Oct. 28, 1924. 1,513,143

E. F. WELCH ET AL

GYROSCOPIC CONTROLLED WHEELED TOY

Filed Dec. 6, 1922 2 Sheets-Sheet 1

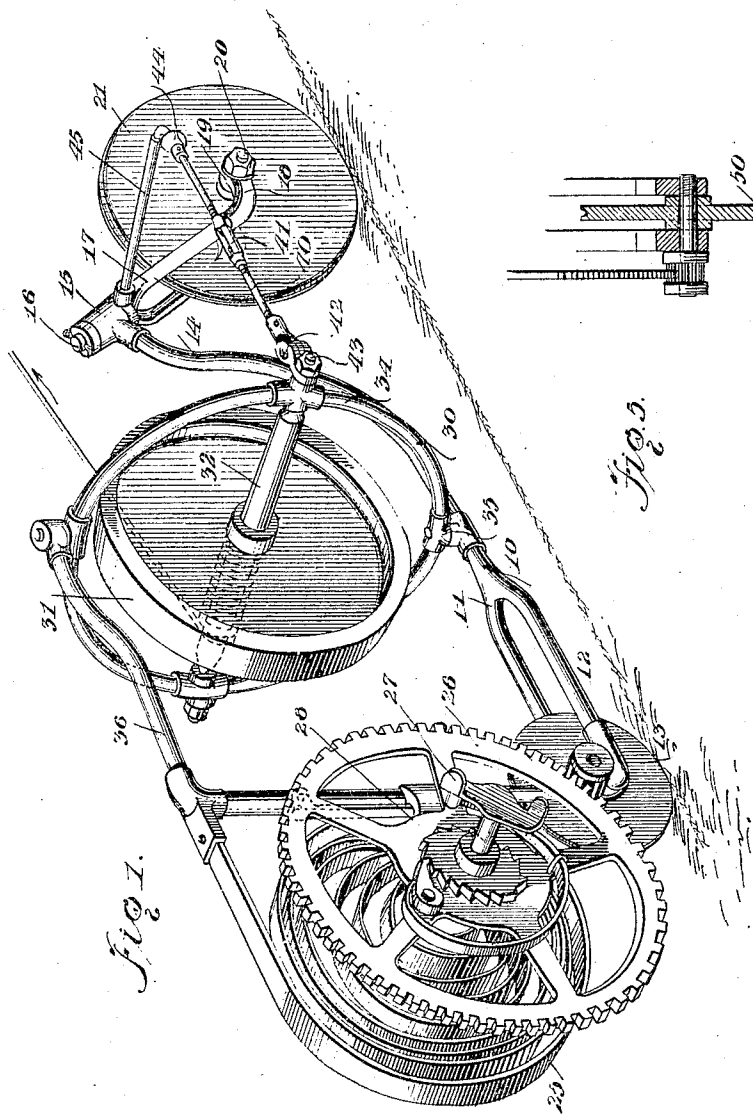


Fig. 1.

Fig. 3.

WITNESSES

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Fig. 2.

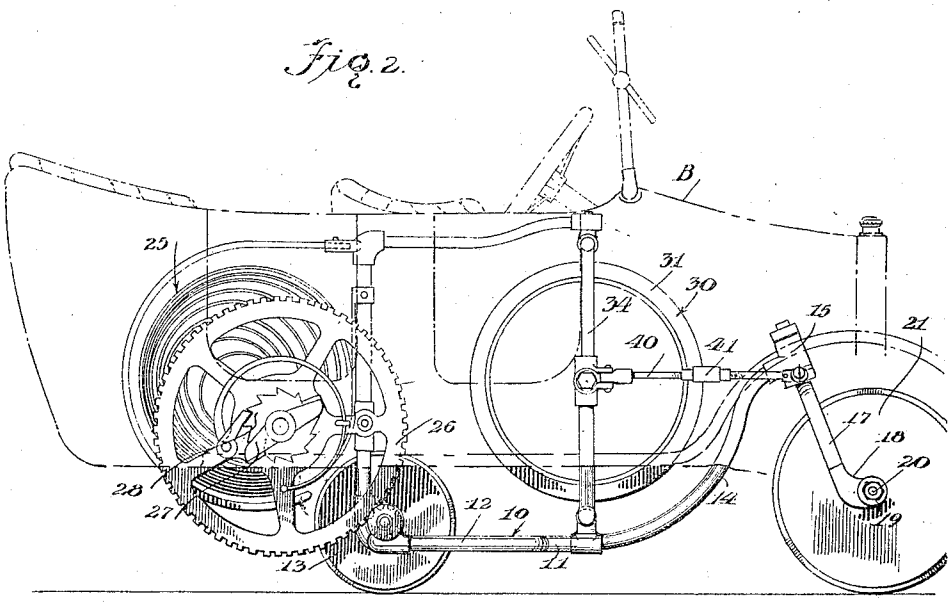


Fig. 3.

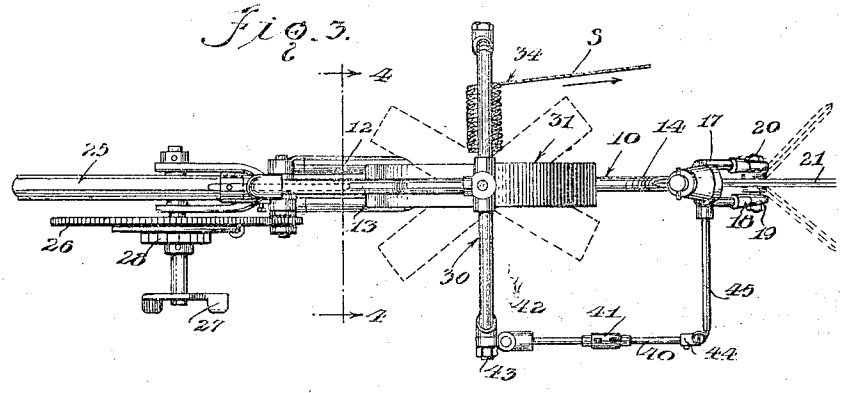
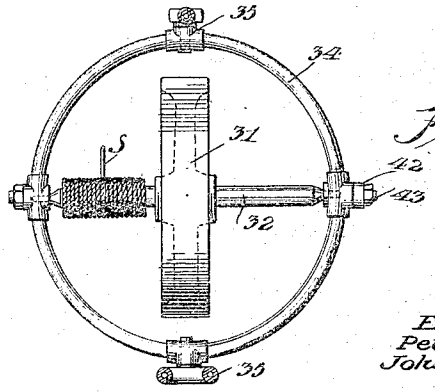


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD FRANCIS WELCH, PETER EUGENE FRAROW, AND JOHN FRANKLIN PHILLIPS, OF BALBOA, CANAL ZONE, PANAMA.

GYROSCOPIC-CONTROLLED WHEELED TOY.

Application filed December 6, 1922. Serial No. 605,233.

To all whom it may concern:

Be it known that we, EDWARD FRANCIS WELCH, PETER EUGENE FRAROW, and JOHN FRANKLIN PHILLIPS, citizens of the United States, and residents of Balboa, Canal Zone, Panama, have invented certain new and useful Improvements in Gyroscopic-Controlled Wheeled Toys, of which the following is a specification.

This invention relates to an improvement in gyroscopic controlled wheeled toys of the monorail type.

The object of the invention is to provide a toy of this character which will be balanced and caused to travel along a predetermined course by the action of the gyroscope organized with the steering wheel of the toy thereby presenting an interesting and attractive exhibition of the action of the gyroscope, the organization being such that the gyroscope may be so located and arranged as to be clearly viewable during all phases of the operation.

Another object is to provide a toy of this character which is of simple and durable construction, reliable and effective in operation and easy and comparatively inexpensive to manufacture.

Other objects and advantages of the invention reside in certain novel features of the construction, combination and arrangement of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming part of this specification, and in which:

Figure 1 is a perspective view, showing an embodiment of the invention;

Figure 2 is a view thereof in side elevation, a body being shown applied to the frame of the toy;

Figure 3 is a plan view of the toy shown in Figure 1;

Figure 4 is a detail view, in section, on line 4—4 of Figure 3; and

Figure 5 is a detail view, showing a modified form of wheel.

Referring to the drawings wherein for the sake of illustration is shown one embodiment of the invention, the numeral 10 designates generally a single rigid frame which may be constructed of any suitable material and may take any desired form and which in the construction illustrated in the drawings includes a body portion 11 having a yoke 12 at one end to which a driving wheel 13 is rotatably connected. The other end of the body portion 11 has integrally formed therewith an upwardly and forwardly curved bar 14 terminating in a bearing 15. The bearing 15 supports for rotative movement a spindle 16 rigidly connected to the upper ends of a pair of forks 17. The bearing and spindle of the forks are so arranged that the forks are slightly inclined but may be said to be approximately vertical. The lower ends of the forks are offset forwardly of the body thereof, as shown at 18, and the outer ends of the offset portions are formed with bearings 19 in which the axle 20 of the rotatable steering wheel 21 is mounted. It is to be noted at this point that the axis of rotation or revolution of the steering wheel 21 is offset horizontally from the approximate vertical axis of rotation of the fork 17.

Means is provided for actuating or driving the traction or drive wheel 13. Any suitable means may be employed for this purpose and for the sake of illustration there is shown a spring motor 25 carried upon the frame 10 and actuating the drive wheel through the gearing 26. The spring motor includes a winding key 27 and suitable ratchet mechanism 28.

A gyroscope, designated generally at 30, is suitably mounted on the rigid main frame 10. Any type of suspension means for the gyroscope may be employed but for the sake of illustration this gyroscope is shown as comprising a fly wheel 31 fixed to a shaft or axle 32 which is rotatably mounted at its ends in a ring 34, the ring 34 in turn being rotatably mounted, as at 35 on the frame 10 and on an extension 36 of this frame 10 which overhangs the body portion 11 of the frame. The axis of rotation of the shaft 32 is at right angles to the axis of rotation of the ring 34. As above indicated however any desired form of suspension means may be employed for mounting the gyroscope on the frame of the toy. The gyroscope 30 is operatively connected with the steering wheel for controlling the same in order to maintain or preserve the balance of the vehicle and keep it on its predetermined course. Preferably the motion transmission mechanism made use of to operatively connect the gyroscope to the supporting wheel comprises

a connecting rod 40 having a turn buckle 41 incorporated therein so that the rod is adjusted as to length. One end of the rod 40 has a universal pivotal connection 42 to a stud 43 which is rigidly connected to and projects laterally from one side of the ring 34 and the other end of the rod has a ball or socket or other type of universal connection 44 with an arm 45 rigidly secured to the forks 17.

In practice the gyroscope may be actuated in any suitable manner and is preferably actuated by means of a string S wound on one portion of the axle 32, the axle being preferably apertured transversely to facilitate the association of the string therewith. The motor having been wound up and rapid rotation having been imparted to the fly wheel of the gyroscope when the toy is placed on the floor or other flat surface it will be advanced therealong by means of the drive imparted to the wheel 13 by the motor 25 and its balance or stability will be preserved by the action of the gyroscope 30. Should any forces be set up in the toy tending to disturb its balance or stability such as for instance to tilt it to one side, the gyroscope will cause a turning movement to be imparted to the forks of the steering wheel so as to swing the steering wheel around to the side to which the vehicle tends to tilt. This action will effect a righting up of the vehicle and will overcome the tendency of the same to tilt. By adjusting the turn buckle 41 or by otherwise varying the length of the rod 40 the course of the wheeled toy may be varied if desired.

Preferably the wheel 21 does not include any body other than the frame 10 since it is perferred that the action of the gyroscope in controlling and maintaining the stability of the vehicle be viewable. If however it is desired to employ a body any suitable type of body may be carried by the frame and in Figure 2 there is shown a vehicle body B which may be employed in conjunction with the frame 10.

The toy is preferably used on the floor or other flat surface but it may be used on a string, wire or monorail, and if employed for this purpose the peripheries of the wheels have grooves therein which accommodate the wire W (see Figure 5) or string or monorail. In Figure 5 the driving wheel of the toy is adapted especially for use with a string, wire or monorail, and as shown this driving wheel is designated at 50 and its periphery is illustrated as having an annular groove 51 therein. The steering wheel is provided with a similar groove in such form of the invention.

Although we have herein shown and described the preferred embodiment of the invention, various changes in the form, arrangement and size of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

We claim:

1. In a toy vehicle, a single rigid frame, a driving wheel rotatably connected to the frame at the rear end thereof, a spring motor carried by the frame and operatively connected with the driving wheel, a fork mounted on the forward end of the frame for rotative movement about an axis approximately vertical, a steering wheel mounted for revolution on the fork about a substantially horizontal axis, the axis of the steering wheel being offset horizontally from the axis of rotation of the fork, a gyroscope including a ring pivoted about a vertical axis on the frame and a fly wheel having an axle pivoted to rotate about a horizontal axis on the ring, an arm rigidly connected with the fork and an adjustable rod having universal connection at one end with the ring of the gyroscope and universal connection at its opposite end with the arm.

2. In a toy vehicle, a single rigid frame, two wheels rotatably mounted on the frame, the planes of the wheels lying in the longitudinal axis of the frame, one of said wheels constituting a steering wheel and the other of said wheels constituting a driving wheel, means for actuating the driving wheel, and a gyroscope mounted on the frame, and motion transmission means between the gyroscope and the steering wheel including an adjustable connecting rod whereby the stability and balance of the toy is preserved and the course of the toy may be varied if desired.

3. In a toy vehicle, a frame, a driving wheel rotatably connected to the frame at one end thereof, a motor carried by the frame and operatively connected with the driving wheel, a rotatable fork mounted on the frame, a revoluble steering wheel mounted on the fork, a gyroscope including a ring pivoted about a vertical axis on the frame, and a fly wheel having an axle pivoted to rotate about a horizontal axis on the ring, an arm rigidly connected with the fork, and a rod having a connection at one end with a ring of the gyroscope and a connection at its opposite end with the arm.

4. In a toy vehicle, a frame, a driving wheel connected with the frame, a motor carried by the frame and operatively connected with the driving wheel, a steering wheel mounted on the frame, a gyroscope mounted on the frame, an arm connected with the steering wheel, and a rod having a universal connection between one of its ends and the gyroscope and having a universal connection between its opposite end and the arm connected to the steering gear.

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