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Glass et al.

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[54] **VEHICLE ACTION TOY**

[75] Inventors: **Marvin I. Glass**, Chicago; **Jeffrey Dale Breslow**, Highland Park; **Robert Snyder McKay**, Morton Grove, all of Ill.

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

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[52] **U.S. Cl.** ..... **273/86 H**, 272/31 R

[51] **Int. Cl.** **A63f 9/14**, A63h 13/20

[58] **Field of Search**..... 273/86 H; 272/31 R, 31 A, 272/31 B

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Primary Examiner—Anton O. Oechsle

Attorney, Agent, or Firm—Coffee & Sweeney

[57] **ABSTRACT**

An amusement device in the form of a moving, manipulatable toy having a plurality of simulated vehicles each mounted on the outer free end of its own independent support arm, with the support arms pivotally mounted at their opposite ends to a standard for pivotal movement about a common vertical axis to rotate the vehicles in an orbital pattern about the standard. One of the arms has a constant length and is rotated by driving means at a constant speed. The other arm is controlled by an operator of the device so as to rotate the arm at varying speeds, from said constant speed of the one arm to a faster speed. The other arm is formed of two portions mounted for relative radial movement so that the arm becomes extended under centrifugal force at the faster speed to permit the vehicle carried thereby to pass the other vehicle on the one arm as they travel in orbital paths about the standard. An obstacle is placed in the path of the vehicle on the other arm when the arm is in its extended position rotating at its faster speed.

15 Claims, 10 Drawing Figures

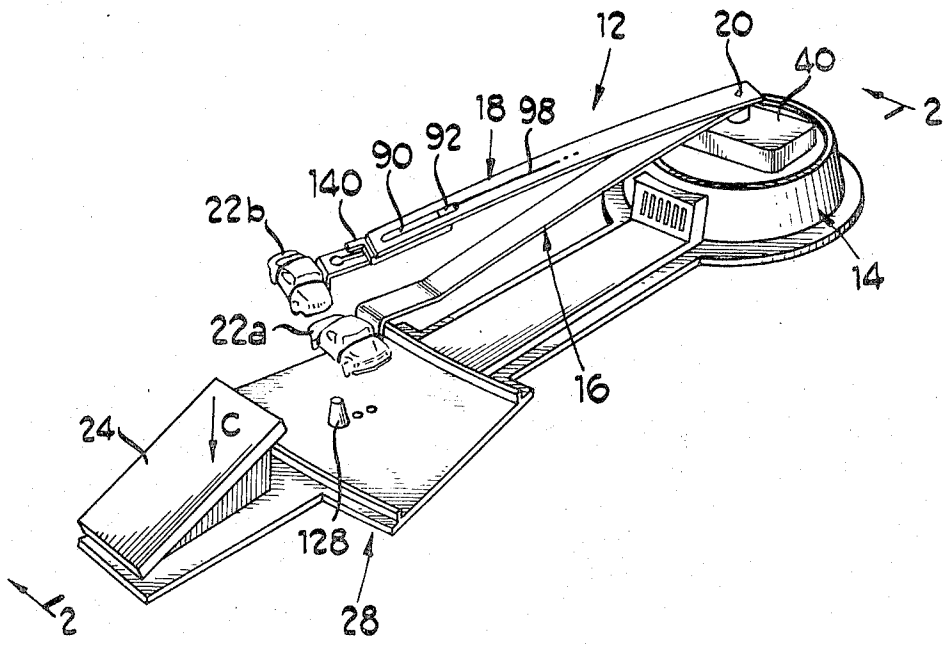


Fig 1

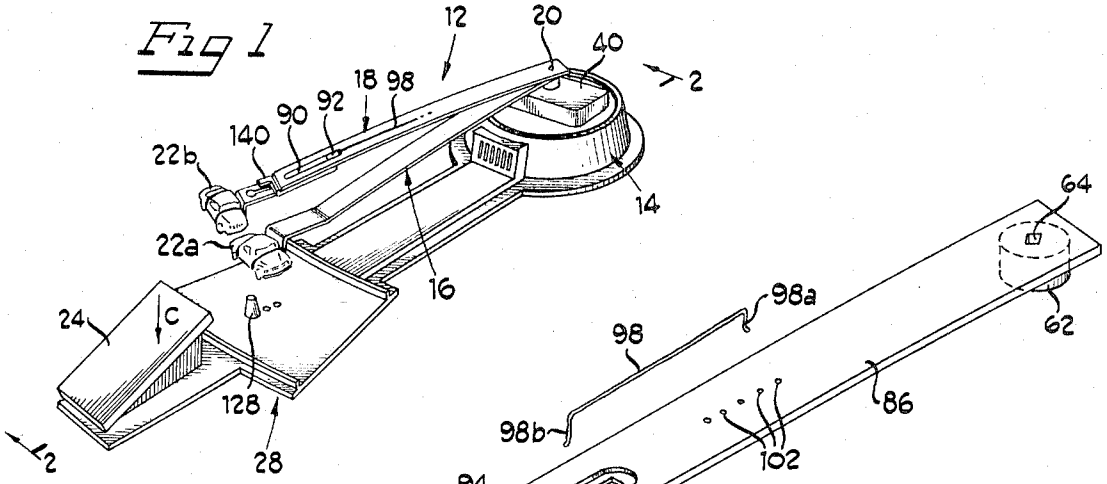


Fig 8

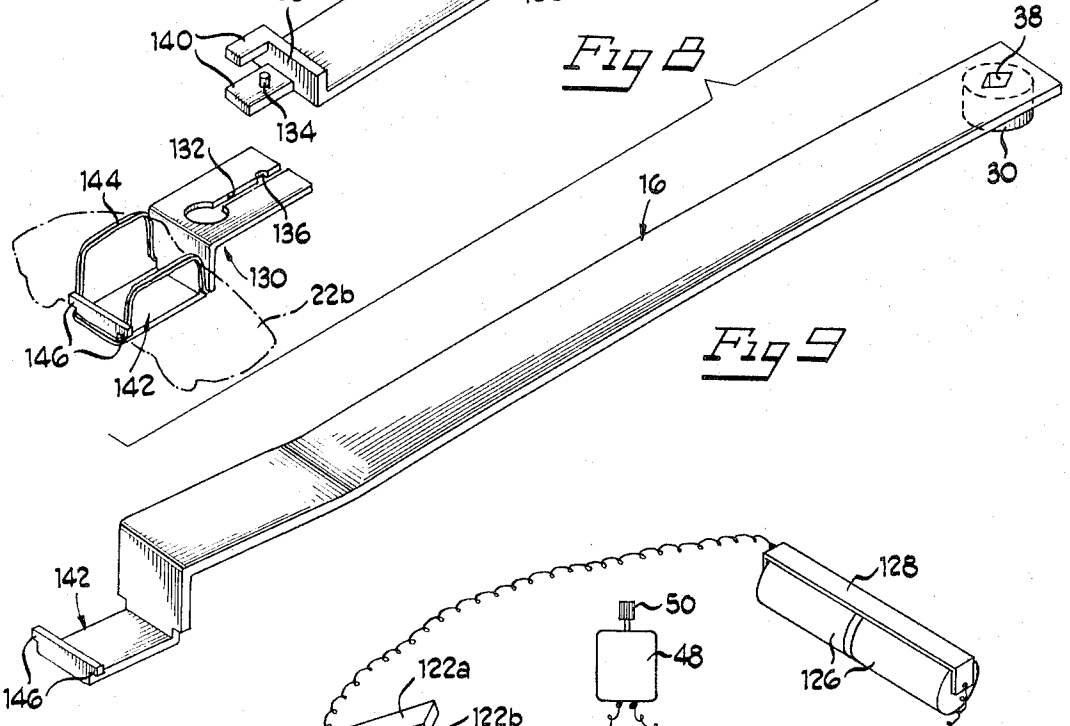


Fig 9

Fig 10

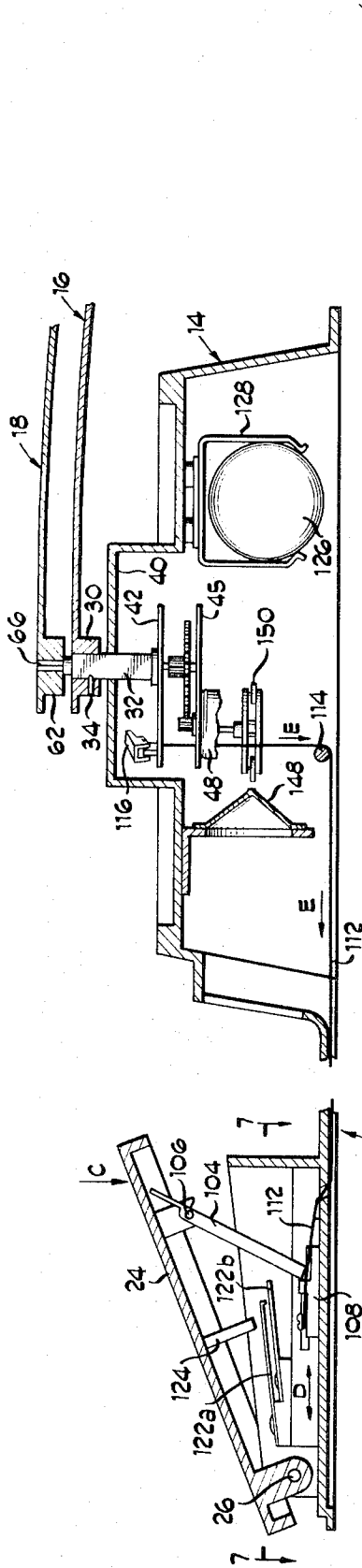


Fig 2

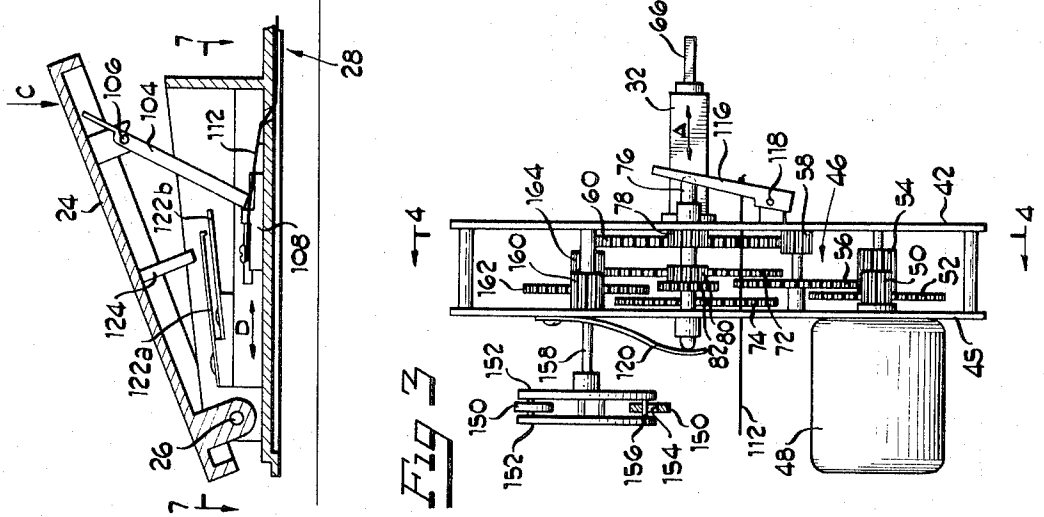


Fig 3

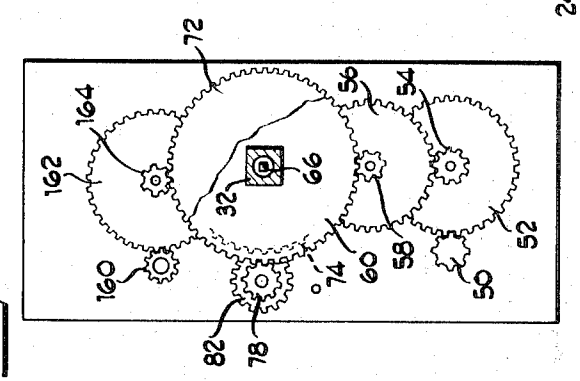


Fig 4

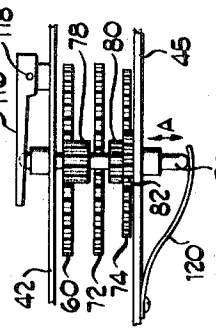


Fig 5

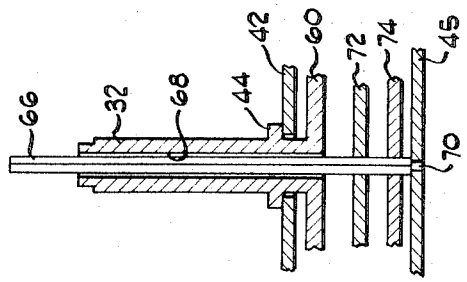


Fig 6

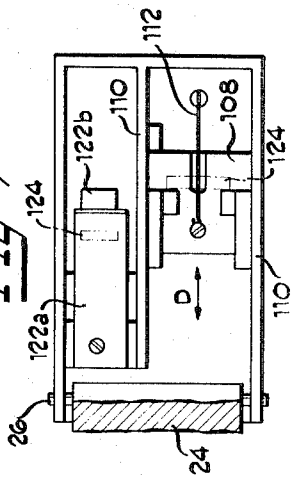


Fig 7

VEHICLE ACTION TOY

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a toy or amusement device and more particularly relates to a car or vehicle device wherein the vehicles travel in orbital patterns about a central standard, with at least one of the vehicles being controlled by means spaced from the central standard, preferably outside of the orbital path of the vehicles.

Toy aircraft or airplanes or other vehicles of the power driven type are known wherein the vehicles are capable of sustained flight and commonly are tethered by means of a power cable and/or a tethering line secured at one end to the craft, with the opposite end, in effect, being held and controlled by the operator through a control mechanism to cuase the craft to travel in closed circles about an upright support pylon. In some instances, rigid or sometimes relatively flexible support arms are used instead of tethering lines. Various means are employed to permit varying the altitude of flight of the aircraft and/or the speed or orbital diameter of the aircraft, or other vehicles. Still other amusement devices are provided with confining tracks in the form of road racing toys, a few of which provide a degree of freedom of operation for an operator of the device to provide for realism in permitting one vehicle to change directions of movement to simulate passing other vehicles. This invention is directed to such toys or amusement devices and particularly to a new and improved, novel amusement device in the form of a moving, manipulatable toy incorporating certain aspects of both types of amusement devices described above.

The principle object, therefore, of the present invention is to provide a new and improved amusement type device of the type having one or more moving, manipulatable toys, particularly simulating vehicles.

In the exemplary embodiment of the invention, a plurality of simulated vehicles each are mounted generally on the free moving end of an independent, somewhat vertically flexible, support arm, with the arms for the vehicles being pivotally mounted at their opposite ends to a standard for pivotal movement about a common generally vertical axis to rotate the vehicles in an orbital pattern about the standard and with the vehicles being disposed approximately in the same horizontal plane. One of the arms for one of the vehicles has a constant length to provide a constant diameter circular path for a first vehicle mounted on the free end thereof. The constant length arm is driven about the standard at a constant rate of speed. A second arm having a second vehicle removably mounted on the free end thereof is provided and is controlled by an operator of the device. The second arm is driven at variable rates of speed under the control of the operator. In the embodiment of the invention shown herein a first rate of speed is provided substantially the same as the constant rate of speed of the first arm and its associated vehicle. A second rate of speed selectable by an operator is provided for the second arm, which rate of speed is faster than the constant speed of the first arm. The second "controlled" arm is provided with resilient means to permit the free end thereof and the respective vehicle removably mounted thereon to move outwardly to an extended position under centrifugal force in response

to said increased speed to permit the second "controlled" vehicle to pass the vehicle on the first constant speed, constant length arm.

To enhance the playability of the game, an obstacle is provided radially outwardly from the axis of rotation of the support arms at a predetermined position along the orbital path thereof and beyond the orbital path of the vehicle on the end of the constant length arm. However, the obstacle is in the path of the vehicle on the end of the variable speed, variable length arm (when in an extended condition) so that an operator of the "controlled" arm and its associated vehicle must judge the peripheral speed and orbital path of the controlled vehicle to pass the constant speed vehicle without crashing into the obstacle.

To further enhance the playability of the device, the control means for the "controlled" vehicle includes a foot pedal disposed outwardly of the orbital path of the vehicles and somewhat simulating the foot pedal of an actual automobile to increase its speed when passing another vehicle.

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 an amusement device incorporating the concepts of the present invention;

FIG. 2 is a vertical central section, partially broken away and on an enlarged scale, taken generally along the line 2—2 of FIG. 1;

FIG. 3 is an elevational view of the motor and gear trains to the shafts for the support arms and to the sound producing mechanism;

FIG. 4 is a plan view taken generally along the line 4—4 of FIG. 3;

FIG. 5 is a partial elevational view of a section of the gear train shown in FIG. 3, illustrating certain of the gears in a shifted position to change the speed of the "controlled" vehicle support arm;

FIG. 6 is a vertical section through the shaft and gear for the constant speed vehicle support arm and the gears for the controlled speed vehicle support arm;

FIG. 7 is a horizontal section taken generally along the line 7—7 of FIG. 2;

FIG. 8 is an exploded perspective view, on an enlarged scale, of the controlled speed vehicle support arm shown in FIG. 1;

FIG. 9 is a perspective view, on an enlarged scale, of the constant speed vehicle support arm shown in FIG. 1; and

FIG. 10 is a schematic perspective view of the wiring for the motor, batteries and switch means of the device of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings in greater detail, the amusement device of the present invention, generally designated 12 in FIG. 1, includes a standard or housing, generally designated 14, on which is mounted a pair of vehicle support arms, generally designated 16 and 18, for pivotal movement about a vertical axis 20 generally centrally of the standard 14 to rotate a pair of vehicles 22*a* and 22*b* in generally circular orbital patterns about the standard 14. Driving means, connecting means and portions of control means (all of which will be de-

scribed in greater detail hereinafter) are housed within the standard 14, and a controlling foot pedal 24 is pivotally mounted, as at 26 in FIG. 2, to a radially extending rib-like framework section, generally designated 28 in FIG. 1, with the foot pedal 24 disposed outside of the orbital path of the vehicles 22.

For purposes which will be apparent hereinafter, the vehicle support arm 16 at times herein will be referred to as the "constant speed support arm" for the vehicle 22*a*, and the vehicle support arm 18 at times herein will be referred to as the "variable speed support arm" or the "controlled support arm" for the controlled vehicle 22*b*. As seen best in FIGS. 1, 8 and 9, both the constant speed support arm 16 and the controlled speed support arm 18 are fabricated of relatively thin generally flat strips of material to provide for a degree of flexibility or resiliency in a vertical direction. With the vehicles 22*a* and 22*b* mounted on the ends of the support arms 16 and 18, respectively, as shown in FIG. 1, the vehicles travel about the standard 14 approximately in coincident horizontal planes.

Referring to FIGS. 2, 3, 6 and 9, the constant speed support arm 16 has a boss 30 on the underside of the inner end thereof and is fixed to an upright rectangular shaft 32 by means of a set screw 34 (FIG. 2) or other appropriate means. The rectangular shaft 32 is received in a complementary rectangularly shaped hole 38 (FIG. 9) so that the constant speed support arm 16 rotates with the shaft. The shaft 32 extends through a top plate 40 of the standard 14 and is journalled in an upper bracket plate 42 appropriately fixed within the standard 14. A flange 44 is formed integrally with the shaft 32 for seating the same on top of the upper bracket plate 42. As best seen in FIG. 3, the gear train, generally designated 46, is supported between the upper bracket plate 42 and a lower bracket plate 45 and, among other things, drivingly connects the shaft 32 to a motor 48 which drives the shaft at a constant speed. A series of speed reduction gear arrangements is provided. More particularly, as best seen in FIGS. 3 and 4, a pinion gear 50 is fixed to the rotating motor shaft and is in mesh with a larger diameter disc gear 52 which is fixed for rotation with a smaller pinion gear 54. Gear 54 is, in turn, in mesh with a second larger diameter disc gear 56 which is fixed for rotation with another smaller pinion gear 58. Gear 58, in turn, is in mesh with yet a larger diameter disc gear 60 which is fixed for rotation with the constant speed support arm shaft 32. Thus, during operation of the motor 48, shaft 32 for the vehicle support arm 16 is driven at a continuous constant speed through the gears 50, 52, 54, 56, 58 and 60.

Referring now additionally to FIG. 8, the variable speed vehicle support arm 18 also has a boss 62 on the underside of the inner end thereof and, like the constant speed control arm 16, has a rectangular hole 64 which receives the end of a complementary rectangular shaft 66, as best seen in FIGS. 2 and 6. Boss 62 provides for vertical spacing between the support arms. The shaft 66 is smaller in cross sectional dimensions than the shaft 32 and extends longitudinally or axially therethrough within an elongated bore 68 whereby the shaft 66 may rotate at different speeds relative to the constant speed of rotation of shaft 32. The shaft 66 is connected through portions of the gear train 46 and a shifting gear arrangement (described hereinafter) to the motor 48 for providing variable speeds of rotation to the controlled speed support arm 18 and the vehicle 22*b* supported thereon. More particularly, the lower end on the shaft 66 is journalled by a pin 70 (FIG. 6) in the lower bracket plate 45. A pair of disc gears 72 and 74 are fixed to the shaft 66 between the bracket plates 42 and 45 for rotation with the shaft 66. The disc gear 72, as best seen in FIGS. 3 and 4, is of the same diameter as the disc gear 60 which drives the constant speed control arm shaft 32. However, disc gear 74 is of a slightly smaller diameter. A speed shifting shaft 76 (FIGS. 3 and 5) is journalled in the bracket plates 42 and 45 for reciprocating movement in the direction of double-headed arrow A. A pinion gear 78 is fixed to the speed shift shaft 76 and is maintained in constant meshed engagement with the gear 60 regardless of the reciprocating movement of the shaft 76. Thus, the shaft 76 and gear 78 are driven continuously and at a constant rate of speed in unison with the constant speed driving of the gear 60 which drives the constant speed support arm shaft 32. A second pinion gear 80 and a third gear 82 also are fixed to the shaft 76 and are provided for selective meshed engagement with the disc gears 72 and 74, respectively. It should be noted that the gear 80 is of the same diameter as the gear 78. Thus, with the gear 78 in mesh with the disc gear 60 and the gear 80 in mesh with the disc gear 72, it is apparent that both vehicle support arms 16 and 18 will be driven at the same speed by the motor 48.

In order to increase the speed of rotation of the vehicle support arm 18, the speed shaft 76 must be moved from the position shown in FIG. 3 to the position shown in FIG. 5. In the position of FIG. 5, it will be seen that the gear 78 on the shaft 76 still is in mesh with gear 60 providing a gear train to the motor 48. However, gear 80 has been moved out of meshed engagement with gear 72 and the larger gear 82 on shaft 76 has been moved into meshed engagement with gear 74 which is smaller in diameter than gear 72. Thus, it can be seen that shaft 66 which is fixed to gear 74 is driven at a faster rate of speed when the gears are in the positions shown in FIG. 5 then when in the positions shown in FIG. 3. Therefore, as will be more clear hereinafter, the vehicle 22*b* on the variable speed support arm 18 is capable of overtaking the vehicle 22*a* on the support arm 16.

In order to permit the vehicle 22*b* to pass the vehicle 22*a* as vehicle 22*b* is speeded up as described above, a sliding connecting means is provided in the support arm 18 which is responsive to centrifugal force of the increased speed to permit the vehicle 22*b* to move radially outwardly to pass the vehicle 22*a*. More particularly, as seen best in FIG. 8, support arm 18 actually is comprised of a pair of arm portions 86 and 88. Arm portion 86 is the inner portion which is fixed to shaft 66 and has a longitudinal slot 90 at the outer end thereof. Arm portion 88 has a lug, generally designated 92, formed on the upper surface thereof for extending upwardly through the slot 90, with flat plate portions 92*a* of the lug extending transversely outwardly and seated on top of a pair of flanges 94 along the side edges of the slot 90. The flanges 94 terminate short of the outer end of the slot 90 to provide an enlarged opening 96 through which the flat plate portions 92*a* of lug 92 may be inserted to assemble the arm portions 86 and 88 together. Thus, it is apparent that the outer arm portion 88 is capable of reciprocating movement in the direction of double-headed arrow B (FIG. 8) as the lug

92 rides radially in the slot 90. An elastic or otherwise resilient member 98 is connected between the arm portions by somewhat rigid leg portions 98*a* and 98*b*, as seen in FIG. 8. Leg 98*b* is inserted into an aperture 100 in the outer plate portion 92*a* of the lug 92 and the inner leg 98*a* of the resilient member is selectively received in one of a plurality of apertures 102 in the arm portion 86. The plurality of apertures 102 provide for adjusting the resiliency afforded by member 98. It thus can be seen that resilient member 98 urges the outer arm portion 88 radially inwardly to an inner limit position defined by the inner extent of movement of the lug 92 in the slot 90. At this inner limit position, the length of support arm 18 preferably is approximately the same length as the constant speed support arm 16 so that the vehicles 22*a* and 22*b* are approximately equidistant from the axis of rotation therefor, as seen in FIG. 1. This is the normal position of the vehicle 22*b* when the two arms 16 and 18 are driven at substantially constant rates of speed when the gear 80 on the speed shift shaft 76 is in mesh with gear 72 fixed to shaft 66 for the support arm 18. However, as the vehicle 22*b* is speeded up by shifting the gears from the positions shown in FIG. 3 to the positions shown in FIG. 5, as described above, centrifugal force caused by the greater speed will stretch the resilient member 98 and permit the arm portion 88 and the vehicle 22*b* mounted thereon to move radially outwardly whereby the vehicle 22*b* may pass the constant speed vehicle 22*a*.

In order to effect the speed shifting as described above, the foot pedal 24 is operatively connected to the speed shift shaft 76 whereby downward movement of the foot pedal in the direction of arrow C (FIGS. 1 and 2) will cause the vehicle 22*b* to speed up. More particularly, a lever member 104 is pivoted at 106 on the underside of the foot pedal 24 and is in engagement with a sliding plate member 108 mounted on the framework section 28 beneath the foot pedal for reciprocating movement in the direction of arrow D (FIGS. 2 and 7). The sliding plate 108 is guided by upstanding wall portions 110 (FIG. 7). An elongated string, cable or similar means 112 is connected to the sliding plate 108 and extends under the framework section 28 and into the housing defined by standard 14. As best seen in FIG. 2, the cable 112 is wrapped around a pin or shaft 114 and extends upwardly through the bracket plates 42 and 45 (FIGS. 2 and 3) and is fixed to a lever 116 intermediate the ends thereof. The lever 116 is pivoted at one end 118 (FIG. 3) to the top bracket plate 42. The opposite end of the lever 116 is in abutment with the top of the speed shift shaft 76. Thus, it is apparent that downward movement of the foot pedal 24 in the direction of arrow C (FIGS. 1 and 2) causes the sliding plate to move to the left as viewed in FIGS. 2 and 7, causing the cable 112 to move in the direction of arrow E (FIG. 2) to force the lever 116 downwardly. The lever 116 moves the speed shift shaft 76 downwardly from the position shown in FIG. 3 to the position shown in FIG. 5 to effect a speeding up of the rotating support arm 18 and the vehicle 22*b* secured thereto, as described above. When the foot pedal 24 is released, a leaf spring 120 (FIG. 3) urges the speed shift shaft 76 back to the position shown in FIG. 3 which, in turn, moves the lever 116, cable 112, sliding plate 108, lever 104 and foot pedal 24 back to their initial positions. The vehicles again will be travelling at approximately the same rates of speed.

As best seen in FIGS. 2 and 7, switch means is provided to turn on the motor 48 during the initial downward movement of the foot pedal 24. More particularly, a pair of spaced contact plates 122*a* and 122*b* are provided beneath the foot pedal 24. A protruding arm 124 is fixed to the underside of the foot pedal 24 and engages the upper contact 122*a*. The contacts 122*a*, 122*b* are wired to the motor 48 through batteries 126 mounted within the standard 14 by a bracket 128 (FIG. 2). Appropriate wiring for the contacts, motor and batteries is shown schematically in FIG. 10. Preferably, the length of the arm 124 on the underside of the foot pedal 24, the spacing of the contacts, and the extent of movement of the sliding plate 108 to effect the speed shifting, all should be correlated so that the motor may be turned on by initial downward movement of the foot pedal 24 before the speed of the vehicle 22*b* is increased by further downward movement of the foot pedal. This enables an operator to more realistically drive the vehicle 22*b* at more realistic "controlled" variable speeds to effect proper passing of the vehicle 22*a*.

In order to enhance the playability of the game, an obstacle pin 128 (FIG. 1) protrudes upwardly from the framework portion 28 at a point radially outwardly of the orbital path of movement of the vehicle 22*a*, but in the orbital path of movement of the vehicle 22*b* should the vehicle 22*b* be travelling at its increased rate of speed and at its outer limit position. Thus, an operator of the device not only must be capable of properly increasing and decreasing the speed of the vehicle 22*b* in order to pass vehicle 22*a*, but he must judge the peripheral distance of the orbital paths of travel of the vehicles, and, through manual dexterity in operating the foot pedal 24, effect passing of the vehicle 22*a* after vehicle 22*b* passes the obstacle pin 128 but before the vehicle 22*b* makes a full 360° revolution. Should the operator fail to pass vehicle 22*a* in one revolution, vehicle 22*b* will "crash" into obstacle pin 128, and, by means described hereinafter, become dislodged from the end of support arm 18.

More particularly, a mounting bracket, generally designated 130 (FIG. 8), has a slot 132 providing resiliency to permit a pin 134 on the outer end of arm portion 88 to be snapped into an aperture 136 in the slot 132. An upwardly extending flange 138 and horizontal flanges 140 on the arm portion 88 facilitate stabilizing the vehicle support bracket 130. Should the vehicle crash into the obstacle pin 128, the support bracket 130 simply is knocked off of the end of arm portion 88. Bracket 130 may easily be remounted onto the arm portion 88 by snapping the pin 134 through slot 132 and into aperture 136.

The vehicle support bracket 32 on the outer end of the support arm 16 and also the outer end of the constant speed support arm are formed with cradles, generally designated 142, within which the vehicles 22*b* and 22*a* are received. Elastic bands 144 may be utilized for wrapping around the vehicle and under ears 146 to hold the vehicles in position. Thus, various vehicles may be selected by the players of the game and interchanged at will.

To further enhance the enjoyment of the game, a sound device is provided within the housing formed by standard 14 to simulate the sound of racing automobiles, as the motor 48 is rotating the vehicles 22*a*, 22*b* about the standard. The sound device comprises a

sound cone 148 (FIG. 2) which is struck by a plurality of discs 150 loosely sandwiched between a pair of larger supporting discs 152. The discs 150 are provided with enlarged apertures 154 (FIG. 3) through which pins 156 extend between the discs 152. The discs 152 are rotated by the motor so that the peripheral smaller discs 150 are urged outwardly by centrifugal force to strike the sound cone 148 whereupon they yield inwardly while producing a repetitive sputtering sound resembling a piston engine, for instance. The discs 152 are connected by means of a shaft 158 to a pinion gear 160 which, in turn, is in mesh with a larger disc gear 162. Gear 162 is fixed for rotation with a smaller gear 164 which is in constant meshed engagement with gear 72 fixed to shaft 66. It is apparent that the sound discs 150 are rotated at a speed proportionate to the speed of rotation of shaft 66 and thus the sound frequency increases in direct proportion to the speed of the vehicle 22*b* to simulate the speeding up of the vehicle's motor.

It should be pointed out that the support arms 16 and 18 are shown herein as comprising relatively thin elongated strips which may be fabricated of metal, plastic or the like. However, the invention certainly contemplates the utilization of other supporting arm means such as cables or the like, with resiliency provided in controlled speed arm means connected to vehicle 22*b*. Not only is the invention applicable to driving vehicles such as cars as shown in the drawing, but aircraft or other vehicles would be equally appropriate. The vehicles either may be driven over a supporting surface or orbitally through the air. No unnecessary limitations are intended by the exemplary embodiment.

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. A moving, manipulatable toy, comprising: a plurality of simulated vehicles each mounted generally on a free moving end of a respective independent support arm, the support arms being pivotally mounted generally at the opposite ends thereof to a standard for pivotal movement about a common generally vertical axis to normally rotate said vehicles in an orbital pattern in a common path about the standard with the vehicles being disposed approximately in the same horizontal plane, driving means for rotating said arms about said standard with at least one of the arms driven at selectively variable speeds, and means for selectively varying the length of the variable speed arm to permit the vehicle mounted thereon to move out of said common path and pass at least one other vehicle in said common path about the standard.

2. The toy of claim 1 including a pair of said support arms, means connecting the arm of variable length to said driving means for pivoting the arm at selectively variable rates of speeds, and means connecting the other arm to said driving means for pivoting the arm at a constant speed less than the maximum speed of the arm of variable length.

3. The toy of claim 2 wherein both of said arms are driven through said connecting means by a common power source.

4. The toy of claim 3 wherein said connecting means and said power source are located on said standard, and including control means located outside said orbital pattern for controlling the speed selection of the variable speed arm.

5. The toy of claim 4 wherein said control means includes on-off switch means operatively connected to said power source.

6. The toy of claim 3 wherein said connecting means comprises a gear train between said power source and said arms and including a clutch gear in the train between the power source and the variable length arm, the clutch gear being selectively engageable in mesh with one of a plurality of companion gears of different sizes to provide for said variable rates of speed.

7. The toy of claim 6 wherein said gear train and said power source are located on said standard, and including control means located outside said orbital pattern and operatively associated with said clutch gear for controlling the selective engagement of the clutch gear with said companion gears and thus control the rate of speed of the variable length arm.

8. The toy of claim 7 wherein said control means includes a foot pedal for simulating the foot control of an actual vehicle.

9. The toy of claim 1 including means connecting the arm of variable length to said driving means for pivoting the arm at selectively variable rates of speeds, and wherein said means for selectively varying the length of the arm is controlled automatically as a function of the speed of rotation of said arm.

10. The toy of claim 9 wherein said means for varying the length of said arm is a function of the centrifugal force caused by the rotation of said arm whereby the arm becomes longer to pass the vehicle on another arm as the speed of rotation of the variable length arm is increased.

11. The toy of claim 10 wherein the variable length arm includes at least a pair of arm portions slidably mounted for limited longitudinal movement relative to each other in a radial direction between extended and retracted positions, and biasing means between the arm portions urging the portions toward one another.

12. The toy of claim 1 including obstacle means radially spaced from said axis at a predetermined position along said orbital pattern beyond the common path of rotation of said vehicles but in the path of rotation of said vehicle on the variable length arm when the arm is of a length to permit its vehicle to pass said other vehicle.

13. The toy of claim 12 wherein said vehicle on the variable length arm is detachably mounted on the end thereof so that it may be knocked off the end of the arm should it "crash" into said obstacle means.

14. The toy of claim 1 wherein said vehicles are removably mounted on the ends of said arms.

15. The toy of claim 1 including sound means operatively associated with said arm which is driven at selectively variable speeds whereby at least one parameter of the sound emitted by the sound means increases in direct proportion to the speed of said one arm.

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