July 13, 1965 H. J. NOTTAGE 3,194,583

TOY VEHICLES HAVING TRACK-TYPE WHEELS

Filed May 13, 1963 3 Sheets-Sheet 1

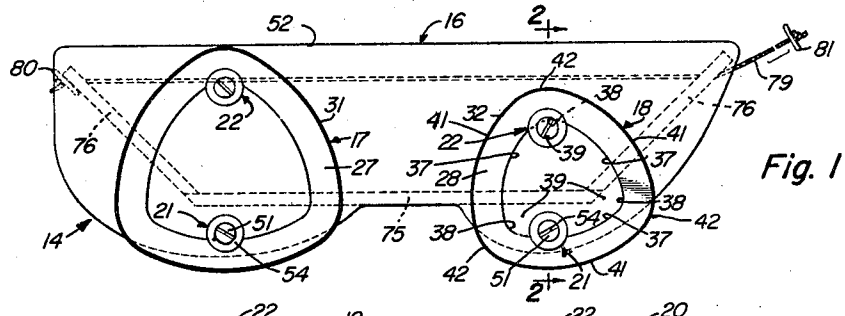


Fig. 1

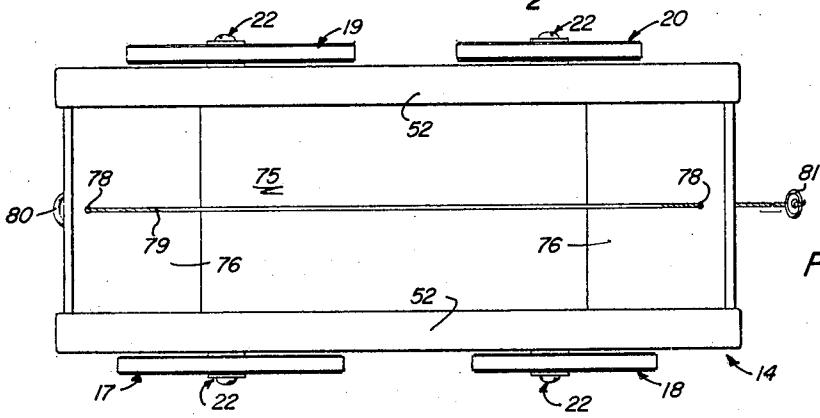


Fig. 3

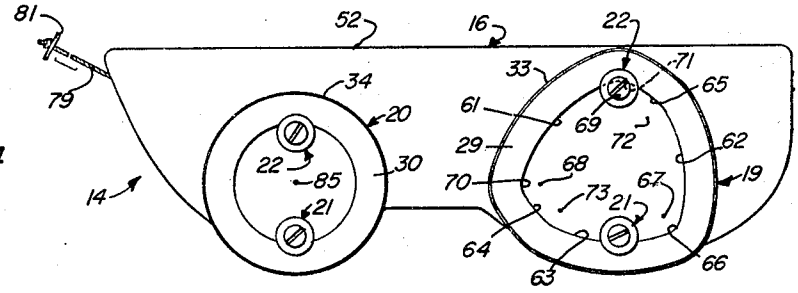


Fig. 4

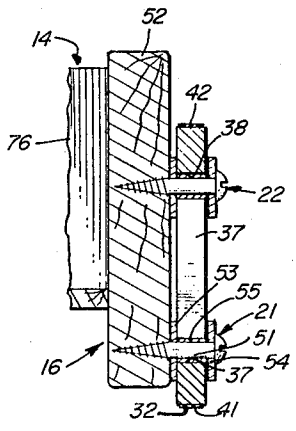


Fig. 2

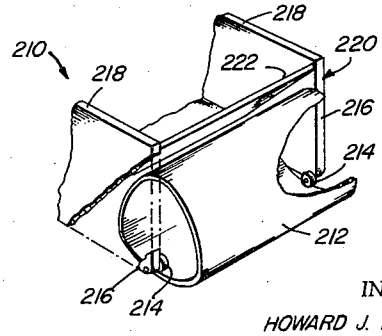


Fig. 15

INVENTOR.
HOWARD J. NOTTAGE

BY

BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

July 13, 1965 H. J. NOTTAGE 3,194,583

TOY VEHICLES HAVING TRACK-TYPE WHEELS

Filed May 13, 1963 3 Sheets-Sheet 2

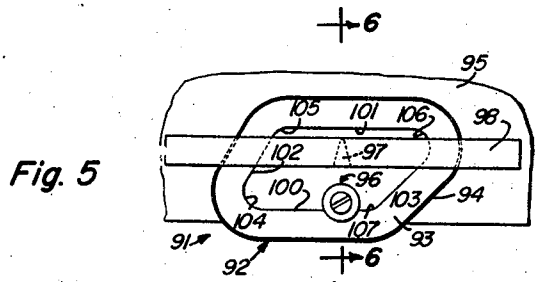


Fig. 5

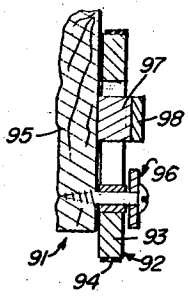


Fig. 6

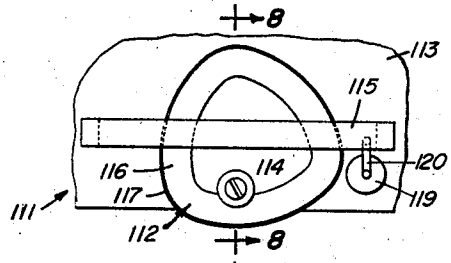


Fig. 7

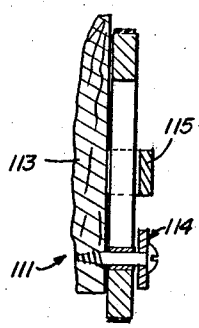


Fig. 8

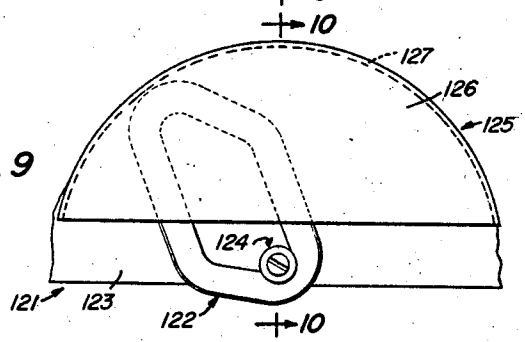


Fig. 9

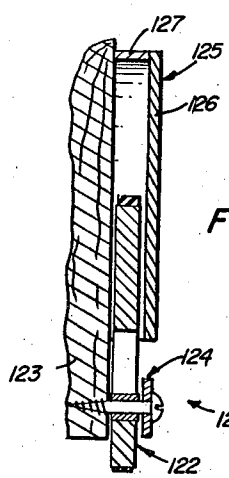


Fig. 10

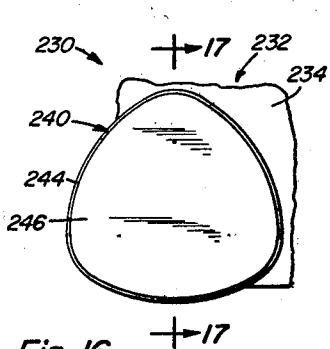


Fig. 16

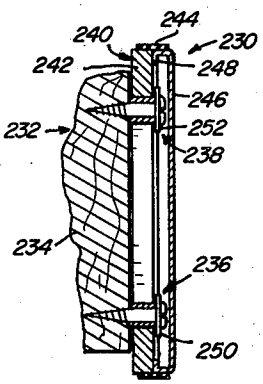


Fig. 17

INVENTOR.
HOWARD J. NOTTAGE

BY

BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

July 13, 1965 H. J. NOTTAGE 3,194,583

TOY VEHICLES HAVING TRACK-TYPE WHEELS

Filed May 13, 1963 3 Sheets-Sheet 3

Fig. 11

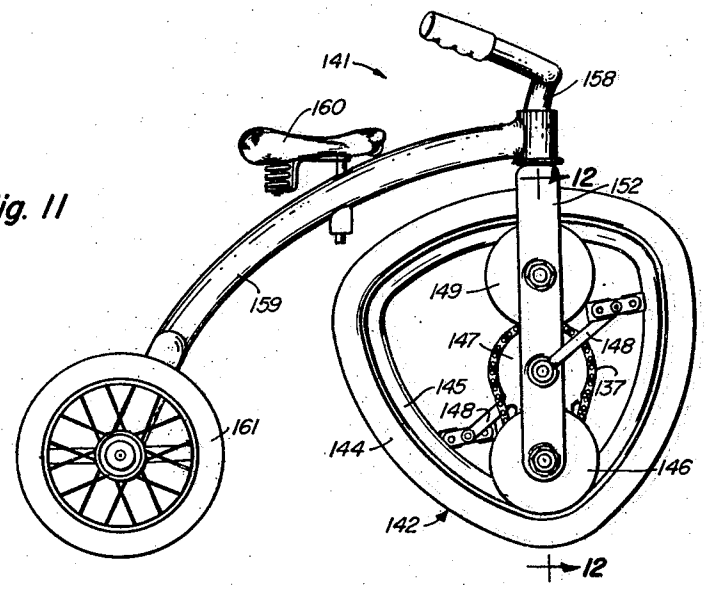


Fig. 12

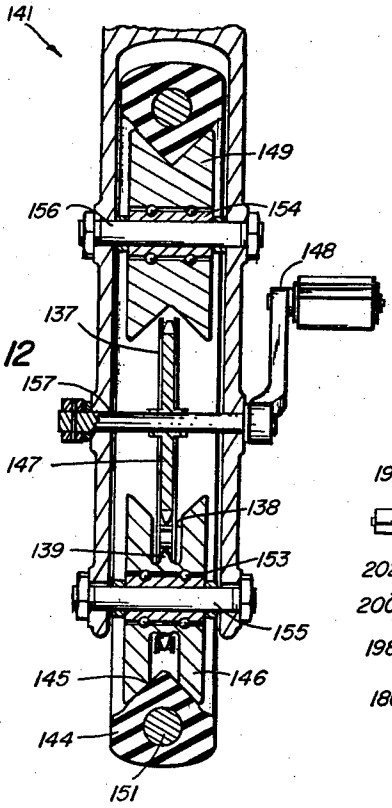


Fig. 13

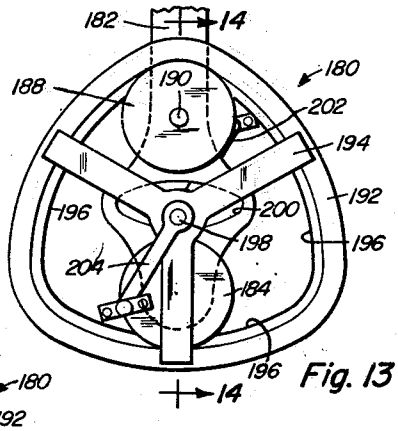
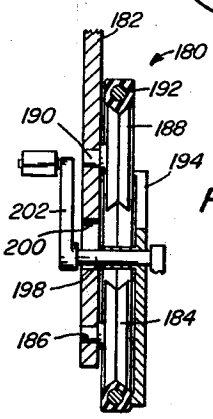


Fig. 14



INVENTOR.
HOWARD J. NOTTAGE
BY
BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

United States Patent Office 3,194,583 Patented July 13, 1965

3,194,583

TOY VEHICLES HAVING TRACK-TYPE WHEELS

Howard J. Nottage, 609 SE. 41st Ave., Portland, Oreg.

Filed May 13, 1963, Ser. No. 279,934
11 Claims. (Cl. 280—229)

This invention relates to toy vehicles having track-type wheels, and more particularly to push-type and pedaled-type toys having track-type wheels.

An object of the invention is to provide toys having track-type wheels.

Another object of the invention is to provide a toy cart having track-type wheels.

A further object of the invention is to provide a tricycle having a track-type wheel.

Yet another object of the invention is to provide a toy vehicle having noncircular track-type wheels of constant width to create oscillating motions of the wheels.

Another object of the invention is to provide a toy vehicle with a noncircular track-type wheel with an oscillating rolling action together with a noise-creating member periodically struck by the wheel.

A still further object of the invention is to provide a pull-cart with a noncircular, flopping track-type wheel,

Yet another object of the invention is to provide a driven toy vehicle having a track-type wheel driven by a driving roller.

A still further object of the invention is to provide a toy cart having a pull string adapted to pull the cart in either of two directions, and also adapted to hold articles in the cart.

The present invention provides toy vehicles having track-type wheels supporting roller memans fixed to the vehicle body and traveling along the inner portion of the wheel and rolling the wheel. The wheel may be circular or may be polygonal of a constant internal width. The wheel also may be polygonal and have a varying diameter or width. In a toy vehicle forming one embodiment of the invention, the body is adapted to be pushed or pulled to move the roller along the interior of the track-type wheel. In a toy vehicle forming another embodiment of the invention, there may be provided a roller driven by a pedaling mechanism or by a motor and serving to roll along a track-type wheel.

A complete understanding of the invention may be obtained from the following detailed description of toy vehicles forming specific embodiments thereof, when read in conjunction with the appended drawings, in which:

FIG. 1 is a side elevation view of a toy cart forming one embodiment of the invention;

FIG. 2 is an enlarged, fragmentary, vertical sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a top plan view of the toy cart of FIG. 1;

FIG. 4 is a side elevation view of the cart of FIG. 1 of the side opposite to that shown in FIG. 1;

FIG. 5 is a fragmentary side elevation view of a toy cart forming an alternate embodiment of the invention;

FIG. 6 is an enlarged, fragmentary vertical sectional view taken along line 6—6 of FIG. 5;

FIG. 7 is a fragmentary, side elevation view of a toy cart forming an alternate embodiment of the invention;

FIG. 8 is an enlarged, fragmentary, vertical sectional view taken along line 8—8 of FIG. 7;

FIG. 9 is a fragmentary side elevation view of the cart forming an alternate embodiment of the invention;

FIG. 10 is an enlarged fragmentary vertical sectional view taken along line 10—10 of FIG. 9;

FIG. 11 is a side elevation view of a tricycle forming an alternate embodiment of the invention;

FIG. 12 is an enlarged vertical sectional view taken along line 12—12 of FIG. 11;

FIG. 13 is a side elevation view of a tricycle forming an alternate embodiment of the invention;

FIG. 14 is an enlarged fragmentary vertical sectional view taken along line 14—14 of FIG. 13;

FIG. 15 is a fragmentary perspective view of a toy cart forming an alternate embodiment of the invention;

FIG. 16 is a fragmentary side elevation view of a toy cart forming an alternate embodiment of the invention; and

FIG. 17 is a fragmentary vertical sectional view taken along line 17—17 of FIG. 16.

Referring now in detail to the drawings, there is shown in FIGS. 1 to 4 a toy cart or wagon 14 including a body 16 and track-type wheels or tracks 17, 18, 19 and 20 adapted to roll along a supporting surface such as, for example, a floor, and supporting flanged roller pin or axle devices 21, which in turn support the body 16. The tracks 17 to 20 are retained on the cart body by the roller devices 21 and by upper, flanged roller devices 22.

The tracks 17 to 20 include rigid or semi-rigid endless track bodies 27 to 30, respectively, having treads 31 to 34 on the exteriors thereof. The treads are preferably composed of resilient material which has good frictional characteristics such as, for example, rubber or the like, and are suitably adhered to the track bodies 27 to 30. Alternately, the track bodies and treads may be molded integrally from a plastic material with the treads having suitable knurling or other frictional characteristics desirable in wheels. In the cart 14, the external width of each of the track bodies 27 to 30, external width being defined as the distance between the inner and outer peripheries of the track body, is the same completely around the circumferences thereof, and this width of each track body preferably is equal to that of the other track bodies. The track bodies 27 and 28 are noncircular, generally triangular and of substantially the same configuration except that the width of the track body 27 is larger than the width of the track body 28. Each track body 27 and 28 though noncircular, has a constant inner width and a constant outer width. Since the configurations of the track bodies 27 and 28 are substantially identical, only the track body 28 will be described in detail. The inner periphery of the track body is of a constant width, and comprises three large diameter arcuate surfaces 37 which are joined at the ends thereof by three small diameter arcuate surfaces 38. The width of the inner periphery of the track body 28 is equal to the radius of each of the large diameter arcuate surfaces 37 plus the radius of each of the small diameter arcuate surfaces 38, and each small diameter surface 38 has a center 39, which is the same as the center of the large diameter surface 37 opposite to that small diameter surface 38. The exterior peripheral surface of the track body 28 is substantially parallel to the inner peripheral surface thereof so that the track body 28 is of a substantially constant width, and includes large diameter arcuate portions 41 concentric with the large diameter arcuate portions 37 and small diameter arcuate portions 42 concentric with the small diameter arcuate portions 38. The annulus width of the annular track body 27 is substantially identical with that of the track body 28 while the internal and external widths of the track body 27 are larger than the corresponding widths of the track body 28.

Each of the flanged roller devices 21 includes a screw 51 threaded into a side 52 of the body 16 and forming an axle on which are mounted washers 53 and 54 and a sleeve or roller 55. The external diameter of the roller 55 is only a small fraction of the inner width of the smallest of the track bodies 27 to 30. The roller 55 fits loosely on the screw 51 and is of sufficient length to space the washers 53 and 54 apart a distance greater than the thickness of the track body 27, 28, 29 or 30 associated

therewith to permit a limited amount of play between the track body and the washers. Also, for noise, it is desirable that the screws 51 be threaded into the sides 52 so as to permit a limited amount of play between the washers 53 and 54 and the rollers 55 and the heads of the screws and the sides 52 to create rattle and noise. The flanged roller devices 22 are of identical construction with that of the roller devices 21, and are spaced directly above the devices 21 a distance such that the distance between the top of the sleeve of the roller device 22 to the bottom of the sleeve of the roller device 21 is slightly less than the internal width of the track body associated therewith, and are adapted to be slapped by the track bodies 27 through 29 as the cart is pulled and the wheel tracks 17 to 19 are rotated thereby.

The track body 29 is a five-sided polygon, and has an internal periphery of constant width and an external periphery of a constant width. The body 29 is of substantially constant width and preferably is rigid. The inner periphery of the body 29 includes elongated arcuate portions 61, 62, and 63. The portions 61 and 63 are separated by a short, sharply curved, arcuate portion 70 and an intermediate length arcuate portion 64, the portions 61 and 62 are joined by a short, sharply curved, arcuate portion 71 and an intermediate length arcuate portion 65, and the portions 62 and 63 are joined by a short, sharply curved, arcuate portion 66. The arcuate portions 61, 62 and 63 are centered on centers 67, 68 and 69, respectively, the arcuate portion 64 is centered on center 72, and the arcuate portion 65 is centered on the center 73. The track body 30 is a circular annulus. The cart 14, while shown with the four tracks 17 to 20 of different widths and configurations, obviously may have all of the wheels of the same size and configuration, and the four different types of wheels 17 to 20 are shown for purposes of illustrating the different types of arcuate, track-type wheels which may be used therewith.

The cart body 16 (FIGS. 1 and 2) includes the sides 52 joined rigidly together by a bed 75 having end walls 76 suitably secured rigidly to the sides 52 and the bed 75, which also is secured rigidly to the sides 52. Each of the inclined end walls 76 has a hole 78 therethrough through which extends a flexible pull cord 79. The flexible pull cord 79 has enlarged handle or stop members 80 and 81 at the ends thereof and is adapted to slide freely through the holes 78 as limited in one direction by the member 80 and in the other direction by the member 81. The portion of the cord 79 between the holes 78 is adapted to press down against articles positioned in the cart and hold the articles in the cart as the cart is being pulled along, the pull cord 79 being tensioned as the car is pulled.

As the cart 14 is pulled along a floor or sidewalk or the like to the right, as viewed in FIG. 1, the roller devices 21 rest on the tracks 17 to 20 and roll therealong, and as each of the roller devices 21 moves from a larger arcuate portion of each of the tracks 17 to 19 into and through one of the smaller arcuate portions thereof, the track flops or swings in a clockwise direction. The track moves through the angle included between the adjacent ends of the larger diameter arcuate portions of the track. The elongated arcuate portions of the track bodies 27, 28 and 29, as the tracks are rotating flop up, strike the upper roller devices 22 to rattle the roller devices 22.

Considering the track 18, as each of the lower roller devices 21 travels from one of the small diameter arcuate portions 38 to the next, the third small diameter portion 38 stays substantially centered on the retaining device 22, so that, in effect, the track body 28 pivots about the upper roller device 22 during this travel of the roller device 21 along each larger diameter portion 37 on the inner periphery thereof. Then, while the lower roller device 21 is traveling over the smaller arcuate portion 38 thereahead, the body 28 swings through substantially 60° in a very short period of time, in effect pivoting about the roller device 21 with the upper elongated arcuate portion 37 swinging over the upper roller device 22. The action of the larger track 17 is similar to that of the track 18, but of course takes slightly longer for a revolution because of the larger size thereof.

The action of the five-sided track 19 is similar to that of the track 18 but the swings of the track 19 about the roller device 21 are proportional to the included angles between the portions 61 to 65. These non-uniform swinging motions are non-uniform rotating motions which amount to swinging motions of the tracks 17, 18 and 19, give a novel, intriguing effect visually without interfering with perfectly smooth, level traveling of the cart. Preferably, the bodies 27, 28, 29 and 30 are of a color sharply contrasting with the color of the sides 52 of the cart to accentuate the visual effect. The wheel 20 travels on the center 85 so that it does not have the swinging or pendulum movements of the wheels 17, 18 and 19. The roller devices 21 and 22 retain the wheels in generally parallel planes as they are rotated.

In a toy cart 91 (FIGS. 5 and 6) forming an alternate embodiment of the invention, there is included a wheel or track 92 of a non-uniform width and polygonal shape. The wheel or track 92 includes a rigid or semirigid track body 93 and a tread 94 of rubber, plastic or the like suitably secured to the outer periphery thereof. The wheel is retained on a side 95 of the cart body by a roller device 96 of substantially identical construction with that of the roller devices 21 (FIGS. 1 to 4). A pin member 97 projecting through the inner opening in the track body and a retaining bar 98 carried by the pin member 97 retain the wheel 92 in a substantially vertical position while permitting rotation of the wheel. The pin 97 is positioned substantially directly above the roller device 96 and prevents the wheel 92 from dropping off the cart when the cart is lifted, the bar 98 maintaining the wheel 92 is substantial lateral alignment with the flanged roller device 96. The body 93 is provided with elongated inner straight portions 100 and 101 joined to intermediate length straight portions 102 and 103 by short, sharply curved arcuate portions 104, 105, 106 and 107. The wheel 92 alternately stands still and then swings through a large angle during the movement of the roller device 96 therealong, to give a pleasing visual effect. While the bar 98 is shown as horizontal, it obviously may be positioned at an angle to the horizontal if so desired.

In a toy cart 111 (FIGS. 7 and 8) forming an alternate embodiment of the invention, a noncircular, generally triangular annular wheel or track 112 of constant width similar to the wheel 18 (FIGS. 1 to 4) is mounted on a side 113 of the cart body by a retaining roller device 114 similar to the roller device 21. A U-shaped strap 115 is secured at its ends to the side 113. The bar 115 is spaced above the top of the flange 114 a distance less than the combined width of track body 116 and tread 117 of the wheel to prevent the track from falling off the device 114 when the cart is lifted. A bell 119 is suspended by a link 120 from the bar 115 or the side 113 in a position in the path of the apex portions of the track 112 as the track swings around the roller device 114 and is struck thereby to produce noise.

In a toy cart 121 (FIGS. 9 and 10) a wheel or track 122 is mounted on a side 123 of the cart body by means of a roller device 124 and a retaining fender 125. The fender 125 has an outer cover portion 126 and an arcuate portion 127 secured to the side 123. The lower edge of portion 126 is spaced sufficiently close to the roller device 124 to retain the track 122 on the roller device when the cart is lifted. The inner periphery of the arcuate portion 127 is spaced from the center of the roller device 124 a distance slightly greater than the greatest distance the wheel 122 extends from the center of the roller device 124, as illustrated best in FIG. 9 to provide clearance for the wheel 122, and preferably is centered on the roller device 124. The wheel 122 is substantially identical to the wheel 92 (FIG. 5).

A tricycle **141** (FIGS. 11 and 12) forming an alternate embodiment of the invention includes a front wheel or track **142** rotatable in a fork **152**. The wheel **142** includes a track body **144** of the same general configuration as that of the track **18** (FIGS. 1 to 4) and has a tapered frictional inner driving surface **145**, which is engaged by a complementarily grooved toothed driving pulley **146** driven by a chain **137** and driving sprocket **147** keyed to pedal arms **148**. The pulley **146** has a central annular groove **138** at the bottom of which is located a small-diameter sprocket **139**. A grooved pulley **149** is provided to keep the track **144** in engagement with the driving pulley **146**. A core **151** is provided to give at least semi-rigidity to the wheel **142**. The fork **152** mounts the pulleys **146** and **149** and sprocket **147** by bearings **153** and **154**, axles **155** and **156** and shaft **157**. The fork is turned by handlebar **158** relative to frame **159** carrying a seat **160**. Conventional rear wheels **161** are provided.

When the tricycle **141** is ridden and the pedal arms **148** are revolved, the pulley **146** is revolved and frictionally engages the inner periphery **145** of the track body **144** and moves the pulley **146** along the track body **144** with the track body **144** alternately pivoting about the pulley **146** and the pulley **149** to produce a very novel, pleasing effect. As an alternate construction, the chain **137** and sprocket **147** may be omitted and pedals similar to but having shorter arms than those of the pedals **148** may be drivingly attached to the pulley **146**. Also, if desired, the sprocket **147**, the chain **137** and the pulley **146** may be replaced with three gears and the periphery **145** provided with gear teeth adapted to mesh with the teeth of the lowermost gear, or instead of three gears, a single gear adapted to be pedaled may be substituted for the chain, sprocket and pulley.

A tricycle **180** (FIGS. 13 and 14) forming an alternate embodiment of the invention includes a single arm support **182** in place of the conventional fork and carrying a grooved supporting pulley or roller **184** on a fixed axle **186** and a grooved idler pulley or roller **188** on a fixed axle **190**. The grooved pulleys mount rotatably a track-type wheel or track **192** of generally triangular, constant width shape. A spider or spoke member **194** is rigidly secured to the track **192** at the middle portions of side **196**, and a pedal shaft **198** is fixed rigidly to the spider as by welding or brazing, and projects through a generally elliptical slot **200** in the support **182**. Pedal arms **202** and **204** are keyed to the shaft. When the rider of the tricycle pedals, the track **192** is driven by the spider and is guided by the pulleys **184** and **188**. The axle **198** is positioned equidistantly from the midpoints of the sides **196** of the track and also equidistantly from the apices of the track. However, the distance to each midpoint is substantially less than the distance to each apex of the track so that the axle **198** moves up and down relative to the ground as the tricycle is pedaled. Due to the triangular periphery of the track **192**, the axle **198** also moves back and forth horizontally relative to the support **182**. The amplitude of this horizontal movement is substantially greater than the amplitude of the vertical movement of the axle **198**, the path of the axle **198** relative to the support **182** being elliptical and generally parallel to and concentric with but slightly smaller than the elliptical slot **200**. This causes a movement of the pedals such as to give the effect of galloping, to a child. The pedal arms **202** and **204**, to provide as close to identical paths of the pedals as possible and also give the best torque relationships for pedaling, are preferably keyed to the shaft **198** in positions extending parallel to one of the sides **196**. However, the pedal arms can be arranged parallel to one of the spokes **194** or in any position between these two.

A cart **210** (FIG. 15) forming an alternate embodiment of the invention includes an elongated, generally triangular, constant width, roller-like wheel or track **212** supporting aligned rollers **214** supported by arms **216** bracketing the track **212**. The arms **216** are integral with sides

218 of cart body **220** which also includes ends **222**. The arms **216** and rollers **214** retain the track **212** on the cart even when the cart is lifted off the floor or ground. The cart **210** gives a pleasing oscillation of the track as the cart is pulled or pushed and may be shaped like a steam roller if so desired.

A cart **230** (FIGS. 16 and 17) forming an alternate embodiment of the invention includes a cart body **232** having a side **234** supporting axle devices **236** and **238** like the axle devices **21** and **22** (FIG. 1), respectively, and a track-like wheel or track **240** having a track body **242** and tread **244** like the track body **28** and tread **32**, respectively. A cap **246** having a triangular, inner flange **248** is secured rigidly to the track body **242** and forms a covered wheel therewith. If desired the cap may be formed integrally with the track body. The cap provides clearance for washers **250** and **252** of the axle devices **236** and **238**.

While in the above described toy carts and tricycle, the tracks have been illustrated as being of uniform width, the tracks may, of course, be of non-uniform width to provide an uneven travel or raising and lowering of the carts and/or tricycle if such an action is preferred. Obviously, many other modifications may be made without departing from the spirit and scope of the invention.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a toy vehicle,
a pair of polygonal, generally annular, non-circular, rigid track members,
a toy cart body having a pulling means,
axle means supporting the body and adapted to rest on and move along the inner peripheral portions of the rigid track member when the track members are supported by a supporting surface, and means retaining the track members in position at opposite sides of the toy cart body and permitting views from the sides of substantially the entire track members.

2. In a toy vehicle,
a generally triangular, annular track member of constant internal width having an inner periphery provided with three curved sides each of a predetermined radius and three curved corner portions joining the sides and each of a second predetermined radius substantially less than that of each side,
a lower axle having a radius not greater than the radius of the corner portions and resting on and movable along the bottom portion of the inner periphery of the track member,
an upper axle having a radius not greater than the radius of the corner portions and positioned directly above the lower axle in a postiion engaging the upper portion of the inner periphery of the track member and retaining the track member on the lower axle,
and vehicle frame means fixed to the axles in a position in which substantially the entire track member is visible from the vehicle frame means.

3. The toy vehicle of claim 2 wherein
each of the lower and upper axles has a radius substantially equal to that of the corner portions of the inner periphery of the track member.

4. The toy vehicle of claim 2 wherein
the vehicle frame means comprises a cart body.

5. The toy vehicle of claim 4 wherein the lower axle comprises an axle member fixed to the cart body,
and flanged roller means rotatable on the axle member.

6. The toy vehicle of claim 2 wherein the vehicle frame means and the track member are of different, contrasting colors.

7. The toy vehicle of claim 2 wherein the vehicle frame means comprises a tricycle fork.

8. The toy vehicle of claim 2 wherein

the track member has a tapered inner periphery,

the lower axle comprises a tapered, flanged driving pulley carried by the vehicle frame means and fitting over the lower portion of the inner periphery of the track member and supported thereby,

and including pedal means for rotating the drive pulley.

9. The toy vehicle of claim 8 wherein

the vehicle frame means includes a generally vertical fork,

the flanged pulley has sprocket teeth thereon,

the upper axle includes an upper flanged pulley carried by the fork,

and including a drive sprocket carried by the fork between the pulleys and adapted to be driven by the pedal means,

and a chain drivingly connecting the drive sprocket and the lower pulley.

10. The toy vehicle of claim 2 including an arm member forming a portion of the vehicle frame means and positioned at one side of the track member,

pedal means,

a drive shaft connected to the pedal means,

and spoke means connecting the drive shaft to the track member and positioned on the other side of the track member.

11. The toy vehicle of claim 10 wherein the arm member is provided with a slot through which the shaft projects and providing clearance for the shaft.

References Cited by the Examiner

UNITED STATES PATENTS

93,686	8/69	Dillaha	280—210
276,227	4/83	Crosby	280—47.34
436,844	9/90	Thorp	280—210
1,151,251	8/15	Eberhard	305—7
1,223,949	4/17	Flagg	280—229 X
1,446,799	2/23	Hunziker	280—47.34
1,487,128	3/24	Werdenhoff	305—6
1,561,918	11/25	Feddersen	280—229
1,985,681	12/34	Miller	301—37 X
2,189,232	2/40	Snell	280—282
2,786,540	3/57	Sfredda	305—60
2,790,503	4/57	Kopczynski	180—7

FOREIGN PATENTS

892,164	1/44	France.
980,314	12/50	France.
175,190	9/06	Germany.

MILTON BUCHLER, *Primary Examiner.*

KENNETH H. BETTS, A. HARRY LEVY, *Examiners.*