TRACK DEVICE

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a track device, in particular, a track device which can move a plurality of parts by the torque of the driving wheels of a self-propelled running toy. By the term of "operating members", we mean operating members excluding power transmission parts herein.

Earlier Development

A conventional track device for a running toy, e.g., a self-propelled train toy, which stops mechanically the propelled train toy on the track surface has been already known. Then, the track device moves only one operating member by using the torque of idle rollers turned by the driving wheels hereof. In this case, as an example of the operating member, a bell may be given. Some types of track devices are known, which rings the bell by the torque of the driving wheels of the self-propelled train of the track device.

Regarding the track devices as described above, there are problems that the track device cannot provide a

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significantly attractive effect, because the track devices can move only one operating member by the torque of the idle roller turned by the rotation of the driving wheels.

SUMMARY OF THE INVENTION

The present invention was developed in the view of the above problems.

That is, an object of the invention is to solve the problems caused by the conventional track device.

Another object of the invention is to provide a track device which can move a plurality of operating members by the torque of the driving wheels.

A further object of the invention is to provide a track device which move the plural operating members through a relatively simple mechanism.

That is, in accordance with one aspect of the present invention, the track device comprising: a stopping position track member which is connectable to a track piece for a self-propelled running toy having a wheel and can stop and restart the running toy and which comprises a power transmission member for transferring a torque of the driving wheel of the running toy when the running toy stops at a stop position of the stopping position track member, and a plurality

of operating members which are operated by the torque transferred through the power transmission member.

By the track device, the significantly dynamic and attractive track device will be accomplished, because the track device moves a plurality of operating members by the torque of the driving wheels of the self-propelled running toy.

Preferably, in the track device, the power transmission member comprises a ring gear which can rotate by the torque of the driving wheel of the self-propelled running toy. The ring gear may comprise a cam for operating the plurality of operating members.

According to the track device having such a structure, because the power transmission member comprises a ring gear which can rotate by the torque of the driving wheel, it is possible to operate other power transmission members and/or a plurality of operating members according to the rotation of the ring gear, by arranging these members separately from one another along the circumference of the ring gear. Therefore, the mechanism or structure would be simpler, in comparison with the case that the torque is transferred from a plurality of transferring members to the plurality of operating members respectively.

The plurality of operating members may comprise a seesaw member which is operated by the cam of the ring gear.

According to the track device having such a structure, because the track device comprises the seesaw member which is operated by the cam, it is possible to amplify the small power of the self-propelled running toy by the leverage. It is also possible to change freely the stroke of the movement of the operating members.

Preferably, the plurality of operating members comprise a seesaw member which is operated by the cam of the ring gear, and a plurality of stages which can be moved up and down by an operation of the seesaw member.

According to the track device having such a structure, for example, if various types of dolls are placed on the stages, respectively, the various types of dolls are moved up and down in accordance with the rotation of the ring gear. Accordingly, it is possible to provide an attractive toy.

Preferably, the cam is provided on a lower surface of the ring gear and an end of each arm of the seesaw members can be engaged with the cam so that the other end of the arm of the engaged seesaw member lifts up a corresponding one of the stages. It may provide a plurality of cams on the lower surface of the ring gear.

The track device may comprises: a stopper to stop the self-propelled train toy at a stop position, idle rollers which

transfer the torque received from the driving wheels to the power transmission members, wherein the disposition of the idle rollers corresponds to the disposition of the driving wheels of the self-propelled train toy which is stopped by the stopper.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not intended as a definition of the limits of the invention, and wherein;

FIG. 1 is a perspective view of the track device according to an embodiment of the invention and the periphery thereof;

FIG. 2 is a perspective view from the lower side, of the train toy of the track device according to the embodiment;

FIG. 3 is a perspective view of the upper frame of the track device according to the embodiment;

FIG. 4 is a perspective view of the lower frame of the track device according to the embodiment;

FIG. 5 is a perspective view of the rocking body of the track device according to the embodiment;

FIG. 6 is a partial view of the power transmission mechanism of the track device according to the embodiment;

FIG. 7 is a perspective view from the lower side, of the ring gear of the track device; and

FIG. 8 is a view showing the engagement relationship among the ring gear and other power transmission parts, the up and down lever and the stages, of the track device according to the embodiment.

PREFERRED EMBODIMENT OF THE INVENTION

The following is the explanation of embodiments according to the track device of the invention.

FIG. 1 is a perspective view of a track device 1 according to an embodiment of the invention. Two track pieces are connected to the both sides of the track device 1. The track device 1 and the two track pieces form a track for a self-propelled train toy (running toy) 2.

According to the track device 1, a stopper 3 stops the self-propelled train toy 2 at an appointed stop position. Then the torque of driving wheels 2a of the train toy 2 is used to move three stages 4a, 4b and 4c up and down by turns. The stages 4a, 4b and 4c are positioned in holes 5a, 5b and 5c which are formed in three stump-shaped projections, respectively and move up and down in the holes 5a, 5b and 5c. On the stages 4a, 4b and 4c, objects, e.g., various types dolls or the like (not shown) can be placed. The dolls on the stages 4a, 4b and

4c appear from and disappear into the holes 5a, 5b and 5c repeatedly in accordance with the up-down movement of the stages 4a, 4b and 4c.

The stoppage of the train can be released by the handling an operating lever 6 to make the train toy restart running. Switching the operating lever 6 to a predetermined side, the train can pass through the appointed position (stop position) without stopping.

Next, the structure according to an example of the train toy 2 will be explained.

The train toy 2 comprises a battery, a motor driven by the battery and a power transmission mechanism which are not shown in the figures and which transfers the torque of the motor to the driving wheels 2a. A stopping plate 2b is attached to the lower surface of the track toy 2, as shown in the FIG. 2.

Then, the track device 1 will be explained. The outer frame of the track device 1 comprises an upper frame 7, as shown in the FIG. 3, and lower frames 8 and 9, as shown in the FIG. 4. The upper frame 7 is set onto the lower frame 8 and 9, as shown in the FIG. 1. The upper frame 7 comprises track portions, platform portions and a field portion which are integrated. The lower frame 8 corresponds to the track portions and the platform portions of the upper frame 7, and the lower frame 9 mainly corresponds to the field portion of

the upper frame 7.

In the field portion of the upper frame 7, the three through holes 5a, 5b and 5c are formed. In the track portion of the upper frame 7, rectangular through holes 10a and 10b are formed at approximately central positions of two tracks on which the driving wheels of the train toy run. Further, a through hole 10c for a stopper 3 to get out of there is formed in the track portion at a position between the rectangular through holes 10a and 10b. In the platform portion opposite to the field portion, of the upper frame 7, a through hole 10d for a operating lever 6 is formed.

A. STOP AND RELEASE MECHANISM FOR TRAIN TOY

As shown in FIG. 5, the track device 1 comprises a rocking body 11 having the stopper 3 in the inner side of the track device 1 so that the rocking body 11 can rock around a horizontal shaft 11a. Because the stopper 3 can protrude from the through hole 10c, it is possible to stop the running train toy 2 reliably at a predetermined stop position. When the train toy 2 is stopped at the stop position by the stopper 3, the driving wheels 2a of the train wheels 2 position at the rectangular through holes 10a and 10b. When the stopper 3 protrudes from the hole 10c, the stopper 3 is caught by the stopping plate 2b of the train toy 2. On the contrary, when the stopper 3 dose not protrude from the hole 10c, the stopper 3 is not caught

by the stopping plate 2b of the train toy 2 and thereby the train toy 2 can pass through the track portion of the upper frame 7.

The handling of the operating lever 6 can control the rocking movement of the rocking body 11. The operating lever 6 protrudes from the through hole 10d and can be swung around the shaft 6a, as shown in the FIG. 5. The operating lever 6 has a cam 6b attached thereto and the rocking body 11 is pressed in a rotational direction by a spring 12 so that the lower surface of an end of the rocking body 11 is always in contact with the upper surface of the cam 6b. The surface of the cam 6b is curved to have gradually varied radii of curvature according to the position. Therefore, by switching the operating lever 6 to one side, the rocking body 11 pushes down the stopper 3 below the track surface. On the contrary, by switching the operating lever 6 to the other side, the spring 12 pushes up the stopper 3 of the rocking body 11 from the track surface.

B. MECHANISM FOR MOVING THE STAGE UP AND DOWN

In the inner side of the track device 1, idle rollers 13a and 13b are fixed to one side of a shaft 14, as shown in FIG. 6. A portion of each idle roller 13a or 13b is exposed from the rectangular through hole 10a or 10b. The idle rollers 13a and 13b enable holding the train toy 2 on the track device

1 with rotating the driving wheels 2a of the train toy 2.

A gear 15 which is attached to the other end of the shaft 14, engages with a crown gear 17 which is fixed on and supported by the lower end of the shaft 16, as shown in the FIG. 6. A gear 18 which is attached to the upper end of the shaft 16, engages with the outer teeth of a ring gear 19.

Therefore, when the idle rollers 13a and 13b are rotated, the ring rear 19 is rotated through the shaft 14, the gear 15, the crown gear 16 and the gear 18. The ring gear 19 comprises a ring cam 20 having two downward protruding portions on the lower surface thereof, as shown in the FIG. 7. The number of the protruding portions may be changed.

On the other hands, the track device 1 comprises three up-down levers (i.e., seesaw members) 21a, 21b and 21c under the ring gear 19, as shown in the FIG. 4. Each of the up-down levers 21a, 21b and 21c acts like a seesaw. The ring cam 20 of the ring gear 19 is in contact with the upper surface of each one end of the arms of the up-down levers 21a, 21b and 21c, as shown in FIG. 8. Therefore, the heights of the one ends of the arms of the up-down levers 21a, 21b and 21c vary depending on the points where the ring cam 20 is in contact with the up-down levers 21a, 21b and 21c, simultaneously. The upper surfaces of the other ends of the arms of the up-down levers 21a, 21b and 21c are in contact with the lower end

surfaces of the stages 4a, 4b and 4c, respectively. As a result, the stages 4a, 4b and 4c move up and down in accordance with the seesaw movement of the up-down levers 21a, 21b and 21c. The number of the up-down levers (i.e., seesaw members) may be changed.

The three stages 4a, 4b and 4c are arranged in the three through holes 5a, 5b and 5c, respectively. The three stages 4a, 4b and 4c move up and down along with the direction of the holes 5a, 5b and 5c, according to the seesaw movement of the up-down levers 21a, 21b and 21c.

To the stages 4a, 4b and 4c, rods 23a, 23b and 23c are attached, respectively, as shown in FIG. 8. The rods 23a, 23b and 23c are supported by rod bearing 24a, 24b and 24c which are provided on the lower frame 9, respectively.

In the track device 1 according to the above-described embodiments, the self-propelled train toy 2 which runs on the track, is stopped mechanically by the stopper 3. During the train toy 2 is stopped by the stopper 3, the driving wheels 2a of the train toy 2 are held by the idle rollers 13a and 13b while keeping the rotation of the driving wheels 2a. The torque of the driving wheels 2a rotates the idle rollers 13a and 13b. The torque of the idle rollers 13a and 13b rotates the ring gear 19. The rotation of the ring gear 19 moves up and down the stages 4a, 4b and 4c suitably. In the embodiments, on the stages 4a, 4b and 4c, various types of three dolls or the like

can be placed, and thereby the three dolls or the like can be moved up and down indirectly by using the torque of the driving wheels 2a of the train toy 2.

Although some embodiments of the invention have been explained as described above, it should also be understood that the present invention is not limited to the embodiments and that various changes and modifications may be made to the invention without departing from the gist thereof.

The track device of the present invention comprises: a stopping position track member which is connectable to a track piece for a self-propelled running toy having a wheel and can stop and restart the running toy and which comprises a power transmission member for transferring a torque of the driving wheel of the running toy when the running toy stops at a stop position of the stopping position track member, and a plurality of operating members which are operated by the torque transferred through the power transmission member. As a result, the significantly dynamic and attractive track device will be accomplished, because the track device moves a plurality of operating members by the torque of the driving wheels of the self-propelled running toy.

What is clamed is:

1. A track device comprising:

a stopping position track member which is connectable to a track piece for a self-propelled running toy having a wheel, to run thereon and can stop and restart the running toy and which comprises a power transmission member for transferring a torque of the driving wheel of the running toy when the running toy stops at a stop position of the stopping position track member, and

a plurality of operating members which are operated by the torque transferred through the power transmission member.

2. The track device as claimed in claim 1, wherein the power transmission member comprises a ring gear which can rotate by the torque of the driving wheel of the self-propelled running toy, to operate the plurality of operating members.

3. The track device as claimed in claim 2, wherein the ring gear comprises a cam for operating the plurality of operating members.

4. The track device as claimed in claims 3, wherein the plurality of operating members comprise a seesaw member which is operated by the cam of the ring gear.

5. The track device as claimed in claim 3, wherein

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the plurality of operating members comprise a seesaw member which is operated by the cam of the ring gear, and a plurality of stages which can be moved up and down by an operation of the seesaw member.

6. The track device as claimed in claim 4, wherein a length of an arm of the seesaw member is changeable.

7. The track device as claimed in claim 5, wherein each of the plurality of stages is moved up and down by a corresponding one of the seesaw members which are operated by the cam of the ring gear according to a rotation of the ring gear.

8. The track device as claimed in claim 7, wherein the cam is provided on a lower surface of the ring gear and an end of each arm of the seesaw members can be engaged with the cam so that the other end of the arm of the engaged seesaw member lifts up a corresponding one of the stages.

9. The track device as claimed in any one of the proceeding claims, comprising:

a stopper to stop the self-propelled running toy at a stop position,

idle rollers which transfer the torque received from the driving wheels to the power transmission members,

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wherein the disposition of the idle rollers corresponds to the disposition of the driving wheels of the self-propelled running toy which is stopped by the stopper.

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