

Nov. 16, 1971

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3,619,943

TOY VEHICLE WHEEL AND AXLE MOUNTING

Filed Dec. 8, 1969

FIG. 1

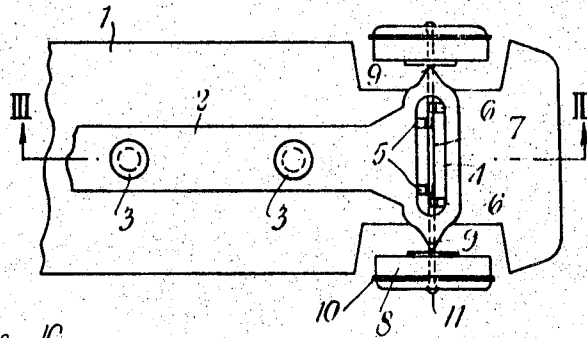


FIG. 2

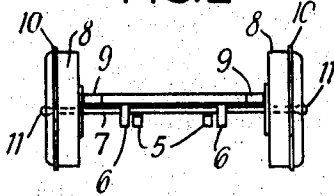


FIG. 3

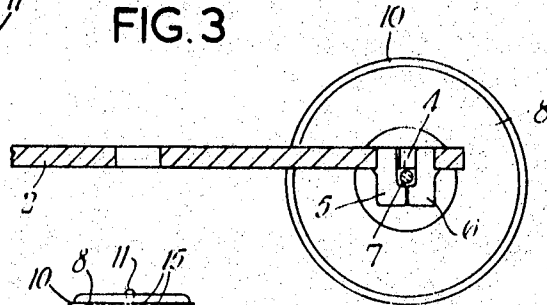


FIG. 4

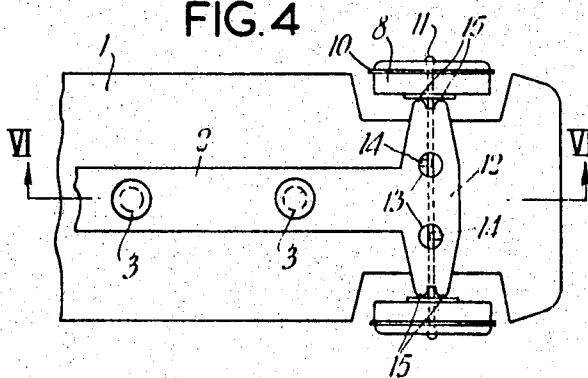


FIG. 5

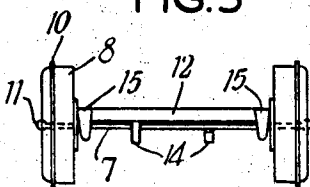
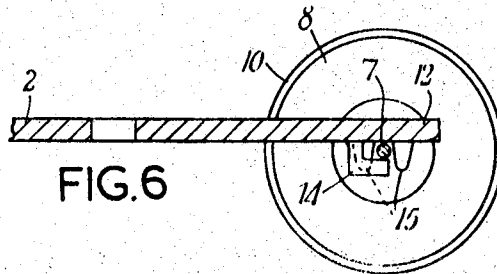


FIG. 6



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## TOY VEHICLE WHEEL AND AXLE MOUNTING

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Filed Dec. 8, 1969, Ser. No. 882,823

Claims priority, application Great Britain, Dec. 10, 1968, 58,729/68

Int. Cl. A63h 17/26

U.S. Cl. 46—221

10 Claims

### ABSTRACT OF THE DISCLOSURE

A toy vehicle having thin wire axles with ground wheels rotatably mounted at their opposite ends. The axles are mounted on end regions of a resilient strip which has a central region secured to a chassis to provide resilient suspension. The axle mountings are afforded by resilient barbed lugs forming parts of the resilient strip and the axles are inserted between them by resilient deformation of the barbed lugs.

This invention relates to toy and model vehicles. An object of the invention is to provide means for reducing the frictional resistance to rotation in the wheels of such toy vehicles without the use of complicated wire or spring arrangements, while retaining the possibility of providing a suspension effect similar to that seen in real motor cars.

According to the present invention, there is provided a toy or model vehicle, wherein a resilient strip is secured onto a chassis of the vehicle and extends substantially parallel to the longitudinal axis thereof, a central region of the resilient strip being secured to the chassis and the strip having a plurality of barbed lugs formed at or near at least one end thereof, the barbed lugs and said end portion of the strip defining a mounting into which is inserted, by resilient deformation of the barbed lugs, an axle at the ends of which are located ground wheels of the toy or model vehicle.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

FIG. 1 is a plan of one end of the chassis of a toy vehicle according to the invention, the other end being similar,

FIG. 2 is an end view of the toy vehicle of FIG. 1 showing its axle arrangement, the chassis being omitted,

FIG. 3 is a section, to an enlarged scale, taken on the line III—III of FIG. 1 with the chassis omitted,

FIG. 4 is a plan view of one end of another embodiment of the invention, the other end being similar,

FIG. 5 is an end view of the toy vehicle of FIG. 4, the chassis being omitted, and

FIG. 6 is a section, to an enlarged scale, taken on the line VI—VI of FIG. 4, the chassis being omitted.

Referring to FIGS. 1 to 3 of the drawings, the toy motor car which is illustrated has a chassis 1 which is a zinc alloy or like die casting or moulding, its precise shape depending on the model of full-size car depicted. A central region of a strip 2 is attached to the chassis 1 by dowels 3 that are integral with the chassis and whose upper ends are flattened onto the strip, the strip 2 extending parallel to the longitudinal axis of the chassis 1 and being formed from spring steel or a flexible synthetic plastics material, which latter is preferably, but not essentially, the acetyl plastics material known by the trademark "Kematal."

The strip 2 has at each end mountings for axles 7, in which mountings are slots 4 extending axially at right-angles to the strip. Projecting downwardly from both sides

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of the slots 4 are barbed lugs 5, 6 whose barbs are directed towards one another to hold the axles 7 in place. The lugs 5, 6 are resilient in order to allow the axles 7 to be put in place while ground wheels 8 are already in position on the axle. Laterally projecting spurs 9 are provided at opposite ends of the portions of the strip 2 in which the slots 4 are formed, the spurs 9 being arranged to contact central bosses on the wheels 8 and prevent any part of those wheels from fouling the chassis 1.

The axle 7 is of small diameter wire, preferably about  $\frac{25}{1000}$ " (0.635 millimetre) diameter, with small integral more or less spherical blobs or heads 11 formed on each end by an automatic or semi-automatic welding apparatus to retain the wheels 8 on the axle. The heat generated by this method of retaining the wheels 8 on each axle 7 would melt or destroy the plastics material from which the wheels are preferably made if the wheels were at the end of the axle during fusion. Therefore, an axle is taken and the wheels 8 are positioned at the centre thereof. The two ends of the axle 7 are then fused into blobs 11, the wheels 8 being at a sufficient distance from the points of fusion to prevent their being damaged. As a consequence of this construction, the axle cannot be mounted on the chassis in the conventional way by placing one wheel on an axle, inserting the axle through mountings on the chassis, and placing the other wheel on the free end of the axle and spreading the end thereof. The strip 2 described herein allows simple and reliable mounting of at least one axle 7 with the wheels 8 already in position.

The wheels 8 are of substantially cylindrical shape and are provided with flanges 10 in order to reduce the area of wheel in contact with the running surface and at the same time to retain the general appearance of full-size tyres on real vehicles. The preferred material for the wheels 8 is polystyrene but they may be made of metal.

In a modification, the wheels 8 are of substantially frusto-conical shape and may or may not be provided with the illustrated flanges 10. In a further embodiment the ground-engaging surfaces of the wheels may be of part-spherical shape in order to provide the effect of the flanges 10 without the manufacturing difficulties associated therewith.

In another embodiment, as shown in FIGS. 4, 5 and 6, the strip 2 is provided with end portions 12 which are axially at right-angles to the strip 2, the illustrated end portion 12 being provided with two holes 13 on the longitudinal axis of the end portion in order to facilitate the moulding of one pair of downwardly projecting barbed lugs 41. Each end portion 12 is also provided with downwardly projecting lugs 15 which retain the corresponding axle 7 against displacements lengthwise of the chassis 1 and strip 2, while the two barbed lugs 14, whose barbs face in opposite directions, retain the axle 7 against displacement relative to the strip 2 in vertical directions, the lugs 15 also serving the same purpose as the spurs 9 in FIG. 1 by preventing any parts of the wheels 8 from fouling the chassis 1.

The effect of the thin, smooth wire axle 7 is to reduce the friction as compared with conventional thicker axled constructions. As the strip 2 is attached to the chassis 1 towards the center of that strip, the wheels 8 can move in a substantially vertical direction against the resilient opposition of the strip. A simulation of the suspension of a real car is thus obtained.

The strip 2 may be provided with lugs that cooperate with recesses formed in the chassis 1 in order to prevent the strip being secured to the chassis upside-down. If this were done, downward pressure on the toy vehicle might spring an axle out of its mounting. It will be noted that disengagement of the axle 7 from its mounting is prevented, when the vehicle is assembled, by the fact that the

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chassis immediately underlies the axle, thus preventing downward movement of the axle past the barbs.

Toy or model cars in accordance with the invention have very free running qualities, while being little, if any, more expensive to produce than conventionally wheeled toy vehicles. This invention could, of course, be applied to any small toy or model having two or more ground wheels.

I claim:

1. A toy vehicle, wherein a resilient strip is secured onto a chassis of the vehicle and extends substantially parallel to the longitudinal axis thereof, a central region of the resilient strip being secured to the chassis and the strip having a plurality of barbed lugs formed in at least one end region thereof, the barbed lugs and said end region of the strip defining a mounting into which is inserted, by resilient deformation of the barbed lugs, an axle at the ends of which are located ground wheels of the toy vehicle.

2. A toy vehicle as claimed in claim 1, wherein at least three of the barbed lugs are formed in each end region of the strip, the barb of at least one of each group of at least three lugs facing in the opposite direction to the barbs of the other lugs of the same group.

3. A toy vehicle as claimed in claim 1, wherein there are two barbed lugs occupying locations that are spaced apart from one another laterally of said strip and serving to support the axle against displacement in a direction at right-angles to the plane of the strip, and wherein the axle is retained against horizontal displacement lengthwise of the strip by downwardly extending dowels located on the strip at positions adjacent the ground wheels.

4. A toy vehicle as claimed in claim 1, wherein the edges of the strip adjacent the ground wheels are formed

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with spurs that extend beyond the edges of the chassis underneath the strip, the spurs being arranged to prevent any parts of the ground wheels from fouling the chassis.

5. A toy vehicle as claimed in claim 1, wherein the strip is formed from an acetyl resin.

6. A toy vehicle as claimed in claim 1, wherein the ground wheels are formed with a circumferential flange.

7. A toy vehicle as claimed in claim 1, wherein the ground-engaging surfaces of the wheels are curved in a plane corresponding to that of the axis of rotation of said wheels.

8. A toy vehicle as claimed in claim 1, wherein the chassis immediately underlies the strip, whereby downward disengagement of at least one axle from its mounting is substantially prevented.

9. A toy vehicle as claimed in claim 1, wherein at least one axle is formed from wire having a diameter of about  $\frac{25}{1000}$ ".

10. A toy vehicle as claimed in claim 9, wherein the ground wheels are maintained on the axle(s) by forming substantially spherical blobs at the ends thereof with the aid of welding apparatus.

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