The present invention relates to wheeled toy vehicles, such as automobiles, provided with steering means, and has as one of its main objects to construct such a vehicle with a self-steering mechanism.

Steerable toy vehicles have been known, in which the wheels are turned by means of a steering wheel or handle, connected by a shaft to said wheels. Obvious difficulties are encountered in the operation of these known vehicles, arising from the fact that the steering thereof must be carried out manually. Thus, the individual operating the vehicle must move at least one hand along with the moving vehicle in order to turn the steering wheel or handle.

It is therefore a principal object of the present invention to provide means facilitating easy and automatic steering of toy vehicles.

Another object of the present invention is to provide means enabling the steering of toy vehicles without the necessity of manual operation of the steering mechanism thereof.

It is still another object of the present invention to provide means affording a simplified construction for the self-steering operation of toy vehicles along even and slanting surfaces.

These and other objects of the invention will become apparent from the following detailed description, reference being made to the accompanying drawings.

In the drawings:

Fig. 1 is a side elevation of an embodiment of a toy vehicle in accordance with the invention, the vehicle body being shown diagrammatically;

Fig. 2 is a top plan view of the toy vehicle shown in Fig. 1, the vehicle body being removed, and the steering wheel being shown in broken lines;

Fig. 3 is a front elevation of the toy vehicle shown in Fig. 1, with the vehicle body removed and with the emission of the steering wheel;

Fig. 4 is a side elevation of a supporting stand providing surfaces which can be inclined in various directions and with the toy vehicle thereon shown on a smaller scale.

Referring to Figs. 1 to 3, the reference numeral 1 denotes the frame of a toy vehicle having a back axle 2 on which the back wheels 3 are mounted. Fixed on the front end of the frame 1 is the front axle 4, to the ends of which the steering knuckles 5 with the axle journals for the front wheels 6 are hinged. These steering knuckles 5 are provided with tie-bar levers 7 which are hingedly connected with the ends of an L-section rail 8 which serves as a tie bar. Fixed along the longitudinal axis of the frame 1 of the vehicle and toward the rear thereof is a vertical axle 9 on which a steering lever 10 is pivotally mounted. The front, free part of this steering lever 10 is connected to the above-described steering means, and lies in a slot 11 which is provided at the transverse center of the vertical arm of the rail 8. A steering member or weight having a convex outer surface, which may be in the form of a solid metal ball 12, is mounted so as to be freely rotatable on the steering lever 10, and is held with clearance in longitudinally fixed position between two adjusting rings 13 and 14.

This metal ball 12 rests on a guide surface of a concave guiding member 15 which is arranged on the frame 1 of the vehicle. The surface of the guiding member 15, which extends transversely over the whole width of the frame 1 of the vehicle, is curved in such a manner that its lowest part lies exactly along the longitudinal axis of the frame 1 of the vehicle. A steering-gear rod 17 with a steering wheel 18 is mounted on the frame 1 of the vehicle in a bearing 16. The steering-gear rod 17 passes through a wide eye plate 19 inserted between the rear and the front portions of the steering lever 10, and is wound round a number of times by a cord 20 which is stretched transversely over this eye plate 19, so that the steering lever 19 together with the eye plate 19 can be swung to and fro by rotating the steering wheel 18 and the steering-gear rod 17. The body of the toy vehicle is indicated in Fig. 1 merely by a part of its outline. This body may be of any desired shape and may represent a passenger car, a lorry, a tank or any other desired vehicle.

An operating surface 21 for the toy vehicle, which is denoted as a whole by A in Fig. 4, can be inclined in various directions, and may, as represented by way of example in Fig. 4, be mounted on the apex of a cone 22 or on the top of a supporting stand on a ball 23.

If the toy vehicle A is placed on the surface 21, and the latter is inclined in the direction in which the toy vehicle is facing the vehicle will run forward. However, if the surface 21 is inclined to one side, the comparatively heavy metal ball 12 will shift along the guide surface of the guiding member 15 to the side to which the surface 21 is inclined and, in so doing, will swing the steering lever 10 about the axle 9; as a result, the steering lever 10 will displace the rail 8, which serves as a tie bar, to the corresponding side of inclination and thus rotate the steering knuckles 5 together with the front wheels 6 by means of the tie-bar levers 7. The toy vehicle A is thus steered towards the side to which the surface 21 is inclined. The curvature of the surface of the guide member 15 causes the metal ball 12 to shift only in accordance with the lateral inclination of the surface 21. Consequently, the steering of the toy vehicle A to the side is effected only to an extent corresponding to the degree of inclination of the surface 21, whilst, if the guide surface were level, a maximum deviation of the toy vehicle A would occur at every slightest inclination of the surface 21. By altering the direction and the extent of the inclination of the running surface, the toy vehicle A can be caused to alter its direction of travel and to travel through any desired curves.

Obstacles (not shown in the drawings) may be arranged on the surface 21, it requiring skill on the part of an operator, to cause the vehicle to travel, and to steer it, by altering the inclination of the surface 21, in such a manner that it travels around such obstacles. The toy vehicle A can also be steered by hand by means of the steering wheel 18.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the above-described claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A self-steering toy vehicle having a frame mounted on at least three wheels; comprising steering means connected to at least one of said wheels, an axle carried by said frame and extending upwardly therefrom, a steering lever pivotally mounted on said axle and operatively con-
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connected to said steering means, a weight provided with a convex outer surface and mounted to be longitudinally fixed upon and coaxially rotatable about said steering lever; a guide track provided with a concave surface curving in crosswise direction of said frame, said weight being adapted to be guided by the convex surface thereof sliding within said concave surface of said guide track, whereby, when said frame is laterally inclined with respect to the longitudinal direction of movement of said toy vehicle, said weight will be guided transversely to the frame along said concave surface of said guide track and said steering lever will pivot about said axle, thereby causing said lever to actuate said steering means for directing said wheels toward said inclina-

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2. A self-steering toy vehicle having a substantially horizontal frame equipped with four wheels; comprising steering means connected to two adjacent wheels, an axle carried by said frame and extending substantially perpendicular thereto, a steering lever pivotally mounted on said axle and operatively connected to said steering means to actuate the latter, a weight longitudinally fixed on and coaxially rotatable about said steering lever, said weight being provided with a first curved outer surface, a guide track provided with a second curved surface for guiding relationship with said weight, said guide track extending across said frame, the deepest point of curvature of said curved surface of said guide track being located substantially centrally of said two adjacent wheels and along the longitudinal axis of said frame, whereby, when said frame is laterally inclined with respect to the longitudinal direction of movement of said toy vehicle, said weight will move due to the force of gravity along said second curved surface of said guide track and pivot said steering lever therewith about said axle, thereby actuating said steering means for directing said two adjacent wheels to assume a position toward the inclination of said frame.

3. A toy vehicle having a substantially horizontal frame equipped with four wheels; comprising steering means connected to two adjacent wheels, each of said adjacent wheels being pivotable about a steering knuckle mounted on said frame, an axle carried by said frame and extending substantially perpendicular thereto, steering lever means swingably mounted on said axle and operatively connected to said steering means to actuate the latter, said steering means including a tie bar and tie-bar levers hinged connecting said two adjacent wheels, said tie-bar having a slot therein in which a portion of said steering lever means lies, a weight longitudinally fixed on and coaxially rotatable about said steering lever, said weight being provided with a first curved outer surface, a guide track provided with a second curved surface for guiding relationship with said weight, said guide track extending across said frame, the deepest point of curvature of said curved surface of said guide track being located substantially centrally of said frame.

4. A self-steering toy vehicle having a frame mounted on at least three wheels; comprising steering means connected to at least one of said wheels, an axle carried by said frame and extending upwardly therefrom, a steering lever pivotally mounted on said axle and operatively connected to said steering means, a weight provided with a guide surface and mounted to be rotatable at its location on and about said steering lever, a guide track provided with a surface extending in crosswise direction of said frame, said weight being adapted to be guided by said guide surface along said surface of said guide track, whereby, when said frame is laterally inclined with respect to the longitudinal direction of movement of said toy vehicle, said weight will be guided transversely to the frame along said surface of said guide track and said steering lever will pivot about said axle, thereby causing said lever to actuate said steering means for directing said wheels toward said inclination.

5. A self-steering toy comprising a frame mounted on a plurality of wheels including a front pair of wheels, steering means connected to said front pair of wheels, an axle carried by said frame extending normal thereto, a steering lever pivotved to said axle and connected to said steering means, a spherical weight longitudinally fixed upon and coaxially rotatable about said steering lever, an arcuate guidetrack mounted on said frame transverse thereto, said weight engaging said track so that when said frame is laterally inclined with respect to the longitudinal direction of movement of said toy, said weight is guided transversely to said frame along said track and said steering lever will pivot about said axle causing said steering lever to actuate said steering means for directing said front pair of wheels towards the inclination.

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