Jan. 5, 1965 D. O'NEAL 3,164,391

FLYING PLATFORM VELOCIPEDE

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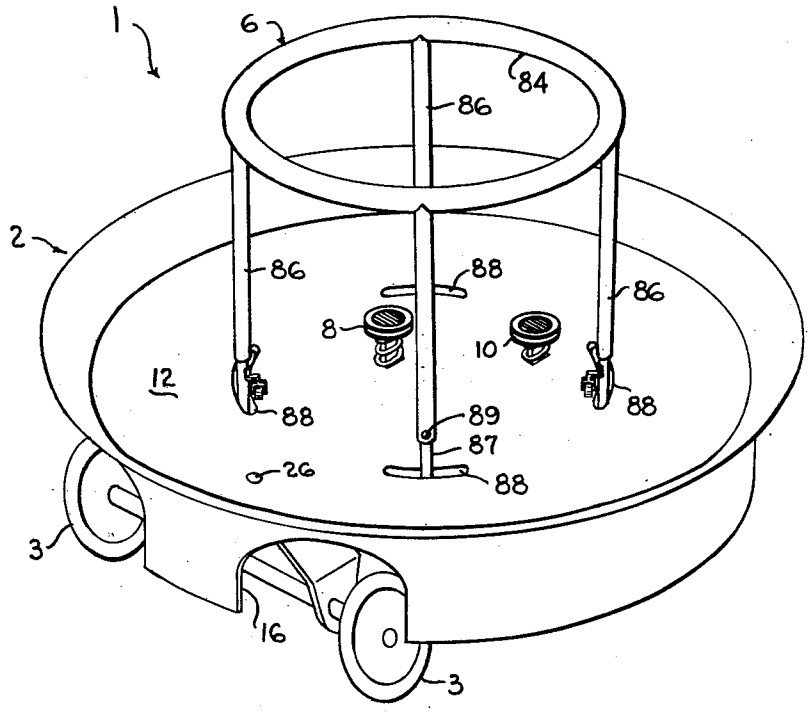


Fig. 1

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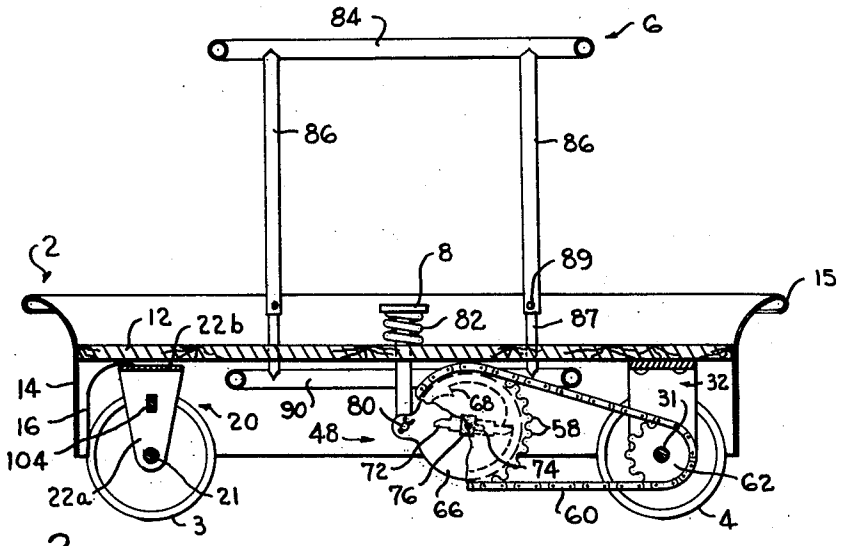


Fig. 2

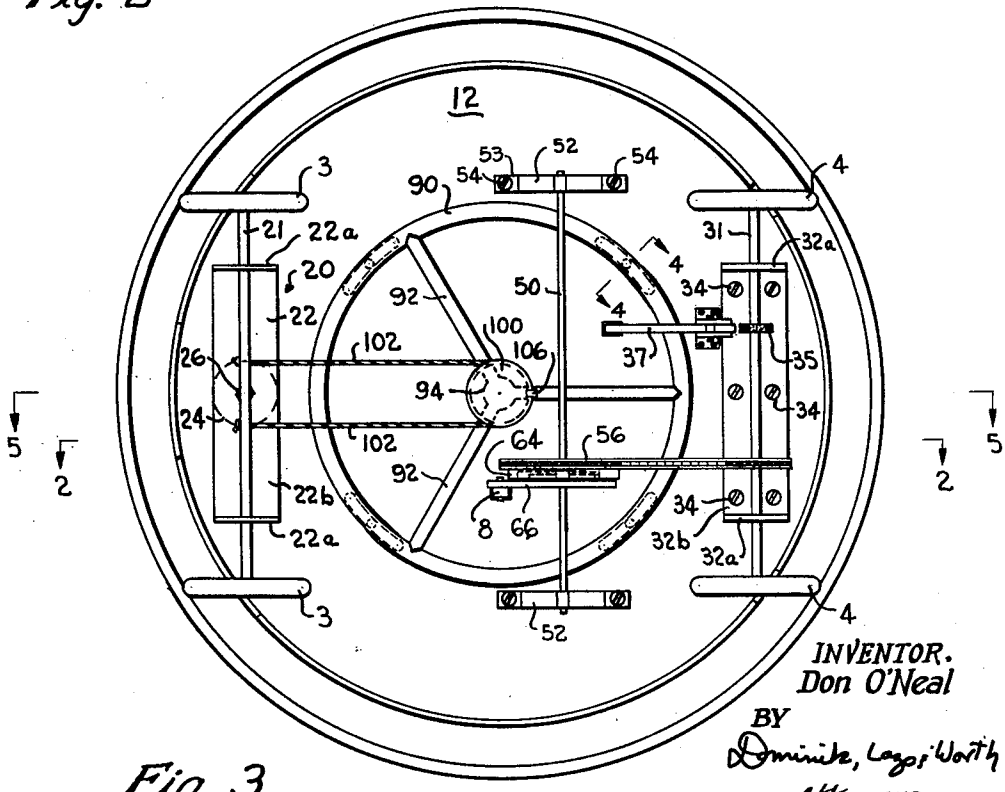


Fig. 3

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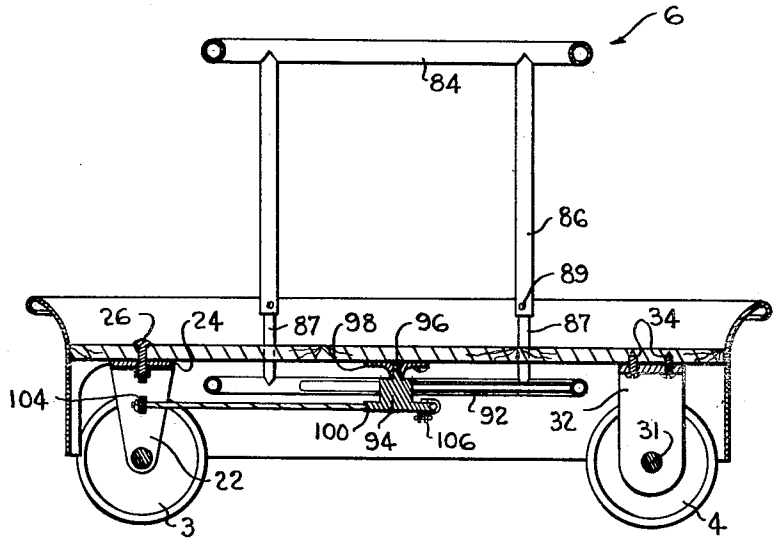


Fig. 5

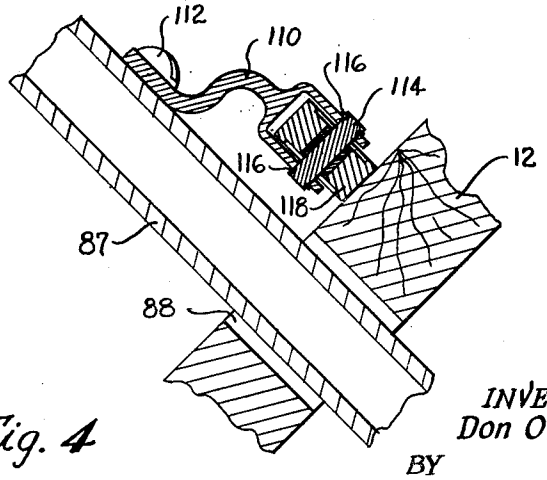


Fig. 4

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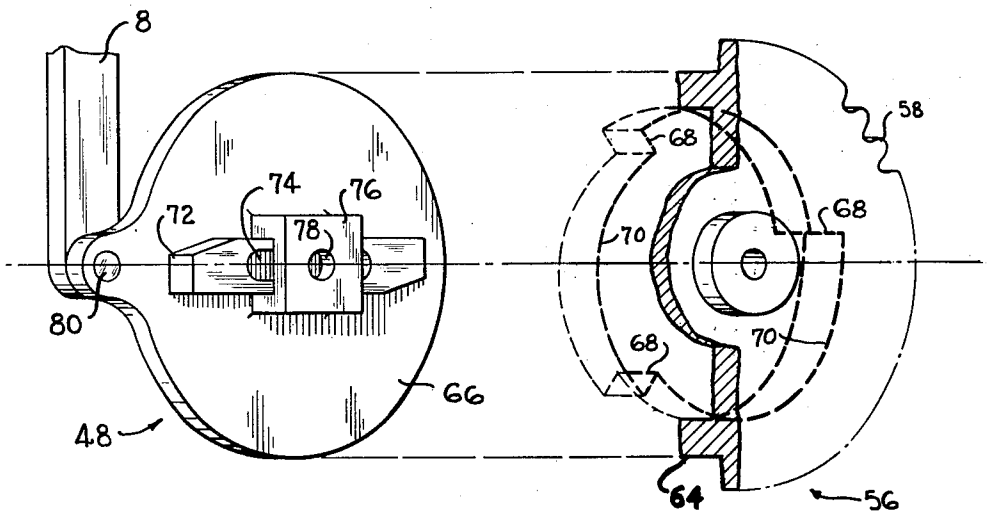


Fig. 6

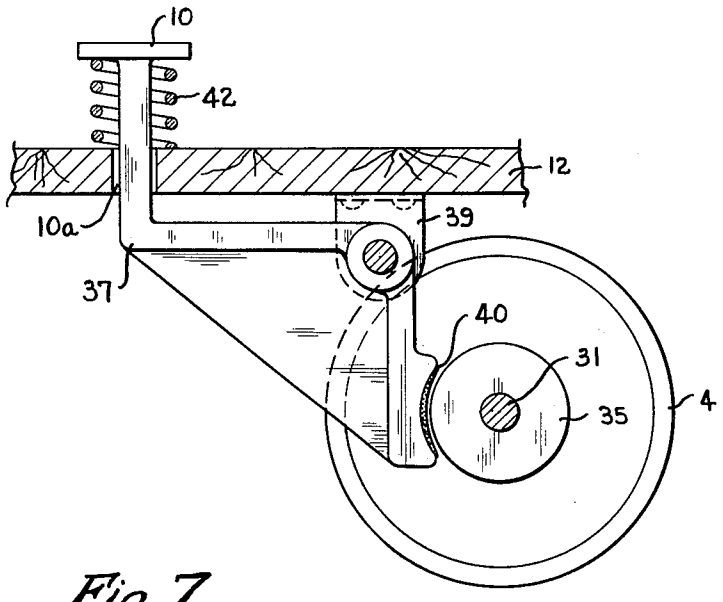


Fig. 7

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FLYING PLATFORM VELOCIPEDE

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4 Claims. (Cl. 280—1.12)

This invention relates broadly to vehicles and more particularly relates to a velocipede which as a toy simulates certain recent developments in aircraft. More specifically, the invention relates to a velocipede or toy vehicle simulating certain types of flying saucers or flying platforms, and for the present purposes is so described.

One type of flying platform is so designed that the operator ordinarily stands up during operation. The present vehicle, although it remains on the ground, is primarily a toy simulating such a platform and is characterized by certain features permitting the operator to stand up during operation.

An object of the invention is provision of a vehicle having a steering means so constructed as to define a cockpit for the operator.

One object of the present invention is to provide a novel foot operated drive means for a velocipede or other vehicle whereby the operator can stand up while operating it.

Another object of the present invention is to provide a novel drive means for a vehicle or velocipede whereby the operator only has to use one foot to operate the same, by a series of reciprocating strokes.

A further object of the invention is to provide a novel steering means for a toy vehicle or velocipede whereby the operator can simultaneously steer and support himself in a standing position while operating the drive means.

The invention also contemplates achieving the foregoing objects in any suitable combination of one with another.

A vehicle in accordance with the contemplated embodiment comprises a platform supported off the ground by a combination of guide means and traction means. The guide means is preferably a pair of wheels supported to turn through a horizontal arc relative to the platform. The traction means is preferably a pair of wheels secured to the platform and connected to the drive means.

The drive means contemplates a foot-operated member biased to its starting position. The foot-operated member is connected to the traction means (or drive wheels) through a one-way clutch and a suitable transmission such as a belt and pulley arrangement. Preferably, the belt and pulley is of positive-drive character, such as a chain and sprocket.

The guide means is preferably connected to the steering means by a belt and pulley arrangement. The steering means is conveniently revolvably supported from the platform and preferably includes a large diameter steering wheel with an unobstructed center. The steering wheel is supported at a convenient height from the platform whereby the operator can both support himself and steer while operating the drive means. The operator ordinarily stands in the unobstructed central portion during operation.

Other objects, advantages and features are to be observed from the following more detailed description when read in conjunction with the associated drawings wherein:

FIG. 1 is a perspective assembly view of a preferred embodiment of the invention.

FIG. 2 is a cross-sectional elevation of the assembly of FIG. 1 as seen along line 2—2 of FIG. 3.

FIG. 3 is a bottom plan view of the assembly of FIG. 1.

FIG. 4 is a partial cross-section view, through section 4—4 of FIG. 3, of a detail of the steering means.

FIG. 5 is a partial cross-sectional view of the steering means as viewed along line 5—5 of FIG. 3.

FIG. 6 is an exploded enlarged cut-away view of the one-way clutch illustrated in FIG. 2.

FIG. 7 is an enlarged partial elevation showing one embodiment of a brake.

Throughout the figures the same numbers are used to refer to the same elements.

FIG. 1 shows the general organization of elements for a vehicle forming a flying platform velocipede **1**. The various elements of the velocipede are supported from a platform assembly **2** which is preferably of circular construction to simulate the full scale flying platform referred to above. The platform assembly is supported above the ground or other surface along which the vehicle moves by a ground engaging means that includes a pair of spaced apart guide wheels **3** disposed on one side of the platform and a pair of spaced apart traction wheels **4** located diametrally opposite the guide wheels on the other side of the platform (see FIG. 5). A steering means **6** is supported in a generally central position and provides within the vertical projection thereof space for an operator to stand and to operate the drive pedal **8** and the brake pedal **10**.

Details of elements **2–10** are found in FIGS. 2 through 7 where it is seen that the platform assembly **2** includes a preferably circular platform **12** which is surrounded by a skirt **14** having therein guide wheel slots **16**. The upper edge **15** of the skirt is also flared and rolled under as a safety feature. The platform may conveniently be made of plywood or metal and the skirt **14** may advantageously be rolled from metal and secured to the platform by any suitable means such as screws, nuts and bolts, or welding if both be of weldable metals.

The guide wheels **3** are supported underneath the platform **12** by a mounting means **20** which supports the guide wheels to turn relative to the platform through a generally horizontal arc about the generally vertical axis when the vehicle is being steered during the course of moving along the ground or other surface. The mounting means more particularly includes a shaft **21** at opposite ends of which the respective guide wheels **3** are secured. The shaft **21**, or front axle, is revolvably supported in a turning bracket **22** having the general configuration of an inverted U or an inverted channel-shaped structure comprising axle legs **22***a* and a bracket back **22***b* connected between the respective legs. At the central portion of the turn bracket is a bolster **24** preferably comprising one or more large generally circular washers or bearing plates which are maintained between the bracket back **22** and the underside of the platform **12** by a bolster pin **26** which most advantageously comprises a rivet or a nut and bolt extending through the sandwich of platform **12**, bolster **24** and back **22***b*. A review of the guide wheels and guide wheel mounting means of FIGS. 2, 3 and 5 reveals that the guide wheels are revolvably mounted from the platform **12** by means of the bolster pin **26**. The guide wheels **3** are turned to an appropriate position responsive to the motion dictated by a hereinafter described steering linkage which connects the guide wheels through their mounting means to the steering means **6**. Bolster pin **26** is conveniently a bolt having a nut locked on by a cotter key or the like.

The traction wheels **4** drive in a normally straight ahead position and are respectively mounted on the opposite ends of a shaft **31**. The traction wheels **4** are keyed or otherwise secured to the shaft so that they rotate in unison therewith. The guide wheels **3**, on the other hand, do not have to be keyed to their shaft **21** and preferably are not in order to obtain a differential action between the guide wheels in the course of steering the vehicle. The shaft or rear axle **31** is revolvably mounted

in a rear bracket 32 which is constructed in a fashion similar to the turn bracket and has a pair of spaced apart legs 32*a* depending from opposite ends of a back 32*b*. The rear bracket is secured to the underside of the platform 12 by any suitable means, screws 34 being shown.

A brake drum 35 is secured to the axle 31, preferably at a point intermediate the rear bracket leg 32*a*. This is most clearly illustrated in FIGS. 3 and 7. The brake drum can be all metal (FIG. 7) or coated with a friction material (FIG. 3). The brake pedal 10 extends vertically from the horizontal arm of reinforced bell crank 37 which is pivotally supported from the bell crank brake pivot 39. A brake surface 40 either of metal or with a friction lining (FIG. 7) is supported from the vertical arm of the bell crank 37 in a position to engage the drum 35. A brake return spring 42 is connected between the pedal 10 and the platform 12 in such fashion as to maintain the brake normally disengaged and to return the same to a disengaged position after actuation. As seen in FIGS. 3 and 7, suitable screws are employed to fashion the bell crank pivot to the underside of the platform 12. Also, a hole 10*a* is cut through the platform so that the pedal 10 can extend upwardly therethrough. For convenience in assembly, the enlarged head at the top of the brake pedal can be screwed on after passing the vertical arm through the hole 10*a*. Drive pedal 8 is similarly constructed.

The rear axle 31 is also connected to the drive pedal 8 through a one-way clutch and a chain-and-sprocket arrangement. The particular arrangement is best illustrated in FIGS. 2, 3 and 6. With the arrangement described, it is possible for an operator to support himself in a standing position by grasping the steering means 6 and to propel the vehicle using only one foot to operate the drive pedal 8, which latter also serves to direct power to the traction wheels 4.

As best seen in FIGS. 2, 3 and 6, the drive means associated with drive pedal 8 comprises a ratchet-and-pawl-like one-way clutch 48 having a clutch shaft 50 secured to the underside of platform 12 by means of a pair of brackets 52 secured to each end thereof and in turn bolted to the underside of the platform. The brackets 52 may be of any suitable design, and preferably comprise a metallic block having flanges 53 on each side thereof, there being holes through the flanges through which the screws 54 pass to secure the same to the platform.

A power output member 56 is revolably supported from the clutch shaft and includes an outer toothed flange-like portion with a series of teeth 58 which operates as a drive sprocket to engage the chain 60 thereby to transfer power to the pinion 62 which is secured on the traction wheel shaft 31.

The power output member 56 also includes a ringlike portion 64 extending from one side of the member toward the pawl crank 66. The ringlike portion is coaxial with the shaft and has a plurality of peripherally spaced internal teeth 68 each of which teeth is connected to the next succeeding tooth by a pawl repositioning cam surface 70 which extends from the root of one tooth to the crest of the next succeeding tooth.

A pawl 72 is slidably supported from the clutch shaft 50 by means of an elongate slot 74 located in the central portion of the pawl 72. The clutch shaft passes through the elongated slot whereby the sliding pawl 72 moves back and forth (from right to left and vice versa as seen in FIG. 6) responsive to repositioning actuation by the surface 70 as will be further explained below.

A pawl guide block 76 is secured to the pawl crank 66 and rotates therewith. Guide block 76 slidably receives and supports the sliding pawl 72 and also permits the clutch shaft to pass through itself by means of the hole 78. The pawl crank and guide block are supported for arcuate motion relative to the clutch shaft by means of the shaft hole 78 and a corresponding aligned hole in the crank 66.

The drive pedal 8 is pivotally connected by any suitable means 80 to the pawl crank 66 and at a radius from the clutch shaft. The connecting means 80 may advantageously comprise a rivet passed through aligned holes and secured on one end by a cotter key as seen in FIG. 2. A drive return spring 82 biases the drive pedal to its starting position whereby only one foot of the operator is required to drive the vehicle because the spring 82 resets the pedal 8. Thus, the propelling force applied to pedal is opposed by the spring 82.

The steering means 6 includes a cage assembly movably supported from the platform and having a ringlike preferably circular closed member 84 that is supported above the platform on the plurality of columns 86. The lower end of each column 86 extends through an arcuate slot 88 to a point below the platform 12, where each connects to the base assembly, including the lower ring 90.

The steering means may preferably be adjustable to accommodate operators of different heights. In such case, the upper part of the columns 86 is welded to the ring 84 but is hollow thereby to telescopingly receive a male member 87, the two column members 86, 87 being secured together by a nut and bolt assembly 89.

The lower end of the column is secured, as by welding, to a second, lower ring 90 which is supported beneath the platform 12 in a position such that it does not interfere with other shafting or mechanism, such as shown in FIGS. 2 and 3. The cage assembly is completed by the ring 90. The cage assembly is such that the upper ring and columns define a cockpit within which the operator stands while operating the pedals and steering.

The ring 90 has a plurality of spokes 92 extending inwardly to a hub 94. As best seen in FIG. 5, the hub includes a spindle 96 on the upper end thereof, and the spindle is revolvably received in a hub spindle journal 98 which is secured by any suitable means such as screws to the underside of the platform.

The hub is a portion of the steering linkage means which is best shown in FIGS. 3 and 5 and which includes a pulley portion 100 mounted in flange fashion on the lower end of the hub. A cable 102 has both ends tied to a turn bracket cross piece 104 and extends around the pulley 100. The cable is clamped or otherwise secured to the pulley 100 by any suitable clamping means 106 so there can be no relative motion between the cable and pulley.

The steering cage assembly comprising the upper and lower rings 84, 90, the column members 86, 87 and 89 also includes a bearing means for movably supporting the steering means 6 from the platform whereby the steering means can be revolved. This is best seen in FIG. 4 where a forked bracket 110 is shown secured to the member 87 by any suitable means such as a bolt 112. The forked portion of the bracket supports a bearing axle 114. Snap rings 116 maintain the axle in place. A bearing wheel 118 is supported on the axle in engagement with the upper surface of platform 12. If desired, self-lubricating journal or anti-friction bearings may be provided to support the bearing wheel on the axle.

As seen in FIG. 1, each of the column members has its own bearing means. This is the preferred embodiment since it reduces the load on each bearing means, drastically reduces binding or cocking, and generally serves to maintain the steering gear in the correct alignment.

Operation of the flying platform velocipede is believed to be reasonably evident from the foregoing description. Steering is accomplished by turning the steering means 6 in the appropriate clockwise or counter clockwise direction, in which case the guide wheels 3 are moved an appropriate amount in response thereto by means of the steering linkage. When it is desired to stop the vehicle during operation, the brake pedal 10 is depressed whereupon, as best seen in FIG. 7, the brake surface 40 engages the drum 35 and the vehicle comes to a halt. When

the operator removes his foot from the brake pedal **10**, the return spring **42** disengages the brake.

When propelling the vehicle by one foot operation, a drive cycle of two strokes is obtained. The first is a power or drive stroke which is accomplished by the operator depressing the pedal **8** against the bias of spring **82** and thereby causing the sliding pawl **72** to engage one of the internal teeth **68**. Continued depression of the drive pedal causes the pawl crank **66** to rotate about the clutch shaft. During this rotation the sliding pawl, being engaged with one of the internal teeth **68**, causes the power output member **56** to rotate thereby driving the drive wheels **4**. However, when the pedal **8** has been fully depressed, the operator allows it to return to its position, in which situation the initial impulse of power creates enough inertia to propel the vehicle and causes the chain **60** to rotate the output member **56**. When the output member is thus rotated, the repositioning cam surfaces **70** slide the sliding pawl **72** out of engagement with the tooth with which it was engaged during the first portion of the stroke and into engagement with the next succeeding tooth.

For the sake of easy repositioning of the sliding pawl relative to the internal teeth which it engages, it is preferred that the pawl be positioned at the beginning of the stroke between a four o'clock position (as in FIG. 2) and a six o'clock position. In this fashion, gravity returns the sliding pawl. Also, on occasion, a small helical spring may be supported in the right hand portion of the slot **74** (as seen in FIG. 2) thereby to bias the sliding pawl into tooth engagement.

Although a specific embodiment with a particular hypothesis of operation has been disclosed, the invention is not intended to be limited thereto. The invention as stated in the following claims comprehends all those changes, substitutions of equivalents or modifications which would be obvious to one skilled in the art.

I claim:

1. A vehicle comprising in combination

a platform having an opening therein;

ground engaging means for supporting said platform above the ground for motion relative to the ground, said ground engaging means including at least one guide wheel revolvable about a horizontal axis and guide wheel mounting means for supporting said guide wheel to turn relative to said platform through a horizontal arc thereby to guide the vehicle;

a steering cage assembly movably supported from said platform and including first and second closed members respectively disposed above and below said platform, said first closed member defining a cockpit in an unobstructed central region within its confines, a columnar member extending through said platform opening secured at each end to one of said closed members and maintainging said closed members in vertical spaced-apart relationship and bearing means connected between said platform and said columnar member for movably supporting said steering cage assembly from said platform; and

a steering linkage means connected between said cage assembly and said at least one guide wheel for revolving said guide wheel in response to, and in the same direction as, said steering cage assembly,

whereby said vehicle provides a place for an operator in said first member central region and the vehicle is steerable by turning said cage assembly relative to said platform and about a generally vertical axis.

2. A vehicle comprising in combination

a platform having therein a plurality of arcuate slots arranged around the periphery of a circle;

ground engaging means for supporting said platform above the ground for motion relative to the ground, said ground engaging means including at least one guide wheel revolvable about a horizontal axis and guide wheel mounting means for supporting said guide wheel to turn relative to said platform through a generally horizontal arc thereby to guide the vehicle, said at least one guide wheel being disposed adjacent one edge of the platform;

a steering cage assembly movably supported from said platform and including first and second members respectively disposed above and below said platform, said first member having an open unobstructed central region defining a cockpit large enough to accommodate a vehicle operator, a plurality of columns respectively extending through said arcuate slots and connected between said first and second members thereby vertically spacing apart said first and second members, and bearing means connected between said platform and selected ones of said columns for movably supporting said steering cage assembly from said platform;

and a steering linkage means connected between said cage assembly and said at least one guide wheel for revolving said guide wheel in response to, and in the same direction as, said steering cage assembly, whereby said vehicle is steerable from within said central region by turning said steering cage assembly to position said at least one guide wheel.

3. A vehicle constructed in accordance with claim 2 and further including means for adjusting the vertical length of said volumns, whereby the height of said steering cage assembly above the platform is adjustable to the height of the operator of the vehicle.

4. A vehicle comprising in combination

a platform having openings therein;

ground engaging means for supporting said platform above the ground for motion relative to the ground, said ground engaging means including at least one guide wheel revolvable about a horizontal axis and guide wheel mounting means for supporting said guide wheel to turn relative to said platform through a horizontal arc thereby to guide the vehicle;

a steering cage assembly movably supported from said platform and including first and second closed members respectively disposed above and below said platform, said first closed member defining a closed cockpit in a central region on said platform and said second closed member being operatively secured to said ground engaging means, columnar members extending through said platform openings and secured at each end to said closed members to maintain said closed members in vertical spaced-apart relationship and bearing means connected between said platform and said columnar members for movably supportion said steering cage assembly; and

a steering linkage means connected between said second closed member of said steering cage assembly and said guide wheel for revolving said guide wheel in respone to, and in the same direction, as said steering cage assembly,

one way reciprocating drive means supported from said platform and operable from within said cockpit and connected to said ground engaging means for transmitting driving force to said ground engaging means during the first stroke of a two stroke reciprocating drive cycle and for returning to a starting position during a following second stroke of the drive cycle,

whereby said vehicle is capable of being propelled by applying a manual driving force to said drive means while being steerable by the application of a manual force to said steering means while the operator is positioned within said cockpit, and whereby said driving force may be increased by utilizing the leverage of said steering means to achieve additional thrust.

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