

May 12, 1931.

H. G. TRAVER

1,805,266

AMUSEMENT COASTER RAILWAY

Filed April 11, 1927

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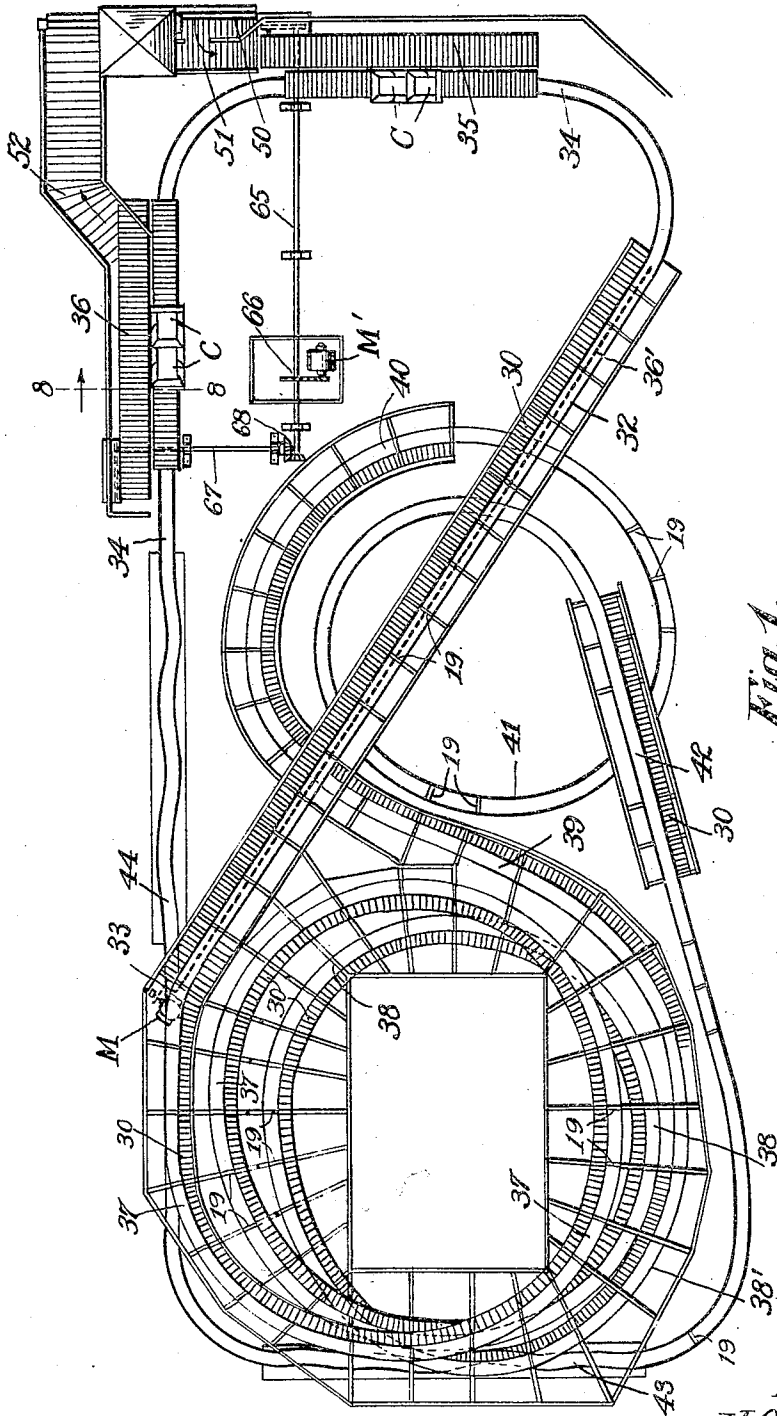


Fig. 1.

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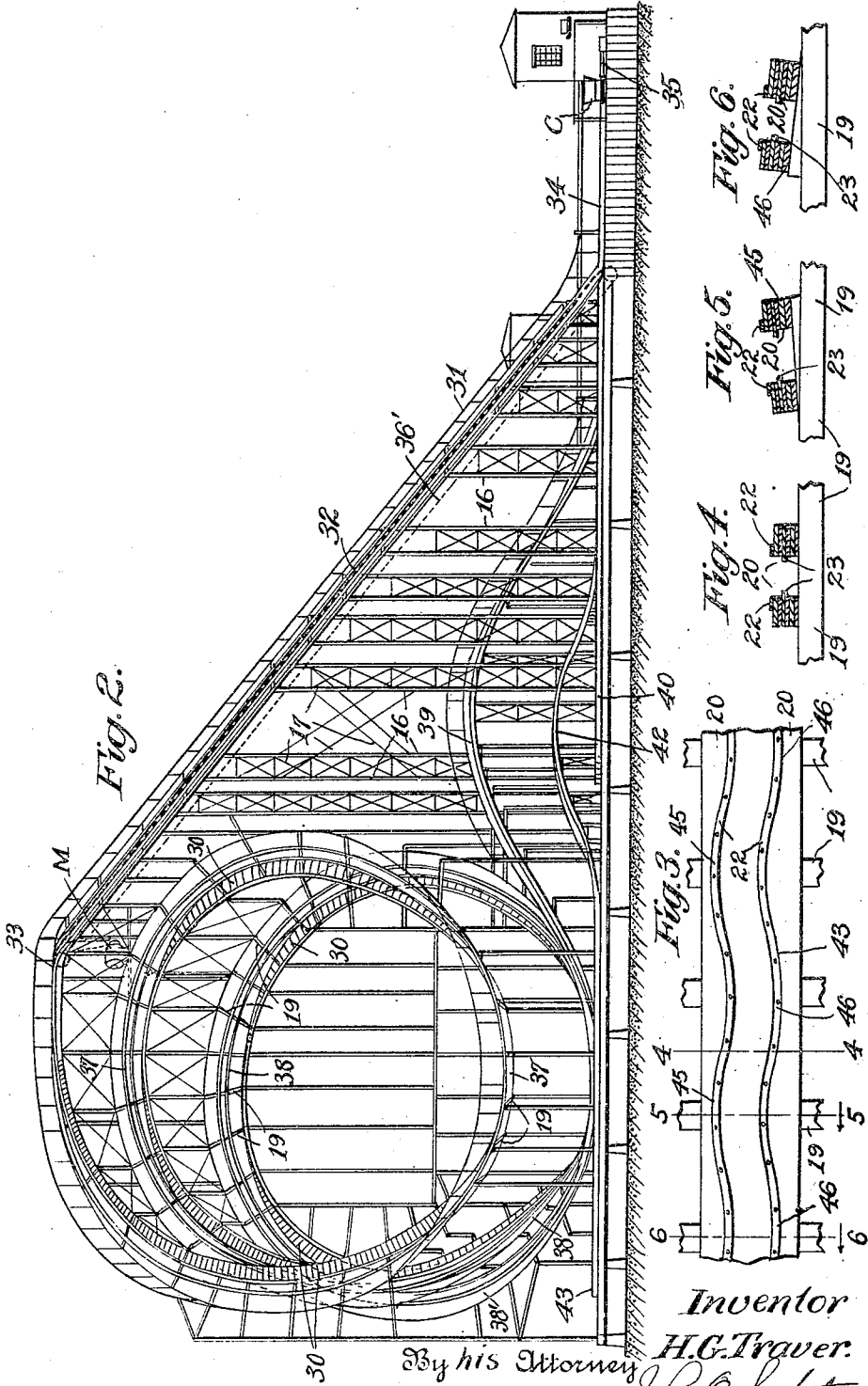
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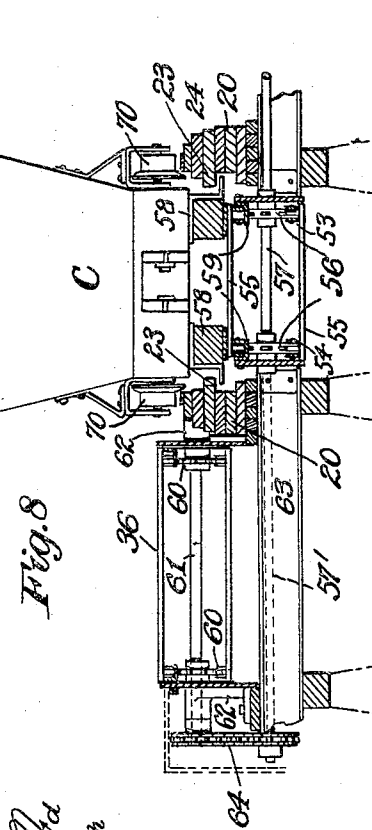


Fig. 8

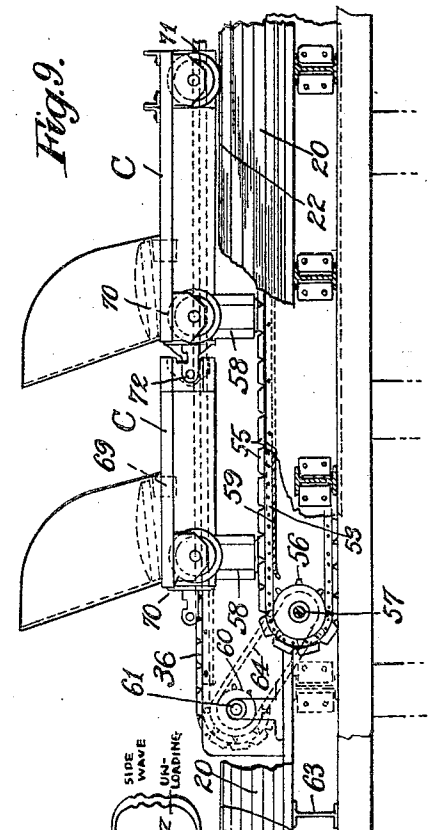


Fig. 9

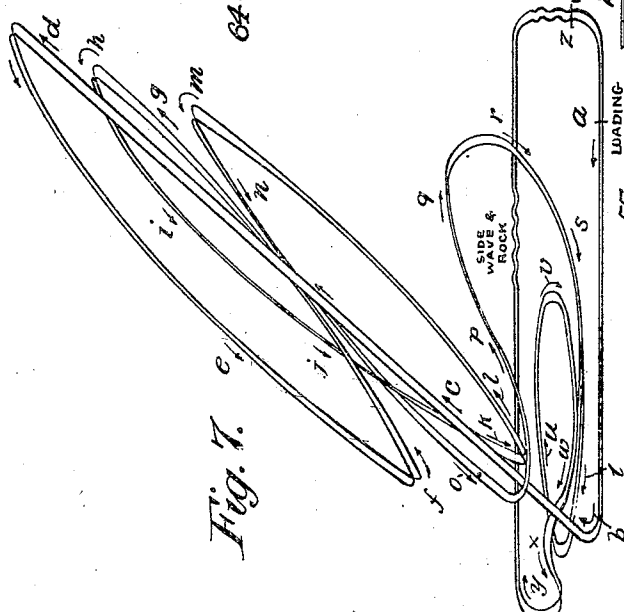


Fig. 7

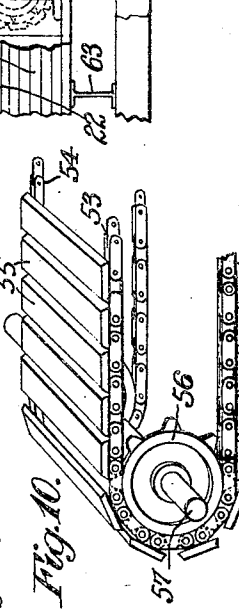


Fig. 10

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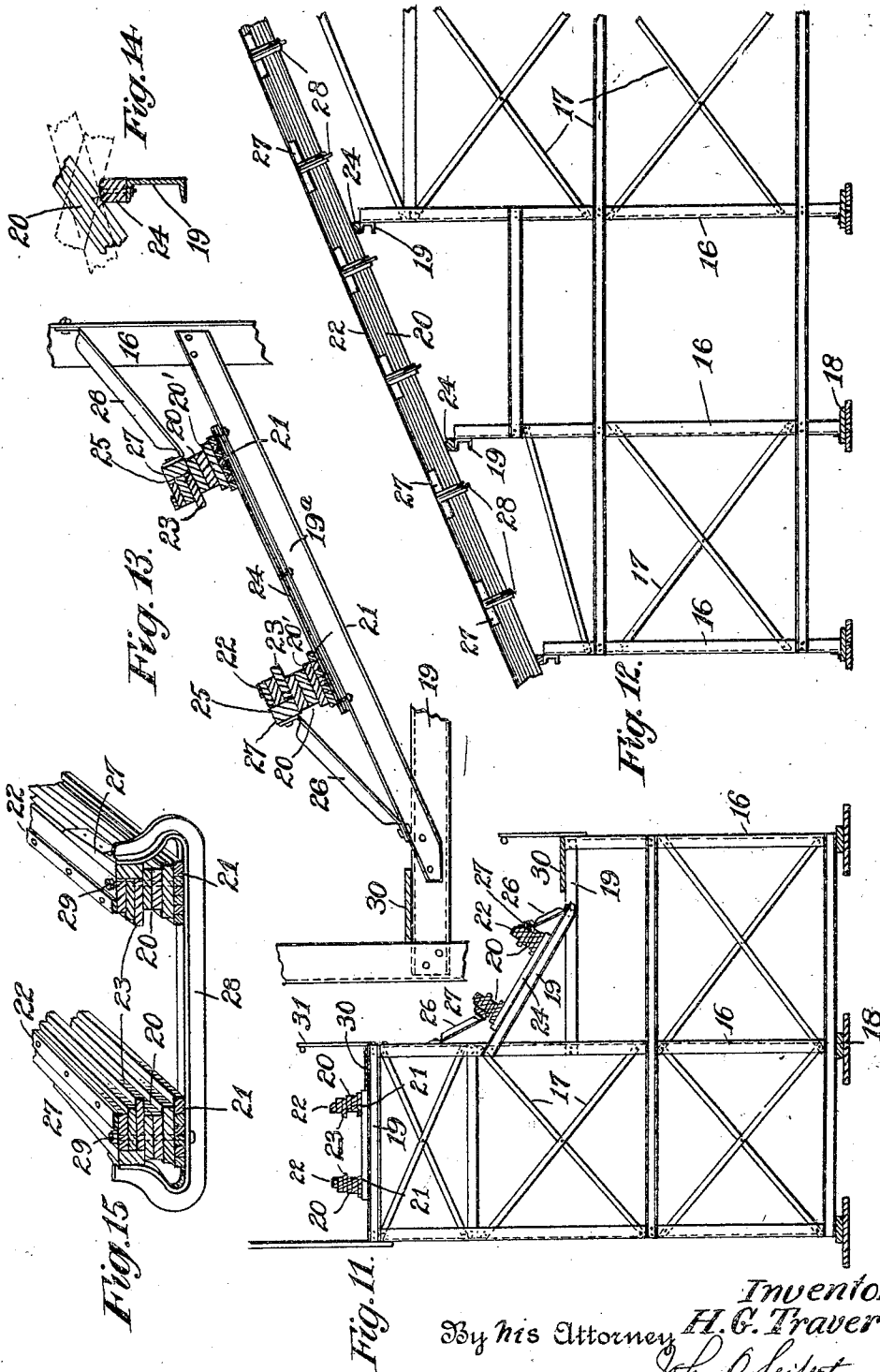
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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AMUSEMENT COASTER RAILWAY

Application filed April 11, 1927. Serial No. 132,719.

This invention relates to amusement rail-ways commonly termed "coaster railways" and embodying a continuous track, whereby cars are propelled up an ascending section of a track structure from a loading station, and the cars coast from the top of the ascending track section to a station for unloading the passengers from the cars, the track being arranged with curved sections and dips and rises, and it is the object of the invention to provide an improved constructed and arranged supporting structure for the track constructed of structural steel which has heretofore been deemed impractical, and to take up a minimum amount of space and to provide a novel arrangement of track whereby patrons will be subjected to successive thrills for the entire period of the ride.

A further object of the invention is to provide a traveling conveyor or conveyors upon which the cars are adapted to ride and be transported thereby for a portion of the ride.

Pleasure railways of this character are used in pleasure resorts which are only open during certain periods of the year and particularly on holidays, and in order that the same may be remunerative it is essential that the cars be kept practically in continuous operation. The interruption of the operation of the cars is mostly due to the delay in loading and unloading the cars, and it is a further object of the invention to provide improved loading and unloading stations embodying a traveling platform and arranging a conveyor relative to the platform to move in synchronism therewith and upon which conveyor the cars are adapted to ride as they enter the unloading and loading stations to be transported thereby for the length of the platform of the stations.

Other objects and advantages will hereinafter appear.

In the embodiment of the invention shown in the drawings Figure 1 is a plan view.

Figure 2 is a side elevation looking at the bottom of Figure 1.

Figure 3 is a plan view of an undulating section of the track.

Figures 4, 5 and 6 are cross sectional views taken on the lines 4—4, 5—5 and 6—6 of Figure 3, Figures 5 and 6 looking in the direction of the arrows to show the arrangement of banking of the track at the successive curves of the track undulations.

Figure 7 is a diagrammatic view of the general arrangement and course of the continuous track as viewed from the right of Figure 1.

Figure 8 is a cross sectional view on an enlarged scale taken on the line 8—8 of Figure 1 looking in the direction of the arrow.

Figure 9 is a side elevation, partly broken away, looking at the right of Figure 8.

Figure 10 is a perspective view of one end portion of a traveling platform at the loading and unloading stations.

Figure 11 is a cross sectional view of the supporting structure to show the manner of mounting the track thereon in level and banked formation.

Figure 12 is a side elevation of a part of a supporting structure and track to show the manner of mounting an ascending portion of the track thereon.

Figure 13 is a cross sectional view on an enlarged scale to show the rail structure of the track and the manner of bracing the rails.

Figure 14 is a cross sectional view of a rail supporting ledger and a rail mounting strip thereon to facilitate the mounting of the track rails on the ledgers at various inclinations; and

Figure 15 is a perspective view in cross section of the track rails and showing means in relation thereto to space and prevent spreading of the rails.

In carrying out the invention there is provided a supporting structure of structural steel, comprising columns 16 of angle shape in

cross section although other forms may be used, said columns being braced by strap or angle iron, as shown in a general way at 17, the columns being supported upon a suitable
 5 base or foundation, such as concrete, with interposed metallic plates 18.

A continuous track is mounted upon the supporting structure by ledgers 19 of steel channel bars, which ledgers extend in a horizontal
 10 plane transversely of and are secured at the intermediate portion of the channel legs to the columns in a straight portion of the track, but where the track goes around curves and loops in order to bank the track
 15 ledgers are superposed to the first-named horizontal ledgers with one end secured to a column and the other end secured to a ledger below, as shown at 19^a in Figure 13.

In order that the rails 20 may be readily
 20 formed in the erecting of the railway to conform to dips and rises they are made of laminated boards, in the present instance shown as comprising five superposed boards, the lowermost board being of greater width than
 25 those superposed thereto with the opposite longitudinal portions extending beyond the next adjacent board, as at 20', and the laminated boards superposed to a series of parallel strips 21 interposed between the ledgers
 30 and the laminated boards. The treads of the rails comprise metallic strips 22 fixed to the topmost boards. The laminated boards are secured together, as by nailing one board to the other, and to facilitate the mounting of
 35 the rails upon the ledgers wooden strips 24, to serve as nailing strips for the rails, are fixed to the ledgers, as by bolts (Figure 14), the track being secured to said strips by driving
 40 nails through the extending marginal portions 20' of the lowermost boards of the rails. Intermediate boards are arranged with lateral marginal portions to project inwardly, as at
 45 23, to form ledges on the rails for the engagement of the same above shoes 24' carried by the car C, as shown in Figure 8, to prevent the car from jumping the track. To facilitate the nailing of the track to the nailing strips the upper surfaces of the strips are made of
 50 convex form in cross section, these faces readily adapting themselves to a track upwardly inclined at one angle, as shown in full lines in Figure 14, or at a different angle, or a downwardly extending angle, as shown in dotted
 55 lines in said figure. The inwardly offset boards 23 and the boards uppermost thereto are offset inwardly relative to the outer marginal portions of the lower boards, as shown at 25. To space the outer portion of the rails
 60 relative to each other and also prevent spreading thereof braces are provided. These braces for the banked portion of the track comprise strips of angle iron 26 having the ends bent laterally, the braces for the upper rail being
 65 secured at one end to the columns 16 while the opposite end of each brace is positioned rela-

tive to the inwardly offset portion of the rail and secured thereto with an interposed wedge
 70 27. The braces for the lower rail are secured at one end to a track supporting ledger 19^a, and at the opposite end secured to the rails with an interposed wedge 27 similar to the
 75 braces for the upper rail. To space and prevent spreading of the rails of a flat track portion U-shaped members 28 (Figure 15) formed
 80 T-iron are provided with the extremities of the legs bent inwardly. These members or braces are alternately arranged with ledgers to extend transversely below the rails with the
 85 legs extending upwardly and engaging the outer sides of the rails, the upper portions of the rails being spaced in a manner similar to spacing the rails in the banked portion of the
 90 track by wedges 27. The braces 28 are secured to the rail by bolts 29, which may also serve to secure the laminated boards of the
 95 rail together. The columns are spaced apart a distance to permit of the mounting of a walk 30 in parallel relation to the track, a rail 31 being mounted on the supporting structure adjacent to the walk.

The supporting structure is so constructed and arranged as to form a substantially rectangular structure in plan with an ascending
 100 or up-track section 32 leading to the highest point 33 of the structure and diagonally of the structure from a low and level track section 34 at the front end and from a loading
 105 station 35 arranged at said end of the structure. An unloading station 36 is also arranged at said low and level track section at the side of the structure adjacent to the front. Cars are propelled up the ascending track
 110 structure by a chain 36' actuated by a motor M, as is usual in railways of this character, the motor in the present instance being mounted adjacent the upper end of the ascending track section.

A declivous track section leads from the top of the up-track section arranged in the
 115 form of a series of loops, as shown at 37 and 38, the loop 38 being arranged below the loop 37. The loops are in the form of a spiral evolved about an axis intermediate the perpendicular and horizontal. The track from the spiral loop 38 leads outside of said loop
 120 forming in effect a further loop 38' to an ascending or up-track section 39 which leads to a declivous track section arranged in the form of a series of flat loops or spiral loops evolved about a vertical axis, as at 40 and 41,
 125 and the track following a centripetal course; that is, the outer convolution of the spiral is of greater diameter than the next succeeding lower convolution 41. The looped track section 37, 38 is at the end of the supporting
 130 structure opposite to the loading station 35, while the looped track section 40, 41 is arranged forwardly thereof and below the up-track section 32. The loop sections 37, 38 and 40, 41 are so arranged that the convolu-

tion of the track in said loops is in opposite directions. In the present instance the convolution or direction of the track in loops 37, 38 is in anti-clockwise direction while the direction of the track in the loop sections 40, 41 is in clockwise direction. The track leads from the loop section 41 to an ascending or up-track section 42 over the juncture of said loop section 41 with the loop section 40 and declines to a level section 43 leading around the end of the supporting structure carrying the loop sections 37, 38 and opposite to the loading station 35 to a level track section 44 at the side of the supporting structure to the unloading station 36. In order that the cars will keep to the track and not be derailed as they pass down the declivous sections, and about the loops, the tracks are variably banked in a direction toward the center or axis of the loops, this banking varying from approximately ten degrees at the high point of the loops to seventy degrees at the low points and sharp curves of the loops.

The rails of the track at the level portion 43 are arranged with corresponding undulations, as shown in plan in Figure 3, within a straight portion of the supporting structure to impart a lateral undulating movement to the cars as they pass over said track section. To impart a simultaneous side swaying or oscillating movement to the cars on the longitudinal axes thereof the successive outer curved portions of the undulations are banked in opposite direction, as shown in Figures 5 and 6. That is, the curved track portions 45 of one undulated portion are inclined or banked to the left, while the successive curved track portions 46 are inclined or banked in the opposite direction or to the right, as shown in Figure 6, the portions of the track at the juncture of the curved portions being level, as shown in Figure 4. The level track section 44 leading to the unloading station is also arranged with lateral undulations to impart a lateral undulating movement to the cars as they approach said station, this undulating of the tracks having a braking effect upon the cars due to the frictional resistance of the rails of the track offered to the rotation of the car wheels. This braking effect, however, will not be imparted to the cars as they pass over the undulating track section 43 due to the alternate banking in opposite directions of the track at the successive curved portions. In Figure 7 there is shown in a diagrammatic manner the course of the track, the course being indicated by arrows with the characters of the alphabet *a* to *z*, inclusive, associated therewith, starting at the loading station and terminating at the unloading station.

In order to give the passengers of cars the illusory effect of extending or prolonging the ride there is interposed in a section of the track structure a traveling conveyor or con-

veyors upon which the cars are adapted to ride from the tracks, the conveyors serving as a brake to retard the movement of the cars and then transport the same at a slow speed. These conveyors in the present instance are arranged at the loading and unloading stations, where they also serve to facilitate the quick loading and unloading of the cars and for which purpose the platforms of the stations are adapted to move in synchronism with the movement of the conveyors. For this purpose the platforms of the stations 35, 36 are in the form of endless conveyors, as shown in Figures 8, 9 and 10. Access is had to the moving platform of the loading station by stairs 50 and a fixed platform 51 constituting in effect a continuation of the moving platform. Stairs or a ramp 52 lead from the moving platform of the unloading station 36. The moving platforms at the loading and unloading stations and the conveyors for moving the cars relative to the platforms are of the same construction and arrangement and a description of one will therefore be sufficient. These conveyors and platforms comprise sprocket chains 53, 54 mounted in spaced relation by a tread portion in the form of slats 55 fixed to alternate links of the chains, (Figure 10). The tread carrying chains constitute the conveyors for the cars at the stations and pass around sprocket wheels 56 fixed to a shaft 57 extending transversely below the tracks with the sprocket wheels engaging between the tracks and the upper stretch of the conveyor positioned below the track rails for the engagement of shoes 58 on the cars and to lift the cars to clear the car wheels of the track, as shown in Figure 8. The momentum of the cars causes them to ride partially upon the conveyors and said conveyors traveling at a relatively slow speed will retard the movement of the cars and then transport the same. It is understood that the conveyors are of the endless type and a sprocket chain carrying shaft is arranged at each end of the loop of the conveyor, the upper stretches of the conveyor chains being guided and supported in angle brackets 59. The moving platforms of the loading and unloading stations are arranged in a higher plane than the conveyors for the cars, as shown in Figures 8 and 9. Sprocket wheels for the chains 60 of said platforms for the loading and unloading stations are carried by shafts 61 extending in parallel relation to the shafts of the car conveyor sprocket wheels, but are arranged in a higher plane, said shafts being journaled in brackets 62 fixed upon the lateral extensions of I beams 63 which support the tracks at the loading and unloading stations. To move the platforms and car conveyors in synchronism the one sprocket wheel carrying shaft 57 of the car conveyor is extended, as at 57' in Figure

8, and said shaft extension is operatively connected with one of the sprocket wheel carrying shafts 61 of the platform by a sprocket chain 64 passing around the sprocket wheels on the extended end of shaft 61 and shaft extension 57'. The platforms and conveyors are driven from a suitable source of power, shown as an electric motor M' in Figure 1, operatively connected to an extension of one of the sprocket wheel carrying shafts of the car conveyor at the loading platform, as shown at 65 in Figure 1, by a chain drive 66, and the motor is operatively connected with the car conveyor and moving platform at the unloading station by extending the shaft of the car conveyor through which the sprocket wheel carrying shaft of the platform is connected with said conveyor, as shown at 67 in Figure 1, and providing a driving gear connection between said shaft extension 67 and the shaft extension 65, as shown at 68.

The cars to be used in connection with the ride are of the type disclosed by my copending application Serial No. 128,341, filed August 10, 1926, and issued January 3, 1928, as Patent No. 1,654,670, wherein the rear or seat carrying portion of the car body 69 is supported by traction wheels 70, while the forward end of the car has a swivel or universal connection 72 with and is supported by the wheel end of a forward car, the forward end of the forward car of a series of cars connected in a train being provided with traction wheels 71. As such cars form no part of the present invention detailed description thereof is not deemed necessary.

It will be obvious that various modifications may be made in construction and arrangement of parts and that portions of the invention may be used without others and come within the scope of the invention.

Having thus described my invention I claim:

1. In a coaster amusement railway, a continuous track having a loading and unloading station interposed in a low and level section thereof, an ascending section leading from the loading station and a declivous section leading from the top of the ascending section arranged in successive loops evolved about an axis intermediate the perpendicular and horizontal.

2. A coaster amusement railway as claimed in claim 1, wherein the loops are arranged in the form of a helix with one convolution below the other and the track banked in a direction toward the center of the helix.

3. A coaster railway as claimed in claim 1, wherein the track has an ascending portion leading from the declivous section and leading to a second declivous looped section evolved about a vertical axis.

4. A coaster amusement railway as claimed in claim 1, wherein the track has an ascend-

ing portion leading from the declivous section and leading to a second declivous looped section arranged in the form of a helix with the successive convolutions taking a centripetal course.

5. In a coaster amusement railway as claimed in claim 1, a second looped section leading from the first looped section, the loops of which section are evolved about a vertical axis, the evolution of the track of one looped section being in clockwise direction and the other section in reverse direction.

6. In a coaster amusement railway as claimed in claim 1, a second declivous looped section leading from the first looped section and arranged in successive loops evolved about a vertical axis, the evolution of the track of the first looped section being in anticlockwise direction and the track of the second looped section in reverse direction, and the track of said looped sections being banked in a direction toward the center of the loops.

7. In an amusement ride, a continuous track, loading and unloading stations arranged adjacent a section of the track, said track having an ascending section leading from the loading station, a declivous spiral section evolved about an axis intermediate the perpendicular and horizontal leading from the top of the ascending section, a flat spiral section advancing in reverse direction from the first spiral section, and a section leading to the unloading station arranged with lateral undulations.

8. In a coaster amusement railway, a supporting structure, a continuous track, loading and unloading stations arranged at a low and level section of the track at one end of the supporting structure, said track having an ascending section leading from the loading station in a direction diagonally of the supporting structure, a declivous spiral looped section at one end of the structure leading from the top of the ascending track section the loops of which track section are evolved about an axis intermediate the perpendicular and horizontal, a second spiral looped section arranged intermediate the ends of the structure and leading from an ascending track section intermediate the looped sections, the second looped section being evolved about a vertical axis, and a section leading from said second looped section about the first looped section to the unloading station and having a portion laterally undulated with the outer portions of the track at the curves of the undulation banked in opposite directions.

9. In a coaster amusement railway, a continuous track having a loading and unloading station interposed in a low and level section thereof, an ascending section leading from the loading station and to a declivous section, and a circular section evolved about a vertical axis leading from said declivous section.

10. In a coaster amusement railway, a continuous track having a loading and unloading station interposed in a low and level section thereof, an ascending section leading from the loading station, a declivous section
5 leading from said ascending section, an ascending section leading from the latter declivous section and leading to a looped section evolved about a vertical axis and arranged
10 substantially in a horizontal plane.

Signed at Beaver Falls, in the county of Beaver and State of Pennsylvania this 8th day of April, 1927.

HARRY G. TRAVER.

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