Sept. 27, 1927. 1,643,903

H. P. PROSSER

AUTOMATICALLY REVERSIBLE TOY VEHICLE

Filed Feb. 17, 1927 2 Sheets-Sheet 1

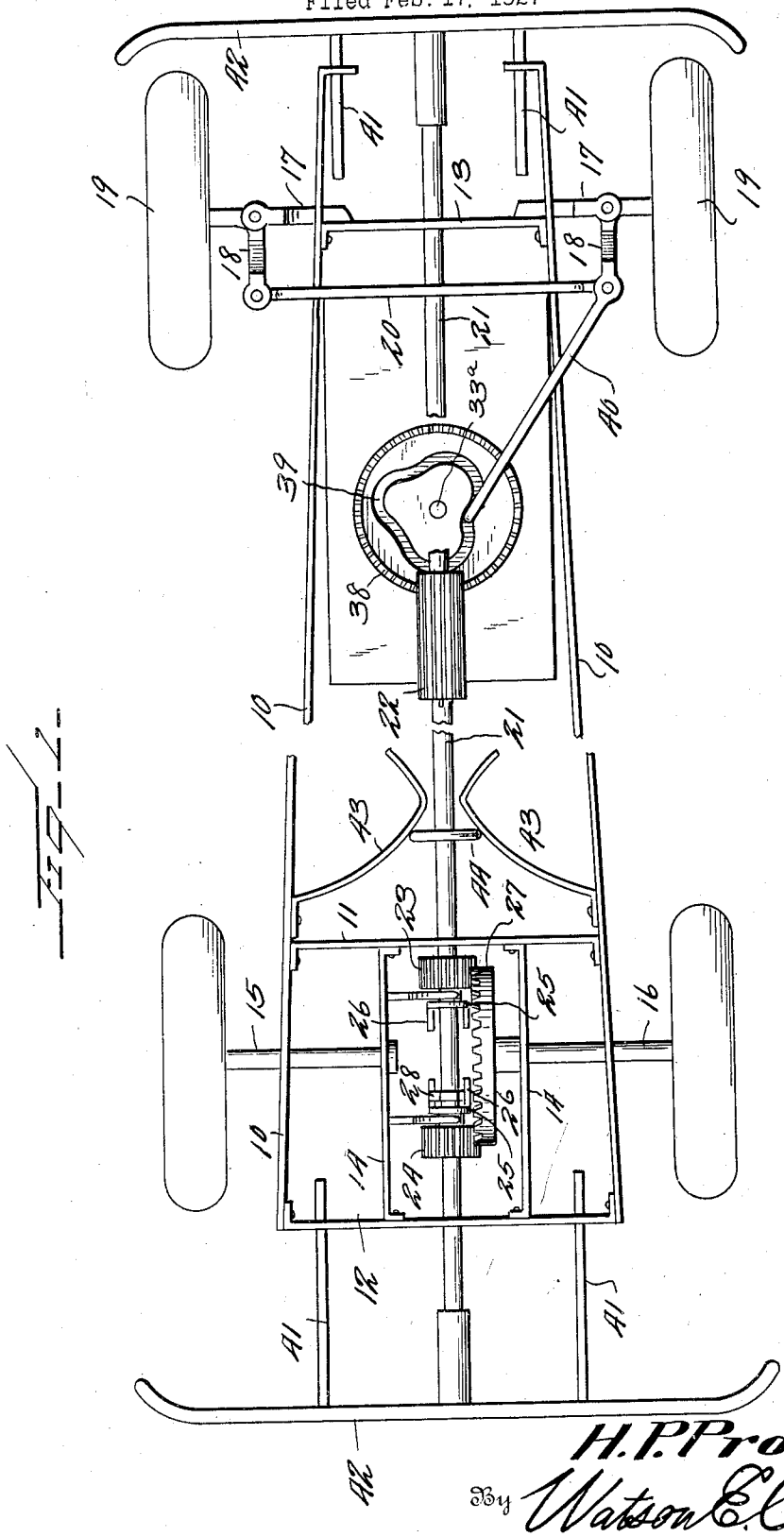


Fig. 1.

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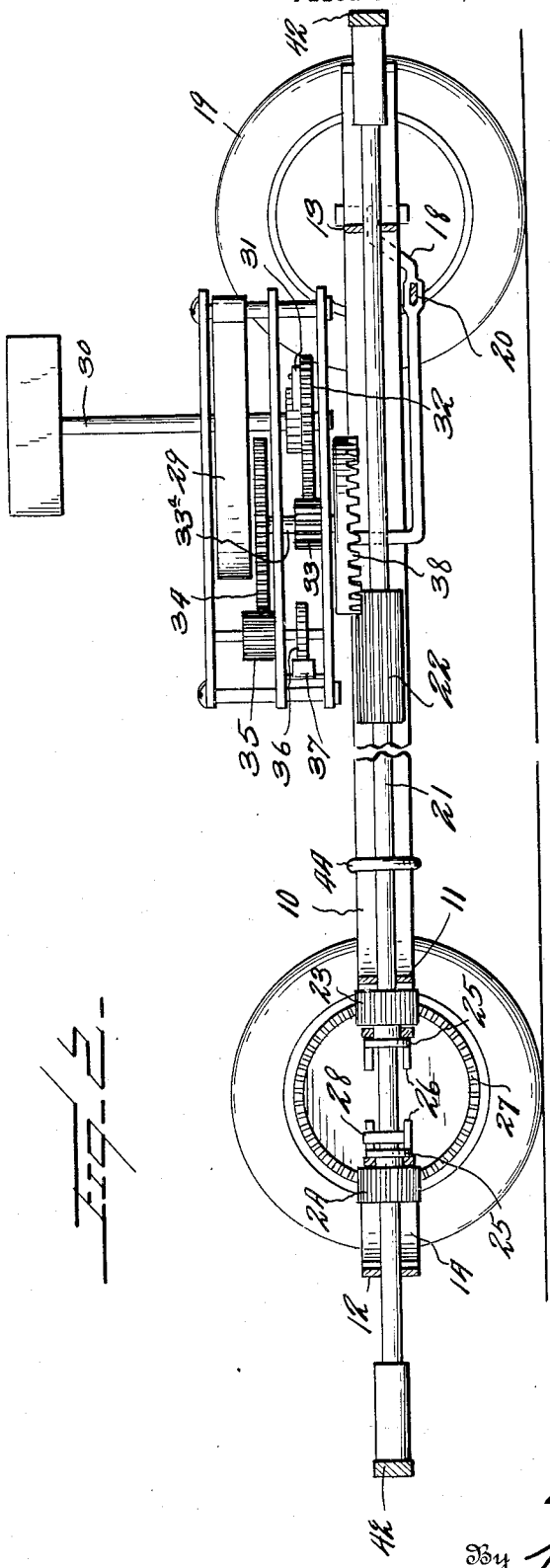


Fig. 2.

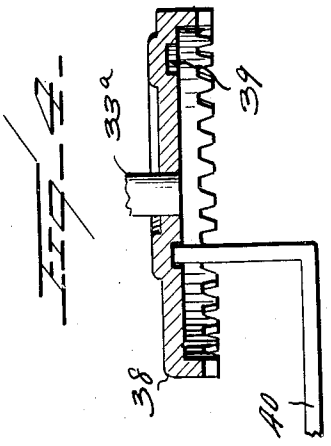


Fig. 4.

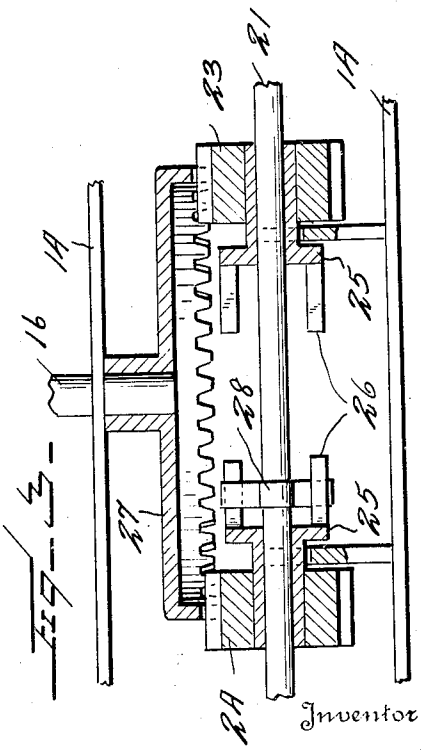


Fig. 3.

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Patented Sept. 27, 1927. 1,643,903

UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-REVERSIBLE TOY VEHICLE.

Application filed February 17, 1927. Serial No. 169,090.

This invention relates to automatic toys and particularly to toy vehicles operated by a spring motor.

The general object of the present invention is to provide a toy vehicle which will run in one direction under the action of the motor until its further progress is impeded or stopped and which will then automatically reverse and run in the other direction until its progress is stopped, whereupon it will again reverse and so on until the motor has run down.

Another object is to provide a device of this character with means whereby the steering wheels of the vehicle will not move in one direction in the same path that it travelled in the other direction.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:—

Figure 1 is an underside plan view of a toy vehicle constructed in accordance with my invention;

Fig. 2 is a longitudinal sectional view thereof;

Fig. 3 is an enlarged section of the transmission gearing;

Fig. 4 is a section of crown wheel and steering cam.

Referring to these drawings it will be seen that I have illustrated just the framework of the vehicle and that this chassis or framework is composed, as illustrated, of the longitudinally extending bars 10 which are connected at intervals by suitable braces as, for instance, the braces 11, 12 and 13. The braces 11 and 12 are connected in turn by longitudinal braces 14. One end of the vehicle is provided with the stub axles 15 and 16, the axle 15 running free at all times and not being positively driven. The other end of the vehicle is provided with the axle stubs 17 upon which the knuckles 18 of the steering wheels 19 are mounted, these knuckles being connected by the transverse rod 20.

Mounted in suitable bearings in the braces 11, 12 and 13, or in any other suitable manner, is a longitudinally extending shaft 21 which has shifting movement in its bearings. This shaft carries upon it intermediate its ends, the relatively long gear wheel 22 and the shaft passes loosely through gear wheels 23 and 24 operatively supported between the braces 11 and 12. Operatively connected to the gear wheels are the disks 25 provided each with a pair of clutch pins 26. These clutch pins confront each other. The disks 25 may be mounted each upon a sleeve upon which the gear wheel 23 or 24 may be carried.

Mounted upon the shaft 16 is the crown wheel 27 whose gear teeth engage both of the loose gears 23 and 24 so that these gear wheels 23 and 24 rotate reversely to each other. Carried upon the shaft 21 between the clutch members formed by the pin 26 is a transversely extending clutching element 28 which is fast upon the shaft 21 and shifts longitudinally therewith from a neutral position into engagement with either of the pairs of pins 26.

Mounted in suitable clock framework carried upon the chassis or frame of the machine is the spring motor 29. This is carried upon the winding shaft 30 and acts to rotate this shaft. This shaft carries upon it suitable ratchet and pawls mechanism designated generally 31 for preventing reverse movement of the shaft and also carries the gear 32 which meshes with a pinion 33 upon whose shaft is mounted the gear wheel 34. This meshes with a pinion 35 having thereon the escapement wheel 36 which coacts with any suitable escapement mechanism such as an anchor escapement 37.

Mounted upon the shaft 33^a is the crown gear 38 which meshes with the long gear wheel 22. The under face of the crown gear 38 has formed in it the cam track 39 shown as having a general heart form with depressions between the lobes. An arm 40 has a pin operating in this cam track 39 and this arm is connected to one of the arms of one of the knuckles 18 and thus it will be obvious that as the crown gear 38 rotates, the steering wheels 19 will be shifted. Any suitable configuration may be given to the cam track 39 but preferably the cam track will have such a form that the wheels will be shifted in one direction for each rotation of the crown gear 38 and then will be held in a straight away position. Thus, upon each rotation of the crown gear, the wheels 19 will be momentarily shifted to steer the vehicle diagonally and then will be again brought back parallel to the frame so as to steer the vehicle on a straight course.

Mounted upon pins 41 having sliding engagement with the frame are the fenders or bumpers 42 which are operatively connected to opposite ends of the shaft 21. When the left hand bumper in Figure 1 moves inward

under impact against an object, clutch pin or member 28 will be carried into engagement with the right hand pair of clutch pins 26 and thus the rotation of shaft 21 will cause the rotation of the traction wheel on shaft 16 in a direction to cause the vehicle to move toward the right in Figure 1. The vehicle will continue to move in this direction until the right hand bumper or fender 42 strikes an object when the shaft will be shifted reversely and will be clutched with gear wheel 24, thus reversing the movement of the driving traction wheel. It will be seen that by reason of the action of cam 39 and arm 40 the vehicle will never reverse on the same path that it travelled in going forward. The escapement mechanism 36 and 37, of course, acts as a governor and prevents the shaft 21 from spinning at an irregular speed when the clutch member 28 is in a neutral position. Preferably the wheels will be fitted with rubber tires though I do not wish to be limited to this nor to any of the exact details of construction as these may be varied in many ways without departing from the spirit of the invention as defined in the appended claims. It is particularly obvious that the form of the cam 39 may be changed so as to give any desired irregularity of the movements of the vehicle.

While I do not wish to be limited to the use of the following mechanism, it may under some circumstances be used. This mechanism consists of the oppositely disposed, inwardly and rearwardly curved springs 43 which are attached to the frame or chassis between the brace 11 and the forward end of the mounting for the spring motor and I mount upon the shaft 21 the disk 44 having a rounded edge. These springs 43 will act to hold the shaft 21 in either of its adjusted positions though the springs are not strong enough to prevent the shaft from being shifted by the bumpers, as heretofore described.

I do not wish to be limited to the exact construction illustrated nor to the particular type of motor vehicle which may be used as it is obvious that the mechanism illustrated may be embodied in many different forms and the type of vehicle imitated in the toy may be varied within a large range. Neither do I wish to be limited to this mechanism as applied to a toy land vehicle as it might be applied to toy boats.

I claim:—

1. A toy vehicle comprising a supporting frame, a motor thereon, a driven shaft, tractor means operatively connected thereto, a longitudinally extending rotatable shaft operatively connected to the motor to be driven thereby, the shaft being mounted for longitudinal movement, bumpers mounted upon opposite ends of the frame and carried by said longitudinal shaft, opposed gear wheels operatively geared to the driven shaft and operating loosely upon the longitudinal shaft, and a clutch carried by the longitudinal shaft and shiftable into engagement with one or the other of said gear wheels as the driven shaft is shifted in one direction or the other.

2. In a toy vehicle, a supporting frame having steering wheels at one end and a traction wheel at the other end, a motor mounted upon the frame, a longitudinally shiftable shaft operatively geared to said motor to be driven thereby in all positions of the shaft, a gear wheel mounted upon the axle of the traction wheel, pinions engaging diametrically opposite portions of said gear wheel and through which pinions the shaft slides, the pinions rotating with the shaft, clutching elements mounted upon the pinions, a clutching element disposed between the first named clutching elements and mounted upon the longitudinal shaft and shiftable with the shaft into engagement with one or the other of the clutching elements, and bumpers slidingly supported upon the frame at opposite ends thereof engaged with the ends of said shaft.

3. In a toy vehicle, a supporting frame having steering wheels at one end and a traction wheel at the other end, a motor mounted upon the frame, a longitudinally shiftable shaft operatively geared to said motor to be driven thereby in all positions of the shaft, a gear wheel mounted upon the axle of the traction wheel, pinions engaging diametrically opposite portions of said gear wheel and through which pinions the shaft slides, the pinions rotating with the shaft, clutching elements mounted upon the pinions, a clutching element disposed between the first named clutching elements and mounted upon the shaft and shiftable with the shaft into engagement with one or the other of the clutching elements, bumpers slidingly supported upon the frame at opposite ends thereof engaged with the ends of said shaft, and motor operated means for automatically shifting the steering wheels at intervals alternately in opposite directions.

4. In a toy vehicle, a supporting frame having steering wheels at one end and a traction wheel at the other end, a motor mounted upon the frame, a longitudinally shiftable shaft operatively geared to said motor to be driven thereby in all positions of the shaft, a gear wheel mounted upon the axle of the traction wheel, pinions engaging diametrically opposite portions of said gear wheel and through which pinions the shaft slides, the pinions rotating with the shaft, clutching elements mounted upon the pinions, a clutching element disposed between the first named clutching elements and mounted upon the shaft and shiftable with

the shaft into engagement with one or the other of the clutching elements, bumpers slidingly supported upon the frame at opposite ends thereof engaged with the ends of said shaft, and motor operated means for automatically shifting the steering wheels at intervals alternately in opposite directions including a cam, knuckles upon which the steering wheels are mounted, and an operative connection between said knuckles and the cam.

5. A toy vehicle comprising a supporting frame, a motor thereon, a driven shaft, tractor means operated by the driven shaft, means for transmitting motion to the driven shaft from the motor including a shiftable reversing clutch and a longitudinally extending shaft upon which the clutch is mounted and operatively engaged with the motor to be driven thereby, and bumpers carried at the opposite ends of said longitudinally shiftable shaft and projecting beyond the vehicle at opposite ends thereof.

In testimony whereof I hereunto affix my signature.

HAROLD P. PROSSER.