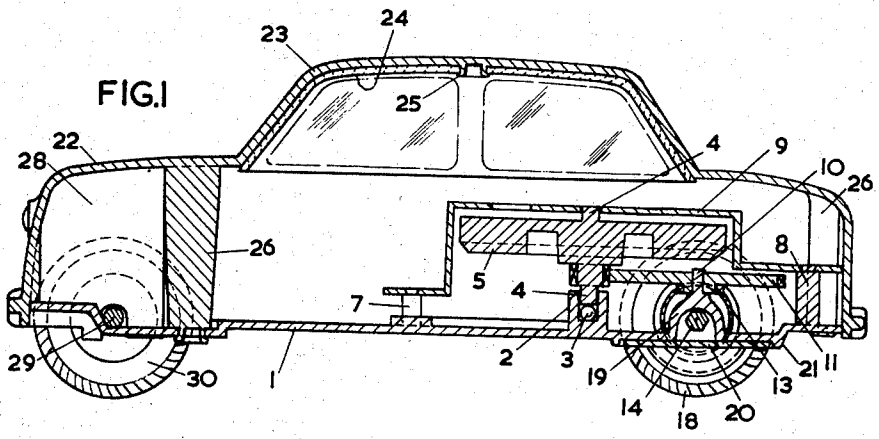
Feb. 17, 1959 H. ULLMAN 2,873,553

DRIVING MECHANISM FOR TOYS

Filed March 15, 1957

FIG.1



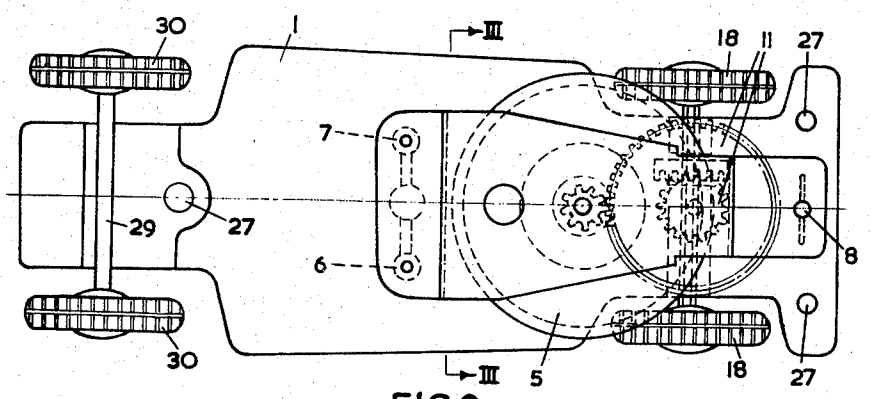


FIG.2

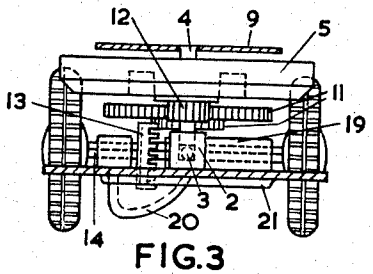


FIG.3

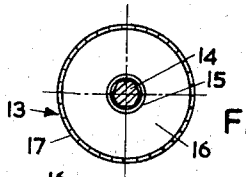


FIG.4

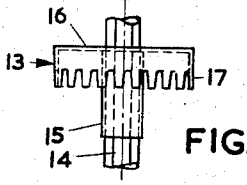


FIG.5

INVENTOR
Henry Ullman
By Holcomb, Dethwiler & Brisebois
ATTORNEYS

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DRIVING MECHANISM FOR TOYS

Henry Ullman, Northampton, England, assignor to The Mettoy Company, Northampton, England, a British company

Application March 15, 1957, Serial No. 646,286

2 Claims. (Cl. 46—209)

This invention relates to toy vehicles and provides a number of improvements in such articles and particularly in the driving mechanism thereof.

According to one feature of the invention, a toy vehicle includes a horizontally disposed flywheel connected through gearing to a running wheel of the vehicle, so that it can first be driven by and can subsequently drive the running wheel, in which the vertical spindle of the flywheel rests at its lower end upon a single bearing ball so supported that it can rotate freely but is restrained against bodily movement. This arrangement considerably reduces the running friction, as compared with the usual arrangement, by which a horizontally disposed flywheel is supported upon an annular shoulder formed by the lower face of its driving pinion.

According to another feature of the invention a toy vehicle includes a rotatable axle having secured thereon at least one running wheel and a gear wheel through which drive can be imparted to the axle and running wheel, in which the gear wheel is formed by a sheet metal member comprising a tubular portion, and a flange integral with and projecting outwardly from one end of the tubular portion, the periphery of the flange being notched to form gear teeth, and the axle extending through and making an interference fit with the tubular portion. This construction effectively avoids the usual dangers of the component parts of the crown wheel becoming loose from one another and of the crown wheel as a whole becoming loose on the shaft.

According to yet another feature of the invention a toy vehicle includes an axle rotatably attached to the body of the vehicle and having secured thereon at least one running wheel and a gear wheel through which drive can be imparted to the axle and running wheel, in which the axle is accommodated in a bearing recess formed in the body and open on its underside so that the axle can be inserted therein after the running wheel and gear wheel have been secured to the axle, and the axle is retained in the recess by a cover member secured to the body.

A particular form of toy vehicle constructed in accordance with the invention is shown by way of example in the accompanying drawing, in which:

Figure 1 is a longitudinal vertical section through the vehicle;

Figure 2 is a plan view of the vehicle with the upper part of the body removed;

Figure 3 is a transverse section taken on the line III—III of Figure 2; and

Figures 4 and 5 are views on an enlarged scale and taken at right angles to one another of a detail.

In the vehicle illustrated, a die-cast base plate **1** is formed with an upstanding hollow boss **2** which constitutes a cylindrical cup accommodating a bearing ball **3**, which is preferably of steel, although brass or other sufficiently hard material may be used. The cup also receives the lower end of the vertical spindle **4** of a flywheel **5**, the spindle having the same diameter as the

ball **3** on which it rests, while the internal diameter of the cup is slightly greater, so that the cup locates but permits the free rotation of both the ball and the spindle. The base plate **1** also comprises three upstanding pillars **6**, **7**, **8** whose upper ends support a cranked horizontal plate **9** and are riveted over to secure it. The plate **9** constitutes a bridge member extending over the top of the flywheel **5** and an aperture in the plate receives and constitutes a bearing support for the reduced upper end of the flywheel spindle **4**, thereby holding the spindle vertical.

A further projection **10** upstanding from the base plate **1** has its upper end reduced to form a shaft for an intermediate gear **11** and may be riveted over to secure that gear. The gear **11** is formed with two rings of teeth of different diameters, the upper and larger ring meshing with a pinion **12** on the spindle of the flywheel. As shown, the pinion **12** and also the spindle **4** are formed integrally with flywheel proper **5**. The lower and small ring of teeth on the intermediate gear **11** meshes with a crown wheel **13** fast on the horizontal rear axle **14** of the vehicle. While an intermediate step-up gear is preferably provided, as shown, between the rear axle and the flywheel the crown wheel may mesh directly with the flywheel pinion, or more than one intermediate gear may be provided.

As best shown in Figures 4 and 5, the crown wheel **13** and the means for securing it to the rear axle **14** are formed as a single integral member. A sheet steel drawing or pressing, resembling a long eyelet and comprising a tubular portion **15** and a flange **16** projecting outwardly from one end of the tubular portion, has the periphery of its flange notched to form teeth **17** and bent back parallel to the tubular portion. The axle **14** is of hexagonal section and is driven through the tubular portion of the crown wheel member, which is initially of circular cross section, the angles of the hexagon making an interference fit and distorting the tubular portion. This construction effectively avoids the usual dangers of the component parts of the crown wheel becoming loose from one another and of the crown wheel as a whole becoming loose on the shaft. The axle **14** is not necessarily hexagonal, but may be of any other suitable section, including circular, providing there is a sufficient degree of interference in the fit to ensure tightness.

The crown wheel **13** and a pair of running wheels **18** are secured to the rear axle **14** and the assembly thus constituted is applied as a unit to the base plate **1**. The base plate is formed with an upwardly bowed portion **19** (from whose crest the shaft **10** of the intermediate gear projects) which provides on the underside of the base plate a bearing recess for the axle in the form of a transversely extending groove. Intersecting this groove is an aperture in the base plate, through which the crown wheel **13** projects to mesh with gear **11** when the rear axle **14** is laid into the open bearing recess. The axle assembly is retained in position by a downwardly dished cover member **20**, which is located on the base plate **1** by a projecting rim **21** formed on the underside of the base plate and is secured to the latter by riveting. The cover member closes the groove in which the axle **14** is accommodated and encloses the crown wheel **13**; it may be shaped to simulate the rear axle and differential casing of a conventional motor vehicle.

The base plate **1** which supports the driving mechanism of the vehicle as described above, also constitutes the underside of the vehicle body. The upper part of the body is formed by a cast or moulded shell **22**, including a top portion **23** formed with window openings. A transparent member **24** fits closely within the top por-

tion **23** to simulate window glass and is secured by a rivet **15**. Within and integral with the shell **23** are three depending pillars **26** whose reduced lower ends are inserted into apertures **27** (Figure 2) in the base plate and riveted over to secure the shell to the base plate. Also formed integral with the shell **23** are a pair of vertical webs **28**, whose lower edges are notched to receive a front axle **29** carrying a pair of running wheels **30**. The front axle is retained in position by the base plate **1**, whose forward end extends below axle **29** and between the webs **28**.

It will be understood that the construction described may be modified in many ways other than those specifically mentioned.

I claim:

1. A toy vehicle comprising a base plate extending substantially horizontally from front to rear of the vehicle and including a transversely extending upwardly arched portion providing a transversely extending groove on the underside of the vehicle and having at its crest a centrally disposed upwardly projecting pivot pin, said base plate being formed with an aperture intersecting said arched portion to one side of said pivot pin and with an integral upwardly projecting hollow boss disposed forwardly of said arched portion and constituting a substantially cylindrical cup, a bearing ball having a diameter slightly less than that of said cup resting freely in said cup, a bridge member secured at its ends to the upper side of the base plate at points forward of said cup and rearward of said arched portion respectively, an intermediate portion of said bridge member being spaced upwardly from the upper surface of the base plate and being formed with an aperture located vertically above said cup, a horizontal transversely disposed axle fitting rotatably within said groove and projecting at its ends beyond the base plate, a pair of road wheels fast on the two ends of said axle, a crown wheel fast to said axle at a point intermediate its ends with the upper part of its periphery projecting through said aperture in the base plate, a downwardly dished cover member secured against the underside of the base plate to close said groove and retain said axle therein and

to enclose the lower part of the periphery of the crown wheel, a horizontally disposed intermediate gear disc supported for rotation on said pivot pin and formed integrally with two rings of teeth of different diameters, the teeth of the lower and smaller ring meshing with those of the crown wheel, an integrally formed fly wheel member including a horizontally disposed fly wheel disc, a horizontally disposed pinion formed on the underside of said fly wheel disc and having teeth meshing with those of the larger and upper ring of said intermediate gear disc, and a pair of aligned vertical stub spindles, the one projecting downwardly from the underside of said pinion and resting with its lower end upon said bearing ball, whereby to support said fly wheel member, and the other projecting upwardly from the upper face of said fly wheel disc and passing rotatably through said aperture in the bridge member, whereby to maintain the axis of said fly wheel member vertical.

2. A toy vehicle in accordance with claim 1, in which said base plate is formed below the end portions of said bridge member with integral upwardly projecting pillars having their upper ends reduced to provide shoulders, the bridge member being apertured to pass over the reduced upper ends of the pillars and rest on the shoulders and being secured by riveting over the reduced upper ends of the pillars.

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