J. W. REHLING.

PLEASURE RAILWAY.

APPLICATION FILED APR. 22, 1908.

915,382.

Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.

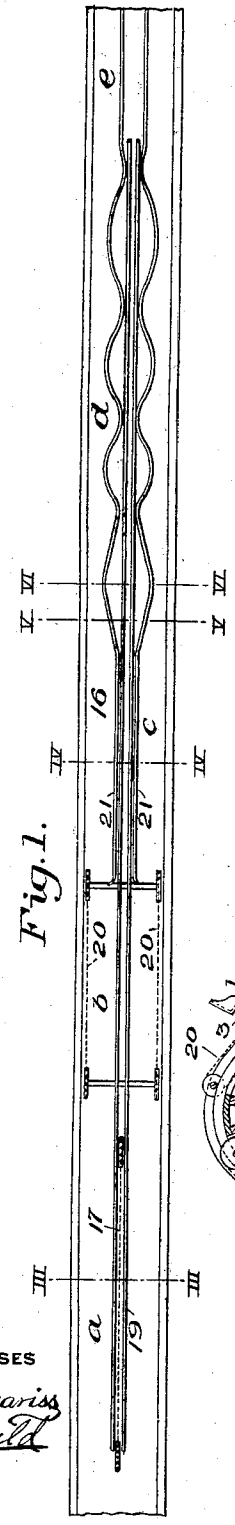

Fig. 1.

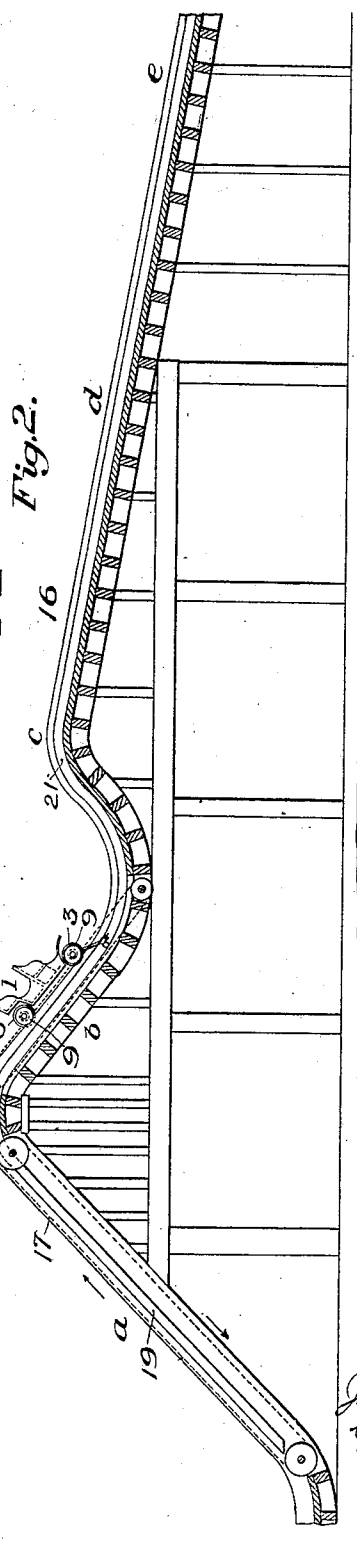

Fig. 2.

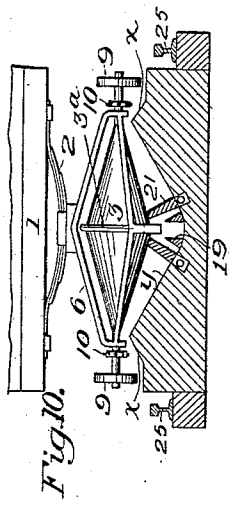

Fig. 10.

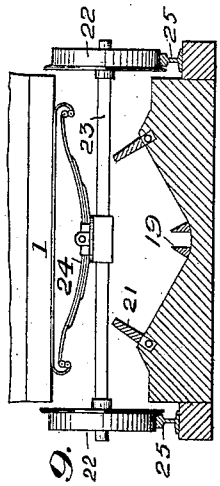

Fig. 9.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

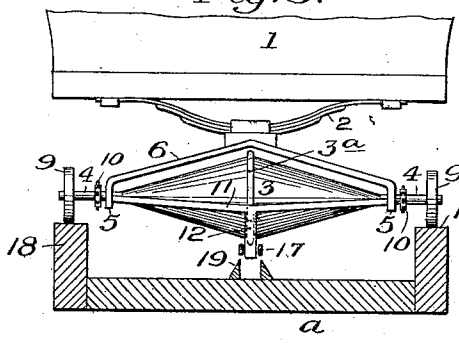


Fig. 4.

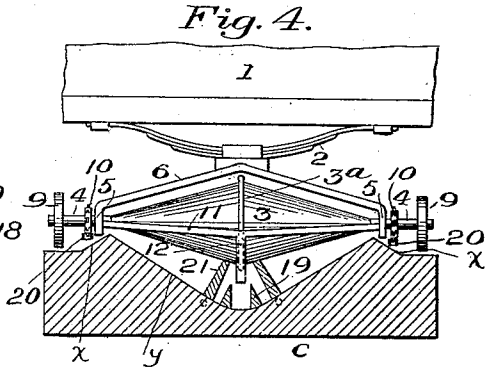


Fig. 5.

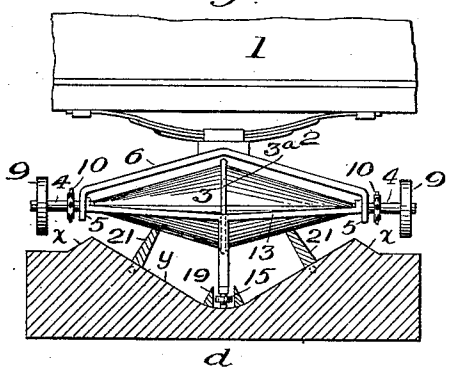


Fig. 6.

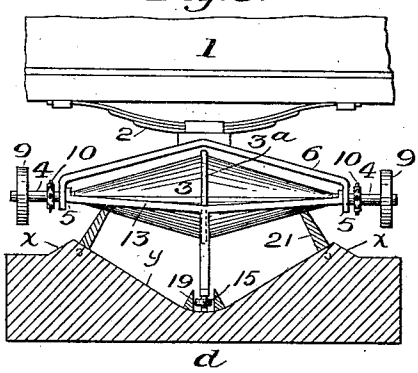


Fig. 7.

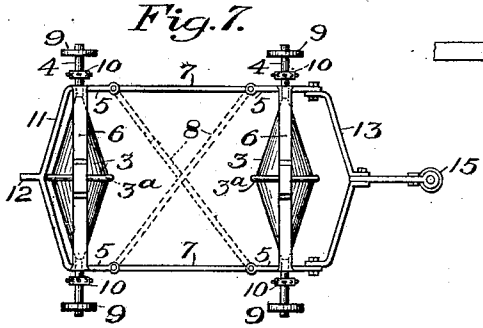
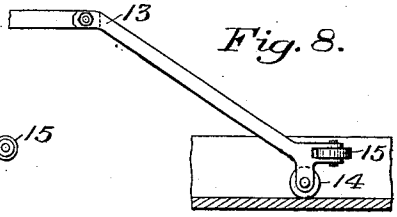


Fig. 8.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN W. REHLING, OF PITTSBURG, PENNSYLVANIA.

PLEASURE-RAILWAY.

No. 915,382. Specification of Letters Patent. Patented March 16, 1909.

Application filed April 22, 1908. Serial No. 428,523.

To all whom it may concern:

Be it known that I, JOHN W. REHLING, a citizen of the United States, and residing in the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Pleasure-Railways, of which the following is a specification.

My invention consists in new and useful improvements in railways and railway appliances, especially relating to the class of railways known as "pleasure railways" or "roller coasters", wherein a vehicle or car is caused to travel in an eccentric manner.

My improved vehicle or car preferably consists of a body mounted on one or more rollers, preferably of varying diameter. The form of roller shown is of double cone shape with the greatest diameter at the center. Thus as the car travels along parallel rails on said roller, a lateral weaving motion is set up owing to the lateral climb or shift of the roller on the rail. By varying the track gage or distance between the roller rails, varying roller diameters engage the rails thus imparting a more or less rapid vertical wave motion, in proportion to the speed of the car and the rapidity of gage variation. To prevent derailment of the car from violent or unusual side thrusts, I prefer to form the center of the roller as an annular flange adapted to engage the rail and prevent a climb or shift over the roller center. To maintain proper alinement between car and track structure where the gage varies or where the gage is relatively narrow and conditions require, I prefer to provide a member carried by the car and adapted to engage suitable guides carried by the track structure. On the roller axles I prefer to provide rigidly mounted sprocket wheels which may be engaged by power chains carried by the track structure whereby rapid rotation may be imparted to rollers when it is desired to impart momentum thereto. In such case I prefer to provide wheels rotatably mounted on the car and adapted to engage wheelways to raise the rollers out of engagement with the track structure temporarily. I also prefer to provide a downwardly extending arm carried by the car and adapted to engage a power chain carried by the track structure whereby the car may be power driven as up elevations. Two or more rollers, flexibly connected together preferably form the running gear of a car, thus providing sufficient elasticity to permit lateral and vertical roller shift. I may use but one roller, if desired, supporting one end of the car in any convenient manner, such as by the usual axle and flanged wheels.

Various other novel features and arrangement of parts will appear in the description.

In the accompanying drawings, Figure 1 is a plan view of a portion of a pleasure railway track structure built in accordance with the principles of my invention; Fig. 2 is a side elevation thereof showing a car mounted thereon; Fig. 3 is an enlarged cross section along line III—III in Fig. 1 showing a car in rear elevation; Fig. 4 is a similar view along the line IV—IV in Fig. 1; Fig. 5 is an enlarged cross section along the line V—V in Fig. 1 showing a car in front elevation and Fig. 6 is a similar view along the line VI—VI in Fig. 1; Fig. 7 is an inverted plan view of the running gear of the car provided with two rollers; Fig. 8 is an enlarged side elevation of a convenient form of guide arm carried by the car; Fig. 9 is an end elevation of a car provided with an axle and flanged wheels, and Fig. 10 is the other end elevation of the same car showing the roller.

The following is a description of the drawings, which however are merely intended to illustrate the principles of my invention without limiting the same to the constructions shown.

1 is a car body of any suitable or convenient design, preferably, as in Fig. 7, mounted on running gear, to be described, by means of springs 2—2. The running gear may be composed of the following elements. 3—3 are rollers, preferably weighted and of double cone shape with the largest diameter at the center. To provide against derailment from violent side thrusts tending to force the roller to climb over its center, I prefer to provide the rollers with an annular central flange 3^a which will engage the side of the rail and limit the climb or shift of the roller. Said rollers are rigidly mounted on axles 4—4 down to the diameter of which said rollers taper at their ends. Said axles are journaled adjacent to their ends in the horizontal portions 5—5 of the frames 6—6 which span the tops of the rollers 3—3 and upon which the springs 2—2 may be mounted. The front and rear frames 6—6 are flexibly connected in any convenient manner as by means of bars 7—7 pivotally attached to the horizontal portions 5—5 of frames

6—6 in such a manner as to allow of both vertical and lateral movement of the frames. If desired bars 7—7 may be omitted and the cross bars 8—8, shown in dotted lines in Fig. 7, may be substituted therefor. Any form of mutual connection sufficiently flexible to permit proper roller shift and movement may be used.

It will be seen that the tendency is for the double cone shape roller to tread the track at the circumferential lines where the two cone diameters are equal and hence, when the guide to be described is not engaged by the track guides, the flexible character of the running gear construction exhibits a tendency to weave or move laterally out of alinement with the track structure resulting in unequal diameters at the points of tread of the two cones of a roller which in turn quickly shifts the tread toward and across the lines of equal diameters so that another unequal diameter tread ensues, the greater and less diameters at points of tread having exchanged from one cone to the other, thus shifting the running gear in the corresponding lateral direction. This lateral shift or weaving is continued on the parallel rails until the guiding means to be described engages the track guides and causes the car to move ahead without lateral motion.

Adjacent to the ends of axles 4—4, outside of horizontal portions 5—5 of frames 6—6, wheels 9—9 are rotatably mounted on said axles. 10—10 are sprocket wheels rigidly mounted on the said axles inside of said wheels 9—9.

The frame 6 of the rear roller 3 is provided with a downwardly extending arm 12 adapted to engage a power chain carried by the track structure.

Between the forwardly extending portions 5—5 of the front frame 6 is pivoted the guide arm 13 whose free end is preferably provided with a vertical supporting wheel 14 and a horizontal guide engaging wheel 15.

The prime function of the guiding means above described is to engage guides carried by the track structure, and to be described, and to pilot the car onto and hold it in central alinement with the rails whenever said car enters upon a track section characterized by varying rail gage. By such guiding or control the double cones of the rollers are caused to travel in such lateral relation to the rails as will assure equal diameters in the case of each pair of cones at their points of contact with the rails, thus preventing lateral oscillation of the car while traversing track sections of varying gage and preventing derailment from normal causes. In case of an unusual or violent side thrust imparted to the car, say to the right in Figs. 5 and 6, the left hand wheel 9 will drop into engagement with and travel upon the incline surface x of the track structure thus arresting such side thrust and preventing derailment. Derailment of the car from a thrust from the left side would likewise be prevented by the engagement of the right hand wheel 9 with the corresponding incline surface x.

16 is the track structure supported at varying alinements, elevations and curvatures as is usual in the case of pleasure railways of this general character. In Figs. 1 and 2 I have shown an illustrative portion of such a structure divided into sections, such as a, b, c, d and e, these sections being shown as illustrative of the operation of my novel features. For instance, the section a represents a sharp upgrade wherein the track structure is provided with a central longitudinal power chain 17 running in the direction of the arrow, which chain is automatically engaged by the arm 12 depending from the rear of the car, thus drawing the car up the incline in the track structure. The edges of the track structure in section a, as is better shown in Fig. 3, and the succeeding section b, are elevated to form the wheelways 18—18 upon which run the wheels 9—9 rotatably mounted on axles 4—4. The center, y, of the track structure is depressed sufficiently in sections a and b to clear the rollers 3—3 and the car is supported solely by the wheels 9—9. The center of the track structure is provided with parallel longitudinal guides 19—19 which in this section are engaged by the guide wheel 15 of the car, thus maintaining the car in proper track alinement and preventing derailment. The car is thus power driven up the incline of section a and at the top thereof enters section b. The next section, b, presents the same track structure as section a except that the power chain 17 is omitted and the sprocket chains 20—20 provided on the track structure in proper position to automatically engage the sprocket wheels 10—10 rigidly mounted on axles 4—4. As this section is shown as a descent the car is carried down the same by its own impulse, guided in proper track alinement by the engagement of the guide wheel 15 with the parallel guides 19—19. The rollers 3—3 being out of engagement with the track structure are caused to revolve at high speed by means of the sprocket chains 20—20 which travel in the direction of the arrow. Such momentum imparted to the rollers 3—3 may be greatly augmented by weighting said rollers, preferably internally, whereby the accumulated energy may be greatly increased. The next section, c, may consist of a sharp rise followed by a less rapid descent. The relation to the track on the part of the car is shown in Fig. 4. The sprocket chains 20—20 are omitted and the roller rails 21—21 appear secured longitudinally on portion y of the track structure.

Said rails are preferably removably secured, as by the bolts shown in dotted lines, so that the track gage may be altered and other changes made, when desired, without trouble. When the car passes onto this section the rollers 3—3 mount upon and move along the rails 21—21 and by their momentum carry the car along at rapid speed. The wheelways 18—18 are dropped somewhat so that the wheels 9—9 do not normally engage the same. However, the rails 21—21 in this section are set relatively close together and owing thereto the car may tend to tip to the right or left, in which case the corresponding wheel 9 will engage the wheelway 18, arresting such movement and righting the car again. The maintenance of the car in proper alinement in this section may be aided by the engagement of the guide wheel 15 with the parallel guides 19—19. The next section, *d*, is shown as characterized by the alternate expansion and contraction of the rail gage as shown also in Figs. 5 and 6, thus causing the rails 21—21 to be engaged by varying roller diameters and alternately raising and lowering the car as it moves along. By this means I procure a novel vertical movement in addition to the forward movement. The car is preferably kept in proper alinement with the track structure in this section by the engagement of guide wheel 15 with the parallel guides 19—19 carried by portion *y* of the track structure. As an additional prevention of derailment arising from sudden and violent side thrusts, the tipping of the car would cause the wheels 9—9 to come into engagement with the inclined surface *x* of the track structure which would arrest the tipping movement and right the car. In the next section, *e*, the tracks are maintained at constant gage and the position of the car thereon is also illustrated in Fig. 5, except that in this section the parallel guides 19—19 of the track structure are omitted. Thus no vertical wave motion results as set up by the varying rail gage of the preceding section. The omission of the guides 19—19 leaves the cones free to climb or weave from side to side as described above giving a novel and advantageous lateral motion. The cones are normally prevented from shifting or climbing a rail beyond their centers by their inherent tendency to adjust themselves to central alinement with the same tread diameter on each track and in operation the rollers are continually shifting on said parallel tracks across the lines of equal diameters. In case of a violent side thrust which would tend to throw the rollers over their centers and thus derail the car, the central flanges 3^a will strike against the rail and reverse the lateral movement.

The rails 21—21 are not intended to be permanently fixed in position shown in Figs. 1, 4, 5 and 6 but are adjustable along the surface *y*, laterally, either toward or from the center, to any desired position. Thus the sections may be readily altered to give lateral or vertical motion to the car as may be desired.

It is to be understood that the individual sections, *a*, *b*, *c*, *d* and *e*, represent but one of several more or less similar sections which go to make up a complete track structure, the characteristic features of each of which may vary in respect to track gage or any other of their various operative functions, all or any of which may at any time be altered to diversify the motion imparted to the car. By this means the character of car movement may be greatly diversified, as well as readily modified, and on any part as well as the entire length of the track, if desired, the car motion may be either uniformly a forward movement, a lateral weaving movement, a vertical wave movement, a lateral rocking movement, a jointly vertical wave and lateral rocking movement, or any other erratic and daily interchangeable motions made available through the track adjustment above described.

In Figs. 9 and 10 I illustrate a modification wherein the car is provided with but one roller, the other end of the car, front or rear, being otherwise supported. The connecting bars 7—7, or 8—8, are omitted and the connection between the spring 2 and the frame 6 of the roller is preferably a universal pivot so that the roller is provided with the requisite elasticity. The other end of the car is provided with some sort of rotary support such as the flanged wheels 22—22 mounted on axle 23 to which is pivoted the spring member 24 attached to the body 1 of the car. It will thus be seen that one end of the car will obtain the erratic movements above described, while the other end will travel on the wheels 22—22. 25—25 are rails carried by the track structure in such case for the engagement of the wheels 22—22. If desired said wheels 22—22 might be caused to travel along the wheel-ways 18—18, as shown in Fig. 3.

I have shown a number of means for preventing car derailment and the maintenance of proper alinement but it will be understood that I do not confine myself to the devices shown but may adopt any convenient means for effecting these purposes.

I have shown my rollers in the form of a double cone but it will be understood that the same may be varied and any contour adopted which will give the results above described. I have also illustrated the use of my rollers in connection with pleasure railways but it will be understood that they may be used in connection with all forms of railways and otherwise as desired.

Many variations in detail will present themselves to those skilled in the art, all of which I regard as within the scope of my invention.

Although for the sake of clearness I have minutely described the embodiment of my invention illustrated in the accompanying drawings, I do not wish to limit myself to the constructions shown but claim broadly:—

1. In a pleasure railway, a car adapted to be operated thereon and a roller of varying diameter upon which said car is mounted, coöperating with parallel ways whereby a lateral erratic or weaving motion is imparted to said car.

2. In a pleasure railway, a car adapted to be operated thereon and a roller of varying diameter upon which said car is mounted whereby a vertical undulating motion is imparted to said car when traveling along a track of varying gage.

3. In a railway car, a body, an axle attached to said body and a horizontally placed roller of varying tread diameter mounted on said axle and coöperating with the rails of a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

4. In a railway car, a body, an axle attached to said body and a horizontally placed roller of varying tread diameter having its greatest diameter at the center mounted on said axle and coöperating with the rails of a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

5. In a railway car, a body, an axle attached to said body and a horizontally placed roller of increasing tread diameter from its ends toward its center mounted on said axle and coöperating with the rails of a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

6. In a railway car, a body, and a roller of varying diameter upon which said body is mounted having a central annular flange and coöperating with a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

7. In a railway car, a body, and a roller, of increasing diameter from its ends toward its center and having a central annular flange, upon which said body is mounted, said roller coöperating with a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

8. In a pleasure railway, a car adapted to be operated thereon and rollers of varying diameter upon which said car is mounted whereby a lateral weaving motion is given to said car when passing along parallel rails and a vertical wave motion is given to said car when passing over a track of varying gage.

9. In a pleasure railway, a car adapted to be operated thereon, rollers of varying diameter upon which said car is mounted whereby a lateral weaving motion is given to said car when passing over parallel rails and a vertical motion is given to said car when passing over a track of varying gage and means for preventing the derailment of said car.

10. In a pleasure railway, a car adapted to be operated thereon and rollers of increasing diameter from their ends toward their centers upon which said car is mounted whereby a lateral weaving motion is imparted to said car when passing over parallel rails and a vertical motion is imparted to said car when passing over a track of varying gage.

11. In a pleasure railway, a car adapted to be operated thereon, rollers of increasing diameter from their ends toward their centers upon which said car is mounted whereby a lateral weaving motion is imparted to said car when passing over parallel rails and a vertical motion is imparted to said car when passing over a track of varying gage and means for preventing the derailment of said car.

12. In a pleasure railway, a car adapted to be operated thereon, rollers of increasing diameter from their ends toward their centers on which said car is mounted whereby a lateral weaving motion is imparted to said car when passing over parallel rails and a vertical motion is imparted to said car when passing over a track of varying gage and a central annular flange on said rollers.

13. In a pleasure railway, a car adapted to be operated thereon, rollers of increasing diameter from their ends toward their centers upon which said car is mounted whereby a lateral weaving motion is imparted to said car when passing over parallel rails and a vertical motion is imparted to said car when passing over a track of varying gage, a central annular flange on said rollers and a guide carried by said car to maintain alinement.

14. In a pleasure railway, a car adapted to be operated thereon, rollers of increasing diameter from their ends toward their centers upon which said car is mounted whereby a lateral weaving motion is imparted to said car when passing over parallel rails and a vertical motion is imparted to said car when passing over a track of varying gage and a guide carried by said car and adapted to engage the track structure to prevent derailment.

15. In a pleasure railway, a car adapted to be operated thereon, rollers of varying diam-

eter upon which said car is mounted, wheels rotatably mounted on said car to support the same when said rollers are out of engagement with the track and means for imparting rotary motion to said rollers.

16. In a pleasure railway, a car adapted to be operated thereon, rollers of varying diameter upon which said car is mounted and wheels rotatably mounted on said car to support the same when said rollers are out of engagement with the track.

17. In a pleasure railway, a car adapted to be operated thereon, rollers of varying diameter upon which said car is mounted, wheels rotatably mounted on said car to support the same when said rollers are out of engagement with the track, sprocket wheels rigidly connected with said rollers and means carried by the track structure for imparting rotary motion to said sprocket wheels.

18. In a pleasure railway, a car adapted to be operated thereon, a roller of varying diameter upon which said car is mounted and normally engaging the two spaced apart rails of a track and means for automatically raising said car so that said roller is elevated out of engagement with said rails without impeding the passage of said car along said track, as and for the purposes set forth.

19. The combination of a railway track of varying gage and a car mounted on rollers of varying diameter operatable thereon.

20. A rotary traveling element adapted to support a vehicle and consisting of an annular body of varying tread diameter, coöperating with a track whereby lateral motion is imparted to said element when passing along parallel rails and vertical motion is imparted to said element when passing along a track of varying gage.

21. A rotary traveling element adapted to support a vehicle and consisting of an annular body of increasing diameter from its ends toward its center, coöperating with a track whereby lateral motion is imparted to said element when passing along parallel rails and vertical motion is imparted to said element when passing along a track of varying gage.

22. A rotary traveling element adapted to support a vehicle and consisting of an annular body of double cone shape having its largest diameter at the center, coöperating with a track whereby lateral motion is imparted to said element when passing along parallel rails and vertical motion is imparted to said element when passing along a track of varying gage.

23. A rotary traveling element adapted to support a vehicle and consisting of an annular body of double cone shape having its largest diameter at the center and provided with a central annular flange, coöperating with a track whereby lateral motion is imparted to said element when passing along parallel rails and vertical motion is imparted to said element when passing along a track of varying gage.

24. In a railway car, running gear consisting of a plurality of double cone shaped rollers flexibly connected together and cooperating with a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

25. In a railway car, running gear consisting of a plurality of double cone shaped rollers flexibly connected together, and having central annular flanges, coöperating with a track whereby lateral motion is imparted to said car when passing along parallel rails and vertical motion is imparted to said car when passing along a track of varying gage.

Signed at Pittsburg, Pa., this 21st day of April, 1908.

JOHN W. REHLING.

Witnesses:
EDWARD A. LAWRENCE,
J. H. HARRISON.