

Nov. 17, 1970

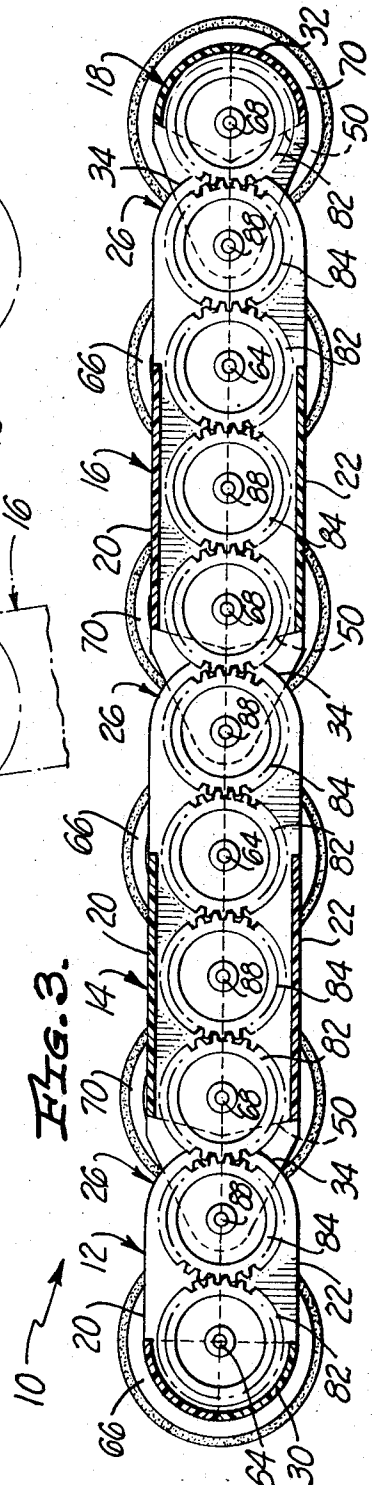
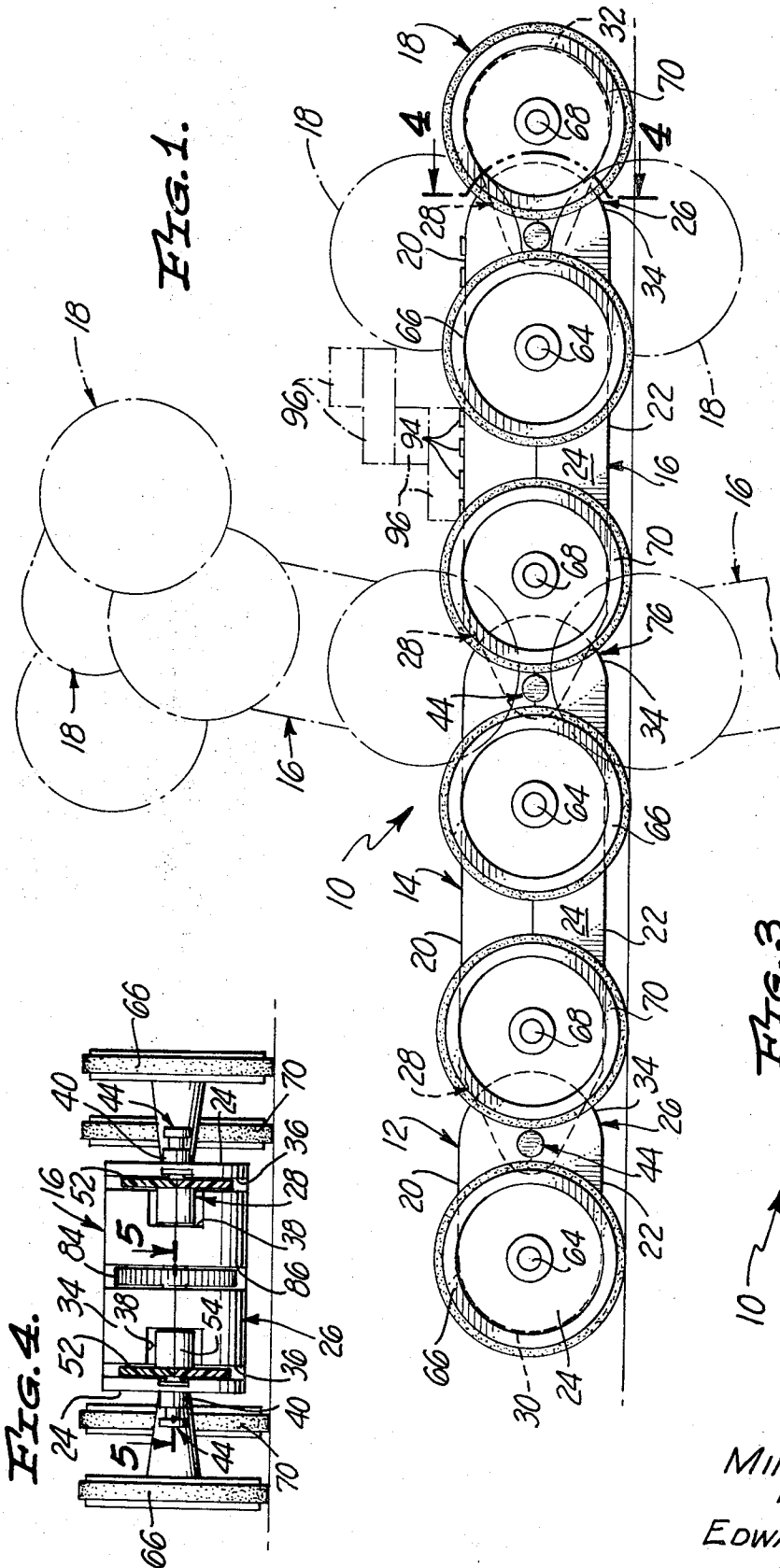
MINORU ISHIDA

3,540,151

MOVING VEHICLE TYPE TOY

Filed Dec. 4, 1968

2 Sheets-Sheet 1



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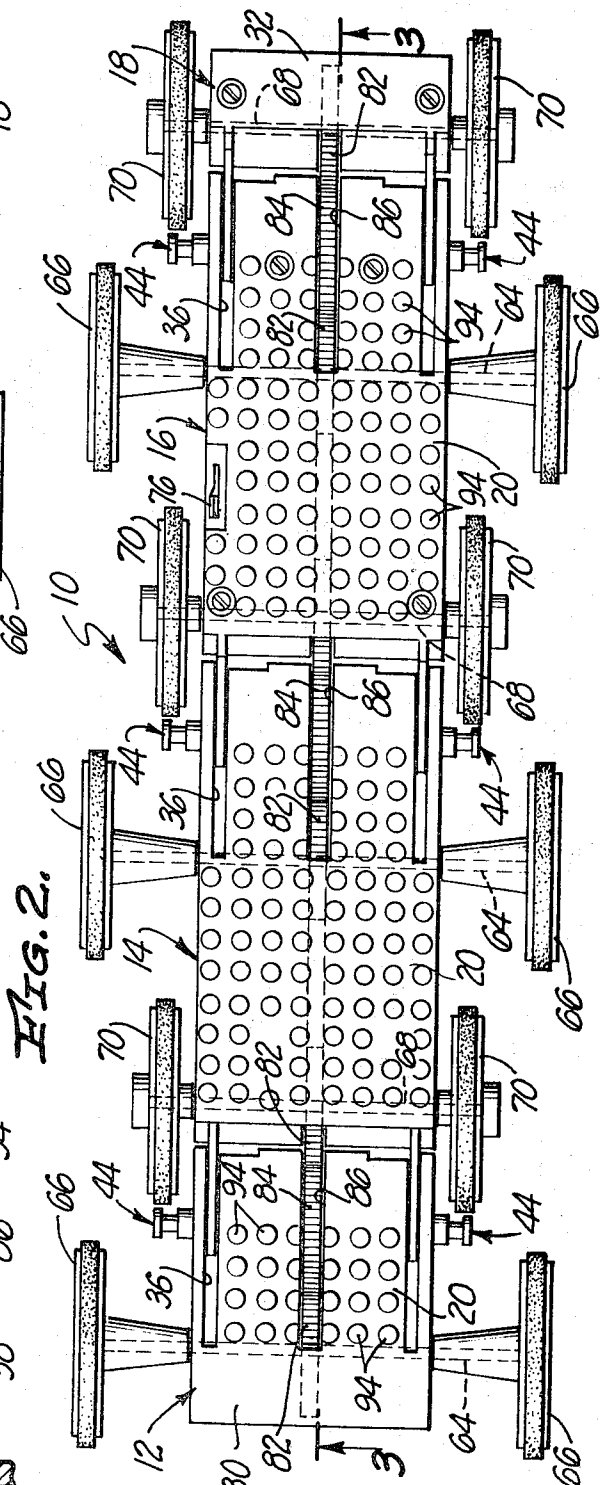
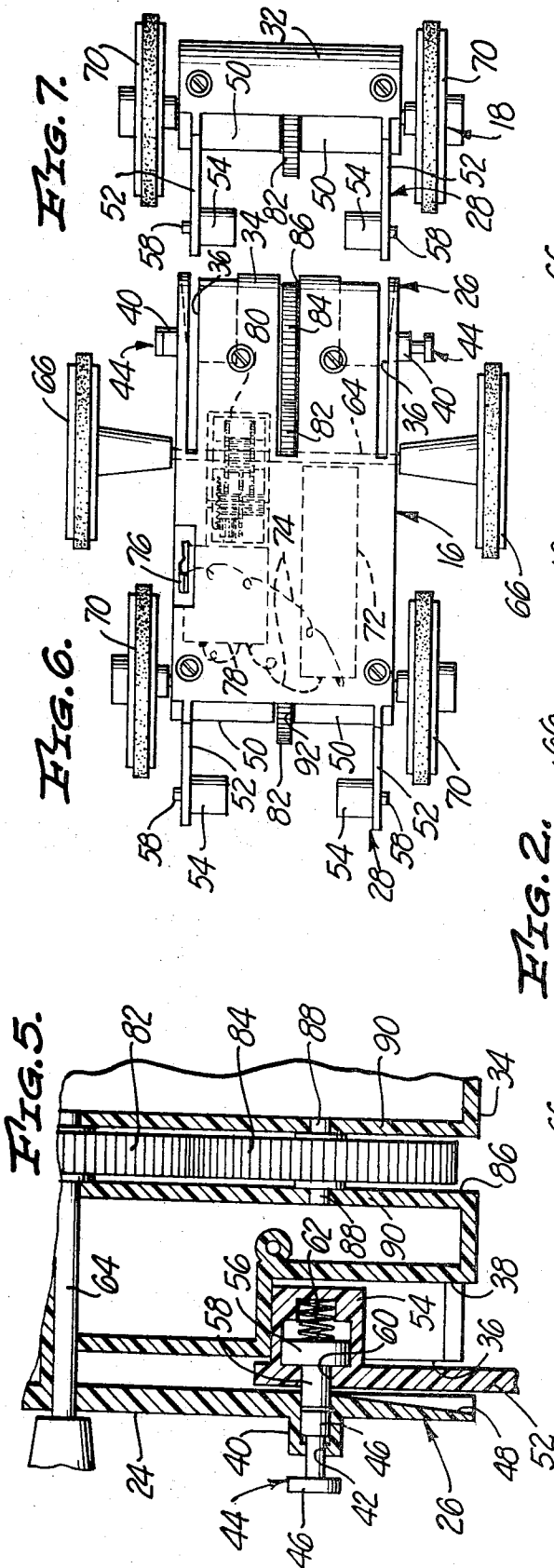
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2 Sheets-Sheet 2



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MOVING VEHICLE TYPE TOY

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11 Claims

ABSTRACT OF THE DISCLOSURE

A moving vehicle type toy is disclosed which has a plurality of vehicle units connected together so that these units are capable of being moved with respect to one another. Means such as wheels or the equivalents are located on each of these units for supporting and propelling these units. The power transmission means within the individual units are connected to one another so that all of the units are caused to be moved in unison through the operation of a motor located on one of the units. The power transmission means used are of such a nature as to permit movement of one unit with respect to the next adjacent unit. The individual units are preferably formed so that elements of construction toys such as construction blocks can be mounted upon them for play purposes.

BACKGROUND OF THE INVENTION

Many types of toys have been developed and manufactured with the objective of capturing a child's imagination. Many of such toys effectively simulate conventional items found in an industrial society. With toys of this type a child can imagine a real thing as he plays with a particular toy.

As a group such toys which simulate conventional items tend to limit the child's imagination. Generally speaking children tend to have imaginations which transcend actual physical reality. As a group, children like to achieve unusual, unexpected type performance from a toy. Such unusual, unexpected toy performance is believed to encourage the inherent creativity of children. As a group, children frequently desire to exercise their creativity by building or adding to toys so that the products of their activity add to the unusual or unexpected achieved.

The amount to which a child's imagination and creativity can be exhibited and exercised with conventional wheeled type toys such as cars, trucks, trains, or the like is comparatively limited. Toy vehicles of this type can only be effectively used in emulation of the real vehicles represented by them. A conventional vehicle toy normally cannot be utilized so as to achieve a type of action which is inherently different from the action one might expect with a conventional vehicle as represented by the toy.

SUMMARY OF THE INVENTION

An objective of this invention is to provide new and improved moving vehicle type toys which are more desirable for play purposes than conventional toy vehicles. An objective of this invention is to provide a moving vehicle type toy which will stimulate a child's imagination and creativity by virtue of a unique method of operation and by virtue of the fact that a child may change the number and/or sequence of units in the toy and/or may build upon the various units of the toy with a conventional construction set, such as a set of construction blocks.

Further objectives of this invention are to provide moving vehicle type toys of the class described: which may be easily assembled together and/or disassembled so as to create a complete vehicle of any desired length or size for play purposes; which may be effectively used in a variety of different manners so as to excite a child's imagina-

tion; which may be easily and conveniently constructed at a comparatively nominal cost; and which are constructed in such a manner that they are capable of giving prolonged, effective service.

5 These and various other objectives of this invention are achieved by providing moving vehicle type toys, each of which includes: a series of at least two vehicle units; at least two propulsion or support means located on and forming a part of each of the units; connecting means 10 connecting these units together so that each of the units may be moved with respect to other of the units; power transmission means located on each of the units for transmitting power to the propulsion and support means on each of the units; the power transmission means on the individual units being connected or interengaged so that 15 power is simultaneously supplied to all of the propulsion and support means; and motor means mounted on one of said units and connected to a power transmission means for causing all of said vehicle units to be moved by said propulsion and support means in synchronism with one another.

20 Although an effective moving vehicle type toy can be made using only the features indicated in the preceding paragraph in accordance with this invention it is preferred to include on at least one of the individual units holding means for holding and supporting parts of a conventional toy construction set. Many such sets are known and used at the present time. Such sets frequently are sets of so-called building blocks designed to interlock by means of 25 projections fitting within internal cavities or elongated members fitting within holes. A plurality of different holding means for different types of such construction sets may be located on any or all of the vehicle units used with a moving vehicle type toy of this invention.

BRIEF DESCRIPTION OF THE DRAWING

The actual nature of the present invention as well as many advantages of it will be more fully apparent from a detailed consideration of the accompanying drawings in which:

FIG. 1 is a side elevational view of a presently preferred embodiment or form of a moving vehicle type toy of this invention;

FIG. 2 is a top plan view of the toy shown in FIG. 1;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken at line 4—4 of FIG. 1;

FIG. 5 is a partial cross-sectional view taken at line 5—5 of FIG. 4;

FIG. 6 is a bottom plan view of an individual vehicle unit utilized in the complete toy shown in FIGS 1, 2 and 3; and

FIG. 7 is a view similar to FIG. 6 of another vehicle unit employed in the complete toy illustrated in FIGS. 1, 2 and 3.

The drawings are primarily intended to represent a presently-preferred embodiment or form of the toy for explanatory purposes. Those skilled in the art of the design and construction of moving toys will realize that the inventive features or principles embodied within the illustrated toys as defined by the appended claims may be embodied within differently appearing and differently constructed toys through the exercise of routine engineering skill or both.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings there is shown a complete moving vehicle type toy 10 of the present invention. This toy includes individual vehicle units 12, 14, 16 and 18. Each of the units 12, 14 and 16 has a flat top 20 and a parallel flat

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bottom 22. The units 12, 14, 16 and 18 all have parallel side walls 24 extending between their tops 20 and their bottoms 22. The units 12, 14 and 16 all have identical female type connecting ends 26 and the units 14, 16 and 18 have identical male type connecting ends 28. The unit 12 has a curved, cylindrical end 30 remote from its end 26. The unit 18 also has a cylindrical end 32 remote from its end 28.

The individual ends 26 and 28 are intended to be used in connecting the individual units 12, 14, 16 and 18 to one another so that the entire toy may be assembled with all of these individual units located within substantially the same plane and so that these units may be conveniently disassembled. Although the individual units 12, 14, 16 and 18 are illustrated in the drawings in alignment with one another, it will be apparent that the ends 26 and 28 are designed so that these individual units may be located in various positions with respect to one another as indicated in phantom in FIG. 1 or in other related manners. These ends 26 and 28 also permit the sequence of the units 12, 14, 16 and 18 to be varied in the toy 10.

Also, the ends 26 and 28 are designed so that the individual units 12, 14, 16 and 18 can be assembled together so that only two of these units are used in a toy or so that all of the units used may be in a different sequence than is shown. Thus, for example, in the toy 10 the unit 16 may occupy the position shown as being occupied by the unit 14 and the unit 14 may be used as occupying the position shown as being occupied by the unit 16. Similarly, only the units 12 and 16 may be used together. Also, only the units 16 and 18 may be used together. Also, the units 12, 16 and 18 may be employed together.

Each of the ends 26 includes a cylindrical terminal wall 34 in which there are formed parallel slots 36 and notches 38. It will be noted that these notches 38 extend into the walls 34 from the adjacent sides of these slots 36 in each of the ends 26. These slots 36 are formed in the walls 34 adjacent to the side walls 24 so that in effect terminal parts of the side walls 24 constitute parts of the ends 26 in the units 12, 14 and 16. In these units the walls 24 carry small, cylindrical holders 40 which are aligned with the axes of curvature of the walls 34.

Each of these holders 40 is open to a slot 36; each of them has a restricted entrance 42 remote from the adjacent slot 36. These holders 40 are intended to retain small actuators 44 in a position that these actuators 44 may be pushed toward the adjacent slots 36 so as to be flush with the interiors of the walls 24 defining such slots 36. Each of the actuators 44 includes two heads 46, both of which are larger than the entrance 42. These heads 46 hold the actuators 44 in place so that these actuators 44 can be moved relative to the slots 36 without being lost. Each of the ends 26 preferably also includes sloping surfaces 48 in the interiors of the walls 24 directly opposite the notches 38.

Each of the ends 28 includes nearly vertical walls 50 supporting two parallel, spaced-apart arms 52. Each of these arms 52 carries adjacent to its end a small cylindrical retainer housing 54. A piston 56 is located within each of the housings 54 so that a rod 58 extending from it projects outwardly through an entrance 60 in the arm 52. Springs 62 are provided within the housings 54 for the purpose of biasing the pistons 56 so that these rods 58 extend generally towards the sides of the unit upon which the ends 28 are located.

These ends 28 are dimensioned so that the arms 52 on any particular end 28 may be inserted within the slots 36 on any particular end 26. During such insertion the projecting rods 58 on an end 28 will engage the sloping surfaces 48 on an end 26 so that the side walls 24 force the rods 58 towards the arms 52 against the pressure of the springs 62. During such insertion the housings 54 will pass through the notches 38. As the vehicle unit upon which the ends 26 and 28 being connected are brought closer together, the rods 58 will be located opposite the

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entrances 42. When this position is reached, the springs 62 within the ends 22 will move the pistons 56 so that the attached rods 58 project into the holders 40. This will have the effect of moving the actuators 44 away from the adjacent slots 36. When the rods 58 are so positioned, the individual units whose ends 26 and 28 are so connected may be rotated in a single plane with respect to one another.

From a careful consideration of the preceding, it will be seen that the ends 26 and 28 provide a convenient method whereby the individual units in the toy 10, such as the units 12, 14, 16, and 18, can be conveniently snapped together in any desired sequence. When so connected each of these units may be pivoted with respect to any so connected unit. All of the so connected units may be rotated or pivoted with respect to all of the other units about axes defined by the connected ends 26 and 28 which are parallel to one another. This is considered quite important because it enables the individual units 12, 14, 16 and 18 to be folded back or positioned with respect to one another in virtually any conceivable manner. The construction of the ends 26 and 28 is also considered to be important because of other factors which will be apparent from a consideration of the remainder of this specification.

In the toy 10 the units 12, 14 and 16 are provided with long axles 64, each of which carries two wheels 66 spaced a significant distance from the side walls 24 of the vehicle unit upon which it is located. In the toy 10 each of the units 14, 16 and 18 carries a short axle 68 which in turn carries other wheels 70. These wheels 70 are spaced from the side wall 24 of the vehicle unit upon which they are located a lesser distance than the wheels 66.

It will be noted that axles 64 and 68 in each of the units 14 and 16 are parallel to one another and are parallel to the axes of the cylindrical walls 34 in these units. It will be noted that when the units 12, 14, 16 and 18 are assembled together through the interconnection of the ends 26 and 28 on these units that all of the axles 64 and 68 are parallel to one another and are parallel to the axes at the connected ends 26 and 28 about which the individual units 12, 14, 16 and 18 can be rotated with respect to one another. As a result of this type of construction regardless of how the units 12, 14, 16 and 18 are oriented with respect to one another so long as these units are connected by the ends 26 and 28 they will all be located in the same plane.

The spacing of the individual wheels 66 and 70 through the use of the long and short axles 64 and 68 permits this to be the case even when the units 12, 14, 16 and 18 are located in other than a linear manner. It will be noted that the long axles 64 of the units 12, 14, and 16 are located adjacent to the ends 26 whereas the short axles on the units 14, 16 and 18 are located adjacent to the ends 28. With this construction wherever two of the units 12, 14, 16 and 18 are connected the wheels 66 and 70 closest adjacent to such connection between two different connected vehicle units are spaced at different distances from the side walls 24. With this construction when these connected units are located in other than a linear manner with respect to one another, the wheels on one unit will not interfere with the wheels on another.

Within the toy 10 the particular wheeled unit 16 illustrated includes conventional batteries 72 connected by wires 74 through an exposed switch 76 to an electric motor 78. This motor 78 operates through a conventional gear box 80 so as to drive the long axle 64 in this unit 16. This will of course have the effect of rotating the wheels 66 on this axle 64. Although the rotation of only these two wheels would be adequate to propel the complete toy 10 for some purposes, it would not provide a toy which operates in the intended manner. To obtain the desired operation of this toy 10 it is necessary to power each of the wheels 66 and 70 used.

This is accomplished by securing a conventional spur gear 82 to each of the axles 64 and 68. In the units 12, 14 and 16 idler spur gears 84 are mounted in the same plane as the gears 82 so as to engage the gears 82 in these individual units. It will be noted that one of these idler gears 84 is located in each of these units 12, 14, and 16 at each of the ends 26. Where an idler gear 84 is located at the end of a vehicle unit it is located within a slot 86 extending from a wall 34 so that its axle 88 is supported by internal walls 90 defining the slot 86 within which it is located.

Any such idler gear 84 at an end 26 of a unit 12, 14 or 16 mates with a gear 82 on an axle 68 at an end 28 of the next adjacent vehicle unit. The gears 82 at the ends 28 of the units 14, 16 and 18 extend through other slots 92 in the walls 50 in these ends 28. From an examination of the drawings it will be apparent that the exposed gears 82 at the ends 28 are located only on the units 14, 16 and 18. The unit 18 contains a single gear 82.

In order that all of the units 12, 14, 16 and 18 will operate at the identical speed it is necessary to form all of the spur gears 82 of one dimension and to form all of the gears 84 of a single dimension. Although the gears 82 and 84 may differ in diameter it is preferred to form them all in the same diameter. It will be recognized that this serves to govern the dimensions of the ends 26 and 28. These ends join the units 12, 14, 16 and 18 in such a manner that they may be pivoted with respect to one another. When they are of the proper dimensions with respect to dimensions of the gears 82 and 84, such pivoting to the individual units 12, 14, 16 and 18 with respect to one another will not disrupt the contact between the meshing gears 82 and 84 at the ends 26 and 28 of the connected units. As a result of this, all of the wheels 66 and 70 on these units will continue to rotate when the individual units 12, 14, 16 and 18 are located in other than a linear orientation.

The importance of this will be apparent from a consideration as to how the complete toy 10 operates. When the toy is assembled as shown in FIGS. 1 and 2 upon a floor and the motor 78 is operated through the use of the battery 72 and the switch 76, all of the wheels 66 and 70 will rotate in the same direction. This will cause the toy 10 to move forward until such time as the toy contacts an object, such as a wall. At this time the terminal vehicle unit of the toy (either the unit 12 or 18 depending upon direction of rotation of the motor 78 and which side of the toy 10 is up or down) will tend to climb the wall. As this occurs, the initial climbing unit (12 or 18) will pivot with respect to the next adjacent vehicle unit and move upwardly along the wall, then in due course such next vehicle unit may also tend to move upwardly along such a wall.

As this occurs, the individual units 12, 14, 16 and 18 will fold more or less over one another and, depending upon the circumstances, the entire toy may even end up going backwards, having turned itself around. Occasionally during such operations individual of the vehicle units will assume various nonlinear positions with respect to one another and the toy will continue in operation. The precise position assumed by the toy 10 will depend upon the manner in which the individual vehicle units of the toy have been assembled, the terrain and the amount of power in the motor 78.

On occasion it may be desired to deliberately pivot the assembled vehicle units 12, 14, 16 and 18 in the toy 10 so that they are located at angles with respect to one another. When the toy 10 is oriented in this manner, it will of course move along a surface. It will also tend to behave in various unexpected manners upon contacting an object such as a wall. This versatility of operation is considered quite important in promoting the imaginative and play values achievable with the toy 10.

Such play values are also promoted and enhanced by forming either the top 20 of one or more of the units 12,

14 and 16 or the tops and bottoms 20 and 22 of one or more of these same units with holding means 94 adapted to be used with conventional construction toys. The particular holding means 94 illustrated in the drawings are boss-like projections of a type intended to be used with a set of construction blocks as shown in the Page Australian patent specification 128,398 accepted July 19, 1948, published Sept. 15, 1945. Other equivalent or related holding means for use with different construction toys may be employed. Similarly, a variety of different holding means for different types of construction blocks may be located on individual of the vehicle units.

The manner in which play objectives can be achieved with such holding means 94 is illustrated by the blocks 96 shown in phantom in FIG. 1 of the drawing. These particular blocks 96 are constructed as shown in the aforementioned Page Australian specification. They may be assembled upon a unit 12, 14 or 16 in any desired manner by a child. When other related types of construction toys are employed, they also may be assembled in a diverse variety of different ways. Part of the play values achieved with the toy 10 derive from the fact that structures assembled from such construction toy on the basic vehicle units can be very imaginative.

In the toy 10 the individual wheels 66 and 70 are to be considered as means for supporting and propelling the individual units 12, 14, 16 and 18. It will be recognized that other conventional means for supporting and propelling vehicles such as endless tracks, nonround wheels or the like may be employed instead of the particular wheels 66 and 70 illustrated. The individual gears 82 and 84 employed in the units 12, 14, 16 and 18 may be considered as power transmission means within each of these units since their function is to transmit power between the axles 64 and 68 and the wheels 66 and 70. These gears 82 and 84 are considered to be particularly effective for their intended purpose inasmuch as they are relatively inexpensive means for transmitting power between the individual vehicle units, permitting these units to be pivoted with respect to one another. Other mechanical structures can, however, be employed in the complete toy 10.

As the toy 10 is used it may occasionally be desired to disassemble one or more of the individual vehicle units 12, 14, 16 or 18 so that the disassembled units may be reassembled in a different sequence or manner or so that individual vehicles may be stored until used again. With the toy 10 such disassembly may be easily accomplished by pushing out the actuators 44 on an individual unit being disassembled. This will have the effect of compressing the springs 62 through movement transmitted by the rods 58 and the pistons 56. When the rods 58 have been moved by the actuators 44 to a sufficient extent as to clear the walls 24, the individual units being disassembled may be easily pulled apart. After such disassembly the units may be reassembled whenever desired in the manner indicated in this specification.

Because of the fact that various modifications may be made in the toy 10 through the exercise of routine design or engineering skill, this invention is to be considered as being limited solely by the appended claims forming a part of this disclosure.

I claim:

1. A moving vehicle type toy which comprises:

a series of at least two vehicle units,

propulsion and support means for use in moving said vehicle units located on each of said vehicle units, connecting means connecting said units so that each of said units may be moved with respect to the other of said units,

motor means located in one of said units,

power transmission means located within each of the said units, said power transmission means within said unit being connected together so that power is transmitted simultaneously to all of said units,

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said motor means being connected to said power transmission means in said one of said units so as to supply power to all of said units through said power transmission means in all of said units,

said power transmission means in each of said units being connected to said propulsion and support means within each of said units. 5

2. A moving vehicle type toy as claimed in claim 1 including:

holding means for holding elements of a construction set located on at least one of said vehicle units. 10

3. A moving vehicle type toy as claimed in claim 2 wherein:

said holding means comprise a series of boss-type projections capable of being used with construction blocks. 15

4. A moving vehicle type toy as claimed in claim 1 wherein:

said connecting means connect said units so that each of said units may be pivoted with respect to the adjacent of said units in said series of units. 20

5. A moving vehicle type toy as claimed in claim 4 wherein:

said connecting means permits said vehicle units to be pivoted with respect to one another only in the same plane. 25

6. A moving vehicle type toy as claimed in claim 5 wherein:

said connecting means comprise two different types of connecting ends, the vehicle units intermediate the end units in said series having both of said types of ends. 30

7. A moving vehicle type toy as claimed in claim 6 wherein:

said different types of ends are capable of being assembled and disassembled with respect to one another and when assembled permit said vehicle units to be pivoted with respect to one another in the same plane. 35

8. A moving vehicle type toy as claimed in claim 1 wherein:

each of said power transmission means comprises gear means located within one of said vehicle units, the gear means at the adjacent ends of the units which are connected together engaging one another so as to transmit power between said vehicle units. 40 45

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9. A moving vehicle type toy as claimed in claim 1 wherein:

each of said power transmission means comprises gear means,

the gear means on each of said units engaging the gear means on the adjacent of said units of said series.

10. A moving vehicle type toy as claimed in claim 8 wherein:

said connecting means connect said units so that each of said units may be pivoted with respect to the adjacent of said units in said series of units and said vehicle units can be pivoted with respect to one another only in the same place, and

said gear means include gears on said units which are engaged at all times during the pivoting of any of said units with respect to any other of said units.

11. A moving vehicle type toy as claimed in claim 2 wherein:

said connecting means connect said units so that each of said units may be pivoted with respect to the adjacent of said units in said series of units and said vehicle units can be pivoted with respect to one another only in the same place, and

said gear means includes gears on said units which are engaged at all times during the pivoting of any of said units with respect to any other of said units.

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