

April 9, 1968

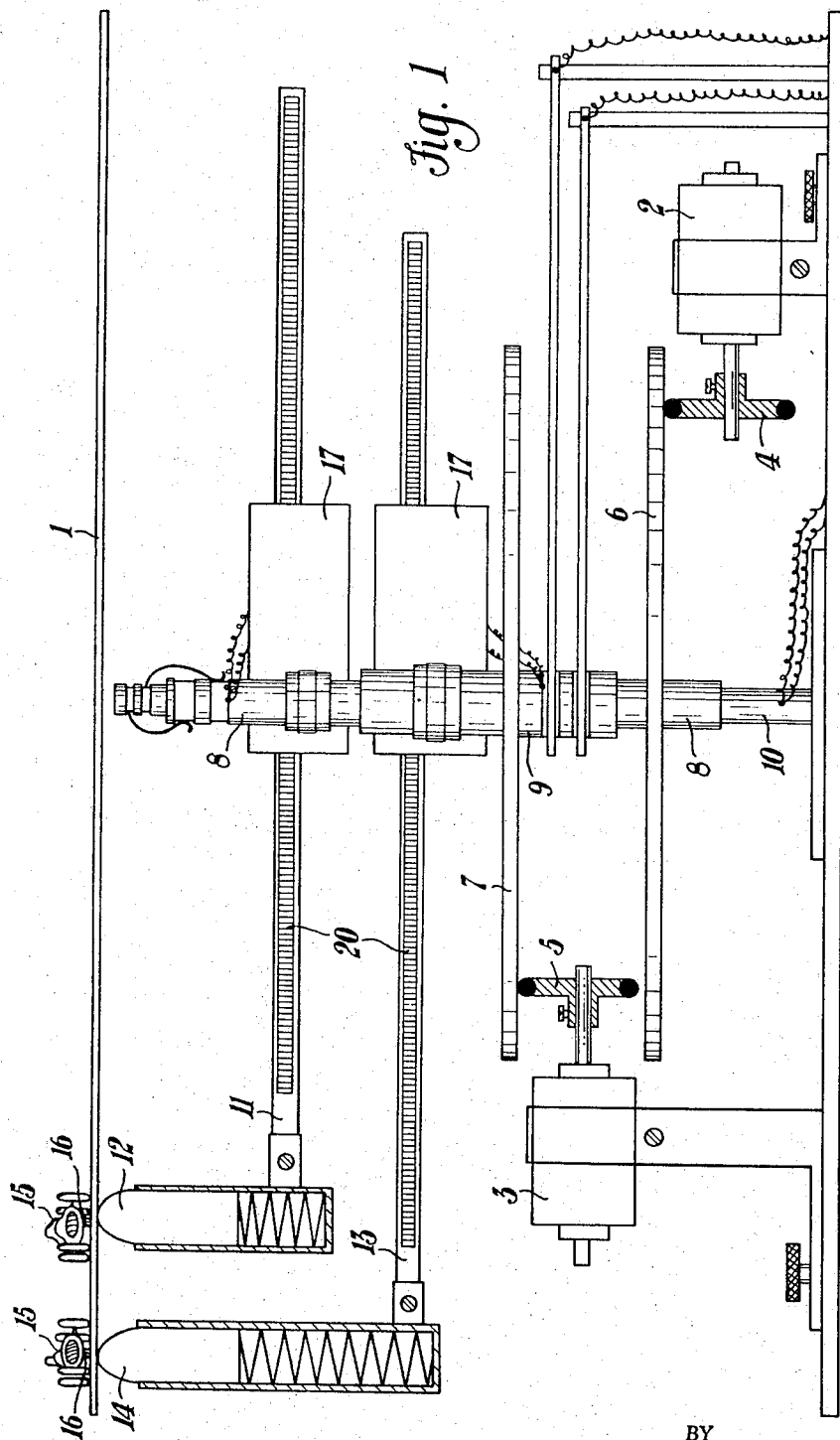
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3,377,067

MINIATURE RACE COURSE

Filed Dec. 9, 1965

4 Sheets-Sheet 1



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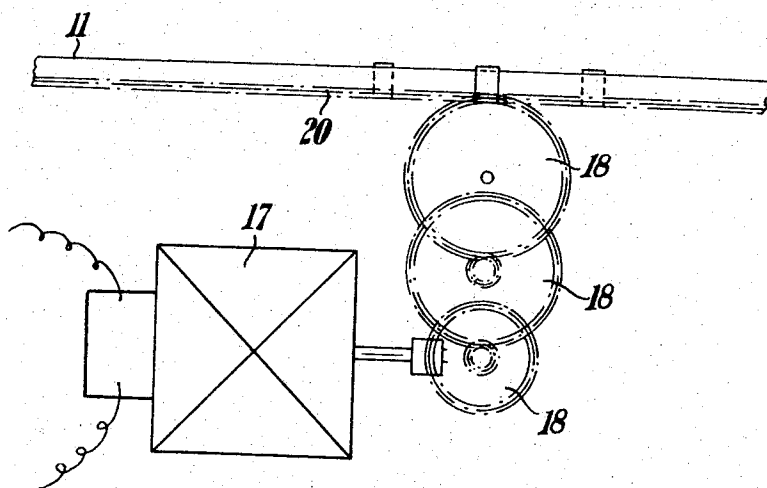


Fig. 2

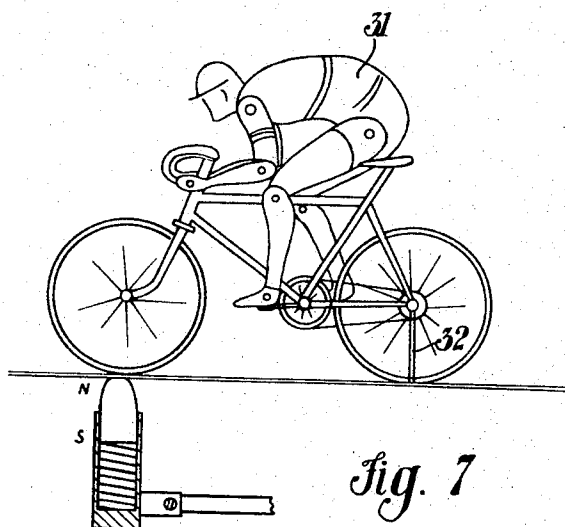


Fig. 7

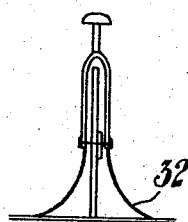


Fig. 8

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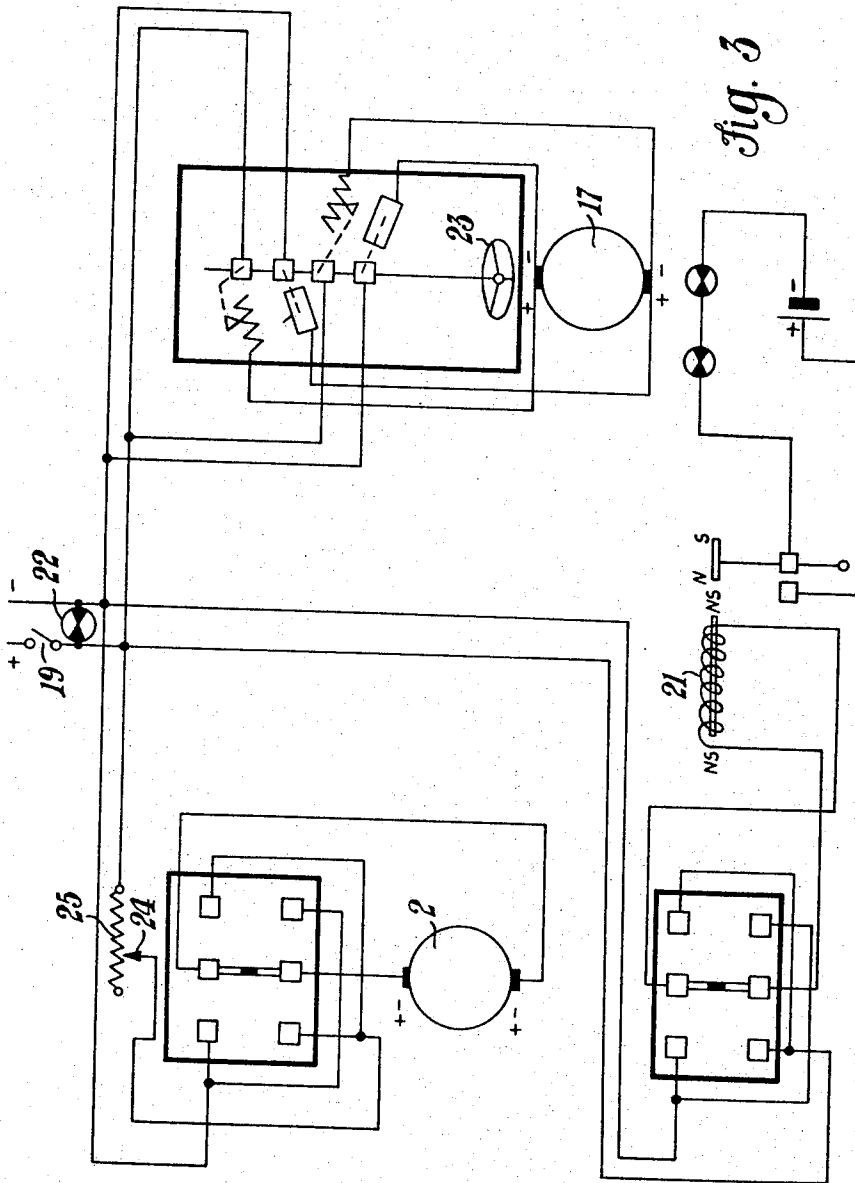


Fig. 3

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Fig. 4

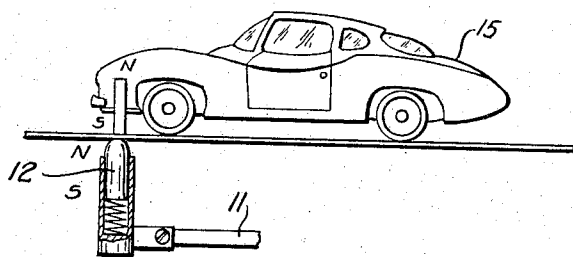


Fig. 5

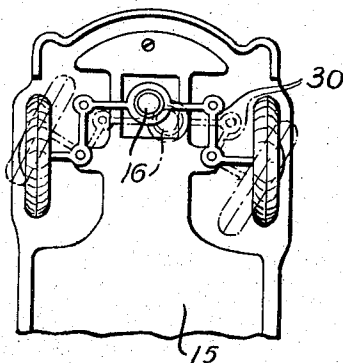
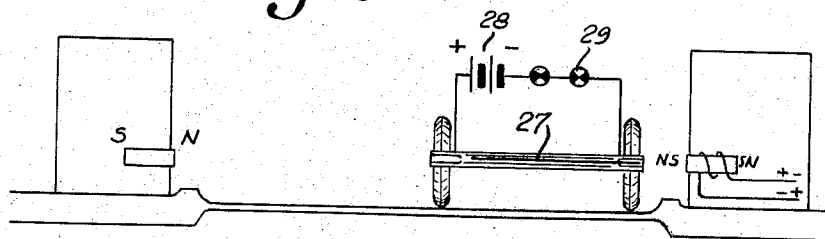


Fig. 6



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MINIATURE RACE COURSE
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This invention relates to a miniature race course and refers more particularly to a device reproducing the race of two or more miniature vehicles along a predetermined track.

An object of the present invention is the provision of a device of the described type capable of giving a precise impression of a real competition in speed between two or more vehicles moving along predetermined courses.

Other objects will become apparent in the course of the following specification.

The invention eliminates the necessity of providing drives in the vehicles or of rolling them along a desired course in that the movement of the vehicles is effected by magnetic means.

According to the invention an apparatus is provided which includes a thin board of dielectrical materials having upon its upper surface suitable indicia representing race tracks, including curves, straight portions, ascending and descending sections, etc. Below the board magnets are provided which are carried by arms capable of rotary and longitudinal movements, the magnets being pressed against the undersurface of the board and adapted to attract magnets carried by miniature vehicles placed upon the board. Thus when the arms are actuated, the magnets carried by the arms will move the vehicles. Means are provided which will cause the vehicles to traverse predetermined courses with regulatable speeds and in different directions.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing by way of example, preferred embodiments of the inventive idea.

In the drawings:

FIGURE 1 shows in side view, partly in section, an apparatus of the present invention, including means rotating the operating arms.

FIGURE 2 is a detail diagrammatic view showing means for the axial movement of the operating arms.

FIGURE 3 is a diagram showing the electrical connections.

FIGURE 4 is a side view, partly in section, illustrating one of the miniature vehicles.

FIGURE 5 is a bottom view of a portion of a miniature vehicle on an enlarged scale, some parts being shown in section.

FIGURE 6 is a diagram representing electrical means carried by a miniature vehicle.

FIGURE 7 is a side view, partly in section, illustrating a miniature bicycle and its rider.

FIGURE 8 is an end view of the miniature bicycle shown in FIG. 7, without its rider.

The miniature race course shown in the drawings includes a board 1 consisting of a dielectrical material carrying the representation of a fixed race course.

Two small electrical motors 2 and 3 are mounted below the board 1. The motor 2 drives a disc 4 provided with an outer rubber insert. The motor 3 drives a similar disc 5. The disc 4 engages and rotates a round plate 6 fixed upon a tubular sleeve or shaft 8. The disc 5 engages and rotates a round plate 7 which is fixed upon a sleeve or shaft 9 mounted upon the shaft 8. The tubular shaft 8 is mounted upon a fixed vertical shaft 10. The shafts 8 and 9 are movable relatively to each other and to the shaft 10.

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The shaft 8 is firmly connected with a casing carrying an arm 11 having teeth 20, so that the shaft 8 is rotatable along with the arm 11. The outer end of the arm 11 carries a magnet 12 slidably pressed by a spring against the underlying surface of the board 1. The shaft 9 is firmly connected with a casing carrying an arm 13 having similar teeth 20. The arm 13 is rotatable along with the shaft 9. The outer end of the arm 13 carries a similar magnet 14 slidably pressed by a spring against the board 1. The two magnets operate independently of each other. The board 1 carries miniature vehicles 15, each of which carries a magnet 16. It is apparent that magnetic forces of attraction of the magnets 12 and 14 will act upon the magnets 16, so that the vehicles 15 will move along with the magnets 12 and 14.

The toothed arms 11 and 13 which rotate about the shaft 10, can be also moved in their longitudinal direction by the device shown in FIG. 2 and comprising for each arm a small electrical motor 17 carried by each rotary shaft and driving a set of interengaging gears 18. The last of these gears engages the teeth of the arm. Thus by the use of the gears 18, the motors 17 can move the arms 11 and 13 longitudinally in opposite directions.

These devices make it possible to move the vehicles along any course which may be represented upon the board 1.

FIGURE 3 shows diagrammatically the electrical connections pertaining to a single vehicle. The electrical connections of the other vehicle are the same and are not illustrated. The current used is direct current produced by a common transformer-rectifier and used to operate the small electrical motors 2, 3 and 17 in opposite directions and with variable speeds produced by the usual electrical switches and resistances.

All actuating controls may be located in a box having the outline of a car section, such as the dashboard (not shown). These controls include a general switch 19 having an indicating lamp 22, a switch 23 used to operate the motor 17 and a switch 24 used to operate the motor 2.

The general switch 19 has the purpose of energizing the entire circuit through current from the transformer, said current lighting the indicating lamp 22. The switch 23 has the shape of a disc the shaft of which is connected with the motor 17 by variable resistances. In a central position of the disc 23 the motor 17 is switched off. The turning of the disc 23 in one direction will actuate the motor 17 in one direction, while by turning the disc 23 in an opposite direction the motor 17 will be also rotated in the opposite direction. The speed of the motor 17 will depend on the extent to which the disc 23 is turned. Since the motor 17 operates a toothed arm, the disc or switch 23 will make it possible to move a car 15 diagonally with lesser or greater speed.

The circumferential movement of the vehicle 15 is produced by a switch or contact 25 movable over a resistance 24 which is connected by suitable means with the motor 2. In this case also the motor 2 is switched off in a central position of the contact 24. Movement of the contact 24 in one of two directions will actuate the motor in that direction and the speed of the motor is increased as the contact 24 is further moved. As already stated, the motor 2 produces a rotation of the arm 11, so that a car 15 will carry out a circular movement.

It is apparent that a user can operate simultaneously the disc 23 and the contact 24. Then the car 15 actuated by a magnet 12 will carry out a composite movement the direction of which will be determined by the sum of circumferential and radial forces acting upon the arm 11. Thus the car 15 will be able to move in substantially any direction upon the board 1.

FIGURES 4 and 7 show two types of vehicles which

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are most likely to be used on a race track and which will be most effective, namely, an automobile and a bicycle.

The miniature car 15 is made of a plastic material of any suitable type and carries the small cylindrical magnet 16 which is magnetically attracted by the other magnet 16 movable under the board, as shown in FIG. 1.

The small magnet 16 is movably mounted in the car casing and is connected with the front wheels of the car by a system of pivoted levers 30. As shown by broken lines in FIG. 5, a movement of the magnet 16 caused by the underlying magnet 12, will result in a turning of the wheels.

The miniature car of the present invention is provided with headlights 29 and within the car a small battery 28 is located (FIG. 6) which is used to turn on the headlights by means of the switch shown in FIG. 3.

The headlight switch is of the usual type which makes it possible to reverse the direction of the electrical current. It is connected to an electromagnet 21 located within a casing close to the edge of the track. Thus when the headlights of the miniature car are to be turned on or off, it is merely necessary to move the car close to the casing and turn on the switch. Then the electromagnet 21 will either attract or repel a magnetic rod 27 slidably mounted within the rear axle of the car. The rod 27, as the result of its movement, will either close or open the electrical circuit located within the car and consisting of the battery 28 and the two electrical lamps 29 (FIG. 6).

The bicycle shown in FIGS. 7 and 8 is a miniature copy of a real bicycle and must be made of a very light plastic material, with the exception of the front wheel which must be made of metal.

The wheels are rotatably mounted and the rotation of the rear wheel is transmitted to pedals which are engaged by the pivoted legs of the figure 31 of the rider. The rear of the bicycle carries a thin outwardly spreading fork 32 supporting the bicycle upon the surface of the board and assuring its upright position.

The above described apparatus can be obviously used for any number of vehicles. However, since the mechanism operating the vehicles is the same, only two vehicles have been illustrated for the purpose of simplifying the description.

It is apparent that further variations and modifications can be made in the described preferred embodiment without departing from the scope or intent of the present invention. All such variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. A miniature race track device, comprising in combination with a number of miniature vehicles and a magnet carried by each vehicle, a board of dielectrical material having upon its upper surface a representation of a race track and adapted to carry the miniature vehicles,

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a number of arms located under said board, the number of said arms each carrying a magnet corresponding to that of said vehicles, means rotating each arm about a vertical axis, means moving each arm comprising an electric motor, a shaft connected with said motor and a gear transmission driven by said motor, and wherein each arm has a plurality of teeth extending longitudinally upon the arm and engaged by said gear transmission, and a magnet carried by the outer end of each arm and pressing against the under surface of said board.

2. A device in accordance with claim 1, wherein at least one miniature vehicle has the form of an automobile having front wheels and pivoted levers for turning said front wheels, the magnet carried by the vehicle being adapted to actuate said levers.

3. A device in accordance with claim 1, wherein at least one miniature vehicle has the form of an automobile having a light, a battery for said light and a magnetic switch for said battery, said device further having an electromagnet mounted on the upper surface of said board and adapted to actuate said magnetic switch.

4. A device in accordance with claim 1, wherein at least one miniature vehicle has the form of a bicycle having a metallic front wheel, a rotary rear wheel, pedals actuated by said rear wheel, and the representation of a rider mounted on the bicycle and having pivoted legs engaging and actuated by said pedals.

5. A device in accordance with claim 1, wherein the first-mentioned means comprise an electric motor, a plate rotated by said motor, and a vertical shaft connected with said plate and the arm, whereby the rotation of said plate is transmitted to the arm.

6. A device in accordance with claim 1, comprising a variable resistance constituting a switch and means operatively connecting said resistance with the electric motor of the first-mentioned means.

7. A device in accordance with claim 1, comprising a rotary disc constituting a switch, and means operatively connecting said disc with the electric motor of the second-mentioned means.

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