Aug. 20, 1957 W. H. JOHNSON 2,803,090

STEERING MECHANISM FOR TOYS

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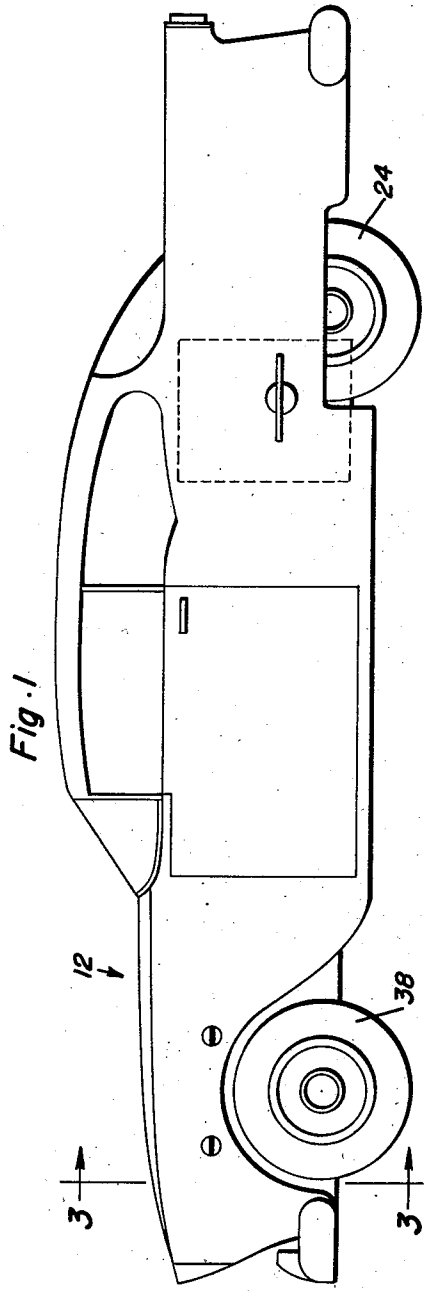


Fig. 1

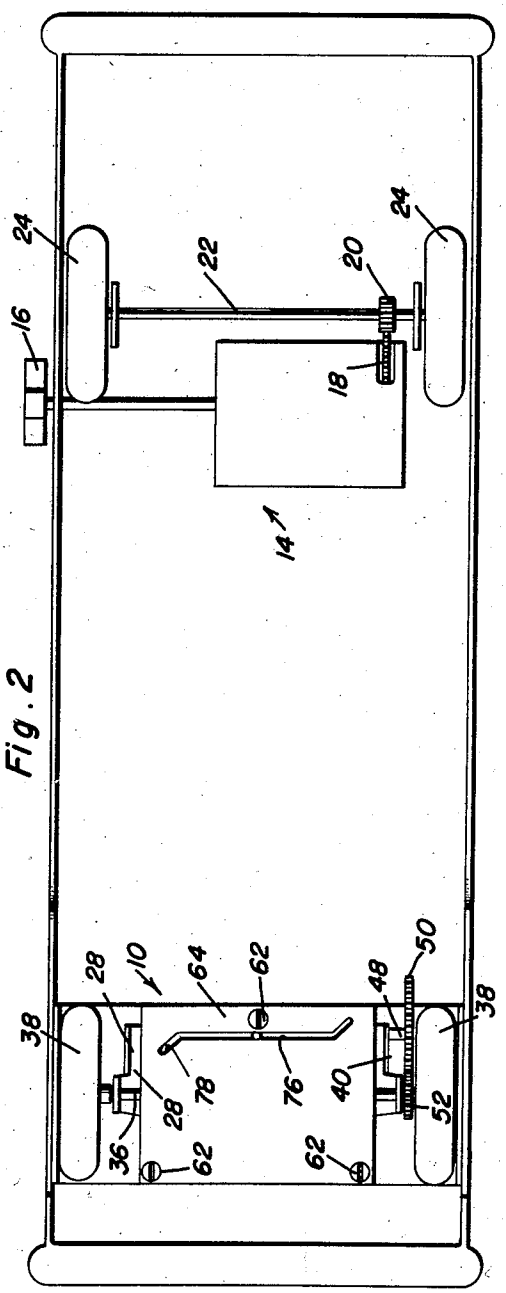


Fig. 2

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Fig. 3

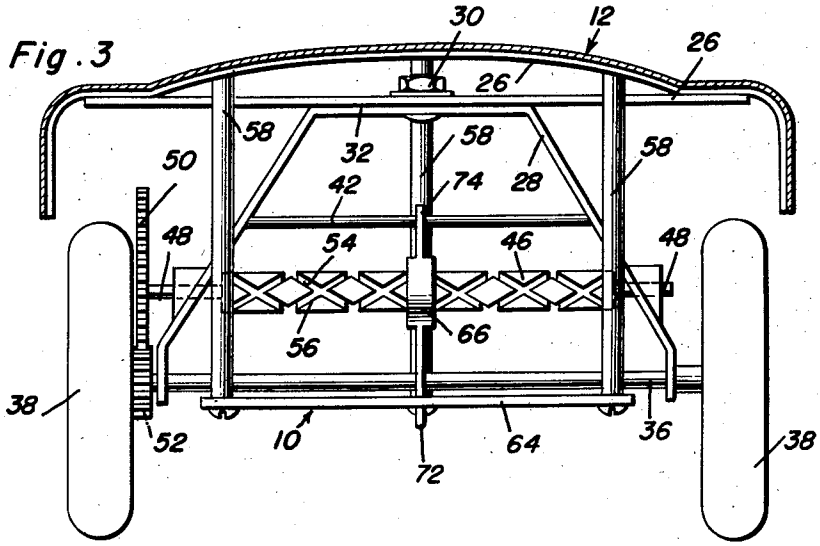


Fig. 4

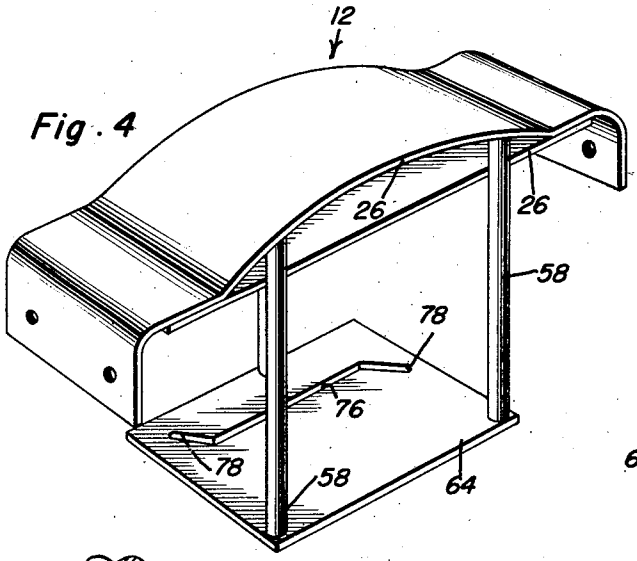


Fig. 5

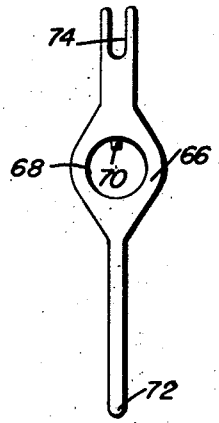
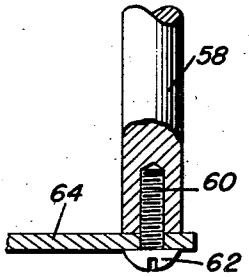


Fig. 6



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Fig. 7

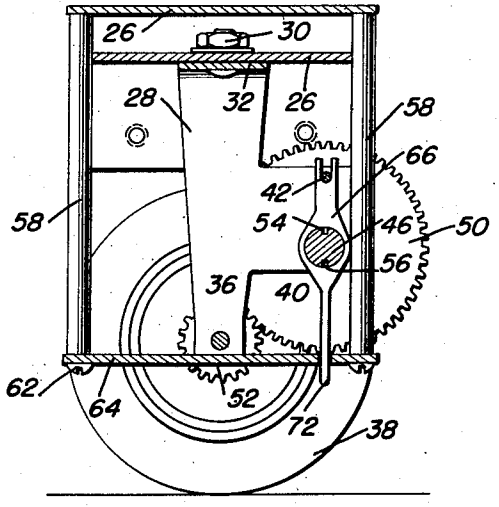


Fig. 8

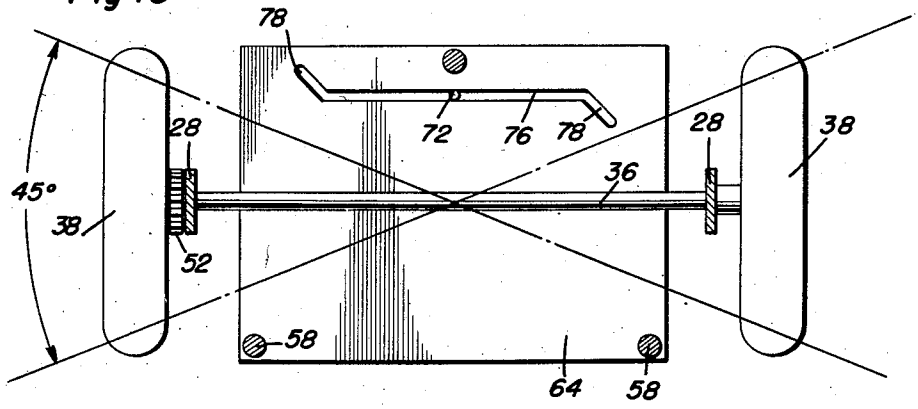
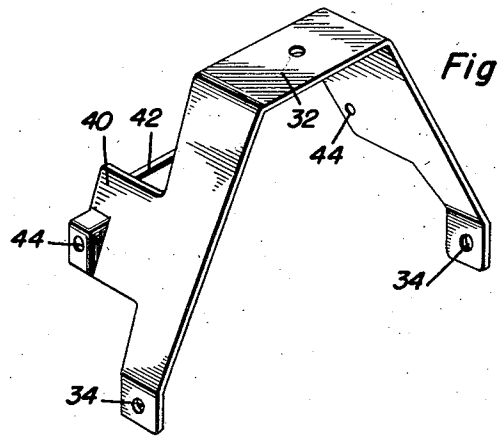


Fig. 9



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2,803,090

STEERING MECHANISM FOR TOYS

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Application June 11, 1954, Serial No. 436,145

2 Claims. (Cl. 46—213)

This invention relates to a steering mechanism for toys and more specifically provides improved construction of directional steering for toys or other devices wherein the continuous motion of such devices will actuate the steering mechanism.

An object of this invention is to provide a steering mechanism for toys wherein a definite pattern of movement of the toy is provided and wherein such pattern may be easily and quickly changed as desired.

A further object of this invention is to provide a steering mechanism for toys which will sequentially guide the toys in opposite angular directions that are determined by a guide plate which may be easily changed or adjusted for forming different patterns of movement.

Still another object of this invention is to provide a steering mechanism for toys utilizing a continuous helical groove reversed upon itself in a rotatable member for transmitting the rotational movement of the steering wheel to a transverse movement of a guide member that is slidably received in a slot in a steering plate wherein the slot is provided with offset portions that force pivotal movement of the steering wheels wherein the path of the steering wheels will be repeated as the guide member slides back and forth on the rotatable cylinder that is provided with the helical groove.

A still further object of this invention is to provide a steering mechanism for toys that is simple in construction, easily adjustable for various paths of movement, easy and attractive in use, well adapted for its intended purposes, and relatively inexpensive to manufacture.

Yet another object of this invention is to provide a steering mechanism for toys or other devices wherein the toy or device may be utilized in certain types of games wherein points are scored by the ability to steer the toy through an entrance or exit, determining the point of turn, or collision with other objects, thereby forming a highly amusing toy and one that will hold the attention of an imaginative child.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view showing one embodiment of the toy of this invention utilizing the steering mechanism wherein the device is illustrated as employed in a toy automobile;

Figure 2 is a bottom plan view showing the construction of the toy of the present invention showing the conventional spring wound driving mechanism and the novel steering mechanism;

Figure 3 is a transverse, vertical section taken substantially along section line 3—3 of Figure 1 showing the details of construction of the steering mechanism of the present invention;

Figure 4 is a perspective view showing a portion of the frame together with the mounting means for the steering plate;

Figure 5 is a detailed side elevational view showing the elongated guide member for sliding engagement with the cylindrical drum;

Figure 6 is a detailed view showing the mounting means for securing the plate to the depending rods for attaching the plate to the frame;

Figure 7 is a transverse, vertical sectional view taken substantially along a center line of the construction of Figure 3, showing the details of construction and the relationship of the various components of the steering mechanism of the present invention;

Figure 8 is a top plan sectional view showing the details of the steering plate and its relationship with the pivotal axle; and

Figure 9 is a perspective view showing the inverted U-shaped bracket for rotatably supporting the axle and the cylindrical member which drives the guide member.

Referring now specifically to the drawings, it will be seen that the numeral 10 generally designates the steering mechanism for toys of the present invention wherein the toy is generally indicated by the numeral 12 and the toy driving mechanism is generally indicated by the numeral 14. In the specific embodiment as illustrated, the toy 12 is illustrated as a simulated automotive vehicle, however, it will be understood that any type of vehicle or similar device that is propelled over a supporting surface and may be guided in different directions lends itself to easy adaptation for use of the steering mechanism 10 of the present invention.

As illustrated in Figures 1 and 2, the vehicle driving mechanism 14 includes a winding key 16 for tensioning a spring device having a driving gear 18 for engaging a driven gear 20 rigidly secured to a transverse shaft or axle 22 having driving wheels 24 mounted on remote ends thereof wherein the vehicle 12 will be propelled along a supporting surface until the tension of the coil spring of the driving mechanism 14 has been dissipated. This particular construction is well known in spring driven toy vehicles and while the drawings illustrate the preferred embodiment, it will be understood that the steering mechanism 10 may be utilized in toys 12 that are driven through electrical, mechanical, chemical or other means wherein the toy is propelled over the supporting surface by driving wheels or similar traction devices and the steering mechanism is used for guiding the path of movement over the supporting surface in a novel manner as described hereinafter.

Referring now specifically to Figures 3–9, it will be seen that the steering mechanism 10 includes generally a frame 26 attached to and supported from the shell of the toy 12 for pivotally supporting an inverted U-shaped bracket 28 by a suitable pivot bolt 30 which extends through the bight portion 32 of the U-shaped member 28 and a portion of the frame 26, thereby pivotally supporting the inverted U-shaped member 28 on the frame 26. The remote ends of the legs of the U-shaped member 28 are each provided with an aperture 34 for rotatably journaling a transverse axle 36 having a wheel 38 secured to each end thereof. As specifically shown in Figure 9, the legs of the U-shaped member 28 are provided with a forwardly projecting portion 40 having a transverse guide rod 42 therebetween and a pair of spaced bearing apertures 44 that are in transverse alignment and spaced below the transverse rod 42. A cylindrical drum 46 having projecting end portions 48 is rotatable with the end portions 48 mounted in the bearing apertures 44 in the projections 40 of the U-shaped member 28. One of the projections 48 is provided with an enlarged gear 50 that is in meshing engagement with a smaller gear 52 mounted

securely on the rotatable axle **36** wherein the cylinder **46** will be driven by the rotation of the wheels **38** and axle **36** at a reduced speed due to the relative size of the gears **50** and **52**. The cylinder **46** is provided with reversed helical grooves **54** and **56** that are continuous with each other and are formed with reverse pitch so that the grooves **54** and **56** are disposed in crossing relation for a purpose described hereinafter. The grooved cylinder **46** is a conventional mechanical expedient as shown in Patent No. 1,765,806, issued June 24, 1930.

As specially illustrated in Figures 4–8, it will be seen that a plurality of vertically depending studs **58** are secured to the frame member **26** and the lower ends of each of the studs **58** are provided with a threaded socket **60** for receiving a screw threaded fastener **62** that retains a steering or guide plate **64** thereon. The steering or guide plate **64** is positioned under the axle **36** for a purpose described hereinafter.

As shown in Figure 5, a vertically elongated guide member **66** is provided with a central aperture **68** having an inwardly projecting lug **70** thereon and one end of the elongated member **66** is provided with a straight shank **72** and the other end of the elongated guide member **66** is provided with a slot **74** which is generally U-shaped, for a purpose described hereinafter. An elongated transverse slot **76** is provided in the guide plate **64** and the slot **76** is provided with angularly offset portions **78** at each end thereof. The elongated guide member **66** is positioned over the cylinder **46** with the projecting lug **70** engaged in either groove **54** or **56** and the slot **74** engaging the guide rod **42** and the straight shank portion **72** engaging the slot **76**. As the driving mechanism **14** moves the vehicle **12** forwardly, the wheels **38** and axle **36** are rotated, thereby driving the cylinder **46** and transversely moving the elongated guiding element **66** thereby engaging the straight shank portion **72** of the element **66** with the angulated end portion **78** of the slot **76** in the guide plate **64**, thereby urging the cylinder **46**, the U-shaped member **28**, axle **36** and guide wheels or steering wheels **38** about a vertical axis formed by the pivot bolt **30**.

In operation, the forward motion of the vehicle **12** caused by the driving mechanism **14** is translated to a reciprocatory motion of the guiding element **66** by the double helical grooves **54** and **56** on the periphery of the cylinder **46** in a manner well known in Patent No. 1,765,806, issued June 24, 1930, and the reciprocating motion of the guide element **66** is transferred to a vertical pivotal movement of the axle **36** due to the angular offset portions of the slot **76** in the guide plate **64**. As shown is Figure 8, the particular arrangement of palte **64** will pivot the axle **36** about a vertical axis with a maximum movement of 45°. By removing the screw threaded members **62**, another plate **64** having a different shaped slot **76** therein may be substituted wherein the path of movement of the vehicle **12** will be changed. It will be understood that as long as the cylinder **46** rotates, the guiding element **66** will reciprocate thereon from one end to the other, thereby pivoting the guiding wheels **38** in opposite directions at predetermined intervals when the guiding element **66** reaches the outer limits of its movement. If desired, the plate **64** may be movably mounted, wherein various-shaped grooves may be provided in the plate **64** for selective registry with the depending portion **72** of the guiding element **66** wherein the pattern of movement of the vehicle may be easily and readily changed and adjusted wherein various types of games may be played by scoring points as to the relative skills of the simulated drivers of the vehicle **12**. The device may be constructed of suitable plastics or other materials normally found in toy manufacture.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A steering mechanism for a toy vehicle having a body and rear driving wheels, said steering mechanism comprising an inverted generally U-shaped bracket pivotally suspended from the forward portion of the body for pivotal movement about substantially a vertical axis, a transverse axle journaled in the lower free ends of the U-shaped bracket, a wheel rigid with each end of said axle for rotation therewith and for guiding the movement of the toy vehicle, a transverse rotatable member journaled on said bracket and being driven from said axle, said rotatable member being generally cylindrical with a continuous crossed cam groove therein, a guide member having a central aperture slidably encircling said rotatable member, a transverse guide rod slidably engaging said guide member to prevent rotation thereof, a radially extending pin extending into the groove whereby unidirectional rotation of the rotatable member will cause transverse reciprocation of the guide member on the cylindrical rotating member, said guide member having a depending shank, a guide plate mounted on the body in underling relation to the axle, said guide plate having a transversely elongated cam slot with angulated end portions, said slot receiving the lower free end of the depending shank on the guide member whereby transverse movement of the free end of the shank in the slot causes engagement of the free end of the shank with the angulated end portions of the slot, the rigid mounting of the guide plate on the body causing a reaction turning force to be exerted on the bracket for pivoting the bracket and axle with the wheels thereon about a generally vertical axis thereby changing the direction of movement of the vehicle.

2. The combination of claim 1 wherein said guide plate is removably attached to the body, the positioning of the plate below the axle facilitating the replacement of the guide plate for mounting guide plates having various cam slot arrangements for varying the path of movement of the vehicle.

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