United States Patent

[11] 3,552,322

[72] Inventor Garth A. Clowes
Palos Verdes Estates, Calif.

[21] Appl. No. 762,575
[22] Filed Sept. 25, 1968
[45] Patented Jan. 5, 1971

[73] Assignee Eldon Industries, Inc.
Hawthorne, Calif.
a corporation of California

[54] TOY IN WHICH AN OBJECT IS MOVED ON A SURFACE
5 Claims, 6 Drawing Figs.

[52] U.S. Cl. 104/172, 273/86
[51] Int. Cl. B61b 13/12; A63f 9/14
[50] Field of Search 104/172; 273/173, 86.2, 86.6; 59/P

[56] References Cited
UNITED STATES PATENTS

1,556,819	10/1925	Hires	104/173
2,224,799	12/1940	Schmid	104/172
2,714,269	8/1955	Charles	59/P
2,786,680	3/1957	Northrop et al.	273/86.2

Primary Examiner—Arthur L. LaPoint
Assistant Examiner—Robert Saifer
Attorney—Edward D. O'Brian

ABSTRACT: A toy is disclosed with which objects may be moved on a track structure. Such a track structure includes an upper surface, an enclosed channel located beneath such a surface, and a groove connecting the channel with the surface. A drive structure is located within this channel which is sufficiently large so as to be incapable of passing through the groove. It includes a series of bodies which fit within the channel so as to be capable of being moved in the channel and a series of flexible links of smaller dimension than the bodies connecting at least some of the adjacent to said bodies. Means are provided for advancing the drive structures in the channel. An object to be moved on the upper surfaces of the track structure carries a projection which fits between adjacent to the bodies of the drive structure through the groove. Such an object will normally be a toy vehicle.

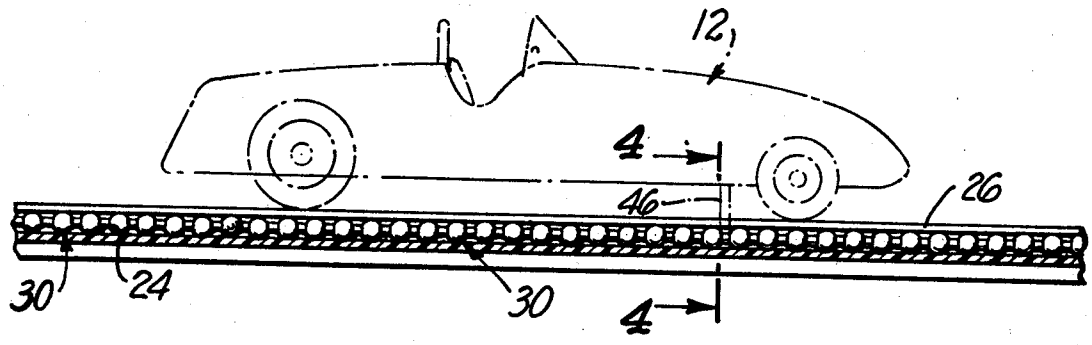


FIG. 1.

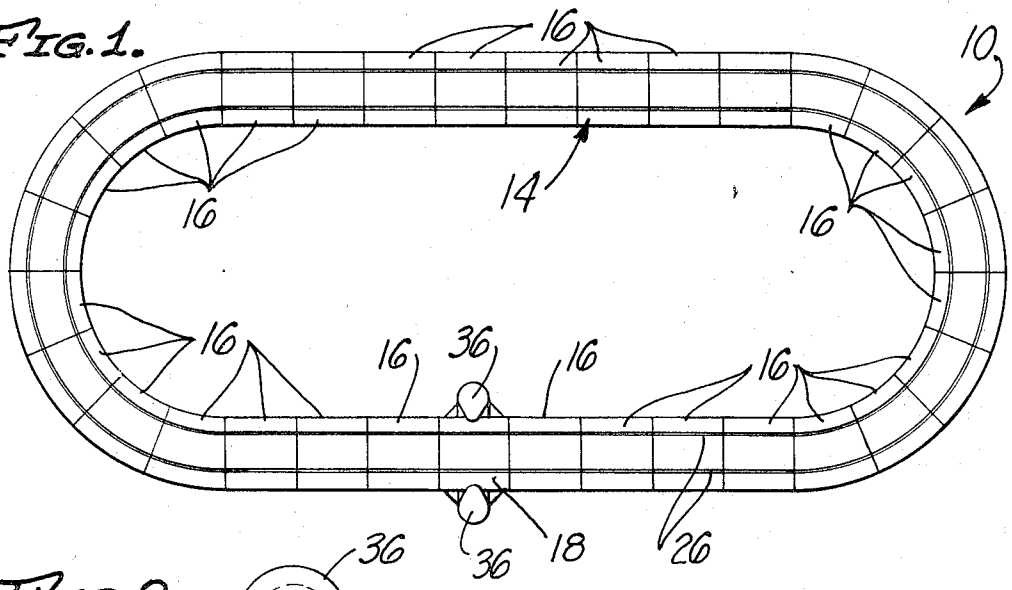


FIG. 2.

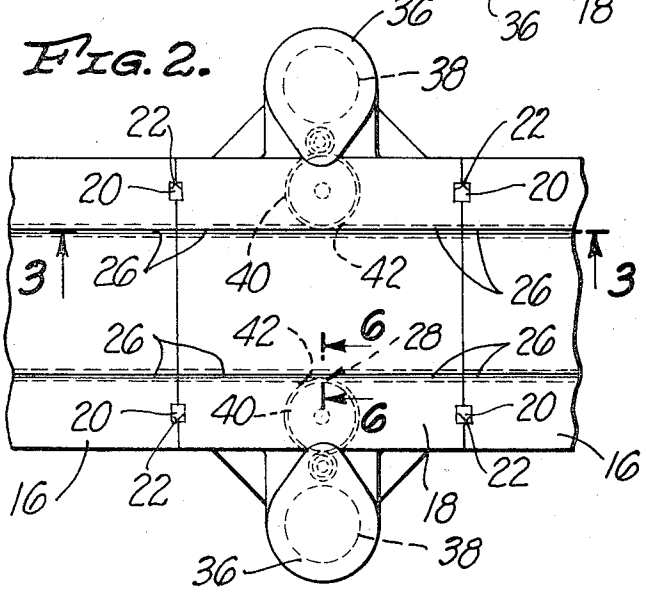


FIG. 4.

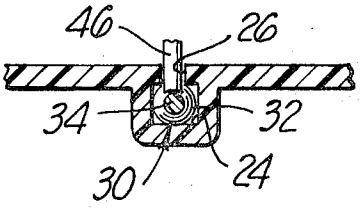


FIG. 6.

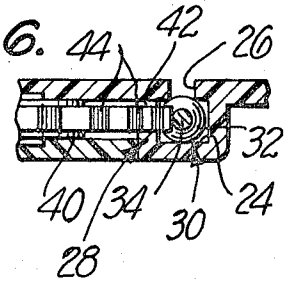


FIG. 3.

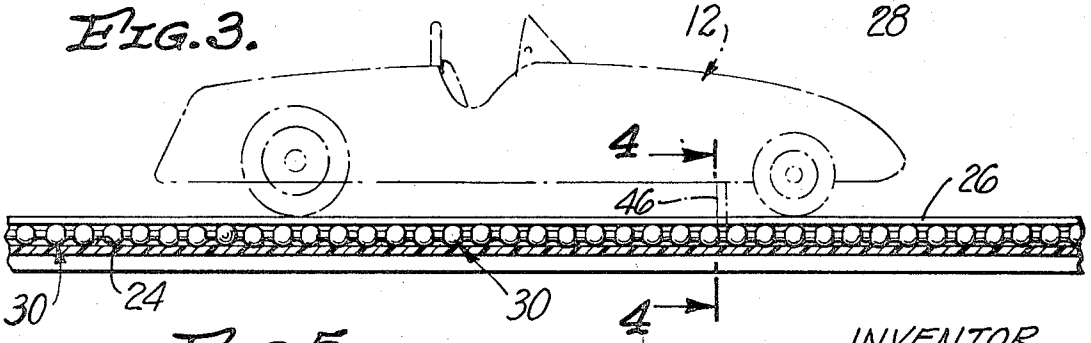
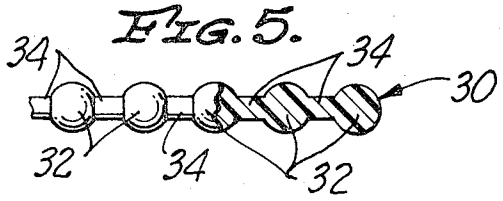


FIG. 5.



INVENTOR
GARTH A. CLOWES
BY
EDWARD D. O'BRIAN
ATTORNEY

TOY IN WHICH AN OBJECT IS MOVED ON A SURFACE

BACKGROUND OF THE INVENTION

A large number of different toys and amusement devices are known which propel objects such as vehicles by means of an interengagement between such an object or a projection extending from it and a movable drive member. Such drive members have been various types of endless belt structures, ratchetlike structures and the like. Because of the nature of these prior drive members, the nature of toys employing them have been undesirably limited.

This will be realized by referring to a toy in which a continuous endless belt is used for drive purposes. Such a belt was normally passed around pulleys or the like in propelling the vehicle in an endless pattern. Because of the nature of such pulleys and such a belt, toys of this type cannot be readily taken apart for storage purposes. Neither can they be readily assembled so that an object moved with such a toy can be moved along paths of different configurations. Neither can they be assembled so that the length of the endless path along which such an object is moved can be varied as desired for different play purposes. Similar considerations limit the utilization of common other different types of movable drive members than endless belts.

Toys such as are commonly referred to as road race sets enjoy a degree of flexibility which is not possessed by various toys of the type indicated in the preceeding. In such road race sets individual toy cars are propelled with respect to a track through the use of electric motors in such vehicles. These motors obtain power by means of brushes from conductors located on the track used. Such a track is normally of a sectional character permitting the individual track section to be assembled in a path of any desired length or configuration. Such road race toys are of course highly acceptable commercially. However, they are limited by the fact that specialized toy vehicles containing electric motors must be utilized with them.

SUMMARY OF THE INVENTION

An objective of this invention is to provide new and improved toys in which an object can be moved or propelled along a surface which incorporates the advantages of so-called road race type toys as are indicated in the preceeding discussion and which also incorporates the advantages of toys in which objects such as vehicles are moved by contact with a movable drive member. An object of this invention is also to provide toys of this type in which the path which such an object may take is not as limited as with a conventional toy moving or propelling an object by inner engagement with a movable driving member and can in fact be varied or altered as may be desired for toy purposes. An object of this invention is also to provide toys which can be used with various objects such as toy vehicles which are constructed in a simple, inexpensive manner.

The invention is also intended to provide new and improved toys in which an object such as an inexpensive model vehicle can be moved or propelled along a surface which are relatively inexpensive to construct, which are capable of being satisfactorily used over a relatively prolonged period, and which are extremely effective for toy purposes. Such effectiveness is considered to be directly related to the facts that the toys of this invention can be assembled in different configurations and can be used so that objects such as inexpensive toy model vehicles sold by different manufacturers can be propelled or moved over a track laid out in virtually any desired configuration or path.

In accordance with this invention these objectives are achieved by providing toys each of which includes an endless track having a surface, an enclosed endless channel located beneath the surface and a groove connecting the channel to the surface. The groove employed in a toy of this invention is of smaller width than the channel. In a toy of this invention a drive structure is located in the channel. Such a drive structure includes a series of bodies which are sufficiently large so as to be incapable of moving out of the channel through the groove and a series of flexible links connecting at least some of the adjacent of said bodies. Means are provided for advancing the drive structure within the channel employed in a particular toy.

With this type of toy a projection may be located on an object such as the known model vehicle and such a vehicle may be located on the track structure with the projection extending through the groove into the channel so as to fit between two adjacent bodies on the drive structure. Then, as the drive structure is moved or advanced, such an object or vehicle will be moved completely around the track structure. Preferably such a track structure is composed of a plurality of individual track sections connected together in any convenient, conventional manner.

Preferably the drive structure consists of a series of individual drive members, each of which includes a series of such bodies and links connected together. When a series of drive members are employed in this manner and when an individual one of the drive members is moved or advanced through the channel this particular drive member will transmit force to the next adjacent drive member, advancing it, and it in turn will transmit force to the following adjacent drive member and so on, causing the entire drive structure to move in the channel along a path determined by the manner in which the individual track section has been assembled. To accomplish this type of objective the drive members must substantially fill the complete channel defined by all of the track sections.

BRIEF DESCRIPTION OF THE DRAWINGS

The aforenoted and various other objectives of this invention as well as many specific advantages of it will be apparent from a detailed consideration of the remainder of this specification, the appended claims and the accompanying drawing in which:

FIG. 1 is a top plan view of a presently preferred embodiment or form of a toy of this invention;

FIG. 2 is an enlarged partial top plan view of a part of the toy shown in FIG. 1;

FIG. 3 is a partial sectional view taken at line 3–3 of FIG. 2;

FIG. 4 is a partial sectional view taken at line 4–4 of FIG. 3;

FIG. 5 is an enlarged side-elevational view, partially in section, of a part of a drive member used with the toy; and

FIG. 6 is a partial cross-sectional view taken at line 6–6 of FIG. 2.

From a detailed consideration of this drawing and of this entire specification, it will be realized that numerous changes may be made within the precise structure illustrated without departing from the essential features or character of this invention through the use of exercise of routine engineering skill or ability. For this reason the accompanying drawing is not to be taken as limiting this invention in any respect.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing there is shown toy structure **10** which is intended to be used in moving an object such as a toy car **12** around a complete endless track structure **14**. This track structure **14** is composed of a plurality of track sections **16**, some of which are curved and some of which are straight, and a differently constructed track section **18** used in supplying mechanical power as hereinafter indicated. These sections **16** and **18** may be connected with one another in any convenient known or conventional manner so that their upper surfaces are coplanar and in effect define the track structure **14**. In the particular embodiment of the toy structure **10** illustrated the individual sections **16** and **18** are connected by spring like U-shaped clips **20** which extend through openings **22** in adjacent of the sections **16** and **18**. It is to be understood that the manner of connecting of these sections **16** and **18** is unimportant as far as this invention is concerned.

The various sections 16 and 18 are formed so as to include bottom channels 24 as are indicated in FIGS. 3, 4 and 6 of the drawing. In the illustrated embodiment of the invention these channels 24 are of a rectilinear internal cross-sectional configuration. If desired, however, they may be of a circular, elliptical or other internal configuration. The channels 24 are formed so as to extend in the sections 16 and 18 between the ends of these sections which abut against one another as the entire structure 10 is assembled by connecting the sections 16 and 18 using the clips 20. All of the channels 24 in all of the sections 16 and 18 are of a uniform cross-sectional configuration.

In the embodiment of the toy 10 illustrated, each of the sections 16 and 18 contains two of the channels 24, and the channels 24 in each sections 16 and 18 are parallel to one another. Each of the channels 24 employed is connected at its top to the top of the section 16 and 18 upon which it is located by a comparatively narrow groove 26. From this it will be seen that the grooves 26 extend to the surfaces of the sections 16 and 18 which in effect define the track structure 14. The widths of the grooves 26 is uniform and are less than the widths of the channels 24 for the purpose of holding in the track in the channels 24 what is referred to herein as a drive structure 28.

In the preferred embodiment of the invention this drive structure 28 consists of a plurality of individual drive members 30, each of which includes a series of bodies 32 and a series of links 34 connecting adjacent of the bodies 32. The bodies 32 in the embodiment shown are shaped substantially as spheres and are dimensioned so as to fit closely within the interior of the channels 24 and are sufficiently large so as to be incapable of moving out of the groove 26. The links 34 as illustrated are essentially rodlike connecting structures which are capable of flexure as in going around a curve in one of the channels 24 in one of the sections 16.

The particular member drives 30 described may be easily and conveniently manufactured by common injection molding techniques so that the bodies 32 are integrally formed with the links 34. When this is done using certain conventional polymers such as various polyolefins, common grades of nylon and the like, the bodies 32 will be sufficiently large and bulky so as to not bend or deflect during the operation of the complete toy structure 10, and the links will be sufficiently flexible so as to bend in going around a curve, but will still be sufficiently strong so that they are capable of transmitting motion from one of the bodies 32 to an adjacent body 32 when a drive member 30 is either pushed or pulled within a channel 24.

It is to be understood that the drive structure 28 may be varied in a number of different ways in use in a toy of this invention and that the description of the particular drive structure 28 illustrated is not to be taken as limiting this invention. The drive member 30 or members 30 utilized may be constructed in a variety of different ways. A common bead chain appearing much like a drive member 30 illustrated may be employed. Similarly a drive member 30 used may be constructed much like a common band saw blade so as to have peaks separated by notches. In this case the peaks correspond to the bodies 32 herein described and the area of reduced section at the notches corresponding to the links herein described. Any such drive member 30 should preferably be utilized in a channel 24 as described having a restricted groove like opening preventing the drive member 30 employed from getting out of this channel 24.

With the structure 10 a single drive member 30 can at least in theory be employed, but this is not considered preferable because of assembly and disassembly problems in connection with this complete structure 10. When such a single drive member 30 is used as the entire drive structure 28, it is necessary that it extends the entire length of the path created by the contiguous channels 24 in the sections 16 and 18. Preferably these drive members 30 correspond approximately in length to the lengths of the individual section 16 and 18 so as to facilitate assembly and disassembly of these sections 17 and 18. It is to be understood, however, that they may be longer or shorter as may be desired.

When the drive members 30 are formed as indicated in the drawing as a single unitary body, they may be easily cut to any desired length necessary for use in a toy structure such as the structure 10 through the use of scissors, knives, and the like. This is considered to be highly advantageous when individual sections 16 are assembled with a section 18 in some unusual or nonstandard type of pattern.

The particular section 18 utilized carries two housings 36, each of which is provided with an internal gear motor 38 used to drive a spur gear 40. The gears 40 are rotatably mounted on the section 18 under the surface of this section 18 so as to each extend through an opening 42 into a channel 24 in this section 18. The gears 40 are arranged so that the individual teeth 44 on these gears 40 are spaced from one another a distance corresponding to the lengths of the links 34 on the drive member 30. As a result of this construction, when electric power is supplied to a gear motor 38 the drive member 30 in the corresponding channel 24 is engaged by a gear 40 so as to be forced against the wall of the channel 24 opposite the teeth 44 on this gear 40 so that as this gear 40 rotates the drive member 30 is pushed and/or pulled through the channel 24 in the section 18 and/or the channels 24 in any adjacent sections 16.

As this occurs a body 32 at one end of a drive member 30 will engage a body 32 at an adjacent and of the next adjacent drive member 30, pushing this second drive member 30 along through the contiguous channels 24 in the sections 16. In this manner one drive member 30 will cause movement of the next adjacent drive member so that all of the drive members are moved within the toy structure 10. A similar type of pushing action is achieved when a link or a vestige thereof extends from one of the drive members 30 as the end of it. After any such drive member 30 is engaged by a gear 40 it is of course pulled past this gear.

In use an object such as a toy model vehicle 12 is located upon the race structure 10 in such a manner that a projection 46 extends from such a vehicle 12 through a groove 26 into a channel 24 so as to fit between two adjacent of the bodies 32. Toy cars corresponding to the vehicle 12 can be built so as to include a projection 46. When desired such a projection 46 can easily be fastened to existing toy cars by any convenient mechanical means. The projection 46 used must of course be of smaller width than the grooves 26 in the sections 16 and 18 and must be dimensioned so as to be capable of fitting between the bodies 32 on the drive member 30.

When the complete toy structure 10 is so assembled with an object such as the vehicle 12, such an object may be advanced around the track structure 14 through the operation of an appropriate motor 38 so as to cause the complete drive structure 28 to move or advance. As this occurs a vehicle 12 as shown is moved because the projection 46 on it fits between bodies 32 on a drive member 30 forming a part of the complete drive structure 28. Such a motor may be connected to an appropriate electric power source directly or may be connected to an electric power source through a conventional variable resistor or other device used to control the speed of a motor. When both of the motors 38 in the toy structure 10 are connected to such devices for controlling their speed, this entire toy structure 10 may be used as a road race set in which one or more toy vehicles are operated through the operation of the drive structures 28 in the different sets of channels 24 illustrated.

From a consideration of the preceding it will be realized that one advantage of the toy structure 10 is that different toy vehicles such as might be obtained from different manufacturers can be used with this toy structure. This is considered to enhance play value. Such play values are also considered to be enhanced by the fact that the individual sections 16 and 18 used in any particular toy structure 10 can be assembled in various different manners so as to simulate different types of roads and the like, as may be desired.

The fact that the drive members 30 may be easily cut to desired lengths is considered to facilitate such assembly of the complete toy structure 10. It will be, of course, realized that

the toy structure **10** may be easily taken apart for storage. The inherent flexibility of the drive members **30** illustrated facilitates such disassembly even if an end of one of the drive members **30** is not contiguous with a particular joint between sections **16** being disassembled. The spherical shapes of the bodies **32** on the drive members **30** shown are considered to facilitate these drive members **30** being engaged by the gears **40** employed.

Because of the nature of this invention, it is to be considered to being limited solely by the appended claims forming a part of this disclosure. Those skilled in the art will realize that a variety of differently appearing and somewhat differently constructed toys can be created on the basis of the disclosure embodied herein by routine engineering skill in the toy field.

I claim:

1. A toy structure which includes:

an endless track structure having a surface;

an enclosed endless channel located beneath said surface in said track structure;

said groove being of smaller width than said channel;

a drive structure located in said channel;

said drive structure being sufficiently large so as to be incapable of passing through said groove and being movable through said channel;

said drive structure including a plurality of separate drive members substantially filling said groove, each of said drive members having a series of bodies and a series of flexible links connecting at least some of the adjacent of said bodies;

said links being smaller than said bodies;

means for advancing said drive structure through said channel located on said track structure and extending into said channel; and

said means for advancing said drive structure, engaging one of said drive members at a time so as to cause the driven drive member to push the other of said drive members through said channel.

2. A toy as claimed in claim **1** wherein each of said drive members is a unitary body formed of a polymer composition which is flexible in a member of comparatively small cross-sectional configuration and which is substantially inflexible when present in a body of larger cross-sectional configuration.

3. A toy as claimed in claim **1** wherein:

said means for advancing including a gear;

the teeth in said gear being capable of being located between the bodies on said drive structure; and

means for rotating said gear.

4. A toy structure a s claimed in claim **1** wherein:

said track structure is composed of a plurality of sections secured to one another;

each of said sections contains a channel and a groove; and

said channels and said grooves in said sections being in communication so as to define said channel and said groove in said track section.

5. A toy structure as claimed in claim **1** wherein:

said track structure is composed of a plurality of sections secured to one another;

each of said sections contains a channel and a groove;

said channels and said grooves in said sections being in communication so as to define said channel and said groove in said track section;

each of said drive members is a unitary body formed of a polymer composition which is flexible on a member of comparatively small cross-sectional configuration and which is substantially inflexible when present in a body of larger cross-sectional configuration;

said means for advancing including a gear,

the teeth in said gear being capable of being located between the bodies on said drive structure; and

means for rotating said gear.

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,552,322 Dated January 5, 1971

Inventor(s) GARTH A. CLOWES

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In column 3, line 73, the numeral "17" should be --16--;

In column 5, after line 19, the following clause should be inserted:

--an endless groove located in said track structure connecting said channel to said surface;--

Signed and sealed this 23rd day of March 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents