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Fig. 1

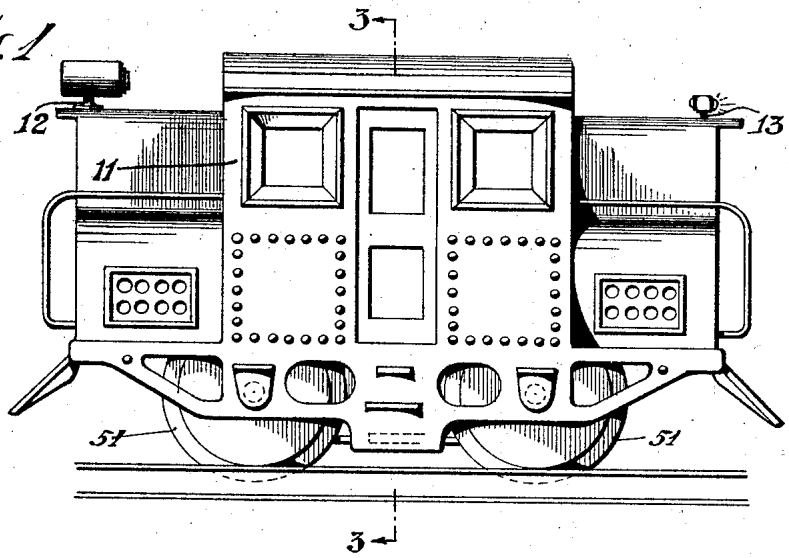

Fig. 2.

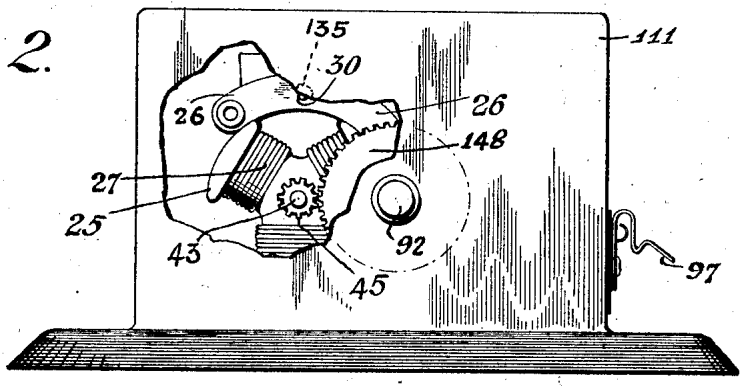

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Fig. 3.

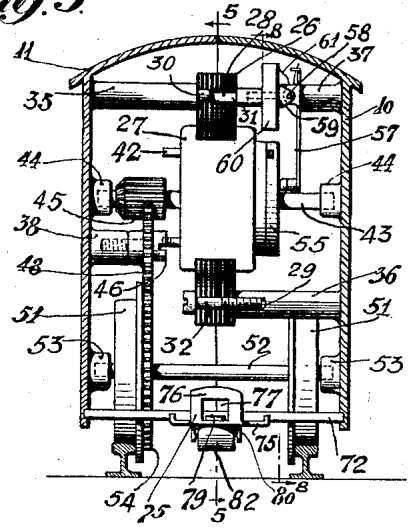

Fig. 4.

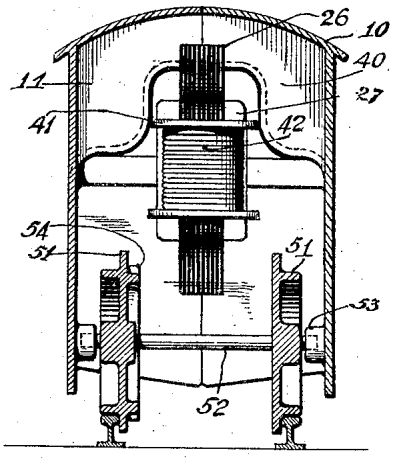

Fig. 5.

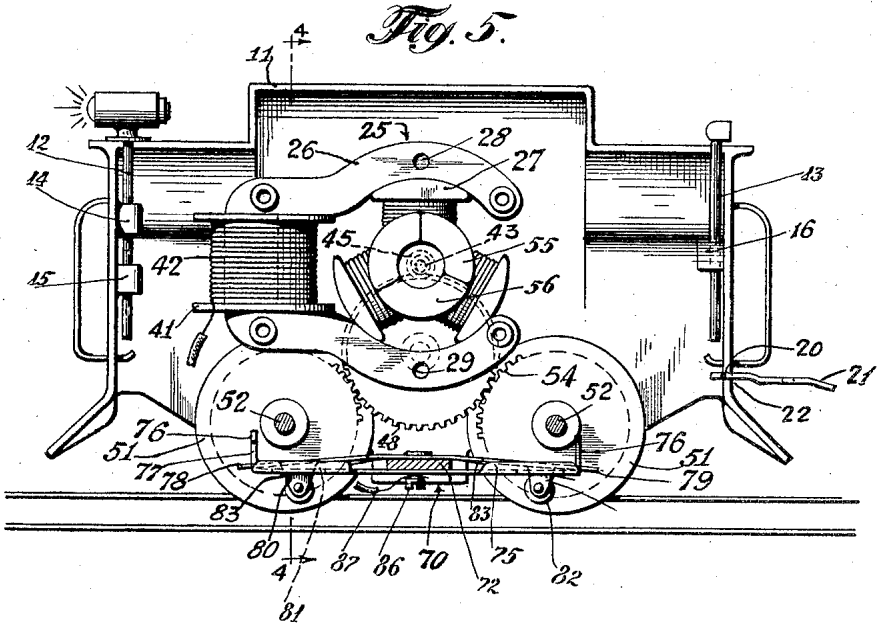

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Fig. 6.

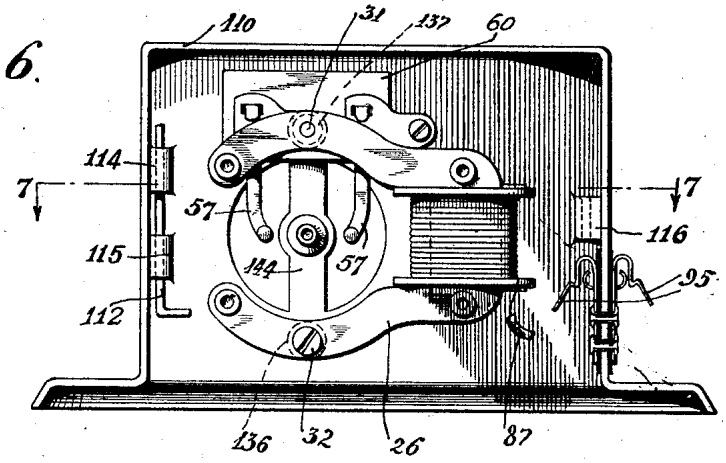
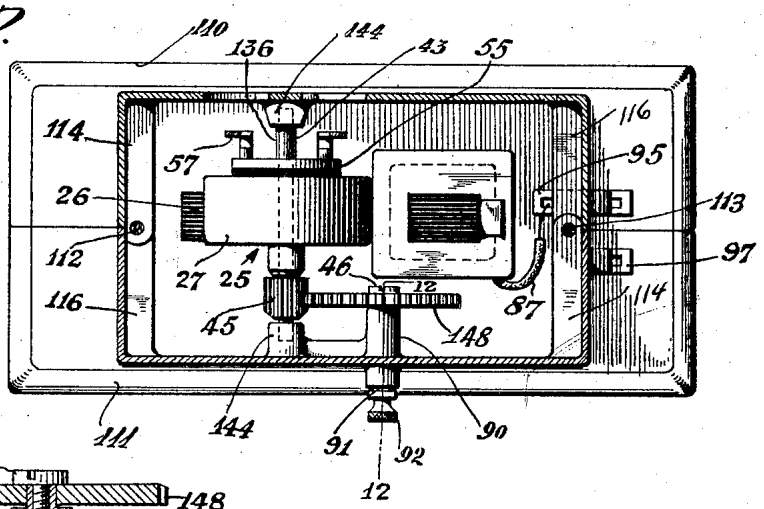


Fig. 7.



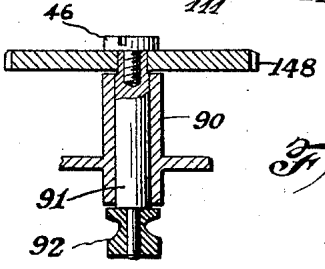


Fig. 12.

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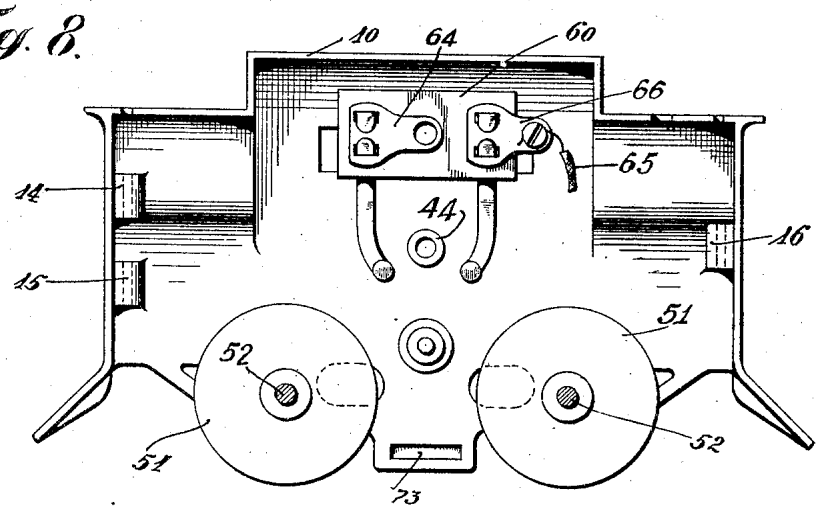
Fig. 8.



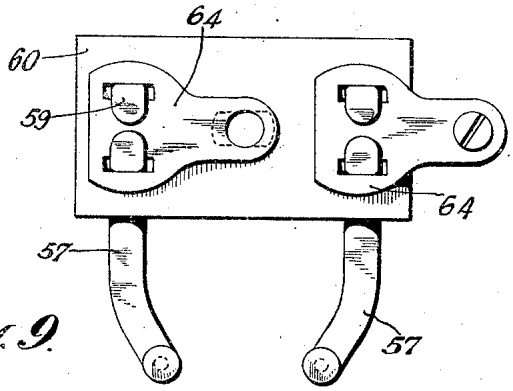


Fig. 9.

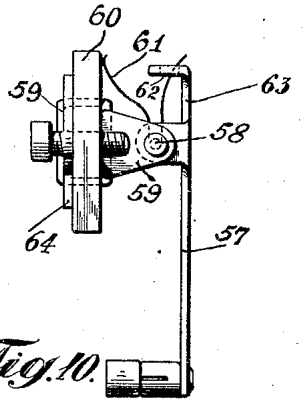


Fig. 10.

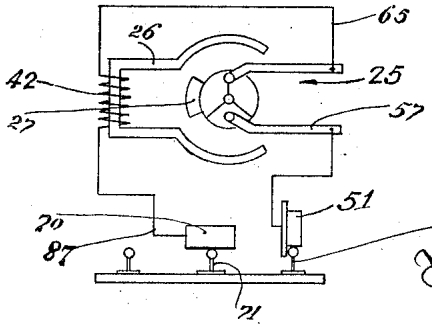


Fig. 11.

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UNITED STATES PATENT OFFICE.

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TOY SET.

Application filed April 24, 1926. Serial No. 104,250.

This invention relates to a set of toy motor parts and casings of different types in which the assembled toy motor may be mounted. The assembled motor and casing may form a toy vehicle in which the casing for the motor forms the vehicle body, or such motor when assembled in a different casing may form an encased stationary motor which may be employed for driving mechanical toys, or other devices.

One object of my invention is to provide a set of motor and casing parts including two or more casings of different types each comprising a pair of members which are adapted to be secured together and each of which is so constructed that the elements of the motor may be mounted therein, all of the various parts of the set being constructed so that the motor may be readily removed from a casing of one type and mounted in a casing of another type. The casings of different types are similarly formed with respect to the parts thereof which form a supporting means for the motor, and these parts are so constructed that the same machining operations which are employed in finishing these parts in one type of casing may be employed in finishing the corresponding parts in another type of casing. Further objects of my invention include simplicity of construction, strength and durability, and efficiency of operation of the assembled motors. Further objects of my invention will appear from the following description taken in connection with the accompanying drawings, wherein,

Fig. 1 is a side elevation of a toy car or locomotive wherein the casing employed for the motor is in the form of a car body.

Fig. 2 is a side elevation, partly broken away, of another or stationary type of motor casing which is adapted to house the same motor parts as are housed by the casing shown in Fig. 1.

Fig. 3 is a sectional view, partly in elevation, taken on the line 3—3 of Fig. 1 and looking in the direction of the arrows.

Fig. 4 is a view similar to Fig. 3, but taken on the line 4—4 of Fig. 5.

Fig. 5 is a sectional view, partly in elevation, taken on the line 5—5 of Fig. 3, but showing the motor field mounted to extend in the opposite direction.

Fig. 6 is a vertical central longitudinal sectional view, partly in elevation, of the motor mounted in the casing shown in Fig. 2, and

Fig. 7 is a horizontal longitudinal sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a view similar to Fig. 5 but taken on the line 8—8 of Fig. 3, certain of the parts being removed.

Fig. 9 is a detailed plan view of the motor brushes and their mountings.

Fig. 10 is a side elevation of the structure shown in Fig. 9.

Fig. 11 is a diagrammatic view of the car circuits.

Fig. 12 is a detailed sectional view taken on the line 12—12 of Figure 7.

Referring to Figures 1, 3 to 5 and 8 inclusive, which represent the assemblage of parts forming a vehicle, the body of the vehicle or car is formed of two similar sections 10 and 11, preferably formed of cast metal, which are secured together by means of pins 12 and 13 each of which passes through the aligned openings in lugs 14 and 15 formed at one end of the section 10 and at the other end of section 11 and an intermediate lug 16 formed at the one end of the section 11 and at the other end of the section 10. Sections 10 and 11 at one end and at their abutting edges 19 are formed with notches 20 and a bar 21 which serves as a coupler is formed with a reduced portion 22 adapted to fit and be held in the notches 20 when the sections are assembled. The motor 25, which in the assemblage shown in Figures 1 and 3 to 5, forms a propelling means for the vehicle, is formed of a stationary field magnet 26 and a rotary armature 27. The former is provided with openings 28 and 29, the opening 28 being adapted to receive pins or rods 30 and 31 which are supported from the car body and serve as supporting and holding means for the field magnet, and the opening 29 being adapted to receive a screw 32 carried by the projecting portion 36 of the body section 10. Pins 30 and 31 are carried respectively by projecting portions 35 and 37 of the car body sections. If desired, the pins 30 and 31 may be formed as integral parts of the projecting portions 35 and 37 respectively. The field magnet 26 is further held in place by engagement of the reentrant portions 40 of the body sections with the insulating head 41 of the field magnet 42 as shown in Figure 4.

Motor armature 25 is provided with a rotary shaft 43 which is journaled in projecting lugs 44 formed integrally with the body castings, and this shaft 43 carries a pinion 45 adapted to mesh with a gear 48 rotatably mounted on a projection 38 formed integrally with the body section 11 and being held in position on the projection 38 by means of a screw 46. The track wheels 51 of the car are fixed to axles 52 which, in turn, are journaled in lugs 53 of the body casting and the two wheels on one side of the car have fixed thereto gears 54 both of which are adapted to mesh with and be driven by the gear 48. The armature 27 of the motor is provided with a commutator 55 formed of contacting segments 56 which are adapted to be engaged by brushes 57. These brushes are each provided with a pin 58 supported by brackets 59 extending from an insulating member 60. Leaf springs 61, which engage the insulating member 60 at one end, pass through openings 62 formed in the upper extension 63 of the brushes and serve to maintain the brushes in yielding contact with the commutator segments. One of the brushes is connected by means of a conducting piece 64 which joins its bracket 59 with the supporting pin 31. The remaining brush is connected to its supporting bracket through the field winding by means of a conductor 65 and strip 66.

The collector 70 which is adapted to take current from the third rail 71 as shown in Figure 11, is supported by an insulated block 72 held in recesses 73 formed in the sections 10 and 11 of the car body. Mounted on the block 72 is a metal member 75 which extends outwardly from the block 72 to points beneath the axles 52 and terminates in upwardly projecting lugs 76 having openings 77 therethrough. Also mounted on the insulated block is a resilient metal strip 78 which carries at its outer ends clips 79 which form downwardly extending brackets 80. Brackets 80 extend through openings 81 near the outer ends of the member 75 and carry rail engaging rollers 82. A resilient strip 83 secured to the block 72 engages at its outer ends the tops of the rollers 82 so as to provide a circuit connection from the rail engaging rollers 82 to the member 75. The clips 79 are formed with outwardly projecting lugs which extend through the openings 77 in the upwardly extending lugs 76. Engagement of these lugs with the top and bottom of the openings 77 serve to limit the upward and downward movement of the rail engaging rollers 82. A screw 86 extending through the member 75 into the block 72 serves as a binding post for conducting current from the collector 70 and a conductor 87 connects the binding post 86 with one terminal of the field winding 42 of the motor. From the above it will be seen that the various rotary parts of the car mechanism, as well as the conducting and insulating elements carried by the car are constructed so that they may be arranged in place relative to the body sections, and when this is accomplished, all may be firmly and securely held by fitting together the car sections and inserting pins 12 and 13 in their respective openings.

Figures 2, 6 and 7 show the same motor parts as shown in Figures 1 and 3 to 5, but mounted in a different type of casing and adapted to be used when so mounted as a stationary motor for driving mechanical toys or other suitable devices. The casing shown in Figures 2, 6 and 7 consists of sections 110 and 111, formed of cast metal, which are secured together by pins 112 and 113 each of which pass through aligned openings in lugs 114 and 115 and an intermediate lug 116 formed on the sections 110 and 111. Pins 112 and 113 are inserted in the openings in the lugs with their heads downward and are entirely concealed by the casing when assembled. Section 110 of the stationary motor casing is provided with inwardly extending projections 137 and 144, which correspond to projections 37 and 44 of the car body section 10 as shown in Figure 3. Projection 137 is adapted to receive the pin 31 which carries the field 26 of the motor 25 and also carries the insulating member 60 which supports the motor brushes. Projection 144 of the stationary motor casing section 110 receives the armature shaft 43 of the motor. Similarly section 111 is provided with a projection 135 and 144 adapted to receive respectively the pin 30 which serves as a support for the motor field and the shaft 43 of the motor armature. Section 110 is likewise provided with a projection 136 which receives screw 32 adapted to assist in supporting the motor field.

For the purpose of making the power of the motor available outside the stationary motor casing so that it may be employed to operate external devices, I provide the section 111 with a bushing 90 preferably cast integral with the section 111 and adapted to form a bearing for a shaft 91 which carries at its outer end a pulley 92 and at its inner end a gear 148 which corresponds in size and form to the gear 48 of the toy locomotive. The gear 148 is adapted to be rotated by the pinion 45 on the motor armature shaft. If desired, instead of providing the additional gear 148, I may employ a gear 48 with means for suitably securing this gear to the shaft 91 by the screw 46.

As means for conducting current from a suitable source to the motor 25 in the casing shown in Figure 2, I provide conductor engaging clips 95 located at opposite sides

of the end wall of the section 110. Clips 95 are electrically connected together, but are insulated from the wall of the section 110. The inner clip 95 receives the conductor 87 to the motor field. As the motor is grounded on the casing through one of the brushes 57, bracket 59 and conducting piece 64, the return ground circuit passes through the motor casing and for the purpose of providing an electrical connection with the motor casing and source, I provide a conductor engaging clip 97 on the section 111 which clip is electrically connected to the metal of the section.

While the toy motor set above described is of considerable value, in that, both the vehicle and the stationary motor may be assembled from the parts described with a large number of the parts common to both the vehicle and the stationary motor, its great value consists in the interest and instruction which it furnishes to the young in assembling the parts into operative mechanisms. For the purpose of assisting in the assembly, I may stamp upon the portions of the car or motor casing, which receive the motor parts, suitable designating characters, such as numbers, and stamp the same number upon the part of the mechanism which is to be received by the correspondingly numbered portion of the casing. It will generally be sufficient to apply such designating characters to but one of the casings.

While I have disclosed parts which may be assembled as motor units, one of which forms a vehicle and the other a stationary motor unit, my invention in its broader aspects is not limited to the particular assembled units disclosed. For example, one of the assembled units may form a toy tractor in which the motor receives its current through a flexible or extensible conductor supplied with current from a suitable stationary source.

I claim:

1. A set of toy parts comprising an electric motor, a plurality of casings in each of which the motor may be mounted, each of said casings comprising a pair of sections provided with means for securing the two sections of the pair together and said sections being further provided with motor bearings and motor supporting means so constructed and arranged that said motor is held in place in said sections and is removable by detachment of said sections, one of said casings having the form of a car body and being provided with bearings for car wheels to be driven by said motor and another of said casings being provided with a bearing for the reception of a pulley shaft, whereby said motor, when mounted in said other casing, may supply mechanical power to devices outside said casing.

2. A set of toy parts comprising an electric motor, a plurality of casings in each of which the motor may be mounted, each of said casings comprising a pair of sections provided with means for securing the two sections of the pair together and said sections being further provided with motor bearings and motor supporting means so constructed and arranged that said motor is held in place in said sections and is removable by detachment of said sections, one of said casings having the form of a car body and being provided with bearings for car wheels to be driven by said motor and being further provided with means for supporting a third rail current collector, and another of said casings being provided with a bearing for the reception of a pulley shaft, whereby said motor, when mounted in said other casing, may supply mechanical power to devices outside said casing, and said other casing being further provided with circuit connections for conducting current therethrough to said motor.

3. A set of toy parts comprising an electric motor, a plurality of casings in each of which the motor may be mounted, each of said casings comprising a pair of sections provided with means for securing the two sections of the pair together and said sections being further provided with motor bearings and motor supporting means so constructed and arranged that said motor is held in place in said sections and is removable by detachment of said sections, one of said casings having the form of a car body and being provided with bearings for car wheels to be driven by said motor and being further provided with means for supporting a third rail current collector, said wheels and collector being removable from said casing upon detachment of the sections from one another, and another of said casings being provided with a bearing for the reception of a pulley shaft, whereby said motor, when mounted in said other casing, may supply mechanical power to devices outside said casing and said other casing being provided, further, with circuit connections for conducting current therethrough to said motor.

4. A set of toy parts consisting of pairs of opposed sections, each pair of sections being formed with interfitting projections at their ends having aligned openings, pins adapted to be inserted in the openings for detachably connecting the two sections of each pair together, a motor adapted to be mounted in and supported and held in position by the two sections of each pair when the sections of said pair are connected together, one pair of sections having the form of a car body and being provided with bearings for holding car wheels in position to be actuated by said mechanism, and another of said sections being provided with a bearing extending

through said section for supporting a shaft to be actuated by said mechanism.

5. A set of toy parts comprising an electric motor having a field, armature and brush structure, a plurality of casings, in each of which the motor may be mounted, each of said casings comprising a pair of sections provided with means for securing the two sections of each pair together, one section of each pair being provided with an inwardly extending projection adapted to support said brush structure and the other section of each pair being provided with an inwardly extending projection adapted to cooperate with said first named projection to support said motor field, and all of said sections being provided with bearings for said armature, one of said casings having the form of a car body and having bearings for car wheels to be driven from said armature, and another of said casings being provided with a bearing for the reception of a shaft whereby said motor, when mounted in said other casing, may supply mechanical power to devices outside said other casing.

6. A toy vehicle formed of detachably connected opposed metal sections forming a vehicle body, an electric motor armature having a shaft journaled in a bearing in each of said sections and so arranged that the removal of one section from the other serves to remove the bearing of the one section from the shaft, a field for said armature held between said sections, means for removably securing said field to one of said sections, a gear on said other section opposite said field, a pinion on said armature shaft meshing with said gear and car wheels journaled in said sections, said wheels having gears meshing with said first named gear.

7. A set of toy parts comprising two pairs of opposed sections, the two sections of each pair being adapted to be readily secured to and detached from one another, one pair of sections when secured together forming a toy vehicle body and the other pair of sections forming a stationary motor casing, a motor having a rotary shaft, adapted to be removably mounted in said vehicle body and in said stationary motor casing, a gear on said shaft, vehicle wheels mounted in said vehicle body, driving gears rigid with said wheels, another gear adapted to be mounted on one of said vehicle body sections beneath said motor shaft and to serve as a driving connection between the gear on said motor shaft and said vehicle wheel gears, a power shaft rotatably mounted in said stationary motor casing and said other gear also being adapted to be mounted on one of said stationary motor casing sections at one side of said motor shaft and to serve as a driving connection between the gear on said motor shaft, and said power shaft.

8. A set of toy parts comprising a motor having a field and rotary armature, a plurality of casings in which the motor may be mounted, each of said casings including a pair of sections and means for securing the two sections of each pair together and said sections being provided with armature bearings and field supporting means so constructed and arranged that said motor is held in place between said sections and said armature is removable by detachment of said sections, one of said casings having the form of a vehicle body and being provided with bearings for vehicle wheels and another of said casings being provided with a bearing for the reception of a power shaft.

Signed at New York in the county of New York and State of New York this 20th day of April A. D. 1926.

JULIUS FORCHHEIMER.