June 6, 1950 A. W. FRANCIS 2,510,310

TOY VEHICLE

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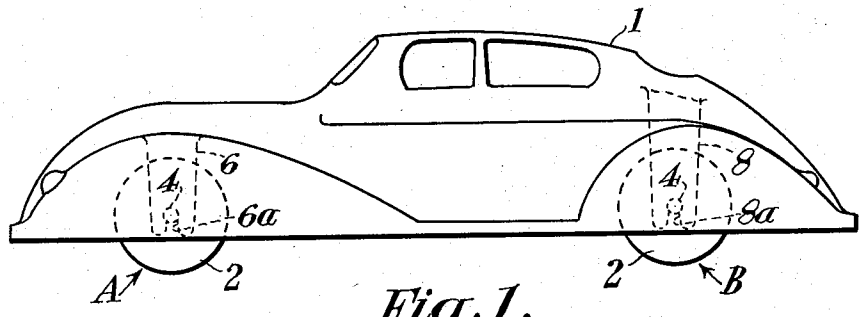


Fig. 1.

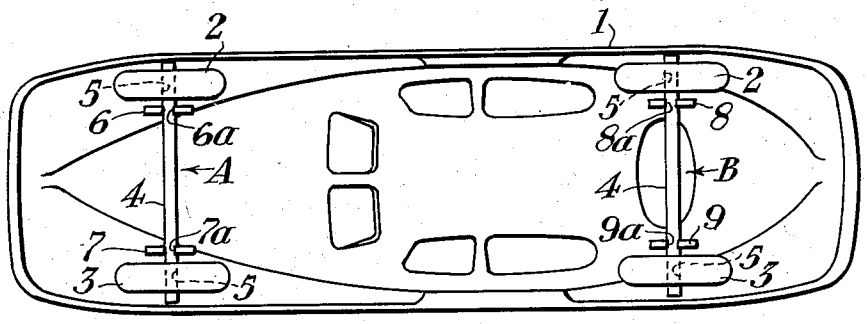


Fig. 2.

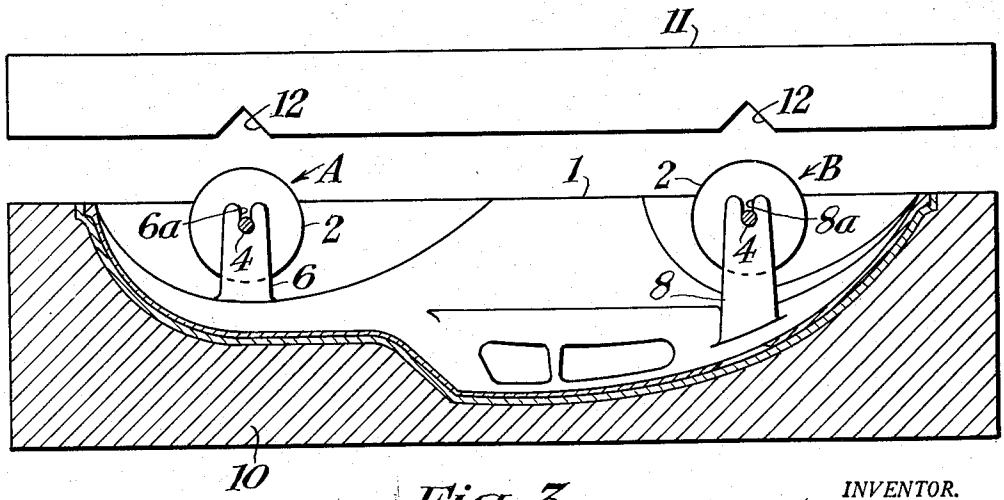


Fig. 3.

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TOY VEHICLE

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3 Claims. (Cl. 46—201)

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My invention relates to toy vehicles, and particularly to toy vehicles having a body of die cast metal and wheel and axle assemblies of some other material secured thereto.

One object of my invention is to provide a novel method and means for securing the wheel and axle assemblies of a toy vehicle of the type described to the body of the vehicle.

Another object of my invention is to provide a toy vehicle of the type described having wheel and axle assemblies which can be constructed and secured to the body of the vehicle at a minimum cost, and which are so rigidly secured in place that they cannot be removed.

A further object of my invention is to provide a wheel and axle assembly for a vehicle of the type described in which the wheels and axles are disposed completely within the body lines so that the vehicle has a pleasing appearance and does not have any rough surfaces which might injure children or scratch or mar furniture while children are playing with the vehicle.

According to my invention, the axles are constructed of round rods and the wheels are moulded of any suitable material such as rubber, a phenol condensation product or the like. The axles are mounted intermediate their ends in slots formed in the lower ends of depending lugs cast integral with the body of the vehicle, and are held in place in the slots by forcing the ends of the lugs on opposite sides of the slots together in a single operation by a suitable die. The lugs are spaced inwardly from the sides of the body of the vehicle far enough to provide clearance for the wheels between the lugs and the body, and the wheels are slipped in place on the ends of the axles before the axles are mounted into the slots.

Other objects and characteristic features of my invention will become apparent as the description proceeds.

I shall describe one form of toy vehicle embodying my invention, and shall then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a side elevational view showing one form of toy vehicle embodying my invention. Fig. 2 is a bottom view of Fig. 1. Fig. 3 is a longitudinal sectional view illustrating the method of securing the wheel and axle assemblies to the body of the vehicle.

Similar reference characters refer to similar parts in all three views.

Referring to the drawings, the toy vehicle here shown is an automobile comprising a body 1 mounted on front and rear wheel and axle assemblies A and B, respectively.

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The body 1 is of metal and is preferably formed by die casting since this method of forming the body enables it to be given intricate contours and body lines simulating those of a real automobile and at the same time reduces the cost to a minimum. Any suitable die casting metal may be employed, but because of its greater durability I prefer to use zinc. In order to conserve metal and reduce weight, the body may be made hollow as shown.

The front and rear wheel and axle assemblies are similar, and each comprises two wheels 2 and 3 rotatably mounted on opposite ends of an axle 4. The wheels may be formed of any suitable material such as moulded rubber or a phenol condensation product, and are each provided with a central hole 5 which is sufficiently large to permit the wheel to turn freely on the axle but which is not large enough to permit the wheel to wobble. The axles 4 are in the form of straight circular metal rods cut to a length which is just slightly less than the width of the inside of the body for a purpose which will appear presently.

My present invention relates to the means for securing the wheels and axles to the body 1, which means I shall now describe. As here shown, this means comprises a first pair of transversely aligned lugs 6 and 7 provided in their lower ends with aligned slots 6a and 7a to receive the front axle, and a second pair of transversely aligned lugs 8 and 9 provided in their lower ends with aligned slots 8a and 9a to receive the rear axle. The lugs are all cast integral with the body, and are spaced inwardly from the adjacent sides of the body a distance which is sufficient to provide clearance for a wheel between each lug and the adjacent side of the body.

In assembling the wheels and axles to the body, the body is first placed upside down in a suitable fixture, such as the fixture 10 shown in Fig. 3. The wheels are then placed on the ends of the axles 4 and the axles are placed in the slots 6a 7a and 8a 9a, respectively, with one of the wheels disposed between each lug and the adjacent side of the body. A suitable die 11 provided with transverse inverted V-shaped grooves 12 is then lowered into engagement with the upper ends of the lugs with sufficient force to bend the ends of the lugs on opposite sides of the axles toward each other to a position in which the axles are firmly secured within the slots. As is well known, zinc die castings are relatively brittle and tend to break rather easily when bent. I have found, however, that if the die 11 is lowered into engagement with the upper forked ends of the lugs in a

manner to strike the forked ends a quick sharp blow, the necessary bending of the lugs can be effected without any breakage, and the axles will be secured in place so firmly that it is impossible for a child to dislodge them while playing with the vehicle.

One advantage of a vehicle constructed in accordance with my invention is that since the axles are disposed wholly within the body lines the appearance of the vehicle is greatly improved, and there are no rough or sharp protruding parts which might scratch a child as is frequently the case where the axles extend through the sides of the vehicle and are provided with upset ends or the like to hold the wheels in place.

Another advantage of a vehicle constructed in accordance with my invention is that no machining is required on either the wheels or axles.

A further advantage of a vehicle constructed in accordance with my invention is that since both the front and rear wheel and axle assemblies are secured in place in a single operation, the cost of securing the wheels and axles to the vehicle is reduced to a minimum.

Although I have herein shown and described only one form of toy vehicle embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. A toy vehicle comprising a hollow body of metal having formed integral therewith front and rear pairs of depending lugs, the lugs of each pair being in transverse alignment and being provided in their lower ends with aligned slots and being spaced inwardly from the sides of the body far enough to provide clearance for a wheel between each lug and the adjacent side of the body, an axle in the form of a straight smooth rod disposed in each slot and held in place in the slots by bending the ends of the lugs on opposite sides of the slots toward each other, and a wheel disposed on each axle between each lug and the adjacent side of the body and held in place on the axle solely by the lateral restraining action of the contiguous lug and the adjacent side of the body.

2. As a new article of manufacture a toy vehicle comprising a body of die cast metal supported on wheel and axle assemblies disposed wholly within the body lines, each said wheel and axle assembly comprising a pair of wheels journaled on the opposite ends of a straight smooth round axle, the said axles being disposed in slots formed in the lower ends of depending lugs cast integral with the body and being held in place in the slots by bending the ends of the lugs on opposite sides of the slots toward each other, and the said wheels being held in laterally spaced relation on the axles solely by being positioned between the axle supporting lugs and the adjacent sides of the body.

3. The method of securing front and rear wheel and axle assemblies to a toy vehicle the body of which is formed of die cast metal, which method consists in casting pairs of depending lugs on the body adjacent the front and rear ends of the body, the lugs of each pair being disposed in lateral alignment and being provided in their lower ends with aligned slots, forming the axles out of a round rod cut to a length which is slightly less than the width of the body at said lugs, placing a wheel on each end of each axle and placing the axles in the aligned slots with a wheel between each lug and the adjacent side of the body, and then simultaneously bending the ends of the lugs on opposite sides of the slots toward each other by moving a die into engagement with the lugs.

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