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J. C. KOERBER

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TOY VEHICLE

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2 Sheets-Sheet 2

Fig. 5.

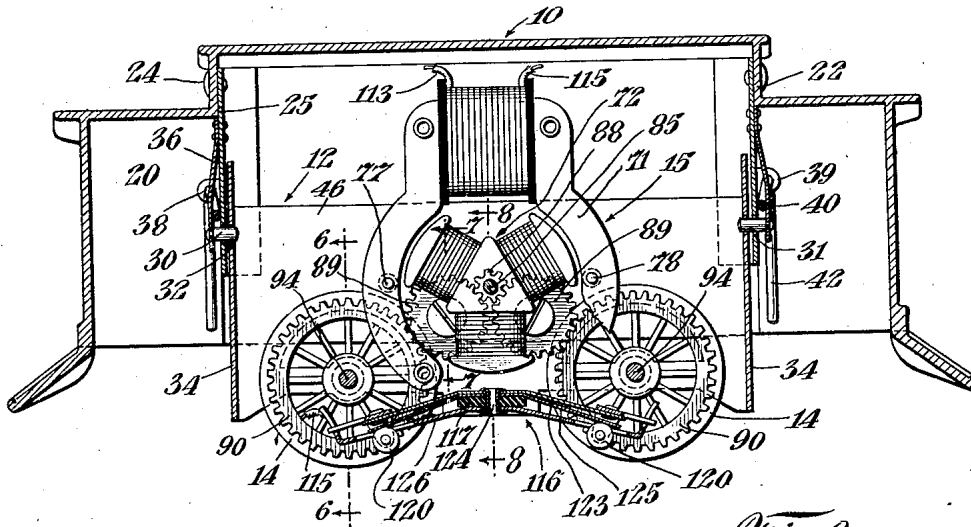


Fig. 6.

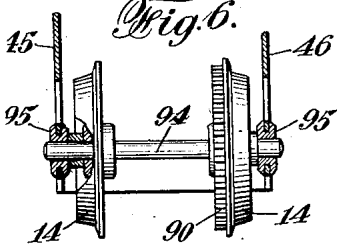


Fig. 7.

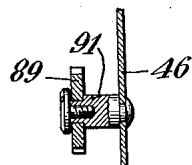
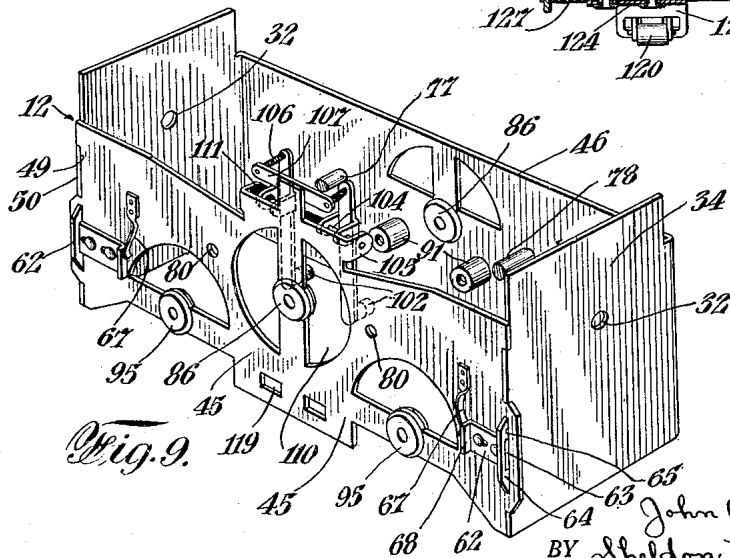
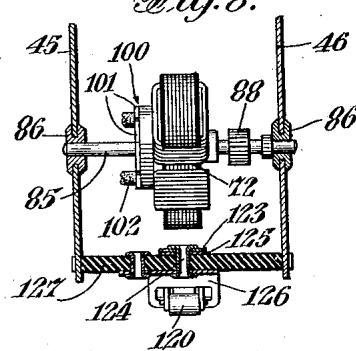


Fig. 8.



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TOY VEHICLE

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This invention relates to toy vehicles and particularly toy motor vehicles, such as toy electric cars.

The principal object of my invention is to provide an improved toy motor vehicle which is formed of parts that may be readily assembled and disassembled. A further object is to provide an improved toy electric vehicle having a body portion and an electric motor for operating the vehicle, which motor may be readily assembled with or inserted into the body portion and also readily removed from the body portion.

In accordance with the present invention, the body portion of the vehicle or car may be formed as a single piece or casting, or may be formed of parts which are more or less permanently secured together, and, in the embodiment of the invention herein disclosed, the motor which comprises a field and rotary armature is mounted in a casing or housing which may be readily inserted into and removed from the car body portion. The motor field is supported in the motor casing and the armature shaft is journaled in the sides of the casing, and the casing is formed so that it may be readily taken apart and the motor field and armature removed therefrom. In the present embodiment also the road or track wheels of the vehicle are mounted in this casing, and these wheels as well as gearing which connects the motor armature with the track wheels may be readily removed from the casing upon disassembling of the casing parts. The vehicle, which is preferably a toy electric locomotive adapted to run on tracks, is provided with a current collector which is adapted to engage an energized third rail of the track. The current collector also is mounted in the removable motor casing and is removable from the casing upon the disassembling of the parts thereof. The casing thus forms a removable supporting means for the motor field, track wheels, gearing and current collector, and it also furnishes a removable supporting means and a removable bearing means for the motor armature.

In order to prevent accidental separation of the motor casing from the car body, I

preferably employ a catch or means for detachably securing the casing in the body, this means being readily accessible for operation from outside the car body.

Numerous objects and advantages of my invention other than those above noted will appear from the following description taken in connection with the accompanying drawings which show by way of illustration one embodiment of my invention and wherein:

Figure 1 is a side elevation of a toy car or locomotive showing the portion of the track rails on which the car or locomotive is adapted to run.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, looking in the direction of the arrows, with certain parts broken away and showing the motor casing inside the car body and the motor field and armature inside the motor casing.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a detail perspective view showing a portion of side and end of the motor casing and showing one means for securing the casing to the car body and also showing one means for securing together the sections or parts of the casing.

Figure 5 is a longitudinal, vertical sectional view taken on the line 5—5 of Figure 2, looking in the direction of the arrows.

Figure 6 is a detail view, partly in section, on the line 6—6 of Figure 5, showing the means for mounting the gear wheels for transmitting power from the armature to the track wheels.

Fig. 7 is a detail sectional view along the line 7—7 of Fig. 5.

Figure 8 is a detail view partly in section, on the line 8—8 of Figure 5, and

Figure 9 is a perspective view of the motor casing, showing a modified means for securing the sections of the casing together.

Referring to the drawings, reference character 10 represents a car body of the form of an electric locomotive. The body 10 is formed with an interior space 11 open at its bottom. Reference character 12 represents a motor casing adapted to be received and secured in the space 11. The lower portion of

the casing 12 projects beneath the car body and may be formed to represent the running gear of a locomotive of the type illustrated. In the projecting lower portion of the casing 12 are journaled wheels 14 which are the traction wheels of the locomotive. Wheels 14 are driven by an electric motor 15 in the casing 12 and are adapted to run on the track rails 16, shown in Figure 1.

10 The body 10, which is preferably made of a single die casting, is formed at its top near the opposite ends with re-entrant portions 20 which are connected with the sides of the car body by lateral walls 22 shown in Figure 2. 15 Located inside the body 10 and permanently secured to the walls 20, as by rivets 24, are plates 25 which form between them a space 23 in which the motor casing 12 is secured.

Various forms of means may be employed 20 for securing the casing or housing 12 to the interior of the car body. Such means should however, preferably be of such a character that it may be easily manipulated so that a child may remove the casing and motor parts 25 from the car body and replace them without difficulty. The means of this character herein disclosed comprises two pins 30 adapted to enter aligned openings 31 and 32 in the supporting plates 25 and the ends 34 of the 30 casing 12, respectively. Each pin is normally biased to its locking or latching position in the opening 31 and 32 by means of a spring 36 secured at one end to the plate 25 and at its other end to the pin 30. To withdraw the 35 pin 30 from its latching position when it is desired to remove the casing, a shaft 38 is provided, which is pivotally mounted in lugs 39 struck up from the plate 25. Shaft 38 is formed with a crank 40 positioned between 40 the spring 36 and plate 25 and is also formed with a handle 42 which extends downwardly so as to be easily accessible for operation through the bottom opening in the car body. By turning the handle 42 in a direction away 45 from the plate 25, crank 40 forces the spring 36 away from the plate 25 and withdraws the pin from the opening 32, thus releasing the motor casing.

50 The motor casing 12 is formed of two opposed metal sections 45 and 46. The section 45 forms one side of the motor casing, and section 46 forms the other side and the ends of the casing. Section 45 is formed at its ends with recesses 49 in which are adapted 55 to be seated lugs 50 which project from the side edges of the section 46. In the casing shown in detail in Figure 4 there are two recesses 49 at each end of the section 45, and the section 45 between the recesses 49 is 60 formed with a lateral extension 54, having at its end outwardly projecting perforated lugs 55. The section 46 of the casing is formed with corresponding perforated lugs which, when the sections are assembled, are 65 located respectively above and below the lugs

55, with the perforations in lugs 55 and 56, at each end of the casing, in alignment with one another. Removable pins 58, extending through the aligned perforations in the lugs 55 and 56, serve to secure the sections of the casing 12 together. Each pin 58 is formed with a head 60, which, when the casing 12 is in position between the holding plates 25, is located immediately below the lower edge of a holding plate and is thus prevented 70 from slipping out of the perforations in the event that the car is turned over.

In Figure 9 I show a modified means for detachably securing the sections of the casing 12 together. Such means includes a 75 latch 62 slidably secured to the section 45 and adapted to enter openings 63 formed in lugs 64 projecting laterally from the ends of the section 46 through slots 65 in the section 45. Latch 62 is biased toward its latching 80 position by a spring 67 which engages the bent end 68 of the latch.

The motor 15 which propels the vehicle is formed of a stationary field magnet 71 and rotary armature 72. The former is provided with openings 75 and 76 adapted to 85 receive, respectively, pins or rods 77 and 78 which are secured at one end to the section 46 and are supported at the other end in openings 80 in the section 45. The rods 77 and 78 serve to support the field magnet 71, and longitudinal movement of the field on the rods is prevented by spacing sleeves 80 90 mounted on the rods between the magnet and walls of the casing 12.

The motor armature 72 is provided with a rotary shaft 85 which is journaled in bearings 86 secured in or formed integral with casing sections 45 and 46. Shaft 85 carries a pinion 88 which meshes with gear wheels 89 removably mounted on studs 91 projecting inwardly from section 46. The gear 95 wheels 89 engage respectively gears 90 fixed to two tracks wheels 14 at one side of the casing or housing 12. Track wheels 14 are 100 fixed to axles 94 which are journaled in bearings 95 in the casing sections 45 and 46, the axles 94 being removable from the bearings 95 upon separation of the sections of the casing 12. 105

The armature 72 of the motor 15 is provided with a commutator 100 formed of conducting segments 101 which are adapted to be engaged by brushes 102. The brushes 102 are pivoted to a pin 104 mounted in inwardly extending lugs 105 formed at the upper 110 edge of the section 45, and the brushes 102 are pressed into engagement with the commutator 100 by springs 106 interposed between the upper ends of the brushes and a horizontal insulating strip 107 secured to the section 45. It will be noted that in the construction shown the brushes 102 are located 115 inside the casing. By forming the lugs 105 so that they extend outwardly from the cas-

ing instead of inwardly as shown in Figures 2 and 9, the brushes 102 may be located outside the casing with their contacting ends projecting inwardly, through openings 110 in the casing, into contact with the commutator.

One of the brushes 102 is insulated from its supporting pin 104 by bushings 111 and this brush is connected to one terminal of the field magnet coil by means of a conductor 113. The other brush 102 is in electrical contact with pin 104 and, through the pin, is electrically connected with the casing 12, this other brush, therefore, forming part of the grounded return circuit from the motor 15. The terminal of the field magnet coil opposite to the one connected to conductor 113 is connected by a conductor 115 with third rail engaging current collector 116.

Current collector 116 is supported by an insulating block 117 held in openings or recesses 119 formed in the opposed sections 45 and 46. The current collector 116 comprises third rail engaging rollers 120 mounted on brackets carried at the ends of a resilient metal strip 123 supported at its center by the block 117 and secured to the block by an eyelet 124. Eyelet 124 also secures to the block 117 a second resilient strip 125 which presses at its outer ends against the rollers 120 so as to form electrical contact therewith and convey current therefrom to the eyelet 124 and thence through the guard bar 126 to the conductor 115 in a manner customary in collectors of this character.

I preferably form the body portion 10 as well as the sections 45 and 46 of brass or other non-magnetic metal so that the metal parts located adjacent the field magnet 71 will not short-circuit the field magnet flux. I find that, in the construction disclosed, the use of non-magnetic material for the metal parts adjacent the motor results in greatly improved operation of the motor, particularly in respect to the power which the motor is able to deliver to the track wheels.

From the above it will be seen that I provide a complete travelling power unit for the car, including the motor, track wheels and a unitary mounting therefor, which power unit may be readily inserted into and removed from the car body. The car body may be of some other type than that shown. Thus a car body representing a street railway car, a steam locomotive, an automobile or a toy derrick may be employed instead of an electric locomotive, as shown in the drawings. Such car bodies would be interchangeable with one another, any car body being capable of assembly with a single unit. Also, separate power units may be assembled with any one car body so that, in case a power unit becomes defective, it may be removed from the car body and a new unit substituted therefor.

I claim:

1. A toy motor vehicle comprising a body portion, a motor for moving said vehicle, positioned in said body portion and said motor being readily removable from said body portion, and insertable into said body portion, and a catch accessible for operation from outside said body portion for releasably securing the motor in such position.

2. A toy motor vehicle comprising a body portion having an opening in its bottom, a motor for moving said vehicle, positioned in said body portion and said motor being readily removable from said body portion and insertable into said body portion, through said opening and a catch for releasably securing said motor in said body portion.

3. A toy vehicle comprising a body portion, means for moving said vehicle, said means being insertable into said body portion and removable therefrom, and said means comprising road wheels and a motor operatively connected with said wheels and a slidable catch for releasably securing said motor in said body portion.

4. A toy vehicle comprising a body portion having an opening in its bottom, means for moving said vehicle, said means being insertable into said body portion, and removable therefrom, through said opening, and said means comprising road wheels, a motor and operative connections between said motor and wheels and a slidable catch for releasably securing said means to said body portion.

5. A toy electric car comprising a body portion having an opening in its bottom, means for moving said car, comprising an electric motor having a rotary armature, said motor being insertable and removable through said opening, bearing means for said armature insertable and removable through said opening and a catch for removably securing said bearing means to said body portion.

6. A toy electric car comprising a body portion having an opening in its bottom, means for moving said car, comprising an electric motor having a rotary armature, said armature being insertable and removable through said opening, bearing means for said armature insertable and removable through said opening and additional means for removably securing said bearing means to said body portion, said additional means being slidably mounted on said car.

7. A toy electric car comprising a body portion having an opening in its bottom, means for moving said car, comprising an electric motor, said means being insertable and removable through said opening, traction wheels and bearing means for said traction wheels, and a catch for removably securing said bearing means to said body portion.

8. In a toy electric vehicle, a housing or casing comprising opposed sections detachably latched together, an electric motor including a rotary armature having a shaft mounted in bearings in said sections, the detachment and removal of one section from the other serving to remove the bearing of the one section from the shaft and a vehicle body portion adapted to contain said housing.
9. A toy electric vehicle, a housing or casing comprising opposed sections detachably latched together, an electric motor including a rotary armature having a shaft mounted in bearings in said sections, the detachment and removal of one section from the other serving to remove the shaft from a bearing and a vehicle body portion adapted to contain said housing, said body portion having an opening therein, said housing being insertable and removable through said opening.
10. A toy electric vehicle, a housing or casing comprising opposed sections detachably latched together, an electric motor including a rotary armature having a shaft mounted in bearings in said sections, the detachment and removal of one section from the other serving to remove the shaft from a bearing, a vehicle body portion adapted to contain said housing, and means for latching said housing to said body portion.
11. A toy vehicle comprising a body portion, road wheels, a housing in which said wheels are mounted, and a latch for detachably securing said housing to the bottom of said body portion.
12. A toy locomotive comprising a body formed of a single casting having an opening in its bottom, a motor for operating said vehicle, said motor being insertable into said body, and removable therefrom, through said opening and a catch for releasably securing said motor to said body portion.
13. A toy locomotive comprising a body formed of a single die casting of non-magnetic metal, said body having an opening therein, a casing formed of non-magnetic material insertable into said body, and removable therefrom, through said opening, and an electric motor mounted in said casing.
14. A toy locomotive comprising a body formed of a single die casting of non-magnetic metal, said body having an opening therein, a casing formed of non-magnetic material insertable into said body, and removable therefrom, through said opening, and an electric motor detachably mounted in said casing.
15. A toy motor vehicle comprising a body portion having an opening therein, an electric power unit for operating said vehicle, insertable into said body portion, and removable therefrom, through said opening and a catch for readily securing said unit to and releasing it from said body portion.
16. A toy electric car comprising a body portion having an opening in its bottom, and an electric power unit for operating said vehicle, said power unit comprising a housing and an electric motor, a current collector, electrical connections between said collector and motor, track wheels, operating connections between motor and track wheels, all detachably mounted in said housing, said power unit being insertable into said body portion and removable therefrom, through said opening and a catch for releasably securing said unit to said body portion.
17. A toy electric car comprising a body portion having an opening in its bottom, an electric power unit for operating said vehicle, said power unit comprising a housing and an electric motor, a current collector, electrical connections between said collector and motor, track wheels, and operating connections between motor and track wheels, all detachably mounted in said housing, said power unit being insertable into said body portion, and removable therefrom, through said opening, and slidable means for detachably securing said housing in said body portion.
18. A toy vehicle comprising a body portion having an opening therein, a housing formed of opposed metal sections, said sections being detachably connected at their ends, a motor for actuating said vehicle, having a shaft in a bearing in each of said sections, the detachment and removal of one section from the other serving to remove the bearing of one section from said shaft, and said housing being insertable into said body portion and removable therefrom, through said opening and a catch for releasably securing said housing to said body portion.
19. A toy vehicle comprising a body portion having an opening therein, a housing formed of opposed metal sections detachably connected at their ends, actuating means for said vehicle in said housing, said actuating means comprising an electric motor, electrical connections carried by said housing for supplying current to said motor from an external source, said actuating means and connections being removable, upon detachment and removal of one of said sections, without other detachment, and said housing being insertable into said body portion, and removable therefrom, through said opening.
20. A toy vehicle comprising a body portion having an opening therein, a housing formed of opposed metal sections, formed with interfitting projections at their ends, having aligned openings and removable pins in said openings for detachably securing said sections together, an electric motor detachably secured in said sections, and said housing being insertable into said body portion, and removable therefrom, through said opening.
21. A toy vehicle comprising a body por-

- tion, a housing formed of opposed metal sections connected together at their ends, latches for detachably securing said sections together, a motor in said housing and removable therefrom upon detachment of said sections, said housing being insertable into said body portion, and removable therefrom, through said opening.
22. A toy vehicle comprising a body portion, means for moving said vehicle, such means being insertable into and removable from such body portion and a catch for releasably securing said means to said body portion.
23. The combination with a casing formed of opposed sections latched together, each end of the casing being integral with a side, an electric motor in said casing, said motor comprising a field magnet held between said sections and removable upon separation of the sections, an armature having a shaft removably mounted on said casing, a pinion wheel on said shaft and a pair of gear wheels mounted on one of said sections and engaging said pinion, and track wheels removably mounted in said casing, two of said track wheels being formed with gears meshed respectively with said gear wheels.
24. A motor casing, comprising opposed metal sections latched together, one section including a side and end of the casing, a motor having a rotary element mounted in bearings in the respective sections, said motor being removable on separation of said sections.
25. A motor casing adapted for use in a toy vehicle, said casing comprising readily detachable opposed sections latched together, one section comprising a side and opposite ends of the casing, a motor having a rotary structure mounted in bearings in the respective sections, said motor being removable on separation of said sections.
26. A motor casing adapted for use in a toy vehicle and having its lower portion formed to represent the running gear of an electric locomotive; a motor and traction wheel mounted inside said casing, a vehicle body adapted to inclose the upper portion of said casing and means for securing said casing to said body.
27. A motor casing adapted to use in a toy vehicle and having its lower portion formed to represent the running gear of said vehicle; a motor and traction wheel mounted inside said casing, a vehicle body adapted to inclose the upper portion of said casing and a latch for securing said casing to said body.
28. A motor casing adapted for use in a toy vehicle and having its lower portion formed to represent the running gear of an electric locomotive, said casing being formed of sections latched to one another, a motor and traction wheel mounted inside said casing, a vehicle body adapted to enclose the upper portion of said casing and means for securing said casing to said body.
29. A motor casing adapted for use in toy vehicles, said casing comprising two opposed metal sections, one forming the side and the ends of the casing, and the other forming an opposite side of the casing, sliding means for securing the sections together, a traction motor mounted in said casing and removable therefrom on separation of said sections and traction wheels geared to said motor, said traction wheels being removably mounted in said casing.
30. A toy vehicle, comprising a body portion having an opening at its bottom, a motor for moving said vehicle, road wheels for said vehicle, a housing in which said wheels are mounted, said housing being insertable and removable through said opening, and additional means for removably securing said housing to said body portion, said additional means being slidably mounted on said vehicle.
31. A toy vehicle, comprising a body portion having an opening therein, a motor for moving said vehicle, road wheels for said vehicle, a housing in which said wheels are mounted, said housing being insertable and removable through said opening, and sliding means engaging said body portion and housing for securing said housing to said body portion.
32. A toy electric car comprising a body portion and an electric power unit for operating said car, said unit comprising an electric motor, a current collector, and electrical connections between said collector and motor, track wheels and operating connections between said motor and wheels, said power unit being insertable into said body portion, and additional means for removably securing said power unit to said body portion, said additional means being slidably mounted on the car.

Signed at New York in the county of New York and State of New York this 13th day of February A. D. 1928.

JOHN C. KOERBER.