Sept. 22, 1931. J. F. KEY 1,824,214

TOY VEHICLE AND GUIDING APPARATUS THEREFOR

Filed Nov. 12, 1930 2 Sheets-Sheet 1

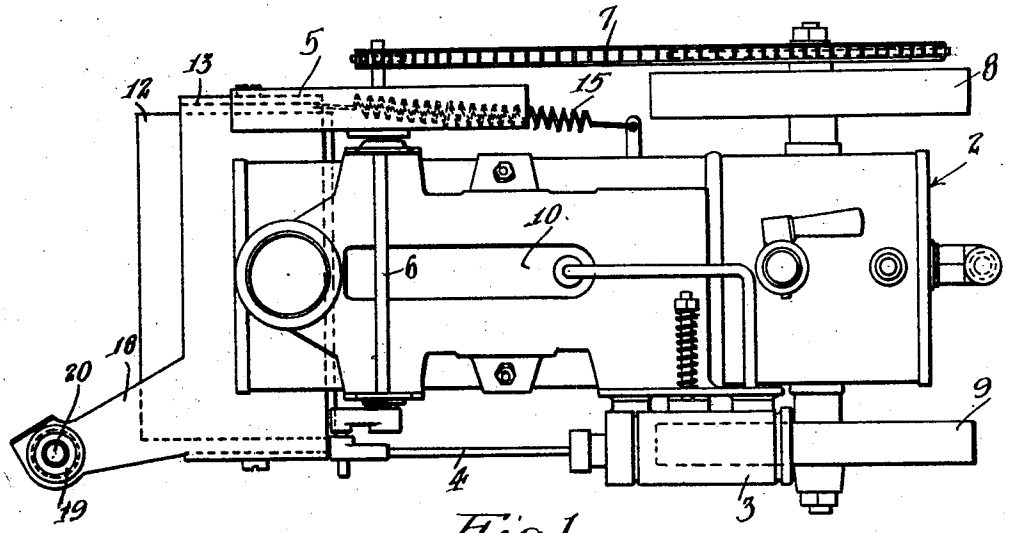


Fig. 1

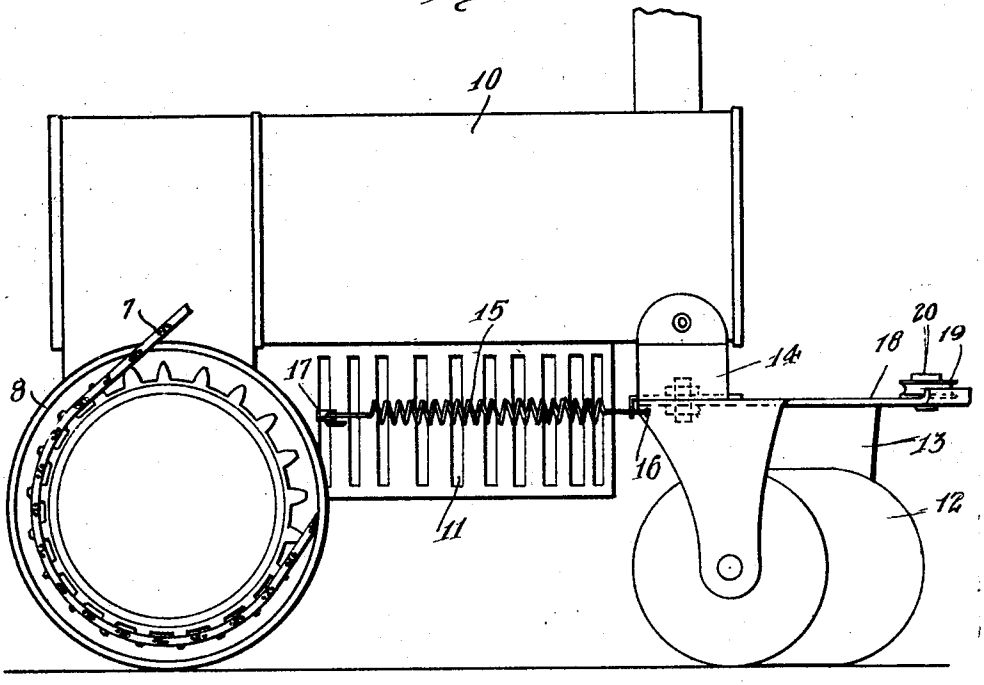


Fig. 2

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Fig. 3

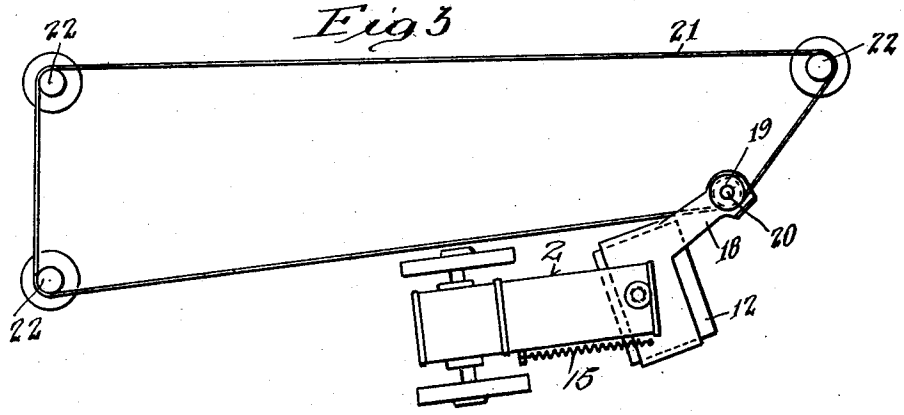
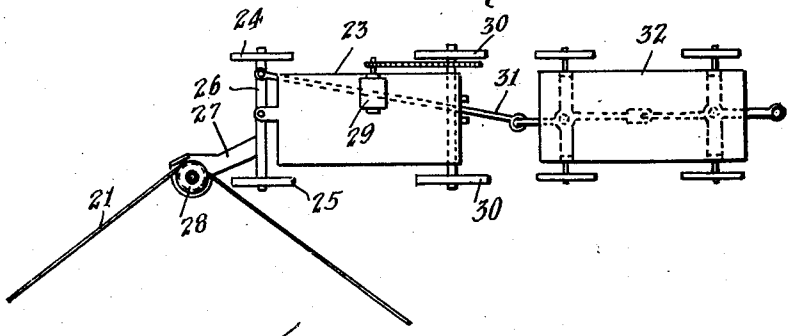


Fig. 4



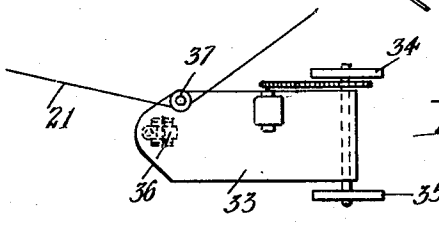


Fig. 5

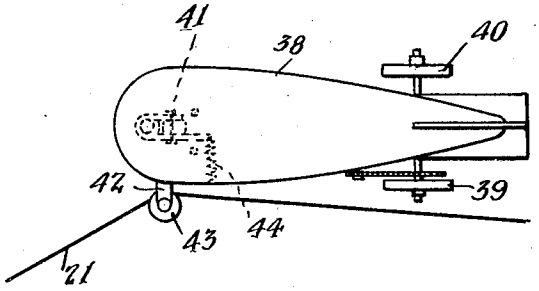


Fig. 6

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Patented Sept. 22, 1931

1,824,214

UNITED STATES PATENT OFFICE

JAMES FRANCIS KEY, OF PASADENA, CALIFORNIA, ASSIGNOR OF SIXTY-EIGHT PER CENT TO JAMES IRVINE, JR.

TOY VEHICLE AND GUIDING APPARATUS THEREFOR

Application filed November 12, 1930. Serial No. 495,077.

This invention relates to a toy vehicle and refers particularly to an apparatus for guiding a toy vehicle rendering it unnecessary to use tracks.

Heretofore, toy vehicles have either been driven on tracks or have been tied to a central post and the vehicle intended to swing in a circle around the post. When the toy vehicles have been tied to a central post there has been no proper means for automatically guiding the vehicle on the proper curve to circle the post, with the result that the toy vehicle has had to skid to circle the post and has required the use of a smooth floor for its operation.

The general object of the present invention is to provide an improved guiding apparatus for toy vehicles which is designed to automatically maintain the vehicle on a given course without the necessity of employing tracks for guiding the vehicle and without causing the vehicle to skid in order to maintain itself on the course prescribed.

In accordance with the present invention means are provided for guiding toy vehicles which are simple and inexpensive in construction and which will enable light low-powered vehicles to operate on a course over rough traction around a desired course, so that the vehicle may be operated over a course where the power of the vehicle would be insufficient to drive the same if it were required to skid to maintain itself on the course.

Another object of the present invention is to provide a simple means for attaching to a toy vehicle by which the toy vehicle may be driven around an irregular path having a number of irregular curves, some of which may be changed at will and the length of which path may be increased or decreased at will.

It is an object of this invention to provide such equipment for guiding a vehicle over a predetermined path without requiring the use of tracks, which equipment may be readily removed from the vehicle and the vehicle left to travel on an unguided path when desired.

Various additional objects and advantages of the present invention will be most clearly understood from a description of a preferred form or preferred forms of vehicles and guiding apparatus therefor, embodying the present invention. For this purpose, I hereinafter describe, with reference to the accompanying drawings, the preferred form or forms of vehicles embodying the invention.

In the drawings:

Figure 1 is a plan view of a preferred form of vehicle and driving means therefor;

Figure 2 is an elevation of Figure 1;

Figure 3 is a diagrammatic plan view of the operation of the preferred form of guiding apparatus for the vehicle shown in Figures 1 and 2;

Figure 4 is a diagrammatic plan view of a modified form of guiding apparatus;

Figure 5 is a diagrammatic plan view of a still further modified form of guiding apparatus; and

Figure 6 is a diagrammatic view of a further form of guiding apparatus.

Referring to Figures 1 and 3 of the drawings, I have shown the invention embodied in a toy vehicle 2, as illustrated, which is a toy steam engine comprising the steam cylinder 3 driving through the crank arm 4 and the flywheel 5. The flywheel shaft 6 has a chain drive 7 with the rear driving wheel 8. A further rear wheel 9 is provided on the rear of the toy vehicle which, however, is freely rotatable on the vehicle and is not driven by the chain drive 7. 10 indicates the boiler of the vehicle which is heated by heating means 11 of any usual or preferred type.

The front of the toy vehicle is illustrated as comprising a roller 12 which, however, may be replaced by a single wheel or a pair of front wheels of any usual or preferred type. The front roller 12 is provided with a guiding truck 13 pivoted to its center to the body or boiler of the vehicle by means of the bracket 14, so that the vehicle may be guided by the pivotal position of the roller 12 with respect to the body of the vehicle.

The toy vehicle so far described is a well known form of toy vehicle and as ordinarily constructed and operated, is permitted to

ramble freely, being guided solely by the predetermined set position of the roller 12 with respect to the remainder of the vehicle. A single front roller is employed on the vehicle for the purpose of preventing the one-wheel drive of the vehicle from causing the vehicle to travel in a sharp circle.

In accordance with the present invention I provide two means for automatically guiding such a vehicle around a predetermined path. Such means includes first a means for yieldingly causing the front guiding roller or guiding means of the vehicle to rotate with respect to the body of the vehicle so as to tend to cause the vehicle to prescribe a circular path. As will be hereinafter described, a variety of different appliances may be utilized for this means.

In Figures 1 to 3 of the drawings I have shown a coiled tension spring 15 attached at its front end, as indicated at 16, to the front wheel of the roller truck 13 and to a point 17 on the body of the vehicle toward the rear. Such a tension spring applies a yielding force tending to rotate the truck 14 and the front guiding roller 12 in the direction of the tension spring 15 and if constituting the sole guiding means of the vehicle, would thereby cause the vehicle to prescribe a general circular path. It is to be noted that such a guiding means on the vehicle would not cause the vehicle to follow a predetermined path because the size of the circle prescribed by the toy would vary with the smoothness of the floor and the force of the motor in the toy so that the toy would wander over the floor in a more or less haphazard manner.

The guiding means of the present invention also include means for indicating the path to be prescribed by the operation of the vehicle. In the preferred form of this invention this guiding means comprises a bracket 18 or other suitable device for supporting a pulley 19 on a vertical axis 20. The bracket 18 is attached to the truck 13 on the side opposite to the side engaged or connected with the spring 15. This pulley 19 is adapted in operation to engage a cable 21 which is preferably a continuous cable having its ends suitably connected together and is placed in use around a number of posts such as posts 22, which may be merely the legs of a chair or other furniture.

While I have described the use of a cable 21, it is to be understood that the term "cable" is used in a generic sense as to include chains, ropes, strings or any light, flexible guiding element.

In operation of the vehicle thus described the motor of the vehicle or steam cylinder, as in this case described, drives the vehicle continuously and the spring 15 operates to place tension on the guiding truck of the vehicle such as to cause the vehicle to turn outwardly from the guiding cable 21. When the motion of the vehicle reaches the end of the slack in the guiding cable 21, the guiding cable 21 holds the vehicle from turning further outwardly from the cable and rotates the guiding truck of the vehicle against the force of the spring 15 so as to cause the vehicle to be automatically guided around a path determined by the position of the posts 22 around which the cable is passed together with the amount of slack in the cable 22.

It will be apparent from the foregoing description that the paths to be prescribed by the vehicle may be readily varied in use by causing the cable 21 to be trained around posts placed at different intervals and by varying the number of posts around which the cable is placed, and also by increasing or decreasing the length of the cable.

It will also be apparent that the vehicle is automatically guided during its motion around the path determined by the cable 21 and post 22 in such manner that the vehicle follows this path and all of the different angle curves therein without the necessity of skidding or sliding the vehicle around the curves, so that the vehicle may be operated on rough surfaces such as rugs or the like, which would not permit of operation of the vehicle if it were necessary to skid the same.

While in Figures 1 to 3 of the drawings I have specifically disclosed a steam engine-driven toy vehicle, it will be obvious that the invention is not restricted in any manner to the type of motor driving the toy vehicle and there might be substituted therefor, with like effect, any other driving means, such as, an electric motor, clockworks, rubber driving band, etc.

It will be observed that in case it is desired that the toy vehicle having the guiding means of the present invention shall follow an exact circular path, this can be accomplished by having the guiding cable 21 trained around a single post 22.

Now referring to Figure 4 of the drawings, I have therein illustrated diagrammatically a modified vehicle and guiding means therefor in which 23 indicates the carriage of the vehicle which is provided with a pair of guiding wheels 24 and 25 mounted upon an axle 26 pivoted to the frame 23. A bracket 27 is attached to the axle 26 and carries a pulley 28 which is similar to the pulley 19 of the form shown in Figures 1 and 3 and may be engaged by the cable 21 of those figures for the purpose of guiding the vehicle around the path determined by the cable 21 and the posts 22 around which the cable is trained. There must be enough slack in the cable 21 to allow the pulley 19 or other guiding member to pass between the cable and the supporting member or members.

The vehicle is shown as provided with a suitable driving means 29 driving one at least of the rear wheels 30. In place of yieldingly urging the guiding wheels 24 and 25 into a

position to turn the vehicle away from the guiding cable 21 by the use of a spring, this form of the invention includes a connecting rod 31 attached to the axle 26 near the outer wheel 24, which connecting rod 31 is coupled to a rear vehicle 32 or other rod to be pulled by the front vehicle.

The connecting rod 31, being connected with the axle 26 near the outer wheel 24, in operation applies a yielding force tending to turn the axle into position to cause the vehicle to travel outwardly from the supporting cable 21 on account of the pull exerted on the rod 31 by the drag weight of the rear vehicle or car 32.

Referring to the form of the invention illustrated in Figure 5, the guiding means of the vehicle is diagrammatically indicated in a further modified form. The vehicle is indicated at 33 and is shown as provided with three wheels, the driven rear wheel 34, the other rear wheel 35, and a single front wheel 36 which is supported by a carriage pivoted to the vehicle frame so as to be free to allow the vehicle to travel in any desired direction. A pulley 37 is in this case pivoted to the frame of the vehicle at one side and at the forward end of the vehicle and is adapted to be engaged by the guiding cable 21. The pulley 37 is on the same side of the vehicle as the driven wheel 34. In this case the utilization of a three-wheel vehicle in combination with the driving of one wheel only of the vehicle provides a means for tending to yieldingly guide the vehicle in a curved path, away from the guiding cable 21. The guiding cable 21 thereby is enabled to cause the vehicle to prescribe the path determined by the length of the guiding cable and position posts 22 around which the cable is trained.

Referring to the form of the invention illustrated in Figure 6, a vehicle is indicated at 38, for example, simulating a dirigible provided with a rear driven wheel 39, a second rear wheel 40 and a pivotally mounted front wheel 41. The vehicle has attached thereto a bracket 42 holding a pulley 43 which is to receive the line trained around the post which guides the vehicle in operation. In this form of the invention, in addition to driving a three-wheeled vehicle from the inner rear wheel only which has a tendency to cause the vehicle to turn outwardly, a spring 44 is provided connected with the front wheel 41 in such manner as to apply a force yieldingly urging the front wheel into such position as to tend to cause the vehicle to turn outwardly from the guiding cable.

While the particular forms of the invention herein described are well adapted to carry out the objects of the invention, it is to be understood that various modifications and changes may be made therein without departing from the scope of the invention, and the invention is of the scope defined in the appended claims.

I claim:

1. A toy vehicle comprising means for driving the vehicle, steering means for the vehicle, means yieldingly urging the steering means into position to turn the vehicle in one direction, and means for connecting the steering means of the vehicle with a guiding cable in such manner that the guiding cable applies force to the steering mechanism to turn the vehicle in the opposite direction and the vehicle is guided around a path determined by the guiding cable and supporting means about which the cable is loosely trained and approximately defining the path of travel of the vehicle.

2. A toy vehicle comprising driving means for the vehicle, steering means for the vehicle, a guiding cable, a pulley carried by the steering means of the vehicle and engaging said guiding cable, and means on said vehicle for yieldingly urging the steering means of said vehicle into position to steer the vehicle away from the cable, supporting means about which the cable is loosely trained whereby to cause the vehicle to travel in a path defined by the cable and supporting means.

3. A toy vehicle and guiding means therefor comprising a continuous cable trained loosely around a plurality of posts, a toy vehicle carrying a pulley engaging said cable, said vehicle having driving means and steering means, said pulley being mounted on said steering means to cause the vehicle to travel in a path defined by the cable and posts.

4. A toy vehicle comprising driving means, steering means for the vehicle and means for operating the steering means of said vehicle, said latter means comprising a cable loosely trained about a plurality of posts, a pulley connected to the steering means of said vehicle, means urging said steering means in one direction and said pulley having said cable trained thereover, whereby the vehicle is caused to travel in a path defined by the cable.

5. A toy vehicle comprising a driving means, steering means for the vehicle, a spring means normally urging said steering means in position to cause the vehicle to turn in one direction, a member carried by said steering means, supporting means and an endless flexible means loosely trained about said supporting means, said flexible means engaging said member to cause the vehicle to travel in a path defined by said flexible means.

Signed at Los Angeles, California, this 5th day of November, 1930.

JAMES FRANCIS KEY.