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Morrison et al.

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[54] **OPERATOR PROPELLED TOY VEHICLE**

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

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[52] **U.S. Cl.** **280/218**, 280/1.191

[51] **Int. Cl.** **A63g 19/00**

[58] **Field of Search** 280/1.191, 1.192, 280/1.194, 1.188, 1.189, 218, 220, 221, 226

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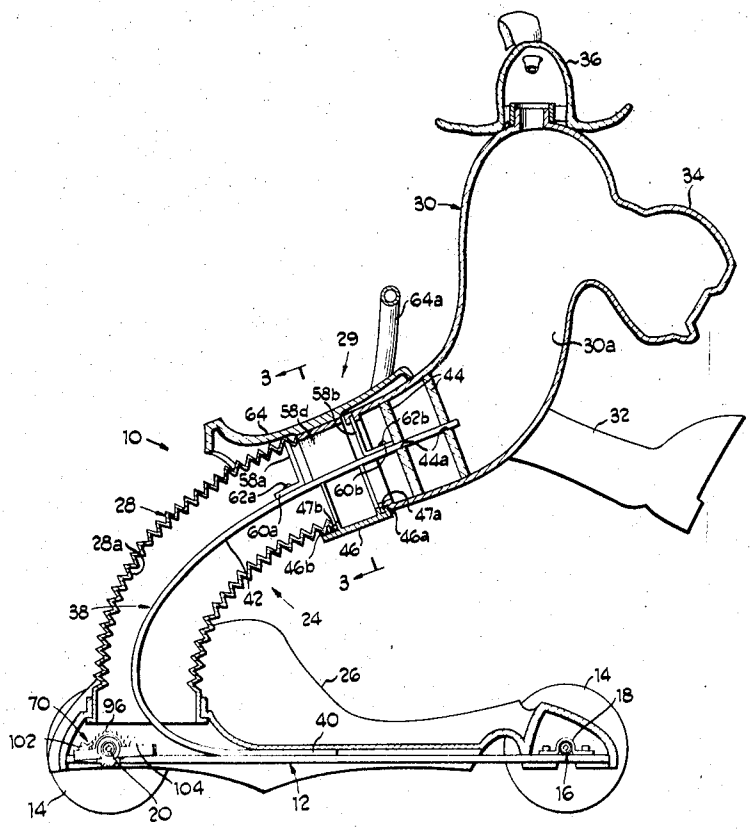
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Primary Examiner—Leo Friaglia
Assistant Examiner—Randall A. Schrecengest
Attorney—James F. Coffee et al.

[57] **ABSTRACT**

An operator-propelled toy vehicle of the type having a body supported on rotatable wheels and including a deformable spring carried by the body with the vehicle intended to be propelled responsive to reaction forces resultant from deflection of the spring, characterized by a motion transmitting means associated with the wheels for permitting movement of the vehicle either in a forward or rear direction or free movement of the vehicle in either direction.

4 Claims, 10 Drawing Figures

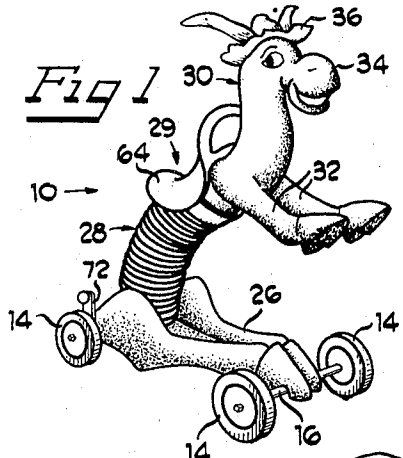


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SHEET 1 OF 2

Fig 1



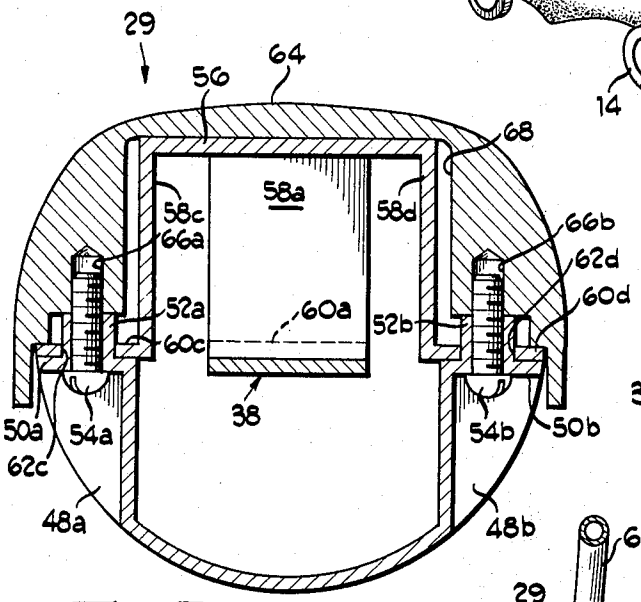
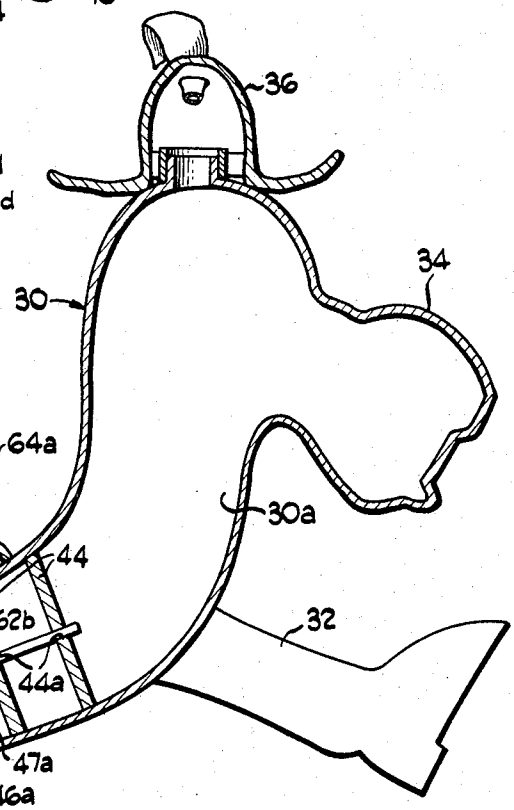


Fig 3



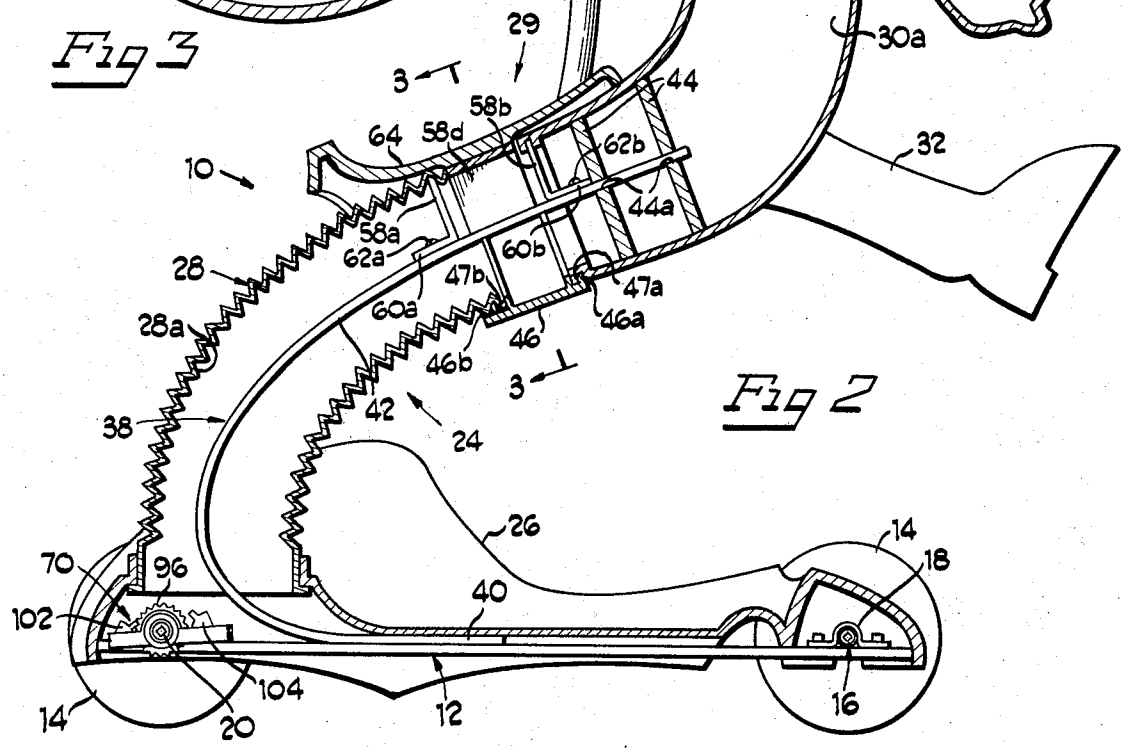


Fig 2

Fig 4

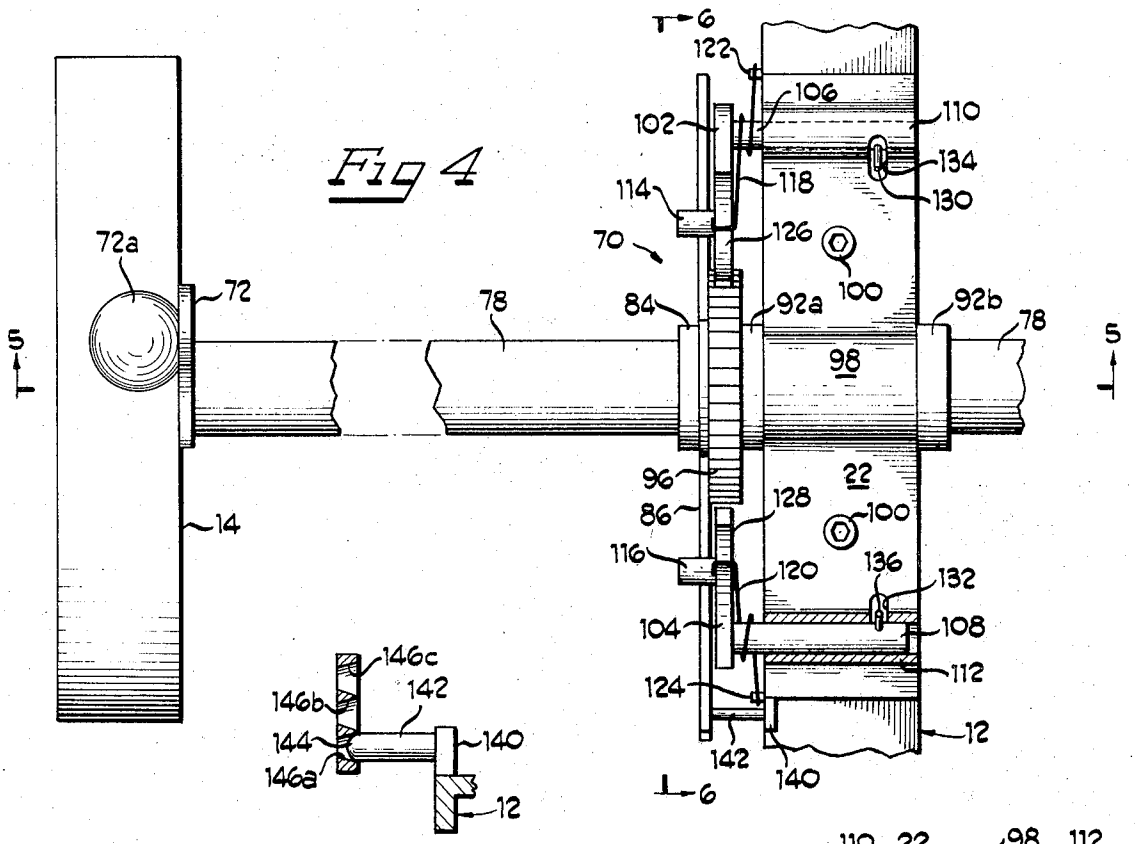


Fig 9

Fig 10

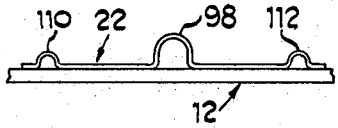


Fig 5

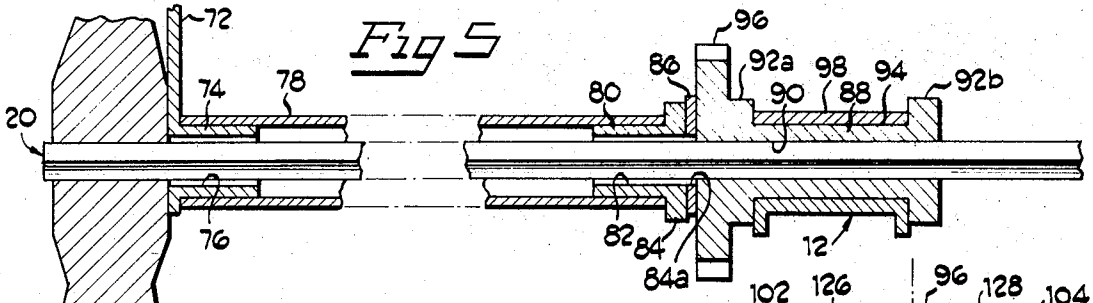


Fig 7

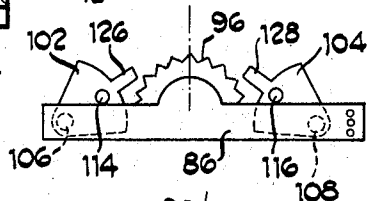


Fig 6

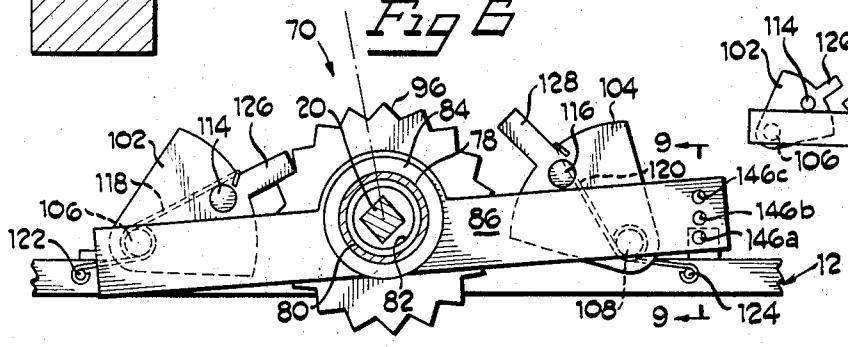
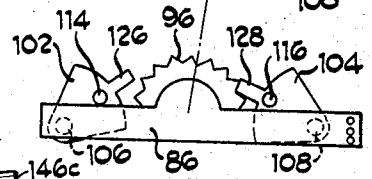


Fig 8



OPERATOR PROPELLED TOY VEHICLE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a toy device and more particularly to an operator propelled toy vehicle.

2. Brief Description of the Prior Art

The Trevena U.S. Pat. No. 3,181,270 discloses an inchworm type toy having five discrete body sections with the forward and rearmost section supporting rotatable wheels and the inner three sections including movable components which can move between an elongated and an arched orientation so that the toy may be moved along in an inchworm type fashion. The copending application of Morrison and Glass, Ser. No. 113,206, filed Feb. 8, 1971, entitled "Inchworm Vehicle" and assigned to the assignee of this invention discloses an improved form of an operator propelled toy wherein a sinuous spring is connected to forward and rear wheels for unidirectional movement of the wheels responsive to reaction forces received from deformation of the spring.

Operator propelled toy vehicles are well received in the art in that they are easily operated and simply constructed and especially suitable for use by extremely young children. Accordingly, it is the object of this invention to meet the continuing need and desire in the art for improvements in toys of this kind by providing an operator propelled toy vehicle wherein the movement of the vehicle may be restrained in either a rearward or forward direction or free movement permitted which may result in a static condition of the vehicle with respect to relative movement over a supporting surface.

SUMMARY OF THE INVENTION

This invention is directed, in brief, to the provision of an improved operator propelled toy vehicle. The best mode currently contemplated for carrying out the invention includes the provision of a body mounted on a base which supports rotatable wheels. The body includes a deformable leaf spring member in the interior thereof which is also connected to the base. The rear wheels of the base are provided with shiftable ratchet mechanism which permits the vehicle to be moved in a forward direction only, a rear direction only, or which may be moved to a neutral mode wherein free movement of the vehicle is permitted which may result in the vehicle remaining stationary responsive to reaction forces as the spring is deflected.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the operator propelled toy vehicle of this invention;

FIG. 2 is a vertical section view of the toy vehicle shown in FIG. 1;

FIG. 3 is a section view taken generally along the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary enlarged view of a portion of the rear axle and motion transmitting assembly of the toy vehicle of this invention;

FIG. 5 is a section view taken generally along the line 5—5 of FIG. 4;

FIG. 6 is an elevational view of the motion transmitting assembly utilized with the rear wheels of the toy vehicle of this invention showing the assembly in a forward mode wherein forward movement of the vehicle is permitted;

FIG. 7 is a view similar to FIG. 6 showing the motion transmitting assembly in a neutral mode;

FIG. 8 is a view similar to FIGS. 6 and 7 showing the motion transmitting assembly in a reverse mode;

FIG. 9 is a section view taken generally along the line 9—9 of FIG. 6 showing the locking means for the motion transmitting assembly of this invention; and

FIG. 10 is a diagramatic view illustrating the mounting plate for the motion transmitting assembly and rear axle of the toy vehicle of this invention.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail a specific embodiment therefor, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

The toy vehicle **10** of this invention is of the type intended to be occupied and propelled by a child, or the like. The vehicle **10** includes a base member **12**, preferably made of a channel stock metal. Rotatable wheels **14** support the vehicle for rotation along a supporting surface. The front wheels **14** are connected to axle **16** which is rotatably connected to base **12** by means of bracket **18**. Rear wheels **14** are connected to axle **20** which is associated with bracket **22** for rotatably connecting the rear wheels with respect to the base **12**. Specific description of the rear wheel mounting arrangement will be explained in detail later.

The body **24** includes a base portion **26** which is in the form of a pair of simulated horse legs. A flexible portion **28** having a hollow interior **28a**, extends upwardly from the base **26** and the flexible portion is preferably made of an accordian pleated plastic. A seating portion **29** joins flexible portion **28** with rigid forward portion **30** which has a hollow interior **30a**. Forward portion **30** includes forwardly projecting simulated horse legs **32** with a simulated horse head **34**. A suitable decorative ornamentation **36** which is shown herein in the form of a hat and ears, may be provided on the horse head **34**.

Spring element **38** is preferably made of a flat elongate leaf spring metal bent into a general C-shape and includes a base portion **40**, which is connected to base **12** and a body portion **42**. Generally speaking, the body portion **42** extends obtusely upwardly and outwardly from the base **40**, generally from the area of the rear axle **20**.

Forward portion **30** of the body **24** is provided with webs **44** which span the interior **30*a***. Webs **44** have openings **44*a*** of a size and shape corresponding to the cross-section of spring **38** to snugly receive the spring therein.

Seating portion **29** is comprised of three subportions. Bottom portion **46** is generally semi-cylindrical in configuration and has annular flanges **46*a*** and **46*b*** which captivate grooves **47*a*** in body portion **30** and grooves **47*b*** in body portion **28** to assist in joining the two portions together. Bottom **46** further has side recesses **48*a*** and **48*b*** defining lateral side flanges **50*a*** and **50*b***, each of which has hollow upstanding hubs **52*a*** and **52*b*** for receiving fasteners **54*a*** and **54*b***.

The seating portion **29** further includes an upper portion **56** having four depending legs **58***a*, **58***b*, **58***c* and **58**d terminating in four outwardly projecting feet **60***a*, **60***b*, **60***c* and **60***d*, respectively. The forward and rearward feet **60***a* and **60***b* are connected by means of fasteners **62***a* and **62***b* to the spring **38**. The two side or lateral feet **60***c*, **60***d* have openings **62***c* and **62***d*, respectively, therein through which hubs **52***a* and **52***b*, respectively, extend. The seating portion **29** further includes a simulated saddle **64** having a simulated saddle horn portion **64***a*. The saddle portion **64** has downwardly opening recesses **66***a* and **66***b* for receiving the fasteners **54***a* and **54***b*. The saddle **64** has an interior configuration **68** which generally snugly embraces the top member **56** so that, through the means of the fasteners **54***a* and **54***b*, the seating portion **29** comprised of the sub-portions **46, 56,** and **64,** may be assembled together as a unit which unit serves to join together the body portions **30** and **28.**

The toy vehicle **10** of this invention further includes motion transmitting means **70** associated with the rear axle **20.** Included in motion transmitting means **70** is an operating arm **72** having a knob **72***a* at the free end thereof. Arm **72** is an integral part of hub **74** which has an enlarged interior **76** positioned concentrically about axle **20.** A sleeve **78** is connected with hub **74** such as by a force-fit relationship and also connected, by the same relationship, with a hub **80** at its other end, with hub **80** also having an enlarged interior **82** which is concentric about axle **20.** Hub **80** further has a circumferentially enlarged flange **84** which is fixedly received within an opening **84***a* of the lever arm **86** by suitable means, such as staking or the like. Therefore, as arm **72** is moved the lever arm **86** will also be moved.

Axle **20** is preferably square in cross-section and is supported in a bearing **88** having a mating square interior **90.** Bearing **88** also has opposite enlarged flanged ends **92***a* and **92***b* defining a cylindrical reduced intermediate portion **94** which is rotatably held between the semi-cylindrical hump **98** of bracket **22** and the base channel **12.** Bracket **22** is preferably connected to the base channel by suitable means such as the fasteners **100.** Preferably, flanged end **92***b* of bearing **88** has a hub extension to which another sleeve **78** is connected and through which shaft **20** passes to support the other rear wheel **14.**

The bearing **88** also includes an enlarged gear **96** at the one flanged end **92***a*. Gear **96** forms part of a pawl and ratchet arrangement for determining the direction of movement which may be imparted to the vehicle **10.**

Further included in the motion transmitting means **70** is a pair of dogs **102, 104** having outwardly extending shafts **106** and **108** respectively, received in spaced semi-cylindrical recesses **110** and **112** of bracket **22.** Thus, the center axes of the shafts **106** and **108** for dogs **102** and **104** as well as shaft **24** which supports wheels **14** and the bearing **88** which supports the gear **96** are all positioned on fixed centers established by the recesses in bracket **22.**

Each of the dogs **102** and **104** has an outwardly projecting finger stub **114** and **116** which overhangs the lever arm **86.** A biasing spring **118** and **120** extends from projections **122** and **124,** respectively, to engagement with each of the dogs **102** and **104** to normally urge the dogs downwardly so that the laterally projecting stubs **114** and **116** are in abutment with the lever arm **86.** It is to be understood that the dogs **102** and **104** would normally abut the lever arm **86** under the influence of gravity, but that the provision of the biasing springs **118** and **120** assist in so positioning the dogs with the stubs **114** and **116** abutting the top of arm **86.** Each dog **102** and **104** has a finger **126** and **128,** respectively which is intended for engagement with the teeth of ratchet rear **96** responsive to the biasing force of springs **118** and **120.** Springs **118** and **120** serve to prevent the dogs from being reversely flipped out of orientation relative to gear **96** and pins **130** and **132** projecting outwardly from openings **134** and **136** in recesses **110** and **112** may also be provided for this purpose.

As can be best understood with reference to FIGS. **6, 7** and **8,** when the arm **72** is moved so that finger **126** abuts gear **96,** the vehicle will be in a forward mode of operation in that reverse movement is restrained. Finger **126** is brought into engagement with the gear **96** by moving arm **86** so that through its engagement with stub **128,** dog **104** is raised and finger **128** is moved away from the gear **96.** At the same time, this permits dog **102** and therefore, finger **126** to drop into engagement with the gear **96.**

FIG. **7** illustrates the orientation of the components of the motion transmitting means in a neutral mode wherein the arm **72** is relatively centered so that both of the fingers **126** and **128** are held out of engagement from the gear **96.** FIG. **8** shows the orientation of the components of the motion transmitting means in a reverse mode, this being the opposite of the mode shown in FIG. **6.** Here the arm **86** has been moved by movement of lever **72** so that dog **102** is raised and finger **126** is moved away from gear **96,** while dog **104** has been permitted to drop with finger **128** in engagement with gear **96.**

Means are provided for locking the motion transmitting means in any one of the aforementioned modes. Included in this locking means is an upright **140** extending upwardly from base **12** and provided with a laterally projecting finger **142.** Finger **142** has a rounded end **144** which can act as a detent in association with the openings **146***a* and **146***b* and **146***c* at one end of the lever arm **86.** As the arm **72** is moved to change the orientation of the lever arm **86,** the finger **142** will be sprung into one of the aforementioned three openings and will hold the lever arm **86** in its preselected orientation and therefore hold the vehicle in a predetermined mode of movement.

In operation, when the motion transmitting means, and therefore, the vehicle, is in a forward mode of operation, as an occupant sits on the saddle **64** and bounces up and down, the reaction forces imparted by the spring **38** will cause the vehicle to move forwardly, in that it is restrained against movement in a rearward direction. The opposite is true when the motion transmitting means is in a reverse mode of operation as shown in FIG. **8.** However, a unique advantage is further afforded by the provision of the so-called neutral position as shown in FIG. **7.** When the vehicle is in this mode of movement, generally speaking, repeated bouncing up and down on the vehicle, will cause the vehicle to remain static relative to a supporting surface. This is because the vehicle is not restrained from movement in any direction and thus, the reactive forces produced by deformation or flexing of spring **38** will not be transmitted into opposing forces which could cause movement of the vehicle in one direction or the other.

On the other hand, when the vehicle is in this neutral mode of operation it may be easily pushed or pulled about in any direction.

Thus, it can be seen that the toy vehicle of this invention provides a unique arrangement in the operator propelled vehicles of the type intended to move responsive to deformation of a spring. With the toy vehicle of this invention, the vehicle may be made to move in either a forward or reverse direction where there is substantial room for the vehicle to move about. Moreover, the toy is extremely suitable as an indoor toy or for use in a limited space in that it may be locked in a neutral position so that an occupant may bounce up and down without causing movement of 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.

We claim:

1. An operator propelled vehicle comprising:
means defining a body having opposite ends;
a leaf spring connected to said body and extending obtusely upwardly near one end thereof and supporting the operator's seat at said end for oscillation;
an axle rotatably journalled to the body;
ground engaging wheel means mounted on said axle for rotation relative to said body;
a ratchet gear concentrically mounted on said axle for rotation with said wheel means;
a carrier pivoted about the axle axis for movement of portions thereof between forward and rear positions;
two ratchet dogs mounted on said carrier portions on opposite sides of the ratchet gear, each dog having a gear engaging portion and a carrier engaging portion normally urged against said carrier, the ratchet dogs preventing rotation of the wheel means in either direction depending on which gear engaging portion of the respective dogs engages the ratchet gear, one dog being in a position for its gear engaging portion to engage the gear when the carrier portions are in said forward position, the other dog being in a position for its gear engaging portion to engage said gear when said carrier portions are in said rear position; and
operating means connected to said carrier for selectively moving said carrier between said forward and rear positions, whereby an operator may selectively determine which direction the vehicle shall move.

2. The vehicle of claim **1** wherein said carrier is movable to a middle position by said operating means whereat neither dog is in a position for engagement of its gear engaging portion with the ratchet gear, whereby the vehicle may move in either direction.

3. In an operator propelled vehicle which includes,
means defining a body,
an axle mounted on said body,
ground engaging wheel means mounted on said axle for rotation to said body, motion restraining means comprising:
a ratchet gear concentrically mounted for rotation with said wheel means;
a carrier mounted on said axle and movable relative to said ratchet gear between a first position and a second position;
pawl means mounted on said carrier and having gear engaging means, said pawl means being in a position for the gear engaging means to engage the gear at one point thereof when said carrier is in said first position for preventing rotation of the wheel means in one direction, said pawl means being in a position for the gear engaging means to engage said gear at another point thereof when said carrier is in said second position for preventing rotation of the wheel means in the opposite direction; and
operating means connected to said carrier for moving said carrier between said first and second positions, whereby an operator may selectively determine which direction the vehicle shall move.

4. The vehicle of claim **3** wherein said carrier is movable to a middle position by said operating means whereat neither dog is in a position for engagement of its gear engaging portion with the ratchet gear, whereby the vehicle may move in either direction.

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