H. O. TRAVER.
TROLLEY AMUSEMENT.
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INVENTOR

WITNESSES:
James F. Duhamele
O. Huling

ATTORNEY

THE WOOLG Retum Co., WASHINGTON, D.C.
To all whom it may concern:

Be it known that I, HARRY G. TRAVER, a citizen of the United States of America, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Trolley Amusements, of which the following is a specification.

My invention relates to an improvement in trolley amusement devices, having for its object the production of an interesting and sensational ride which passengers may take for recreation in parks, at exhibitions or fairs, on outings trips, and elsewhere.

The leading idea of the invention is to thrill those who ride with exciting and unusual experiences, due to the rapid flight of a freely moving car down along a spiral course, the car being lifted from the starting point to the top of the spiral prior to the descent, and after said descent it automatically returns to the starting point.

The invention consists essentially in a spiral track, a suitable structure for supporting it, and various appurtenances and adjunctive mechanisms, whereby the general effect and purpose of the apparatus is attained; and the invention furthermore consists in the construction, arrangement and combination of parts, substantially as will be hereinafter described and claimed.

In the accompanying drawing illustrating my invention: Figure 1 is a side elevation of my improved trolley amusement device. Fig. 2 is a top plan view. Fig. 2a shows one of the cable supports of Fig. 2. Fig. 3 is an enlarged partial side view of the spiral track and the structure for supporting it. Fig. 4 is an sectional detail view of the mechanism whereby the passenger-carrying car is supported on the track. Fig. 5 is a detail side view of the mechanism for suspending the car movably on the track. Fig. 6 is an end view of the same. Fig. 7 is an enlarged detail side view in partial section of the upper end of the central column of the track structure, and illustrates the mechanism for supporting the upper end of the track and for connecting thereto the stationary cable on which the car is lifted to the top, and the means for carrying the upper end of the endless lifting cable. Fig. 8 is a top plan view of the same. Fig. 9 is a detail view of a part of the means for supporting the spiral track. Fig. 10 is a partial plan view of certain details of the track and pulleys. Fig. 11 is a sectional detail of one of the couplings which are used to unite the sections of the central column. Fig. 12 is a side view of one of the pairs of pulleys which operate on the track and are provided with ratchets to prevent reverse movement. Fig. 13 is a platform at the loading station. Fig. 14 is a side view of a brake device for stopping the car at the proper point where it is to be loaded with passengers. Fig. 15 is a detail of one of the clamps. Fig. 16 shows the attachment of the clip to the cable.

Similar numerals of reference designate corresponding parts throughout the different figures of the drawing.

1 denotes a central stationary upright column; its lower end rests on a plate 2, see Fig. 3, supported by some suitable foundation 4; the column 1 is constitutes of sections 5 secured together at the joints by means of couplings 8, see Fig. 11, each coupling having flanged halves which are firmly secured to the column sections, and are fastened together by bolts 11 passing through openings 9, one end of the bolt being screw-threaded and provided with a nut 12, and the other having a collar formed thereon and provided with an eye. On the upper end of the column 1 is a cap 24, preferably like a half of 8 of one of the couplings 8. The bottom plate 2 is provided with sockets to receive brace rods 3, which reach from the column 1 and extend, preferably, in a downward inclined direction to a series of foundations 5, located at convenient distances from the column 1, and sufficiently embedded in the ground to give a firm anchorage. These foundations 5 are provided with sockets to receive the ends of the rods 3 and also with perforated ribs 6 that are engaged by the lower ends of brace rods or cables which lead upwardly and are connected to the eye-bolts 11, see Figs. 3 and 11. Some of the brace rods or cables 7 which extend upwardly from the foundations 5 are attached to the cap 24. There may be as many of these rods as desired, and obviously as many of the foundations 5 as may be suitable, as also of the braces 3.

On the central column 1 is a series of clamps 15 having sockets for holding horizontal arms 14 that carry brackets 21 for supporting a spiral track 13. Track 13 descends from near the top of column 1 to near the bottom in a course of gradually increasing diameter, the degree of inclination of the path depend-
ing upon circumstances and the speed which it is desired to impart to the car, it being obvious that the purpose of the track is to furnish a descending spiral path down which a car will travel by gravity at the proper speed to give the occupants the pleasing sensations of a rapid movement through space. As the central column 1 is one of the principal parts of the structure that upholds this track, the latter is disposed symmetrically around it so that it serves as the vertical axis of the spiral, and hence the clamps 15 are caused to rigidly embrace this column 1, as shown in Figs. 9 and 15. Clamp 15 consists of a split ring, which is preferably ribbed for the sake of strength and is open at the split to a greater or less extent, the two ends being clamped together by means of a bolt 16, which can be tightened up whenever desired, if by chance the clamp should ever work loose at all. Each arm 14 is carried by a socket on clamp 15 and supports at its outer end a vertical bracket 21, which is bolted to the track 13. On the upper end of the bracket 21 is a perforated lug or ear 23 that receives the lower end of a brace rod 18 having on the lower end thereof a nut 20. The upper end of rod 18 is fastened by means of a bolt 19 to a collar 17 which is clamped to the column 1. The braces 18 thus connect with and support the outer ends of the arms 14, and the nut 20 permits the length of this supporting connection to be regulated and adjusted as may be required. These clamp collars 17 which carry the braces 18 are interspersed, at convenient distances, on the column 1 among or between the clamps 15 which carry the horizontal arms 14.

It will be understood that from the outer end of each arm 14 there leads upward one of the inclined braces 18, and that consequently in the make up of the structure for sustaining the spiral track, there is a multiplicity of rods, braces, arms and other parts, but they are all so related to each other and relatively disposed in such an effective way that they co-operate and strengthen each other and provide a structure without any weak spots, but capable to uphold the track 13 and enable it to have the requisite stiffness to permit the travel thereof of the succession of grooved wheels with which the cars are provided. Each bracket 21 is preferably ribbed on the vertical side as shown in Fig. 4 for the sake of strength, although I do not wish to be restricted to any particular form thereof. The track rail 13 is a comparatively thin, vertical plate which is attached side-wise to the bracket 21 by bolts 26 along a line between the upper and lower edges so that the upper edge may enter the grooves in the periphery of the wheels of the cars, while the lower edge is free and allows wheels or rollers 62 and 72 to play against both sides, and rollers 63 against the bottom edge of the same, said wheels or rollers being suitably carried by the same frames in which the grooved pulleys 53 are journaled. The working edge of the track 13 on which the pulleys roll is stiffened by means of a suitable strip 66, see Fig. 4, which is secured thereto in any suitable manner.

Before describing the cars and the means whereby they are enabled to roll on the track, I will explain other parts of the apparatus. The spiral track of which I have just spoken leads downwardly from a considerable height, say 50 or 60 feet or more from the ground, down to a point, say 15 or 20 feet from the ground. It is necessary to provide means for lifting the car to the top of the spiral so that it may be at the proper place to start on its circuitous course. This means consists of an inclined cable 32 leading from a loading station or terminal at 66, which may have any suitable construction and arrangement, upwardly to a point near the top of the column 1, as shown generally in Fig. 1 and in the enlarged detail view of Fig. 7. The stationary inclined cable 32 at the loading station is suitably guided by rollers or pulleys, and connects at 67 with a horizontal track 68 in lieu of which track a cable may be used if desired, and from this track 68 another track or cable 33 leads horizontally, with ups and downs, or undulations, and easy ascents and descents, on supports 36, passing in its course through a tunnel 34 and connecting finally with the lower end of the track 13. The inclined cable 32 connects with the upper end of the track 13 by a stationary connection or casting 27, which is suitably recessed or bored to allow the end of the cable 32 to pass into it, as shown in Fig. 7. The cable is fastened to the connection 27, preferably by one or more U-bolts 69, or some other securing devices, and the end of the cable which emerges from the casting on the other side may be bent around some stationary object or fastened firmly so that the cable 32 cannot be withdrawn from the casting 27. Thus it will be seen that the car wheels which ride upon the cable 32 will pass with ease therefrom onto the connection 27 and thence to the track 13, the latter being firmly attached to the connection 27, as shown in Fig. 7. The connection 27, see Figs. 7 and 8, is supported by hangers 30 and 31 from depending arms 29 and 28, which project horizontally from the column 1 and are provided with clamping sleeves 29a and 28a, which embrace the column and are firmly clamped thereto.

Parallel to the inclined stationary cable 32 is a moving endless cable 43 which, at its upper end, passes around a sheave 44 rotatable on the column 1, and the lower end around a sheave 39 in the loading station, on vertical shaft 41 actuated by a gearing 40, a drive-wheel 38 and an electric or other motor 37.
The endless cable 43, just before it reaches the sheave 39 is deflected from an inclined to a horizontal position by means of idler pulleys 70. Contiguous to the upper sheave 44, at one side, is a pair of idlers 45, 45, supported by bracket 48 carried by a clamp 49 which embraces the column 1, and has its parts firmly secured together by means of bolts 50, and at the other side of the sheave 44 is another pair of idler pulleys 46, 46 carried by a bracket 47, similarly supported from the column 1. These idler pulleys serve to support the endless cable 43 and direct it surely around the sheave 44. The object of this endless cable is to carry the cars from the loading station to the top of the spiral track. Hence, the cable is provided at intervals of a few feet, say twenty or thirty feet, with projecting clips 60 that engage certain parts of the framework of the car in order that the car may be moved upward, said clips being so fixed as to be automatically disengagable from the car at the proper time when the car leaves the cable and is received by the descending spiral.

The cars used in this device may vary widely in their form and structure. They are designed to carry a convenient number of passengers and ordinarily will consist of a passenger compartment over which is a canopy. One of these cars is indicated in Fig. 5, at 10, where it is seen that there are two roller frames 52, each having two rollers 53, and from said frame the canopy 71 of the car 10 is hung. One of the frames 52 is shown in enlarged detail in Fig. 4. The wheels 53 are grooved so as to roll on the track 13 and on the cables 32 and 33. The frames 52 are shaped in some suitable manner so that they may carry anti-friction rollers to bear against the lower part of the track 13. Referring to Fig. 4 it will be seen that said frame 52 has a pair of horizontal rollers 62, suitably journaled to bear against one side of the track 13, and a pair of rollers 72 to bear against the opposite side of the track 13, while one or more rollers 63 is journaled to bear against the under edge of track 13, thus friction is diminished and the easy motion of the frames along the side of the track is promoted. Referring to Fig. 5 it will be seen that the car 10 is moving in the direction indicated by the arrow, and that the rear frame 52 differs slightly in construction from the forward frame, because in practice I find it most convenient that the clips 60 should engage the rear instead of the forward frame. Accordingly, the rear frame, or both frames, if desired, is provided with a ledge or surface against which the clip 60 bears. 58, 58 designate two dogs provided with springs 59, said dogs being pivoted to the rear side 61 and being normally held by the springs in a position where their edges come close to each other without meeting, space enough being left for the shank of the clip 60 to move loosely between the dogs, but not enough to allow the head 60 of clip to be withdrawn therethrough. The clips 60 are shown in detail in Fig. 16, where it is seen that a clamp 70 surrounds the cable 43 and has its ends bolted to the shank of the clip 60 by rivets or bolts 74. Referring to Figs. 4 and 5, it will be seen that when the car 10 is in the proper position, one of the clips 60 will pass into the open space 75 with its shank loosely between the dogs 58, and the head 60 will bear against the forward ledge or partition at the point 76, and while so bearing will carry the frame 52 and the car along with it. The fact that the springs 59 hold the dogs 58 with their edges in close proximity to each other, prevents the clip from being released sidewise from the frame 52. When, however, the car reaches the top of the spiral and comes alongside of the upper sheave 44, the peripheral flanges of said sheave will enter the spaces at both sides of the curved surface 75, as indicated in Fig. 4, and the continued movement of the car will cause the dogs 58 to strike against these flanges on sheave 44 and turn them on their pivots, holding them in the deflected position here shown long enough for the clip 60 to be withdrawn from frame 52. The two frames 52, 52 are swiveled at their lower ends on bolts 57, 57 which are shaped with eyes and engaged by rods 55, 55 that are connected to the canopy 71 of the car. The swiveled connection with the wheel frames is for the purpose of allowing these frames to travel easily around curves, while the loose joint between the bolts 57 and the rods 55 and between the rods 55 and the canopy 71, is to permit of such swinging or centrifugal motion as may occur during the rapid movement of the car. The two bolts 57 are spaced and held rigidly with relation to each other by means of a horizontal connection 54, shown in Fig. 5. Referring to Fig. 4, it will be seen that these bolts 57 pass loosely through perforations in the bottom part of the frame 52 and are screw-threaded in the upper end for the retention of a nut and by these means the frame 52 easily swings on the bolt 57 if the latter is held stationary with relation thereto.

I have already described the method of connecting the upper end of the stationary cable 32 to the top portion of the spiral track 13 by using a connecting casting 27 which receives the cable 32 through a hole therein and allows the said cable to be firmly affixed thereto. Inasmuch as the course over which the cars travel consists in part of a cable-way and in part of a track or rail, I find it necessary to provide means at other points in addition to the top of the column 1, where a connection is made between a rail and track and a cable. Such connection is required also at the lower end of the spiral track, also at the...
lower end of the inclined cable 32 at 67, where it connects with the track 66; also at the other end of the track 68, where it connects with the cable 33. I may say that this connection of the cable with the track may in each case be made in any suitable way, but preferably I shall utilize means similar to that already described at the top of the column 1 in connection with the casting 27. It should here be remarked that a cable and a rail can interchangeably be used for the travel of the car wheels, and although in describing and illustrating one specimen of my trolley amusement, I have indicated a rigid rail or track at one place and a flexible cable at another, yet I do not wish to be absolutely restricted thereto, but desire the liberty of employing either a cable or a rail in any part of the circuitous path along which the car travels, and hence the matter of connecting the cable portions with the rail portions of this course is one which is susceptible of the use of a very wide variety of means.

The tunnel 34 through which the car passes is indicated in Fig. 1 as surrounding a portion of the cable 33 which leads from the lower end of the spiral back to the loading station and which carries the car back over it, after it has made the spiral descent, to the point where the passengers are unloaded from the car and a new lot admitted. This tunnel will prove to be an interesting feature in a ride made up of extraordinary and sensational experiences. Inside of the tunnel I propose to use any suitable scenery 35, or to produce such scenic effects as may be best employed to enliven the travelers. Electrical appliances may be made use of for this purpose, and inside at various points in the tunnel may be arranged suitable wiring and incandescent lamps and other devices, together with means for producing cloud and other effects, and these electrical means may be operated automatically by the passing car, suitable circuit closers and openers being utilized. It is unnecessary to illustrate this automatic means herein or to describe the same in detail, as any well known electrical device for accomplishing the same result may be made use of.

The wheels 53 may, if desired, be provided with ratchets 64 engaged by pawls 65, which latter are pivoted to the frames 52 in such a position that they may engage the teeth of the ratchet. These ratchets prevent reverse motion of the wheels when the car is moving up the inclined cable 32 and serve as safety devices. In Fig. 14 I have represented a brake device consisting of an elongated shoe 77, adapted to be engaged by the wheels 53, belonging to the car. A lever, or several levers, three or more 78, pivoted at 79, below the platform 80 are employed to operate the shoe 77, said levers connecting with the shoe by means of links 81. The spring devices 82, whose tension is regulable, bear against the levers 78 and keep them in the position where the shoe 77 is so located that when the car reaches the limit of its travel toward the loading station, it will be automatically acted upon by the brake. This is one way of arranging the brake, though I do not desire to be restricted thereto. The platform 80 is preferably arranged in connection with the loading station 66, and the levers 78 are conveniently placed so that they may be laid hold of by the attendant at that point. In case the devices are arranged as shown in Fig. 15 and the brake is an automatic one, the attendant will, of course, move one of the levers in the direction of the arrow when he wishes to release the car and allow it to go forward. Manipal other forms of brake may be substituted, if desired.

The operation of the trolley amusement will be fully evident from the foregoing description of the construction and arrangement of the various parts. The car, after being loaded at the station 66, will be moved by hand until it reaches a point at the beginning of the inclined cable 32, where one of the clips 60 will pass into the rear wheel-carrying frame 52 and come into contact with the curved surface 76 on the front ledge or partition of said frame, and this contact or grasping of the car by the clip will, inasmuch as the cable 43 is an endless moving cable, carry the car upward gradually but surely to the top of the spiral track, where the car will be automatically disengaged from the car through the contact of the dogs 58 with the sheave 44 and the consequent opening of the dogs. As soon as this release of the car from the lifting clip 60 occurs, the car will begin its descent along the spiral rail or track 13, moving faster or slower, according to the inclination of the rail which will be properly adjusted to attain the end in view, and proceeding to the bottom of the spiral, giving to the passengers a rapid flight and the pleasurable experiences attendant thereon. From the lower end of the spiral track the car will pass to the cable 33 rushing through the tunnel 34 and again reaching the loading station.

Manipal changes in the precise construction and arrangement of the parts may be made, and I do not desire to be confined to the particulars of the embodiment herein exemplified, inasmuch as my ideas are broad, and I desire complete protection thereon and the liberty of so modifying and re-arranging the features and elements of my improvements as may be found necessary in order to assure me the advantages to be derived from the use of the invention.

At the lower end of the endless cable which lifts the car I can, if desired, employ means for adjusting the position of the lower sheave so as to tighten the cable. Also any suitable
means for making the stationary cable tight and taking up slack may be utilized. In order to steady the central column and in fact the whole structure guy ropes or cables may be used extending from the top of the column to suitable fastenings at a distance and these will protect the column against lateral strain. Referring again to the casting or connection 27 it will be noted that the upper edge is preferably made rounded or round pointed to fit more easily into the grooved wheels of the car and it has a thinner edge below similar to the lower edge of the track 13 in order to fit the safety rollers of the car. The upper edge of connection 27 is horizontal from a point opposite the column, forward and back for a distance of about double the space between the wheels of the car so that the wheels may be on a level when the clip is being disengaged by the large upper sheave wheel 44. Beyond this point the upper edge slants rapidly in order to give the car accelerated speed at the start and to cause the rail to run under the cables on the return side.

Alongside of the track 13 and the sheave 44 I find it convenient to use sometimes an extra flange or guard rail 22, the object of which is to prevent the sheave from pushing the car wheels outwardly from the column, said rail 22 acting like any ordinary guard rail.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:-

1. In a trolley amusement, the combination with a track consisting of a single vertical rail, of central supporting means, and means carried by said central means for supporting the track.

2. In a trolley amusement, the combination with a spiral track consisting of a single vertical rail, of central supporting means, and means carried by said central means for supporting the spiral track.

3. In a trolley amusement, the combination with a track consisting of a single vertical rail, of central supporting means, and radially extending means carried by said central means for supporting said track.

4. In a trolley amusement, the combination with a spiral track, central supporting means, radially extending means carried by said central means, and depending means carried by said radially extending means for supporting said track.

5. In a trolley amusement, the combination with a column, of a spiral track encircling said column said track consisting of a single vertical rail, and means carried by said column for supporting said track.

6. In a trolley amusement, the combination with a spiral track increasing in diameter from top to bottom said track consisting of a single vertical rail, of central supporting means, and means carried by said central means for supporting said track.

7. In a trolley amusement, the combination with a spiral track, said spiral track increasing in diameter from top to bottom and consisting of a single vertical rail, of central supporting means, and radially extending means carried by said central means for supporting said track.

8. In a trolley amusement, the combination with a spiral track increasing in diameter from top to bottom, central supporting means, radially extending means carried by said central means, and depending means carried by said radially extending means for supporting said track.

9. In a trolley amusement, the combination with a column, of a spiral track increasing in diameter from top to bottom and encircling said column said track consisting of a single vertical rail, and means carried by said column for supporting said track.

10. In a trolley amusement, a spiral track, and means for supporting it consisting essentially of a column having projecting arms that hold the track so that there may be a free rail.

11. In a trolley amusement, a spiral track for a gravity-descending car, and means for supporting the track consisting of a central column having projecting arms that sustain the track with a free rail, and suitable braces for said arms.

12. In a trolley amusement, a spiral, and a supporting structure therefor consisting essentially of a central column, clamps on said columns having outwardly extended arms, brackets on said arms supporting the track so that its upper edge may be a free rail.

13. In a trolley amusement, the combination with a supporting structure, of a spiral track increasing in diameter from top to bottom and consisting of a vertical piece supported along its center line so that the upper and lower edges may be free, said track being arranged so that the supporting structure is applied thereto in such a manner as to support it at intervals, and a car having wheels engaging with and running upon said track.

14. In a trolley amusement, the combination of a spiral track increasing in diameter from top to bottom and supported along its middle line so that the upper edge may receive car wheels while the lower edge is surrounded by rollers likewise carried by the car, a central supporting means, outwardly extending means carried by said central means, depending means carried by said outwardly extending means for supporting said track, and the car operating on the track, substantially as described.

15. In a trolley amusement, the combination with a spiral track, of a central column,
clamps adjustably secured thereon, horizontal arms carried by the clamps, brackets on the outer ends of these arms, which brackets are fastened to the track, and braces for the horizontal arms, together with clamps on the column to which the braces are attached.

16. In a trolley amusement, the combination with a track, of a central jointed column, couplings for the sections, bottom radial arms extending outwardly, foundations for the outer ends of said arms, and brace rods running from said foundations to the couplings for the purpose of securing strength and rigidity in the structure.

17. In a trolley amusement, the combination with a spiral track, of a supporting structure, consisting essentially of a sectional column, radial arms at the base for supporting and strengthening it, inclined braces extending from the outer ends of said radial arms to points along the length of the column, and a series of horizontal arms carried by the column and brackets on the outer ends of said arms which are fastened to the spiral track.

18. In a trolley amusement, the combination with a spiral track increasing in diameter from top to bottom and consisting of a single vertical rail, a central column, outwardly extending means carried by the column, means carried by said outwardly extending means for supporting said track, said track forming a circuitous course consisting essentially of an ascent to the top of the spiral, and a return from the bottom of the spiral to the ascent, said return consisting of undulations and short ascents and descents.

19. In a trolley amusement, the combination with a spiral track increasing in diameter from top to bottom and consisting essentially of a single vertical rail, central supporting means, means carried thereby for supporting the track, and a car having grooved drive wheels engaging the track together with frames connected to the car for carrying the wheels.

20. In a trolley amusement, a spiral track along which the car descends by gravity, said track consisting of a single vertical rail and having the spiral increasing in diameter from top to bottom, central supporting means, outwardly extending means carried by said central means, and depending means carried by said outwardly extending means for supporting the track.

21. In a trolley amusement, a spiral track along which the car descends by gravity consisting of a single vertical rail whose spiral arrangement increases in diameter from top to bottom, in combination with a strengthening strip and means for securing said strengthening strip to the spiral track along its edge.

22. In a trolley amusement, an endless course for a car consisting of a track in the form of a descending spiral, said track consisting of a single vertical rail whose spiral arrangement increases in diameter from top to bottom, a central supporting means, means carried by said means and extending outwardly, depending means carried by said outwardly extending means for supporting said track, an ascending course to the top of the spiral, a return from the bottom of the spiral, and a car having wheels running on the track trolley-wise, all arranged so that said endless course may operate in connection with the car to accomplish the results substantially as and for the purpose specified.

23. In a trolley amusement, the combination with a track, of a car, a frame carrying the car, a trolley wheel journaled in the frame and engaging the track, and means engaging said wheel for preventing its reverse movement.

24. In a trolley amusement, the combination with a vertical track or rail, of a car, a frame on which the car is hung, swiveling means between the car and the frame, grooved wheels journaled in the frame and engaging the opposite sides and bottom edge the track, and safety rollers likewise engaging the track.

25. In a trolley amusement the combination with a spiral track, of a car, a frame on which the car is hung, grooved wheels journaled in the frame and engaging the track, an endless lifting cable carrying clips, and dogs pivoted in the car-supporting frame, said dogs being engaged by the clips when the car is being lifted.

26. In a trolley amusement the combination with a spiral track supported along its middle line so as to leave free the upper and lower portions of a car, one or more frames supporting the car, grooved wheels journaled in the frames and engaging the upper part of the track, and safety rollers journaled in the frame and engaging the lower part of the track.

27. In a trolley amusement the combination with a track, supported along its middle line so as to leave the upper and lower portions free, of a car, one or more supporting frames therefor, grooved wheels journaled in the frames and engaging the upper part of the track, and anti-friction rollers journaled likewise in the frames and engaging the opposite sides and the bottom edge of the lower free portion of the track.

28. The combination with a track, central means for supporting said track, of a car, one or more frames supporting it, wheels journaled in the frame and engaging the track, bolts swiveled in the lower part of the supporting frames, and loose connections between the bolts and the car, so that the car may swing easily during its movement and
its wheels may be adapted to run on a curved rail.

29. The combination with a spiral track, of a car, wheel-carrying frames engaging the track, and loose connections between the car and the frames so that the wheels may follow the curvature of the track and the car may swing easily.

30. The combination with a spiral track, of a car, a supporting frame carrying wheels engaging the track, a ledge on the frame, an endless lifting cable having clips that engage said ledge, pivoted dogs in the frame for holding the clip in engagement, and releasing means for said dogs.

31. The combination with a track, of a car, frames supporting the car, loose connections between the car and the frames, wheels journaled in the frames and engaging the track, an endless lifting cable, sheaves around which the cable passes, clips on the cable, pivoted dogs in the car-supporting frame for holding the clips in engagement with the frame, all arranged so that when the dogs strike the cable sheave the clip will be released.

32. The combination with a track, of a car descending the same by gravity, an endless clip-provided lifting cable sheaves around which said cable passes, and means on the car adapted to strike said sheaves and automatically engage and disengage the clips and the car.

33. In a trolley amusement, the combination of a spiral track, a car having trolley wheels engaging it and provided with pivoted spring dogs, an endless clip-provided cable for lifting the car to the top of the spiral, the clips on the cable being held engaged with the car by means of said dogs, and means for releasing the dogs when the car begins its descent.

34. In a trolley amusement, a vertical rail, said rail forming an endless course for a car consisting of a descending spiral, an ascending course to the top of the spiral, and a return course from the bottom of the spiral, a part of the endless course being inclosed to form a tunnel.

35. In a trolley amusement, a vertical rail, said rail forming an endless course for a car consisting of a descending spiral, an ascending course to the top of the spiral, and a return course from the bottom of the spiral, a part of the endless course being inclosed to form a tunnel, said tunnel being provided with scenic effects.

36. In a trolley amusement, a vertical rail, said rail forming an endless course for a car consisting of a descending spiral, an ascending course to the top of the spiral, and a returning course from the bottom of the spiral, said course being in combination with a car having wheels running on the course, and a brake mechanism for stopping the car.

37. The combination with a track, of a car descending the same by gravity, a loading station, means for lifting the car from the loading station to the top of the spiral, means for returning the car from the bottom of the spiral to the loading station, and suitable braking means for stopping the movement of the car.

38. The combination with a spiral track, the diameter of which spiral increases toward the bottom of a car, forward and rear supporting frames, each frame having grooved trolley wheels engaging the track, swiveled bolts in the lower ends of said frames, loose connections between the bolts and the car, and a rigid spacing connection between the bolts.

39. The combination with a track supported along its middle line so as to leave the top and the bottom free, of a car, front and rear supporting frames therefor having trolley wheels engaging the track and also having safety rollers engaging the track, swiveled bolts in the frames, a rigid spacing connection between the bolts, and loose rods connected to the bolts and to the car.

40. The combination with a track, of a car, a supporting frame for the car, grooved wheels journaled in said frame and engaging the track, ratchets on said wheels, and paws on the frame engaging the ratchets, for the purpose of preventing reverse movements.

41. In a trolley amusement, an endless course consisting in part of a cable-way and in part of a track or rail, in combination with means for connecting a cable section with a track section consisting essentially of a rigid connection bored to receive the cable and means for securing the cable within the same as well as for fastening the track to the connection.

42. The combination of an inclined cable, a descending spiral, a connection between the spiral and the cable consisting essentially of a casting to which the spiral is connected said casting being bored to receive the cable, and means for securing the cable within the casting, all arranged so that the wheels of the car may move freely from the cable onto and over the casting and the spiral.

43. In a trolley amusement, the combination with a track, a central column, radially extending arms carried by said column, and depending brackets carried by the arms, said brackets supporting the track so that it has a free edge.

44. In a trolley amusement, the combination with a spiral track, a central column, radially extending arms carried by said column, and depending brackets carried by the arms, said brackets supporting the track so that it has a free edge.

45. In a trolley amusement, the combination with a spiral track, of a car having grooved trolley wheels engaging the track, frames connected to the car for carrying the
wheels, and means on the wheels engaging means on the frames for preventing the reversal of said wheels.

46. In a trolley amusement, the combination with a spiral track, of a central column, clamps adjustably secured thereon, arms carried by the clamps, brackets on the arms and fastened to the track, and braces for said arms, together with clamps on the column to which the braces are attached.

47. In a trolley amusement, the combination with a track, of a central column, clamps adjustably secured thereon, arms carried by the clamps, and brackets on the outer ends of said arms, which brackets are secured to the track.

48. The combination with a spiral track, of a central column, clamps adjustably secured thereon, and brackets fastened to the track and upheld by connection with the clamps.

49. In a trolley amusement, the combination with a spiral track, central supporting means, outwardly extending means carried by said central means, and depending means carried by said outwardly extending means for supporting said track.

50. In a trolley amusement, the combination with a spiral track, central supporting means, outwardly extending means carried by said central means, and means carried by said outwardly extending means for supporting said track.

51. In a trolley amusement, the combination with a spiral track increasing in diameter from top to bottom, central supporting means, outwardly extending means carried by said central means, and depending means carried by said outwardly extending means for supporting said track.

52. The combination with a spiral track, of a car, a supporting frame carrying wheels engaging the track, a ledge on the frame, and an endless lifting cable having clips that engage said ledge.

53. The combination with a spiral track, of a car, a supporting frame carrying wheels engaging the track, a ledge on the frame, an endless lifting cable having clips that engage said ledge, and pivoted dogs in the frame for holding the clips in engagement.

54. In a trolley amusement, the combination with a spiral track, central supporting means, outwardly extending means carried by said central means, depending means carried by said outwardly extending means for supporting said track, and a car having wheels trolleywise on the track.

55. In a trolley amusement, the combination with a central column, of a spiral track encircling said column and consisting of a single vertical rail whose spiral arrangement increases in diameter from top to bottom, and means carried by said column for supporting said track at uniform intervals throughout the length of the track, substantially as described.

56. In a trolley amusement, the combination with a spiral track increasing in diameter from top to bottom and consisting of a single vertical rail, of central supporting means, means carried by said central supporting means, and means carried by said latter means for supporting the track, the points of support being at certain intervals apart throughout the length of the track so that the support may be uniformly effective.

Signed at New York city this 2nd day of January 1806.

HARRY G. TRAVER.

Witnesses:

JOHN H. HAZELTON,
I. HEIBEG.