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CONTROL MEANS FOR ELECTRICALLY DRIVEN MINIATURE VEHICLE

Filed May 12, 1967

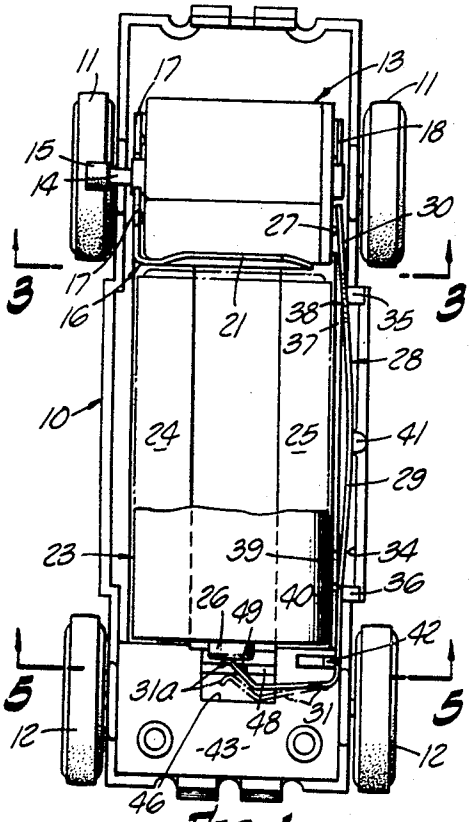


FIG. 1.

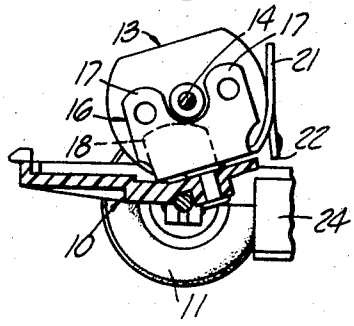


FIG. 2.

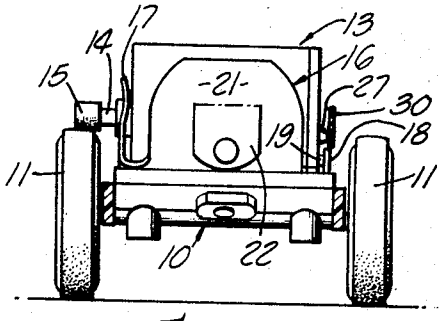


FIG. 3.

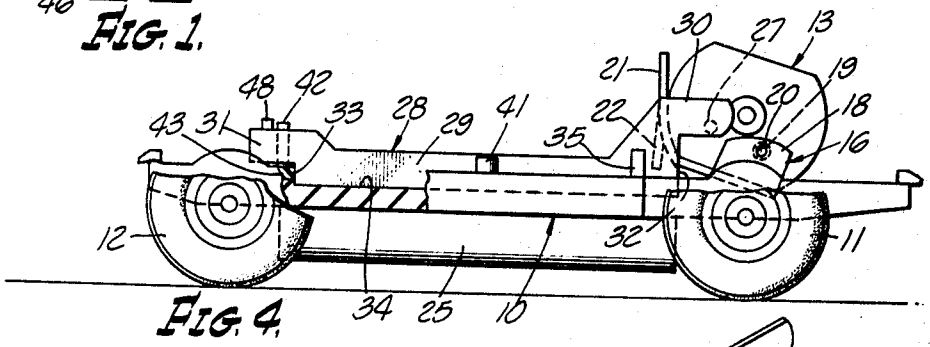


FIG. 4.

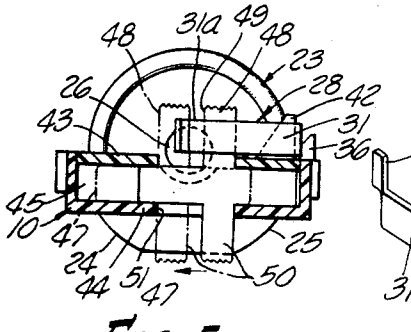


FIG. 5.

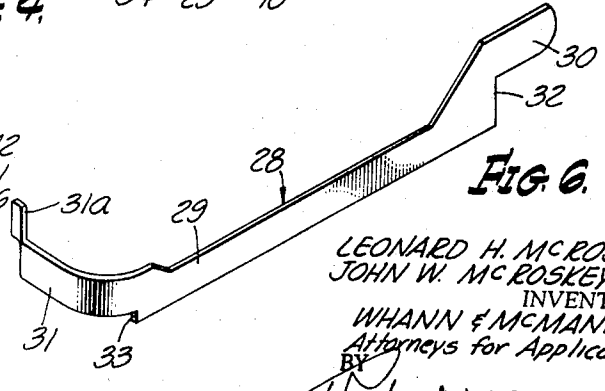


FIG. 6.

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CONTROL MEANS FOR ELECTRICALLY DRIVEN MINIATURE VEHICLE

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Int. Cl. A63h 33/26
U.S. Cl. 46—243 5 Claims

ABSTRACT OF THE DISCLOSURE

Control for a battery powered motor driven miniature vehicle wherein the motor circuit is completed through a connection bar having one end engaged with a terminal of the motor and a deflected portion at its other end spring urged into contact with one terminal of the battery. The motor circuit is opened by a movable insulating cam member which can be positioned between the spring portion and the battery terminal.

BACKGROUND OF THE INVENTION

The present invention relates generally to miniature self-powered vehicles such as toy automobiles and the like, and is concerned particularly with a novel electrical connecting and switching control means for the driving motor.

Heretofore, it has been the practice to utilize a separate switch unit which had to be connected into the motor control circuit by means of separate wire connections which had to be soldered to the switch terminals, battery terminals and motor connection terminals. This required assembly personnel, and the use of tools which materially contributed to the cost of production and multiplied the probable points in the assembly which might fail or malfunction.

In the present invention, the control and connection elements have been greatly simplified and reduced in number, the construction being such that the parts may be assembled quickly and without the use of tools on the vehicle chassis. This is primarily accomplished through the use of a unique connection bar having flexible spring end contacts, one of the contacts bearing against a motor terminal, and the other making pressure engagement with a terminal of the battery. The associated connection bar contact and battery terminal normally cooperate to provide switching contacts which are arranged to be selectively actuated to opened and closed positions by means of a manually operable camming barrier of insulating material. In the arrangement of the present invention, the parts and required assembly personnel are materially reduced, and separate switch units, as such eliminated. Further it is not necessary to provide separate connection wires which have to be soldered or otherwise secured and connected to the different terminals. A material saving and more economical production is thus effected, while at the same time producing an arrangement in which the possibility of failure and malfunction is reduced to a minimum in comparison with the prior art arrangements.

SUMMARY OF THE INVENTION

The present invention relates generally to control means for electrically driven miniature vehicles, and is more particularly concerned with improved means for connecting the driving motor of the vehicle with an electrical source on the vehicle, and the provision of improved manually operable control switching means for energizing and deenergizing the driving motor.

With the foregoing in mind, it is one object of the herein described invention to provide a switch structure having a minimum of parts and assembly operations, which is susceptible of a long operating life, which will be free of failures, and which may be quickly assembled and connected into an energizing control circuit without the use of tools.

It is a further object to provide a unique physical arrangement in a self-powered miniature vehicle, wherein the driving motor, battery and control switch can be interconnected without the use of tools, and in which the battery terminal is utilized as one of the switch contacts.

Another object is to provide a unique circuit connection bar between one of the motor terminals and a battery terminal in which one end of the connection bar is cooperatively associated with one terminal of the battery in such a way that relatively movable contacts are formed which are actuatable to open and closed positions to control the operation of the electric motor.

Still another object is to provide as an article of manufacture an electric connection bar of unitary construction having a body portion by which it is adapted to be mounted on a vehicle chassis, and extensions for making pressural contacts with a motor terminal and a battery terminal, the extension contacting the battery terminal being operable as a switch member by which the bar is connected and disconnected with respect to the battery terminal.

Further objects and advantages of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the accompanying drawings, which are for illustrative purposes only:

FIG. 1 is a plan view of a miniature self-powered vehicle embodying the features of the herein described invention;

FIG. 2 is a fragmentary view, partly in section, at the driving end of the chassis, and showing details of the motor supporting bracket and connector for one terminal of the motor;

FIG. 3 is a transverse sectional view through the chassis, taken substantially on line 3—3 of FIG. 1;

FIG. 4 is a side elevational view of the vehicle with cutaway portions shown features of construction;

FIG. 5 is a transverse sectional view at the forward end of the chassis, taken substantially on line 5—5 of FIG. 1; and

FIG. 6 is a perspective view of the connector bar as embodied in the invention.

DESCRIPTION OF THE PRFERRED EMBODIMENT

Referring more specifically to the drawings, for illustrative purposes, the invention is shown as being incorporated into a miniature vehicle of the self-propelled type. More specifically, as shown in FIG. 1, the miniature vehicle embodies an elongate chassis frame structure **10** of substantially rectangular configuration. The frame structure may be constructed of any suitable material, but is preferably molded from a plastic, the frame structure being provided at its rear end with rotatably mounted driving wheels **11—11**, and at its forward end with wheels **12—12**.

An electric driving motor **13** is mounted at the rear end of the frame structure with its driving shaft **14** extending transversely of the vehicle and being fitted with a sleeve **15** for making frictional engagement with the adjacent driving wheel **11**.

The motor is supported within a motor mounting bracket **16** which forms a cradle within which the motor is removably supported in operating position. The bracket is constructed of a current carrying metal such as copper or other suitable material and is laterally provided with side fingers **17—17** for engaging one end of the motor frame on opposite sides of the driving shaft, while a finger **18** on the opposite side engages an adjacent connection terminal **19** having its end seated in an opening **20**. The mounting bracket is also provided with a forward upstanding extension **21** having a struck up integral finger portion **22** for engagement with an adjacent terminal, in this case the casing of a battery **23** which provides the source of electrical energy for driving the electric motor.

The battery **23** is supported so as to extend lengthwise along the axis of the chassis frame structure in a receptacle formed by downwardly curved inwardly extending side wings **24** and **25**, these wings having their confronting edges in spaced apart relation. At the forward end of the receptacle, the central electrode of the battery provides a battery terminal **26** which projects beyond this end of the receptacle for cooperative association with a switching and connecting arrangement, as will hereinafter be more fully described, for controlling the supply of energy to the motor **13**.

An electrical connection is established between the battery terminal **26** and the other motor terminal connection **27** by means of a conductor bar **28** of the configuration shown in FIG. 6. This connection bar is fabricated from a flat strip of suitable conducting material, such as copper. The bar comprises a substantially straight body portion **29** which is provided at its opposite ends with integrally formed end extensions **30** and **31** which provide flexible contacts. The extension **30** is offset relative to the body portion **29** to define an abutment edge **32**. The extension **30**, it will be observed, lies substantially in the same plane as the body portion **29**. The extension **31** is deflected at substantially right angle to the body portion, and where it joins the body portion is provided with an abutment edge **33**. The outermost free end of the extension **31** terminates in an angular portion **31***a*. As thus arranged, it will be apparent that the extension **30** is deflectable laterally with respect to the longitudinal axis of the body portion **29**, while extension **31** is deflectable in a direction substantially parallel to the longitudinal axis of the body portion.

The connection bar as described above is arranged for mounting at the side of the battery **23** so as to extend longitudinally along the side of the chassis frame structure **10**. This is accomplished by providing an upwardly opening groove **34** at the side of the chassis frame. As best shown in FIG. 1, the groove **34** has end walls **35** and **36** at its opposite ends. Adjacent the end wall **35** is an upstanding projection **37** which with the end wall **35** are positioned on opposite sides of an opening **38** through which the connector bar is adapted to extend. At the opposite end of the groove **34**, an upstanding projection **39** similarly cooperates with the end wall **36** on opposite sides of an opening **40** through which this end of the connector bar may extend. Between the projections **37** and **39**, there is a projection **41** on the opposite side of the groove. The projections **37**, **39** and **41** serve to laterally retain the body portion of the connector bar within the groove. Moreover, it will be observed that when the connector bar is slightly fixed and positioned in the groove with the end portions extending through the openings **38** and **40**, the connector bar will be forcefully retained due to its flexure. As thus positioned, the abutment edges **32** and **33** engage the end portions of the groove **34** and and thus anchor the connection bar against longitudinal shifting movement.

As best shown in FIG. 4, when mounted as explained above, the connection bar will have its extension **30** in contact engagement with the terminal connection **27** of the motor. At the other end, the body portion adjacent the juncture of extension **31** bears against a post **42** which serves to further retain this end of the conductor bar in its mounted position against deflection. As thus mounted, however, it will be seen that the extension **31** will have its end portion **31***a* resiliently urged into contact engagement with the battery terminal **26**. The connector bar provides a unique structure which combines into a single unit electrical connecting media and a switch contact for controlling energization of the driving motor.

The actuating means for moving the extension **31** so as to provide a control switching function will now be described. Adjacent the battery terminal **26**, the underlying frame structure, as shown in FIG. 5, is constructed with spaced walls **43** and **44** which define an internal cavity **45**. The frame structure is so arranged that the terminal **26** will extend into a slot **46** provided in the wall **43**. This wall also serves as a support for the post **42**.

For controlling actuation of the extension **31** as a switch contact, there is provided an actuator which comprises a slide member **47** supported in the internal cavity **45** for rectilinear movement. This slide member carries an upper projection **48** which extends through the slot **46** in the wall **43**. The projection **48** has an edge **49** so that this projection will serve as a camming barrier which can be moved from its full line position as shown in FIG. 1 to a phantom line position between and separating the contact **31***a* and the battery terminal **26**. Upon return of the projection **48** to the full line position, the contact will again be forcefully urged into engagement with the battery terminal. The projection **48** is of non-conducting material and may be constructed of a suitable plastic or insulation either separately or integrally with the slide member **47**.

The slide member **47** also has a downwardly extending projection **50** which extends through a guide slot **51** in the wall **44**. The projection **50** provides a digitally engageable handle for manually shifting the slide member during operation of the switch.

From the foregoing description and drawings, it will be clearly evident that the delineated objects of the invention will be accomplished.

Various modifications may suggest themselves to those skilled in th art without departing from the scope of our invention, and, hence we do not wish to be restricted to the specific form shown or uses mentioned.

We claim:

1. In a miniature vehicle, the combination comprising:

(a) an electric driving motor;

(b) a supporting structure for said motor, said structure having a portion for receiving and supporting a battery;

(c) circuit means for energizing said motor from said battery including a spring contact carried by said supporting structure, said spring contact being normally urged into engagement with an electrical terminal of said battery; and

(d) means for moving said contact including a camming barrier of non-conducting material supported for movement into and out of a position between said contact and terminal, whereby with the barrier positioned between said contact and terminal said motor circuit means will be interrupted.

2. The combination according to claim **1**, wherein the supporting structure comprises a chassis having a receptacle for receiving said battery in a position such that an electrical terminal on said battery is positioned adjacent one of said receptacle; and including means at said one end of said receptacle for guiding said camming barrier rectilinearly into and out of said position between said contact and said terminal.

3. The combination according to claim **1**, wherein said spring contact is integrally formed at one end of an electric conducting element extending longitudinally of said chassis, and having electrical connection at its other end with a terminal of said motor.

4. The combination according to claim **3**, wherein said driving electric motor is positioned at the opposite end

of said receptacle and has another terminal having electrical circuit connection with another terminal of said battery at this end of the receptacle; and said conducting element being formed from a flat strip material and mounted in an upstanding edgewise position.

5. In a miniature vehicle:

(a) a chassis frame structure having an inter-end portion for receiving a battery into a position with its axis extending lengthwise of said frame structure;

(b) an electric motor supported at one end of the battery receiving portion, said motor having a pair of electrical energizing terminals, one of which is in electrical connection with an adjacent terminal of a battery positioned in the battery receiving portion;

(c) electrical conducting means extending lengthwise of said frame structure, said means having a flat spring contact portion adjacent the motor electrically in connection with the other motor terminal,

and said means also having a flat spring contact portion adjacent the other end of the battery having a disengaged position and an engaged position in which latter position said spring contact portion is spring urged into engagement with the electrical terminal on this end of the battery;

(d) and manually operable means for moving such spring urged contact portion to its disengaged position.

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R. F. CUTTING, Assistant Examiner

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,474,567 Dated October 28, 1969

Inventor(s) LEONARD H. McROSKEY and JOHN W. McROSKEY

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 48, "shown" should read --showing--.

Column 3, line 28, "conductor" should read --connector--; line "angle" should read --angles--; line 64, "fixed" should read --flexed--.

Column 4, line 65, --end-- should be inserted after "one".

Column 6, line 15, "Bemkoe" should read --Benkoe--.

SIGNED AND
SEALED
MAY 26 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents