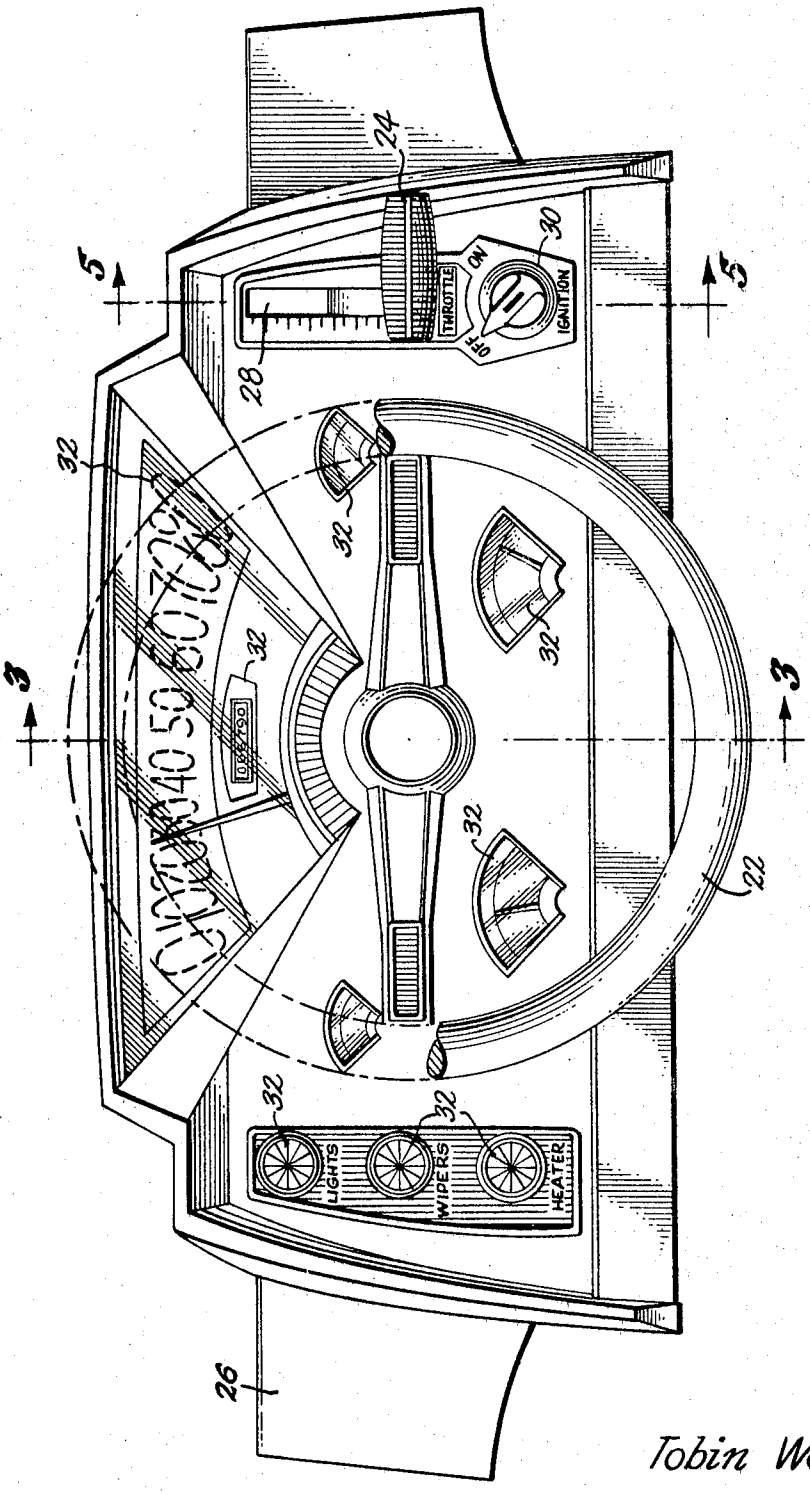
TOY SIMULATING REALISTIC DRIVING CONDITIONS

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Fig. 2.



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TOY SIMULATING REALISTIC DRIVING CONDITIONS

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Fig. 1.

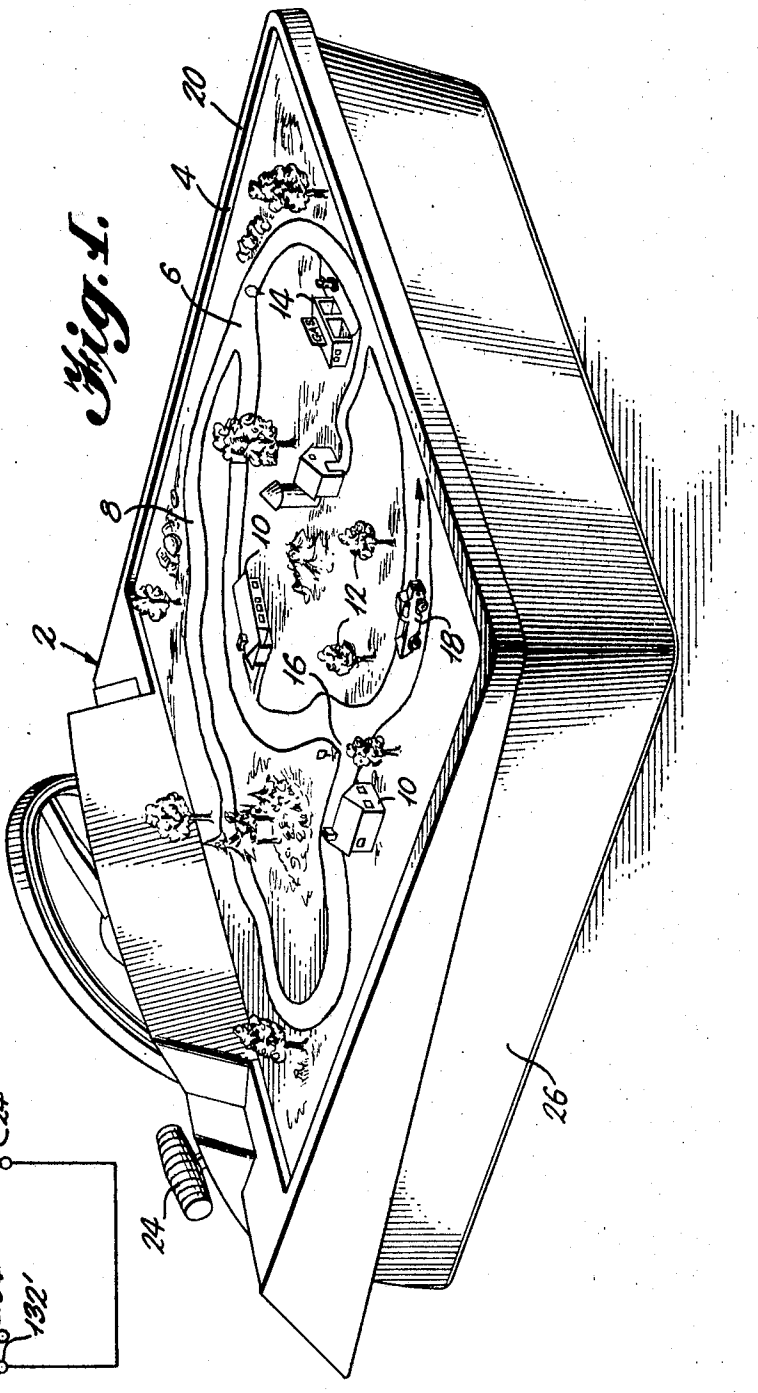
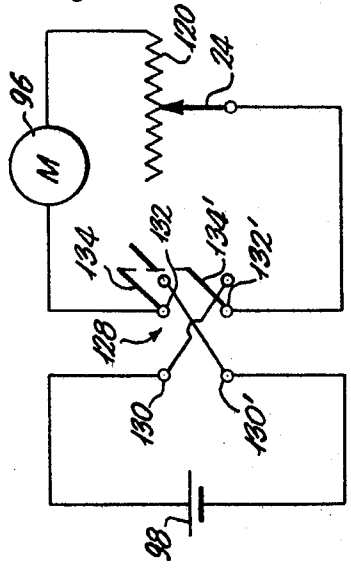


Fig. 9.



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TOY SIMULATING REALISTIC DRIVING CONDITIONS

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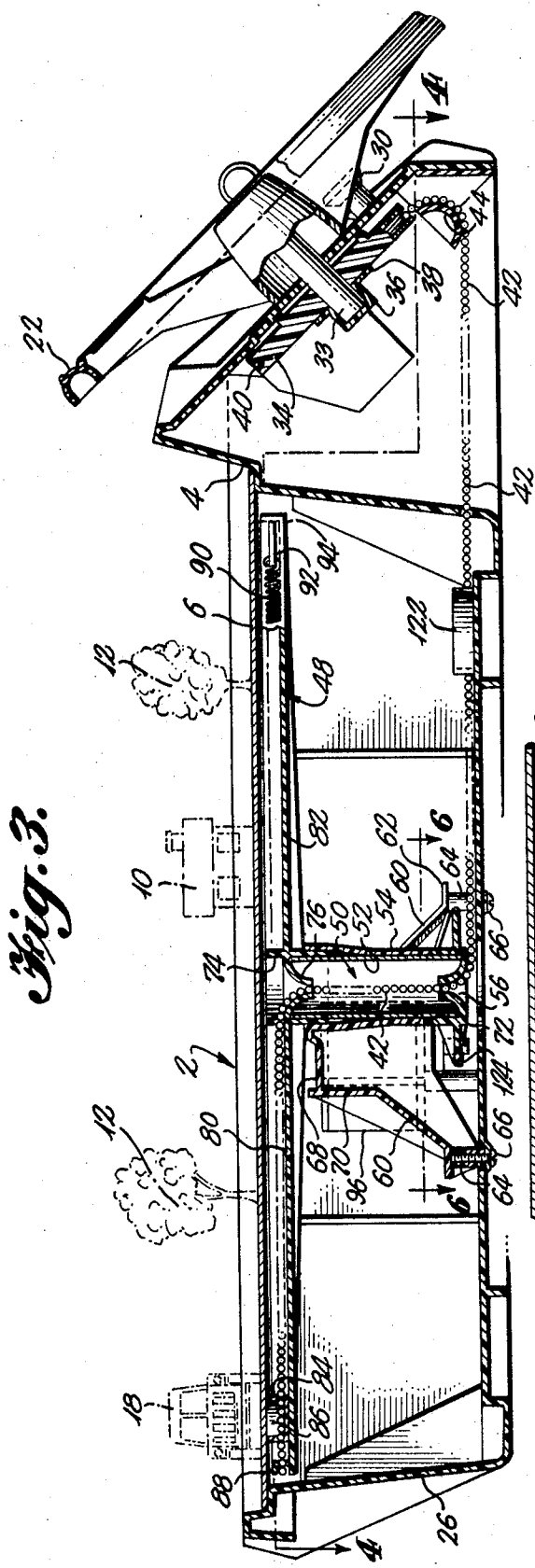


Fig. 3.

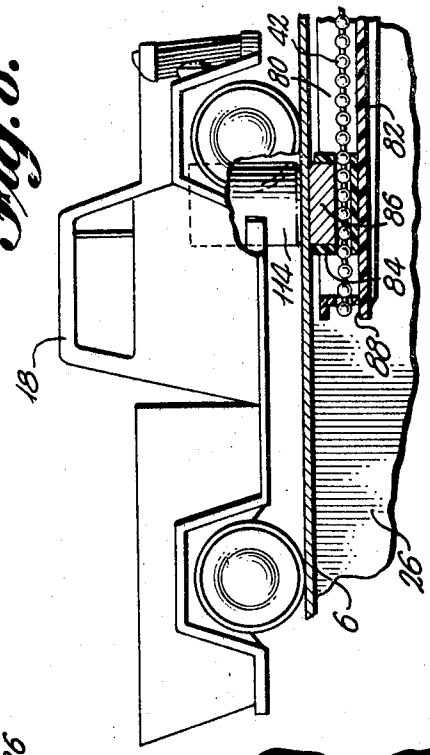


Fig. 8.

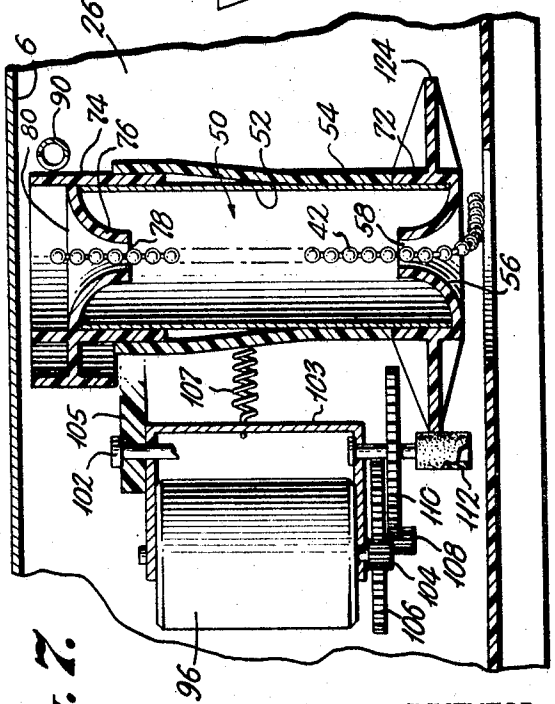


Fig. 7.

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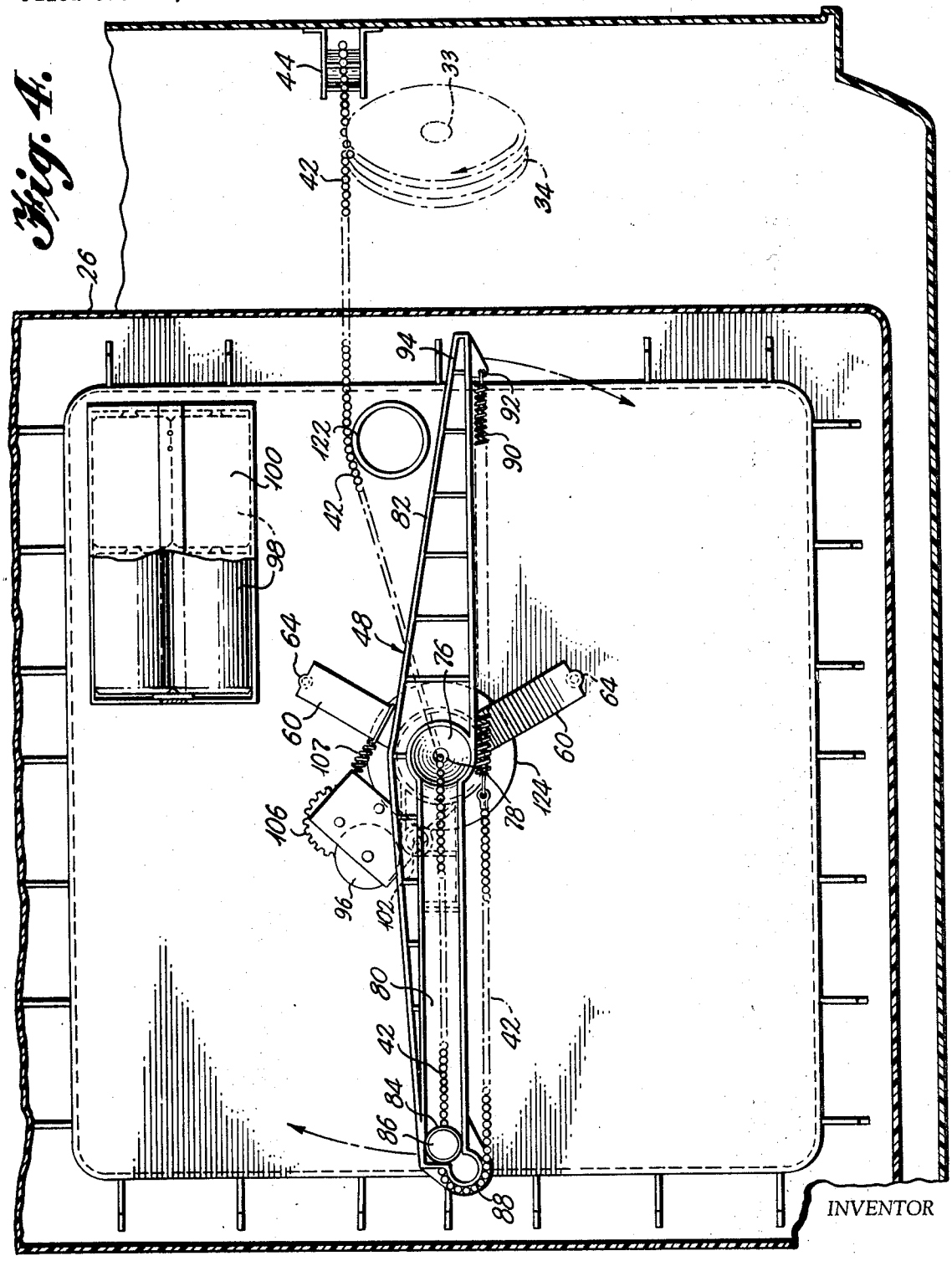
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TOY SIMULATING REALISTIC DRIVING CONDITIONS

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Fig. 4.



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TOY SIMULATING REALISTIC DRIVING CONDITIONS

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Fig. 5.

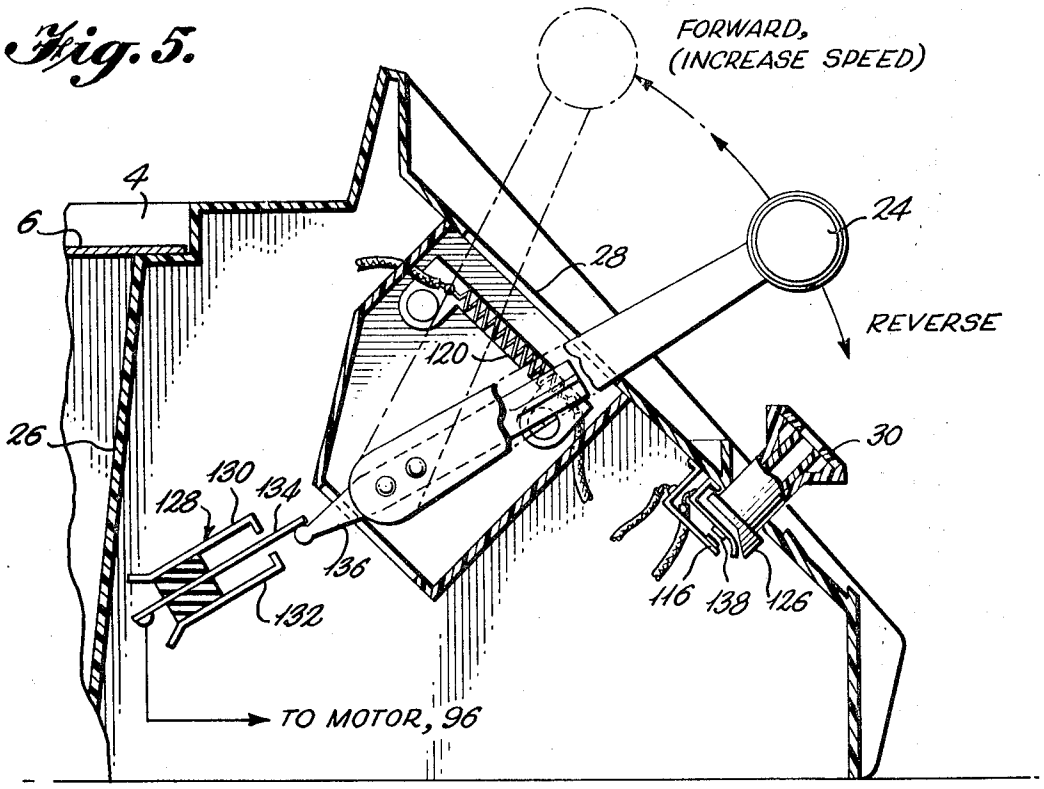
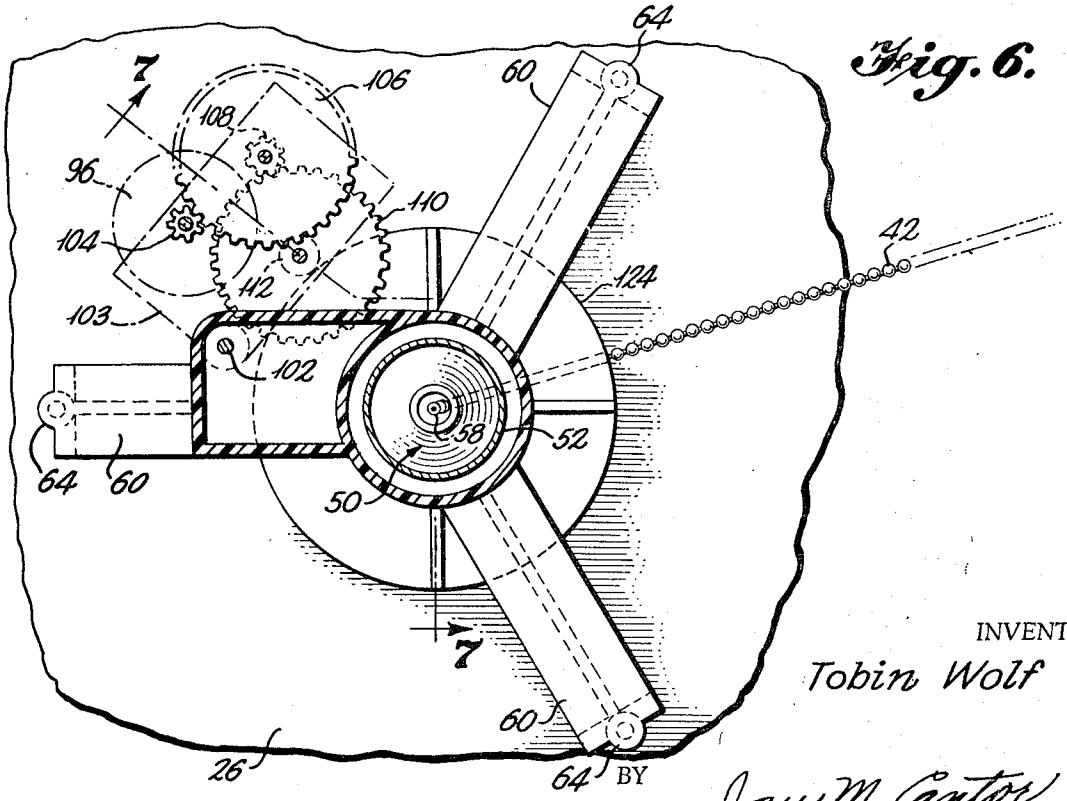


Fig. 6.



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3,525,175

TOY SIMULATING REALISTIC DRIVING CONDITIONS

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Filed Oct. 11, 1965, Ser. No. 494,462
The portion of the term of the patent subsequent to Aug. 25, 1986, has been disclaimed
Int. Cl. A63h 33/26
U.S. Cl. 46—240 2 Claims

ABSTRACT OF THE DISCLOSURE

A toy for simulating realistic driving conditions of an automobile. A housing carries a simulated terrain containing a maze of roadways and is provided with a steering wheel for controlling the vehicle. The vehicle is provided with a slave magnet for cooperation with a master magnet carried by a groove in a rotating arm under the simulated terrain. A beaded chain is connected to the master magnet and wheel and extends through the axes of rotation of the arm to shift the master magnet along the groove.

This invention relates to a toy or game for simulating realistic driving conditions and, more particularly, to a toy apparatus for simulating realistic driving conditions, wherein an individual may control the movement of toy vehicles about a prearranged terrain model by manipulating controls simulating the controls of full-sized vehicles.

Toys for simulating realistic driving conditions have been known in the prior art. Typical patents of this type are those of Oback, Pat. No. 2,806,323; Vingee, Pat. No. 2,993,299 and Favre, Pat. No. 2,903,821. The prior art has also disclosed the concept of moving a magnet beneath a surface, such as an artificial terrain model, for controlling a toy figure or vehicle. Such devices are shown in the above mentioned prior art patents.

The devices available heretofore have relied upon mechanical linkages for positioning toy vehicles on an artificial terrain by means of a series of orthogonal forces acting on the toy along a single flat plane. Devices of this type, while operating satisfactorily, have been cumbersome to operate, have required many parts, thereby being fragile and more readily breaking down, these devices also being expensive to manufacture due to the large number of operating parts required. Accordingly, devices of this type have met with limited commercial success in the past.

The problems displayed by prior art toys simulating realistic driving conditions are overcome in accordance with the present invention, wherein a simple, inexpensive and positive control of a toy vehicle on an artificial terrain model is provided which is far superior to the dedevices of the prior art.

In accordance with the present invention, full control of the vehicle is permitted following a polar coordinate path, permitting a freedom of movement and a realization of a more realistic and life-like depiction of automobile driving as well as a more realistic depiction of automobile control. Briefly, in accordance with the present invention, a miniature vehicle, intended to travel over an artificial roadway or the like, is provided with a coupling device on the chassis thereof to couple the vehicle to a moveable

drive and steering device, such as a magnet, which is positioned adjacent and preferably beneath the terrain. The moveable drive moves radially outwardly or inwardly from a center position of the terrain, such movement being provided by movement of a steering wheel which is manipulated by an operator sitting directly adjacent the terrain and viewing the terrain model. Forward and backward movement of the automobile as well as speed control thereof is provided by a rheostat controlled by a throttle, whereby the power provided to a motor which rotates the moveable drive means can be altered in speed and, if desired, reversed in direction by suitable adjustment of the throttle mechanism.

A principal object of this invention is to provide a patentably novel, magnetically coupled vehicle adapted for operation upon a novel terrain model having numerous roadways, buildings and other simulations of a town with streets and othe city environs, the vehicle being remotely controlled by controls substantially simulating the controls of a normal automobile.

It is a further object of this invention to provide a universally positionable toy vehicle controlled by easily manufactured durable and inexpensive positioning means.

It is a still further object of this invention to provide a simple, inexpensive magnetically coupled control and drive apparatus for universally positioning a toy vehicle which is foolproof in operation.

It is a yet further object of this invention to provide a simulation of a toy vehicle whereby the operator can simulate the travel of a vehicle on a terrain model.

It is an even further object of this invention to provide a simulation of a vehicle control for a toy vehicle, wherein the control mechanism controls the toy vehicle position by radial movements from the terrain center or another predetermined position of a controlling device, such as a magnet, operating directly beneath the terrain surface and controlled by a remote stearing wheel.

The above objects and still further objects of this invention will become apparent to those skilled in the art, when considered in view of the following description of a preferred embodiment of the invention, which is provided by way of example and not by way of limitation, wherein:

FIG. 1 is a perspective view of the terrain surface of the preferred embodiment of this invention;

FIG. 2 is a front elevational view of a suitable control panel for use with the present invention;

FIG. 3 is a sectional view of the preferred embodiment of the present invention;

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

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 2;

FIG. 6 is a plan view taken along the line 6—6 of FIG. 3;

FIG. 7 is a sectional view taken along the line 7—7 of FIG. 6;

FIG. 8 is an elevational view of a typical vehicle used in accordance with the present invention and positioned on the road bed above the magnetic positioning means; and

FIG. 9 is a diagram of the electrical circuit of the embodiment of FIGS. 3 to 7.

Referring first to FIG. 1, there is shown an elevational view of a complete toy simulating realistic driving con-

ditions in accordance with the present invention and labelled **2**. The toy includes a molded plastic enclosure **26** which includes an aperture **4** in the top surface thereof for receiving a simulated terrain surface **6** representing a portion of a town or a village and including various components thereon, such as a roadway **8**, buildings **10**, trees **12** and a service station **14**. Also included are crossroads **16** and a vehicle **18** positioned on one of the roadways. The terrain surface **6** is recessed below the upper surface of the enclosure **26**, a flange portion **20** being provided on the upper surface of the enclosure surrounding the simulated terrain **6**. To the rear of the upper surface of the enclosure **26** there is shown a portion of the steering wheel **22** and the throttle **24**. The toy also includes a base portion of the enclosure **26** wherein many of the components for control of the vehicle are positioned. The terrain surface **6** can be removed from the upper surface of the enclosure **26** to provide access into the interior of the enclosure in the event of repair to the internal mechanism or the like is required or in the event it is desired to replace the terrain surface **6** with a new terrain.

Referring now to FIG. 2, there is shown the control panel utilized in accordance with the present invention. The control panel includes the steering wheel **22** and the throttle **24** which is movable along the channel **28** for increasing or decreasing the speed of the automobile as well as reversing the travel of the automobile on the terrain **6**. An on-off switch **30** is positioned beneath the throttle for providing electric power through the motor (to be described hereinbelow) which provides the forward and backward motion to the automobile **18** (FIG. 1). Also included on the control panel are various knobs and meters to simulate the knobs and meters in a real automobile marked **32**. These meters are not used in the operation of the toy and are provided merely for decorative purposes and to provide an added element of realism to the toy.

Referring now to FIGS. 3 to 7 and particularly to FIG. 3, there is set forth the operating mechanism in accordance with the present invention for providing motion to vehicle **18** on the terrain **6** by means of control elements at the control panel which consists of the steering wheel **22** and the throttle **24**. Also shown on the control panel portion of the chassis is the key operated on-off switch **30**. The steering wheel **22** includes a shaft **33** secured thereto and passing through an aperture in the molded enclosure **26** to a pulley or guide member **34** which includes a central aperture through which the shaft **33** passes. The shaft **33** is secured to the pulley member **34** by a key (not shown) so that the pulley turns with the shaft and the steering wheel. The shaft **33** is held in position by means of a friction-fitting member **36** which passes over the end portion of the shaft **33** and abuts the pulley **34** and its flanges **38**. The pulley can move axially along the shaft. As an alternative, the pulley **34** may be press fitted to the shaft **33**, thereby eliminating the friction-fitting member **36** and the key. The pulley member **34** includes an annular recess **40** along its outer edge portion in which is positioned a bead chain **42** which is taken up or released in the groove **40** by rotation of the steering wheel **22**. The bead chain **42** passes around pulley **34** in the groove **40** thereof and is secured thereto. The bead chain **42** then passes around a pulley or guide **44** secured to the enclosure **26** and around a pulley or guide **122**. The bead chain **42** then passes along the bottom portion of the enclosure **26** to a beam member **48** described in detail hereinbelow.

The beam member **48** includes a cylindrical channel **50** through which the bead chain **42** passes. The cylindrical channel **50** is formed by an annular cylindrical shaft **52** which is positioned within a larger substantially cylindrical member **54** which bows outwardly at one end thereof at its upper portion and forms a portion of a spider **60**. The hollow cylindrical shaft **52** is rotatable within the portion **54** of the spider **60**. The spider **60** includes an outwardly extending member **68** secured to the spider portion **54**. A downwardly extending member **70** extends downward from the other end portion of the member **68** and a 45° outwardly extending bend continues from the other end of the member **70**. An outwardly extending flange, which runs substantially normal to the 45° bend member **70**, is integral with one end of the 45° bend and secured thereto is a hollow threaded cylindrical member **64** for receiving bolts therein. Three such structures having members **62**, **64**, **68** and **70** are positioned at approximately 120° apart. The spider **60** is secured to the base portion of the enclosure **26** by means of threaded bolts **66** which pass through apertures formed in the base of the enclosure **26** and which are received in the threaded bolt receiving interior of the cylindrical member **64**.

A second hollow cylindrical member **72** of the same diameter as the cylindrical member **54** is positioned coaxial with and below the cylindrical member **54** and abuts the cylindrical member **54**. The cylindrical member **72** is secured to the hollow cylindrical shaft **52** for rotation therewith. An inwardly extending flange member **56** extending into the channel **50** and defining a small aperture **58** opens into the channel for directing the path of travel of the bead chain **42** which passes therethrough. The cylindrical member **72** also includes an outwardly extending flange or drivewheel **124** normal thereto and of annular shape for abutting a power means (to be explained hereinbelow) which provides the rotation to the shaft **52** and the cylindrical member **72**.

A third cylindrical member **74** of substantially the same shape as the cylindrical member **72** is positioned coaxial with the shaft **52** and secured to the upper portion of the shaft **52**. The cylindrical member **74** rests between the shaft **52** and the outwardly extending or bowed portion of the cylindrical member **54**. The cylindrical member **74** also includes an inwardly extending flange member **76** which is similar to the flange member **56** but extends downwardly into the channel **50** and defining a small aperture **78** opening into the channel for directing a path of travel of the bead chain **42**. A rotating beam arm member **82** is molded as an integral part of the cylindrical member **74**, the beam arm member **82** including a channel **80** therein.

The bead chain **42** extends around the flange member **76** and along the channel **80** of the rotating beam arm member **82**. The bead chain **42** is connected to one end of a plastic cup **84** which contains therein a magnet **86** for movement along the channel **80** of the rotating beam arm member **82**. The bead chain **42** is continued from the other end of the plastic cup **84** around a pulley or guide **88** where the bead chain then passes parallel to its path of travel from the flange **76** to the cup **84** whereupon the bead chain joins and is connected to a tension spring **90**. The tension spring **90** is secured at its other end in an aperture **92** at the far end of the portion **94** of the rotating arm beam member.

The outwardly extending flange portion or drivewheel **124** of the cylindrical member **72** is set into motion about the axis of the cylinder **72** by means of a motor powered as stated hereinabove. This power is provided by means of a motor **96** to which power is supplied by means of a set of batteries **98** secured within a battery compartment **100** positioned in the base of the molded enclosure **26**. Power from the batteries **98** to the motor **96** is supplied by means of the on-off switch **30** (FIGS. 2 and 5) which can be operated by a key (not shown) and is in the direct line of the flow of current from the batteries **98** to the motor **96** and closes the circuit when the switch **30** is in the "on" position.

The on-off switch **30** includes a cam **126** secured thereto which turns with the switch **30**. In this manner, rotation of the switch **30** with a key will cause the cam **126** to rotate and force the contact **138** against the contact **116** to close the circuit from the batteries **98** to the motor **96**.

The amount of current flowing from the batteries **98**

to the motor **96** is determined by the throttle handle **24** which operates a rheostat **120** positioned in series with the battery **98** and the motor **96**. This circuit also includes a switch such that a sufficient movement of the throttle handle **24** will cause a reversal of the current travelling from the battery **98** to the motor **96**, thereby reversing the rotation of the motor **96**. Half of such reversing switch **128** is shown in FG. 5, wherein the contact **130** is connected to the positive battery terminal and the contact **132** is connected to the negative battery terminal. The contact **134** is resilient and is connected to one terminal of the motor **96** and is normally biased against the contact **132**. The throttle handle **24** includes an extending finger **136** which abuts the contact **134** and forces contact **134** against contact **130** when the throttle handle **24** is moved in the clockwise direction as shown in FIG. 5. The reversing switch also includes a second section (not shown) which can be identical to the reversing switch half **128** with the corresponding contact **134** connected to the other motor terminal and with the polarity of the contacts **130** and **132** reversed. This second switch half would be operated by the finger **136** in the same manner described hereinabove so that either contacts **130** or contacts **132** of both switch halves would be connected across the motor simultaneously. This action can also be provided by means of a customary switch as shown in FIG. 1 in the patent to Reiser, No. 2,923,092. Many other methods of providing such operation are well known in the art and need not be further discussed herein.

The motor **96** is mounted in a U-shaped metal motor bracket **103**, the motor bracket being secured to the base portion of the enclosure **26** by means of a hinge pin **102** which extends through the extension **105** of the spider **60** and then through the motor bracket and is secured in the base portion of the chassis (not shown). The shaft of the motor **96** includes a gear element **104** which drives a gear element **106**. Gear element **106** in turn includes, on the shaft thereof, a smaller gear element **108** for driving the gear element **110**. The shaft of the gear element **110** includes a rubber drive sleeve **112** which abuts the flange member **124** or drivewheel of the cylindrical member **72** to provide rotation to the shaft **52** and thereby to the rotating beam member **48**. The sleeve **112** is maintained in abutting relation with the flange member **124** by means of the spring **107** (FIG. 7).

Positioned on the artificial terrain **6** is the vehicle or automobile **18** which includes at the bottom portion thereof a magnet **114**. The vehicle **18** is shown in greater detail in FIG. 8. The magnet **114** is positioned above the magnet **86** for movement therewith.

Referring to FIG. 9, there is shown the electrical circuit diagram of the present invention. The electrical circuit includes a battery **98** connected across a reversing or double-pole double-throw switch **128** having contacts **130** and **132** and **130'** and **132'** and moveable contacts **134** and **134'**. The reversing switch **128** allows current to flow in the desired direction from battery **98** through the motor **96** and the speed controlling rheostat **120**.

In operation, power is provided by turning the ignition switch **30** (FIGS. 2 and 5) to the "on" position, thereby closing the switch comprising contacts **116** and **126** (FIG. 5) and supplying power from the batteries **98** to the motor **96**. This causes the motor to rotate and rotate the beam **48**, thereby causing the vehicle **18** to revolve in a counterclockwise direction on the artificial terrain member **6** due to the action of magnets **86** and **114**. The speed of rotation of the vehicle **18** is controlled by movement of the throttle arm **24** (FIGS. 2 and 5) by rotating the throttle arm **24** about its pivot **118** so that it can move along the resistor **120** to provide varying amounts of resistance in series with the battery-motor circuit. As stated hereinabove, a double-pole double-throw switch as shown in the prior art is used to provide the reverse motion for counterclockwise rotation of the motor **96**. As a second alternative, the reference potential can be tapped from the center of the resistor **120**, thereby providing both positive-going and negative-going current to the motor **96**, depending upon the position of the throttle arm **24**.

It can be seen from the aforementioned statement of operation of the motor circuit that the vehicle can travel in either a forward or reverse direction at any desired speed. A second type of motion which is a radial motion inwardly and outwardly from the center of the rotating arm is provided by rotation of the steering wheel **22**. Rotation of the steering wheel **22** causes the bead chain **42** to be let out by the pulley **34** or to be taken up, depending upon whether the steering wheel **22** is rotated in the clockwise or counterclockwise direction. Assuming rotation of the steering wheel in the clockwise direction, it can be seen that the bead chain will be let out and therefore will travel through the apertures **78** and **58** and along the channel **80** of the rotating beam, thereby forcing the magnet **86** and the cup **84** to move outwardly, away from the axis of the shaft **52** and thereby moving the vehicle **18** therewith away from the center of the terrain. Such action would contract the tension spring **90**. It can be seen that the rotation of the steering wheel in the counterclockwise direction would cause the bead chain **42** to be taken in and therefore allow the magnet **86** and the cup **84** to move radially inward to the axis of the shaft **52** against the force of the tension spring **90**. Accordingly, the vehicle **18** would be moved radially inward toward the axis of the rotating beam member, thereby providing a degree of resistance to the movement as would be encountered under normal driving conditions.

It can be seen that the vehicle **18** is subject to two simultaneous forces, one being a radially inward or outward force provided by means of the steering wheel **22**, the bead chain **42** and the magnet **86**. Also, a forward and reverse motion is provided by means of the ignition switch **30** and the throttle **24** which controls the electrical circuit and the motor **96** which causes rotation of the rotating beam member. The combination of these forces provides the resultant movement of the vehicle **18**.

Although the invention has been described with respect to a specific preferred embodiment thereof, it should be understood that many variations thereof will immediately became obvious to those skilled in the art. For example, a bead chain need not be used but, on the contrary, any type of wire-like or string-like element could be used in place thereof. Also, the rotating beam member **48** need not include a pair of radial arms but, on the contrary, could be a circular disc member and need only have the property of being rotatable and having a channel for movement of the magnet **86** therein. Also, if desired, the tensioning of the steering wheel can be adjusted as, for example, by placing a spring or spring washer between the member **36** and the pulley **34** to maintain a pressure between the annular groove **40** on the pulley and the adjacent face of the enclosure. This provides stability to the steering wheel and provides a slight brake drag that prevents the force exerted by spring **90** from turning the steering wheel. In additon, different landscapes may be used.

Since, as stated above, many variations and alterations of the present invention will immediately become obvious to those skilled in the art from the reading of the preferred embodiment of the invention provided hereinabove, it is the intention that the claims appended hereto be interpreted as broadly as possible in view of the prior art to include all such variations and modifications.

What is claimed is:

1. A toy comprising a casing, a nonmagnetic sheet carried by the casing having a simulated terrain thereon and means mounting a master magnet under the sheet for rotation about an axis normal to the sheet and for shifting movement laterally of said axis, said means compris-

ing a carrier, a tubular column secured to the carrier mounted for rotation about said axis, a pair of conical guides in the column having openings on said axis with the large openings of the cones adjacent the ends of the column, a steering wheel mounted on the casing, and a beaded chain connecting the wheel and magnet and guided along the axis of rotation through the column by said openings whereby the magnet can be shifted by the rod while the carrier is rotating, said carrier being secured to one end of the column and a circular flange is secured to the other end, an electric motor mounted adjacent the column, a driving wheel in frictional driving engagement with the flange, and means connecting the motor for driving the wheel.

2. A toy as defined in claim **1** further including an

electric motor for rotating the column and throttle means carried by the casing for varying the speed of the motor.

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U.S. Cl. X.R.

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