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Winston

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[54] **WHEEL DRIVE TOY**

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[52] **U.S. Cl.** **46/202,** 46/211
[51] **Int. Cl.** **A63h 11/10**
[58] **Field of Search** 46/202, 206, 209

[56] **References Cited**

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[57] **ABSTRACT**

A toy vehicle designed to travel over a solid surface and comprising a drive means in the form of a disc or wheel which has at least a portion of its periphery arranged in surface engaging position while the vehicle is not in its upright position relative to that surface. A propelling means including a weighted flywheel is in surface engaging position when the vehicle is in upright relation to that surface and is movably connected to the drive means by a interconnecting gear arranged in intermeshing relation to the drive wheel or disc.

6 Claims, 4 Drawing Figures

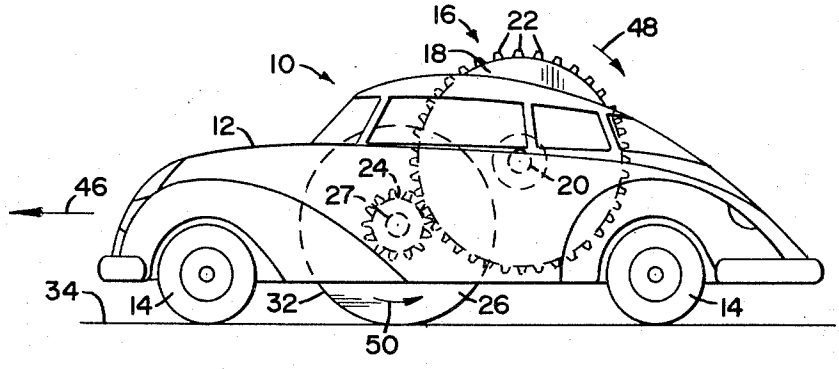
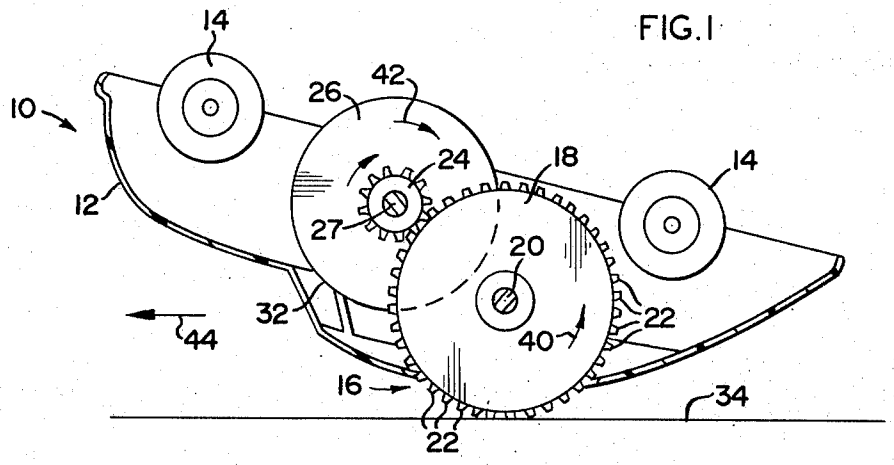


FIG. 1



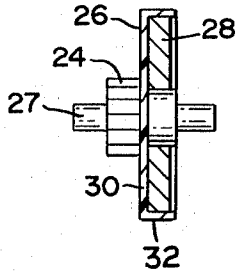


FIG. 4

FIG. 2

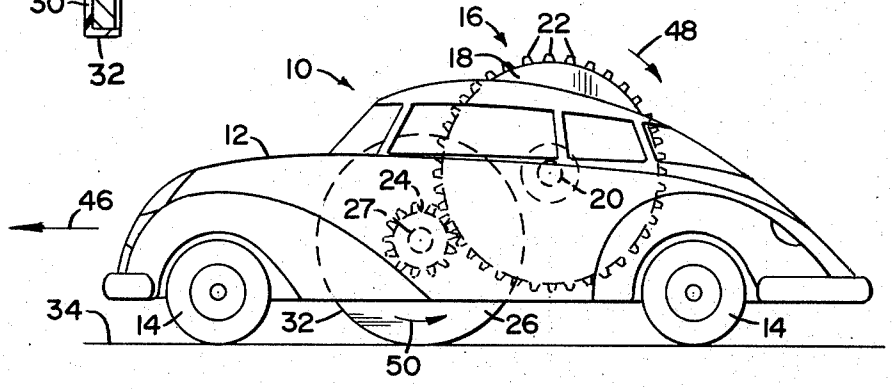
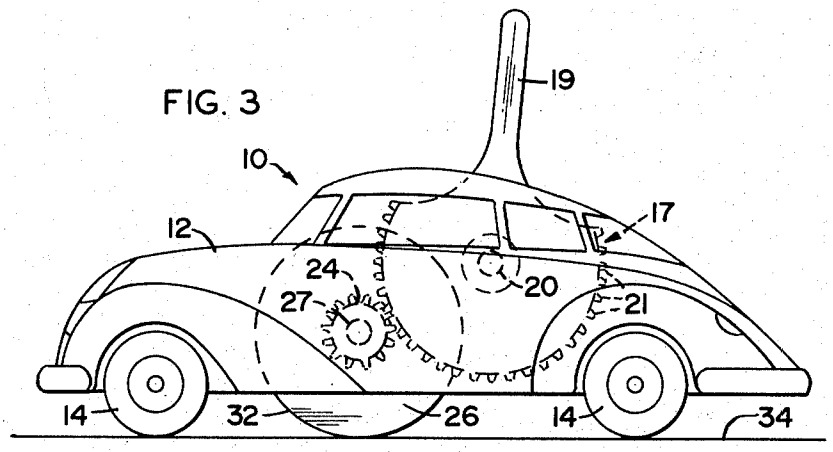


FIG. 3



WHEEL DRIVE TOY

BACKGROUND OF THE INVENITON

1. Field of the Invention

This invention relates to a toy vehicle designed to travel over a solid surface wherein the drive assembly of the vehicle includes a single drive wheel interconnected by gear means to an energy storing flywheel which also serves as the propelling means wherein movement of the vehicle due to the propelling means engaging the surface over which the vehicle travels is caused by manual, prior rotation of the drive wheels.

2. Description of the Prior Art

A large number of vehicle type toys such as airplanes, helicopters, motorcycles, automobiles, boats and the like, exist in the prior art, and are commercially available. In designing such a vehicle, whether it is intended to move over a solid surface, through the air or in water, it is highly desirable to provide a sturdy, relatively uncomplicated structure. This is particularly true when designing and structuring a drive assembly capable of providing the vehicle with the desired motion. The sturdiness and unsophisticated structural nature of these toys is partially important since they will be subjected to rather severe treatment when in the hands of small children. While simplicity of structure is obviously desirable from an economic standpoint it is also necessary that such toys be capable of high performance in order to be popular with children and therefore be commercially more attractive. It is an obvious and well recognized problem in the toy manufacturing and designing industry that any toy structure must be inexpensive, durable and of relatively simple structure yet be capable of performing efficiently under abusive conditions.

In an attempt to make such toys more popular from a marketing standpoint, a number of prior art designs have accentuated the performance features of the toy. However, the majority of the prior art mobile toys which feature increased performance characteristics have resorted to relatively complex drive assemblies which have the effect of raising the cost while making such a toy less durable. In many cases it has become apparent that the more complicated drive assemblies are unsatisfactory since they readily break down, thereby necessitating repair or rendering the toy inoperative and useless.

One of the more popular drive assemblies include the very simple arrangement wherein the running gear or wheels in contact with the surface over which the vehicle travels are interconnected to each other or to some energy storing means by a plurality of intermeshing and cooperating gears. The surface wheels are brought up to rotation by the user merely running the vehicle along the surface successively a number of times until the desired rate of rotation of the wheels is reached. The user then places the vehicle on the surface and releases it. The energy stored in the driving gear assembly is transferred to the wheels and the vehicle moves in a desired direction.

As with other prior art devices this type of toy vehicle and its associated drive assembly is unnecessarily complicated due to the complex nature of the plurality of gears and energy storing means associated directly with the surface running wheels on the vehicle.

Therefore it can be seen that there is a need in the mobile toy industry for a simplified drive assembly which is durable, inexpensive to maintain and manufacture, delivers high performance and yet is easily operated by children of all ages.

SUMMARY OF THE INVENTION

This invention relates to a mobile toy vehicle which may be in a variety of forms such as an automobile, motorcycle, bicycle or the like, which is designed to travel across a hard or solid surface as opposed to traveling through water or air. More particularly, the vehicle comprises a body on the interior of which is mounted a drive means. This drive means is movably or rotatably mounted about an axle which itself is journalled or otherwise attached to mounting on the interior of the body casing. This drive means may be in the form of a wheel or disc which is specifically oriented to have at least a portion of its peripheral edge extending out of the body of the vehicle such that this peripheral edge may movably engage a surface or the like over which the vehicle travels. It is particularly important to note that the drive means is intended to be oriented such that its engagement with a surface occurs only when a vehicle is not in its upright or "traveling" position. This particular structural arrangement will be described in greater detail hereinafter.

Alternately, the drive means may include a partial wheel or a wheel portion having a lever integrally attached thereto. The propelling means may include a complete wheel having a plurality of teeth covering at least a portion of its periphery.

The drive means further includes its peripheral edge being defined by a plurality of gear teeth. These gear teeth are provided to cooperate with the interconnecting means which serves to operatively connect the propelling means with the drive means.

The propeller means comprises a wheel or disc which may include a weighted flywheel serving as the energy storing means to aid in the propulsion of the vehicle when it is traveling across an intended surface. In order to bring the propulsion means up to its intended speed the interconnecting means is provided in the form of a gear member fixedly attached to the propelling means and operatively engaging the periphery of the drive means. To accomplish the inner working relation between the gear member of the interconnecting means and the drive means, the periphery of the gear member is defined by a plurlaity of gear teeth similarly configured to that of the periphery of the drive means. The gear member and the drive means are both rotatably mounted, relative to one another on the interior of the vehicle such that the peripheries of these two members movably engage one another thereby causing the gear teeth on each member to intermesh. It is obvious, therefore, that the rotation of the drive means will cause rotation of the interconnecting means. As pointed out above due to the fact that the gear members are fixedly attached to the drive means any rotation of the gear member caused by the drive means will serve to rotate the propelling means. The propelling means may be rotated at an increased speed due to the gear ratio between the drive means and the gear member. Ideally, this gear ratio may be in the range of from 1–6 to from 1–10. When the partial wheel and lever embodiment is used, actuation of the lever extending outwardly on the periphery of the car, causes rotation of the partial wheel. The teeth of the partial wheel intermeshes with the teeth of the drive means when the propelling means is activated.

The orientation of the drive means is such as to expose at least a portion of its periphery to the exterior of the vehicle position. In operation, a child or user of the vehicle merely turns it upside down or in any desired orientation such that the disc of the drive means may movably engage the surface over which the vehicle is traveling. When properly oriented, the drive wheel is rapidly moved along the surface continuously until the desired rate of rotation is accomplished. The rapid turning of the drive wheel by virtue of its connection with the interconnecting gear member causes the propelling wheel to run at an even higher speed due to the gear member and the drive wheel. When the drive wheel is turning fast enough, the vehicle is oriented right side up so that the propelling wheels may engage the surface over which the vehicle is traveling. The vehicle is then released in the high speed of the propelling wheel causing the vehicle to run at a relatively high speed across the surface.

Alternately, the toy may be driven by actuation of the lever means of the partial wheel which sets the propulsion means into relatively high speed rotation.

The invention accordingly comprises the features of construction, combination of elements and arrangment of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and object of the invention, reference should be had in the following detailed description taken in connection with the accompanying drawings in which:

FIG. **1** is a front sectional view showing the interior of the vehicle of the present invention including the drive means arranged in cooperative relation to the propelling means.

FIG. **2** is a side view of the vehicle showing the relative orientation of the drive wheel and propelling wheel when the vehicle is in its upright or traveling position.

FIG. **3** is a detailed view of the propelling means.

FIG. **4** is a side sectional view of another embodiment of the drive means of the present invention.

Similar reference characters refer to similar parts throughout the several views of the drawing.

DETAILED DESCRIPTION

As shown in FIGS. **1** and **2**, this invention relates to a mobile toy vehicle generally indicated as **10** and including a body **12** which may take a variety of configurations such as an automobile, motorcycle or any structure primarily designed to travel over a surface. The body **12** may include a number of substantially conventional structural elements such as wheels **14**. However, it should be noted that in the particular invention described herein, it is not required that wheels **14** be functional in the sense of movably supporting the vehicle over the surface which it is traveling. The relationship of wheels **14** to the movement of the vehicle will be described in greater detail hereinafter.

The drive assembly of the present invention includes a drive means generally indicated as **16** which comprises a wheel or disc **18** rotatably mounted on the interiior of body **12** about a central axis **20**. The axle **20** may be journalled or otherwise attached on the interior of body **12**. It is irrelevant for the purposes of the present invention whether or not axle **20** is movable relative to disc **18** or fixedly attached to disc **18** and movable relative to the body **12**. It is only important that the drive disc **18** is capable of being rotated relative to the body **12**. The periphery of drive disc **18** is defined by a plurality of gear teeth **22** which are specifically configured to mesh with the gear member **24** serving as the interconnecting means between drive disc **18** and propelling wheel **26** which itself serves as propelling means for the vehicle.

Alternately, another embodiment of the drive means includes a partial wheel **17** having a lever means **19** integrally attached thereto and a plurality of gear teeth **21** intermeshing with the teeth of interconnecting means **24**.

More particularly, gear member **24** is fixedly attached to the propelling wheel **26** and is co-axially located about central axle **27**. The particular location of gear member **24** is such as to align in substantially planar relationship the member **24** with the disc **18** or partial wheel **17**. In this aligned manner the peripheries and respective gear teeth defined thereon are positioned to engage one another in an intermeshing relationship. Accordingly, rotation of disc **18** serves to rotate gear member **24** and propelling wheel **26**.

With specific reference to FIG. **3**, rotation of partial wheel **17** occurs through movement of lever means **19**. As shown, gear teeth **21** extend along only a portion of the periphery of wheel **17**. The remaining portion of the periphery is removed to allow disengagement between wheel **17** and gear member **24**. To accomplish this, the length or portion of the periphery along which gear teeth **21** extend is predimensioned to allow the removed portion of the periphery, defined by the nonexistence of teeth **21**, to be positioned adjacent gear **24**. Since this portion of the wheel will be positioned in spaced relation to gear **24**, there will be no contact therebetween and fly wheel **28** will be allowed to rotate freely.

The propelling means, including propelling wheel **26**, of the present invention comprises a weighted flywheel **28** which may be made of a metallic material or material having a density greater than that of the drive disc **18**. A cover or cap member **30** is provided and specifically configured to at least partially enclose a portion of the flywheel **28** as shown in FIG. **4**. For ease of manufacture, the gear member **24** can be integrally formed to the cap member and both the member **24** and the cap member may be formed of a moldable, plastic material. As configured, the cap member has its outer periphery surface **32** arranged in surface engaging relation to surface **34** when the vehicle is in its upright or traveling position. As shown, the peripherial surface **32** completely overlap the peripheral **34** of the flywheel. Accordingly, the flywheel being movably connected to the drive disc **18** serves as an energy storing device because of its increased weight thereby allowing the vehicle to travel over a relatively extended distance once it is brought up to the desired rotational velocity due to the rotation of drive means **16**. It is of course obvious that the cap member can be eliminated and the flywheel be attached directly to the interconnecting member without sufficiently reducing the efficiency of the device.

It is important to note that while both the drive disc **18** and the propelling wheel **26** are rotatably mounted on the interior of the body **12**, both have at least a por-

tion of their peripheral surface exposed to the exterior of the vehicle body in order to engage the surface **24** over which the vehicle is intended to travel. As shown, the peripheral surface of propelling wheel **26** engages the surface **34** when the vehicle is in its upright or traveling position. As shown in FIG. **2**, conversely driving disc **18** is positioned such that it may not engage the surface **34** when the vehicle is in its upright position but rather is only engageable with surface **34** when the vehicle is oriented other than in its upright position.

In operation, a child or user of the vehicle merely turns the body **12** upside down and runs drive disc **18** along the surface **34** repeatedly until this wheel is turning at the desired rotational velocity. The rapid turning of disc **18** by virtue of its connection with gear member **24** cuases the propelling wheel **26** to rotate at a higher rotational speed due to the gear ratio between gear member **24** and drive disc **18.** When the propelling wheel **26** is turning fast enough the vehicle iw turned to its upright or traveling position as shown in FIG. **2** so that the wheel **26** may engage the surface **34.** The vehicle is then released and the high speed of the wheel **26** causes the vehicle to run in the desired direction. The directional arrows **40** and **42** show the direction of rotation of wheels **18** and **26** respectively when the vehicle is repeatedly advanced along the direction of arrow **44** (FIG. **1**). Similarly, in FIG. **2**, the vehicle will travel in the direction of arrow **46** when the disc **18** and wheel **26** are rotating in the direction indicated by arrows **48** and **50** respectively.

It will thus be seen that the object made apparent from the preceding description, are efficiently attained, and since certain changes may be made in the above article without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described, what is claimed is:

1. A toy vehicle comprising: drive means rotatably mounted on said vehicle, propelling means rotatably mounted on said vehicle and disposed in movable engagement with the surface over which the vehicle travels, when said vehicle is in an upright position; interconnecting means fixedly attached to said propelling means and positioned in interconnecting relation between said drive means and said propelling means, said interconnecting means comprising a gear member having a plurality of gear teeth defined about its periphery, said drive means comprising at least a portion of its outer periphery configured to cooperatively engage the periphery of said gear member, said drive means further positioned to have at least a portion of its periphery exposed to the exterior of the vehicle out of engagement with the surface on which said vehicle travels when said vehicle is in an upright position.

2. A toy vehicle as in claim **1** wherein said propelling means comprises flywheel means rotatably mounted on said vehicle in fixed relation to said interconnecting means, said flywheel means being formed from a material having a density greater than that of the material of said drive means.

3. A toy vehicle as in claim **2** wherein said propelling means further comprises surface engaging means fixedly attached to said interconnecting means and rotatably mounted on said vehicle, said surface engaging means substantially disposed on the interior vehicle and having a portion thereof exposed to the exterior of the vehicle and positioned to engage the surface over which said vehicle travels.

4. A toy vehicle as in claim **3** wherein said surface engaging means comprises a cap member mounted to at least partially enclose said flywheel and being integrally connected to said interconnecting means.

5. A toy vehicle as in claim **1** wherein said drive means comprises a single disc member rotatably mounted on said vehicle, the periphery of both said gear member and said disc defined by a plurality of gear teeth, said gear member and said disc positioned relative to one another so as to mesh said respective gear teeth in working relation with one another, said propelling means comprising a weighted flywheel and a cap member arranged to at least partially enclose a flywheel and be arranged in surface engaging position relative to the surface over which said vehicle travels.

6. A toy vehicle as in claim **1** wherein said drive means comprises a partial wheel member, a plurality of gear teeth formed on the periphery of said partial wheel, said partial wheel teeth arranged in intermeshing engagement with said interconnecting means, lever means integrally attached to said partial wheel and positioned to extend outwardly from the interior of said vehicle whereby movement of said lever means causes rotation of said propelling means.

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