



(19) **United States**

(12) **Patent Application Publication**

Kim et al.

(10) **Pub. No.: US 2002/0142702 A1**

(43) **Pub. Date: Oct. 3, 2002**

(54) SAFETY DEVICE FOR TOY CAR

Publication Classification

(76) Inventors: Da-Young Kim, Kyungki-Do (KR);
Eun-Young Kim, Kyungki-Do (KR)

(51) Int. Cl.⁷ A63H 29/22
(52) U.S. Cl. 446/484

Correspondence Address:
BURNS DOANE SWECKER & MATHIS L L P
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404 (US)

(57) **ABSTRACT**

A safety device for assuring safety of a user (a child) when he or she plays with the toy car and for preventing damage of an electric motor due to overload of the motor by automatically stopping the operation of the electric motor when the toy car runs into or when the toy car is under an idle conditions. The safety device includes an actuating switch adapted for maintaining or cutting-off the supply of the electric power to the electric motor and a micro switch having an actuating bar of which one end extends down to a frame of the toy car's body.

(21) Appl. No.: 10/063,171

(22) Filed: Mar. 27, 2002

(30) Foreign Application Priority Data

Mar. 28, 2001 (KR) 2001-0008585

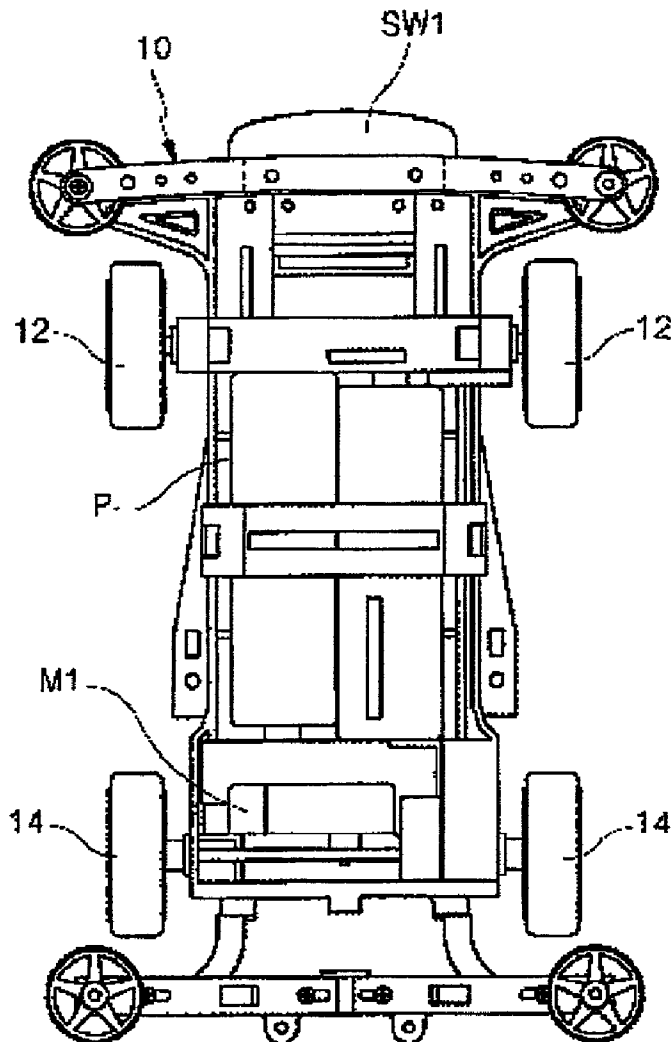


Fig. 1

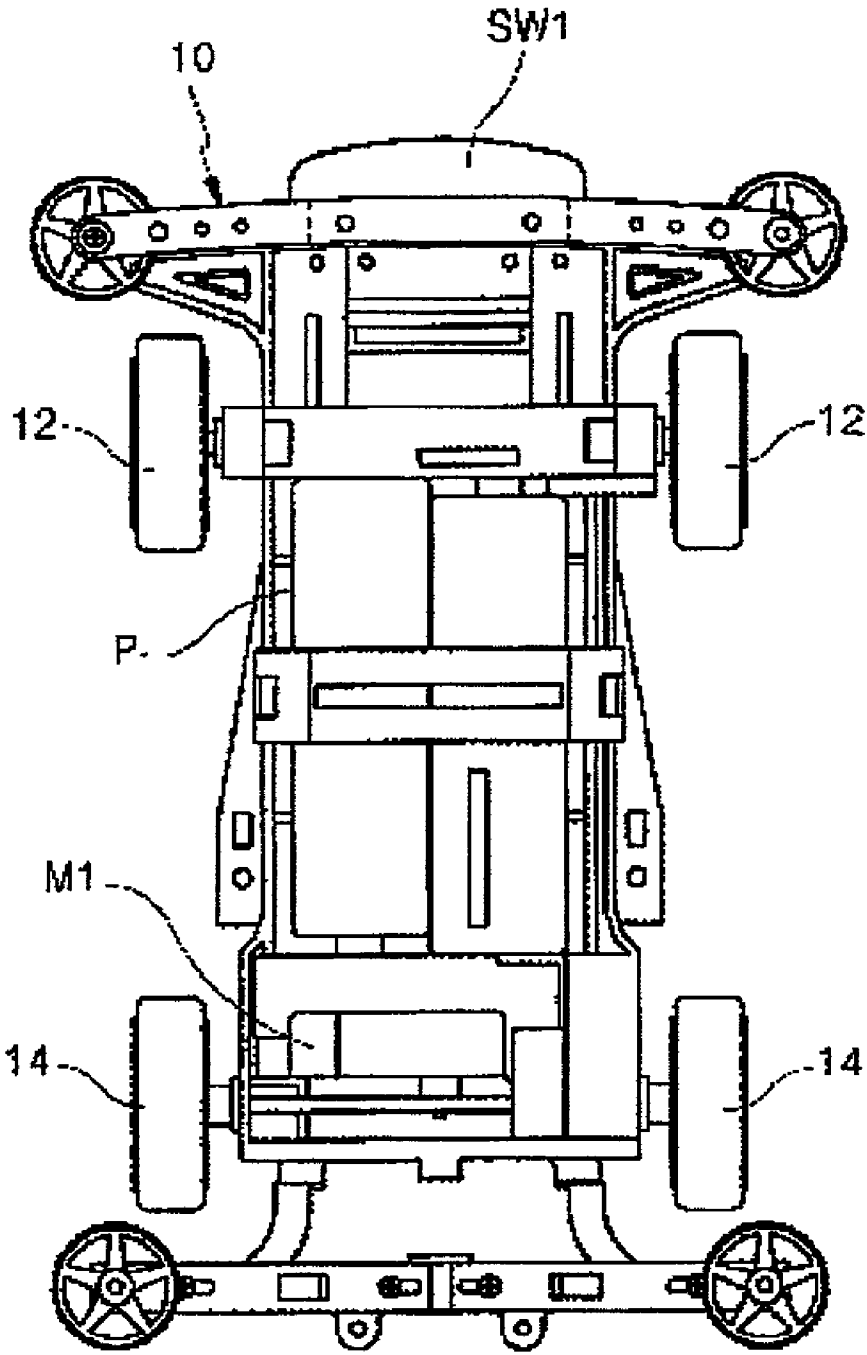


Fig. 2

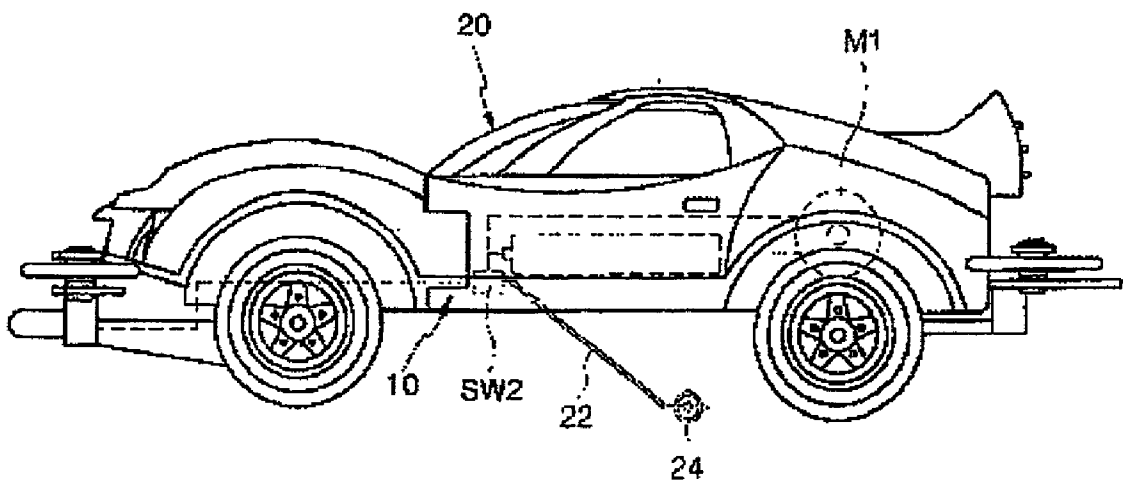


Fig. 3

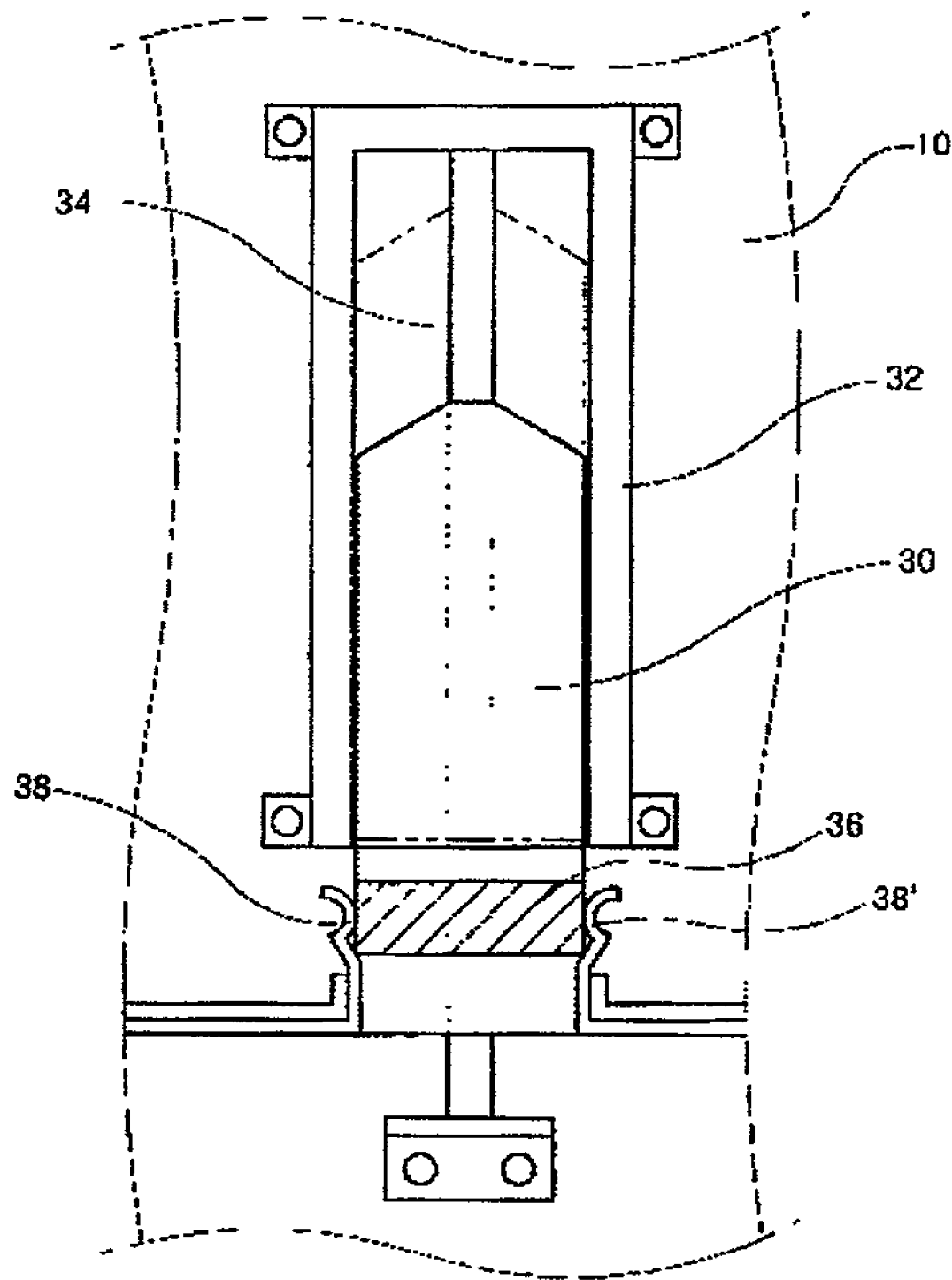
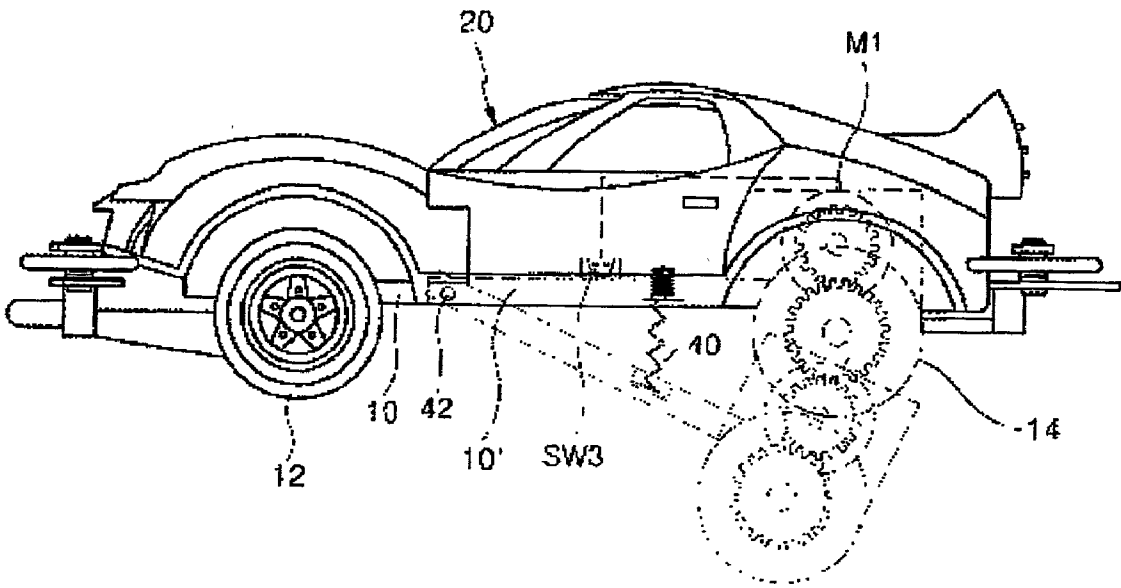


Fig. 4



SAFETY DEVICE FOR TOY CAR

BACKGROUND OF INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to a safety device for a toy car. More particularly, the present invention relates to a safety device for a toy car, said safety device for assuring safety of a user (a child) when he or she plays with the toy car and for preventing any damage of an electric motor due to overload of the motor by automatically stopping the operation of the electric motor when the toy car runs into another toy car from behind or when the toy car is under the idling conditions.

[0003] 2. Description of the Prior Art

[0004] Generally, a toy car comprises an electric motor driven by the supply of the electric power from a battery, and front and rear wheel rotated by the motive power (rotation power) from the electric motor via a power transmission system. Furthermore, the toy car includes an electric switch for turning on or off the electric motor by means of an electric signal, and several electronic parts adapted for providing various illuminations and melodies.

[0005] At present, a toy car in wide use is provided with up-to-date function and capability, which are obtained by the highly developed technology, artificial intelligence, and an electric motor for rotating at high speed so that the toy car is used in a motor race.

[0006] A manufacturer for manufacturing the toy car which is provided with an electric motor for rotating at high speed is always busy pursuing profit followed by selling of the toy car through stimulation of possessiveness, curiosity and a spirit of competition of children. However, the manufacturer does not provide any safety device for preventing any safety accident, which may occur by virtue of the high speed of the toy car.

[0007] For example, in case that the toy car equipped with the electric motor for rotating at high speed is used at a place where exclusive track for racing is not provided, there may be a high possibility for a child's collision with a real passing car when he or she tries to catch the moving toy car since control of the toy car travelling at high speed is very difficult. Even in case that the toy car is used on the track, there is a possibility that frequent rear-end collision leads to easy breakdown and damage, especially a possibility that a safety accident, such as a contusion or a scratch due to the shock occurs frequently when the child's body (for example, fingers) comes into contact with the toy car.

[0008] Moreover, when the toy car is stopped by a rear-end collision or a front obstruction on the track, or when the toy car is off the track, the supply of the electric power for the electric motor is kept, which may cause the overload of the electric motor. Consequently, the life span of the electric motor is decreased, and at the same time the motor may be damaged easily or the battery may be consumed unnecessarily.

SUMMARY OF INVENTION

[0009] It is accordingly an object of the present invention to overcome aforementioned problems of a toy car of the prior art.

[0010] It is another object of the present invention to provide a novel type of a toy car in which the operation of an electric motor is stopped by means of automatic cutoff of electric power using an actuating switch when the toy car runs into another toy car from behind during the travel of the car, and the actuating switch is turned off so that any unnecessary no-load operation of the electric motor is prevented under the idling conditions, namely when the toy car is held by a user away from the ground (track), when the toy car is overturned due to a rear-end collision during the travel of the car, or when the toy car is off the track.

[0011] In order to accomplish the aforesaid objects, the present invention provides a safety device for a toy car, said toy car comprising a car body by injection molding in a designated shape, an electric motor mounted behind a frame of said car body, and front and rear wheels connected to said electric motor via the power transmission system, said safety device being characterized in that an actuating switch adapted for keeping the supply of the electric power to said electric motor or cutting off the supply of the electric power to said electric motor is mounted at the middle part to the front end of said frame, and in that said device further comprises a micro switch having an actuating bar of which one end extends down said frame from said car body.

[0012] In a preferred embodiment of the present invention, a moving member is disposed at the middle part in the bottom of said frame, said moving member being fixed by a bracket and being movable back and forth along a guide rail, a conducting member in the form of a strip is provided at the rear end of said moving member, an auxiliary wheel is joined to the end of the actuating bar of said micro switch, and an auxiliary frame formed separately from a middle portion of said frame is supported resiliently by a coil spring and attached to said frame pivotally by means of a hinge pin.

[0013] Furthermore, a power switch is disposed between said frame and said auxiliary frame for keeping the supply of the electric power to said electric motor or cutting off the supply of the electric power to said electric motor when said auxiliary frame is turned.

BRIEF DESCRIPTION OF DRAWINGS

[0014] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings, in which:

[0015] **FIG. 1** is a schematic plan view showing a toy car equipped with a safety device according to the present invention;

[0016] **FIG. 2** is a schematic side view showing a toy car equipped with a safety device according to the present invention;

[0017] **FIG. 3** is a partial enlarged bottom plan view showing another preferred embodiment of a safety device according to the present invention; and

[0018] **FIG. 4** is a schematic side view showing still another preferred embodiment of a safety device according to the present invention.

DETAILED DESCRIPTION

[0019] **FIG. 1** is a schematic plan view showing a toy car equipped with a safety device according to the present

invention. As shown in **FIG. 1**, in the toy car comprising an electric motor **M1** mounted behind a frame **10**, and front and rear wheels **12** and **14** connected to the electric motor **M1** via a power transmission system (not shown), such as various kinds of gears, an actuating switch **SW1** adapted for keeping the supply of the electric power to the electric motor **M1** or cutting off the supply of the electric power to the electric motor **M1** is mounted at the middle part to the front end of the frame **10**.

[0020] **FIG. 2** is a schematic side view showing a toy car equipped with a safety device according to the present invention. As shown in **FIG. 2**, a micro switch **SW2** adapted for keeping the supply of the electric power to the electric motor **M1** or cutting off the supply of the electric power to the electric motor **M1** is mounted in a car body **20** formed by injection molding in a designated shape. The micro switch **SW2** is provided at one end thereof with an actuating bar **22**, which extends down the frame **10**. To the end of the actuating bar **22** of the micro switch **SW2** is joined an auxiliary wheel **24** for preventing abrasion of the actuating bar **22** due to its contact with the ground when the toy car is travelling.

[0021] **FIG. 3** is a partial enlarged bottom plan view showing another preferred embodiment of a safety device according to the present invention. As shown in **FIG. 3**, a moving member **30** for cutting off the supply of the electric power to the electric motor **M1** is disposed at the middle part in the bottom of the frame of the toy car. The moving member **30** is fixed in the bottom of the frame **10** by a bracket **32**, and is movable back and forth along a guide rail **34**. At the rear end of the moving member **30** is provided a conducting member **36** in the form of a strip. The conducting member **36** is connected to the connection terminals **38** and **38'**, which are connected to a battery **P**.

[0022] **FIG. 4** is a schematic side view showing still another preferred embodiment of a safety device according to the present invention. As shown in **FIG. 4**, an auxiliary frame **10'**, which is formed separately from a middle portion of the frame **10**, is supported resiliently by a coil spring **40** and attached to the frame **10** pivotally by means of a hinge pin **42** in the toy car comprising the car body **20** formed by injection molding in a designated shape, the electric motor **M1** mounted behind the frame **10**, and the front and rear wheels **12** and **14** connected to the electric motor **M1** via the power transmission system. Between the frame **10** and the auxiliary frame **10'** is disposed a power switch **SW3** for keeping the supply of the electric power to the electric motor **M1** or cutting off the supply of the electric power to the electric motor **M1** when the auxiliary frame **110'** is turned.

[0023] The operation of the safety device according to the present invention will now be described.

[0024] When a user plays a car racing with the toy car comprising the car body **20** formed by injection molding in a designated shape, the electric motor **M1** mounted behind the frame **10**, the front and rear wheels **12** and **14** connected to the electric motor **M1** via the power transmission system, the actuating switch **SW1** mounted at the middle part to the front end of the frame **10** for keeping the supply of the electric power to the electric motor **M1** or cutting off the supply of the electric power to the electric motor **M1**, and the micro switch **SW2** having the actuating bar **22** of which one end extends down the frame **10** from the car body **20**, as

shown in **FIG. 1** and **FIG. 2**, the actuating switch **SW1** mounted to the frame **10** is actuated by the front object or the user's hand, by which an electrical signal (not shown or not described as it is an ordinary signal for keeping or cutting off the supply of the electric power) is applied to the battery **P**. As a result, the electric power supplied from the battery **P** to the electric motor **M1** is cut off so that the operation of the motor is stopped, if the travelling toy car runs into another toy car from behind or if the user touches the front part of the toy car to stop the toy car.

[0025] As mentioned above, as the electric power supplied from the battery **P** to the electric motor **M1** is cut off by means of the actuation of the actuating switch **SW1**, the travelling toy car is stopped immediately when the toy car runs into another car from behind. As a result, overload, which otherwise may be imposed on the electric motor **M1** due to the failure in cutting off the supply of the electric power after the toy car runs into another car from behind, is prevented. Similarly, in case that the toy car is stopped by the user's hand, the actuating switch **SW1** is actuated so that the operation of the electric motor **M1** is stopped as in the case of the rear-end collision, if the actuating switch **SW1** mounted to the frame **10** comes into contact with the user's hand. As a result, shock applied to the user, especially the child's hand, is minimized, preventing any safety accident (a contusion or a scratch) due to the contact.

[0026] Moreover, as shown in **FIG. 2**, as the micro switch **SW2** having the actuating bar **22** of which one end extends down the frame **10** from the car body **20** of the toy car is provided, the supply of the electric power from the battery **P** to the electric motor **M1** is cut off by the micro switch **SW2** if the toy car is under the idling conditions, that is, if the front and rear wheels **12** and **14** of the toy car are off the ground (the track), and the micro switch **SW2** is actuated by the actuating bar **22**, by which the electric power is supplied from the battery **P** to the electric motor **M1** so that the toy car is able to travel if the front and rear wheels **12** and **14** of the toy car are on the ground. In this case, any abrasion of the actuating bar **22** due to its contact with the ground is prevented when the toy car is travelling, as the auxiliary wheel **24** is joined to the end of the actuating bar **22** of the micro switch **SW2**.

[0027] If the toy car travelled by actuation of the micro switch **SW2** is off the track, the actuating bar **22** of the micro switch **SW2** is lowered to its original position, by which the supply of the electric power from the battery **P** to the electric motor **M1** is cut off. Consequently, any overheating of the electric motor **M1** and no-load operation of the front and rear wheels **12** and **14** under the idling conditions are prevented, and the protection of the expensive electric motor is accomplished.

[0028] It will be understood that the detailed description of the electrical connection for keeping or cutting off the supply of the electric power among the battery **P**, the electric motor **M1** and the micro switch **SW1** is omitted since such connection is one of the commonly employed technical arts.

[0029] **FIG. 3** is a partial enlarged bottom plan view showing another preferred embodiment of a safety device according to the present invention. As the moving member **30** is fixed in the bottom of the frame **10** by the bracket **32**, and is movable back and forth along the guide rail **34**, and the conducting member **36** in the form of a strip is provided

at the rear end of the moving member **30**, the supply of the electric power from the battery **P** to the electric motor **M1** is automatically cut off by means of the moving member **30** when the toy car runs into another toy car from behind during the travel of the car. In other words, when the travelling toy car is stopped abruptly due to the rear-end collision, the moving member **30** is moved forwardly along the guide rail **34** by means of inertia, and then the conducting member **36** is disconnected from the connection terminals **38** and **38'**. Consequently, the supply of the electric power is cut off, by which the operation of the electric motor **M1** is stopped.

[0030] FIG. 4 is a schematic side view showing still another preferred embodiment of a safety device according to the present invention. As the auxiliary frame **10'**, which is formed separately from a middle portion of the frame **10** of the toy car, is supported resiliently by the coil spring **40** and attached to the frame **10** pivotally by means of the hinge pin **42**, and the power switch **SW3** is disposed between the frame **10** and the auxiliary frame **10'**, the auxiliary frame **10'** with the electric motor **M1** and the rear wheels **14** attached thereto is turned downwardly by a predetermined angle about the hinge pin **42** as its starting point, having the power switch **SW3** turned off, preventing overheating and the no-load operation of the electric motor **M1** if the toy car is under the idling conditions, that is, if the front and rear wheels **12** and **14** of the toy car are off the ground (the track), and the auxiliary frame **10'** is turned upwardly about the hinge pin **42** as its starting point (the auxiliary frame is turned upwardly by its own load of the toy car), having the power switch **SW3** turned on, by which the electric power is supplied to the electric motor **M1** so that the toy car is able to travel if the front and rear wheels **12** and **14** of the toy car are on the ground.

[0031] At this time, since the auxiliary frame **10'** is attached resiliently to the frame **10** by the coil spring **40**, the auxiliary frame **10'** is turned downwardly about the hinge pin **42** as its starting point by the spring force of the coil spring **40** when the toy car is under the idling conditions, and the coil spring **40** is compressed by means of its own load of the toy car when the front and rear wheels **12** and **14** of the toy car are on the ground.

[0032] By provision of the safety device as mentioned above, it is possible to keep or cut off the supply of the electric power safely and conveniently so that the toy car is travelled or stopped. Furthermore, it is possible to prevent overheating and no-load operation of the electric motor **M1**, and thus any damage of the electric motor **M1** when the toy car runs into another toy car from behind or when the toy car is under the idling conditions.

[0033] With the safety device provided in the toy car as mentioned above, the supply of the electric power is auto-

matically cut off by means of the actuating switch when the toy car runs into another toy car from behind during the travel of the car, and the actuating switch is turned off so that any unnecessary no-load operation of the electric motor is prevented when the toy car is under the idling conditions, namely when the toy car is held by a user away from the ground (track), when the toy car is overturned due to a rear-end collision during the travel of the car, or when the toy car is off the track. Consequently, overheating or damage of the electric motor due to overload imposed to the motor is prevented, the life span of the expensive electric motor is increased, and unnecessary consumed electric power (energy) is saved. Furthermore, since shock applied to the child's hand is minimized when the toy car is stopped by the child's hand, preventing any safety accident, such as a contusion or a scratch, and thus assuring the safety in playing with the toy car.

1. A safety device for a toy car, said toy car comprising the car body (**20**) formed by injection molding in a designated shape, an electric motor (**M1**) mounted behind a frame (**10**), and front and rear wheels (**12**, **14**) connected to said electric motor (**M1**) via a power transmission system, said safety device being characterized in that an actuating switch (**SW1**) adapted for keeping the supply of the electric power to said electric motor (**M1**) or cutting off the supply of the electric power to said electric motor (**M1**) is mounted at the middle part to the front end of said frame (**10**):

2. The device according to claim 1, characterized in that said device further comprises a micro switch (**SW2**) having an actuating bar (**22**) of which one end extends down said frame (**10**) from said car body (**20**).

3. The device according to claim 1, characterized in that a moving member (**30**) is disposed at the middle part in the bottom of said frame (**10**), said moving member (**30**) being fixed by a bracket (**32**) and being movable back and forth along a guide rail (**34**), and in that a conducting member (**36**) in the form of a strip is provided at the rear end of said moving member (**30**).

4. The device according to claim 2, characterized in that an auxiliary wheel (**24**) is joined to the end of the actuating bar (**22**) of said micro switch (**SW2**).

5. The device according to claim 1, characterized in that an auxiliary frame (**10'**) formed separately from a middle portion of said frame (**10**) is supported resiliently by a coil spring (**40**) and attached to said frame (**10**) pivotally by means of a hinge pin (**42**), and in that a power switch (**SW3**) is disposed between said frame (**10**) and said auxiliary frame (**10'**).

* * * * *