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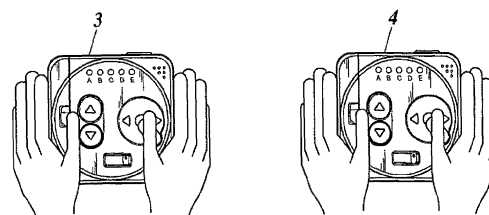
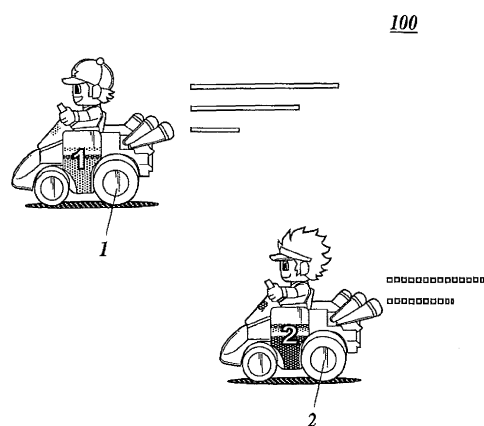
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(54) **Racing toy**

(57) A racing toy including: at least one first running body (1); and at least one second running body (2) which competes with the first running body for speed, wherein the first running body includes: a driving mechanism (12) for automatic running; and a first obstructing signal transmitting section (13) to transmit an obstructing signal at least forward and/or backward by radio, the obstructing signal which obstructs the running of the second running body, and the second running body includes: a driving mechanism (12) for automatic running; an obstructing signal receiving section (15) to receive the obstructing signal; and an obstruction control section (16) to control an obstructing operation of the driving mechanism of the second running body according to the obstructing signal received at the obstructing signal receiving section.

FIG.1



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Description

[0001] The present invention relates to a racing toy.

[0002] Racing toys in each of which a plurality of running bodies, two running bodies for example, are competed with one another are known.

[0003] In general, in such racing toys, attack signals are transmitted, for example, from a first running body to a second running body to stop and/or overturn the second running body which receives the attack signals, so as to obstruct running of the second running body. Consequently, the first running body may win. (Refer to Patent Document 1: Japanese Patent Application Laid-Open Publication No. S54-79747 and Patent Document 2: Japanese Patent No. 3791773, for example.)

[0004] However, in the racing toys described in the Patent Documents 1 and 2, the first running body can attack the second running body only in one direction.

[0005] Accordingly, in a case of a racing game making a plurality of running bodies competed with one another, a transmitting section of a first running body, the transmitting section which transmits attack signals, needs to be directed toward a second running body (attack target) by turning the transmitting section thereof toward the second running body when the second running body is in front, behind, or around the first running body. While a case where the running bodies are combat vehicle toys has no problem since a rotatable gun battery can be used as the transmitting section, a case where the running bodies are racing car toys is problematic in that it is impossible for the running bodies to turn around greatly while running.

[0006] Thus, when the reality of an actual running vehicle is pursued in a conventional racing toy, the play therewith may become tedious and monotonous during a long period of the play, and may cause a user thereof to feel short of fun and excitement.

[0007] The present invention is made to solve the problems described above. An object of the present invention is to provide a racing toy which makes up the shortage of fun and excitement and which can be enjoyed more for a long time by a user thereof without boredom compared with a conventional racing toy.

[0008] According to an aspect of the present invention, a racing toy includes: at least one first running body; and at least one second running body which competes with the first running body for speed, wherein the first running body includes: a driving mechanism for automatic running; and a first obstructing signal transmitting section to transmit an obstructing signal at least forward and/or backward by radio, the obstructing signal which obstructs the running of the second running body, and the second running body includes: a driving mechanism for automatic running; an obstructing signal receiving section to receive the obstructing signal; and an obstruction control section to control an obstructing operation of the driving mechanism of the second running body according to the obstructing signal received at the obstructing signal re-

ceiving section.

[0009] Preferably, the racing toy further includes: a controller to perform a running operation of the first running body by using a radio signal, the controller including: an inputting section to receive an input regarding the running operation of the first running body from a user; a running operating signal transmitting section to transmit to the first running body a running operating signal according to the input received at the inputting section; and an instruction signal transmitting section to transmit to the first running body an instruction signal which makes the obstructing signal transmitted from the first running body to the second running body, wherein the first running body further includes: a running operating signal receiving section to receive the running operating signal; a running control section to control the running operation of the driving mechanism of the first running body according to the running operating signal received at the running operating signal receiving section; an instruction signal receiving section to receive the instruction signal; and a transmission control section to control the first obstructing signal transmitting section to transmit the obstructing signal when the instruction signal is received at the instruction signal receiving section.

[0010] Preferably, in the racing toy, the controller further includes a second obstructing signal transmitting section to transmit to the second running body by radio the obstructing signal which obstructs the running of the second running body.

[0011] Preferably, the racing toy further includes: a signal storing section to store a plurality of the obstructing signals which are different from each other; and a selection control section to randomly select a obstructing signal from among the obstructing signals stored in the signal storing section, wherein the first obstructing signal transmitting section transmits the obstructing signal selected by the selection control section.

[0012] Preferably, the racing toy further includes: a display section to display a function of the obstructing signal selected by the selection control section; and a display control section to control the display section to display the function of the obstructing signal selected by the selection control section.

[0013] Preferably, the racing toy further includes: a sound storing section to store sound data different for each of the obstructing signals stored in the signal storing section; and a sound generating section to generate a sound by reproducing the sound data for the obstructing signal selected by the selection control section.

Preferably, in the racing toy, the obstructing signal includes a signal which moves the second running body backward.

[0014] Preferably, in the racing toy, the obstructing signal includes a signal which spins the second running body.

[0015] Preferably, in the racing toy, the obstructing signal includes a signal which decelerates the second running body.

[0016] The present invention will be more fully understood by the detailed description below and the accompanying drawings. However, these are not intended to limit the present invention, wherein:

FIG. 1 schematically shows a racing toy according to an embodiment of the present invention;
 FIG. 2 is a perspective view of a running body;
 FIG. 3 is a perspective view showing an internal structure of the running body;
 FIG. 4 is a block diagram showing a configuration of the running body;
 FIG. 5 is a perspective view of a steering mechanism;
 FIG. 6 is a plan view of the steering mechanism;
 FIG. 7 shows a part of a coil electrification circuit;
 FIG. 8 shows directions in which obstructing signals and a barrier signal are transmitted, and shows a range in which the running body can receive the obstructing signals;
 FIG. 9 is a plan view of a controller;
 FIG. 10 is a block diagram showing a configuration of the controller;
 FIG. 11A is an illustration for explaining a function of an obstructing signal;
 FIG. 11B is an illustration for explaining a function of an obstructing signal;
 FIG. 11C is an illustration for explaining a function of a power-up signal;
 FIG. 12A is an illustration for explaining a function of an obstructing signal;
 FIG. 12B is an illustration for explaining a function of a barrier signal; and
 FIG. 13 is an illustration for explaining selection of a running control signal according to a modification of the present invention.

[0017] Embodiments of the present invention are described below with reference to the accompanying drawings. It is noted that, although various limitations which are technically preferred to carry out the present invention are given to the embodiments below, the scope of the invention is not limited to the embodiments and the drawings.

[0018] FIG. 1 schematically shows a racing toy 100 according to an embodiment of the present invention. As shown in FIG 1, the racing toy 100 includes a plurality of automatic running bodies 1 and 2 and a plurality of controllers 3 and 4, in which the number of running bodies is equal to the number of controllers. In the embodiment, two running bodies and two controllers are provided. With the racing toy 100, each of two users competing with each other holds a controller and operates a running body to compete for speed on a course. The number of running bodies is not limited as long as a plurality of running bodies are provided. In the embodiment, two running bodies 1 and 2 are included in the racing toy 100.

<Running Body>

[0019] FIG. 2 is a perspective view of the running body 1, FIG 3 is a perspective view showing an internal structure of the running body 1, and FIG. 4 is a block diagram showing a configuration of the running body 1.

The running bodies 1 and 2 are different only in the design of the surface of a body thereof, and other configurations of the running bodies 1 and 2 including a configuration related to driving are the same. Thus, the running body 1 is hereinafter described in detail as a representative of the running bodies 1 and 2. Components of the running body 2 are described by using the same reference numerals as the numerals of the components of the running body 1.

As shown in FIGs. 2 and 3, the running body 1 includes a body 10 and a chassis 11.

The body 10 is made of a resin material such as plastic, and is modeled on a racing car with a driver sitting therein. The body 10 is removably attached to the chassis 11.

[0020] As shown in FIGs. 2 to 4, the chassis 11 includes: a driving mechanism 12 allowing the running body 1 to automatically run; a forward light emitting section 13 emitting an infrared ray forward from the running body 1, namely in the running direction (forward direction) of the running body 1; a backward light emitting section 14 emitting an infrared ray backward from the running body 1, namely, in the opposite direction (backward direction) to the running direction of the running body 1; a light receiving section 15 receiving an infrared ray coming from outside; and a control section 16.

[0021] As shown in FIG. 4, the driving mechanism 12 includes a battery 12a as a driving power supply, a motor 12b connected to the battery 12a, a transmitting mechanism 12d mechanically connecting an output shaft of the motor 12b to front wheels 12c so as to transmit rotation movement of the output shaft of the motor 12b to supporting shaft for the front wheels 12c, and a steering mechanism 12e for steering the front wheels 12c.

(Battery, Motor, and Transmitting Mechanism)

[0022] The battery 12a is a driving power supply of the running body 1, and may be a dry battery or a rechargeable battery.

[0023] The motor 12b is a motor connected to the battery 12a and capable of forward and reverse rotations. The transmitting mechanism 12d includes a gear provided on the output shaft of the motor 12b, a gear provided on the supporting shaft supporting the front wheels 12c, and one or a plurality of gears meshed with both of the gear provided on the output shaft of the motor 12b and the gear provided on the supporting shaft supporting the front wheels 12c.

(Steering Mechanism)

[0024] FIG. 5 is a perspective view of the steering

mechanism 12e, FIG. 6 is a plan view of the steering mechanism 12e, and FIG. 7 shows a part of a coil electrification circuit.

[0025] As shown in FIG. 5, the steering mechanism 12e includes right and left knuckle arms (rotating bodies) 21 respectively provided with the right and left front wheels 12c, and a tie rod (coupling body) 22 mutually coupling the right and left knuckle arms 21.

[0026] The knuckle arms 21 are provided with front wheel shafts (supporting shaft) 21a, respectively. The front wheels 12c are set to the front wheel shafts 21a, respectively, in such a manner that the front wheels 12c can spin. The right and left knuckle arms 21 are supported by the chassis 11 to be rotatable around right and left shafts 21b, respectively, as shown in FIG. 6. The upper end portion and the lower end portion of each of the right and left shafts 21b are fitted in the chassis 11. Free end portions of the knuckle arms 21 and end portions of the tie rod 22 make pairs, respectively, so as to be capable of rotating at positions of shafts 21c, respectively, as shown in FIG. 6. As a result, when the tie rod 22 swings from side to side, the right and left knuckle arms 21 rotate around the shafts 21b, respectively, so as to change directions of the right and left front wheels 12c.

[0027] A permanent magnet (not shown) is provided at the neutral position of the tie rod 22. The permanent magnet acts to hold the tie rod 22 at a position where the tie rod 22 does not lean toward either the right or the left (neutral position) by magnetic attraction with a permanent magnet 24 described below. It is noted that the tie rod 22 may be held at the neutral position by means other than the permanent magnets. The tie rod 22 may be held at the neutral position by a spring or the like.

[0028] The permanent magnet 24 is provided at the center of the tie rod 22. The permanent magnet 24 is formed in a disc shape and is provided such that the end surfaces thereof are arranged vertically. The permanent magnet 24 is configured to have one end surface be the south pole and the other end surface be the north pole. At the front of the tie rod 22, coils 26 are provided side by side. Each of the coils 26 is a round air-core coil having no core. One of the end portions of each of the coils 26 faces one of the end surfaces of the permanent magnet 24 provided on the tie rod 22. The reason for particularly using the disc shaped permanent magnet and the round air-core coils is to achieve size and weight reduction of the entire toy. That is, the disc shaped permanent magnet and the round air core coils do not require or have a core.

[0029] As shown in FIG 7, electrification of the coil electrification circuit is controlled by the control section 16. The coil electrification circuit is configured in such a manner that the right and left coils 26 are electrified simultaneously, and when the right and left coils 26 are electrified simultaneously, polarities of the end portions of the right and left coils 26 are different from each other, the end portions which face the end surface of the permanent magnet 24. Therefore, when the right and left coils 26 are electrified, magnetic attraction acts between one of

the coils 26 and the permanent magnet 24 while magnetic repulsion acts between the other of the coils 26 and the permanent magnet 24. As a result, the tie rod 22 swings. In this case, the swing direction of the tie rod 22 can be changed by changing the direction of the current flowing in the coils 26 by the control section 16.

The right and left coils 26 may be configured so as to be selectively electrified, whereby the tie rod 22 swings by the magnetic attraction or the magnetic repulsion acting between the electrified coil 26 and the permanent magnet 24. The steering mechanism 12e is not limited to the above structure, and may be a mechanism which is a combination of a rack and a pinion, for example.

(Light Emitting Sections and Light Receiving Section)

[0030] As shown in FIGs. 3 and 4, the forward light emitting section 13 is arranged to transmit infrared signals by radio in the forward direction of the running body 1. The forward light emitting section 13 is composed of, for example, an infrared light emitting diode (LED).

[0031] The backward light emitting section 14 is arranged to transmit infrared signals by radio in the backward direction of the running body 1. The backward light emitting section 14 is composed of, for example, an infrared LED.

[0032] The light receiving section 15 receives infrared signals emitted from the forward light emitting section 13, the backward light emitting section 14, and the controller 3.

[0033] Infrared rays emitted from the forward light emitting section 13 and the backward light emitting section 14 serve as obstructing signals which obstruct running of the running body 2 as a competing running body (second running body) running in front or behind the running body 1 as a user's own running body (first running body). Accordingly, the forward light emitting section 13 and the backward light emitting section 14 function as first obstructing signal transmitting sections.

[0034] The light receiving section 15 receives obstructing signals transmitted from the forward light emitting section 13, the backward light emitting section 14 of the running body 2, and the controllers 3 and 4. Accordingly, the light receiving section 15 functions as an obstructing signal receiving section.

[0035] From the controller 3, the light receiving section 15 receives instruction signals, each of which instructs the running body 1 (first running body) to transmit an obstructing signal to the running body 2 (second running body). Accordingly, the light receiving section 15 functions as an instruction signal receiving section.

The light receiving section 15 receives running operating signals regarding running operations of the running body 1 transmitted from the controller 3. Accordingly, the light receiving section 15 functions as a running operating signal receiving section.

[0036] The obstructing signals are signals among running control signals of the running bodies 1 and 2. When

the control section 16 of the running body 2 receives an obstructing signal, the control section 16 thereof controls driving of the driving mechanism 12 thereof according to the obstructing signal received at the light receiving section 15 thereof. The obstructing signals are described in detail below.

(Control Section)

[0037] As shown in FIG. 4, the control section 16 includes a CPU, a ROM, and a RAM, which are publically known. The control section 16 of the running body 1 controls an obstructing operation of the driving mechanism 12 of the running body 1 according to an obstructing signal received at the light receiving section 15 thereof. Accordingly, the control section 16 functions as an obstruction control section.

[0038] The control section 16 of the running body 1 controls a running operation by the driving mechanism 12 thereof according to a running operating signal received at the light receiving section 15 thereof. Accordingly, the control section 16 functions as a running control section.

[0039] The control section 16 controls at least one of the forward light emitting section 13 and the backward light emitting section 14 to transmit an obstructing signal in a case where the light receiving section 15 receives an instruction signal from the controller 3. Accordingly, the control section 16 functions as a transmission control section.

[0040] FIG. 8 shows directions in which obstructing signals are transmitted and a range in which the running body 2 can receive the obstructing signals. The control section 16 of the running body 1 controls the forward light emitting section 13 to transmit an obstructing signal A in the forward direction of the running body 1, the obstructing signal A which moves the running body 2 backward. The range in which obstructing signals transmitted in the forward direction of the running body 1 can be received is from a position of the running body 1 to a position about 40 cm forward from the position of the running body 1. The range in which the obstructing signals can be received can be appropriately set.

[0041] The control section 16 controls the backward light emitting section 14 to transmit an obstructing signal B in the backward direction of the running body 1, the obstructing signal B which spins the running body 2. The range in which obstructing signals transmitted in the backward direction of the running body 1 can be received is from a position of the running body 1 to a position about 40 cm backward from the position of the running body 1. The range in which the obstructing signals can be received can be appropriately set.

[0042] The control section 16 of the running body 1 does not transmit to the running body 2 a power-up signal C which accelerates the running body 1. When the power-up signal C is received, the output of the motor 12b of the running body 1 is increased. Driving of the motor 12b

is controlled by the control section 16 by using a known pulse width modulation (PWM) control method so that ON/OFF control of the motor 12b is performed using pulses. The control section 16 appropriately changes the width of an ON-pulse. That is to say, the control section 16 modulates the pulse width, and accordingly controls energy to be supplied to the motor 12b. Consequently, by increasing a duty ratio, the control section 16 increases the output of the motor 12b to accelerate the running body 1, and by decreasing the duty ratio, the control section 16 decreases the output of the motor 12b to decelerate the running body 1.

[0043] The control section 16 does not transmit to the running body 2 a barrier signal E which invalidates obstructing signals transmitted from the running body 2 to the running body 1. When the barrier signal E is received, the control section 16 sets a flag in the RAM thereof so as to ignore the obstructing signals A and B transmitted from the running body 2 even when such signals are received. When the barrier signal E is received, the control section 16 controls the forward light emitting section 13 and the backward light emitting section 14 to transmit the obstructing signals A and B in the forward direction and the backward direction of the running body 1, respectively.

<Controller>

[0044] FIG. 9 is a plan view of the controller 3, and FIG. 10 is a block diagram showing a configuration of the controller 3.

[0045] As shown in FIG. 9, the controller 3 operates running of the running body 1, and instructs obstruction to running of the running body 2. Signals are transmitted by radio between the running body 1 and the running body 2.

[0046] The controller 3 includes a case 30 held by a user, a forward/backward input key 31, a right/left input key 32, a light emitting section 33, a signal storing section 34, a signal transmission inputting section 35, display sections 36, a speaker 37, a sound storing section 38, a band switching section 39, and a control section 40.

(Case and Input Keys)

[0047] The case 30 is formed approximately in a rectangular shape in a planar view, and is formed to have a thickness sufficient to be held by hands. The case 30 includes the following sections and the like.

[0048] The forward/backward input key 31 is provided such that an operation part of the forward/backward input key 31 is exposed from the top surface of the casing 30. The forward/backward input key 31 is a key for inputting an operation to run the running body 1 forward or backward. Accordingly, the forward/backward input key 31 functions as an input section. The running body 1 runs forward when the upper key of the forward/backward input key 31 in FIG. 9 is pressed, and the running body 1

runs backward when the lower key thereof is pressed. This can be done by rotating the motor 12b in the forward or reverse direction thereof depending on the pressed key.

[0049] The right/left input key 32 is provided so that an operation part of the right/left input key 32 is exposed from the top surface of the case 30. The right/left input key 32 is a key for inputting an operation to change the running direction of the running body 1 toward the right or the left. Accordingly, the right/left input key 32 functions as an input section. The running body 1 runs in the left direction when the left key of the right/left input key 32 in FIG. 9 is pressed, and the running body 1 runs in the right direction when the right key thereof is pressed. This can be done by driving the steering mechanism 12e to change the directions of the right and left front wheels 12c depending on the pressed key.

(Light Emitting Section)

[0050] The light emitting section 33 is provided on the side surface of the case 30. The light emitting section 33 is composed of, for example, an infrared LED. The light emitting section 33 transmits infrared signals to the running body 1 and the running body 2.

[0051] One of the infrared signals transmitted from the light emitting section 33 to the running body 1 is a running operating signal according to an input from the forward/backward key 31 or the right/left input key 32. Accordingly, the light emitting section 33 functions as a running operating signal transmitting section.

One of the infrared signals transmitted from the light emitting section 33 to the running body 1 is an instruction signal which makes an obstructing signal transmitted from the running body 1 to the running body 2. Accordingly, the light emitting section 33 functions as an instruction signal transmitting section.

[0052] In addition, the light emitting section 33 can transmit an obstructing signal by radio directly from the controller 3 to the running body 2 without transmitting an instruction signal to the running body 1, which depends on the kind of the obstructing signal transmitted to the running body 2. Accordingly, the light emitting section 33 functions as a second obstructing signal transmitting section. More specifically, the light emitting section 33 can directly transmit to the running body 2 an obstructing signal D which stops all the functions on running being activated by the running body 2.

(Signal Storing Section)

[0053] The signal storing section 34 is provided inside the case 30. The signal storing section 34 stores therein programs to transmit a plurality of running control signals regarding running abilities of the running bodies 1 and 2. The running control signals include the obstructing signals A, B, and D, which are different from one another, and which obstruct running of the running body 2, the

power-up signal C which enhances the running ability of the running body 1, and the barrier signal E which invalidates attacks against the running body 1. The programs executed by a central processing unit (CPU) of the control section 16 to select and transmit the respective signals are stored in the signal storing section 34. Accordingly, the signal storing section 34 functions as a signal storing section.

[0054] More specifically, the signal storing section 34 stores therein programs to transmit the obstructing signal A which moves the running body 2 backward as shown in FIG. 11A, the obstructing signal B which spins the running body 2 as shown in FIG. 11B, and the obstructing signal D which stops a power-up effect being activated by the running body 2 (e.g., the obstructing signal which decelerates the running body 2 when the running body 2 is accelerated) as shown in FIG. 12A.

[0055] The signal storing section 34 also stores therein a program to transmit the power-up signal C which accelerates the running body 1 as shown in FIG. 11C and a program to transmit the barrier signal E which invalidates obstructing signals transmitted from the running body 2 to the running body 1 and to transmit the obstructing signals A and B as shown in FIG. 12B.

(Signal Transmission Inputting Section)

[0056] The signal transmission inputting section 35 is provided on the side surface of the case 30. The signal transmission inputting section 35 is a press-type switch to instruct transmission of the running control signals (the obstructing signals A, B, and D, the power-up signal C, and the barrier signal E) from the controller 3 to the running body 2 or the running body 1.

(Display Section)

[0057] The display sections 36 are provided on the top surface of the case 30. The display sections 36 are provided for the respective running control signals. Each of the display sections 36 includes an LED 36b arranged behind a display window 36a formed on the top surface of the case 30. Beside each of the display sections 36, a symbol, an illustration, or the like which explains a function of the corresponding running control signal is printed. In the embodiment, the obstructing signal which moves the running body 2 backward is indicated as A, the obstructing signal which spins the running body 2 is indicated as B, the power-up signal which accelerates the running body 1 is indicated as C, the obstructing signal which stops a power-up effect being activated by the running body 2 is indicated as D, and the barrier signal which invalidates obstructing signals transmitted from the running body 2 to the running body 1 is indicated as E. Accordingly, each of the display sections 36 functions as a display section. The LED 36b corresponding to a selected running control signal emits light under the electrification control of the control section 40. Here, for a pre-

determined period of time after start of selection of a running control signal, the LEDs 36b are controlled by the control section 40 so as to emit light in turn and one by one, and controlled in such a manner that the LED 36b emitting light stops emitting the light right before its adjacent LED 36b emits light. Subsequently, only the LED 36b corresponding to a selected running control signal emits light. In other words, the control section 40 functions as a display control section, and consequently, starts to control light emission of the LEDs 36b in such a manner that the LEDs 36b sequentially emit light when the selection of a running control signal starts, and after a predetermined period of time lapses, starts to control light emission of the LEDs 36b in such manner that only the LED 36b behind the display window 36a corresponding to a function of a selected running control signal emits light. This enables a user to visually recognize that the selection of a running control signal is performed in a roulette manner.

(Speaker and Sound Storing Section)

[0058] The speaker 37 is provided inside the case 30. An opening 30a through which a sound generated by the speaker 37 propagates to outside is formed at a part of the case 30 opposed to the speaker 37.

[0059] The sound storing section 38 is provided inside the case 30. The sound storing section 38 stores therein sound data corresponding to each running control signal so that a different sound is generated from the speaker 37 according to a running control signal. When the control section 40 selects a running control signal and the signal transmission inputting section 35 instructs transmission of the selected running control signal, the control section 40 reads sound data corresponding to the selected running control signal from the sound storing section 38 and reproduces the sound data. With this operation, the selected running control signal can be aurally recognized by a user. Accordingly, the speaker 37 and the control section 40 function as a sound generating section, and the sound storing section 38 functions as a sound storing section.

[0060] Also, the sound storing section 38 stores therein sound data for start sounds (a fanfare and a countdown) of a game and sound data for a roulette sound during the selection of a running control signal.

(Band Switching Section)

[0061] The band switching section 39 is provided on the top surface of the case 30. The band switching section 39 is configured to be switched to a position for turning power of the controller 3 off when the controller 3 is not in use, a position for turning the power of the controller 3 on and performing a running operation of the running body 1, or a position for turning the power of the controller 3 on and performing a running operation of the running body 2. That is to say, the band switching section 39

functions as a power switch of the controller 3 too. By switching the positions of the band switching section 39, the control section 40 changes the wavelength of an infrared signal to be transmitted from the light emitting section 33 so as to enable only the selected running body to be operated.

(Control Section)

[0062] The control section 40 is provided inside the case 30. The control section 40 controls light emission of the light emitting section 33 to transmit a running operating signal for the running body 1 to the running body 1 when the control section 40 determines that there is an input from the forward/backward input key 31 or the right/left input key 32. The control section 40 controls light emission of the light emitting section 33 to transmit a running control signal to the running body 1 or the running body 2 when the control section 40 determines that there is an input from the signal transmission inputting section 35.

[0063] The control section 40 is connected to a clock circuit 41 measuring a lapse time from the start of running of the running body 1. When the lapse time measured by the clock circuit 41 reaches a predetermined lapse time, the control section 40 randomly selects a program corresponding to one running control signal from among a plurality of kinds of running control signals stored in the signal storing section 34. That is to say, the clock circuit 41 provides a trigger for starting the selection of a program for a running control signal for the control section 40. Accordingly, the control section 40 functions as a selection control section, and the clock circuit 41 functions as a trigger providing section. That is, in the embodiment, the selection control section and the trigger providing section are provided in the controller 3.

[0064] During the selection of a program, the control section 40 controls the LEDs 36b of the display sections 36 to sequentially emit light so as to make a user visually recognize that a running control signal is being selected in a roulette manner. Also, during the selection of a program, the control section 40 reproduces sound data for a roulette sound stored in the sound storing section 38 and generates its sound through the speaker 37. The control section 40 also reproduces sound data for a fanfare sound stored in the sound storing section 38 and generates its sound through the speaker 37 when a race is about to start. The control section 40 further reproduces sound data for a countdown sound, the countdown which is a countdown to the start of the race, and generates its sound through the speaker 37, subsequent to the fanfare sound.

[0065] The selection of a running control signal by the control section 40 is performed by generating a random number by a known random number generation program so as to randomly select one running control signal. After the selection, the control section 40 controls the LED 36b of the display section 36 corresponding to the function

of the selected running control signal to emit light. Accordingly, the control section 40 functions as a display control section. In a case where there is no input from the signal transmission inputting section 35 within a predetermined period of time after the end of the selection of the running control signal, the control section 40 resets the selected running control signal and re-selects a running control signal.

[0066] Further, the control section 40 directly transmits to the running body 2 the obstructing signal D which stops a power-up effect being activated by the running body 2.

<How to Play with Racing Toy>

[0067] Two users competing with each other respectively hold the controllers 3 and 4. Each of the users operates the band switching section 39 to select the running body 1 or 2 which the user operates.

[0068] After each of the users selects the running body 1 or 2, the control section 40 generates the fanfare sound through the speaker 37 and subsequently generates the countdown sound.

[0069] After a race starts, each of the users operates the forward/backward input key 31 and the right/left input key 32 of the controller 3 or 4 to operate running of the running body 1 or 2.

[0070] With regard to each of the controllers 3 and 4, when a predetermined lapse time is reached by a lapse time measured by the clock circuit 41 after the start of the race, the selection of a running control signal by the control section 40 in a roulette manner starts. During the selection, the LEDs 36b of the display sections 36 sequentially and repeatedly emit light and stop emitting the light, and eventually, one running control signal is selected randomly. Then, the LED 36b of the display section 36 corresponding to the function of the selected running control signal emits light.

[0071] After a running control signal is selected, the user (here, the user holding the controller 3) presses the signal transmission inputting section 35 to allow the light emitting section 33 to transmit to the running body 1 the selected running control signal which is one of the obstructing signals A and B, the power-up signal C, and the barrier signal E, with an instruction signal therefor as infrared signals. In a case where the obstructing signal D which stops all the functions being activated by the running body 2 is selected, the light emitting section 33 directly transmits the obstructing signal D to the running body 2.

[0072] In the running body 1 which receives the obstructing signal with the instruction signal, the control section 16 makes the selected obstructing signal transmitted to the running body 2 from the forward light emitting section 13, the backward light emitting section 14, or both of the light emitting sections 13 and 14 depending on the signal. An instruction signal is not always necessary. An instruction signal does not need to be transmitted to the running body 1 when the running body 1 is capable of

determining the kind of a received obstructing signal, and transmitting the obstructing signal to the running body 2.

[0073] In the running body 2 which receives the obstructing signal A or B, the control section 16 of the running body 2 limits the operation of the driving mechanism 12 thereof according to the received obstructing signal so that the running operation of the running body 2 is obstructed by means of backward movement, deceleration, spin, or the like.

[0074] The running body 1 which receives the power-up signal C accelerates itself to enhance the running ability thereof according to the received power-up signal C.

[0075] The running body 1 which receives the barrier signal E invalidates obstructing signals transmitted from the running body 2 and transmits the obstructing signals A and B toward the running body 2 in the forward and backward directions of the running body 1, respectively.

[0076] The same can be said for the running body 2. The running bodies 1 and 2 compete with each other in order to reach the goal first by transmitting obstructing signals each other and by enhancing their own running abilities by receiving power-up signals, for example.

[0077] Consequently, there is always a possibility that the positions of the running bodies 1 and 2 are reversed depending on a selected running control signal. Therefore, users can have a race, enjoying gamesmanship until their running bodies reach the goal.

[0078] As described above, in the racing toy 100, the forward light emitting section 13 and the backward light emitting section 14 provided in the running body 1 transmit obstructing signals by radio in the forward and backward directions of the running body 1, respectively, the obstructing signals which obstruct running of the running body 2. The light receiving section 15 provided in the running body 2 receives the obstructing signals, and the control section 16 controls an obstructing operation of the driving mechanism 12 of the running body 2 based on each of the received obstructing signals.

[0079] Thus, even when the running body 2 is running in front of the running body 1 or is approaching the running body 1 from behind, the running body 1 can obstruct running of the running body 2. In other words, even when the running body 1 is about to obstruct running of the running body 2 which is running behind the running body 1, the running body 1 does not need to turn around to merely obstruct the running body 2.

[0080] Consequently, according to the racing toy 100, the reality of an actual racing car is not impaired, the play therewith becomes diversified, and the shortage of fun and excitement is made up. Accordingly, the racing toy 100 can be enjoyed more for a long time by a user thereof without boredom compared with a conventional racing toy.

[0081] In addition, when the user performs an input regarding a running operation of the running body 1 through the forward/backward input key 31 or the right/left input key 32 of the controller 3, the light emitting section 33 of the controller 3 transmits a running operating

signal according to the input performed through the forward/backward input key 31 or the right/left input key 32 to the running body 1. At the time, the control section 16 of the running body 1 controls the running operation of the driving mechanism 12 of the running body 1 based on the running operating signal received at the light receiving section 15 thereof.

[0082] When the light emitting section 33 of the controller 3 transmits to the running body 1 an instruction signal which makes an obstructing signal transmitted from the running body 1 to the running body 2, the control section 16 of the running body 1 controls the light emitting section 13 or 14 to transmit the obstructing signal based on the instruction signal received at the light receiving section 15.

[0083] Thus, a running operation of the running body 1 and transmission of an obstructing signal to the running body 2 can be performed by operations of only the controller 3.

[0084] The light emitting section 33 of the controller 3 can directly transmit an obstructing signal to the running body 2 too.

[0085] Further, when the control section 40 of the controller 3 is triggered to start the selection of a running control signal by the clock circuit 41 which measures a lapse time from the start of running of the running body 1, the control section 40 randomly selects one of the running control signals stored in the signal storing section 34.

[0086] Then, the control section 40 of the running body 1 enhances the running ability of the running body 1 or reduces the running ability of the running body 2 according to the selected running control signal.

[0087] Consequently, the running states of the running bodies 1 and 2 can be changed variously, and the play becomes diversified. Also, since the selection of a running control signal by the control section 40 is not determined by a user but in a roulette manner, which uses a random number, by the control section 40 randomly, the user can play while looking forward to how the running bodies 1 and 2 run next during the race. Also, by making each of the running bodies 1 and 2 run in a different way, the positions thereof can be reversed and re-reversed in the middle of the race.

[0088] Accordingly, the racing toy 100 can make up the shortage of fun and excitement which a conventional racing toy causes, and can be enjoyed more for a long time by a user thereof without boredom compared with a conventional racing toy.

[0089] The control section 40 of the controller 3 also controls the display section 36 to display a function of a selected obstructing signal.

[0090] Since the display section 36 displays the function of the selected obstructing signal in such a manner that a user can visually recognize how the running bodies 1 and 2 run next, the user can enjoy the race with alternate hope and fear by looking at the display.

[0091] Further, the control section 40 of the controller 3 reproduces sound data corresponding to a selected

obstructing signal and generates a sound through the speaker 37.

[0092] Since a user can aurally recognize how the running bodies 1 and 2 run next, the user can enjoy the race with alternate hope and fear by listening to the sound.

[0093] The obstructing signals are signals to move backward, spin, and decelerate the running body 2, respectively. Accordingly, the obstructing signals can put the running body 1 in a better position than the running body 2. Also, the power-up signal is a signal to accelerate the running body 1, and the barrier signal is a signal to invalidate obstructing signals transmitted from the running body 2 so that the running of the running body 1 is not obstructed by the running body 2. Accordingly, the power-up signal and the barrier signal can put the running body 1 in a better position than the running body 2.

[0094] Since the control section 40 selects a running control signal and controls the running body 1 or 2 according to the selected running control signal every time a lapse time measured by the clock circuit 41 reaches a predetermined lapse time, the running states of the running bodies 1 and 2 can be changed several times during the race.

<Others>

[0095] The present invention is not limited to the above embodiments, and the design of the present invention can be changed freely without departing from the spirit and scope of the present invention.

For example, obstructing signals may be transmitted not only in the forward and backward directions of the running body 1 but also in the right and left directions thereof.

[0096] Although some of the aforementioned obstructing signals are obstructing signals which are transmitted only in the forward direction or only in the backward direction of the running body 1, it is not necessary that the obstructing signals are transmitted only in one direction, and may be transmitted in both of the forward and backward directions thereof regardless of the kinds of the obstructing signals. The obstructing signals in the above embodiments are merely examples, and the functions, the transmission directions, the signal reception ranges, and the like of the obstructing signals can be appropriately changed.

[0097] Also, as shown in FIG. 13, a metallic gate 50 may be provided on a course 70 on which the race is held, and a proximity sensor which detects the gate 50 when the running body 1 approaches the gate 50 may be provided with the running body 1, and the selection of a running control signal may be performed by the control section 16 in a roulette manner every time the running body 1 passes the gate 50. In this case, the control section 16 of the running body 1 is provided with a roulette function and makes the selected running control signal transmitted to the running body 2. Accordingly, the proximity sensor functions as a detecting section to detect the arrival of the running body 1 at a predetermined po-

sition. Also, since the running body 1 passing through the gate 50 provides a trigger for the selection of a running control signal, the gate 50 and the proximity sensor function as the trigger providing section. That is, in this case, the selection control section and the trigger providing section are provided with the running body 1.

[0098] The selection control section and the trigger providing section are not necessarily provided with the controllers 3 and 4 or the running bodies 1 and 2 but may be provided with the gate 50 on the course 70, a side of the running path of the course 70, or a structure on the course 70 (a model of a building, for example).

[0099] In addition, the duty ratio in the PWM control of the motor 12b may be increased by keeping pressing the forward/backward input key 31 from a predetermined timing during the countdown to the start of the race so that the running body 1 is rapidly accelerated right after starting. With such a configuration, the running body 1 can be put in a better position than the running body 2 by using a kind of tricky technique.

[0100] Further, when no competing running body is present, a one-person mode may be available by powering the controller 3 on while keeping pressing any key such as the signal transmission inputting section 35. In this case, the one-person mode may be informed by a sound through the speaker 37, and the race is held in a time attack mode. In the one-person mode, it is preferable to allow only the power-up signal which accelerates the running body 1 itself to be selected.

Claims

1. A racing toy comprising:

at least one first running body; and
at least one second running body which competes with the first running body for speed, wherein
the first running body includes:

a driving mechanism for automatic running;
and
a first obstructing signal transmitting section to transmit an obstructing signal at least forward and/or backward by radio, the obstructing signal which obstructs the running of the second running body, and

the second running body includes:

a driving mechanism for automatic running;

an obstructing signal receiving section to receive the obstructing signal; and
an obstruction control section to control an obstructing operation of the driving mechanism of the second running body according to the ob-

structing signal received at the obstructing signal receiving section.

2. The racing toy according to claim 1 further comprising:

a controller to perform a running operation of the first running body by using a radio signal, the controller including:

an inputting section to receive an input regarding the running operation of the first running body from a user;
a running operating signal transmitting section to transmit to the first running body a running operating signal according to the input received at the inputting section; and
an instruction signal transmitting section to transmit to the first running body an instruction signal which makes the obstructing signal transmitted from the first running body to the second running body, wherein

the first running body further includes:

a running operating signal receiving section to receive the running operating signal;
a running control section to control the running operation of the driving mechanism of the first running body according to the running operating signal received at the running operating signal receiving section;
an instruction signal receiving section to receive the instruction signal; and
a transmission control section to control the first obstructing signal transmitting section to transmit the obstructing signal when the instruction signal is received at the instruction signal receiving section.

3. The racing toy according to claim 1 or claim 2, wherein the controller further includes a second obstructing signal transmitting section to transmit to the second running body by radio the obstructing signal which obstructs the running of the second running body.

4. The racing toy according to any one of claims 1 to 3 further comprising:

a signal storing section to store a plurality of the obstructing signals which are different from each other; and
a selection control section to randomly select a obstructing signal from among the obstructing signals stored in the signal storing section, wherein
the first obstructing signal transmitting section transmits the obstructing signal selected by the

selection control section.

5. The racing toy according to claim 4 further comprising:

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a display section to display a function of the obstructing signal selected by the selection control section; and

a display control section to control the display section to display the function of the obstructing signal selected by the selection control section.

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6. The racing toy according to claim 4 or claim 5 further comprising:

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a sound storing section to store sound data different for each of the obstructing signals stored in the signal storing section; and

a sound generating section to generate a sound by reproducing the sound data for the obstructing signal selected by the selection control section.

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7. The racing toy according to claim any one of claims 1 to 6, wherein the obstructing signal includes a signal which moves the second running body backward.

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8. The racing toy according to any one of claims 1 to 6, wherein the obstructing signal includes a signal which spins the second running body.

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9. The racing toy according to any one of claims 1 to 6, wherein the obstructing signal includes a signal which decelerates the second running body.

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FIG.1

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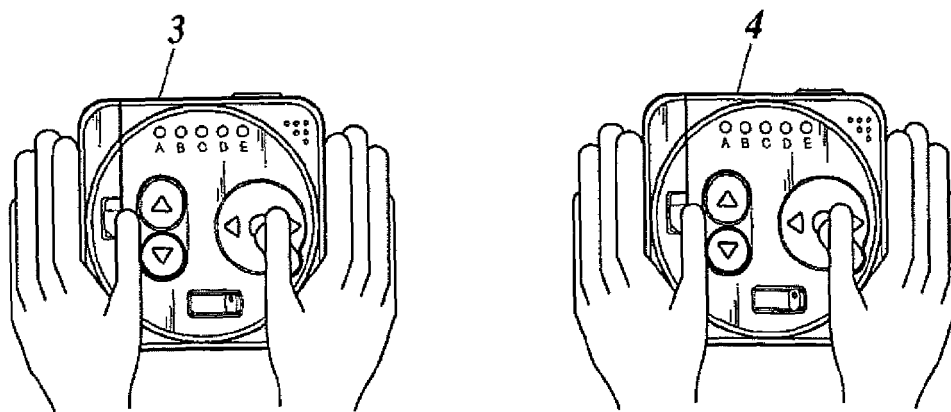
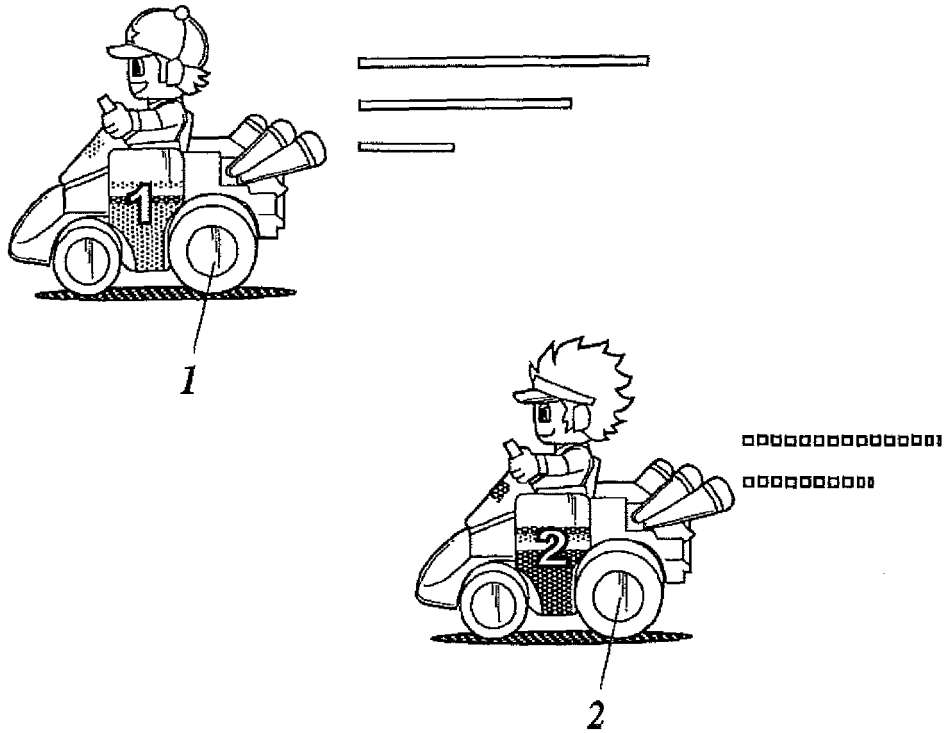


FIG.2

1 (2)

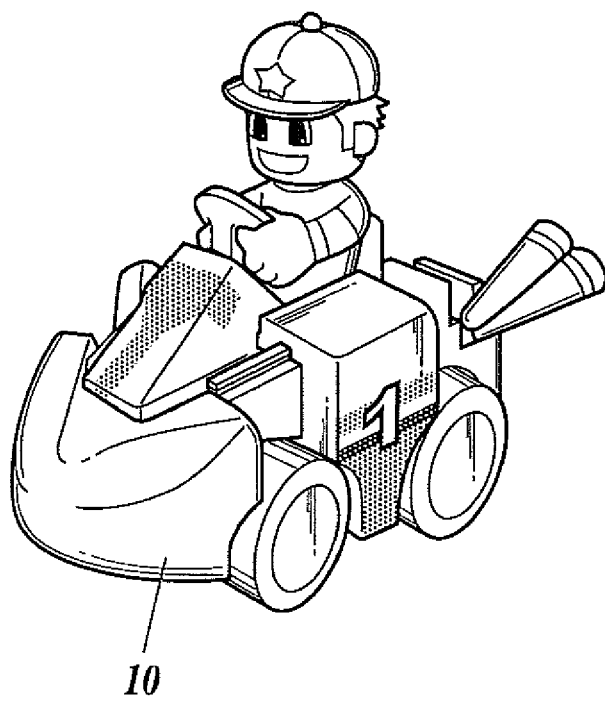


FIG.3

1 (2)

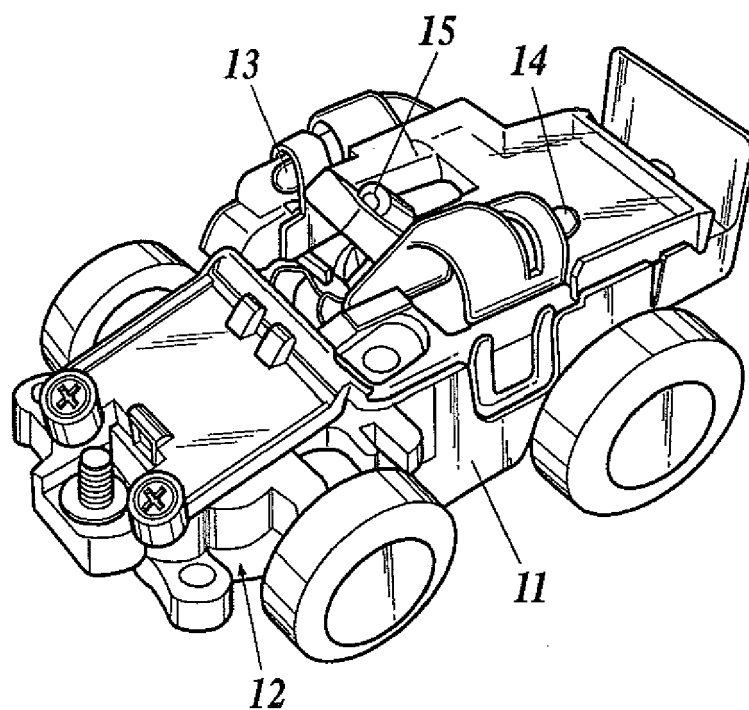


FIG. 4

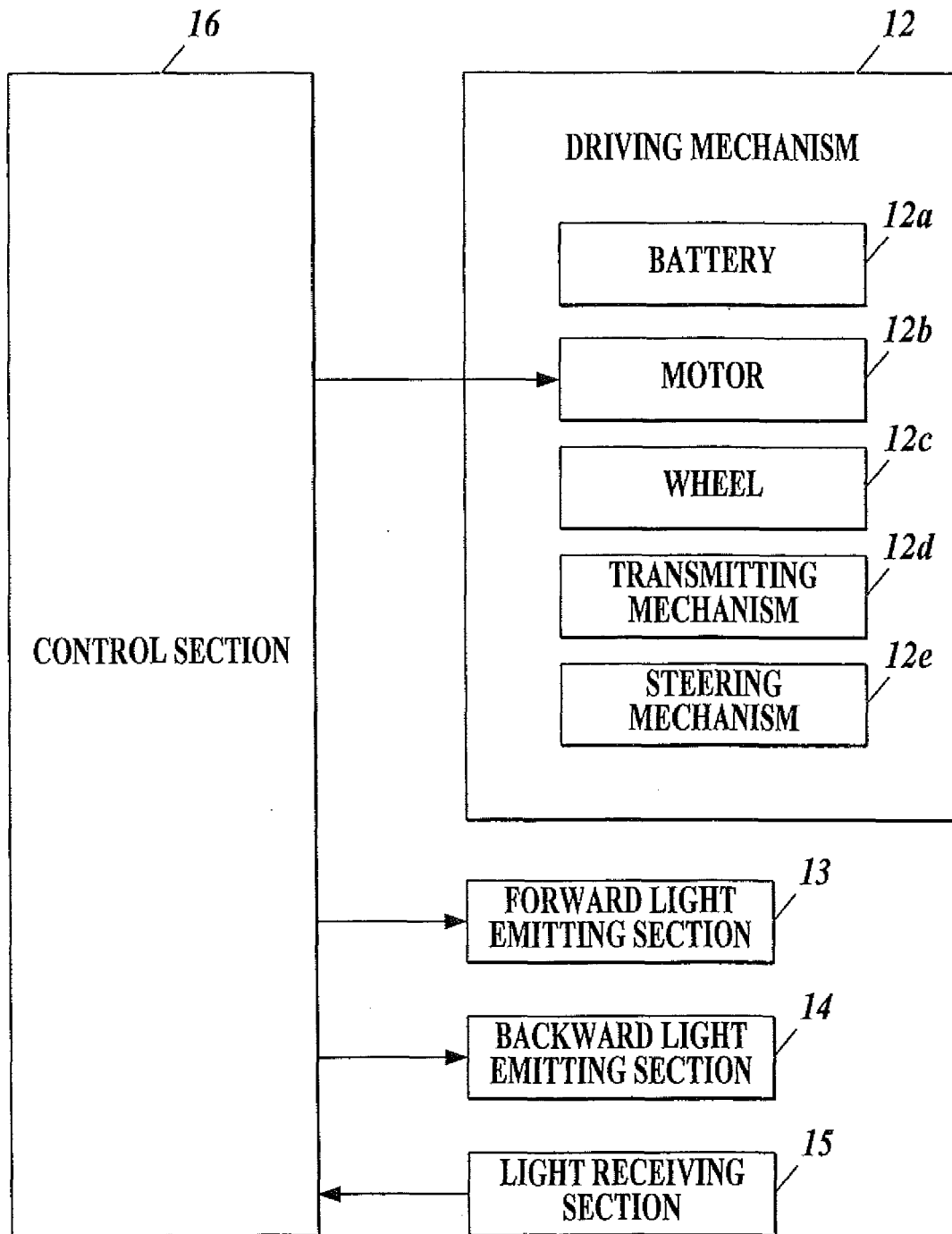


FIG.5

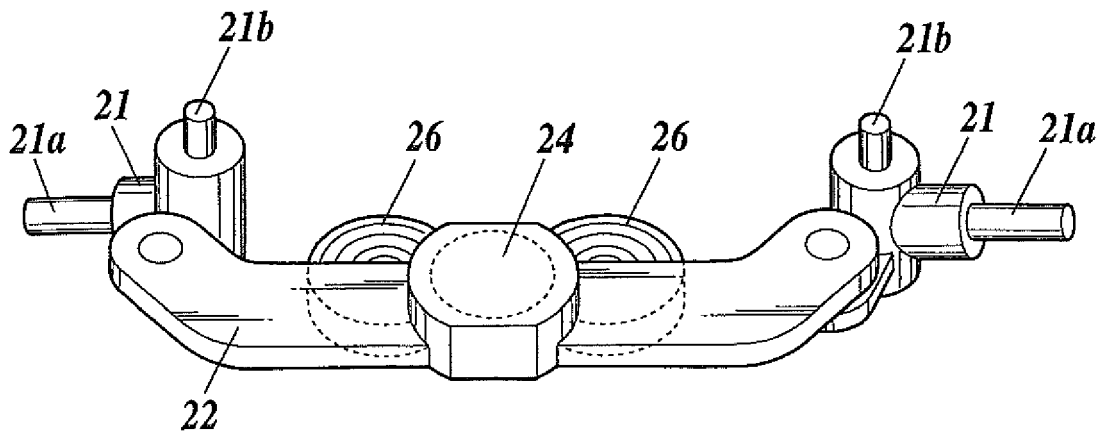


FIG.6

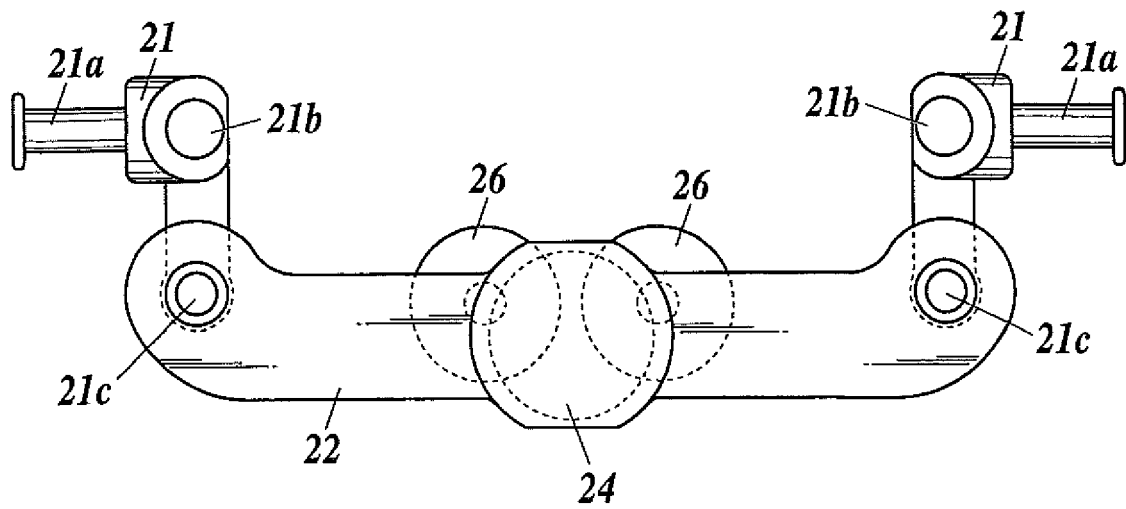


FIG.7

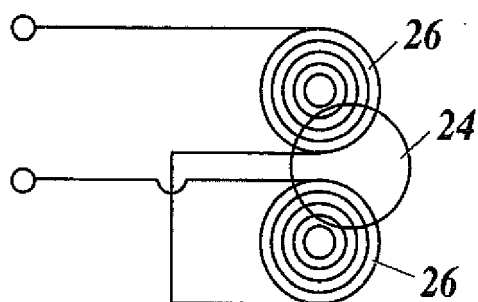


FIG.8

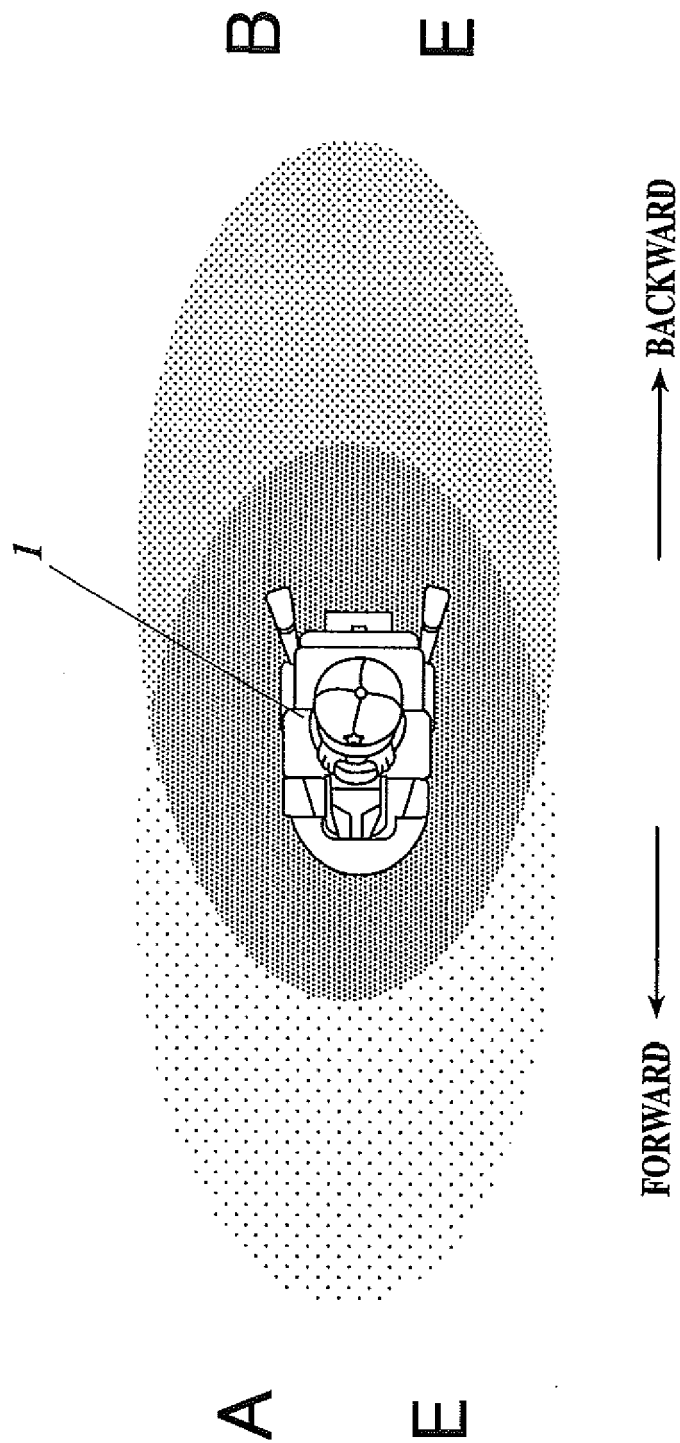


FIG.9

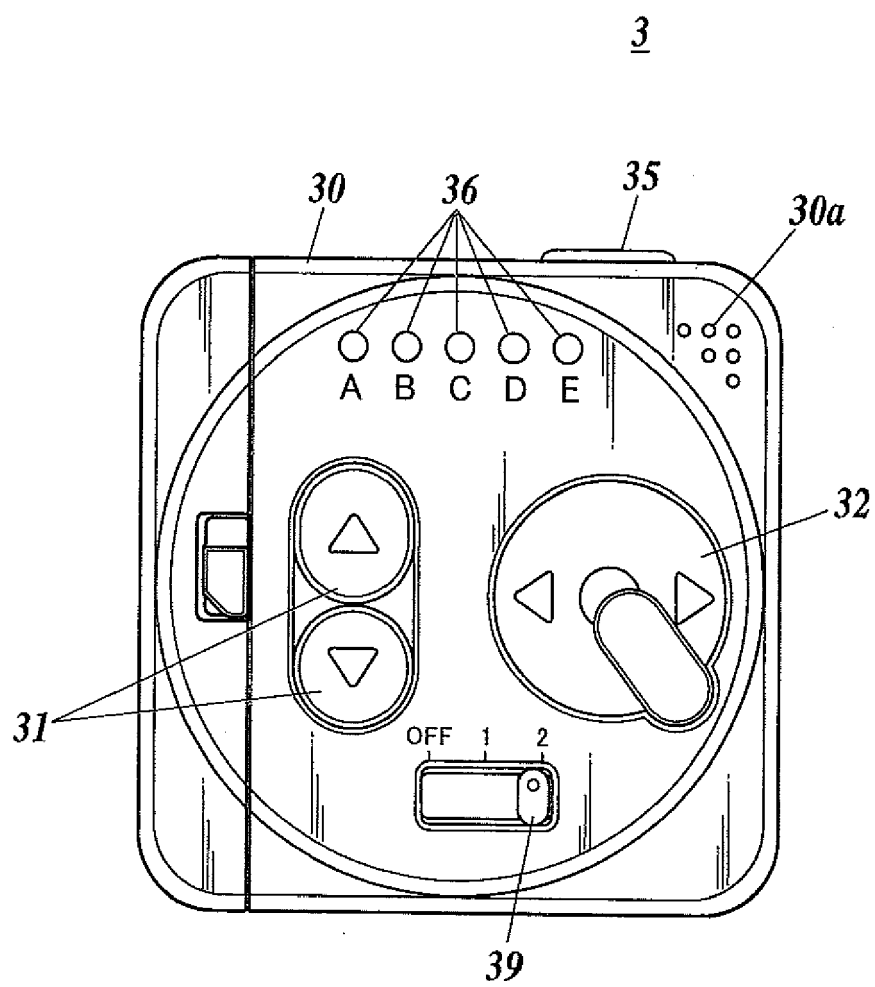


FIG.10

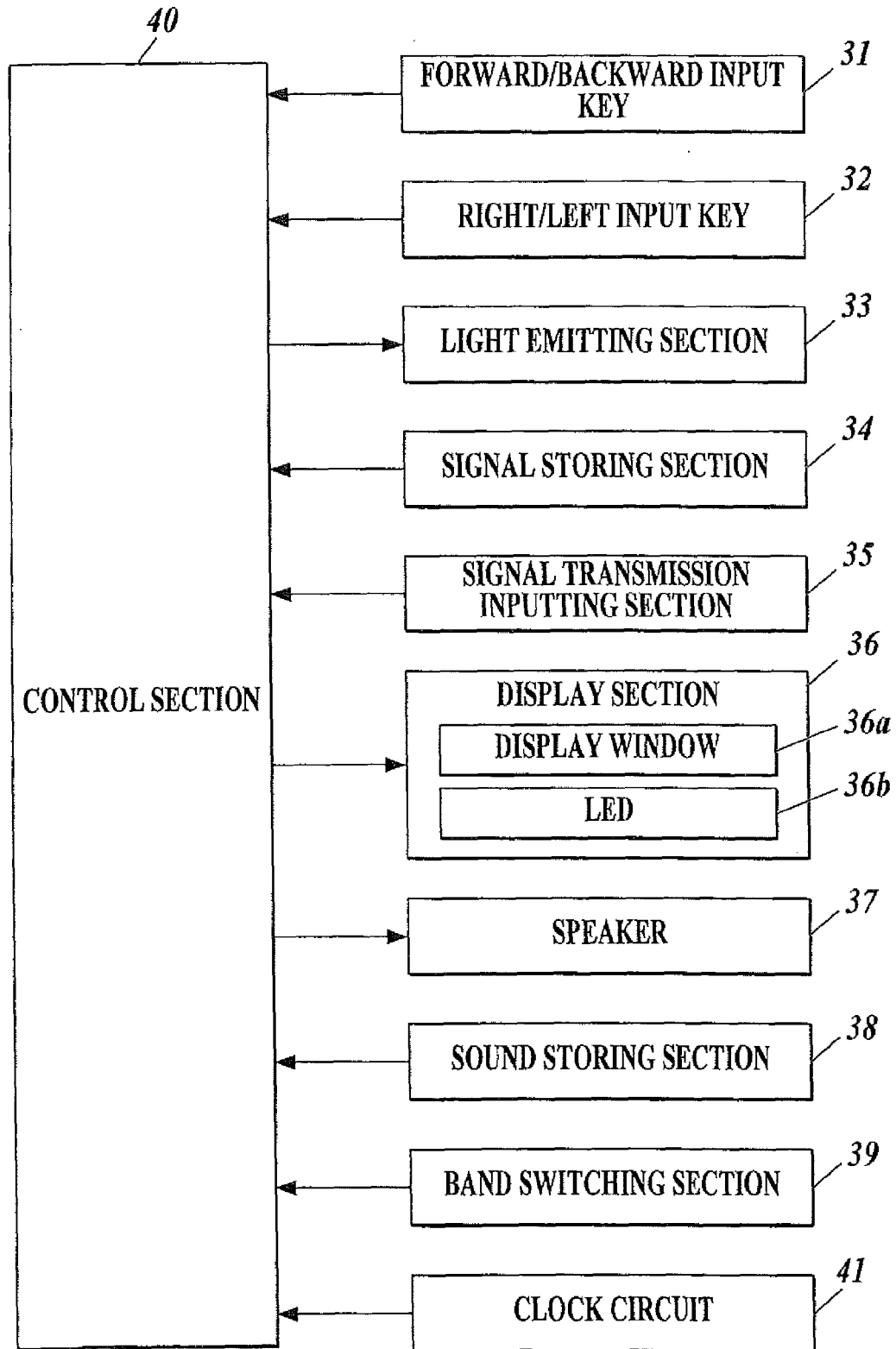


FIG.11A

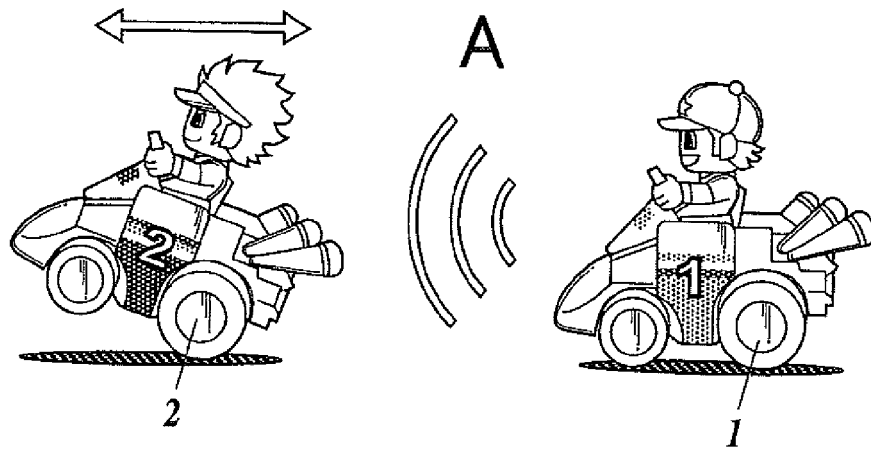


FIG.11B

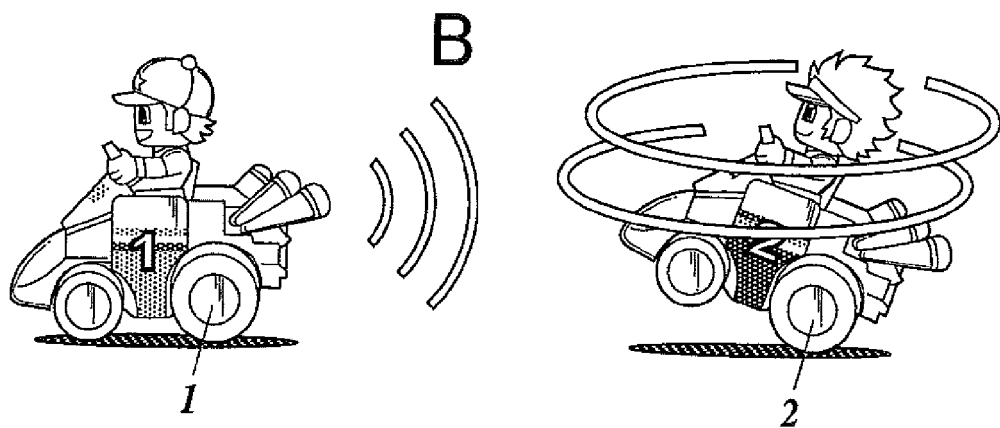


FIG.11C

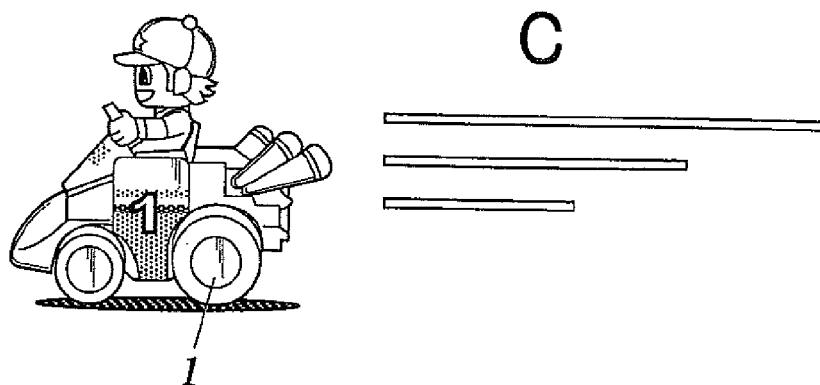


FIG.12A

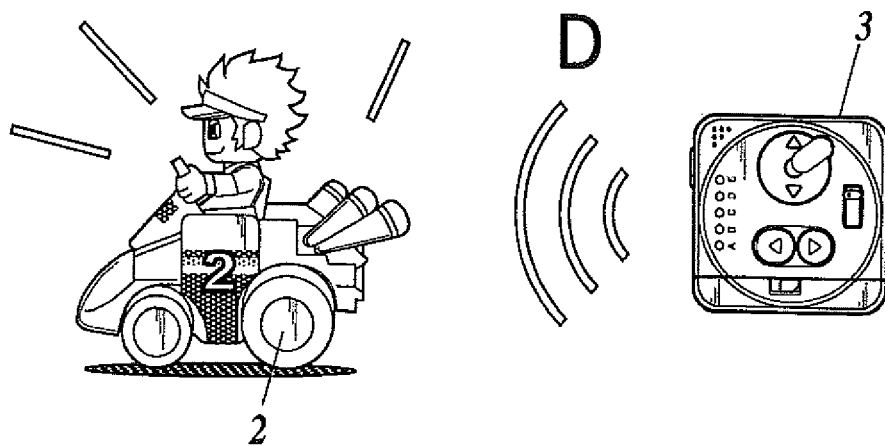


FIG.12B

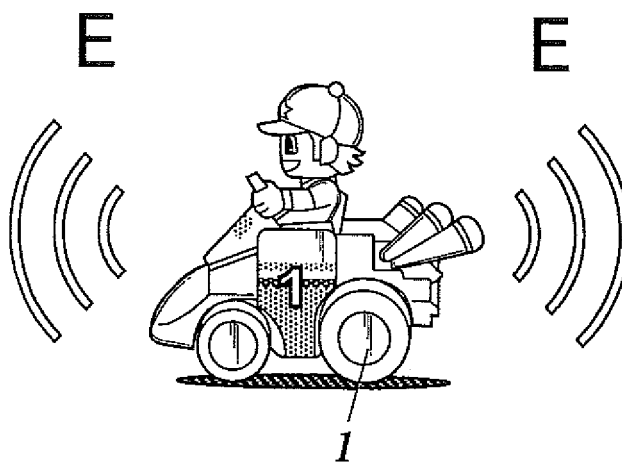
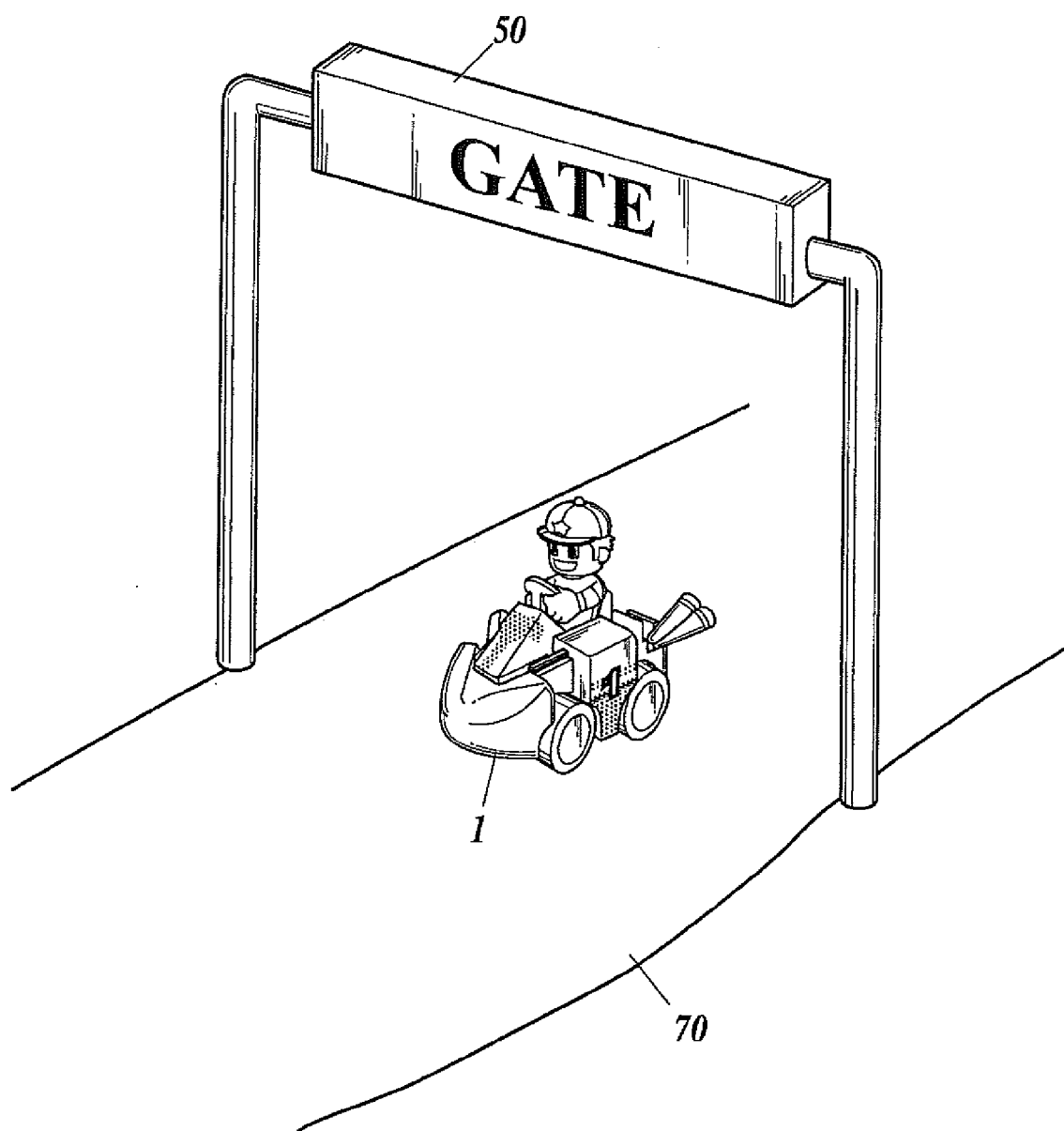


FIG.13





EUROPEAN SEARCH REPORT

Application Number
EP 11 15 0292

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/186884 A1 (EVANS JANET E [US]) 25 August 2005 (2005-08-25) * paragraph [0015] - paragraph [0026] * * paragraph [0077]; figures *	1-9	INV. A63F9/14 A63H17/26 A63H30/04
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 April 2011	Examiner Lucas, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 11 15 0292

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15-04-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- JP 3791773 B [0003]