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(54) **SUSPENDED TRACK AMUSEMENT RIDE**

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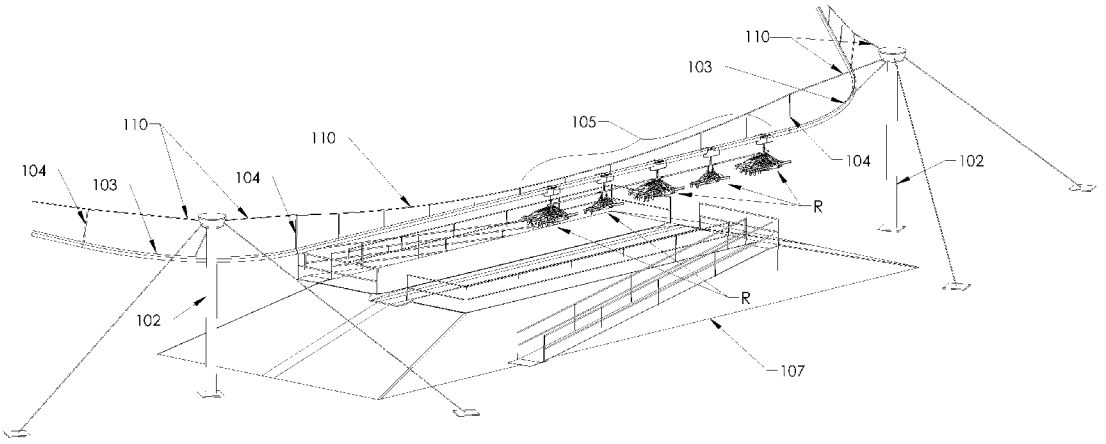
(52) **U.S. Cl.**
CPC ..... *A63G 21/04* (2013.01)
USPC ..... **104/53**

(57) **ABSTRACT**

A suspended track amusement ride is disclosed. A cylindrical rail is suspended from catenary curved tensioned support cables by vertical attachment cables, creating a single rail track that can be suspended over large distances.



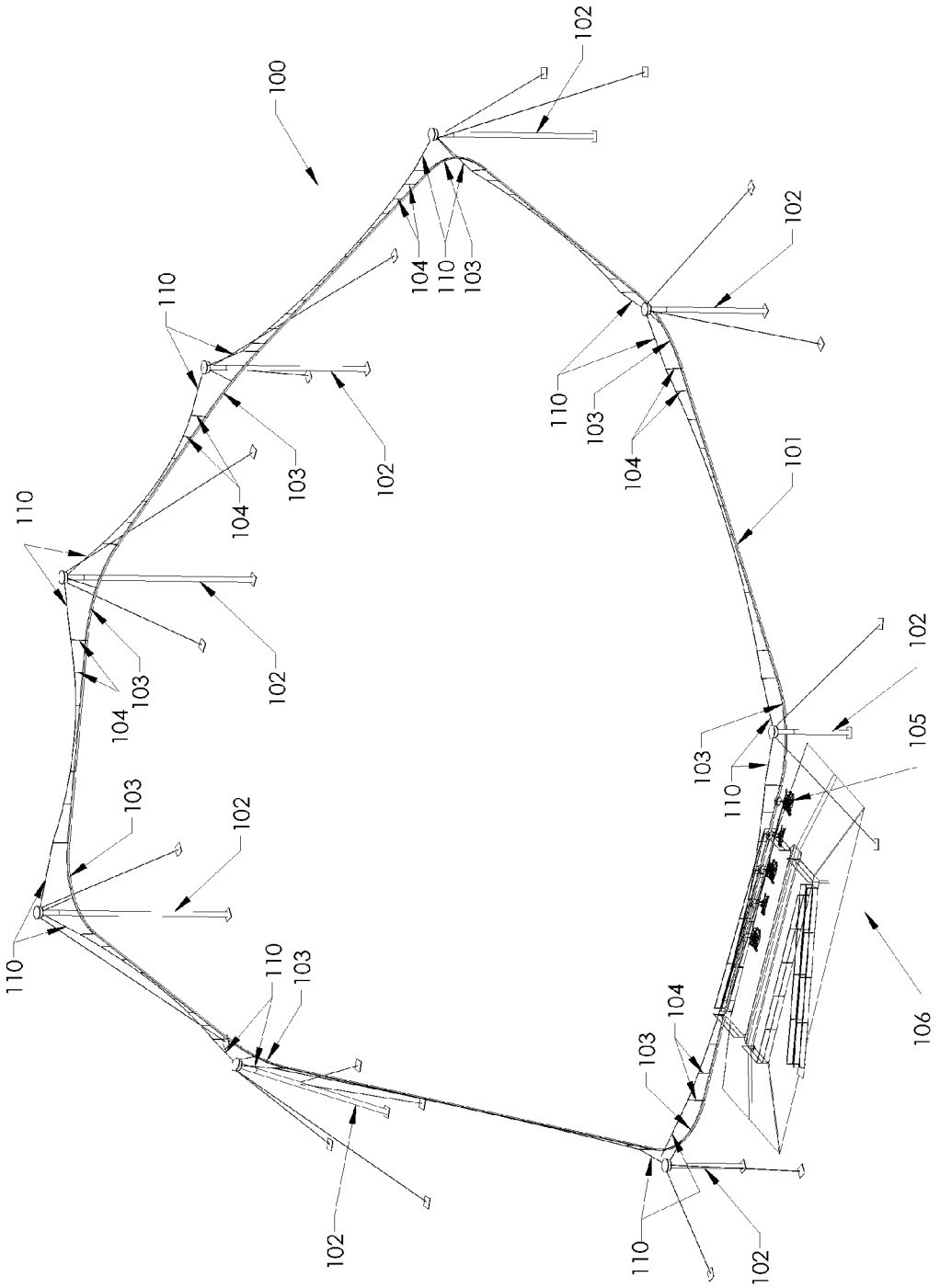



Fig. 1

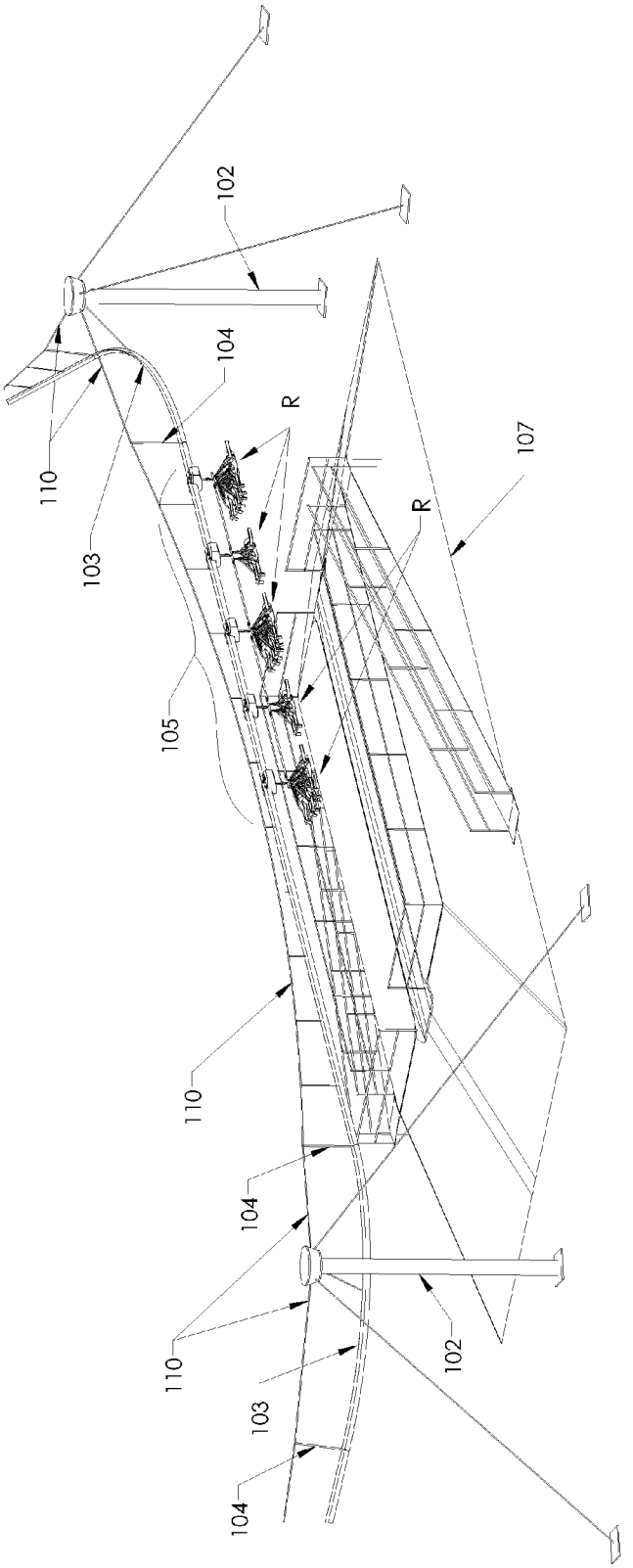



FIG. 2

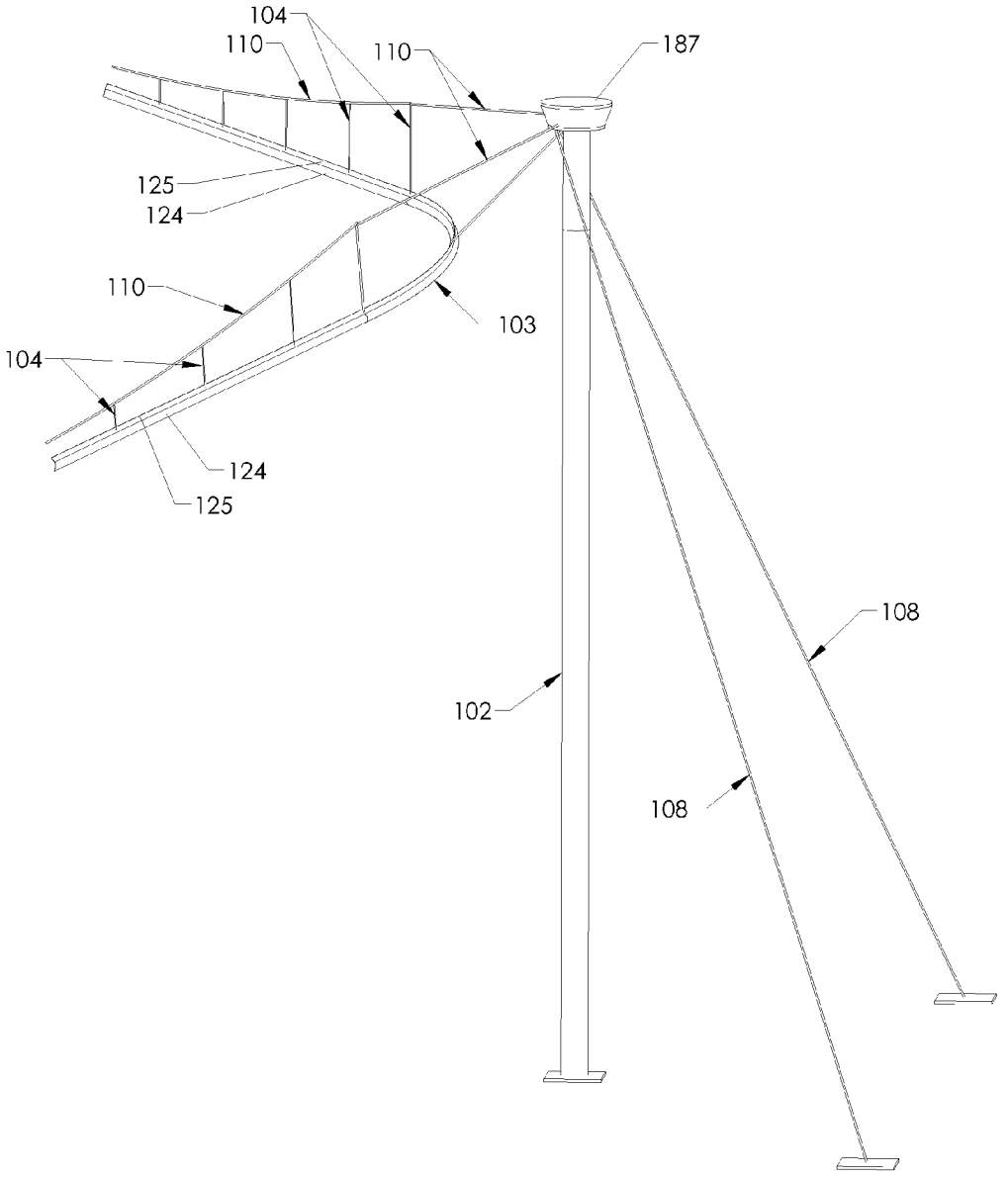



FIG. 3

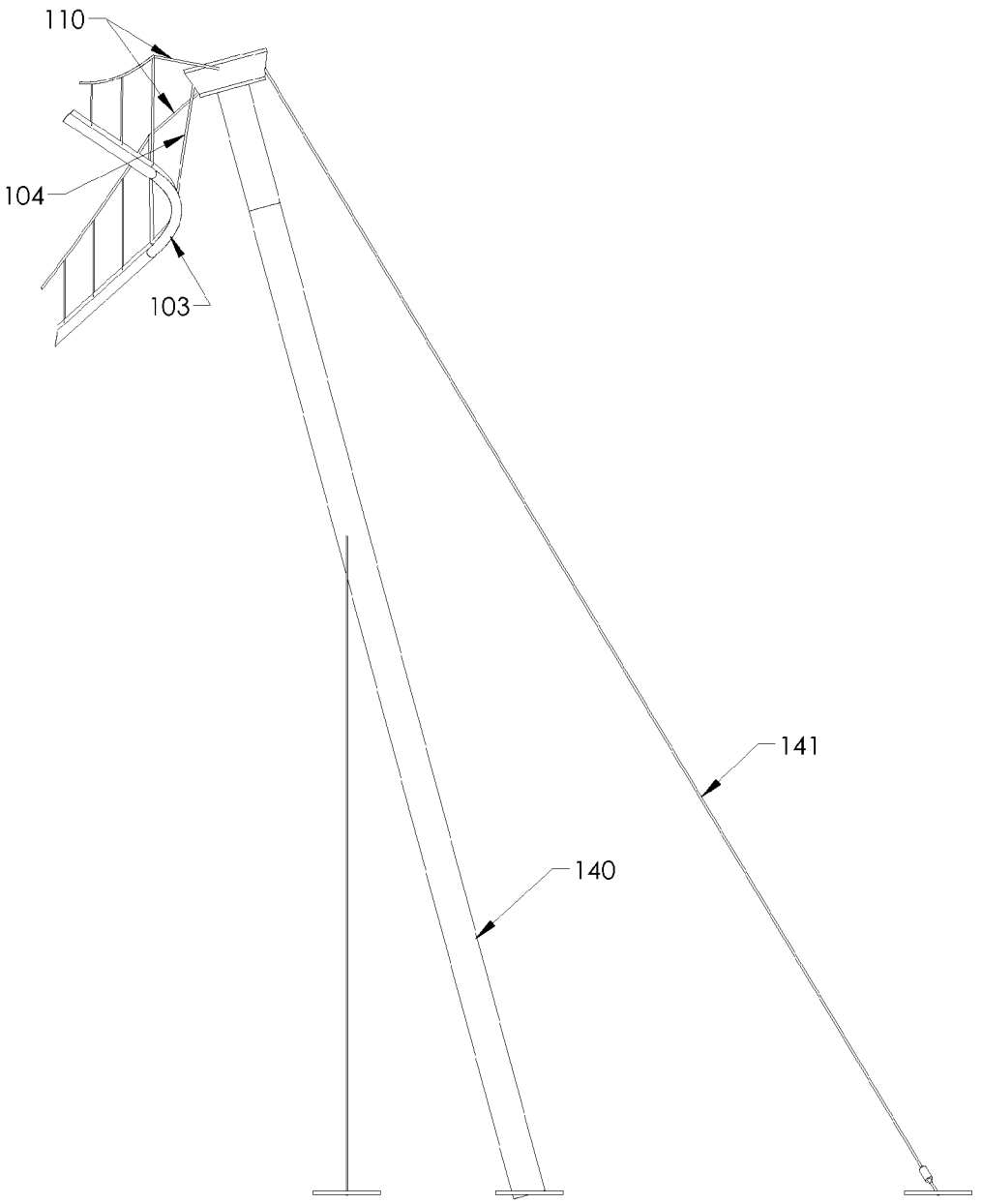



FIG. 4

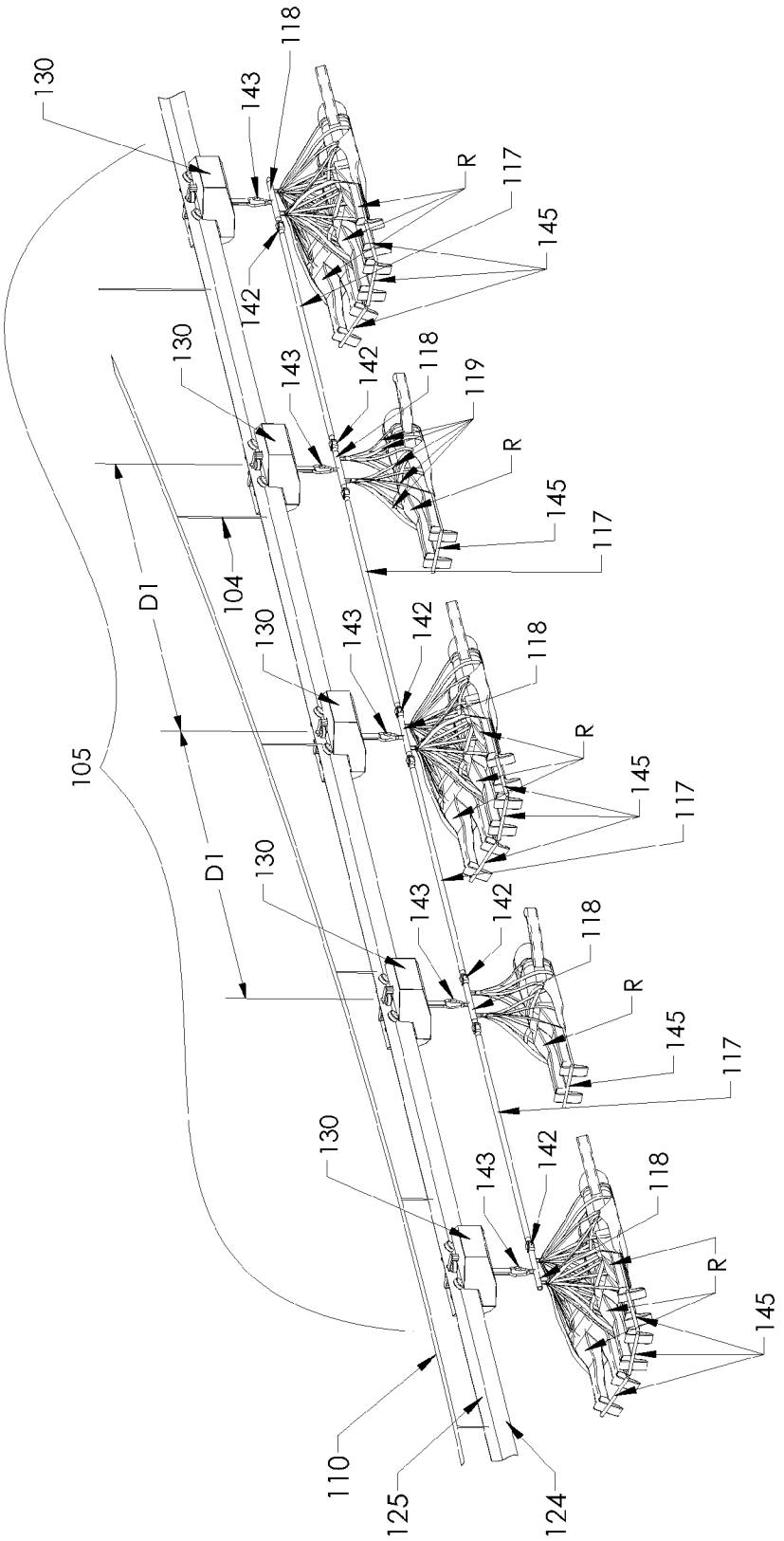

130
143
118
R
117
145
142
130
143
142
118
119
R
145
117
104
D1
130
143
142
118
R
145
117
105
D1
130
143
142
118
R
145
117
130
143
142
118
R
145
110
125
124

FIG. 5

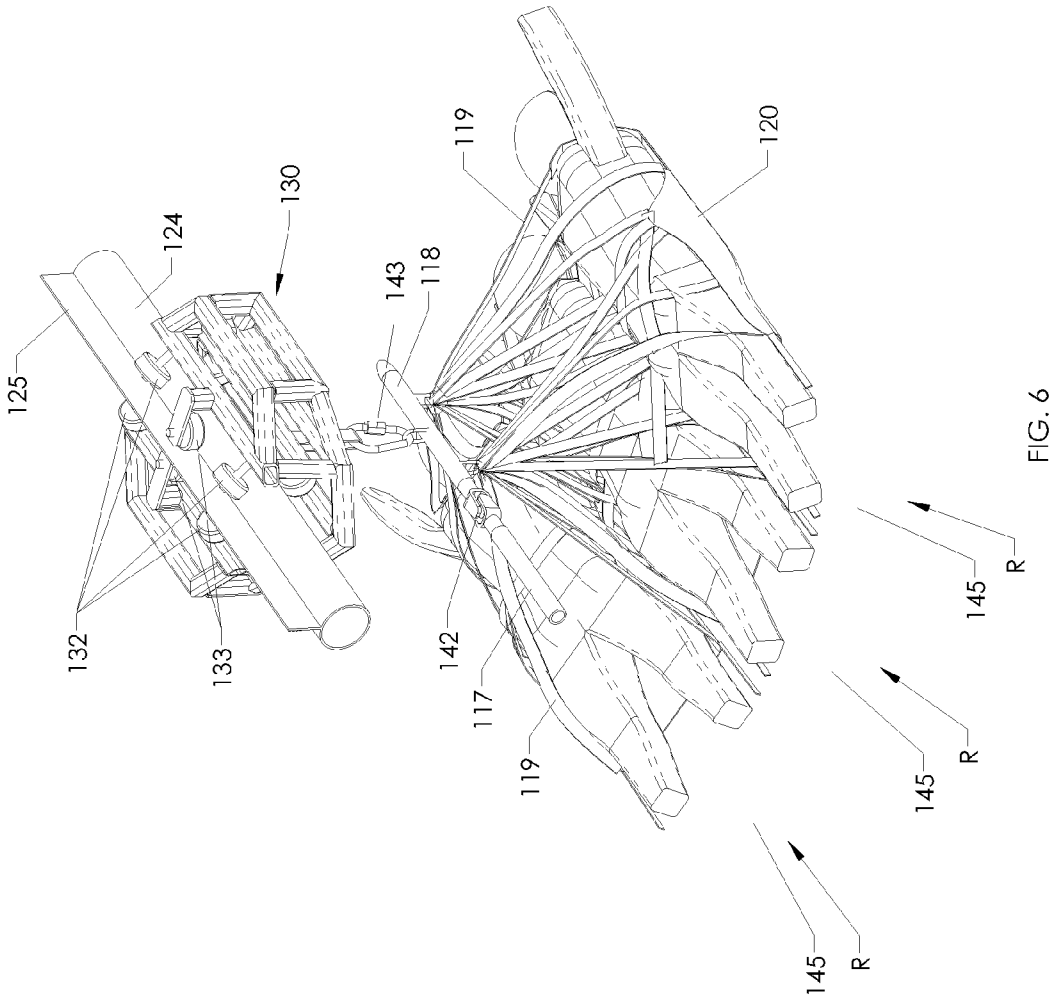



FIG. 6

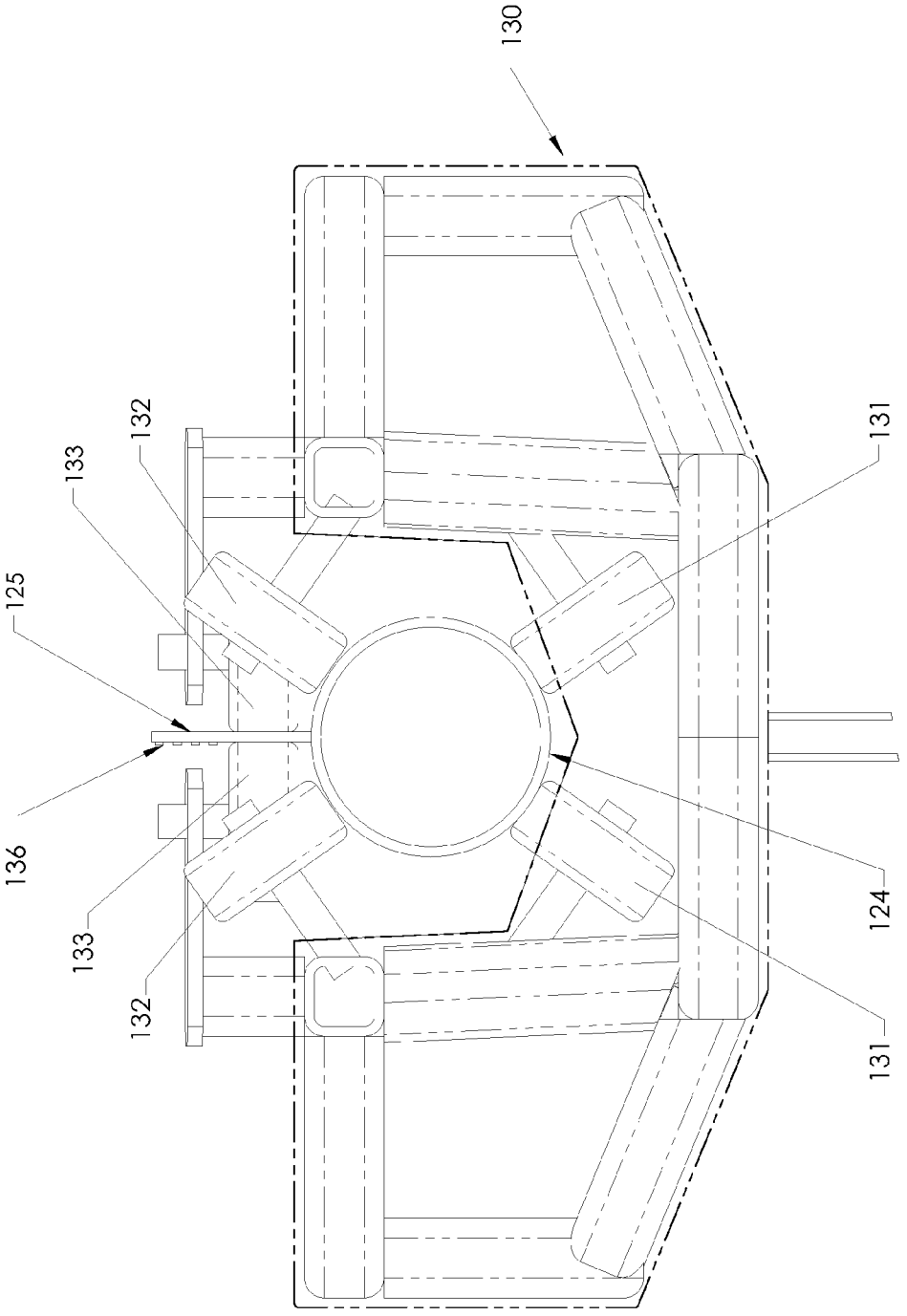
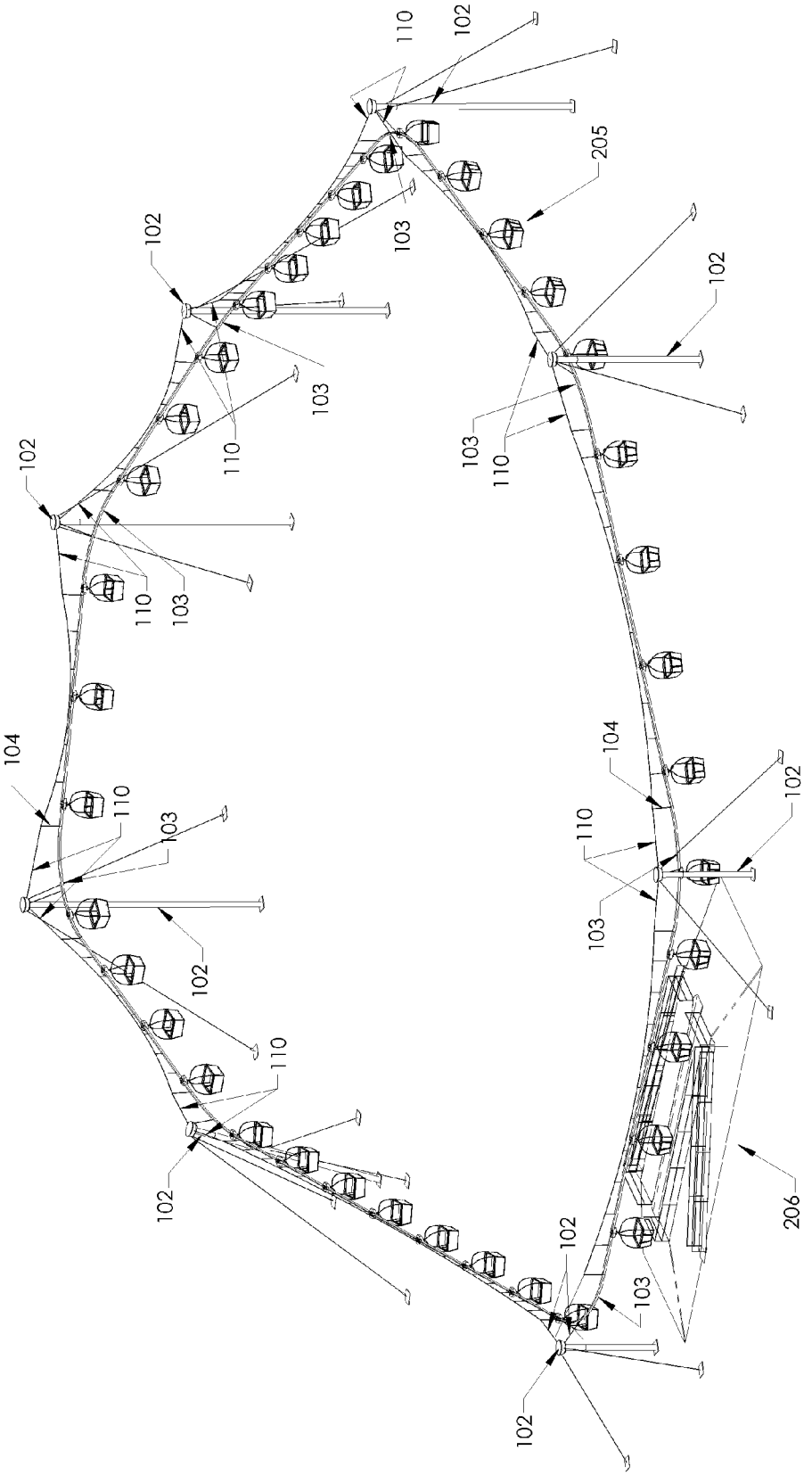



FIG. 7


110
102
205
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103
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110
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104
102
110
103
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206
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103
102

FIG. 8

# SUSPENDED TRACK AMUSEMENT RIDE

## CROSS REFERENCE APPLICATIONS

**[0001]** This application is a non-provisional application claiming the benefits of provisional application No. 61/503,345 filed Jun. 3, 2011, which is hereby incorporated by reference for all purposes.

## BACKGROUND

**[0002]** Amusement rides are well known in the art. The amusement ride industry has seen an increasing growth in what are called thrill rides, rides that provide the appearance of danger to the rider. Rides such as swing rides, sling shot rides and bungee jumps are among the many thrill rides currently known. The safety of the rider is always a primary concern, and always constrains the design of rides. Other concerns include cost of installation and maintenance, the size of the footprint (space needed on the ground) and number of riders that can use the ride in a given interval of time. Various types of cable supported rides are well known, including ski lifts and other similar rides. Cable rides are generally not considered suitable for thrill rides because of the difficulties of moving the rider at the speeds necessary for a thrill ride while being able to make sharp turns also considered desirable in a thrill ride. Fixed track rides, rides with a solid metal track, are considered better suited to thrill rides, but have the disadvantage that the weight of the track requires a much larger footprint to have a suspended track.

**[0003]** The foregoing examples of the related art and limitations related therewith are intended to be illustrative and not exclusive. Other limitations of the related art will become apparent to those of skill in the art upon a reading of the specification and a study of the drawings.

## SUMMARY

**[0004]** An aspect of the amusement ride disclosed is to provide a fixed track that is suitable for use as a thrill ride with a minimal footprint on the ground.

**[0005]** The following embodiments and aspects thereof are described and illustrated in conjunction with systems, tool and methods which are meant to be exemplary and illustrative, not limiting in scope. In various embodiments, one or more of the above described problems have been reduced or eliminated, while other embodiments are directed to other improvements.

**[0006]** The amusement ride is a suspended fixed track loop that has a means for conveying multiple riders in a generally front down prone position. The single track rail is supported by tensioned cables. To ensure rider safety there are a number of means to reduce and/or limit the amount of sway and/or twisting that the rides can experience.

**[0007]** A second embodiment of the amusement ride is a people mover type ride using the tensioned cable supported track.

**[0008]** In addition to the exemplary aspects and embodiments described above, further aspects and embodiments will become apparent by reference to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0009]** FIG. **1** is a top perspective view of the suspended track amusement ride.

**[0010]** FIG. **2** is a top perspective view of the rider loading/unloading area.

**[0011]** FIG. **3** is a side elevation view of a suspension tower.

**[0012]** FIG. **4** is a side elevation view of a tilted suspension tower.

**[0013]** FIG. **5** is a rear perspective view of the rider train.

**[0014]** FIG. **6** is a rear perspective view of the rider conveyance assembly with riders with outer surface removed.

**[0015]** FIG. **7** is a cross section of a rider conveyance assembly

**[0016]** FIG. **8** is a top perspective view of a second embodiment of the ride.

**[0017]** Before explaining the disclosed embodiment of the present invention in detail, it is to be understood that the invention is not limited in its application to the details of the particular arrangement shown, since the invention is capable of other embodiments. Exemplary embodiments are illustrated in referenced figures of the drawings. It is intended that the embodiments and figures disclosed herein are to be considered illustrative rather than limiting. Also, the terminology used herein is for the purpose of description and not of limitation.

## DETAILED DESCRIPTION OF THE DRAWINGS

**[0018]** FIG. **1** is a top perspective view of a suspended track amusement ride **100**. A single rail track **101** is suspended in the air from towers **102** by a catenary curved suspension cable **110**. The track **101** is a continuous loop that can be between 150 meters and 500 meters long.

**[0019]** The real limit on the length of the track **101** is the strength of the track **101** and the suspension cable **110** and not any limitations on the other elements of the ride. In the depicted embodiment the loop is about 480 meters long. The towers can vary in height between 6 and 60 meters tall, or higher. In the depicted embodiment the towers range in height between 6 meters and 20 meters. The track **101** is attached to the towers **102** and is supported by tensioned cable **110**. Riders R are carried on a flyer train **105** with rider conveyances in a generally front down orientation in the depicted embodiment. If desired the riders could be sitting in a seat or swing type device (not shown). In order to make it easier to load the riders on flyer train **105**, it may be desirable to have two towers **102** be shorter than the other towers **102** to bring the flyer train **105** closer the ground at loading area **106**. In some installations, this may not be desired. Maximum distance between the towers is dependent on the height of the towers and the terrain. If desired a second train (not shown) could be provided on the opposite side of the suspended track loop from the rider train **105** to add more passenger capacity.

**[0020]** FIG. **2** is a perspective view of one embodiment of a loading area **106**. A queue guide **107** is provided to organize and guide the line of people waiting to ride on the suspended track amusement ride **100**. The design of such queue guides **107** to ensure safety and minimize customer dissatisfaction with wait times is well known and will not be further discussed here.

**[0021]** FIG. **3** is a side elevation view of a tower **102** with the suspension cable **110** attached to the tower **102** and the track **101** suspended from the suspension cable **110**. In the depicted embodiment the suspension cable **110** is a single loop of cable that is fed through the towers **102** and tensioned and then attached to the tower **102**. Cable **110** is slid through channels in the top of the towers and then clamped in place in the channels when the desired tension is reached. This

method allows the whole cable **110** to be tensioned all at the same time in one operation, helping to ensure that the tension is even over the whole ride. If desired the suspension cable **110** could be strung and tensioned between the towers **102** as separate segments. In the depicted embodiment the suspension cable **110** is a 30 mm (1⅛ inch) diameter steel cable. The track **101** is suspended beneath the suspension cable **110** on attachment cables **104**, which are **13** mm (½ inch) diameter cables in the depicted embodiment attached to the suspension cable **110** with swaged clamps in the depicted embodiment. The track **101** is a 15 cm (six inch) diameter cylindrical rail **124** with a welded plate **125** on top that the attachment cables **104** attach to with swaged clevis in the depicted embodiment. Although the plate **125** is welded to the rail **124** in the depicted embodiment, other ways of attaching would work as well, including casting the track as a single piece. In the depicted embodiment the distance between the towers **102** varies between 150 and 110 feet with between 15 to 10 feet of sag in the suspension cable at the middle of the span. The amount of span and swag will depend on the size of the ride and the wind loads the ride **100** is designed to withstand. Stay cables **108** are used to balance the tower **102** against the pull of the suspension cable **110** and the weight of the ride. The tension on the cable is between 4.5 to 4545.5 kilograms (10 to 100,000 pounds0 depending on the size of the ride and the length of the spans.

**[0022]** FIG. **4** is a side elevation view of a tilted suspension tower **140** with stay cables **141**. This configuration of tower can be used if there is a particular geometry of the track that is desired, but for some reason a tower cannot be placed exactly where required in an upright position.

**[0023]** Referring next to FIGS. **5** and **6**, a rider train **105** supports the riders R on rider conveyances **130**. In FIG. **6**, the rider conveyance **130** is shown with its outer casing removed. Multiple rider conveyances **130** are mounted to the track **101** a given distance D1 apart. In the depicted embodiment D1 is about 3.7 meters to ensure that the riders R cannot come into contact with each other. Other distances could be used as well, so long as safety considerations are met. A rider support rod **118** is suspended by hanger **143** from the rider conveyance **130**. The rods **118** are pivotally attached to connection members **117**. The connection members **117** function to reduce any forward and backward (relative to the direction of travel of the rider R) sway of the rider R and to tie the riders R in the rider train **105** together to prevent too much strain on the track **101** being caused by each rider R being able to sway individually when the riders R are coming out of a turn. The connection members **117** are rigid in the depicted embodiment.

**[0024]** Riders R are attached below the rod **118** on straps **119** attached to a flight suit **120** in at least two locations at the neck and base of the spine of the rider R to prevent twisting of the rider R. In the depicted embodiment straps **119** are made of webbing. The flight suits **120** in the depicted embodiment are a modified hang gliding suit with the two attachment locations, such as are used on Skycoaster® amusement rides and other similar flight rides. Between one to three riders R can be attached to a rod **118**. For safety reasons, it is probably desirable to make it difficult for the riders to detach themselves from straps **119**. This could be done in a number of ways, including locking attachments or other means known in the art.

**[0025]** FIG. **7** is a cross sectional view through a rider conveyance **130**. The rider conveyance **130** has ten wheels in the depicted embodiment that function to attach the rider conveyance **130** to the track **101**. As seen in FIGS. **5** and **6**, there are four lower vertical stabilizing wheels **131** and four upper vertical stabilizing wheel **132** that rider on the circular rail **124**. Two horizontal stabilizing wheels **133** ride along plate **125**. At least two **132** wheel are driven, in the depicted embodiment all of wheels **132** are driven. Plate **125** has electric feed rails **136** that carry power for the ride. The rider conveyances **130** connect to the electric feed rails with a contact armature (not shown) known in the art in the depicted embodiment. Other methods of driving the rider conveyance along the track would work as well, including being pulled by cables, gravity, chain drives or other known methods.

**[0026]** FIG. **8** is a perspective view of a rider carriage embodiment of the rider conveyance for the suspended cable amusement ride **200**. The flexibility of the layout of the cable **101** that is allowed by the towers **102** and the suspension cable **110** may be desirable in standard cable lift uses, such as ski lifts, aerial viewing rides, people movers or similar types of rides. A rider carriage **205** would be used instead of suspending the riders R as in the other embodiment. A loading platform **206** would be provided to allow the riders R to come up to the level of the rider carriage **205**, or the cable **101** could dip low enough that this is not necessary. The cable could either be moving slow enough (1.6-2.4 kilometer per hour) that riders could walk on to the slowing moving rider carriage **205** and then a ride operator would close and lock door **188** or the cable **101** could be stopped and the ride loaded and unloaded as above. The design of the rider conveyances **130** allows the rider carriage **205** to be easily stopped and started, unlike with standard bull wheel type cable lifts.

**[0027]** While a number of exemplary aspects and embodiments have been discussed above, those of skill in the art will recognize certain modifications, permutations, additions and sub-combinations therefor. It is therefore intended that the following appended claims hereinafter introduced are interpreted to include all such modifications, permutations, additions and sub-combinations are within their true sprit and scope. Each apparatus embodiment described herein has numerous equivalents.

**[0028]** The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions to exclude any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed. Thus, it should be understood that although the present invention has been specifically disclosed by preferred embodiments and optional features, modification and variation of the concepts herein disclosed may be resorted to by those skilled in the art, and that such modifications and variations are considered to be within the scope of this invention as defined by the appended claims

**[0029]** In general the terms and phrases used herein have their art-recognized meaning, which can be found by reference to standard texts, journal references and contexts known to those skilled in the art. The above definitions are provided to clarify their specific use in the context of the invention.

**1**. A track for an amusement ride comprising:

a plurality of support towers;

a tensioned loop of suspension cable attached to the support towers;

a loop of substantially rigid track suspended beneath the suspension cable;

said track adapted to support at least one rider conveyance slidably attached to the track; and

a the rider conveyance being driven along the track.

**2**. The device of claim **1** where in the track further comprises a substantially circular rail and a plate extending there from, said plate being attached to the suspension cable.

**3**. The device of claim **1**, wherein the track is attached to the suspension cable by attachment cables.

**4**. The device of claim **1**, wherein a drive system mounted on the rider conveyance drives the rider conveyance along the track.

**5**. The device of claim **4**, wherein the drive system comprises a plurality of driving wheels driving the rider conveyance along the track.

**6**. The device of claim **1**, wherein the loop of suspension cable is comprised of sections strung between two of the plurality of towers, each section being individually tensioned.

**7**. The device of claim **1**, wherein the loop of suspension cable is comprised of sections strung between more than two towers, each section being individually tensioned.

**8**. The device of claim **1**, wherein the loop of suspension cable is comprised of a single loop of cable attached to all of the tower and tensioned as a single unit.

**9**. The device of claim **1** wherein the rider conveyance had riders suspended beneath it.

**10**. The device of claim **1** wherein the rider conveyance had riders is a sitting position.

**11**. A track for an amusement ride comprising:

a plurality of support towers;

a tensioned line of suspension cable attached to the support towers;

a substantially rigid track suspended beneath the suspension cable;

said track adapted to support at least one rider conveyance slidably attached to the track; and

a the rider conveyance being driven along the track.

**12**. The device of claim **11** where in the track further comprises a substantially circular rail and a plate extending there from, said plate being attached to the suspension cable.

**13**. The device of claim **11**, wherein the track is attached to the suspension cable by attachment cables.

**14**. The device of claim **11**, wherein a drive system mounted on the rider conveyance drives the rider conveyance along the track.

**15**. The device of claim **14**, wherein the drive system comprises a plurality of driving wheels driving the rider conveyance along the track.

**16**. The device of claim **11**, wherein the suspension cable is comprised of sections strung between two of the plurality of towers, each section being individually tensioned.

**17**. The device of claim **11**, wherein the suspension cable is a single cable attached to all of the tower and tensioned as a single unit.

**18**. The device of claim **11** wherein the rider conveyance had riders suspended beneath it.

**19**. The device of claim **11** wherein the rider conveyance had riders is a sitting position.

* * * * *