Aug. 2, 1966 O. F. LINDSTROM 3,263,364

ELECTRICALLY OPERATED TOY AUTO AND GUIDE RAIL

Filed Oct. 3, 1963 2 Sheets-Sheet 1

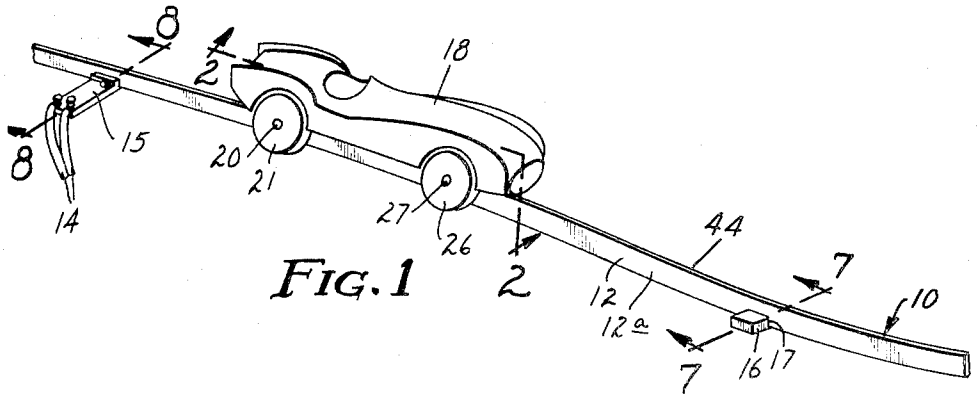


FIG. 1

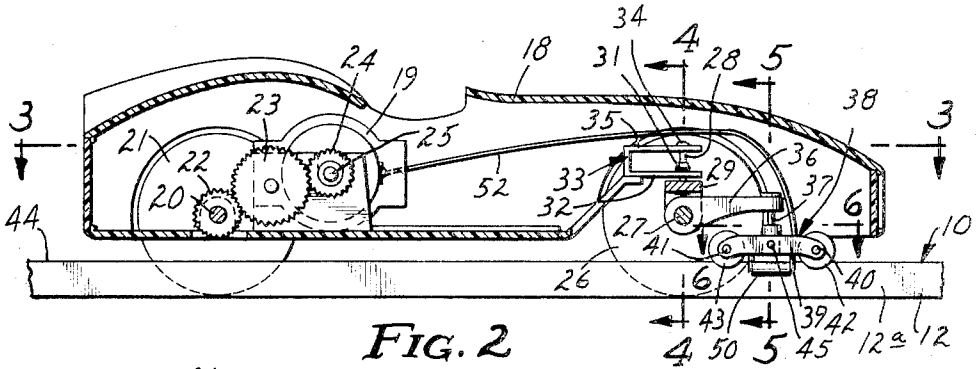


FIG. 2

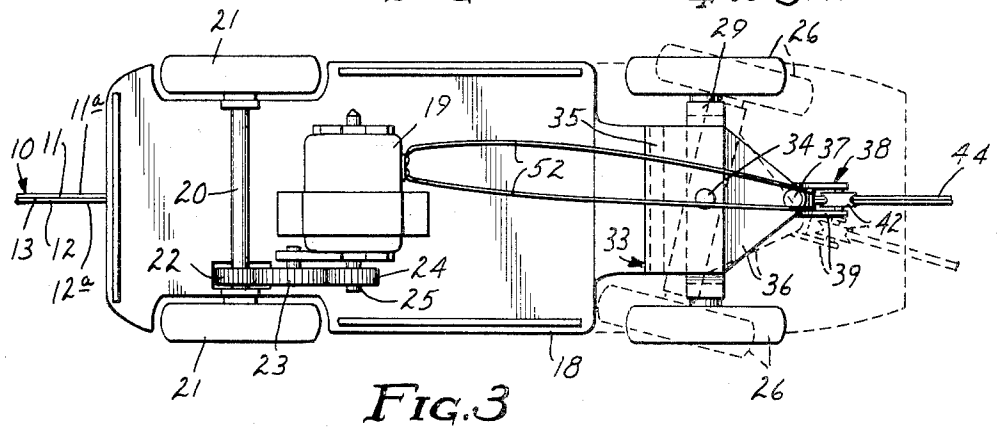


FIG. 3

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ELECTRICALLY OPERATED TOY AUTO AND GUIDE RAIL

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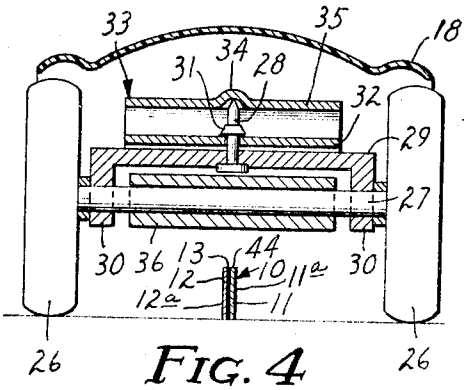


FIG. 4

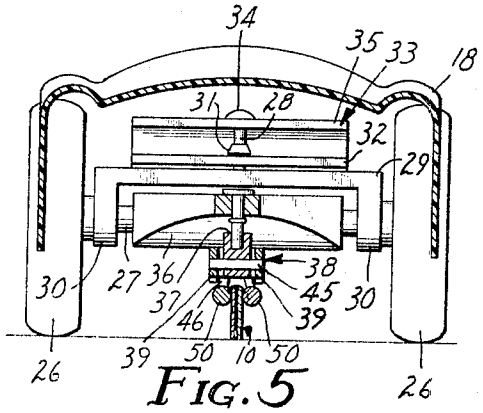


FIG. 5

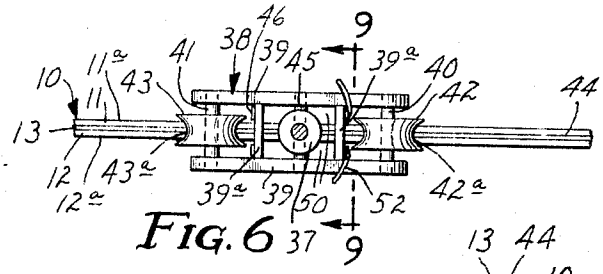


FIG. 6

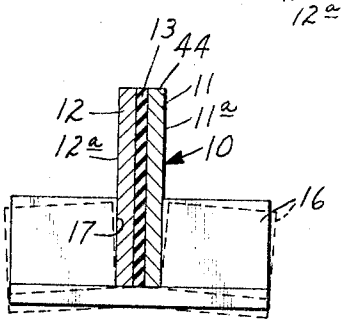


FIG. 7

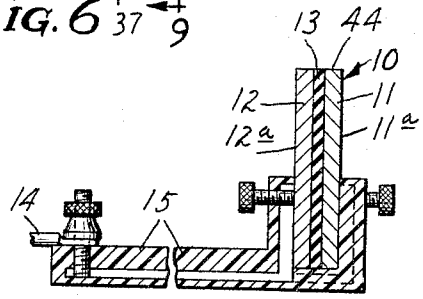


FIG. 8

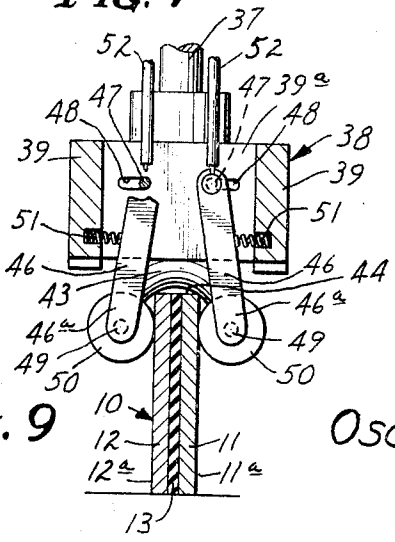


FIG. 9

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3,263,364

ELECTRICALLY OPERATED TOY AUTO AND GUIDE RAIL

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Filed Oct. 3, 1963, Ser. No. 313,690
3 Claims. (Cl. 46—244)

My invention relates generally to toys and more particularly to minature vehicles.

Still more specifically, my invention relates to and provides a novel electric motor-propelled miniature vehicle and a novel tape for guiding and imparting power thereto.

An important object of my invention is the provision of a novel tape for guiding and imparting power to miniature vehicles having an electric motor operatively coupled to a pair of rear wheels, a pair of dirigible front wheels, and a pair of laterally spaced brush elements associated with the motor which are interposed between the path of travel of said wheels and which are yieldingly biased towards each other transversely of said path of travel, said tape being in the nature of a vertically disposed flexible resilient ribbon adapted to be received between said brush elements and formed to define a pair of longitudinally extended parallel electrical conductor elements having insulator means therebetween and one each exposing a brush-engaging surface on opposite sides thereof.

A further object of my invention is the provision of a tape of the type immediately above described which is sufficiently flexible to permit lateral flexation and adjustment on a horizontal supporting surface.

A further object of my invention is the provision of a tape of the class above described wherein said conductor elements and said insulator means are in the nature of laterally disposed laminae.

A still further object of my invention is the provision of novel means on said miniature vehicle associated with said front wheels for transferring electrical energy from said guide tape to said electric motor.

The above and still further objects of my invention will become apparent from the following detailed specification, appended claims, and attached drawings.

Referring to the drawings wherein like characters indicate like parts throughout the several views:

FIG. 1 is a fragmentary view in perspective of my novel guide-track showing my novel vehicle mounted thereon;

FIG. 2 is an enlarged view in longitudinal section taken on the line 2—2 of FIG. 1;

FIG. 3 is a plan view as seen from the line 3—3 of FIG. 2, portions thereof removed;

FIG. 4 is a transverse sectional view taken on the line 4—4 of FIG. 2, on an enlarged scale;

FIG. 5 is a view in transverse section taken on the line 5—5 of FIG. 2, on an enlarged scale;

FIG. 6 is an enlarged fragmentary view in horizontal section as seen from the line 6—6 of FIG. 2;

FIG. 7 is a transverse sectional view as seen from the line 7—7 of FIG. 1, on an enlarged scale;

FIG. 8 is a view in transverse section as seen from the line 8—8 of FIG. 1, on an enlarged scale; and

FIG. 9 is an enlarged fragmentary sectional view as seen from the line 9—9 of FIG. 6.

Referring with greater particularity to the drawings, my novel tape, identified in its entirety by the numeral 10, is comprised of laterally spaced upstanding tape sections 11, 12, and 13 in the nature of bonded laminae. Tape sections 11 and 12 are flexible, preferably of resilient metallic strips capable of conducting electrical energy, whereas lamina 13 is a suitable insulating and bonding member.

For a purpose which will hereinafter become apparent, the conductor elements 11, 12 define, respectively, brush-engaging opopsite side surfaces 11*a*, 12*a*.

Electrical energy, from a source not shown, is supplied to the conductor elements 11, 12 of the tape 10 by means of suitable lead wires collectively identified by 14 and a cooperating coupler element 15, as seen particularly in FIGS. 1 and 8. For the purpose of maintaining the guide tape 10 in a vertically disposed operative position, I provide at longitudinally spaced points therealong suitable supporting members preferably in the nature of rubber blocks 16 having central channels 17 cut therethrough for the snug reception of said tape 10, as illustrated particularly in FIG. 7. However, I wish to emphasize that the tape 10, by virtue of its inherent characteristic, is self-supporting when formed either into a circular or serpentine shape.

My novel miniature vehicle adapted to be guided by and derive power from tape 10 comprises a frame or chassis 18 having an electric motor 19 suitably mounted thereon. Suitably journalled in the frame or chassis 18 is a horizontally disposed and transversely extended axle 20 having rear wheels 21 fast on opposite ends thereof. Mounted upon the axle 20 intermediate the wheels 21, for common rotation therewith, is a driver gear 22 which has meshing engagement with an idler gear 23, which in turn has meshing engagement with a drive gear 24 fast on the output shaft 25 of motor 19.

The dirigible front wheels 26 are journalled on opposite ends of a front axle 27. Axle 27 intermediate the wheels 26 is mounted for rotation on a vertical axis 28.

As shown particularly in FIG. 4, this is accomplished through the medium of an inverted yoke 29, depending opposite ends 30 of which encompass said axle 27 and the intermediate portion of which is provided with an upstanding pivot pin 28 which passes through the lower fork 32 of a bifurcated mounting bracket 33 carried by the frame 18 and is received within a downwardly opening recess or socket 34 in the upper fork 35 of said bracket 33. A collar 31 fast on the pivot pin 28 intermediate the forks 32, 35 maintains the pin 28 in its operative position during removal of the vehicle from the tape 10. This arrangement obviously permits combination steering and rocking movements to be imparted to the front wheels 26 with a minimum of friction.

Pivotally secured to the intermediate portion of front axle 27 for raising and lowering movements, and projecting longitudinally, preferably forwardly therefrom, is a mounting arm 36. Journalled for rotation about a vertical axis to the projected forward end of the mounting arm 36 is a depending pivot pin 37. Pivotally secured on the lower end of pivot pin 37 is a carriage 38, which, as shown particularly in FIG. 6, comprises a pair of laterally spaced longitudinally extended arm elements 39 secured together by means of wall-like cross members 39*a*. Projecting through opposite end portions of the arm elements 39 are shafts 40, 41 having guide-wheels 42, 43, respectively, mounted thereon for common rotation therewith. As shown, guide-wheels 42, 43 are formed at their peripheries to define grooves 42*a*, 43*a*, respectively, for reception of the upper edge portion 44 of the tape 10. Wheels 42 and 43 are in non-conducting relationship to the metallic strips 11 and 12. Projecting through the intermediate portion of the arm elements 39 and the lower end of pivot pin 37, and journalling same for pivotal movements about a horizontal axis, is a pivot pin 45.

As shown particularly in FIGS. 2, 5, 6, and 9, longitudinally spaced pairs of laterally spaced legs 46, having their upper end portions secured for limited compound sliding and pivotal means, one pair on each wall-like cross member 39*a*, as indicated particularly in FIG. 9. This is accomplished by means of pivot pins 47 fast on the

upper end of each of the arms **46** and slidably, pivotally received in transversely extended slots **48** in said cross members **39***a*, one each on opposite sides of the transverse center thereof. Extending between the free ends **46***a* of the arms **46** and secured thereto, as indicated at **49**, one each on an opposite side of tape **10**, is an elongated brush element **50**, preferably and as shown having a cylindrical cross section. Yieldingly biasing each pair of arms **46** and the brush elements **50** carried thereby toward each other and towards engagement with the brush-engaging surfaces **11***a*, **12***a*, of the tape **10** are suitable springs **51**, as shown, being of the coil-compression type.

Leading from the upper end portions of the legs **46** and having operative connections with the motor **19** are lead wires identified collectively by **52**.

When it is desired to operate my novel vehicle, above described, the guide-tape **10** is first placed upon a horizontal supporting surface to define a desired path of travel; thereafter the vehicle is placed thereover with the wheels **21**, **26** in straddling relationship to the tape **10**. Finally, the carriage **38** is elevated by raising the mounting arm **36** and the guide-wheels **42**, **43** are placed in overlying relationship to the upper edge **44** of the track **10** in tandem relationship with the grooves **42***a*, **43***a*, receiving said upper edge **44**. As this operative relationship is assumed under the action of gravity, the brush elements **50** will be spread apart against yielding bias of the spring **51** so as to come to rest in the operating position of FIG. 9 in engagement with said brush elements **50** one each respectively with a brush-engaging side surface **11***a*, **12***a*. Obviously, travelling movements may now be imparted to the miniature vehicle by merely connecting the lead wires **14** to a suitable source of power.

My invention has been thoroughly tested and found to be entirely satisfactory for the accomplishment of the above objects; and while I have disclosed a preferred embodiment thereof, my invention may be capable of modification without departure from the scope and spirit of the appended claims.

What is claimed is:

1. In combination with a vertically disposed flexible guide rail formed to define a pair of longitudinally extended parallel electrical conductor elements having insulator means therebetween and one each exposing a brush-engaging surface on opposite sides thereof:

(a) a toy vehicle having rear wheels;

(b) an electrically operated motor carried by said vehicle and operatively connected to impart rotation to said rear wheels;

(c) means supporting and guiding the front portion of said vehicle along the guide rail and including:

(1) a longitudinally extended carriage;

(2) grooved guide wheels one each journalled for rotation on an opposite end of said carriage and engageable with the guide rail in tandem relationship;

(3) means pivotally mounting said carriage intermediate said wheels to said vehicle for compound pivotal movements on a horizontal axis extending normal to the guide rail and on an extended vertical axis which bisects said horizontal axis;

(4) a pair of laterally spaced brush elements;

(5) means pivotally mounting said brush elements to said carriage in underlying relationship to said axes for swinging movements one each toward and away from one of the conductor elements of the guide rail;

(6) means yieldingly biasing each of said brush elements toward engagement with the adjacent exposed brushing surface of its respective conductor element;

(7) conductor means connecting each of said brush elements to said electric motor; and

(8) means connecting said conductor elements to a source of electrical power.

2. The structure of claim **1** in further combination with:

(a) a pair of front wheels;

(b) means including a horizontally disposed axle rotatably mounting said wheels to said vehicle for steering movements about a vertical axis;

(c) a longitudinally extended arm pivotally secured at one end to the intermediate portion of said axle for raising and lowering movements of the free forward end thereof toward and away from said guide rail;

(d) said carriage being pivotally secured to said free end of said arm for pivotal movements about said vertical axis of said carriage.

3. The structure of claim **2** in which the means mounting said wheels to said vehicle for steering movements about a vertical axis comprises:

(a) an inverted U-shaped element having opposed depending legs journalling said axle;

(b) a vertically extended shaft carried by said U-shaped element intermediate said legs;

(c) a mounting bracket carried by the forward end of said vehicle and defining upper and lower mounting plates;

(d) said lower plate defining a central aperture;

(e) said upper plate defining a central socket in vertical alignment with said aperture;

(f) said shaft being receivable in said aperture with the upper free end thereof in engagement with said socket; and

(g) stop means on said shaft limiting movement of said free end axially out of said socket.

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