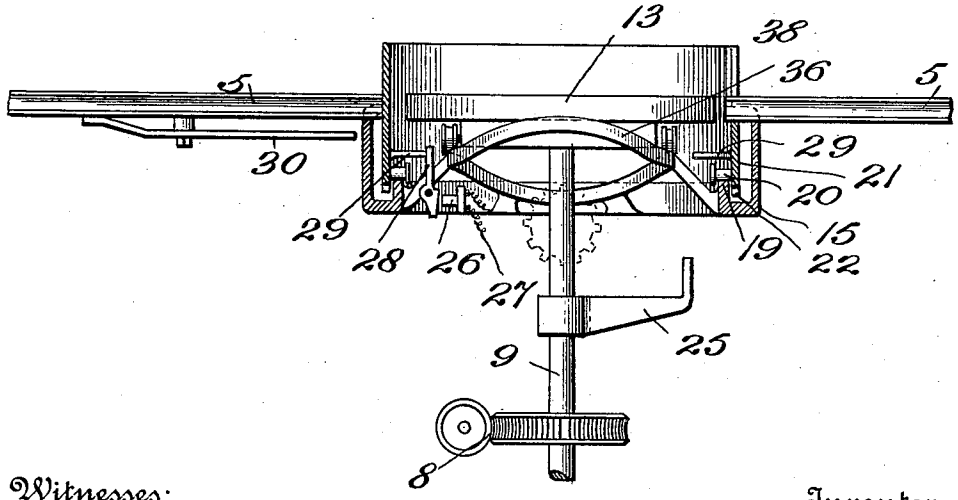


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANK GLYNN, OF PERTH AMBOY, NEW JERSEY.

GRAVITY-RAILWAY.

1,085,902. Specification of Letters Patent. Patented Feb. 3, 1914.

Application filed March 24, 1913. Serial No. 756,378.

To all whom it may concern:

Be it known that I, FRANK GLYNN, a citizen of the United States, residing at 186 Washington street, Perth Amboy, in the county of Middlesex, State of New Jersey, have invented certain new and useful Improvements in Gravity-Railways, of which the following is a specification.

The general object of the invention is to improve amusement railways in point of adapting these to impart a diversity of movement to the cars or other wheeled objects adapted to travel thereon. And to this end the invention resides in arranging certain sections of the railway track on movable supports and constructing these supports so as to have them, when successively operated, combine to give to the car the effect usually obtained by a rider, upon mounting a bucking broncho.

Other objects will appear and be better understood from that embodiment of my invention of which the following is a specification, reference being had to the accompanying drawings forming part hereof, in which:—

Figures 1 and 1ª show one embodiment of my invention in connection with an inclined or gravity railway. Fig. 2 is a plan of the parts in Figs. 1 and 1ª but showing these parts connected. Fig. 3 is an enlarged detail plan of one of the stations at which the car is given a turning movement, certain of the parts being broken away to disclose the locking and starting mechanisms. Fig. 4 is a detail side elevation of the station shown in Fig. 3 showing a part of the side wall of the guard broken away. Fig. 5 is a vertical cross section of the station shown in Figs. 3 and 4 and looking at right angles to Fig. 4. Fig. 6 is a view similar to Fig. 3 of a station at which the car is given a reciprocating movement. Fig. 7 is a detail partly in section and side elevation of the station shown in Fig. 6. Fig. 8 is a view similar to Figs. 3 and 6 of the station at which the car is given a compound rotary and oscillating movement. Fig. 9 is a detail vertical section of Fig. 8 showing the turn table and track in elevation.

The invention is herein shown as associated with an amusement railway of the inclined type, but it will be understood that this application is merely illustrative.

The two sections of the railway shown in Figs. 1 and 1ª are indicated generally by *a*, and access is had to the highest point *b* of this railway by means of an elevator *c* which is adapted for holding one or more cars, which include trucks *d* and the figure of an animal or other desirable object adapted for carrying one or more passengers and indicated by *e*. The elevator is operated by suitable mechanism, a portion of which is shown and indicated by *f* and the shaft *g* for this elevator, extends from the ground upwardly beyond the point *b* so as to admit of the elevator positioning the car or cars thereon to take the track of the railway *a*. The track rails 5—5 are channel-shaped structures as shown in the drawings, and adapted to receive the wheels of the truck *d* whereby to prevent the upward displacement of these wheels on the track. The piers *h* which support the track rails, are for the most part of ordinary construction and graduated in height and disposed so as to admit of having the track follow a gradual incline from the starting point *b* to the ending point *i* except at the middle portion of the railway where, by virtue of a reversed disposition of piers the track is given an upward inclination as indicated at *j*, such upwardly inclined portion connecting together the downwardly inclined sections shown in Fig. 1. In Fig. 2 this upwardly inclined portion *j* is shown as provided with a chain elevator *k*, which is operated by suitable mechanism (not shown) and employed for moving those cars up the incline *j*, that have not attained sufficient momentum to make such incline during their descent on the downwardly inclined portion of the track.

The foregoing, it will be observed, is typical of the well-known inclined railway and is given simply to admit of a clearer understanding of one application of my invention about to be described, it being understood that any desired variations may be made in the disposition of the track rails without departing from the spirit of the invention.

Referring now to Figs. 1 and 2, the inclined track is divided into a plurality of sections and between these several sections there are interposed a series of stations, the units of which are herein indicated by *l*—*m*—*n* and *o*. It may here be stated that any desired number of units may be employed in carrying out the principle of my invention and certain of these units may be constructed to correspond with others in

point of giving the desired variation of movement to the car, or each unit may be constructed differently from the other, whereby, to obtain any desirable degree of variation of movement on the part of the car. In the embodiment shown the units are so constructed as to combine with the track in giving to the car and its occupant, the usual variation of movement experienced by the rider of a bucking broncho, but it will be understood, of course, that this is merely illustrative and such movement may be modified without departing from the spirit of the invention. The mechanism for imparting the desired movement to the units may be of any preferred type, that is to say, each unit may be operated manually or mechanically, or the several units may be so connected as to be operated by a single motor or hand operated device, in which event, of course, suitable car operated mechanism such as clutches, will be substituted for the car operated controllers hereinafter to be described.

Referring now to the drawings mechanism in the form of electric motors 6—6, is employed for operating the stations or units *l—m—n—o*. In each instance, the armature shaft 7 of each motor is suitably connected such as by worm gearing 8 to a driven shaft 9, suitable supports and bearings being provided for the said motors and shafts in the piers *h*.

The driven shaft 9 of the station *l*, is rigidly secured at its upper end to an inclined turn table 10 which carries track rails 11 and 12, the pitch of this table being such as to admit of the track rails extending coextensive with the adjacent track rail sections 5—5 when the platform is positioned as shown in Fig. 1. The driven shaft 9 of the station *m* is flexibly connected at its upper end to a platform 13 which, like the platform 10, has track rails disposed so as to function similarly to the track rails 11 and 12 when the platform is positioned as shown in Fig. 1. The driven shaft 9 of the station *n* is rigidly connected to a platform 14 adapted to function like the hereinbefore described platforms, when positioned as shown in Fig. 1 and the driven shaft 9 of the station *o* is connected to a platform similarly to the shaft in the station *l* to which station, the station *o* conforms in each particular.

The circular casing 15 for the turn table or platform 11 is formed with a spider 16 which supports a circular track 17 which forms a bearing surface for the grooved wheels 18—18 of the turn table 10; and this casing is also formed with a circular track 19 concentric with the track 17 and which forms a bearing for the rollers 20 of an annular guard member 21. The dispositions of the track 19 and rollers 20 are such as to maintain the rack teeth 22 in the lower edge of the guard 21 out of contact with the casing 15, as shown in Fig. 5. The guard 21 has oppositely disposed cut-away portions 23—23 in its upper edge, the widths of these portions corresponding approximately to the distance between the track members 5—5, whereby, to admit of the passage of a car onto or from the turn table 10 when the said cut-away portions are positioned in alinement with the track on the turn table or the adjacent track sections. The portions of the guard on either side of the cut-away portions 23 project above the plane of the adjacent track sections and track on the turn table 10.

Referring now to Fig. 3 it will be noted that when the cut-away portion on the left is in alinement with the track section on the left and track on the turn table 10, the opposite cut-away portion is out of alinement with the other end of the track on the turn table and the adjacent track section. Now from this, it will be observed that when the last-named cut-away portion is in alinement with the track on the turn table and the adjacent track section, the converse of which is shown, will be true. This structure performs a two-fold function in that when the cut-away portion on the left is out of alinement with the track on the turn table, a car on the track will be prevented from moving in a direction to the left in Fig. 3, while a car moving down the incline track section on the right, will be prevented from moving onto the platform or turn table, the preventing element in each instance being the uncut-away portions of the guard.

Referring now to Fig. 5 the casing 15 carries a pinion 24 which meshes with the rack teeth 22 of the guard. This pinion is disposed in the path of a rotating pawl 25 fixed to the driven shaft 9. The controller for the motor circuit includes a switch member, the stationary part 26 of which is connected to the circuit wires 27 and the movable part 28 of which projects upwardly between the track rails 11 and 12 of the table 10 and into the path of a member depending from the truck *d* of the car.

The position of the controller is such as it will be out of the way until the car is wholly upon the track of the turn table, whereupon the progressive movement had by the car will bring the member depending therefrom into contact with the movable member 28, which, upon being rocked, will close the motor circuit and effect the starting of the motor. Now upon the starting of the motor the shaft 9 and the table 10 will rotate and simultaneously with the initial movement of the shaft and turn table, the rotating pawl 25 on account of its position will kick the pinion 24. This will effect on the part of the guard, a movement relative to the turn

table so as to accelerate the positioning of that part of the guard, or the uncut portion to prevent further progressive movement on the part of the car. Now it will be understood that when the parts of the station *l* are in their normal positions, the cutaway portion 23 on the right in Fig. 3 of the drawings, will be in alinement with the track on the turn table and the adjacent track section, while the uncut portion of the guard will block the end of the track on the left in the said figure, so that upon initial movement of the guard and turn table as just described and with these parts moving in the direction of the rollers in Fig. 3, the blocking of the turn table track and the preventing of movement of the car in either direction will be accelerated. Now it will be observed that the guard is operated with a step by step movement, while the turn table is operated with a continuous movement so that the turn table will have made a considerable number of revolutions by the time the guard has made a half revolution.

Referring now to Fig. 3 the guard carries radial cams 29—29 which are disposed in the path of the movable element 28 of the motor control. These cams are so proportioned that when either wipes the movable member 28 it will move the same from the closed position into which it has been placed by the member depending from the car, into the open position. But it will be observed that the cams are so positioned that this opening of the controlling element brought about by the cam, will not take place until the guard has made half a revolution and the ends of the track members 11 and 12 on the left in Fig. 3 are in alinement with the adjacent track section and the cutaway portion 23 positioned so as to admit of the car's passing from the track members 11 and 12 onto the track section on the left in the same figure. Upon the car's passing onto the section on the left in Fig. 3 the member depending from the car will move into contact with one end of a spring-pressed kicker 30, whereby to rock this kicker against the action of its spring and bring the end portion 31 thereof into contact with a lateral tooth 32 on the guard 21. Referring now to Fig. 3 the tooth 32 is disposed opposite to a similar tooth 33 on the guard and upon the operation of the kicker 30 the said kicker will, upon engaging with the tooth 32, move the guard a step and sufficient to move the cutaway portion 23 on the left out of alinement with the track sections and the portion 23 on the right, into alinement with the adjacent track sections and at the same time the tooth 33 will have operated a gravity latch 34 to rise from a notch in the turn-table or platform 10 and ont of a notch in the guard 21, whereby to unlock the said turn-table and guard and permit of their operation when the motor circuit is again closed by the car. When the latch is lifted by the tooth 33 its free end will be thrown beyond the guard so that when the guard comes to rest after the kick imparted to it by the lever 30, the notch in the said guard will be out of alinement with the latch, whereupon the latch will take its position on the exterior of the guard until such time as the guard has completed another half revolution, whereupon the notches on the opposite side of the guard and turn-table will be in position to receive the latch and prevent overthrow of the guard and turn-table after these parts are positioned to admit of the passing of the car from the turn table onto the adjacent track section.

Referring now to Fig. 4 the dog 35 carried by the casing 15 is arranged so as to operate on the tooth 22 of the rack and adapted to yield when the rack is rotating in the direction of the arrow in Fig. 3, but to rock and interlock with any tooth in the rack upon a tendency of the same to rotate in the opposite direction.

The several elements described in connection with the station or unit *l* are substantially the same as those for the station or unit *m*, with this difference: The track 36 for the turn-table of station *m*, has a tread surface of compound curvature as shown in Fig. 9 and the guard 38 rises to a greater distance above the normal horizontal position of the turn-table than does the guard 21, whereby to prevent the table, as it rotates, from rising above the edge of the guard and the consequent displacement of the car.

The components of the station indicated by *n*, are substantially the same as those previously described except that their disposition, arrangement and details of structure are somewhat different. Here it will be seen now by referring to Fig. 7, that both elements of the worm gearing 6 are disposed so as to rotate in vertical planes and the worm wheel 39 has a crank 40 which is connected to the driven shaft 9 by a connecting rod 41. This connecting rod is extended at its upper end, which extension is arranged to intermittently operate a pinion 42 corresponding to the pinion 24 of stations *l* and *m*, and cross head guides 43—43 are provided for the driven shaft 9. Here too it will be observed that the guard 44 rises considerably above the normal plane of the turn-table 14 so as to insure against the table being lifted above the edge of the guard and the consequent displacement of the car when the table is in its highest position, as shown by dotted lines in Fig. 7. Thus it will be seen that when the motor at station *n* is started, the rotary movement of the wheel 39 will, through the connecting rod 41 and driven

shaft 9, be converted into reciprocating movement and at the same time the oscillating upper end of the connecting rod 41 will be intermittently projected into contact with the pinion 42 and move the same together with the guard with a step by step movement, it being, of course, understood that the upper end of the connecting rod 41 will be suitably offset to effect such engagement with the pinion.

The station indicated by *o* in Fig. 1, is in all respects identical with that indicated by 1.

In arranging the several parts of the stations or units the casings will be suitably secured to the framework of the piers and suitable supports will be provided for the various kickers 30 and bearings will also be provided for the shafts 9. The several casings and guards will be so proportioned and the speeds of these and the duration of movement will be so timed as to have the guards and turn table positioned to function as previously stated and at the required time.

In using the device the rider boards the car which has been previously adjusted onto the elevator now located at the bottom of the shaft. Upon the elevation of the car by the elevator to the point marked *b*, the car is forced onto the track. Now with the parts of the first station adjusted so as to admit of the passing of the car thereonto, the car will progress until it moves onto the first station *l* and effects the closing of the motor circuit. The construction of the parts of the station *l* are such as to cause the car to rotate in a horizontal plane for a given number of times and until the mechanism is adjusted and the motor stopped, whereby, to admit of the car passing onto the next track section upon which it will proceed until moving onto the station *m*. Here, owing to the construction of the parts of the station *m*, the car is given a compound rotary and rocking movement for a given number of times, after which it proceeds to the succeeding track section and onto the station *n*, where, owing to the construction of this station, the car is reciprocated vertically. After leaving the station *n* the car moves along the spiral incline of the track to the endless elevator *k* which carries the car onto the lower section of track indicated in Fig. 1. Here the car will progress and pass over a sinuous section 45 of the track and ultimately onto the station *o*, where the car will be rotated as at *l*. From the station *o* the car passes to the foot of the elevator shaft *g*.

From the foregoing it will have been observed that the several stations combine successively to gyrate the car and its occupant, thus imparting to the car the movements gone through by the ordinary broncho while the inclination of the rigid sections of the track correspond to the advance movement made by the aforesaid animal between his turning freaks.

What is claimed as new is:

1. An amusement railway provided with power actuated movable members, said members being operated independently and successively and combining to gyrate a car.

2. In an amusement railway, the combination of adjacent fixed track sections, a movable track section including relatively movable guard and platform members, and operating mechanism common to both said guard and platform members.

3. In an amusement railway, the combination of adjacent fixed track sections, a movable track section including relatively movable guard and platform members, operating mechanism common to both said guard and platform members, and controlling means for the operating mechanism arranged to be operated by a member depending from a car.

4. An amusement railway provided with power actuated movable track sections, said sections being operable independently and successively and combining to move a car universally.

5. An amusement railway provided with movable power actuated track sections, combining to move a car angularly and universally by operating the car successively.

6. An amusement railway provided with a series of movable track sections, means operating to move adjacent track sections in said series each differently from the other, and means operated by a car for controlling the operation of said sections.

7. An amusement railway comprising a series of stationary track sections arranged in spaced relation, movable track sections interposed between the stationary track sections, and means operating to move the movable track sections beyond the plane of extension of the stationary track sections.

8. An amusement railway comprising a series of stationary track sections arranged in spaced relation, movable track sections interposed between the stationary track sections, and means operating to move the movable track sections above and below the plane of extension of the stationary track sections.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 28th day of February, 1913.

FRANK GLYNN.

Witnesses:

JOHN A. DONEGAN,

GEO. A. BYRNE.