

PATENT SPECIFICATION

1,092,743

DRAWINGS ATTACHED.

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Date of filing Complete Specification: Aug. 1, 1966.

Application Date: May 7, 1965. No. 19384/65.
(Patent of Addition to No. 891,681 dated April 8, 1960).

Complete Specification Published: Nov. 29, 1967.

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1,092,743



Index at Acceptance:—A6 S(19A1A, 19D6, 19D7).

Int. Cl.:—A 63 h 17/36.

COMPLETE SPECIFICATION.

Improvements in or relating to Toy Vehicles.

We, MECCANO LIMITED, of Binns Road, Liverpool, 13 a British Company do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to toy motor vehicles and is more particularly concerned with an improvement in or modification of the invention claimed in British Patent No. 891,681.

Patent No. 891,681 claims a toy motor vehicle which permits pivoting of an axle to provide a steering effect. According to that invention, the axle for at least the front wheels passes through slots in upstanding lugs on opposite sides of the vehicle floor plate, which slots have rearward upwardly inclined extensions, and a spring acts on the axle urging it to assume a normal position for straight line movement of the vehicle at the bottom of the inclined extensions of the slots.

With this arrangement however the body of the vehicle appears to lean in the direction of the centre of curvature of the arcuate path in which it is travelling. In this respect it does not simulate steering of a real vehicle because the centrifugal force acting on a real vehicle moving in an arcuate path would cause the vehicle to roll in an opposite direction, i.e., away from the centre of curvature of the course followed.

It is, therefore, the object of the present invention to overcome this disadvantage by providing an arrangement such that when a selected part of the vehicle is depressed, at least one axle of at least one pair of wheels is caused to pivot to produce the observed

effect of the true steering as hereinbefore set out.

According to the present invention, the slots have forward upwardly inclined extensions.

The invention will be better understood from the following description of two embodiments taken in conjunction with the accompanying drawings comprising Figs. 1 to 5. In the drawings:—

Figure 1 is a perspective view of part of a vehicle base plate,

Figures 2a, 2b and 2c are diagrammatic views showing the principle of operation of the invention,

Figure 3 is a top plan view of the base plate,

Figure 4 is a cross section taken on line IV—IV of Figure 1, and

Figure 5 is a perspective view of another embodiment.

Referring to Figures 1 to 4, a toy motor vehicle comprises a body (not shown) and a base plate, generally designated 1, adapted to be secured to the body. The base plate is preferably of die cast construction and comprises a flat plate 2 having upstanding wall portions 3, 4. At the forward end of the chassis base plate, the upstanding wall portions are provided with outwardly convex arcuate guides 5, 6 on opposite sides of the flat plate 2, the flat plate 2 therebetween being cut away as indicated at 7 and 8 leaving a bridge piece 9 (Fig. 3). Located on the bridge piece 9, on either side of a transverse groove 9a (Fig. 4) are two vertical members 10, 11 which serve to guide a front axle 12 of the vehicle during any vertical movement of that axle. A length of spring strip metal 13, having fingers 14, 15 is

secured to the plate 2 by a rivet 16 and is arranged such that the fingers 14, 15 bear on the axle 12 so as to resiliently urge the axle 12 in a downward direction, that is, so that it tends to bed in the transverse groove 9a.

The convex guides 5, 6 of the upstanding wall portions 3, 4 extend above and below the wall portions 3, 4 and have cut therein slots 17, 18 respectively. Through these slots 17, 18 passes the front axle 12, the slots 17, 18 serving to guide the axle in an arcuate path, pivoting about the members 10, 11 when appropriate displacement of the axle 12 relative to the body is effected. Ideally, the slots 17, 18 extend forwardly and upwardly from the rear 19 of a convex guide to the front 20 of the guide as shown on the guide 6, thus forming an arcuate angle with the longitudinal axis of the vehicle. The distance between the upper track 21 and the lower track 22 of the slots should be such as to permit limited upward movement of either end of the axle, although such upward movement would be restrained by the strip metal 13 acting as a spring thereby constituting a spring suspension for the front wheels of the vehicle.

During normal rectilinear motion of the vehicle the front axle 12 is supported in the groove 9a between the members 10, 11 and troughs 23, 24 situated at the centre of the lower surfaces of the slots 17, 18 as indicated in Figure 2a.

Supposing, however, it is desired to turn the vehicle to the right, the centrifugal force acting on a body turning to the right of a straight line path (i.e. a body moving clockwise around an arc of a circle) would cause the body to heel over to the left. If the vehicle in this present example is depressed on its forward left front side, the left-hand end of the front axle will lift against the action of the spring finger 15 and roll along the upper track 21 of the guide 5. The resultant motion of the left-hand end of the front axle is therefore forward, as indicated in Figure 2b, but since the axle is located between the members 10, 11, it will pivot about them and the ends of it will follow an arcuate path. Axial sliding movement of the axle 12 during pivoting may be prevented by its circumferential groove 12a (Figure 3).

When the pressure on the left-hand side of the vehicle is released the fingers 14, 15 of the spring 13 urge the axle to assume a transverse position as for rectilinear motion, as indicated in Figure 2a.

If it is desired to turn the vehicle to the left the vehicle is depressed at the front right-hand corner and, in similar fashion to

the action described above the right-hand end of the front axle pivots forwardly and the left-hand end pivots back, as indicated in Figure 2c.

In this example, the members 10, 11 extend upwardly from the base plate 1, but they could, of course, be depending from a part of the vehicle body. Furthermore, the example has been described as limited to one steerable front axle but it will be appreciated that the invention also includes models of motor vehicles which have multi-steerable wheels and axles.

In the preferred example shown in Figure 5 slots 25, 26 are formed by a "unit" of two parts, a depending web 27, 28 and a convex wall section 29, 30. This arrangement is convenient for assembly purposes since the bottom of the slots 25, 26 is provided by upstanding wall portions of the base plate while the top of the slots is provided by the downwardly depending webs attached to the vehicle body. The arrangement permits installation of a steerable wheel axle prior to securing the base plate to the vehicle body, since it is only when the chassis base plate and vehicle body are fitted together that the slots 25, 26 are fully formed.

In yet another example of combined spring suspension and steering means, only the upper tracks (21, Figure 1) of a pair of depending webs (27, 28 Figure 5) are provided, i.e. the axle is not enclosed by a "slot" as hereinbefore described but is guided by a single track on each depending web. During normal rectilinear motion of the vehicle, the front axle 12 is supported in the groove 9a between the members 10, 11 and is held in this position by the fingers 14, 15 of the spring 13. In the same way as previously described, if the vehicle is depressed on its forward left front side, the left-hand end of the front axle will lift against the action of the spring finger 15 and roll along the track in the depending web, similar to the upper track 21 of the guide 5. The vehicle will therefore turn to the right. It will be appreciated that in the present example, the bridge piece 9 (Figure 3) vertical members 10, 11 (Figures 1, 3 and 4) and the resilient means 13, 14 and 15 (Figures 1 and 3), or other equivalents, will still be included.

WHAT WE CLAIM IS:

1. A toy motor vehicle as claimed in Patent No. 891,681, wherein the slots have forward upwardly inclined extensions.
2. A toy motor vehicle as claimed in claim 1, wherein each of the slots is formed by the shaped edges of two engaging wall

portions, the lower of which is attached to the base plate of the vehicle and the other is attached to the vehicle body.

5 3. A toy motor vehicle substantially as described with reference to the accompanying drawings.

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Abingdon: Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1967.
Published at The Patent Office, 25 Southampton Buildings, London, W.C.2,
from which copies may be obtained.





