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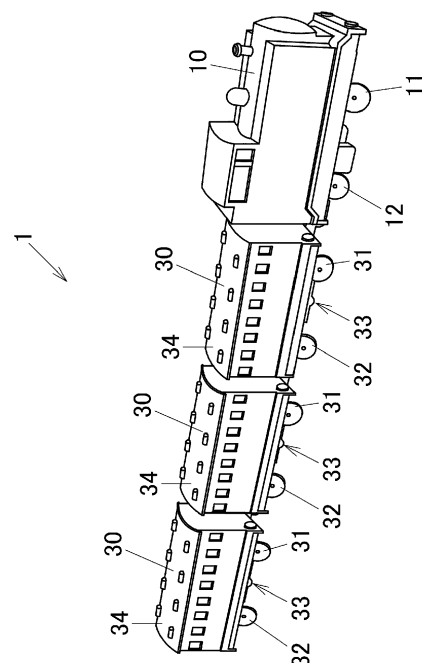
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(54) **CONNECTED RUNNING TOY**

(57) A connected running toy is provided including a connected vehicle hauled by a driving vehicle, the connected vehicle includes a bogie and a casing, and the bogie has a front wheels support member turning on a running surface about a vertical shaft, which supports rotatably a front axle on which front wheels are provided and on which a movable coupling portion is formed to project forwards to be coupled with another vehicle, a rear wheels support member turning on the running surface about a vertical shaft and which supports rotatably a rear axle on which rear wheels are provided, a front link member fixed to the front wheels support member, a rear link member connected to the front link member and fixed to the rear wheels support member and a fixed coupling portion projecting in an opposite direction to the driving vehicle to be connected to a further vehicle.

FIG.1



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Description

[0001] The present invention relates to a connected running toy which copies a train, for example.

[0002] Conventionally, connected running toys which copy a train and the like have been proposed in which a plurality of toy vehicles are connected together for running without laying a track of rails. For example, in a connected running toy disclosed in Japanese Unexamined Utility Model Publication No. H6-44596, a coupling at the rear of each connected vehicle having front wheels and rear wheels is connected to the rear wheels via a cam barrel or a gear so that the coupling can swing. Consequently, when this connected running toy is pushed manually to run, each connected vehicle is swung to the left or right with respect to a traveling direction by the swinging coupling so that a snaking operation is performed.

[0003] Additionally, Japanese Patent Publication No. 5411797 proposes a connected running toy which includes a preceding vehicle and a driving vehicle which is connected to a rear end of the preceding vehicle. A front axle of the preceding vehicle is a turning axle which is formed so as to turn on a running surface about a vertical shaft. Then, the driving vehicle runs while leaning to the left or right by the action of an eccentric cam which is connected to a power spring functioning as a drive source and a leaning operation rod. Consequently, when this connected running toy runs, in the event of the driving vehicle leaning to the left, the turning axle, which is the front axle of the preceding vehicle, turns to the left, while in the event of the driving vehicle leaning to the right, the turning axle turns to the right. Thus, the connected running toy is allowed to run while snaking.

[0004] In a connected running toy disclosed in Japanese Unexamined Utility Model Publication No. H6-44596, front wheels and rear wheels are fixed or not steerable. Consequently, even though each connected vehicles is swung to the left or right by a coupling which is formed so as to swing, the each connected vehicles slides to the left or right and cannot snake smoothly. As disclosed in Japanese Patent Publication No. 5411797, even though the front wheels of the vehicle are fitted on the axle which can turn, there is caused a difference in radius between paths traced by the inner front wheel and the inner rear wheel when turning. Consequently, in the event of a plurality of connected vehicles being involved, the turning radius of the front connected vehicle differs from the turning radius of the rear connected vehicle, whereby it becomes difficult for the connected running toy to run while snaking smoothly.

[0005] An aim of the present invention is to provide a connected running toy which can run smoothly even when the toy is snaking.

[0006] A connected running toy according to the invention has a driving vehicle and a connected vehicle which is hauled by the driving vehicle, and the connected vehicle has a bogie and a casing which is provided on the bogie. The bogie has a front wheels support member

which is formed to turn freely on a running surface about a vertical shaft, which supports rotatably a front axle on which front wheels are provided and on which a movable coupling portion is formed so as to project towards the driving vehicle to be coupled with a coupling portion of another vehicle, a rear wheels support member which is formed to turn freely on the running surface about a vertical shaft and which supports rotatably a rear axle on which rear wheels are provided, a front link member which is fixed to the front wheels support member, a rear link member which is connected to the front link member and which is fixed to the rear wheels support member, and a fixed coupling portion which projects from a rear portion of the bogie in an opposite direction to the direction towards the driving vehicle to be connected to a coupling portion of a further vehicle.

[0007] Preferably, in the front wheels support member, a front rotational shaft which is provided so as to rise from a front wheels support portion which supports the front axle rotatably is supported rotatably on the bogie, and in the rear wheels support member, a rear rotational shaft which is provided so as to rise from a rear wheels support portion which supports the rear axle rotatably is supported rotatably on the bogie.

[0008] Advantageously, the front link member is fixed to an end portion of the front rotational shaft, and the rear link member is fixed to an end portion of the rear rotational shaft.

[0009] Preferably, the bogie has a weight member which is provided at a center thereof.

[0010] Advantageously, the bogie has wheel house portions which are formed therein to accommodate individually the front wheels and the rear wheels, and a lower surface edge of the bogie at each of the wheel house portions is formed into a convexly curved configuration.

[0011] Preferably, the driving vehicle has a receiver which receives a control signal which is sent from a transmitter, a steering unit which is formed to steer the front wheels, a drive unit which drives the rear wheels, and a control circuit which transmits the control signal to the steering unit and the drive unit to control both the steering unit and the drive unit.

[0012] The front wheels and the rear wheels which are formed so as to turn freely about the corresponding vertical shafts are connected to each other by the link members. The movable coupling portion projects from the front wheels support member which supports the front axle. Consequently, the front and rear wheels of the connected vehicle are steered individually through four-wheel steering. Namely, the front wheels are steered to turn as the movable coupling portions moves to the left or right, and when the front wheels are turned, the rear wheels are steered to turn in an opposite direction to the direction in which the front wheels are turned by the link members.

[0013] In the connected vehicle which is steered on the four wheels or is four wheel steered, the rear wheels are steered in the opposite direction to the direction in

which the front wheels are steered, and therefore, the front and rear wheels can be turned on almost the same loci or tracks, whereby the connected vehicle can turn within a small turning circle. Consequently, when the connected running toy to which the plurality of connected vehicle are connected is operated to snake, although the connected running toy is not operated to run on rails, the connected running toy is allowed to run to snake smoothly and neatly, and therefore, the playing quality of the connected running toy can be enhanced.

[0014] In the construction in which the front and rear wheels are turned freely on the running surface about the vertical shafts, the rotational shafts which are provided so as to rise from the support portions which respectively support the front and rear wheels are supported by the bogie, whereby the construction in which the front and rear wheels are turned can be formed with the simple configuration.

[0015] The front and rear link members are preferably fixed to the end portions of the corresponding rotational shafts. This enables the front and rear wheels to be connected together with the simple configuration, and the four-wheel steering construction can be attained.

[0016] The weight member is preferably provided on the bogie of the connected vehicle. This prevents the connected vehicle according to the invention which can turn within the small turning circle from losing its balance and thereby falling down due to a centrifugal force produced when the connected vehicle takes a turn.

[0017] At each of the wheel house portions where the front and rear wheels are accommodated individually, the lower surface edge of the bogie is preferably formed into the convexly curved configuration. This provides constant spaces between the front and rear wheels and the bogie while preventing the interference of edge portions of the wheel house portions with the corresponding front and rear wheels even when the front and rear wheels turn about the corresponding vertical shafts. Consequently, the narrow spaces can be defined constantly between the front and rear wheels and the bogie, and therefore, it is possible to reduce a risk of the spaces between the front and rear wheels and the bogie being clogged with dust or the like.

[0018] The connected running toy according to the invention can be made into a toy which can be run and steered through radio communication. This enables a player to enjoy operating the connected running toy more.

Fig. 1 is a perspective view showing a connected running toy according to an embodiment of the invention.

Fig. 2 is a block diagram showing the configuration of a driving vehicle according to the embodiment of the invention.

Fig. 3 is a perspective view showing a controller according to the embodiment of the invention.

Fig. 4A is a plan view of a bogie of a connected ve-

hicle according to the embodiment of the invention, and Fig. 4B is a bottom view of a bogie of a connected vehicle according to the embodiment of the invention.

Fig. 5 is a longitudinal vertical sectional view of the bogie of the connected vehicle according to the embodiment of the invention.

Fig. 6A is a plain view showing the operation of a link mechanism of the connected vehicle according to the embodiment of the invention, and Fig. 6B is a bottom view showing the operation of a link mechanism of the connected vehicle according to the embodiment of the invention.

[0019] Hereinafter, a preferred embodiment of the invention will be described based on the drawings. Fig. 1 is a perspective view showing an external appearance of a connected running toy 1 which can run on a running surface without laying rails. The connected running toy 1 is a toy which copies a train. A leading vehicle is a driving vehicle 10 which copies a locomotive. Three vehicles which copy a passenger carriage are connected to the rear of the driving vehicle 10. The connected running toy 1 is a toy which can be controlled to run and to be steered through radio communication by the use of a controller 50 (refer to Fig. 3).

[0020] Running and steering mechanisms shown in a block diagram of Fig. 2 are provided on the driving vehicle 10. A control signal transmitted from the controller 50 is received by a receiver 13. The control signal received by the receiver 13 is sent out to a control circuit 14 and is then sent out further to a steering unit 15 and a drive unit 16.

[0021] The steering unit 15 is connected to front wheels 11 of the driving vehicle 10. The front wheels 11 are steered to turn according to a control signal by the steering unit 15. The steering unit 15 can be configured, for example, by placing two permanent magnets with their magnet poles being laid opposing to each other and setting an electromagnetic coil between the permanent magnets.

[0022] As this occurs, the front wheels 11 are connected to a link member, and this link member is connected to a base plate on which the permanent magnets are placed and which can slide to the left and right. Then, when an electric current is caused to flow to the electromagnetic coil in a positive direction, the right permanent magnet is attracted by the electromagnetic coil, while the left permanent magnet is repulsed by the electromagnetic coil, whereby the driving vehicle 10 turns to the left in such way that the front wheels are turned to the left. On the contrary, when the electric current is caused to flow to the electromagnetic coil in an opposite direction, the driving vehicle 10 turns to the right in such a way that the front wheels are turned to the right. The front wheels 11 are biased at all times by an elastic member such as a spring in such a way that the front wheels 11 return to their central positions where the front wheels 11 face

straight ahead in a traveling direction of the driving vehicle 10. Thus, when no electric current flows to the electromagnetic coil, the driving vehicle 10 moves straight ahead.

[0023] In addition to this configuration, the steering unit 15 can also be made up of a servo mechanism using a servomotor.

[0024] The drive unit 16 is connected to rear wheels 12 of the driving vehicle 10. The drive unit 16 includes a motor, a battery and a gear or the like which transmits a driving force to the rear wheels 12. The drive unit 16 is controlled by a control signal so as to rotate the rear wheels 12 forwards or backwards.

[0025] Fig. 3 is a perspective view showing the controller 50. The controller 50 copies a controller of an actual electric train and has provided therein two steering rods 51, 52, a power supply switch 53 and a transmitter 17 which transmits a control signal. When switching on the power supply switch 53 and operating the steering rod 51 or 52, a corresponding control signal is transmitted from the transmitter 17 to the running and steering mechanisms of the driving vehicle 10, and the control signal is then received by the receiver 13 of the driving vehicle 10.

[0026] The driving vehicle 10 can be controlled to run and to be steered by the controller 50 as follows, for example. When the connected running toy 1 is turned to the right while it is moving straight ahead, the right steering rod 51 is pushed down to the front. When the connected running toy 1 is turned to the left while it is moving straight ahead, the left steering rod 52 is pushed down to the front. When the connected running toy 1 is caused to move straight ahead, the two steering rods 51, 52 are pushed down to the front at the same time. When the connected running toy 1 is reversed, the two steering rods 51, 52 are pulled down to the rear at the same time. When the connected running toy 1 is turned while it is being reversed, one of the steering rods is pulled down to a rear side. In this way, the driving vehicle 10 of the connected running toy 1 is run and steered.

[0027] The driving vehicle 10 of the connected running toy 1 hauls the three connected vehicles 30 which are connected thereto as shown in Fig. 1. The connected vehicles 30 each have a bogie which includes front wheels 31 and rear wheels 32. A housing 34 which exhibits a passenger carriage shape is provided on the bogie 33. The front wheels 11, 31 and the rear wheels 12, 32 of the driving vehicle 10 and the connected vehicles 30 are each made up of a resin wheel and a rubber ring which is mounted on the resin wheel to act as an anti-slip means.

[0028] Next, the bogie 33 of the connected vehicle 30 will be described based upon Figs. 4A, 4B and 5. Fig. 4A is a plan view of the bogie 33 and Fig. 4B is a bottom view of the bogie 33. Fig. 5 is a longitudinal vertical sectional view of the bogie 33. In Figs. 4A, 4B and 5, a right end of the bogie 33 denotes the front thereof (in other words, an end facing the driving vehicle 10).

[0029] The left and right front wheels 32 of the bogie 33 are fixed individually to ends of a front axle 35. The front axle 35 is supported rotatably by a front wheels support member 36. Specifically speaking, a rotatably supporting portion 36b is provided at a lower end of the front wheels support member 36 so as to extend between the left and right front wheels 31. A through hole 36a having a circular cross section is formed in the rotatably supporting portion 36b. The front axle 35 is supported rotatably by an inner circumferential surface of the through hole 36a. A movable coupling portion 36c projects towards the driving vehicle 10 from a position on an outer circumferential surface of the rotatably supporting portion 36b which lies at a center between the left and right front wheels 31. The movable coupling portion 36c is formed substantially into a flat plate. A connection hole 36c1 is provided in a front portion of the movable coupling portion 36c, and a connection pin 33c1 of a fixed coupling portion 33c, which will be described later, is inserted through this connection hole 36c1. A hole portion 36c2 is provided at a rear side of the connection hole 36c1, and a screw configured to fasten the casing 34 to the bogie 33 is inserted through this hole portion 36c1.

[0030] A front rotational shaft 36d having a cross section of a circular outline is provided so as to rise upwards from a position on the outer circumferential surface of the rotatably supporting portion 36b which lies at the center between the left and right front wheels 31. The front rotational shaft 36d is supported rotatably in a through hole 33a which is provided in a front portion of the bogie 33 in such a way as to penetrate the bogie 33 in an up-to-down direction. Then, a front link member 37 is fixed to an upper end portion of the front rotational shaft 36d with a screw 38a.

[0031] The left and right rear wheels 32 of the bogie 33 are fixed individually to both ends of a rear axle 40. The rear axle 40 is supported rotatably on a rear wheels support member 41. Specifically speaking, a rotatably supporting portion 41b is provided at a lower end of the rear wheels support member 41 so as to extend between the rear wheels 32. A through hole 41a having a circular cross section is formed in the rotatably supporting portion 41b. The rear axle 41 is supported rotatably by an inner circumferential surface of the through hole 41a.

[0032] A rear rotational shaft 41d having a cross section of a circular outline is provided so as to rise upwards from a position on an outer circumferential surface of the rotatably supporting portion 41b which lies at a center between the left and right rear wheels 32. The rear rotational shaft 41d is supported rotatably in a through hole 33b which is provided in a rear portion of the bogie 33 in such a way as to penetrate the bogie 33 in the up-to-down direction. Then, a rear link member 39 is fixed to an upper end portion of the rear rotational shaft 41d with a screw 38b.

[0033] Flange portions 36e, 41e are formed at lower ends of the front rotational shaft 36d and the rear rotational shaft 41d, respectively. Upper surfaces of the

flange portions 36e, 41e are brought into sliding abutment with a lower surface of the bogie 33 at portions which surround respective lower end opening portions of the through holes 33a, 33b. In this way, the bogie 33 is supported by the flange portions 36e, 41e of the front wheels support member 36 and the rear wheels support member 41.

[0034] The front link member 37 is formed by a proximal end portion 37a having a boss-like shape and a link portion 37b which extends long from this proximal end portion 37a to the rear. A hole portion 37a1 is formed in the proximal end portion 37a, and the screw 38a is inserted through this hole portion 37a1. A hole portion 37a2 is formed on a lower surface of the proximal end portion, and an end portion of the front rotational shaft 36d is inserted into this hole portion 37a2. The lower surface of the proximal end portion 37a and a lower surface of the link portion 37b are formed so as to be level with each other. A hole portion 37b1 is formed in a distal end portion of the link portion 37b to connect the rear link member 39 and the front link member 37 together.

[0035] The rear link member 39 is formed by a proximal end portion 39a and a link portion 39b. The proximal end portion 39a has a flat upper surface and a lower surface where a hole portion 39a2 is formed. The link portion 39b extends from the proximal end portion 39a towards the front. A hole portion 39a1 is formed in the proximal end portion 39a, and the screw 38b is inserted through this hole portion 39a1. An end portion of the rear rotational shaft 41b is inserted into the hole portion 39a2. The upper surface of the proximal end portion 39a and an upper surface of the link portion 39b are formed so as to be level with each other. A pin 39b1 is provided at a distal end of the link portion 39b so as to project downwards to be inserted into the hole portion 37b1 in the front link member 37.

[0036] The fixed coupling portion 33c is fixed to a center of a rear end portion of the bogie 33. The fixed coupling portion 33c is made up of a proximal portion 33c2 which projects from the bogie 33 towards the rear into a flat plate-like shape and the connection pin 33c1 which is provided to rise upwards from the proximal portion 33c. A projection 33c3 is formed at a distal end portion of the connection pin 33c1 so as to prevent the connection pin 33c1 from being dislocated easily from the connection hole 36c1 when the connection pin 33c1 is inserted through the connection hole 36c1.

[0037] A recess portion 33d is formed in a center of the bogie 33. A weight member 42 is accommodated in this recess portion 33d. The weight member 42 is prevented from being dislocated from the recess portion 33d by a plate 43 which is screwed on to an upper surface of the bogie 33. Countersunk holes 33e, 33f are provided at the front and rear of the bogie 33, and screws with which the casing 34 is attached to the bogie 33 are inserted through these countersunk holes 33e, 33f.

[0038] The front wheels 31 and the rear wheels 32 are accommodated individually in wheel house portions 44

which are formed at corresponding locations of the bogie 33. At each wheel house portion 44, a lower surface edge 44a of the bogie 33 is formed into a convexly curved configuration. This allows narrow spaces to be defined between inner surfaces of the front wheels 31 and the rear wheels 32 and vertical surfaces of the wheel house portions 44 which face the inner surfaces, whereby it is possible to avoid the interference of the front wheels 31 and the rear wheels 32 with the vertical surfaces of the wheel house portions 44 which would otherwise be caused when the front wheels support member 36 and the rear wheels support member 41 turn on the running surface about the vertical shafts. By narrowing the spaces between the inner surfaces of the front wheels 31 and the rear wheels 32 and the vertical surfaces of the wheel house portions 44 in the way described above, a risk is reduced of catching dust or the like between the inner surfaces of the front wheels 31 and the rear wheels 32 and the vertical surfaces of the wheel house portions 44 which face the inner surfaces.

[0039] In the connected vehicle 30 having the bogie 33 which is formed as described above, in the event of the front wheels support member 36 being swung about the front rotational shaft 36d, the rear wheels support member 41 is swung via the front link member 37 and the rear link member 39. For example, in the event of the connected vehicle 30 turning to the right, a state shown in Figs. 6A, 6B will result. Consequently, the connected vehicle 30 can turn smoothly within a small turning circle, whereby the connected running toy 1 can perform smoothly a snaking operation. Additionally, the weight member 42 is provided on the connected vehicle 30, and therefore, the connected vehicle 30 is prevented from falling down during the snaking operation.

[0040] Namely, in the connected vehicle 30, the turning direction of the front wheels 31 is opposite to the turning direction of the rear wheels 32, and therefore, there is caused no difference in radius between paths traced by the inner front wheel and the inner rear wheel when turning. Thus, there is no such situation that the rear end of the connected vehicle 30 traces a path which lies further inwards. Consequently, the rear connected vehicle 30 can turn along the same track as the track along which the front connected vehicle 30 turns, and this allows the connected running toy 1 to turn as when the connected running toy 1 turns on the rails.

[0041] Further, in the connected vehicle 30, the front coupling portion is configured as the movable coupling portion 36c which is provided on the front wheels support member 36, and the rear coupling portion is configured as the fixed coupling portion 33c. Therefore, the turning angle of the front wheels support member 36 is controlled by the connected vehicle 30 which is connected to the front of the connected vehicle 30 on which the front wheels support member 36 is provided, and the turning angle of the rear wheels support member 41 is not affected by the connected vehicle 30 which is connected to the rear of the connected vehicle 30 on which the rear

wheels support member 41 is provided. Consequently, there is no such situation that unreasonable force is exerted on the rear wheels support member 41.

[0042] In the embodiment shown in the accompanying drawings, the front link member 37 and the rear link member 39 are formed in the same length so that the front wheels 31 and the rear wheels 32 are steered at the same angle in the opposite directions. However, a configuration may be adopted in which the front link member 37 is formed shorter than the rear link member 39 so that the steering angle of the rear wheels 32 is smaller than the steering angle of the front wheels 31.

[0043] Thus, while the embodiment of the invention has been described heretofore, the invention is not limited to the embodiment and hence can be carried out in various forms. For example, the invention can be carried out with the number of connected vehicles 30 which are hauled by the driving vehicle 10 being one or more. Additionally, a configuration can also be adopted in which the support members which support the front and rear wheels are not provided on some of a plurality of connected vehicles 30 which are hauled by the driving vehicle 10 so that the connected vehicles 30 with no support members are not turned relative to the running surface. However, the connected vehicle 30 according to the invention is preferably used for all vehicles that are hauled by the driving vehicle 10.

[0044] While the invention has been described heretofore based on the embodiment, the embodiment is described to represent one of examples, and hence, the scope of invention is not intended to be limited by the embodiment. This novel embodiment can be carried out in other various forms, and hence, various omissions, replacements and/or modifications can be made thereto without departing from the spirit and scope of the invention. The embodiment and its resulting modifications are included in the spirit and scope of the invention, as well as in the scope of inventions described in claims and equivalents thereof.

Claims

1. A connected running toy comprising:

a driving vehicle;
a connected vehicle which is hauled by the driving vehicle; wherein,
the connected vehicle comprises a bogie and a casing which is provided on the bogie, and wherein
the bogie comprises:

a front wheels support member which is formed to turn freely on a running surface about a vertical shaft, which supports rotatably a front axle on which front wheels are provided and on which a movable coupling

portion is formed so as to project towards the driving vehicle to be coupled with a coupling portion of another vehicle;
a rear wheels support member which is formed to turn freely on the running surface about a vertical shaft and which supports rotatably a rear axle on which rear wheels are provided;
a front link member which is fixed to the front wheels support member;
a rear link member which is connected to the front link member and which is fixed to the rear wheels support member; and
a fixed coupling portion which projects from a rear portion of the bogie in an opposite direction to the direction towards the driving vehicle to be connected to a coupling portion of a further vehicle.

2. The connected running toy according to Claim 1, wherein
in the front wheels support member, a front rotational shaft which is provided to rise from a front wheels support portion which supports the front axle rotatably is supported rotatably by the bogie, and wherein
in the rear wheels support member, a rear rotational shaft which is provided to rise from a rear wheels support portion which supports the rear axle rotatably is supported rotatably by the bogie.
3. The connected running toy according to Claim 2, wherein
the front link member is fixed to an end portion of the front rotational shaft, and wherein
the rear link member is fixed to an end portion of the rear rotational shaft.
4. The connected running toy according to anyone of Claims 1 to 3, wherein
the bogie has a weight member which is provided at a center thereof.
5. The connected running toy according to anyone of Claims 1 to 4, wherein
the bogie has wheel house portions which are formed therein to accommodate individually the front wheels and the rear wheels, and wherein
a lower surface edge of the bogie at each of the wheel house portions is formed into a convexly curved configuration.
6. The connected running toy according to anyone of Claims 1 to 5, wherein
the driving vehicle comprises a receiver which receives a control signal which is sent from a transmitter, a steering unit which is formed so as to steer the front wheels, a drive unit which drives the rear wheels, and a control circuit which transmits the con-

trol signal to the steering unit and the drive unit to control both the steering unit and the drive unit.

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FIG.1

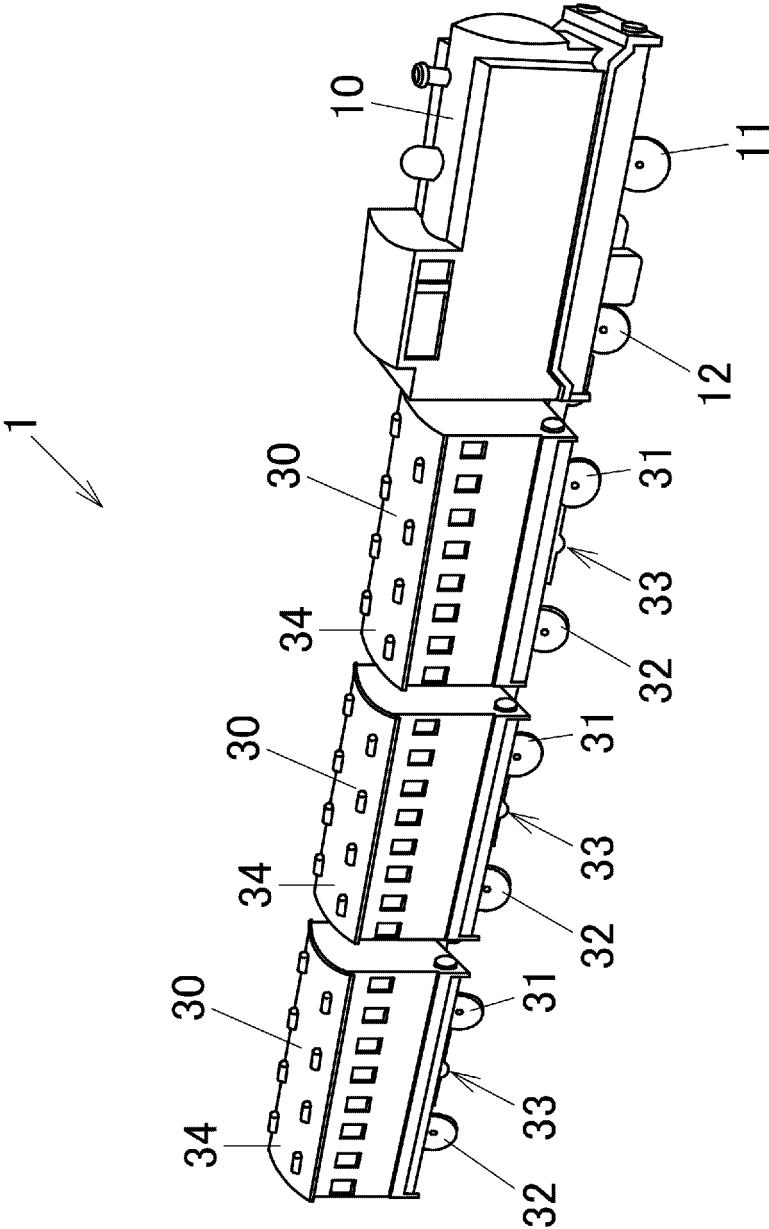


FIG.2

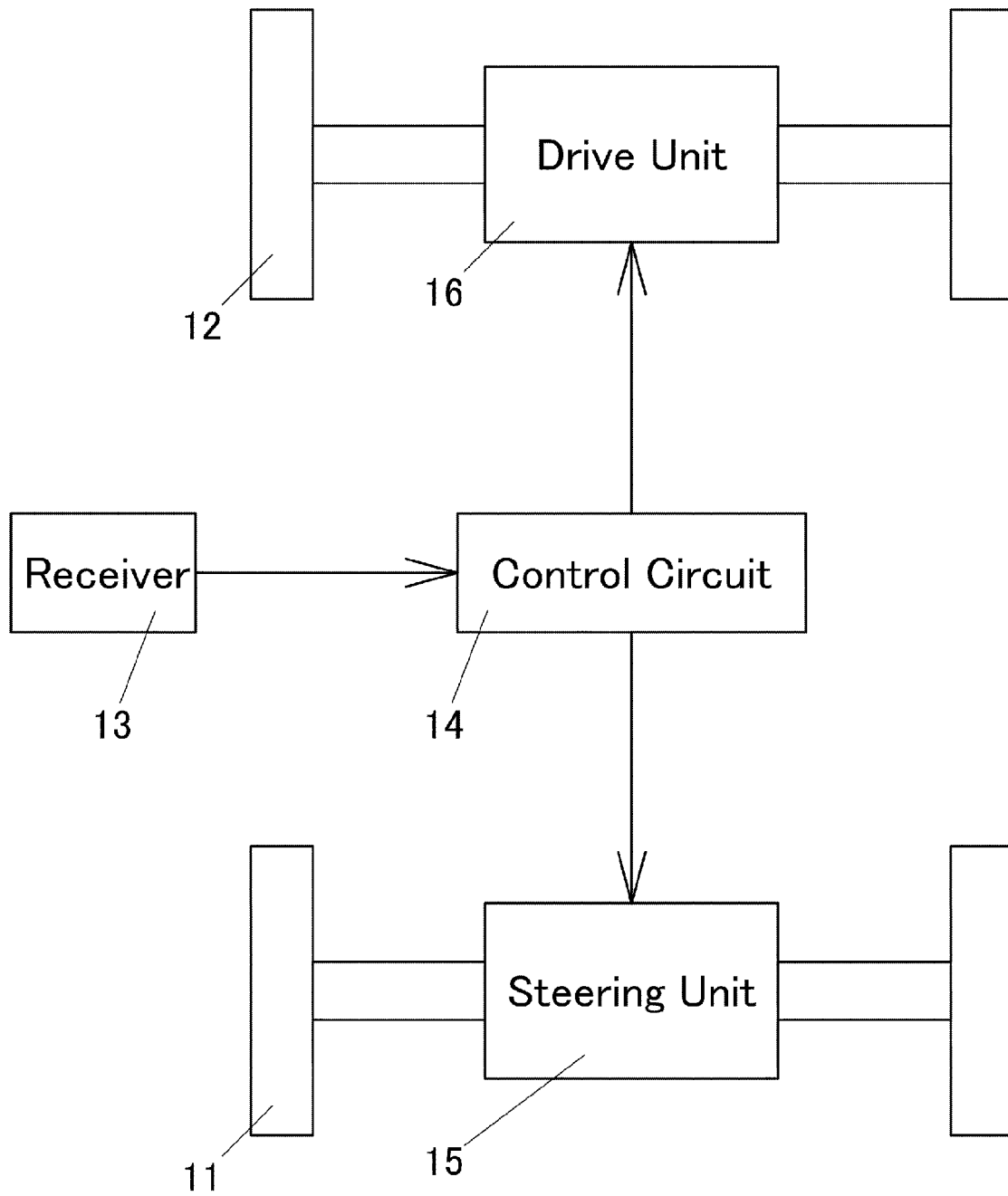


FIG.3

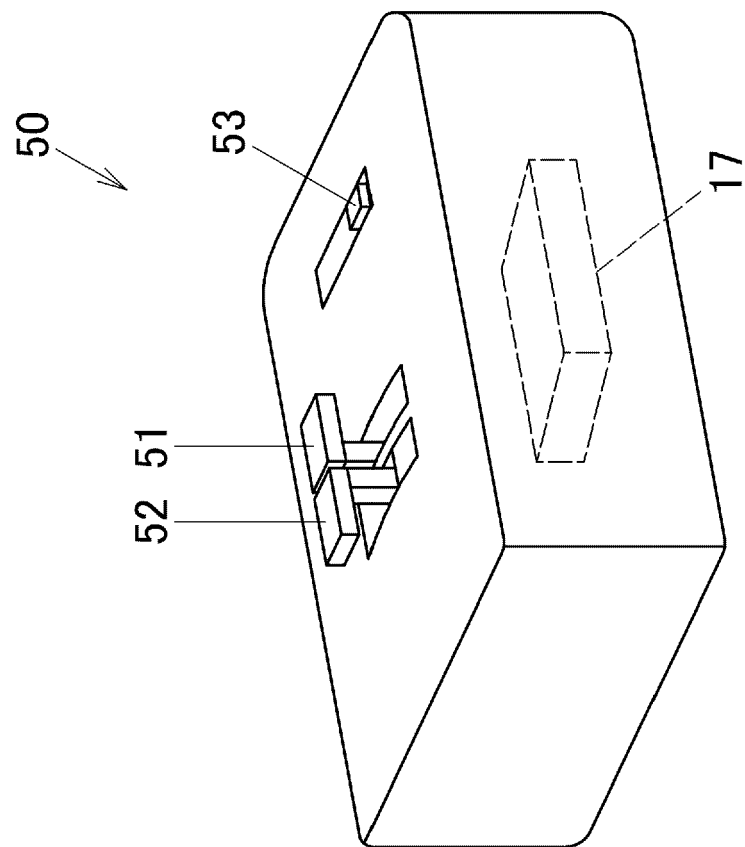


FIG.4A

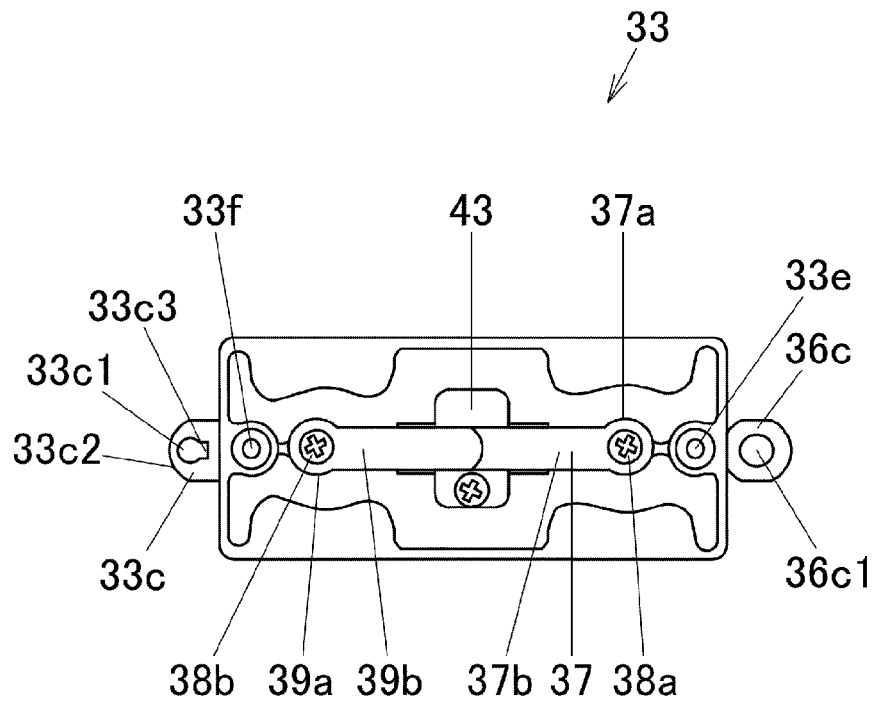


FIG.4B

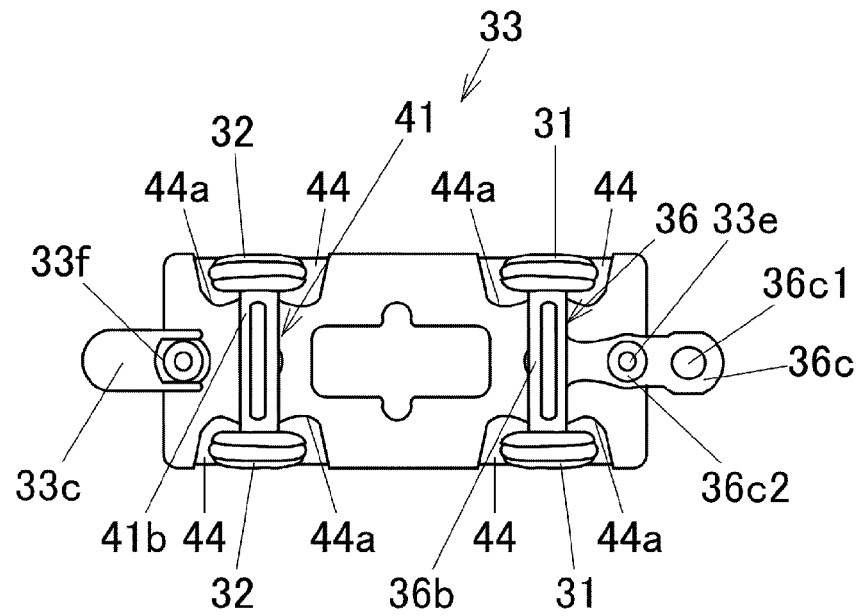


FIG.5

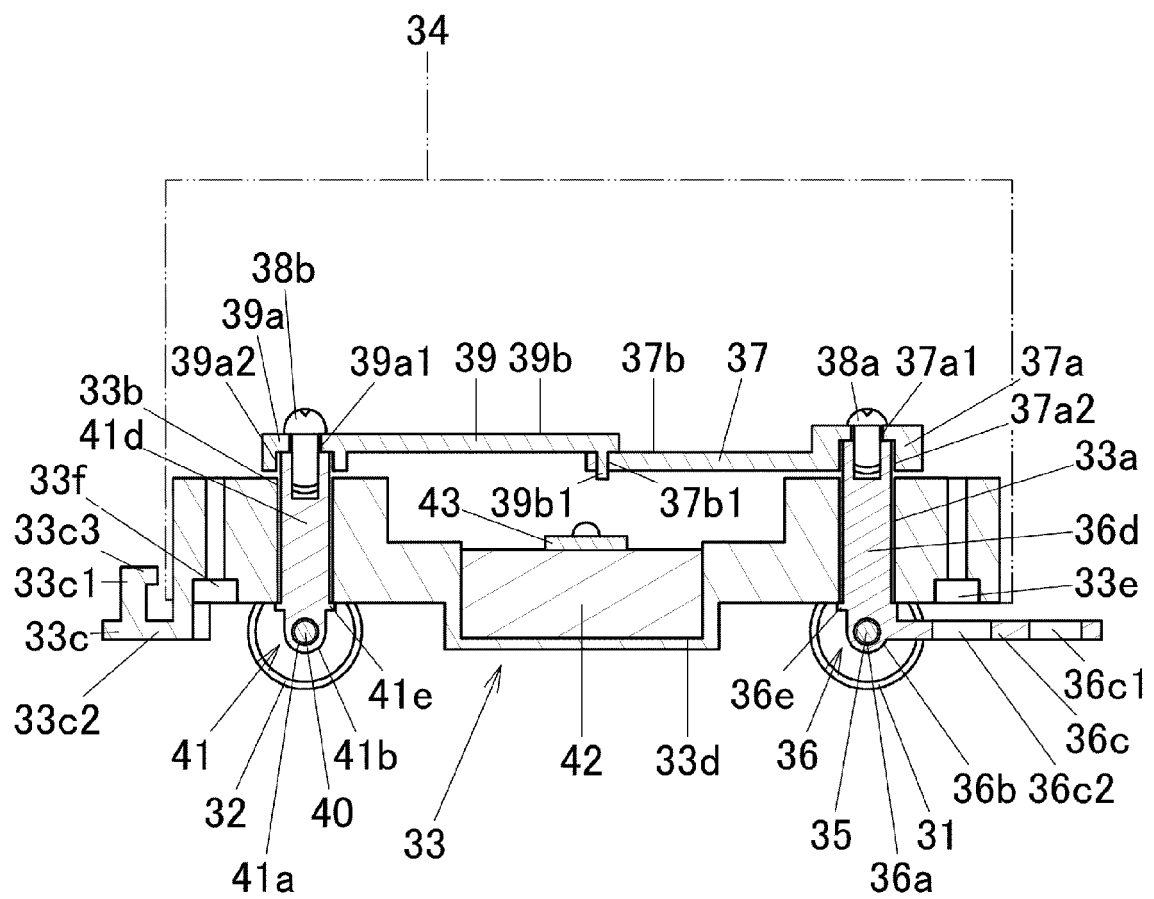


FIG.6A

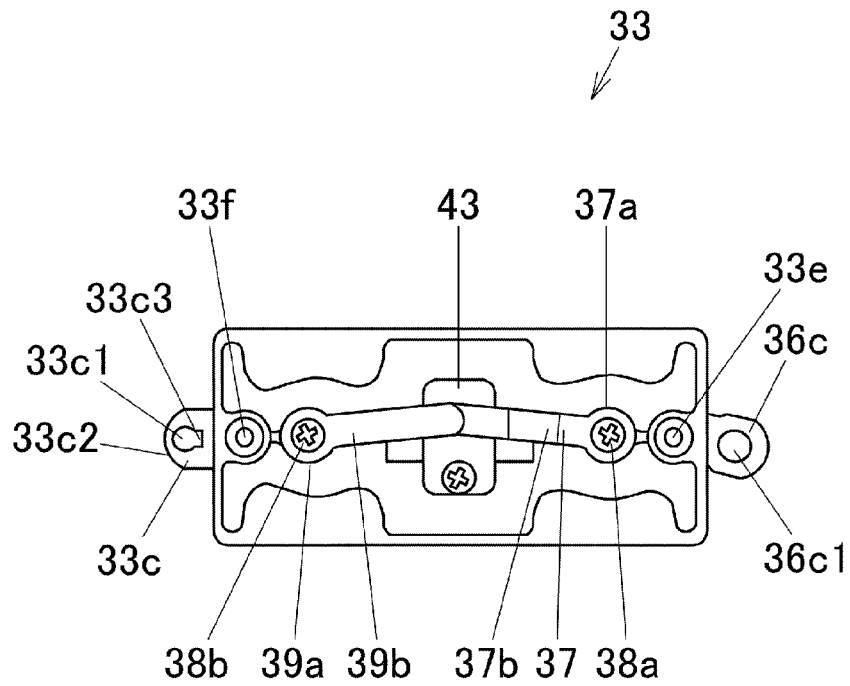
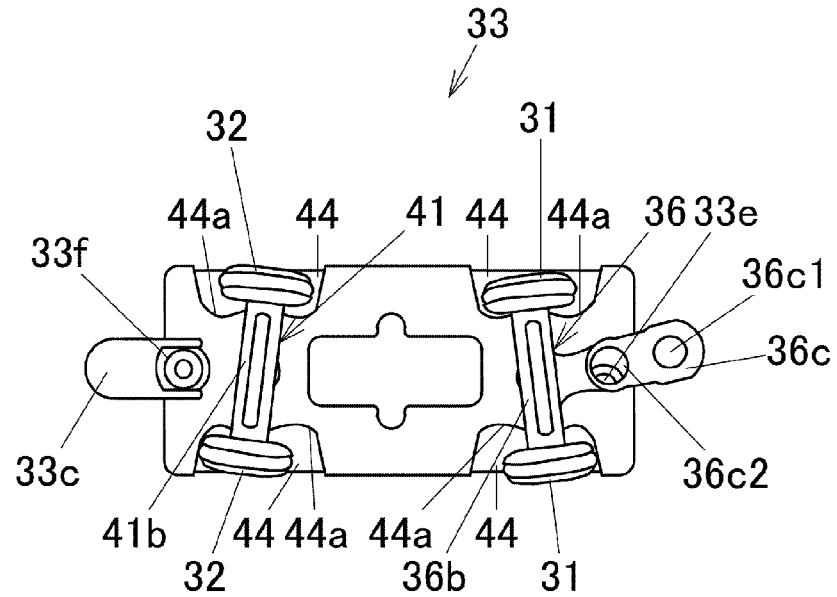


FIG.6B





EUROPEAN SEARCH REPORT

Application Number
EP 15 18 9245

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 533 872 A (FRANK FARRAR VOORHEIS) 21 February 1941 (1941-02-21)	1-3	INV. A63H19/22 A63H17/26
Y	* sentence 10 - sentence 77; figures * -----	4-6	
Y	US 8 069 793 B2 (RICE VIC G [US]) 6 December 2011 (2011-12-06) * column 1, line 32 - line 35; figures * -----	4	
Y	DE 11 80 293 B (FLEISCHMANN GEB) 22 October 1964 (1964-10-22) * column 2, line 49 - column 3, line 35; figures * -----	5	
Y	US 2005/079793 A1 (OGIHARA NOBUAKI [JP]) 14 April 2005 (2005-04-14) * paragraph [0038]; figures * -----	6	
A	DE 14 78 376 A1 (FLEISCHMANN GEB) 17 July 1969 (1969-07-17) * page 5, line 15 - page 7, line 18; figures * -----	1	
A	CN 203 436 821 U (GOLDLOK TOYS HOLDINGS GUANGDONG CO LTD) 19 February 2014 (2014-02-19) * the whole document * -----	1-6	TECHNICAL FIELDS SEARCHED (IPC) A63H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 April 2016	Examiner Lucas, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 18 9245

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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13-04-2016

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