

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in and relating to Toy Vehicles

We, BRITAINS LIMITED, a British Company, of 28, Lambton Road, Hornsey Rise, London, N.19, and GEORGE EDWARD SMALLWOOD, a British Subject, of 46, 5 Mayfield Avenue, North Finchley, London, N.12, do hereby declare the nature of this invention to be as follows:—

10 This invention consists in improvements in and relating to toy vehicles.

The object of the invention is to provide means for automatically steering an electrically or mechanically driven toy road vehicle, such as a toy motor car or 15 trolley bus, in accordance with the configuration of a wire, rail, or the like, of any suitable kind which can be set up or laid out in accordance with any desired "route" comprising straights, curves, 20 inclines etc. conforming with the "route" on which the toy vehicle is to run.

Our invention consists in a toy vehicle having means for propelling same and 25 steering mechanism adapted to impart directional movement to the steering wheels of the vehicle wherein the steering mechanism is automatically actuated by means of a swingable arm connected to said 30 steering mechanism and having at its free end a grooved wheel, shoe or the like adapted to travel upon or in contact with the underside of a wire or rail conforming with the route along which the vehicle is 35 to travel whereby as the vehicle travels the steering mechanism thereof will be actuated by said arm in accordance with the configuration of said wire or rail and the vehicle will take a similar 40 course.

In the case of electrically driven toy vehicles the wire or rail would convey the current from a suitable source of supply to the driving motor of the vehicle 45 through said arm and in this case two symmetrically arranged wires or the like would be provided and the swingable arm would be provided with two wheels adapted to run upon or in contact with the undersides of the respective wires and adapted by suitable connections to convey 50 the current to the motor one of said wires conveying the current and the other for

the return, suitable insulations being provided where necessary. 55

The annexed drawings illustrate two examples of construction of the invention respectively applied to a toy motor car and to a toy trolley bus which are electrically driven the driving motors however not 60 being illustrated.

Fig. 1 is a side elevation of the motor car,

Fig. 2 is a plan view thereof showing the swingable arm and the steering mechanism in dotted lines as seen from 65 above.

Fig. 3 is a side elevation of the trolley bus.

Fig. 4 is a plan view of the swingable arm and the steering mechanism only of the trolley bus. 70

In the construction shown in Figs. 1 and 2 the swingable arm *a* is arranged below the body of the car *b* and is provided at its free end with two parallel grooved wheels *c c*¹ adapted to run on 75 parallelly arranged current conveying wires *d d*¹ the arm *a* being open and comprising two limbs as can be seen in Fig. 2 and being swingable in the directions of the arrows. 80

The inner ends of the arm are fixed to a toothed quadrant *e* mounted on the lower end of a vertical shaft *f* turnable in bearings constituted by top and bottom plates *g* and *h* respectively. 85

The quadrant *e* gears with a second quadrant *i* turnably mounted on a fixed vertical shaft *j* and is connected at its apex to a collar or bracket *k* fixed to the one steering wheel *l* this bracket being also turnable on the shaft *j*. It follows that when the quadrant *i* is turned in the one direction or the other the wheel *l* will be 90 turned vertically through a corresponding angle. 95

The quadrant *i* is provided at *m* with a pivot pin on its lower face to which is pivoted the one end of a curved link *n* 100 extending below the quadrants and pivoted at its other end as at *o* to a short arm *p* connected to a block *q* turnable on a second vertical shaft *r* parallel to the shaft *j* the block *q* being fixed to the second steering wheel *l*¹. 105

By this mechanism the link n transfers the movement of the quadrant i to the wheel l^1 through the short arm p so that the two wheels l l^1 will always turn through equal angles and always strictly parallel to one another.

In the drawing the car is shown on a straight route but when a curve occurs in the wires d d^1 the wheels c c^1 will move to the right or the left and the arm a will swing accordingly while the steering wheels will turn by the mechanism described in accordance with the new direction of travel.

In the trolley bus shown in Figs. 3 and 4 the swingable arm a is provided with the runner wheels c c^1 adapted to run on twin overhead current conveying wires in like manner to that described with reference to Figs. 1 and 2 except that the wires being overhead suitable supports for same must be provided.

The arm a is open as shown in Fig. 4 being formed of two parallel members a^1 a^2 which may be constructed of stiff wire bent at one end as at a^3 to form axles for the runner wheels c c^1 and at the other end fixed to a horizontal disk s for instance by being bent round this disk and then soldered thereto.

The disk is fixed to the top of a vertical shaft s^1 extending through the body of the bus and supported by suitable bearings. Fixed to the bottom end of the shaft s^1 is a short, horizontal arm s^2 to which is pivoted a horizontal link s^3 .

The steering wheels t , t^1 are similar to the construction shown in Figs. 1 and 2, fixed to bearing blocks u , u^1 respectively turnable on vertical spindles v v^1 the blocks u u^1 being provided with rearwardly extending rods w w^1 fixed thereto

and pivoted at their rear ends to a connecting bar x as can be seen in Fig. 4.

The front end of the link s^3 is pivoted as at s^4 to a short lever y the other end of which is fixed to the block u the latter being fixed to the one steering wheel t as previously described.

The action is simple when the running wheels c c^1 meet a lateral curve of the wires d d^1 the arm a will swing to the right or left thus turning the vertical shaft s^1 and thereby the short arm s^2 through an angle this movement being transmitted through the link s^3 to the lever y thereby turning the wheel t which through its rod w connecting bar x and rod w^1 of the wheel t^1 transmits the movement to the latter wheel, the said wheels being simultaneously moved while always remaining parallel to one another.

Suitable current conveying leads from the wires d d^1 and carried by the arm a would be provided for the actuation of the electric driving motor of the vehicle these leads and motor not being however illustrated in the drawings as they may be arranged in any suitable way.

It is obvious that our invention can be applied to clockwork driven vehicles in which case possibly only a single wheel would be required for the swingable arm adapted to run on a single wire but if desirable two parallel wires could be used and two wheels as in the examples of construction illustrated.

Dated this 10th day of February, 1937.

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COMPLETE SPECIFICATION

Improvements in and relating to Toy Vehicles

We, BRITAINS LIMITED, a British Company, of 28, Lambton Road, Hornsey Rise, London, N.19, and GEORGE EDWARD SMALLWOOD, a British Subject, of 46, Mayfield Avenue, North Finchley, London, N.12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention consists in improvements in and relating to toy vehicles.

The object of the invention is to provide means for automatically steering an electrically or mechanically driven toy road vehicle, such as a toy motor car or trolley bus, in accordance with the con-

figuration of a wire, rail, or the like, of any suitable kind which can be set up or laid out in accordance with any desired "route" comprising straights, curves, inclines etc. conforming with the "route" on which the toy vehicle is to run.

It has been proposed in mechanically propelled toy vehicles to provide automatic means for guiding same by the provision of a pivoted arm connected to the steering wheel or wheels of the toy and having at its free end a roller or the like mounted on a vertical axle and maintained by a spring against a vertical abutment such as the edge of a table or the side of a vertical rail,

It has also been proposed in electrically propelled toy vehicles to provide a guiding and current conveying abutment arranged to one side of the vehicle against the side
 5 of which spring contacts of an arm connected to the steering wheels of the car abut and travel also it has been proposed to provide guiding and current conveying means for electrically driven toy vehicles
 10 consisting in a current conveying channel having vertical side walls or rails, a wheel connected to the vehicle conveying the current to the motor of the vehicle by running on said rails while a horizontal roller
 15 mounted on a vertical rod connected to an arm connected to the steering wheels of the vehicle is engaged in said channel to provide guiding means for the vehicle.

Our invention consists in a toy vehicle
 20 having means for propelling same and steering mechanism adapted to impart directional movement to the steering wheels of the vehicle actuated by an arm pivoted to the vehicle and having at its
 25 free end a roller or the like adapted to run against a guiding abutment or rail characterized in that the arm connected to the steering mechanism of the vehicle is pivoted thereto adjacent the front end of
 30 the same and normally extending rearwardly from its pivot along the central vertical plane of the vehicle, the free end of said arm carrying a grooved wheel or shoe pivotal about an axis substantially
 35 vertical to said arm and adapted to run either upon the top of, or in contact with the under side of a wire or rail conforming with the route along which the vehicle is to travel whereby on said wheel or shoe
 40 meeting a curve on the route wire or rail, the arm will be swung to the one or other side of said vertical plane of the vehicle and will actuate the steering mechanism thereof accordingly.

In the case of electrically driven toy vehicles double route wires or rails convey the current from a suitable source of supply to the driving motor of the vehicle through suitable connections and we provide two grooved wheels or shoes each
 50 pivotally mounted on a separate arm these arms being pivoted with a certain amount of play on a common horizontal cross shaft mounted on a vertical shaft or pivot these
 55 arms being individually vertically turnable about the cross shaft and collectively swingable about the vertical shaft or pivot. In this case two symmetrically arranged route wires or the like would be
 60 provided one of said wires or rails conveying the current and the other for the return, suitable insulations being provided where necessary.

The annexed drawings illustrate two
 65 examples of construction of the invention

respectively applied to a toy motor car and to a toy trolley bus which are electrically driven, double swingable arms and route wires or rails being
 70 provided.

Fig. 1 is a side elevation of the toy motor car,

Fig. 2 is a plan view of Fig. 1 with part of the car body broken away and showing the two swingable arms and the steering mechanism in dotted lines as seen from above.

Fig. 3 is a side elevation of the toy trolley bus.

Fig. 4 is a plan view of Fig. 3 with part of the body of the bus broken away and showing the swingable arms and the steering mechanism.

In the construction shown in Figs. 1 and 2 the double swingable arms 1, 1a are arranged below the body of the car 2 and each is provided at its free end with a small grooved wheel 3, 3a revoluble in bearing forks 4, 4a which are angularly turnable about substantially vertical
 85 pivots 5, 5a the wheels 3, 3a are thus castor wheels and run on parallelly arranged current conveying wires.

The inner ends of the arms 1, 1a are provided with transverse bearing sleeves 7, 7a by which they are mounted with a certain amount of play on a transverse shaft 8 fixed to a horizontal plate 9 which is attached to a vertical rotatable shaft 10. The arms 1, 1a are thus capable of
 90 vertical angular movement about the shaft 8 and owing to the loose mounting thereon, the free ends of the arms and consequently the pivots 5, 5a can have a certain amount of lateral movement, this
 105 allows for any variation in the spacing between the route wires. To the shaft 10 is also fixed a horizontal toothed quadrant 11. The shaft 10 has its bearings in a plate 12 and in an upper plate 13.

The quadrant 11 gears with a second quadrant 14 fixed on a rotatable vertical shaft 15 having its bearings in the plates 12 and 13. The steering wheels 16, 16a are rotatably mounted on pins 17, 17a
 115 extending laterally from blocks 18, 18a these blocks being fixed to rotatable vertical pins 19, 19a having bearings in the plate 12. The free ends of arms 20, 20a are pivoted as at 21, 21a to the
 120 respective ends of a connecting link 22 the inner ends of said arms being fixed to the blocks 18, 18a.

The arms 1, 1a being turnable about the shaft 8 a light wire spring 23 is provided on each and operating to maintain them depressed so that the grooved wheels 3, 3a are maintained in contact with the route wires 6, 6a.

By this mechanism the angular move-
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ment of the quadrant 11 is transferred through the quadrant 14 to the wheel 16a through its block 18a which in turning the arm 20a actuates the arm 20 of the wheel 16 through the link 22 so that the two wheels 16, 16a will always turn through equal angles while remaining parallel to one another.

In the drawing the route wires 6, 6a are shown to be straight but when a curve occurs in the lay out of these wires the grooved castor wheels 3, 3a will move to the right or the left and the arms 1, 1a will swing accordingly and cause the steering wheels to turn by the mechanism described in accordance with the new direction of the route wires 6, 6a and the vehicle will travel accordingly the road wheels 16, 16a thereof running on a basic support 24 on which said wires would be laid.

The vehicle is driven by an electric motor 25 contained within the body 2 and driving the rear wheels 26 through suitable gears 27 the current would be conveyed from a suitable source of supply by the route wire 6a and picked up by the wheel 3a and the arm 1a to the lead 28 and thence to the motor 25 the return lead being through the arm 1 wheel 3 and the route wire 6.

In the trolley bus shown in Figs. 3 and 4 the swingable arms 28, 28a are provided with grooved castor wheels 29, 29a adapted to run against twin overhead current conveying route wires 30, 30a suitable supports being provided for these wires.

The grooved wheels 29, 29a are mounted in forks 31, 31a turnable about substantially vertical pivots 32, 32a carried by the extremities of the arms 28, 28a in a similar manner to the grooved wheels 3, 3a in Figs. 1 and 2 but inverted. Also the arms 28, 28a are similarly mounted with a certain amount of play on a transverse axle 33 so as to be capable of vertical rotary movement about said axle while being allowed a certain amount of individual lateral movement at their extremities, consequently the pivots 32, 32a and the grooved wheels 29, 29a can have like movements.

These individual lateral movements which the wheels 29, 29a can assume allow for proper contact of said wheels with the route wires 29, 29a in spite of any variations which may be present in the spacing between said route wires.

The transverse axle 33 is carried on a plate 34 fixed to the top of a vertical shaft 35 extending through the body of the bus and supported by suitable bearings. Fixed to the bottom end of the shaft 35 is a toothed quadrant 36 gearing with a second toothed quadrant 37 fixed to the block 38

of the steering wheel 39. The angular movement of the quadrant 36 caused by a movement of rotation of the shaft 35 promoted by a swinging movement of the arms 28, 28a is imparted to the quadrant 37 and the steering wheel 39 to the steering wheel 39a through the link 40, arm 40a and block 38a. The mounting of the steering wheels and the connecting link 40 is similar to that described with reference to Fig. 1 and 2 so that the action will be readily understood without further description.

The arms 28, 28a are supported in such a way that the wheels 29, 29a will be maintained in good running contact with the route wires 30, 30a by means of a wire spring or springs 41 and the current is conveyed by the wheel 29, through the lead 42 to the driving motor 43 of the vehicle and returned through the lead 42a to the wheel 29a or vice versa the motor being connected to the driving wheels 44 by gearing 45 as in the construction illustrated in Figs. 1 and 2.

Each arm 28, 28a is provided with a guide wire or the like 46 the purpose of which is in case of sagging of the wires 30, 30a or other causes, to prevent the said wires from fouling the castor wheels 29, 29a.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A toy vehicle having means for propelling same and steering mechanism adapted to impart directional movement to the steering wheels of the vehicle actuated by an arm pivoted to the vehicle and having at its free end a roller or the like adapted to run against a guiding abutment or rail characterized in that the arm adapted to actuate the steering mechanism of the vehicle is pivoted thereto adjacent the front end of the same and normally extending rearwardly from its pivot along the central vertical plane of the vehicle, the free end of said arm carrying a grooved wheel or shoe pivotal about an axis substantially vertical to said arm and adapted to run either upon the top of, or in contact with the under side of a wire or rail conforming with the route along which the vehicle is to travel, whereby on said wheel or shoe meeting a curve on the route wire or rail, the arm will be swung to the one or other side of said vertical plane of the vehicle and will actuate the steering mechanism thereof accordingly.

2. A toy vehicle according to Claim 1 provided with two similar arms for actuating the steering mechanism each pivoted on a common horizontal cross shaft

mounted on a vertical shaft or spindle rotatably arranged towards the front end of the vehicle and lying in the central vertical plane thereof, said arms being 5 individually vertically turnable about the cross shaft and collectively swingable about the axis of the vertical shaft or spindle, each of said arms having at its 10 free end a grooved wheel or shoe arranged to swivel about axes substantially vertical to said arms, the said wheels or shoes being adapted to run on or against substantially parallel route wires or rails, the vertical shaft or spindle being in 15 operative connection with the steering mechanism of the vehicle.

3. A toy vehicle according to Claim 2 wherein the propelling means therefor is an electric motor carried by the vehicle, 20 the current being conveyed from a suitable source of supply by the parallelly arranged route wires or rails and the wheels or shoes running thereon to the motor, through suitable leads.

4. A toy vehicle according to Claims 1 25 to 3 wherein the arm or arms actuating the steering mechanism is or are arranged beneath the vehicle and the pivoted wheel or wheels thereof are adapted to run on a 30 route wire or wires or rail or rails laid on the surface on which the vehicle is to travel.

5. A toy vehicle according to Claims 1 to 3 wherein the arm or arms actuating the steering mechanism is or are arranged on 35 top of the vehicle and the pivoted wheel or wheels thereof are adapted to run in contact with a route wire or wires or rail or rails supported above the vehicle.

6. A toy vehicle according to Claims 1 40 to 5 wherein the arm or arms is or are mounted with play on their pivots and is or are provided with a spring or springs adapted to maintain the grooved wheel or wheels carried by said arm or arms in 45 operative contact with a route wire or wires, rail or rails substantially as described.

7. A toy vehicle constructed substantially as herein described and as illustrated 50 in Figs. 1 and 2 of the drawings filed with our complete specification.

8. A toy vehicle constructed substantially as herein described and as illustrated 55 in Figs. 3 and 4 of the drawings filed with our complete specification.

Dated this 28th day of September, 1937.

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Fig. 3.

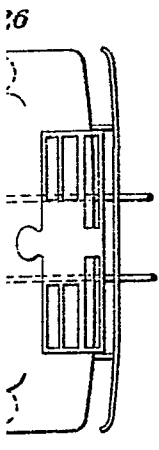
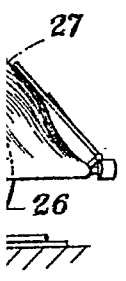
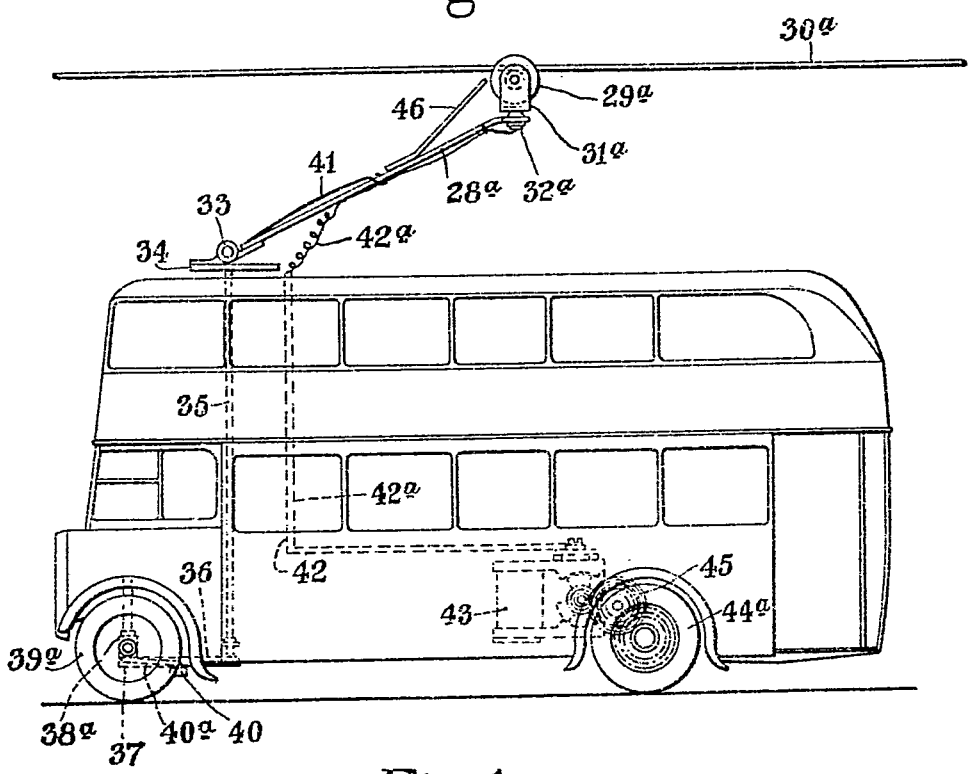


Fig. 4.

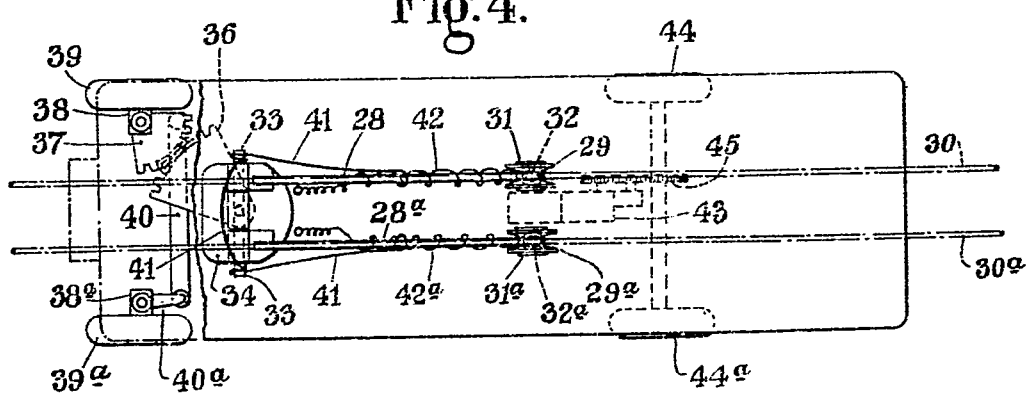


Fig. 1.

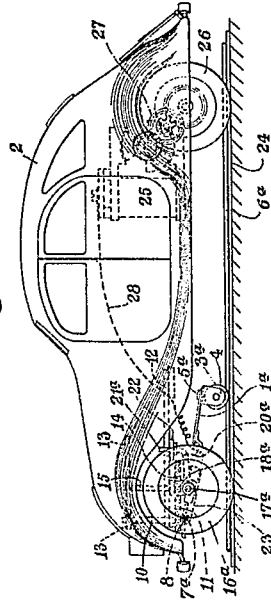


Fig. 2.

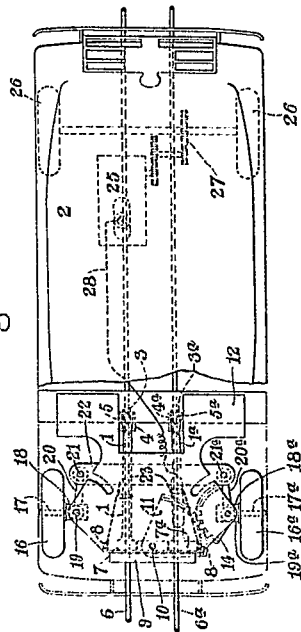


Fig. 3.

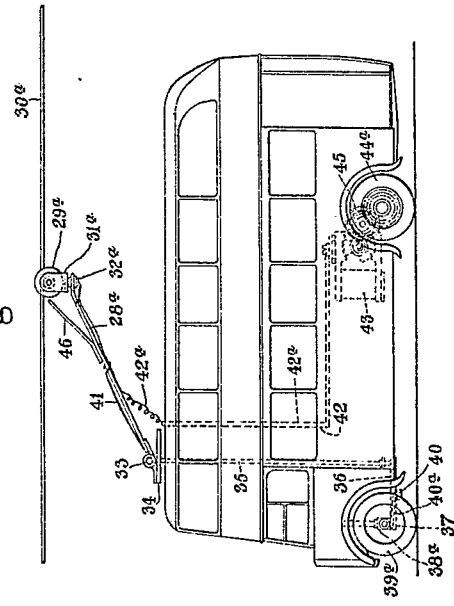
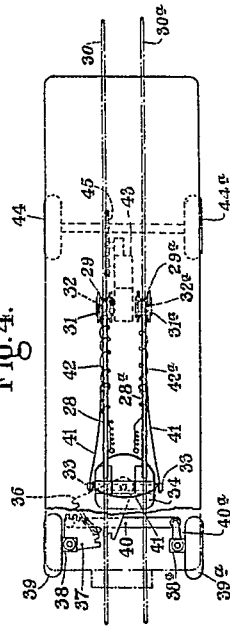


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale.]