(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 806 166 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
11.07.2007 Bulletin 2007/28

(21) Application number: **06126549.2**

(22) Date of filing: **19.12.2006**

(51) Int Cl.:
A63H 18/16 *(2006.01)* ***A63H 19/24*** *(2006.01)*
A63H 19/32 *(2006.01)* ***A63H 30/02*** *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **21.12.2005 ES 200503140**

(71) Applicant: **Ninco Desarrollos, S.L.**
08940 Cornella de Llobregat (ES)

(72) Inventor: **Nin Martí, Diana**
08940, Cornella de Llobregat (ES)

(74) Representative: **Pons Arino, Angel**
Pons Patentes Y Marcas Internacional, S.L.
Glorieta Ruben Dario 4
28010 Madrid (ES)

(54) **On-track localization system for digitally controlled electric model vehicles**

(57) On-track localization system for digitally-controlled, model electric vehicles, such as racing vehicles, of the system-type comprising a number of sensors (4) suitably arranged on one or more tracks (1,2) or roads along which several vehicles (14) are guided, powered by an electrical engine supplied with constant voltage by two parallel electrodes forming part of the track or road, into which modulated pulses with individualized control are injected; the execution of some of the aforementioned includes the generation of a signal, on the vehicle passing one of the sensors, to synchronize the execution of an action like track-change activation or time-logging.

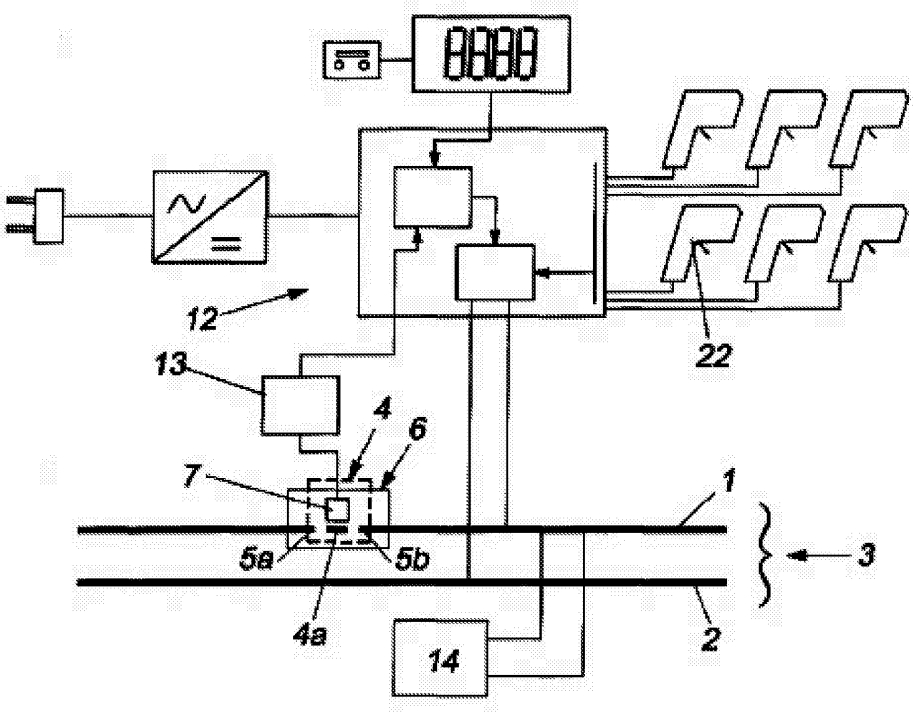

FIG. 1

EP 1 806 166 A2

Description

OBJECT OF THE INVENTION

[0001] The present invention refers to an on-track localization system for digitally controlled, model electric vehicles, such as racing vehicles (slots), electric trains and similar model vehicles.

BACKGROUND OF THE INVENTION

[0002] At present, toys which consist in model vehicles with road or track-guided movement are known, racing vehicles (slots) and electric trains being the most well known.

[0003] These tracks or roads comprise a pair of metallic strips or continuous parallel electrodes on which brushes or vehicle parts make contact and from which they dynamically take the necessary electric power to drive a direct-current motor fitted to the vehicle, and, in some cases, lighting.

[0004] In the case of slot vehicles, there are several tracks in parallel to allow overtaking, the wheels of the vehicles driving along a support in the tracks that simulates a road or speed-circuit, usually made from pieces that fit together. In this case, each track comprises a groove flanked by both electrodes; in this groove, the brush-fitted vehicle guide is inserted and slides along it.

[0005] Traditionally, variation in speed was obtained by changing the power voltage supplied to the vehicle's motor by means of a user-operated rheostat. For this reason, a track is needed for each vehicle, detracting competitiveness on the tracks having different morphologies (inside, outside, slopes, etc).

[0006] Nowadays, this problem has been solved by means of digital control. This control is based on supplying each vehicle with a decoding/regulating circuit capable of reading individualized control signals sent by means of pulse modulation in the power supply of the vehicles through the electrodes in the tracks, the power supply of which becomes continuous in this case, equal to the nominal engine rate, and common to all tracks and vehicles. The circuit decoding part for each vehicle interprets the commands that the vehicle receives (speed level, switching on/off of lighting) and the regulating part executes them, either regulating the voltage reaching the motor or switching the lighting. Control signal individualization is carried out by giving a single code to each vehicle in the commands, so that, out of all the commands emitted to the electrodes for all the vehicles on the tracks, each vehicle is capable of discriminating its own. This allows the traffic of all vehicles along all the tracks, enabling the choice of the most suitable route and permitting track changes for overtaking by means of suitable track-changing electromechanical devices.

[0007] The power supply and control signals are supplied by a micro-processed control console to which the controls that the users operate are connected.

[0008] The track-changing electromechanical devices are the same as the traditional electric train track changes or split-switches and are activated in the chosen direction on each vehicle passing, according to the orders that the user gives from his control, suitably processed and transformed into commands by the digital control, namely in the console.

[0009] The digital control also comprises the fitting of a vehicle localization system to synchronize certain events, such as the selection of a road or track change in one direction or the other or the logging of a time (timing), with the passing of a specific vehicle and not another one.

[0010] In slots, this localization system has been carried by means of a network of sensors suitably distributed along the route. When a user generates a command for their vehicle that needs external synchronization, for example a track change, the vehicle receives the command and emits a signal that, on going past any sensor, is picked up by the sensor, locating the vehicle and used by the control to synchronize the corresponding action, for example track-change activation for that vehicle without affecting others.

[0011] The implementation of these sensors is nowadays based on mechanical and magneto-mechanical systems, where a magnet is activated by a mechanical system activated on the vehicle passing; or also by optical systems, where a photodiode detects the beam emitted by another photodiode emitter fitted inside the vehicle.

[0012] In the first of these cases, there is considerable power loss both through mechanical rubbing and the magnetic fields, whereas failures due to dirt in the photodiodes or inadequate light conditions are caused in the second case.

[0013] These inconveniences are overcome by the use of the system referred to in this invention.

DESCRIPTION OF THE INVENTION

[0014] The invented system has an optimum embodiment to implement the effective localization of digitally controlled model vehicles along the route they make, avoiding the disadvantages described above.

[0015] To this end, a network of sensors adequately distributed along the tracks or roads is fitted, with the special characteristic of each sensor comprising a short-length conductor section that is inserted into an electrode. This section has the suitable shape to match the profile of the electrode and is interconnected by means of a bridge that inserts a resistance with a considerable ohmic value.

[0016] The invention likewise provides for the integration in each vehicle of a circuit generating a signal suitable to be detected by the sensors. Such a circuit includes a derivation, parallel to the normal charges (motor, lighting, decoding/regulating circuit) of the vehicle.

[0017] The aforementioned derivation is fitted with a resistance of an ohmic value considerably less than that

of the previous resistance, but in turn considerably larger than the resistance of the normal charges of the vehicle so as not to weaken the power capable of being reached by them. Serial with this second resistance, the derivation includes a switch controlled by the decoding/regulating circuit that the vehicle is equipped with.

[0018] When the vehicle receives a signal requiring external synchronization, track change, for example, its decoding/regulating circuit turns the derivation switch off. On the vehicle passing the first sensor it finds, a voltage divider circuit comprising both serial resistances is switched off. Given that the resistance value of the sensor is considerably larger than that in the resistance of the signal-generating circuit fitted to the vehicle, a voltage variation in the sensor is produced at that moment that will trigger the signal of the vehicle passing the position of the sensor. This signal is picked up by the digital control to synchronize the event, for example, track-changing activation, or the logging of a time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1 shows a general view of a section of the circuit that implements the invented system.

Figure 2 shows a detail of a vehicle that implements the invented system.

Figure 3 shows a detail of track change according to the invention.

DESCRIPTION OF A PRACTICAL EMBODIMENT OF THE INVENTION

[0020] The invented system comprises the insertion in the earth electrode 1, out of the couple 1, 2 that make up the tracks 3 where a model racing vehicle (slot) runs and gets its power, of a number of sensors 4 made up of short-length conductor sections 4a that are interconnected to the electrode 1 by means of bridges 6 fitted with a resistance 7 with a considerably high ohmic value, so that, under normal conditions, these sections have the same potential as the electrode 1. The sections 4a have the same profile as that of the electrode itself to minimize rubbing or unbraiding of the brushes, and in this example of the invention they are inserted into interrupts fitted to the electrode, taking advantage of the bridge 6 to ensure electrical continuity between its open ends 5a, 5b, as seen in figure 2.

[0021] By distributing the sensors 4 around interesting places along the tracks, before track changes 10, or at the finishing line, for example, a detecting network will have been configured capable of informing the digital control about the passing of a specific vehicle from its position. The digital control includes a console 12 to which the controls 22 of different users are connected, as well as the sensors 4 through adapter circuits 13.

[0022] The invention also includes fitting each vehicle 14 with a circuit 15 prepared to generate a suitable signal to be picked up by the sensors 4. Said circuit comprises a derivation 16 parallel to the motor 17, lighting 18 and decoding/regulating circuit 19 of the vehicle. A resistance with an ohmic value considerably less than that in the bridge resistance 7 is included at this derivation, as well as a serial switch 21 controlled by the circuit 19. When the user of a vehicle commands a specific action using their control 22, track change in this example of the invention, the console, by means of pulse modulation in the electrodes of the tracks, emits the corresponding command, which includes the identification of the specific vehicle. The command is interpreted by the decoding part of the circuit 19 and its regulating part turns the switch 21 off. On the vehicle passing along the section 4a, the voltage divider circuit comprising the serial resistances 7 and 20 closes, causing a variation in the normal voltage of the section 4a, an event that is detected by the digital control through the adapter circuit 13. This signal will be picked up by the digital control for the synchronized activation of the track-changing electromechanical device 22, on the vehicle going past.

[0023] The circuit 15 is completed with the insertion of a condenser 23 parallel to the normal charges of the vehicle (motor, lighting, and circuit 19), a condenser that stores power to supply these elements during the brief space of time elapsing during the passing by of the sensor, where their voltage supply drops, a diode 24 preventing the discharging of the condenser through the sensor.

[0024] Having sufficiently described the nature of the invention, as well as the way to embody it in practice, it must be emphasized that the previously indicated layouts, represented in the attached drawings, may be modified in details as long as they do not alter the fundamental principle.

Claims

1. -On-track localization system for digitally-controlled, model electric vehicles, such as racing vehicles, electric trains and similar; of the system-type comprising a number of sensors suitably arranged on one or more tracks or roads along which several vehicles are guided powered by an electrical engine supplied with constant voltage by two parallel electrodes forming part of the track or road, whose movement is digitally controlled according to user orders by injecting pulse modulation control signals into the power supply including an identifier for each vehicle and orders to execute such as speed or track changes, signals that are identified and discriminated from the rest, and carried out in each vehicle by an inbuilt decoding/regulating circuit; the execution of some of the aforementioned commands including the generation of a signal, on the vehicle passing one of the sensors, to synchronize the execution of an action

like track-change activation or time-logging; **characterized by** each sensor comprising a short-length conductor section inserted into one of the electrodes along the track to which it is interconnected through a bridge that integrates a serial resistance with a high ohmic value; each vehicle is additionally fitted with a synchronism signal generating circuit comprising a derivation parallel to the engine, a decoding/regulating circuit and lighting where necessary, the aforementioned derivation including a switch controlled by the decoding/regulating circuit serial with a resistance having an ohmic value considerably less than that in the resistance of the bridge of the sensor but considerably larger than that of other vehicle charges, in such a way that, the switch being off according to the received code tone, when the vehicle passes over the sensor, a voltage divider circuit is established according to which a voltage variation is produced in the sensor that is interpreted as a localization signal on the vehicle passing its position.

2. -System according to claim 1, **characterized by** fitting, in parallel with a vehicle decoding/regulating and lighting circuit, a condenser capable of supplying power to these elements on the vehicle passing the sensor, as well as a diode that prevents the discharging of the above-mentioned condenser through the sensor.

3. -System according to claim 1, **characterized by** the conductor section that forms part of each sensor being inserted at a discontinuity of the corresponding electrode in the track, implementing the electrical continuity of the electrode in this area by means of the sensor interconnection bridge.

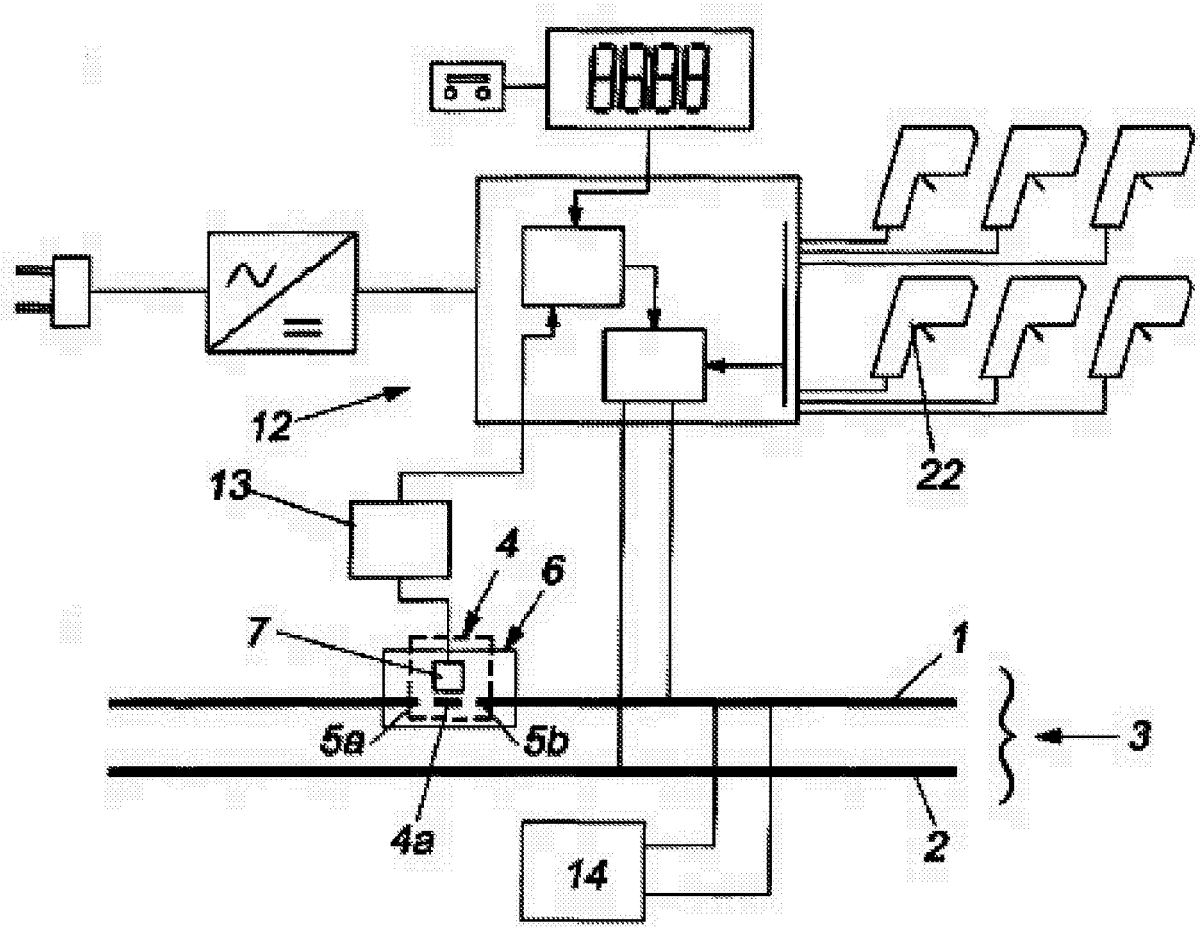

FIG. 1

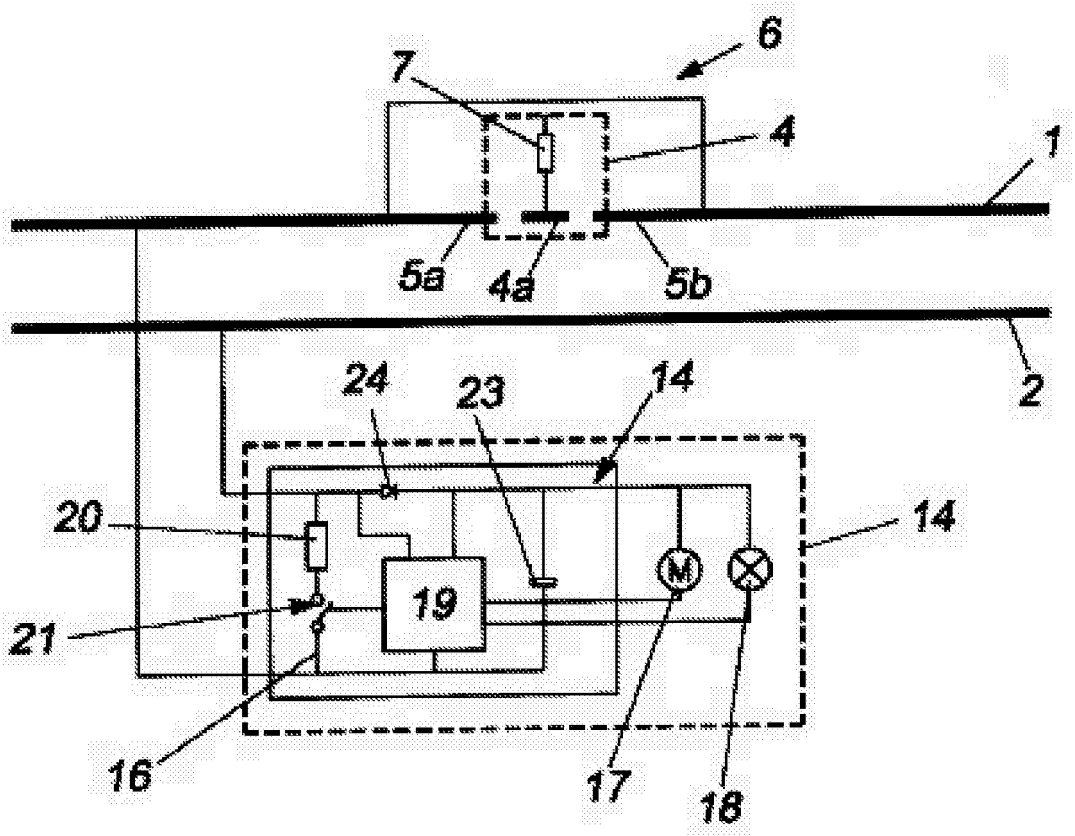

FIG. 2

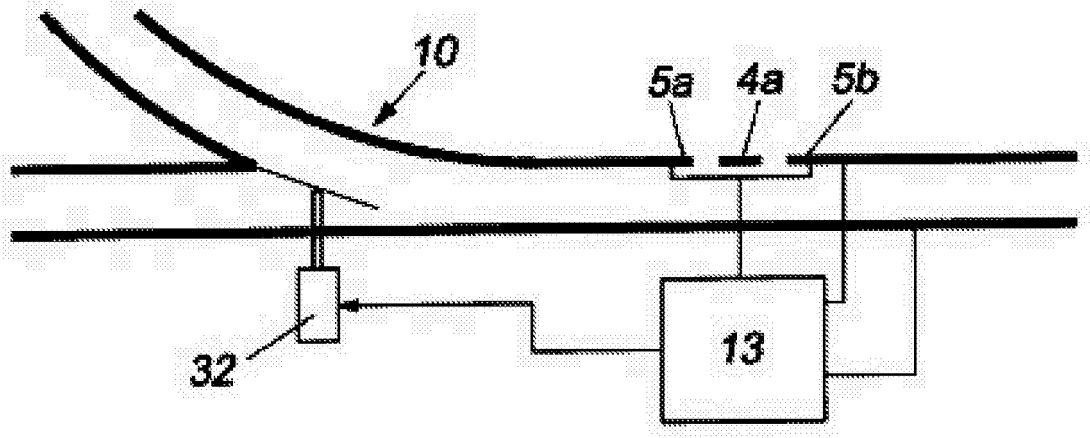

FIG. 3