

April 1, 1947.

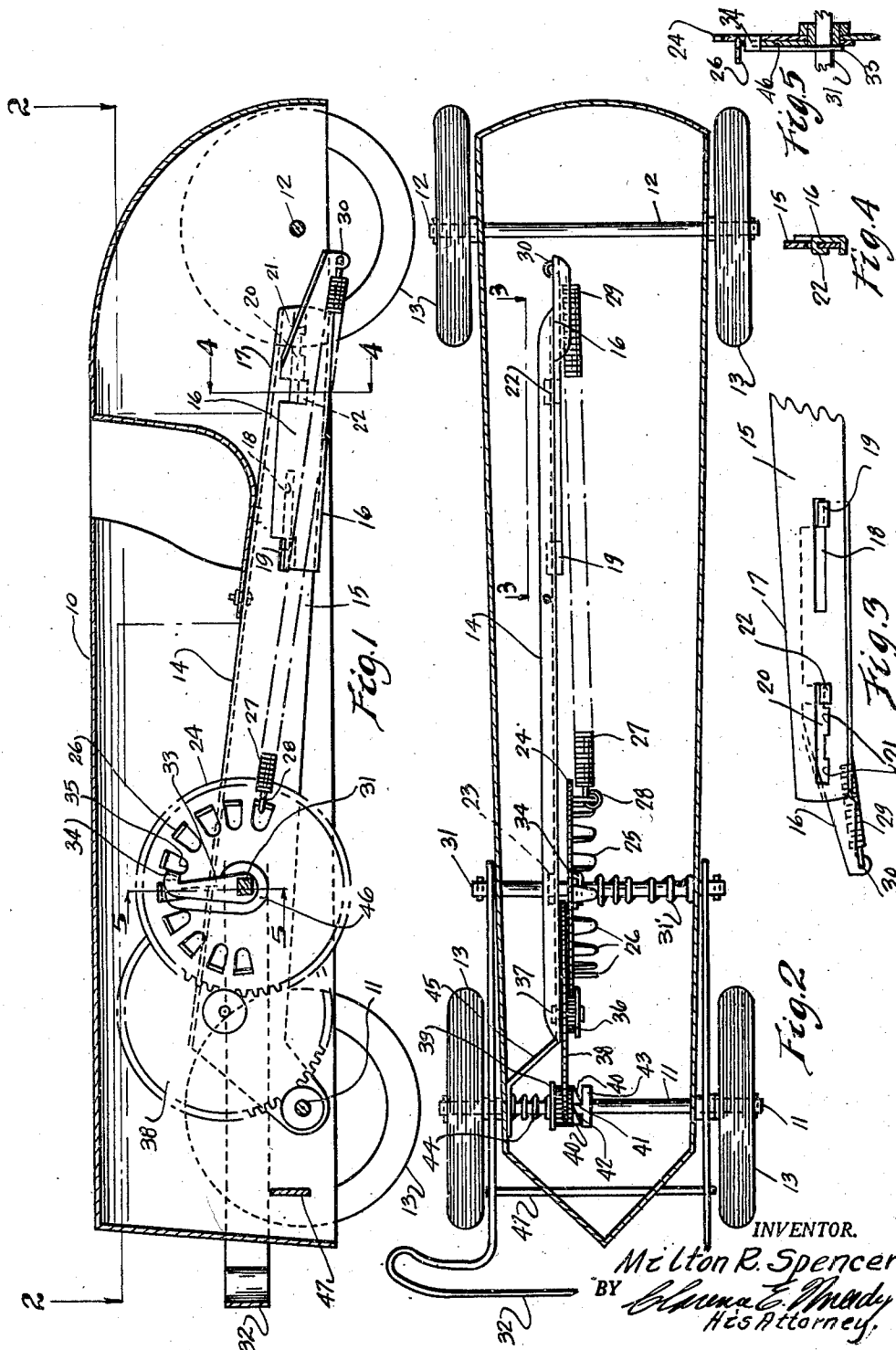
M. R. SPENCER

2,418,201

SPRING-DRIVEN TOY

Filed March 17, 1944

2 Sheets-Sheet 1



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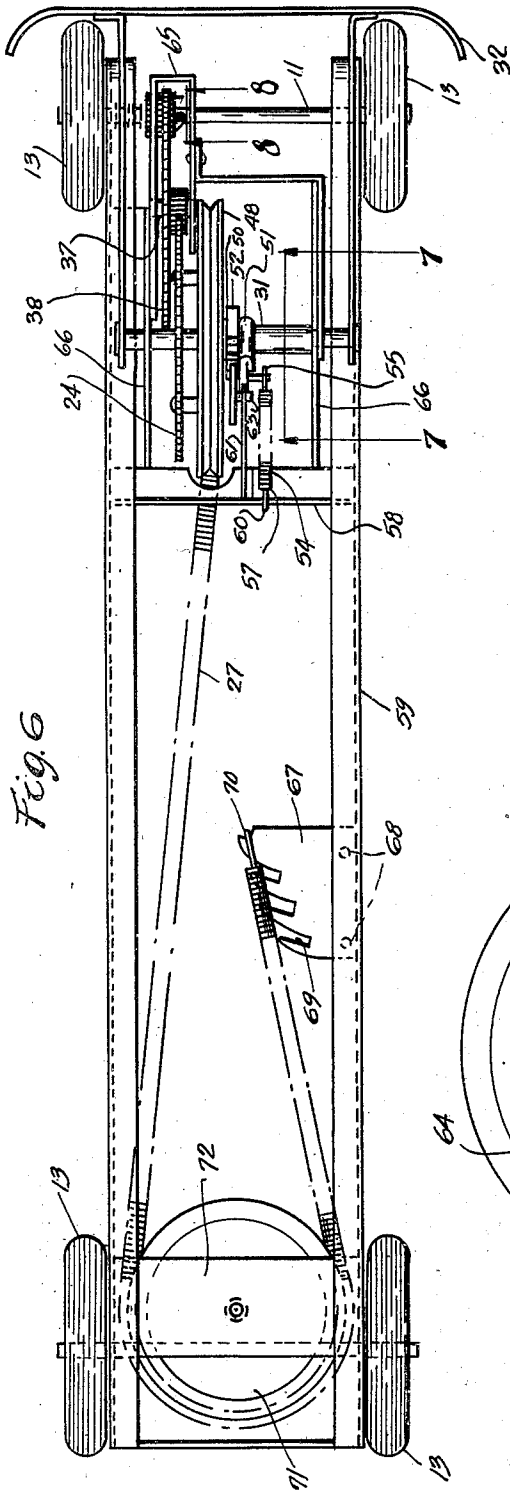
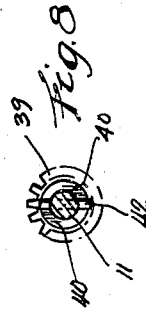
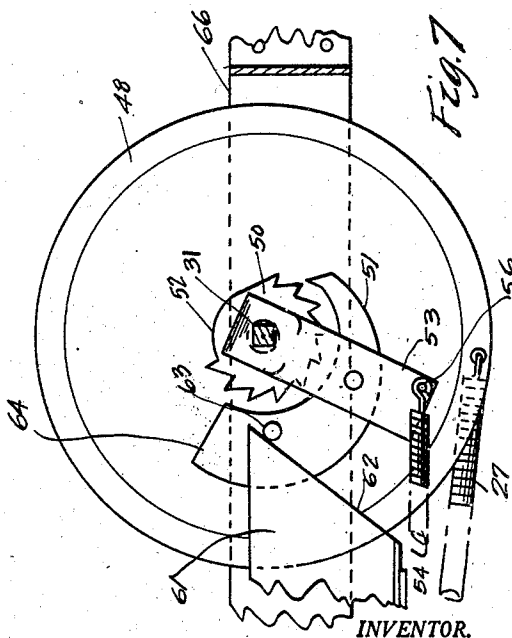
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SPRING-DRIVEN TOY

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9 Claims. (Cl. 46-206)

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This invention relates to spring-driven toys and more specifically to a toy having a wheel-bearing body propelled under the action of a spring, and has for its principal object the provision of an improved construction which will be highly efficient in use and economical in manufacture.

The present invention constitutes an improvement over that shown in my United States Letters Patent No. 1,730,634, dated October 8, 1929, granted to me on a Wheeled toy.

Among the salient objects of this invention is to provide a simple and efficient arrangement of parts for propelling a wheel-bearing toy, in which the arrangement includes, among other things, a mechanism functioning to prevent overwinding of the spring power means.

A still further object of the invention is the provision of a wheel-bearing toy designed and built to simulate a commercial vehicle of a miniature scale and wherein there is employed for placing the spring power means of the toy in condition to propel the same, an element in the form of a bumper arranged and adapted to be pivoted in a direction to place the spring power means in such condition, thus eliminating the employment of a structure which would otherwise distort the simulation of a commercial vehicle.

Another and further object of the invention is the provision of a simple arrangement for increasing or decreasing the tensile strength of the spring element included in the spring power means for propelling the toy.

Yet a further object of the invention is found in the simple manner by which the several parts constituting the wheel-bearing toy may be assembled into a complete operative unit.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a longitudinal vertical sectional detail view of a wheel-bearing toy embodying my invention;

Fig. 2 is a sectional detail view of the same taken substantially on line 2-2 of Fig. 1;

Fig. 3 is a fragmentary side view of the mounting structure taken substantially on line 3-3 of Fig. 2;

Fig. 4 is a sectional detail view taken substantially on line 4-4 of Fig. 1;

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Fig. 5 is a fragmentary sectional detail view taken substantially on line 5-5 of Fig. 1;

Fig. 6 is a plan view of the chassis structure of a vehicle showing my invention associated therewith and illustrating a modified form of construction over that shown in Fig. 1;

Fig. 7 is a fragmentary sectional detail view of the same taken substantially on line 7-7 of Fig. 6;

Fig. 8 is a fragmentary sectional detail view taken substantially on line 8-8 of Fig. 6.

In the drawings I have illustrated the preferred form of construction of my invention. In this connection, and in carrying out my invention, I provide a toy (referring particularly to Figs. 1 to 5 inclusive), which includes a body 10 of any suitable design and shape and which may be ornamentally painted and shaped to simulate a miniature commercial vehicle. At each end of this body 10 there are carried axles 11 and 12, and mounted on these axles for rotation therewith and in any suitable well-known standard manner, are wheels 13.

Within the body 10, I preferably mount, as best shown in Fig. 1, a mounting plate 14 comprising sections 15 and 16 adjustably connected together for adjustment longitudinally with respect to each other. This adjustability of the sections 15 and 16 is accomplished by forming in the tail end 17 of the section 15 an elongated slot 18 in which rides an intumed portion 19 of the section 16. Also formed in the tail end 17 of the section 15 is a second elongated slot 20 communicating with which are notches 21. Adapted to ride in the slot 20 and engaged in the notches 21 is an intumed portion 22 of the section 16. Thus, by disposing the intumed portion 22 in either one of the notches 21 or in the position shown in Fig. 3, the tail 16 may be releasably adjusted longitudinally with respect to the tail portion 17 of the section 15.

Fixedly mounted in the section 15 of the mounting plate 14 is a bushing 23 and rotatably mounted on this bushing 23 is a gear 24. This gear 24 provides a drum 25. This drum 25 is formed by elongated projections 26 struck from the body of the gear 24 and disposed at substantially right angles with respect thereto. On this drum 25 is adapted to be wound a portion of a spring 27. The end 28 of the spring 27 is connected to one of the projections 26 as shown in Fig. 2. The opposite end 29 of the spring is connected as at 30 to the end of the section 16 of the mounting plate 14.

Projected through the bushing 23 and carried

by the body 10 is a shaft 31 preferably substantially square in cross section. This shaft 31 carries a bumper element 32, and mounted on this shaft 31 and rotatable therewith by pivotal movement of the bumper element 32 is a pawl 33. This pawl 33 has an intumed end portion 34 adapted to engage the detents 35 provided by striking the projections 26 from the gear 24.

The gear 24 meshes with a pinion 36 carried by a stud shaft 37 in turn carried by the mounting plate 14. This pinion 36 is formed integrally with a gear 38. The gear 38 operatively meshes with a driven pinion 39 rotatably mounted upon the axle 11 and provided with tapering lugs 40. These lugs 40 are provided with shoulders 41 arranged to contact with lateral pins 42 carried by a disc 43 fixedly mounted on the axle 11. A spring 44 is mounted between the pinion 39 and the end 45 of the mounting plate for allowing the pinion to move out of operative engagement with the pins 42 when the pinion is rotated in one direction upon the axle 11.

To complete the invention, means is provided for disengaging the angled end portion 34 of the pawl 33 from engagement with the detents to allow the gear 24 to rotate in a direction under the retroactive action of the spring 27. In the present instance, in Figs. 1 and 5, this means comprises a plate 46 fixedly mounted on the bushing 23 in the path of movement of the pawl 33, whereby when the outer end portion of the pawl 33 rides upon the outer end portion of the plate 46 the angled end 34 will be flexed from engagement with the detents 35 for reasons hereinafter stated.

In the form shown in Figs. 1 and 5, there is mounted on the shaft 31 a spring 31' bearing against the body and the pawl 33 to retain the pawl in its proper relationship with respect to the plate 46.

As shown in Figs. 1 and 2 when the bumper element 32 is in a horizontal position, the outer end thereof is supported by a cross bar 47 carried by the body 10.

In use the axle 11 is held against rotation during the pivotal action of the bumper element 32 to rotate the shaft 31 whereby to wind the spring 27 upon the drum 25. In thus winding the spring 27 upon the drum 25 by engagement of the pawl 33 with the detents 35, the spring 27 is placed under the tension. Upon a predetermined winding of the spring upon the drum 25, the outer end portion of the pawl 33 will ride upon the outer end portion of the plate 46 and be flexed from engagement with the detents 35. This arrangement prevents overwinding of the spring upon the drum, and also holds the outer end portion of the pawl 33 from engagement with the detents 35 until release of the axle 11 for rotation by unwinding action of the spring from the drum 25. In this unwinding action of the spring from the drum 25, the lugs 40 of the pinion 39 will move into engagement with the pins 42 and thus operatively connect the axle 11 with the gear 38 to impart propulsion to the wheels 13 of the body 10 and consequently cause the toy to roll a substantial distance upon the surface supporting the same. During winding action of the spring upon the drum 25, the tapered lugs 40 will be disengaged from the pins 42 to permit this winding of the spring upon the drum without imparting rotation to the shaft 11.

In Figs. 6 to 8 inclusive I have shown a modified form of construction, and in the description of this form of construction, structure having its

counterpart in the forms shown in Figs. 1 to 5 inclusive will be designated by like reference numerals.

In this connection the gear 24 is supported by the drum 48, which drum 48 is in the form of a grooved pulley, in the groove of which the spring 27 is wound.

Carried by this pulley 48 is a partially toothed gear 50 adapted to be engaged by a pawl 51 and having an uninterrupted surface 52. The pawl 51 is pivotally carried by an arm 53 fixed to and movable with the shaft 31. This pawl 51 is normally held from engagement with the teeth of the gear 50 by means of a spring 54, one end 55 of which is connected to the arm as at 56 and the opposite end 57 being connected to a cross bar 58 of the chassis 59, as indicated at 60. Extending upwardly from the cross bar 58 is a plate 61 having a cam surface 62 engaging a pin 63 carried by the end 64 of the pawl 51, the end 64 serving as a counterweight to pivot the pawl into engagement with the teeth of the gear 50 when the pin 63 is moved out of engagement with the cam surface 62 of the plate 61 by rotation of the shaft 31. Overwinding of the spring 27 upon the drum 48 is prevented by engagement of the pawl with the uninterrupted surface 52 of the gear 50.

As in the case of the form of construction shown in Figs. 1 to 5 inclusive, the front walls of the vehicle are held by the operator against rotation during the pivoting of the bumper element 32 in an anticlockwise direction. As this bumper element 32 is fixedly secured to the shaft 31, this rotation of the bumper element 32 will impart rotation to the shaft 31 and as the shaft 31 is rotated in this anticlockwise direction, the pawl 51 by reason of its counterweight tail 64, when the pin 63 is disengaged from the cam edge 62, will engage one of the teeth of the toothed gear 50 and by reason of such engagement, rotation of the drum 48 in an anticlockwise direction will be imparted thereto with the result that the spring 27 will be wound upon the drum. This rotation of the drum 48 will continue until the pawl 51 engages the uninterrupted surface 52, in which case further pivotal movement of the bumper element 32 will in no way effect further rotation of the drum 48 and as a result the spring cannot be overwound upon the drum 48. Upon movement of the bumper element 32 to the position shown in Fig. 6, the pin 63 will be caused to engage the cam edge 62 and as a result the pawl 51 will be pivoted about its pivot and will be disengaged from engagement with the toothed gear 50 during the unwinding operation of the spring from the drum.

In this modified form of construction, the stud shaft 37 on which the gear 38 is mounted, is supported by a mounting bracket 65 attached to the chassis by side bars 66.

To increase the tension of the spring 27, I provide a plate 67 attached to the chassis 59 as at 68, the chassis side members being substantially channel-shaped in cross section. This plate 67 is provided with a plurality of spaced notches 69 which receive the end ring 70 of the spring 27. In leading the spring 27 for attachment to the plate 67, the spring is payed around a grooved roller 71 horizontally supported by a mounting plate 72 carried by the chassis 59 as shown in Fig. 6.

The operation of the form shown in Figs. 6 to 8 inclusive is substantially the same as that with reference to the form shown in Figs. 1 to 5 inclusive.

The advantages of the structure herein described becomes obvious from the foregoing description. It is apparent that the form or shape of the toy may be varied without departing from the spirit of the invention.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A toy comprising a body, a wheel-bearing drive axle carried by the body, a drive shaft carried by the body, a gear carried by and rotatable independently of said shaft, a bumper structure carried by the shaft for rotating the latter, a drum provided by said gear, gear means operatively connecting said gear to said axle, a spring having one end connected to the body and the other end to the drum and adapted to be placed under tension when wound upon the drum by rotation of the bumper structure, and means carried by and rotatable with the shaft and adapted to engage said gear to operatively connect the gear and said shaft whereby to rotate said gear and the drum provided thereby in a direction to wind a portion of said spring upon said drum to place said spring under tension.

2. A toy comprising a body, a wheel-bearing drive axle carried by the body, a drive shaft carried by the body, a gear carried by and rotatable independently of said shaft, lever means carried by the shaft for rotating the latter, a drum provided by said gear, gear means operatively connecting said gear to said axle, a spring having one end connected to the body and the other end to the drum and adapted to be placed under tension when wound upon the drum by rotation of the lever means, and pawl and detent means carried by and rotatable with the shaft and adapted to engage said gear to operatively connect the gear and said shaft whereby to rotate said gear and the drum provided thereby in a direction to wind a portion of said spring upon said drum to place said spring under tension.

3. A toy comprising a body, a wheel-bearing drive axle, carried by the body, a drive shaft carried by the body, a gear carried by and rotatable independently of said shaft, a bumper structure carried by the shaft for rotating the latter, a drum provided by said gear, gear means operatively connecting said gear to said axle, a spring having one end connected to the body and the other end to the drum and adapted to be placed under tension when wound upon the drum by rotation of the bumper structure, means carried by and rotatable with the shaft and adapted to engage said gear to operatively connect the gear and said shaft whereby to rotate said gear and the drum provided thereby in a direction to wind a portion of said spring upon said drum to place said spring under tension, and stationary means carried by the body in the path of movement of said last-named means and adapted when engaged by said last-named means to disengage said means from engagement with said gear to permit rotation of said gear and the drum provided thereby independently of said shaft under retraction of said spring.

4. A toy comprising a body, a wheel-bearing drive axle carried by the body, a drive shaft carried by the body, a gear carried by and rotatable independently of said shaft, lever means carried by the shaft for rotating the latter, a drum provided by said gear, gear means operatively connecting said gear to said axle, a spring having one end connected to the body and the other end to the drum and adapted to be placed under tension when wound upon the drum by rotation of the lever means, a pawl carried by and rotatable with the shaft, said gear providing detent means adapted for engagement with the pawl to operatively connect the gear and said shaft whereby to rotate said gear and the drum provided thereby in a direction to wind a portion of said spring upon said drum to place said spring under tension, and stationary means carried by the body and disposed in the path of movement of said pawl and adapted when engaged by said pawl to disengage said pawl from said detent means to permit rotation of said gear and the drum provided thereby independently of said shaft under retraction of said spring.

5. A toy comprising a body, a wheel-bearing drive axle carried by the body, a drive shaft carried by the body, a gear carried by and rotatable independently of said shaft, lever means carried by the shaft for rotating the latter, a drum provided by said gear, gear means operatively connecting said gear to said axle, a spring having one end connected to the body and the other end to the drum and adapted to be placed under tension when wound upon the drum by rotation of the lever means, a pawl carried by and rotatable with the shaft, said gear providing detent means adapted for engagement with the pawl to operatively connect the gear and said shaft whereby to rotate said gear and the drum provided thereby in a direction to wind a portion of said spring upon said drum to place said spring under tension, and stationary means carried by the body and disposed in the path of movement of said pawl and adapted when engaged by said pawl to disengage said pawl from said detent means to permit rotation of said gear and the drum provided thereby under retraction of said spring and to prevent overwinding of said spring on said drum.

6. A toy comprising a body, a wheel-bearing drive axle carried by said body, a mounting plate within said body, a shaft extending transversely of the body through said mounting plate, a bumper structure carried by said shaft, gear means operatively connecting said shaft with said axle including a gear rotatably carried by the mounting plate and rotatable independently of said shaft, a drum provided by said gear, spring means a portion of which is adapted to be wound on said drum to impart rotation to said gear means, and means providing operative connection between said shaft and said gear for rotating the gear and shaft in a direction to wind a portion of said spring on said drum, said gear being free to rotate in an opposite direction by retraction of said spring means.

7. A toy comprising a wheel-bearing axle, a mounting plate comprising longitudinal sections and means for connecting said sections together for longitudinal adjustment with respect to each other, driving means for said axle including a rotatable drum and a spring member, one portion of which is adapted to be wound upon said drum, means for connecting one end portion of said spring member on said drum, and means for con-

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necting the opposite end portion of said spring member to one of the sections of said mounting plate.

8. A toy comprising a body, wheel-bearing axles carried by the body, spring power means, means operatively connecting the spring power means to one of said wheel-bearing axles, a bumper structure pivotally supported by said body, means operatively connecting the bumper structure to said spring power means whereby upon rotation of said bumper structure said spring power means will be placed under condition to rotate said one of the wheel-bearing axles, and means to prevent over-

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winding of said spring power means by said bumper structure.

9. Means for driving a wheel-bearing toy including a spring-bearing drum and pawl and detent means, a shaft carrying said pawl and adapted to rotate the same, a bumper structure carried by the shaft for rotating the shaft to impart rotation to said spring-bearing drum by engagement of the pawl with said detent means, and means for releasably holding said pawl from engagement with said detent means to permit rotation of said drum in an opposite direction.

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