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Terzian

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[54] **TOY VEHICLE AND ASSOCIATED CONDITIONING MEANS THEREFOR**

[75] Inventor: **Rouben T. Terzian,** Chicago, Ill.

[73] Assignee: **Marvin Glass & Associates,** Chicago, Ill.

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[52] **U.S. Cl.** **46/206**

[51] **Int. Cl.** **A63h 17/00**

[58] **Field of Search** 46/202, 201, 206

[56] **References Cited**

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Primary Examiner—Louis G. Mancene
Assistant Examiner—D. L. Weinhold
Attorney, Agent, or Firm—Coffee & Sweeney

[57] **ABSTRACT**

A toy vehicle and associated external winding mechanism characterized by the provision of a crank arm on the winding mechanism connected through coupling devices and intermediate gears to a spring motor on the vehicle which in turn in connected through gears to a driven wheel of the vehicle. The connection between the spring motor and the driven wheel includes an automatic clutching gear which operatively disengages the motor from the driven wheel automatically in response to movement of the crank arm while storing energy in the spring motor, and which operatively engages the motor and driven wheel automatically in response to releasing the energy stored in the motor. The vehicle is in the form of a contemporary motorcycle.

10 Claims, 6 Drawing Figures

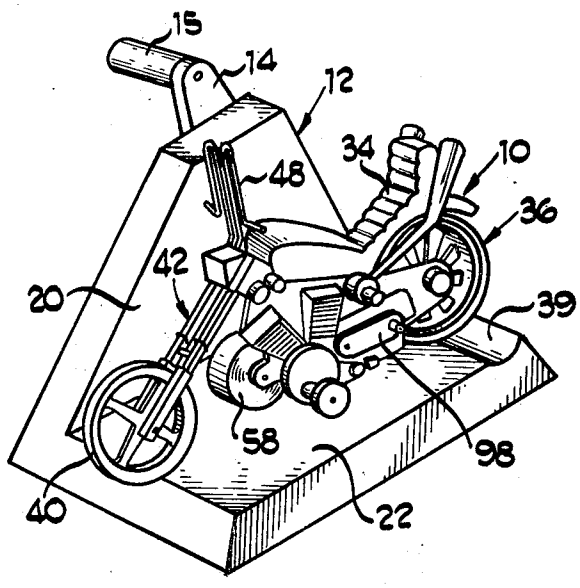


Fig 1

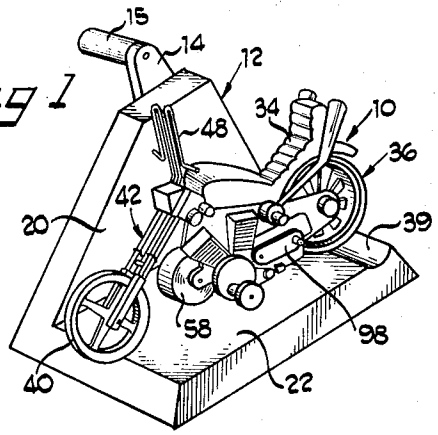


Fig 2

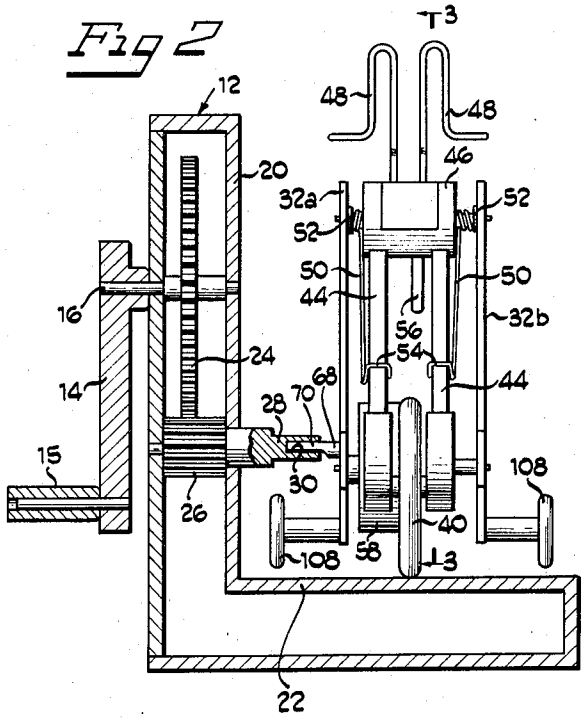


Fig 5

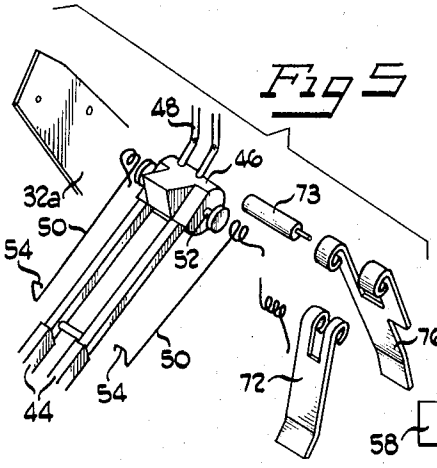


Fig 4

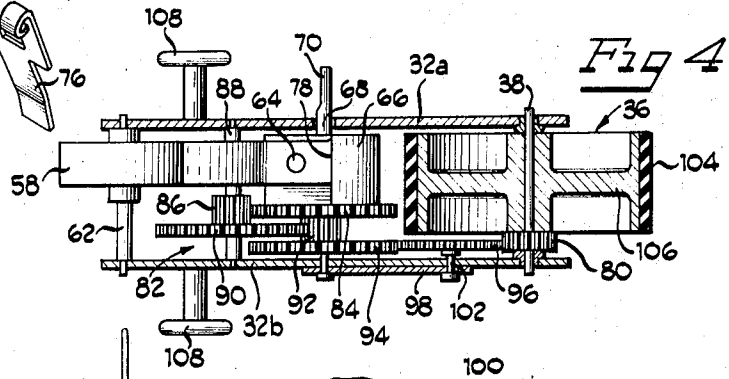


Fig 3

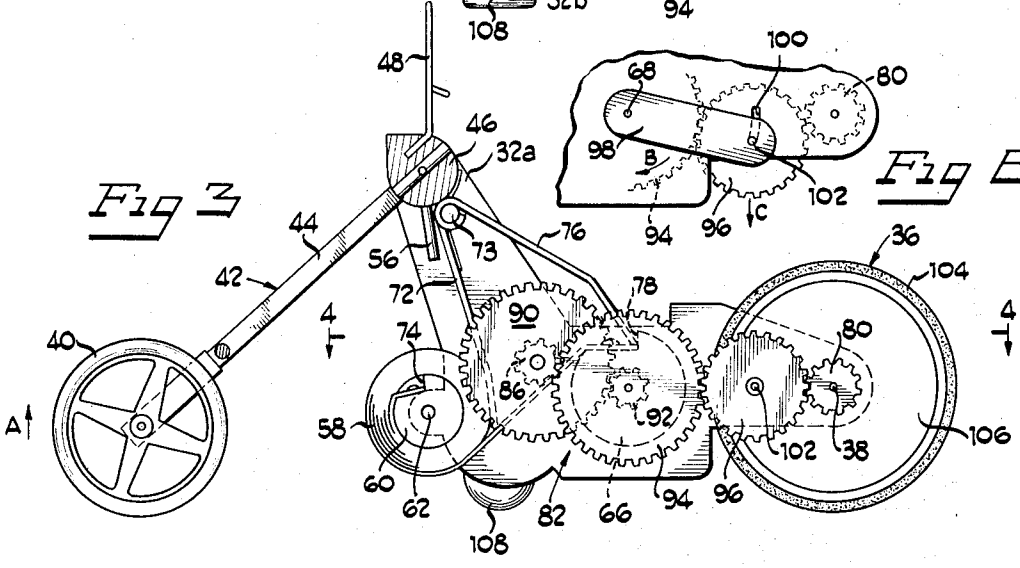


Fig 6

TOY VEHICLE AND ASSOCIATED CONDITIONING MEANS THEREFOR

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to toy devices and more particularly to driven vehicle type toys operated by constant torque spring motors, or the like.

There are many different forms of driven vehicles or inertia toys which operate, or have portions which operate, on the release of energy stored in a momentum imparting component. Generally speaking, this oftentimes is accomplished by storing energy in a constant torque spring type motor which operates through gears or linkages to a driven component of the vehicle.

Such toys of the character described are well received in that they are simple in structure and operation and, with sufficient power or energy, dramatic in operation. The principal object of this invention is to meet the continuing need and desire in the art for improved toys of the character described.

In the exemplary embodiment of the invention, a toy vehicle and external manipulatable conditioning means is provided for winding the vehicle's motor and to permit the vehicle to be driven over a supporting understruture on release of energy stored in the motor. A supporting frame is provided with a platform or stand portion on which the vehicle is positioned, and a crank arm is movably mounted on the frame. The crank arm is connected through coupling means to a spring torque motor on the vehicle which is operatively connected to motive means, such as a wheel of the vehicle, for moving the vehicle. The motor is cnoditioned (i.e., energy is stored therein as it is wound) in response to movement of the crank arm on the external supporting frame. Actuating connecting means is operatively connected between the motor and the driven wheel and includes automatic clutch means for operatively disengaging the motor and the driven wheel automatically in response to movement of the crank arm to store energy in the motor and for operatively engaging the motor and driven wheel automatically in response to releasing the energy stored in the motor.

The actuating connecting means includes a gear train between the motor and the driven wheel and the automatic clutch means includes a gear member mounted for free movement in a direction transversely of its axis of rotation for movement out of engagement with a gear on the driven wheel as the crank arm conditions the spring motor and for movement into engagement with the gear on the driven wheel under the momentum of the energy released from the spring motor to the other gears of the gear train.

The exemplary form of vehicle simulates a motorcycle having a body portion on which the spring motor, gear train, clutch gear, coupling means and driven wheel are mounted, with a front wheel for the motorcycle being disposed on the front end of an elongated resiliently mounted shaft pivotally mounted to the vehicle's body portion at the front top areas thereof.

Other objects, features and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the toy vehicle and external actuatable conditioning means of the present invention;

FIG. **2** is a vertical transverse section through the supporting frame and crank arm of the actuating means, on an enlarged scale, with the toy vehicle coupled thereto and shown in front elevation;

FIG. **3** is a vertical section through the vehicle taken generally along the line **3—3** of FIG. **2**;

FIG. **4** is a horizontal section taken generally along the line **4—4** of FIG. **3**;

FIG. **5** is an exploded perspective view of the various components pivotally connected at the juncture between the vehicle body portion and the front wheel shaft; and

FIG. **6** is an elevational view of the automatic clutch gear of the present invention, disengaged from the rear wheel gear permitting winding of the vehicle's spring motor.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings in greater detail, a toy vehicle, generally designated **10,** is provided in the shape of a motorcycle and is operatively associated with an associated external manipulatable conditioning means, generally designated **12,** on which the vehicle may be positioned, as shown in FIG. **1,** so that the motor means thereof may be conditioned by storing energy therein in response to movement of a crank arm **14.** The crank arm has a handle portion **15** and is pivotally mounted by means of a shaft **16.**

More particularly, the external conditioning means **12** includes a supporting frame having an upstanding housing portion **20** on which the crank arm shaft **16** is pivotally mounted, and a generally horizontally disposed lower stand or platform portion **22** on which the vehicle **10** may be positioned. Power transfer means between the crank arm **14** and the vehicle **10** includes a disc-shaped gear member **24** mounted within the upright housing portion **20** for conjoint rotation on the crank arm shaft **16.** Gear **24** is in meshed engagement with a smaller diameter gear member **26** to provide for increased mechanical advantage and an increase in revolutions. The gear member **26** is mounted for rotation on the upright housing portion **20.** A first coupling member **28** is secured to the gear **26** for conjoint rotation therewith and is disposed on the exterior of the upright housing **20.** The coupling member **28** is provided with a female socket or connection **30.**

The vehicle **10** is formed in the shape of a motorcycle having a body portion formed by a pair of spaced support plates **32***a* and **32***b* on top of which is mounted a seat portion **34** (FIG. **1**). A rear wheel, generally designated **36,** is rotatably mounted by means of a rear axle **38** to the body support plates **32***a*, **32***b*. The rear wheel is the motive means for the vehicle. A rounded recess **39** is formed on the platform portion **22** to properly position the vehicle for conditioning the vehicle by rotating the crank arm **14.** A front wheel **40** for the vehicle is mounted on the front end of elongated shaft means, generally designated **42,** which extends forwardly and downwardly from the top front of the body support plates **32***a* and **32***b* of the vehicle. The shaft means **42** actually comprises a pair of generally parallel shaft members **44** extending downwardly from an enlarged

pivot boss **46**, with the front wheel **40** pivotally mounted between the shaft members **44**. The pivot boss **46** is pivotally secured between the body support plates **32***a*, **32** *b*. Handle bar means **48** extend upwardly from the pivot boss **46**. As best seen in FIGS. **2** and **5**, a pair of wire springs **50** are wrapped around projections **52** on the sides of the pivot boss **46**, with embracing portions **54** of the wire springs seated on top of the shaft members **44** to urge the shaft means **42** and front wheel **40** downwardly. A stop rod **56** (FIG. **3**) defines the lower limit position of the shaft means **42** and wheel **40**. The wire springs **50** provide resiliency for the vehicle whereby the front wheel may be forced upwardly by irregularities in the surface over which the vehicle is traveling, generally in the direction of arrow A (FIG. **3**).

The motor means for the vehicle of the present invention comprises a spring band **58** wound on a core **60** (FIG. **3**) which is fixed to a shaft **62** rotatably mounted between the body support plates **32***a*, **32***b*. The core **60** comprises a take-up drum for the spring to move the vehicle as described hereinafter as the spring is wound back onto the take-up drum. The opposite end of the spring **58** is secured, as by a screw **64** (FIG. **4**), to a second drum **66** which is rotatably mounted between the body support plates **32***a*, **32***b* by means of a shaft **68**. The shaft **68** extends through the support plate **32***a* (as best seen in FIGS. **2** and **4**) and has an irregularly shaped male coupling portion **70** which is insertable into the complementarily shaped socket **30** of the coupling means **28**. Thus, in order to store energy in the spring motor (comprising spring **58**), the vehicle is placed in position on stand portion **22**, as shown in FIGS. **1** and **2**, with the coupling means **70** and **28** interconnected, and the crank arm **14** is rotated to wind the spring **58** onto the drum **66**. When the spring is completely wound off of the drum **60**, a stop spring leaf **72** (FIG. **3**) mounted on a shaft **73** falls into a recess **74** on the drum **60** to prevent further winding of the spring off of the drum **60** to prevent damage to the connection between the spring and the drum. A second stop spring leaf **76** also is provided for dropping into a recess **78** on the drum **66** when the spring returns to the take-up drum **60** to avoid damaging the connection between the spring and the drum **66**.

Actuating connecting means is operatively connected between the motor spring drum **66** and a rear wheel gear member **80** mounted on the rear axle **38** for rotation with the rear wheel **36**, and comprises a gear train, generally designated **82**. The gear train includes a disc gear **84** mounted for conjoint rotation with the spring drum **66** and which is in mesh with a smaller diameter gear **86**, providing increased mechanical advantage and increased revolutions, the gear **86** being mounted on a shaft **88** for conjoint rotation with a larger disc gear **90**. Disc gear **90** is in mesh with a smaller diameter gear **92**, providing for further increased mechanical advantage and increased revolutions, the gear **92** being secured for conjoint rotation with a larger diameter gear disc **94**. Gears **92** and **94** are mounted on the spring drum shaft **68** for free rotation relative thereto, whereby the disc gear **94** may be rotated at a faster rate of speed than the gear disc **84** (on the same shaft) due to the step down gears **86** and **92**.

The gear train **82** includes an automatic clutch gear **96** which is mounted on a lever member **98** for movement generally transversely of the axis of rotation of the gear **96** into and out of engagement with the rear wheel gear **80**. More particularly, the lever **98** is pivotally mounted on the shaft **68** which is common to the gears **84**, **92** and **94** as well as the spring drum **66**. Thus, the gear **96** is maintained in constant meshed engagement with the disc gear **94**. With the arrangement as shown and described above, the clutch gear **96** thus comprises a momentum clutch whereby it moves out of engagement with the rear wheel gear **80** as the motor spring **58** is wound onto the spring drum **66**. This occurs because the disc gear **94** rotates in the direction of arrow B (FIG. **6**) as the motor spring **58** is wound onto the spring drum **66** by the crank arm **14**. Rotation of the disc gear **94** in the direction of arrow B tends to force the clutch gear **96** downwardly in the direction of arrow C out of engagement with the rear wheel gear **80**. A slot **100** is provided in the body support plate **32***b* through which a pin shaft **102** of the clutch gear **96** extends to accommodate the movement of the clutch gear. When the vehicle is moved out of engagement with the crank arm coupling means **28**, and the energy stored in the motor spring **58** is released to permit the motor spring to return to its stored position on drum **60**, the momentum of the rotating gears (caused by the energy in the spring, with the disc gear **94** rotating opposite the direction of arrow B (FIG. **6**)), forces the clutch gear **96** upwardly opposite the direction of arrow C and into engagement with the rear wheel gear **80** to drive the same and move the vehicle over an understructure such as a floor, the ground, or the like.

It will be noted that the rear wheel **36** is oversized relative to the front wheel **40** and includes an outer tread portion **104**. The outer tread portion **104** may be fabricated of rubber or like material which has a greater weight per volume than the framework **106** of the rear wheel, which may be fabricated of plastic or the like. In addition, outrigger wheels **108** are provided, protruding outwardly from the body support plates **32***a*, **32***b* to provide stabilization for the vehicle.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom as some modifications will be obvious to those skilled in the art.

I claim:

1. A toy vehicle and associated remote manipulatable conditioning means therefor, comprising, in combination:

means defining a supporting frame;

crank means movably mounted on said frame;

power tranfer means, including first coupling means, on said frame operatively associated with said crank means for transferring power resultant from movement of said crank means;

a vehicle having motive means for moving the vehicle and second coupling means releasably engageable with the first coupling means on said frame;

a spring-type motor on said vehicle and connected to said second coupling means for storing energy in the motor in response to movement of said crank means; and

actuating connecting means operatively connected between said motor and said motive means, including automatic clutch means for operatively disengaging said motor and said motive means automatically in response to movement of said crank means

to store energy in said motor and to operatively engage said motor and motive means automatically in response to releasing the energy stored in said motor.

2. The toy of claim **1** wherein said actuating connecting means includes a gear train having at least one gear thereof mounted on said vehicle for movement transverse to its axis of rotation for movement into and out of engagement with a second gear in the gear train.

3. The toy of claim **2** wherein said one gear is mounted for free movement in said transverse direction between limit positions and providing a momentum clutch whereby the one gear moves out of engagement with said second gear when said crank is moved to store energy in said motor and whereby the one gear is forced into engagement with said second gear as the energy in the motor is released to drive said motive means.

4. The toy of claim **3** wherein said one gear is mounted on one end of a lever member which is pivotally mounted on said vehicle for pivotal movement about an axis concentric with the axis of rotation of a third gear in said gear train, said third gear being in constant meshed engagement with said one gear.

5. The toy of claim **1** wherein the motive means of said vehicle includes at least one driven wheel and said supporting frame includes a stand portion on which at least a portion of said vehicle is positioned for connecting said first and second coupling means.

6. The toy of claim **5** wherein said stand portion has a recess into which the wheel of said vehicle is positionable when the vehicle is properly positioned on the stand for connecting said first and second coupling means.

7. The toy of claim **1** wherein said vehicle is formed in the shape of a motorcycle having front and rear wheels, and including a pair of side stabilizing wheels, one on each opposite side of the vehicle.

8. The toy of claim **1** wherein said vehicle is formed in the shape of a motorcycle having front and rear wheels and a body portion, said motor, coupling means and actuating connecting means being mounted on the body portion, with the rear wheel generally therebehind, and said front wheel being mounted on the front end of elongated shaft means extending forwardly and downwardly from the top front area of said body portion.

9. The toy of claim **8** wherein said elongated shaft is pivotally mounted on said body portion and including resilient biasing means between the shaft and body portion for resiliently urging the front wheel downwardly against an undersurface such as a floor or the like.

10. The toy of claim **8** wherein said rear wheel is oversized relative to said front wheel.

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