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Spiegel

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[54] **TOY VEHICLE**

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[73] Assignee: **Nasta Industries, Inc.**, New York, N.Y.

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[52] **U.S. Cl.**.....**46/244 R**, 46/97, 46/106, 46/202

[51] **Int. Cl.**.....**A63h 33/26**

[58] **Field of Search**....46/12, 97, 106, 107, 202, 243 M, 46/243 LV, 244 R

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[57] **ABSTRACT**

Toy vehicle having a reversible drive motor connected with at least one of a plurality of wheels, an operator figurine representing the operator and a plurality of passenger figurines representing passengers thereof wherein each of the figurines has a geometrically shaped base portion and the vehicle has matching sockets therefor together with switch means for the drive motor responsive to positioning of the operator figurine and means responsive to movement of the vehicle to provide up and down motion of at least one of the passenger figures.

16 Claims, 6 Drawing Figures

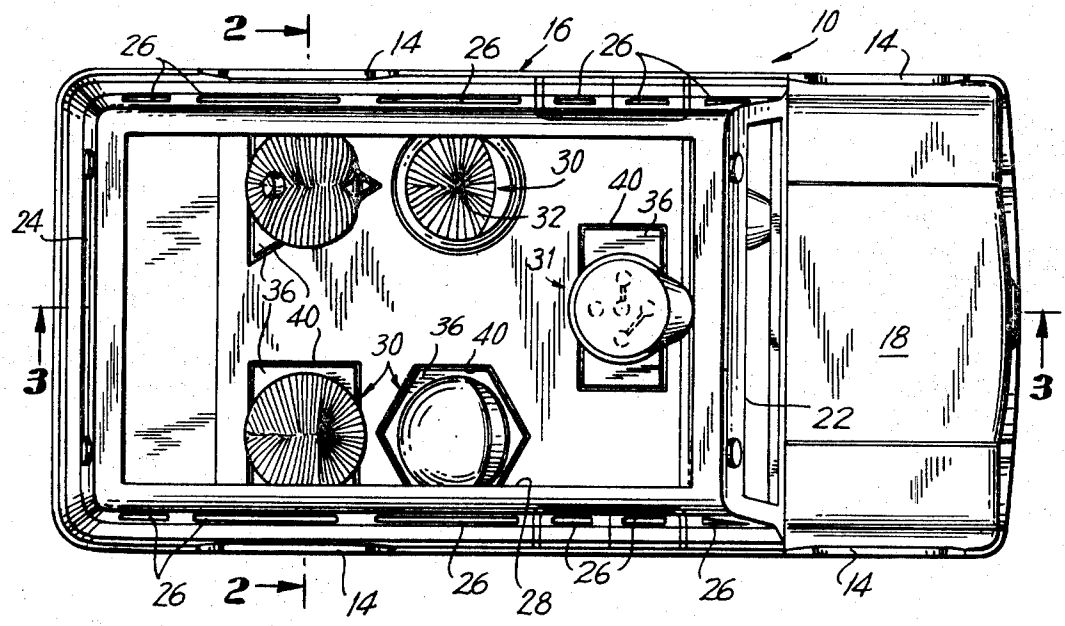


FIG. 1

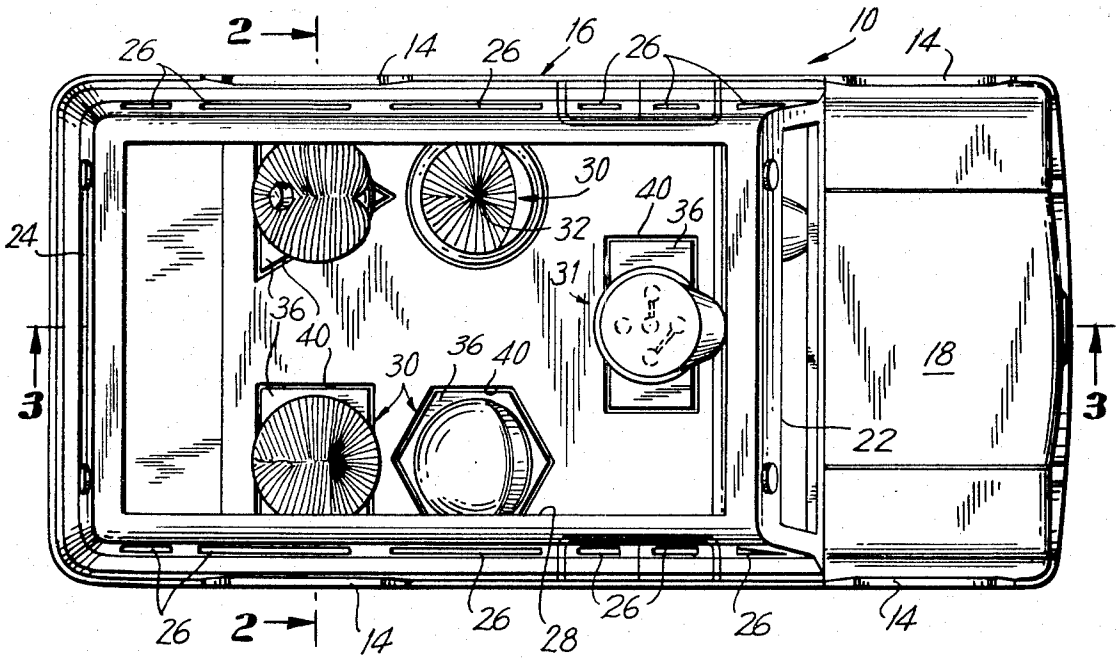

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FIG. 2

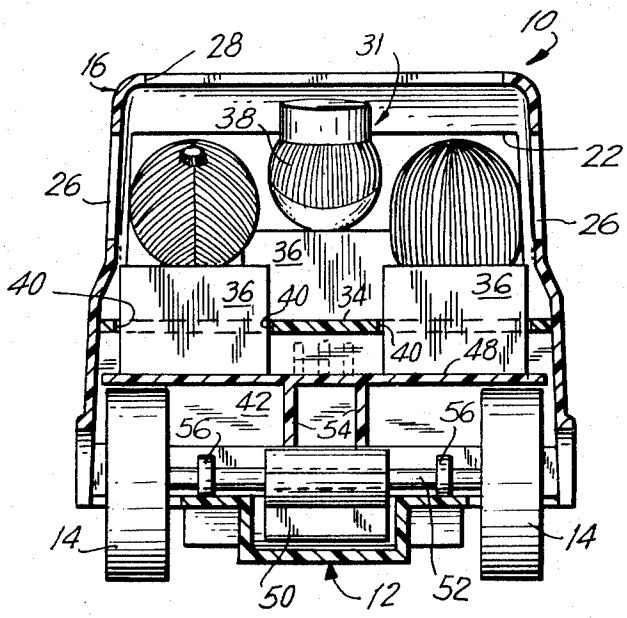

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FIG. 3

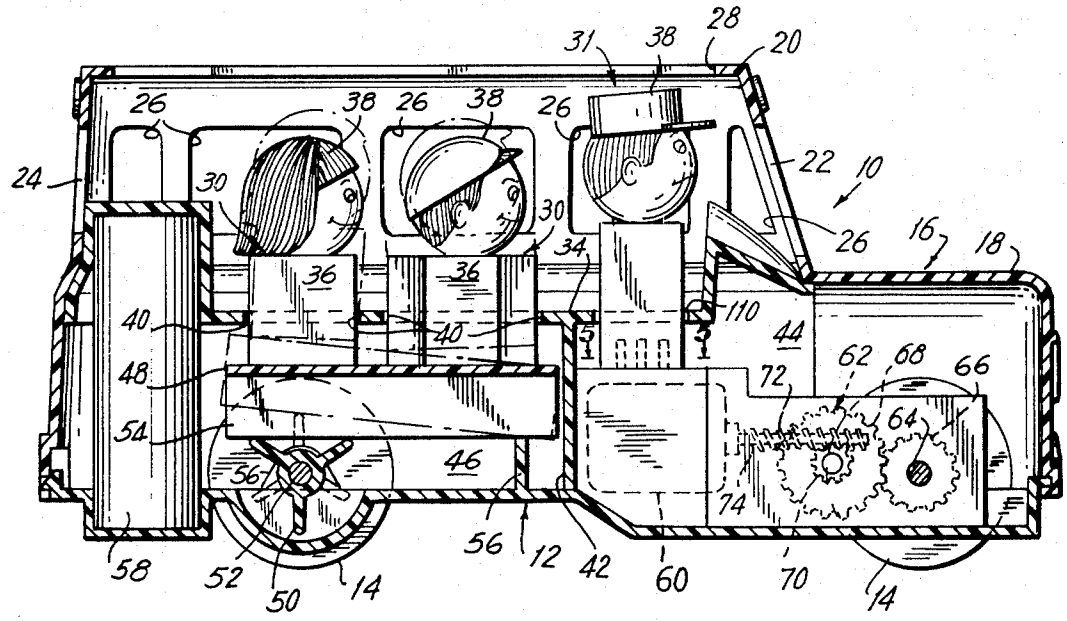
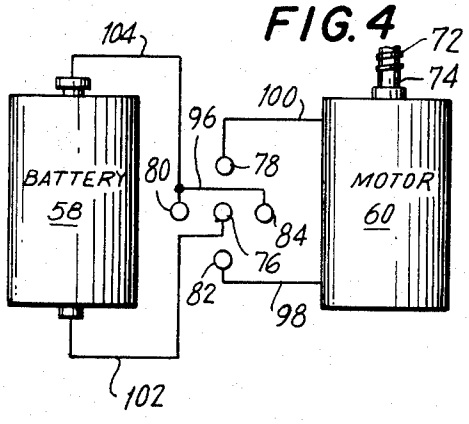


FIG. 4



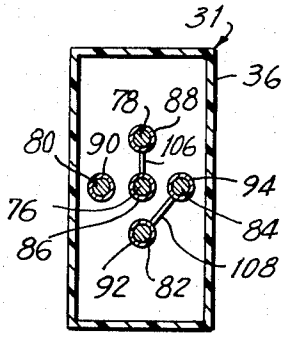


FIG. 5

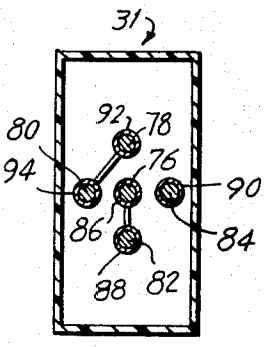


FIG. 6

TOY VEHICLE

This invention relates generally to toys and, more particularly, to toy vehicles.

It is a primary object of the present invention to provide a novel and improved toy vehicle exhibiting a high degree of action to maintain the interest of a young child.

It is another primary object of the present invention, in addition to the foregoing object, to provide such a toy vehicle having figurines associated therewith and removable therefrom to further aid in maintaining the interest of a young child.

It is still another primary object of the present invention, in addition to each of the foregoing objects, to provide such a toy vehicle wherein the figurines comprise bases having simple geometric shapes adapted to be combined with corresponding geometric shape apertures or sockets on the vehicle to aid a young child in developing coordination and dexterity.

Still another primary object of the present invention, in addition to each of the foregoing objects, is to provide in such a toy vehicle means for moving such figurines relative thereto to simulate the bouncing of the vehicle over a surface.

Yet still another primary object of the present invention, in addition to each of the foregoing objects, is to provide such means for moving the figurines driven from a wheel of the vehicle.

Another and yet still further primary object of the present invention, in addition to each of the foregoing objects, is the provision of such a vehicle having a movable support plate positioned beneath the figurine-receiving apertures for supporting the figurines together with means for rocking the plate generally up and down to simulate bouncing of a genuine vehicle.

Another and yet still further primary object of the present invention, in addition to each of the foregoing objects, is the provision of such a novel vehicle having reversible drive means therefor together with novel means for controlling the direction of travel.

Still another and yet further primary object of the present invention, in addition to each of the foregoing objects, is the provision of such a toy vehicle having electrical switch means connected with a figurine representing a driver thereof so that the vehicle will move in the general direction to which the driver is faced.

Yet another and still further primary object of the present invention, in addition to each of the foregoing objects, is the provision of such a toy vehicle wherein such switch means comprises reversible plug means associated with the figurine representing the driver enabling the driver to plug into the vehicle in each of a plurality of positions so that the vehicle will move in the direction that the driver figurine is facing.

A yet further primary object of the present invention, in addition to each of the foregoing objects, is the provision of novel and improved action toys for aiding a child in developing shape recognition, increased mental stimulation and increased reasoning ability, while being yet amusing and interesting to the child.

Yet further, it is still another primary object of the present invention, in addition to each of the foregoing objects, to provide novel and improved action toys of the class described.

Still further, it is still yet another primary object of the present invention, in addition to each of the foregoing objects, to provide novel and improved methods of operating an action toy.

The invention resides in the combination, construction, arrangement and disposition of the various component parts and elements incorporated in an improved action toy vehicle constructed in accordance with the principles of this invention and in the method of operation and control thereof. The present invention will be better understood and objects and important features other than those specifically enumerated above will become apparent when consideration is given to the following details and description, which when taken in conjunction with the annexed drawing describes, discloses, illustrates and shows a preferred embodiment or modification of the present invention and what is presently considered and believed to be the best mode of practicing the principles thereof. Other embodiments or modifications may be suggested to those having the benefit of the teachings herein, and such other embodiments or modifications are intended to be reserved especially as they fall within the scope and spirit of the subjoined claims.

It is to be understood that terminology such as "above," "below," "forwardly," "rearwardly," along with other similar directional terminology as may be used in the ensuing description and the subjoined claims is to be construed and interpreted with reference to the structure as illustrated in the drawing merely to facilitate an understanding of and to clearly set forth and particularly define the present invention and is not to be construed or interpreted in a limiting sense either in the ensuing description or the subjoined claims.

IN THE DRAWING

FIG. 1 is a top plan view of an action toy vehicle constructed in accordance with the principles of the present invention;

FIG. 2 is an elevational cross-sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is an elevational cross-sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is a schematic wiring diagram of the vehicle;

FIG. 5 is a partial cross-sectional plan view taken along line 5—5 of FIG. 3; and

FIG. 6 is a cross-sectional plan illustration similar to FIG. 5 but showing the disposition of the operator figurine facing the rear of the vehicle.

With reference now to the drawing, and particularly to FIGS. 1–3 thereof, there is shown and illustrated a toy vehicle constructed in accordance with the principles of the present invention and designated generally by the reference character **10** which may comprise a chassis plate **12** having rotatably mounted thereon a plurality of supporting wheels **14** and a body portion **16** configured to represent the body of a vehicle, such as a school bus.

While the body portion **16** is illustrated as being configured to represent a school bus, it is to be expressly understood that the body portion **16** may be configured to represent substantially any type of vehicle, substantially without limitation.

The body portion **16** may, as shown, comprise a front hood portion **18** providing the appearance of a conventional hood over an engine compartment and a generally box-shaped passenger compartment portion **20** having openings defining one or more front windows **22**, one or more rear windows **24** and one or preferably a plurality of side windows **26**. Yet further, the passenger compartment portion **20** may be provided with a top fenestration **28** encompassing substantially the entire top of the passenger compartment portion **20** and enabling a plurality of passenger figurines **30** and an operator or driver figurine **32** to be positioned within the passenger compartment portion **20** and viewed through the windows **22**, **24** and **26**, as well as the top fenestration **28**.

Forming a part of the body portion **16** there may be provided a passenger compartment lower plate **34** extending substantially beneath the fenestration **28** and at a level slightly below the lowermost extreme of the windows **24**, **22** and **26** to define, together with the passenger compartment portion **20** a substantially hollow space defining the passenger compartment of the vehicle **10**. Each of the figurines **32** representing the driver or operator and **30** representing the passengers may comprise lower portions or bases **36** comprising parallelepipeds of differing cross-sectional geometries as, for example, the driver or operator figurine **32** having a base portion **36** with a generally rectangular cross-sectional configuration, and each of the passenger figurines **30** having base portions **36** comprising generally circular, generally triangular, generally square and generally hexagonal cross-sections, respectively. Each of the figurines **30** and **32** may further comprise head portions **38** situated on the upper end portion of each of the respective base portions **36** and providing amusing faces, and the like. Accordingly, each of the figurines **30** and **32** has a base portion **36** with a differing cross-sectional configuration than any of the other figurines forming a part of the toy and each of the base portions has a cross-sectional configuration comprising a simple geometric shape. The passenger compartment lower plate **34** may be provided, as shown particularly in FIG. **1** with mating apertures **40** of the same geometric configuration as the cross-sectional geometry of the bases **36** so that each of the bases **36** of the figurines **30** and **32** are capable of uniquely passing through only a single one of the apertures **40** so that the apertures **40** form unique, simply geometrically configured sockets or receiptacles for each of the figures **30** and **32**. The lower plate **34** is in generally spaced apart relationship and generally parallel above the chassis **12** being held apart therefrom by means of the body portion **16** and a spacer element or member **42** dividing the space between the lower plate **34** and the chassis **12** into a forward compartment **44** and a rearward compartment **46**, the forward compartment **44** being generally beneath the operator figurine **32** and the rearward compartment **46** being generally beneath the passenger figurines **30**.

Disposed within the rearward compartment **46** and movably contained therein there may be provided a floor plate **48** positioned generally beneath the lower plate **34** and extending generally beneath the apertures **40** a distance less than the height of the passenger figurine bases **36** for supporting the passenger figurines thereon. The floor plate **48** is adapted to be moved generally upwardly and downwardly by means, such as a plurality of generally radially extending fins mounted with an axle **52** mounted for rotation with at least one of the wheels **14**. For example, there may be provided three fins **50** spaced approximately 120° apart around the axle **52** which may be structurally associated for rotation with both of the rearward ones of the wheels **14**. The floor plate **48** may be provided with a pair of generally downwardly extending webs **54**, the rearward portions of which rest upon the fins **50** so that upon rotation of the wheels **14**, the axle **52** and associated fins **50** will rotate therewith and the fins **50** will alternately cam the webs **54** and attached rearward end portion of the floor plate **48** upwardly and downwardly between the extreme positions as shown in solid and phantom lines in FIG. **3**. Similarly, the passenger figurines **30** being supported on the floor plate **48** will be moved between upper and lower extreme positions indicated by phantom and solid lines, respectively, in FIG. **3** during rotation of the wheels **14**. The forward end portions of the webs **54** may be pivotally supported on a generally upstanding flange **56** extending generally upwardly from the chassis **12** within the compartment **46**. The axle **52** may be supported in apertured supports **56** extending generally upwardly from the chassis **12**. Accordingly, as the vehicle **10** moves along the surface so that the rear ones of the wheels **14** thereof are rotated the passenger figurines **30** will appear to be bouncing up and down therewithin to provide a high degree of mobility and action to the toy **10**.

Contained within the vehicle **10** and, for example, beneath the rearward end portion of the passenger compartment there may be provided a compartment containing one or more electric energy cells, hereinafter referred to as a battery **58** for providing energy to drive the vehicle **10** by means of a motor **60** and drive chain **62** operatively associated with at least one of the wheels **14** and, for example, with both of the front wheels **14** by means of an axle **64** mounted thereto for rotation therewith. The axle **64** may, for example, have mounted thereto for rotation therewith a driven gear **66** meshed with the driving gear **68** having mounted therewith for rotation therewith a driven gear **70** defining the worm gear of a worm and gear reduction drive further comprising a worm **72** carried by the armature **74** of the motor **60**. Hence, upon high speed rotation of the armature **74** of the motor **60**, the front wheels **14** of the toy **10** will be rotated to drive the vehicle **10**.

Preferably the motor **60** is of an electrically reversible type, there being provided associated therewith switch means for controlling the direction of rotation thereof. The switch means may, as illustrated, be operatively associated with the operator figurine **32** so that reversal of position of the operator figurine **32** provides reversal of the direction of rotation of the motor **60** and, hence, reversal of the direction of movement of the toy vehicle **10**.

For example, switch means may be provided between the operator figurine **32** and the motor **60** for selectively reversing the direction of rotation of the armature **74** of the motor **60** depending upon the direction that the operator figurine **32** is facing so that when the operator figurine **32** is facing forwardly then

the motor 60 drives the armature 74 thereof in a direction intended to move the vehicle 10 forwardly while if the operator figurine 32 is positioned so as to face rearwardly then the motor 60 will rotate in an opposite direction tending to move the vehicle 10 in a generally rearward direction. Further, the switch means may be constructed and arranged so that in the absence of the operator or, in other words, when the operator figurine 32 has been removed from the vehicle, no movement of the vehicle 10 will occur. Accordingly, there may be structurally associated with the operator figurine 32 and structurally and operatively associated with the motor 60 a plug and socket assembly adapted to be assembled in at least two positions, one position of which completes a circuit between the battery 58 and the motor 60 such as to operate the motor 60 in a direction hereinafter defined as forwarded whereat the gear train 62 drives the vehicle 10 forwardly and a second position whereat a circuit is completed between the battery 58 and the motor 60 whereat the motor 60 operates in a reverse direction such that it drives the vehicle 10, through the gear train 62 generally rearwardly. Further, the respective portion of the plug and socket assembly may be associated with the operator figurine 32 for movement therewith and arranged relative thereto so that when the operator figurine 32 is positioned in the vehicle 10 facing forwardly the first of the above-mentioned circuits will be completed while when the operator figurine 32 is positioned within the vehicle 10 in the rearward facing position the second or reverse circuit will be completed. Where the battery 58 comprises a sufficiently low number of electric cells, such as two zinc-carbon cells, two mercury cells, two alkaline cells, or two cells of the type generally referred to as flashlight cells, the voltages involved are sufficiently low that no substantial shock hazard exists and, accordingly, a combination of pins extending upwardly from the vehicle 10 may be provided forming a multi-pinned plug which, in combination with a socket carried by the operator figurine 32 and having a corresponding number of socket connections may be utilized, it being understood that whether the pins or socket connections are carried by the vehicle or by the operator figurine 32 are substantially a matter of choice and design. However, where, as pointed out, the energy source is of sufficiently low power as to obviate any shock hazard, then it is preferable that the pins be carried by the vehicle 10 and the socket connections be associated with the operator figurine 32 inasmuch as the pins may be recessed within the body of the vehicle 10 and accordingly guarded from mechanical injury more easily while, on the other hand, socket connections may be provided on the operator figurine 32 without substantially weakening the structure of the operator figurine nor substantially increasing the mass thereof.

Accordingly, a plurality of generally upstanding pins 76, 78,80, 82 and 84 may be provided extending generally upwardly from a corresponding wall of the chassis 12 generally within the chamber 44 and a plurality of socket connections 86, 88, 90, 92 and 94 positioned for mating association with the pins 76–84 may be provided extending generally upwardly into the lowermost portion of the base 36 of the operator figurine 32. While many internal wiring connections are possible, an exemplary wiring connection for the motor 60, battery 58 and associated pins 76–84 is shown in FIG. 4, while, similarly, a mating wiring circuit for the socket connections 86–94 is shown and illustrated in FIGS. 5 and 6 so that when the operator figurine 32 is inserted with the socket connections 86–94 thereof associated over the mating and symmetric pins 76–84, when the operator figurine 32 faces forwardly, the vehicle 10 will be driven forwardly and when the operator figurine 32 faces rearwardly, the vehicle 10 is driven rearwardly.

For example, the pins 80 and 84 may be connected together, in parallel, by means of a wire connection 96 and pin 82 connected with the motor 60 by means of wires 98, with the pin 78 being connected with one terminal of the battery 58 by means of a wire 100 and a pin 76 connected to one terminal of the battery 58 by means of a wire 102 and the parallel connected pins 80 and 84 may be connected with the opposite terminal of the battery 58 by means of a wire 104. Additionally, the sockets 86 and 88 may be connected together by means of a jumper wire 106 and the sockets 92 and 94 may be connected together by means of a jumper wire 108. Moreover, the pins and sockets, respectively, may form a pattern having a central pin and socket 76 and 78 surrounded by the mating pins and sockets at generally equispaced distances therefrom and at generally 90° angles thereapart so that the pins and sockets, respectively, may be mated at each of four 90° positions of the operator figurine 32. Inasmuch as only two positions are desired, spaced 180° apart, the base portion 36 of the operator figurine 32 may be of generally rectangular configuration, as shown, and the lower plate 34 may be provided with a generally rectangular aperture 110 limiting the possible positions of the operator figurine 32 to only two, namely, facing forwardly and facing rearwardly. As is apparent from a study of the schematic diagram in FIG. 4, together with the diagram of FIG. 5 illustrating the jumper connections internal of the operator figurine 32 when the operator figurine 32 is facing forwardly, the motor 60 is provided with electric power from the battery 58 at a first polarity which is selected so as to drive the vehicle 10 forwardly. Alternatively, and with reference to FIGS. 4 and 6, FIG. 6 illustrating the jumper connections interior of the operator figurine 32 when the operator figurine 32 is facing rearwardly, when the operator figurine 32 is associated with the pins in that position, then the polarity of the electric power provided to the motor 60 is reversed and, accordingly, the armature 74 of the motor 60 will be rotated in an opposite direction so as to cause movement of the vehicle 10 in a generally rearward direction.

Accordingly, when the operator figurine 32 is separated from the vehicle 10, then no motion of the vehicle 10 by means of the motor 60 will occur and when the operator figurine 32 is inserted through the aperture 110 so as to engage the pins 76–84 with the operator figurine 32 facing forwardly the vehicle 10 will be driven forwardly. Conversely, when the operator figurine 32 has its base portion 36 inserted through the aperture 110 with the operator figurine 32 facing rearwardly, the socket connections 86–94 thereof will engage the pins 76–84 as shown in FIG. 6 to reverse the direction of travel of the vehicle 10. Moreover, since

the operator figurine 32 and the passenger figurine 30 are each insertable into the respective apertures in only a single and unique arrangement, both the interest of the child utilizing the toy will be satisfied and, in addition, the toy provides valuable training in various mental and physical arts.

While the invention has been described, disclosed, illustrated and shown in terms of an embodiment or modification which it has assumed in practice, the scope of the invention should not be deemed to be limited by the precise embodiments or modifications herein shown, illustrated, described or disclosed, such other embodiments or modifications as may be suggested to those having the benefit of the teachings herein being intended to be reserved especially as they fall within the scope and breadth of the claims here appended.

What is claimed is:

1. Toy comprising a model vehicle having a body and means for supporting said body for movement along a surface in each of a plurality of directions, a figurine representing the operator of said vehicle, means for structurally and operatively connecting said operator figurine with said vehicle and enabling facing of said operator figurine in each of said plurality of directions, and means for responding to the direction of facing of said operator figurine to drive said vehicle in such direction.

2. Toy defined in claim 1 wherein said supporting means comprises at least one drive wheel, said responding means comprises a reversible electric motor operatively connected with said drive wheel and a source of electric power therefor and said connecting means comprises switch means associated with said operator figurine for selectively connecting said motor with said power source.

3. Toy defined in claim 2 wherein said switch means comprises a plug and socket arrangement one portion of which is carried by said vehicle and the other portion of which is carried by said figurine for mating association therewith in a plurality of differing mating configurations, each of said mating configurations defining a direction of travel for said vehicle.

4. Toy defined in claim 3 wherein said plug and socket arrangement comprises a plurality of pairs of mating pin and receptacle elements structurally associated, respectively, with said vehicle and said operator figurine, said pairs of elements being arranged in a regular and symmetric geometric pattern enabling assembly thereof in at least two opposite positions corresponding to forward and rearward direction of facing of said operator figurine and movement of said vehicle.

5. Toy defined in claim 4 wherein said source of electric power provides direct current and each of said opposite positions provides a different polarity connection of said source of electric power with said reversible electric motor.

6. Toy defined in claim 5 wherein said mating pins and receptacles are disposed in a pattern having a generally central mating pin and receptacle and four mating pairs of pins and receptacles disposed generally equi-distantly from said central pin and receptacle and spaced apart approximately 90° to one another.

7. Toy defined in claim 6 wherein said operator figurine has a generally rectangular base portion and said vehicle comprises a mating aperture therefor restricting the association of said operator figurine and said vehicle to a forward-facing and a rearward-facing assembly corresponding to forward and reverse connections of said motor.

8. Toy defined in claim 1 wherein said means for supporting defines at least one wheel rotatably mounted therewith, further comprising a floor plate carried by said vehicle for movement therewith along said surface and for movement relative thereto generally perpendicular said surface, means driven by said wheel for moving said plate generally perpendicular said surface during rolling of said wheel therealong and at least one passenger figurine adapted to represent a passenger being transported by said vehicle operatively associated with said floor plate and supported thereby for movement therewith to simulate bouncing motion of a passenger.

9. Toy defined in claim 8 wherein said vehicle comprises a chassis portion having a generally upstanding rib, said floor plate is pivotally supported adjacent one end portion thereof by said rib and said means for moving said floor plate comprises at least one pin carried on an axle mounted for rotation with said wheel at least intermittently engaging a portion of said floor plate spaced apart from said rib so as to move said spaced apart portion of said floor plate generally and away from said axle during rotation of said wheel and rocking motion of said floor plate about said rib.

10. Toy defined in claim 9 comprising a plurality of such fins mounted generally equi-angularly around said axle extending generally radially outwardly thereof.

11. Toy vehicle defined in claim 10 comprising a plurality of such passenger figurines each of which has a base portion defined by a parallelopiped, said toy vehicle further comprising an intermediate plate spaced generally above said floor plate a distance less than the axial length of said bases of said passenger figurines and provided with apertures corresponding to the cross-sectional configuration of said bases so that said figurines may be supported by said floor plate to move with said floor plate generally perpendicular the plane of said intermediate plate.

12. Toy defined in claim 11 wherein the cross-sections of said bases and the configurations of said apertures in said intermediate plate each comprise a pair having a differing simple geometric figure permitting the insertion of only one of said passenger figurines uniquely in each of said apertures so that said figurines may be assembled thereto in only a single arrangement or pattern.

13. Toy vehicle having a reversible drive motor connected with at least one of a plurality of wheels, an operator figurine representing the operator of said vehicle and a plurality of passenger figurines representing passengers thereof wherein each of the figurines has a geometrically shaped base portion and the vehicle has matching sockets therefor together with switch means for the drive motor responsive to positioning of the operator figurine and means responsive to movement of the vehicle to provide up and down motion of at least one of said passenger figurines.

14. Toy vehicle defined in claim 13 wherein each of the base portions of said figurines and the matching socket therefor comprise a unique pair of differing con-

figurations from the configuration of each of the other pairs of figurines and matching sockets.

15. Toy vehicle defined in claim 13 wherein the base portion of said operator figurine and the matching sockets therefor enables assembly of said operator figurine selectively in a forward-facing and a rearward-facing position, said switch means being responsive to the position of said operator figurine so as to cause forward movement of said vehicle when said operator figurine is in the forward-facing position thereof and rearward movement of said vehicle when said operator figurine is in rearward-facing position thereof.

16. Toy vehicle defined in claim 15 wherein said switch means comprises a reversible plug and socket arrangement connected with said operator figurine and said vehicle for providing a forward polarity and a rearward polarity interconnection, selectively, of said drive motor with a source of electric power dependent upon the position of said operator figurine.

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