May 26, 1959 C. H. VAUGHAN 2,887,823

STEERING MECHANISM FOR TOYS

Filed Sept. 12, 1958 2 Sheets-Sheet 1

Fig. 1.

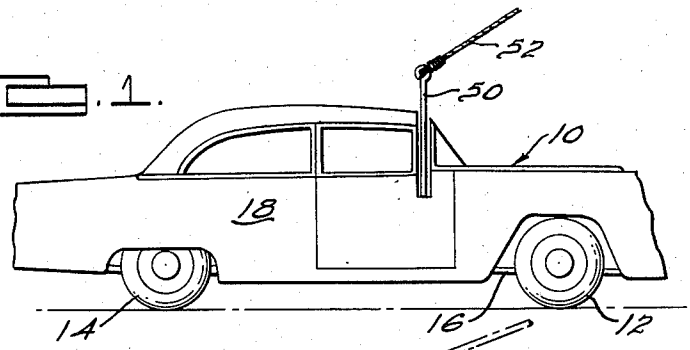
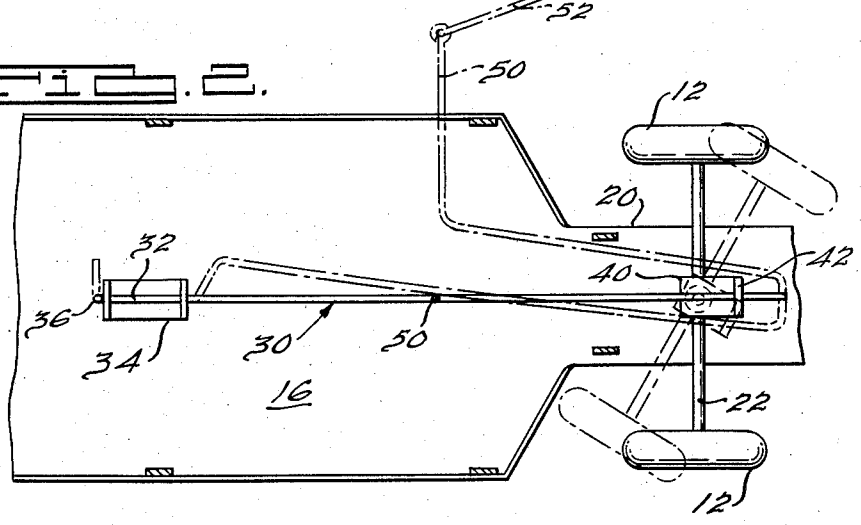


Fig. 2.



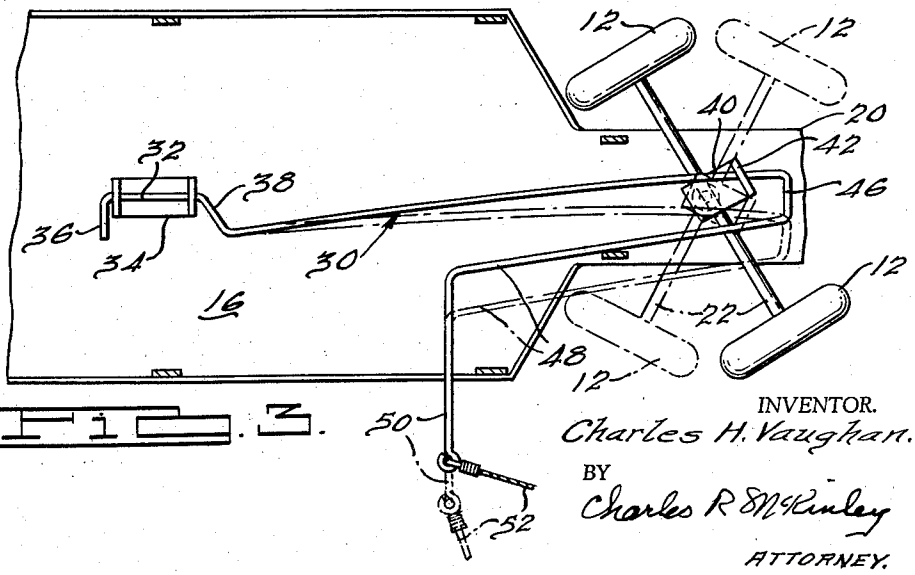


Fig. 3.

INVENTOR.
Charles H. Vaughan.
BY
Charles R. McKinley
ATTORNEY.

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Filed Sept. 12, 1958 2 Sheets-Sheet 2

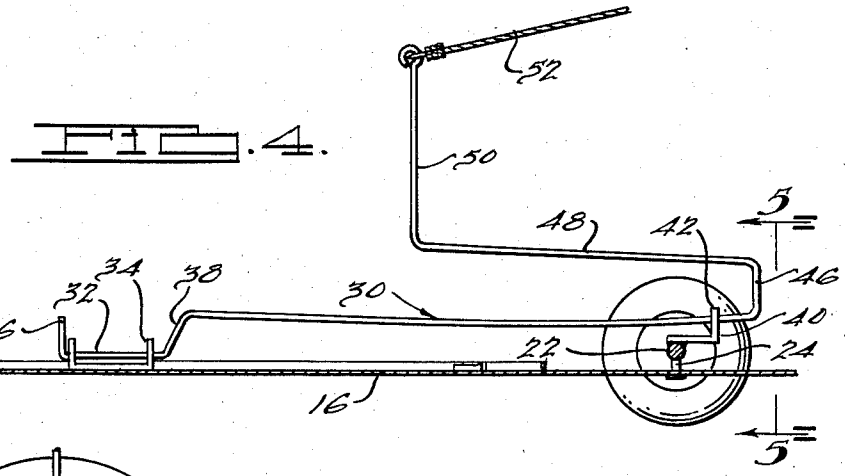


FIG. 4.

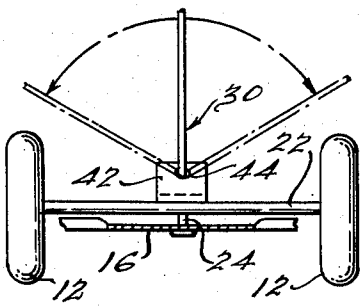


FIG. 5.

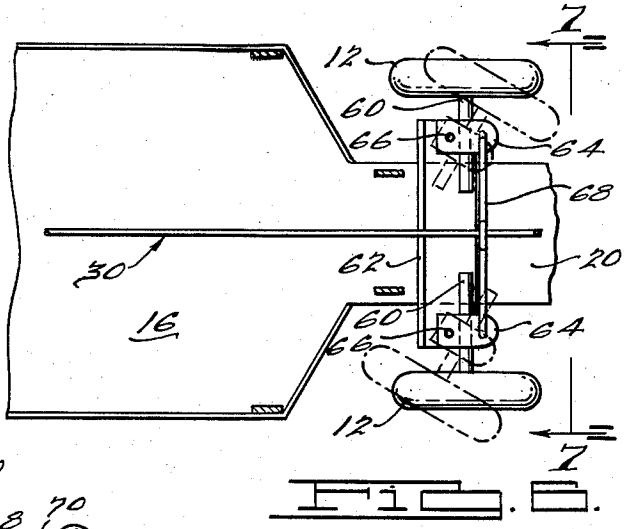


FIG. 6.

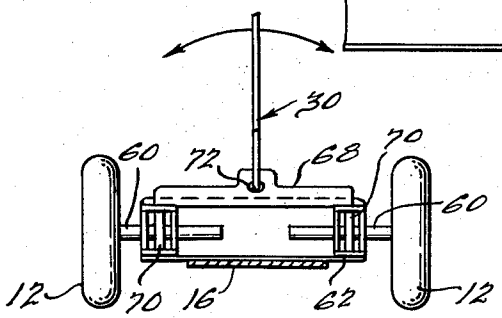


FIG. 7.

INVENTOR.
Charles H. Vaughan.
BY
Charles R. McKinley
ATTORNEY.

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STEERING MECHANISM FOR TOYS

Charles H. Vaughan, Pontiac, Mich.

Application September 12, 1958, Serial No. 761,280
3 Claims. (Cl. 46—201)

This invention relates to a toy vehicle and has particular reference to a steering control mechanism for a toy.

The present invention contemplates a manually controllable steering mechanism for a toy such as a toy automobile, a boat, an airplane, or the like. The control means may be manipulated through a remote control means such as a cord, which may also provide a means for propelling the toy, although a separate motive power source may be employed if desired.

A principle object of the invention is to provide a new and improved dirigible toy and a remote control means for operating the same.

Another object of the invention is to provide a directional control mechanism for a toy vehicle which is simple in construction and economical to manufacture.

A further object of the invention is to provide a steering control for a toy which may be remotely controlled while the toy is in motion.

Other and further objects of the invention will be apparent from the following description and claims and may be understood by reference to the accompanying drawings, of which there are two sheets, which by way of illustration show preferred embodiments of the invention and what I now consider to be the best mode in which I have contemplated applying the principles of my invention. Other embodiments of the invention may be used without departing from the scope of the present invention as set forth in the appended claims.

In the drawings:

Fig. 1 is a side elevational view of a toy vehicle equipped with the novel steering mechanism of this invention;

Fig. 2 is a fragmentary top plan view of the vehicle with the body removed to illustrate the steering mechanism;

Fig. 3 is a view similar to Fig. 2 but showing the steering mechanism in another position thereof;

Fig. 4 is a fragmentary side elevational view of the steering mechanism;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is a fragmentary plan view of a modified form of steering mechanism; and

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6.

A preferred form of the invention is shown in Figs. 1 to 5 in which a toy vehicle **10** having steerable front wheels **12** and rear wheels **14** is provided with a steering mechanism constructed according to the present invention. The vehicle **10** may include a frame **16** and a body **18** mounted thereon, with the front and rear wheels **12** and **14** supported from the frame **16**. As shown in the drawings, the frame **16** comprises a generally flat sheet metal plate having a narrower forwardly projecting end **20** on which the front wheels **12** are mounted.

The front wheels **12** are journaled on a front axle **22** which is pivotally mounted at its center on a pin or rivet **24** projecting upwardly from the forward portion **20** of the vehicle frame **16**. The front wheels **12** form the steering wheels of the vehicle and the axle **22** may be

pivoted on pin **24** between the dotted-line position of the wheels shown in Fig. 2 in which the vehicle will make a right-hand turn and the position shown in Fig. 3 in which the vehicle will turn to the left when propelled in a forward direction.

The directional control mechanism comprises a rod-like control element **30** having its inner end **32** rotatably anchored to a bracket **34** which is suitably secured to the vehicle frame **16**. The inner end **32** of the control element **30** is rotatably supported in suitable apertures in bracket **34** for rotation about its axis and has a laterally bent end **36** and a bend indicated at **38** to prevent any substantial endwise movement of the control element within the bracket **34**.

An angular plate **40** is suitably secured such as by spot welding to the upper surface of axle **22** and has an upwardly turned end **42** provided with a slot **44** substantially on the center line of the vehicle and in longitudinal alignment with the apertures in the bracket **34** in which the inner end **32** of the control element is supported. The control element **30** is preferably made of wire having some degree of resiliency and the element **30** is bent so that it is maintained in a stressed or sprung condition between its points of engagement with the bracket **34** and the plate **40**, which is secured onto the front axle **22**.

The up-turned end **42** of plate **40** is spaced forwardly of the pivot pin **24** on which the axle **22** is journaled so that the control element **30** will engage the plate **40** at a point spaced from the pivot axis of the front wheel assembly. The control element **30** is shown in Fig. 4 and in solid lines in Fig. 2 in the position it would occupy when the wheels **12** are set to move the vehicle in a straight line. As will be seen from Fig. 4, the control element **30** is slightly bowed between its point of engagement between the plate **40** and the bend **38** which leads to the end portion **32** which is journaled in the bracket **34**. After passing through the aperture or slot **44** in plate **40**, the control element **30** is bent upwardly as at **46** and then rearwardly at **48** and has an upwardly projecting outer end or control arm **50** adapted to pass through a suitable clearance slot in the body **18** of the toy. A string or cord **52** is secured to the outer end **50** of the control element **30** for a purpose to be described hereinafter.

As illustrated in Fig. 5, the control element **30** may be shifted between the two limit positions thereof illustrated in dotted lines in Fig. 5 which correspond to the limit positions of the front wheel assembly of the toy. The vehicle may be propelled by pulling on the cord **52** and the cord is also employed to effect steering of the toy. When the control arm **50** is rotated to the right-hand side of the toy into the position shown in Fig. 3, the stressed portion of the control element, which is that portion between bracket **34** and plate **40**, will react against the plate **40** in a direction to pivot the same and the axle **22** and wheels **12** carried thereby in a direction to effect a left turn of the toy. When the control element **30** is swung to its other limit position corresponding to the position shown in dotted lines in Fig. 2, the stress of the control wire **30** will be in an opposite direction to swing the front wheel assembly in the opposite direction to effect a right-hand turn.

A toy equipped with a steering control mechanism of the kind described herein may be very easily operated through the control cord **52**. The resiliency of the control wire **30** is such that the same may be deflected by a pull exerted through the cord **52** to effect turning of the wheels from one position to another, without change in the rotational position of the control wire. Thus, when the arm **50** of the control element is positioned at the right-hand side of the toy, as illustrated in solid lines in Fig. 3,

the front wheels will be turned to effect a left-hand turn under the normal stress of the control wire if the cord **52** is allowed to remain slack. However, if a sufficiently strong pull is exerted on the cord **52** with the control arm **50** in the Fig. 3 position, the control wire will be deflected sufficiently to the dotted line position shown in Fig. 3 to turn the wheels **12** to effect a right-hand turn, while the control arm **50** remains at the right-hand side of the toy because of the pull exerted through the cord. When the vehicle is swung in an arc at the end of the cord **52**, for example, in a right-hand turn, with the control arm **50** extending toward the operator from the right-hand side of the toy, the control wire will be deflected to turn the wheels to the right as long as the cord is maintained sufficiently taut under the influence of centrifugal force. If the cord is then allowed to go slack, the control wire, while remaining in the same rotational position will turn the wheels to the left due to the resiliency of the wire and the normal stress imparted thereto by its engagement with the bracket **40**. The vehicle will then continue in a left-hand turn and, as soon as the vehicle reaches a certain point in its left-hand turn relative to the position of the operator, a pull on the cord will swing the upper end **50** of the control element **30** over to its other limit position. If the cord were then to be allowed to go slack, the leverage of the bowed portion of the control wire would be directed in the opposite direction against the plate **40** to pivot the steering wheel assembly in the opposite direction, whereupon the toy would begin to execute a 180° turn. However, if instead a strong pull is again exerted through the cord **52**, the control wire will be deflected to turn the wheels for a left-hand turn as long as the cord is maintained in a taut condition by swinging the toy in an arc at the end of the cord, even though the arm **50** now extends from the left-hand side of the vehicle. Subsequent slackening of the cord will allow the wheels to be turned by the stress of the control wire to effect a right-hand turn and after a certain point is reached in such turn the control arm **50** will swing over to the opposite or right-hand side of the toy by a slight pull on the cord, to complete the cycle. Thus by proper manipulation of the control cord **52**, the toy can be made to traverse a path simulating a figure **8** by executing a substantially 180° turn at each end of the path of movement.

In the embodiment of the invention shown in Figs. 6 and 7, the construction is essentially the same as that previously described, except that the front wheels **12** are mounted on separate axles **60**, each of which is pivotally supported from the frame **16**. In this modification a bracket **62** is suitably secured on the forward end of the frame **16** such as by spot welding or the like. The bracket **62** pivotally supports a bearing element **64** at each end thereof. Each bearing element **64** is pivoted on a pin **66** supported by the bracket **62**. The wheel supporting axles **60** are supported in the bearing elements **64**. A plate **68** is provided at its ends with depending pins **70** journaled in suitable apertures in the bearing elements **64**. The plate **68** has a slot **72** through which the control wire **30** extends as in the previous modification, with the control wire being stressed between its points of engagement with the plate **68** and the fixed anchor bracket to which the inner end of the wire **30** is connected as in the previous modification. The operation of the steering arrangement shown in Figs. 6 and 7 is the same as in the previous modification and movement of the control element **30** into one position will through plate **68** effect pivoting of the bearing elements **64** in one direction to turn the steering wheels **12**. Movement of the control element **30** to its other position will swing bearing elements **64** in the opposite direction to turn the vehicle in the opposite direction.

The invention has been described in connection with a toy automotive vehicle, but it will be apparent that the novel steering control mechanism might be employed for operating a direction controlling member such as a rudder on a boat or a suitable airplane control surface. It is also contemplated that the control mechanism might be employed for controlling a single steerable wheel such as in a three-wheeled toy vehicle. The novel steering control might also be employed in a toy vehicle provided with an independent motive power source, such as a flywheel or spring type motor.

This application is a continuation-in-part of my copending application Serial No. 619,446 filed October 31, 1956, now abandoned, for "Steering Mechanism for Toys."

While I have illustrated and described preferred embodiments of my invention, it is understood that these are capable of modification, and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a toy having a body, a direction controlling member pivotally mounted on said body, a control element in the form of a wire rotatably supported on said body for rotation on its axis, said control element engaging said direction controlling member at a point spaced from the pivot axis of the latter and having an arm extending laterally therefrom, and a manually manipulatable cord connected to said arm for imparting movement to said toy and for rotating said control element toward the side of the toy from which the pull is exerted on the cord, said control element being resilient and deflected by its said engagement with said direction controlling member so as to be stressed to exert a turning force on said direction controlling member, the direction of which turning force is determined by the rotational position of said control element, said control element being disposed so that, when the cord is slack, the stress imparted thereto by said engagement with said direction controlling member reacts against and turns the latter to effect turning of the toy in a direction opposite the side of the toy on which said arm is disposed, said control element being adapted to yield in response to a pull thereon through said cord to turn said direction controlling member and toy in the opposite direction without change in the rotational position of said control element.

2. In a toy having a body, a direction controlling member pivotally mounted on said body, a control element in the form of a wire rotatably supported on said body for rotation on its axis, said control element engaging said direction controlling member at a point spaced from the pivot axis of the latter, said control element being resilient and deflected by its said engagement with said direction controlling member so as to be stressed to exert a turning force on said direction controlling member, the direction of which turning force is determined by the rotational position of said control element when the cord is slack, and a manually manipulatable cord connected to said control element for imparting movement to said toy and for rotating said control element between said positions, said control element being adapted to yield and be deflected without change in its rotational position in response to a pull thereon through said cord to pivot said direction controlling member and thereby turn the toy in the direction opposite that to which it is turned in response to the said turning force exerted thereon by the stress of said control element.

3. In a toy having a body, a direction controlling member pivotally mounted on said body, a control element in the form of a wire rotatably supported on said body for rotation on its axis, said control element engaging said direction controlling member at a point spaced from the pivot axis of the latter and having an arm extending laterally therefrom, and a manually manipulatable cord connected to said arm for imparting movement to said toy and for rotating said control element toward the side of the toy from which the pull is exerted on the cord, said control element being resilient and deflected by its said engagement with said direction controlling member so as to be stressed to exert a turning force on said direction

controlling member, the direction of which turning force is determined by the rotational position of said control element, said control element being disposed so that, when the cord is slack and said arm is disposed at one side of the toy, said turning force effects turning of the toy toward the opposite side thereof, said control element being adapted to yield in response to a pull thereon through said cord to turn said direction controlling member and the toy in the other direction without change in the rotational position of said control element.

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