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(54) **Toy train**

Spielzug

Train jouet

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(56) References cited:
GB-A- 1 380 876 **GB-A- 2 102 685**
GB-A- 2 207 362

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Description

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to a remotely controlled toy train. Toy trains consisting of a powered vehicle adapted to move on rails and remotely controlled by the child are popular. The main body, sometimes referred to as the locomotive, contains a motor which may be activated by the controller to rotate in one direction causing the train to move forward and in the opposite direction causing the train to move in reverse. The path of travel of such toy trains is usually governed by the configuration of the trackway.

Toy trains of this type are sometimes designed to run on the floor in which case a track is not provided. There is limited amusement value because the toy train usually moves in a straight path. Toy trains have been designed permitting movement along both straight and curved paths directly on the floor. Trains of this type which operate on the floor are designed primarily for infants and thus the controller must be very simple to operate and of low cost.

A toy vehicle as defined in the precharacterizing portion at independent claim 1 is disclosed in GB-A-2 102 685. In this known toy vehicle, when the drive wheel on one side of the vehicle is driven the drive wheel on the other side free wheels. When the drive motor rotates in the direction it drives the drive wheel on one side of the vehicle in a forward direction, and when the motor rotates in the other direction it drives the drive wheel on the other side of the vehicle in a forward direction. Thus, the direction of rotation of the drive motor controls the steering or veering of the vehicle.

In accordance with the invention there is provided a toy vehicle comprising a main body provided with wheels on both sides thereof, a reversible motor, a driving mechanism to drive the wheels for turning the main body in a first direction when the motor rotates in a first direction and for turning the main body in a second direction when the motor rotates in the opposite direction, and an operating mechanism for activating the driving mechanism, characterized in that the toy vehicle is a toy train and the driving mechanism is formed so that the wheels on both sides of the main body are always driven, but those on one side faster than those on the other, and that reversing the direction of the motor maintains the direction of drive of the wheels, but changes the side on which the wheels are driven faster.

Moreover, in one embodiment the toy train features a plurality of cars pulled by the traction car, adjacent cars being provided with a coupling device which may be bent in the horizontal plane. Thus, the toy train may turn to the left, turn to the right, and move in a generally straight path when operated by the controller. Additional amusement is derived by the couplings since the cars of the train meander.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective of the toy train and controller of the present invention;

Fig. 2 is an exploded perspective view showing the operating mechanism within the locomotive;

Fig. 3 is a view showing a portion of the driving mechanism of the locomotive;

Fig. 4 is a view illustrating a portion of the driving mechanism of the locomotive;

Fig. 5 is a diagram illustrating movement of the funnel mechanism when turning to the left;

Fig. 6 is a diagram illustrating the funnel descending;

Fig. 7 is a diagram illustrating movement of the funnel mechanism when turning to the right;

Fig. 8 is a perspective view showing the switching mechanism;

Fig. 9 is a perspective view illustrating movement of the arm which is electrically operated;

Fig. 10 is a perspective view illustrating movement of the arm when operated by hand;

Fig. 11 is an view showing the meshing relationship of the gears which are electrically operated; and

Fig. 12 is a view showing the meshing relationship between the gears when operated by hand.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In Fig. 1 the reference numeral 1 designates generally the toy train assembly, which includes a controller 2 and the train 3. The controller 2 is provided with operating pushbuttons 2a and 2b. The main body of the train 3 consists of a locomotive or traction vehicle 4 and a series of hopper cars 4a. The locomotive 4 is provided with an operating piece 5 of the sliding type at a rear portion thereof, as seen in Fig. 2.

The main body 4 of the toy train 3 turns to the left when the operating piece 5 is moved to the "ON" side and the operating pushbutton 2a of the controller 2 is pressed. In similar manner the toy train 3 turns to the right when the operating piece 2b of the controller 2 is pressed. A funnel 44 (Fig. 2) of the toy train 3 moves up and down during movement of the vehicle. Optionally, the toy train 3 can be moved by hand when the operating piece 5 is positioned in the "OFF" position. In this position the funnel 44 does not move up and down.

The construction of the toy train 3 will now be described in detail with reference to Fig. 2. The locomotive 4 includes a battery (not shown), a motor M energized by the battery, a receiver R which controls the rotation of the motor M, and a driving mechanism 10 for transmitting the driving force of the motor M to the left wheels 14 and the right wheels 15 to rotate same. The receiver R is adapted to control the direction of rotation of the motor M in accordance with a control signal from the controller 2.

The driving mechanism 10 rotates the left wheels 14 and the right wheels 15 together during forward movement when the motor M is rotating normally, as seen in Fig. 3. The power of the motor M is transmitted to the left wheels 14 and the right wheels 15 under circumstances where the right wheels 15 achieve greater rotational speed than the left wheels 14. That is, when the motor M rotates normally its power is transmitted to the left wheels 14 through the gears 10a, 10b, 10c, 10d, 10e, 10f, 10g, 10h and 10j to rotate the left wheels 14 in a forward direction. Simultaneously, the rotating power of the motor M is transmitted to the right wheels 15 through gears 10a, 10b, 10c, 10d, 10e, 10f, 11a, 11b, 11c and 11d to rotate the right wheels 15 forwardly. In this manner, when the motor M rotates normally the left wheels 14 and the right wheels 15 are rotated together but the numbers of teeth of the respective gears are set in such a manner that the right wheels 15 achieve greater rotating speed than the left wheels 14. Accordingly, when the motor M rotates normally the toy train 3 turns to the left.

The driving mechanism 10 rotates the left wheels 14 and the right wheels 15 together in a forward direction when the motor M rotates in the reverse direction, as seen in Fig. 4. In this case the power of the motor M is transmitted to the left wheels 14 and the right wheels 15 through the power transmitting path such that the left wheels 14 achieve a greater rotating speed than the right wheels 15. That is, when the motor M rotates normally its power is transmitted to the right wheels 14 through gears 10a, 10b, 10c, 10d, 10e, 10f, 11a, 12a, 12b, 10h, 10i and 10j to rotate the left wheels 14 forwardly. Simultaneously, the rotating power of the motor M is transmitted to the right wheels 15 through gears 10a, 10b, 10c, 10e, 13a, 13b, 11c and 11d to rotate the right wheels 15 forwardly. In this way when the motor M rotates normally the left wheels 14 are rotated forwardly together, but the tooth numbers of the respective gears differ in such a manner that the left wheels 14 rotate more rapidly than the right wheels 15. Thus, when the motor M rotates normally the toy train 3 turns to the right. The speed of turning to the right is identical to the speed of turning to the left.

The gear 10a is affixed to the shaft of the motor M. The gear 10b normally meshes with the gear 10a. The gear 10c is formed as a part of the gear 10b. The gears 10b and 10c are mounted rotatably about the shaft 17. The gear 10d normally meshes with the gear 10c. The gear 10e is formed as a part of the gear 10d. The gears 10d and 10e are mounted on the shaft 18 and adapted to move about gear 10c. The shaft 18 is supported on an arm 19 which swings with the shaft 17 as its center. The shaft 18 is attached to the gears 10d and 10e which are adapted to revolve around the gear 10c when the arm 19 swings with the shaft 17.

The gear 10f normally meshes with the gear 10e. The gears 11a and 10g unite with the gear 10f. The gears 10f, 11a and 10g are rotatably mounted on the

shaft 20 and adapted to revolve around the gear 10e. The shaft 20 is supported on an arm 21 which swings with the shaft 18 as its center. The shaft 20 is attached with the gears 10f, 11a and 10g.

The gear 10h meshes with the gear 10g when the motor M rotates normally. The gear 10i is rotatably mounted about the shaft 23. The gear 11b meshes with the gear 11a when the motor M rotates normally. The gears 11c and 13b unite with gear 11b. The gears 11b, 11c and 13b are rotatably mounted on the shaft 23.

The gear 10j normally meshes with the gear 10i and is rotatably mounted on the shaft 24 engaging the left wheels 14 to rotate same. The gear 11d normally meshes with the gear 11c and is rotatably mounted on the shaft 24 engaging the right wheels 15 rotating same. The gear 12a meshes with the gear 11a when the motor M rotates in reverse direction. The gear 12b normally meshes with the gear 10h and is united with gear 12a. The gears 12a and 12b are rotatably mounted about shaft 24. The gear 13a meshes with gear 10f when the motor M rotates in reverse and normally meshes with gear 13b.

The mechanism 30 for changing the power transmitting path will now be described. The changing mechanism generally designated by the reference numeral 30 includes the gear 10e and the gears 10f, 11a and 10g which revolve about the gear 10e as seen in Fig. 2. The gear 10e is a sun gear. The gears 10f, 11a and 10g are planetary gears. The gears 10f, 11a and 10g revolve in the rotating direction of the gear 10e such that the power transmitting path is changed.

A funnel mechanism generally designed by the reference numeral 44 is connected to the driving mechanism 10 and will now be described. The funnel mechanism 44 is depicted in Fig. 5 and consists of a cam 41 fixed and supported by the shaft 18 and a lever 42 and arm 43 moved by the cam 41. The cam 41 is formed by disposing an eccentric pin 41a on a disk and rotates in a counter-clockwise direction, as seen in Fig. 5, to press a portion B of the lever 42, thereby pushing the arm 43 upwardly to raise the funnel 44. When the cam 41 rotates in a clockwise direction, as seen in Fig. 7, pressing the portion B of the lever 42 thereby pushing upwardly the arm 43 by the portion C raises the funnel 44. The eccentric pin 41a does not abut the lever 42 when the motor M rotates normally. The funnel 44 descends by its own weight, as seen in Fig. 6.

The switching mechanism will now be described. The reference numeral 50 as seen in Fig. 8 denotes a seizing portion 50 for interposing an electric source switch SW disposed at the rear side of the operating piece 5.

A changing mechanism generally designated by reference numeral 60 for changing from manual operation to electrically driven operation will now be described. As seen in Fig. 8, a slant guiding portion 51 for swinging the arm 19 is disposed at the rear side of operating piece 5. The operating piece 5 causes the

arm 19 to swing by a spring 61 in the direction of the arrows shown in Figs. 9 and 11 when the electric source switch SW is turned on. The operating piece 5 causes the arm 19 to swing by the spring 61 when the electrical source switch is turned off thereby releasing the connection of the middle portion of the gear mechanism.

The construction of the hopper cars 4a will now be described. As seen in Fig. 1, the couplers 70 are disposed at the rear portion of the locomotive 4 and as well at the front or rear of the cars 4a. One of the couplers 70 is provided with a protrusion 70a while the other of the couplers 70 is provided with a hole 70b for receiving the protrusion 70a. Each of the hopper cars 4a is provided with a pair of left and right wheels 71. The hopper cars 4a are adapted in such a manner that respective distances between the contacting point of the wheels 71 and the pin coupling portion are identical with each other at fore and rear portions.

The toy train 3 may turn left or right by operation of the controller 2. Running along a straight path is also possible. Since both the locomotive 4 and the lead car 4a, and adjacent cars 4a, are coupled for rotating movement relative to each other, the toy train 3 "meanders" when running in a straight path enhancing the amusement value and pleasure.

Claims

1. A toy vehicle (3) comprising a main body (4) provided with wheels (14, 15) on both sides thereof, a reversible motor (M), a driving mechanism (10) to drive the wheels (14, 15) for turning the main body (4) in a first direction when the motor (M) rotates in a first direction and for turning the main body (4) in a second direction when the motor (M) rotates in the opposite direction, and an operating mechanism for activating the driving mechanism (10), characterized in that the toy vehicle is a toy train (3) and the driving mechanism (10) is formed so that the wheels (14, 15) on both sides of the main body (4) are always driven, but those on one side faster than those on the other, and that reversing the direction of the motor (M) maintains the direction of drive of the wheels (14, 15), but changes the side on which the wheels (14, 15) are driven faster.
2. A vehicle toy according to claim 1, characterized in that the toy train (3) includes a plurality of cars (4a) coupled to each other and to the main body (4), including a coupling device (70) operatively connecting adjacent of said cars (4a) and adapted for movement in a horizontal plane permitting the cars (4a) to meander along the surface along which they are travelling.
3. A toy vehicle according to claim 1, characterized by further comprising a remote controller (2) for activating the operating mechanism to change the

direction of rotation of the motor (M) of the main body (4).

Patentansprüche

1. Spielfahrzeug (3) mit einem Hauptkörper (4), der auf beiden Seiten mit Rädern (14, 15) versehen ist, einem umsteuerbaren Motor (M), einer Antriebseinrichtung (10) zum Antreiben der Räder (14, 15) zum Drehen des Hauptkörpers (4) in einer ersten Richtung, wenn der Motor (M) in einer ersten Richtung läuft und zum Drehen des Hauptkörpers (4) in einer zweiten Richtung, wenn der Motor (M) in der entgegengesetzten Richtung läuft, und eine Betätigungseinrichtung zum Aktivieren der Antriebseinrichtung (10), dadurch gekennzeichnet, daß das Spielfahrzeug ein Spielzeugzug (3) ist und die Antriebseinrichtung (10) so ausgelegt ist, damit die Räder (14, 15) auf beiden Seiten des Hauptkörpers (4) ständig angetrieben werden, jedoch auf einer Seite schneller als auf der anderen Seite, und daß die Umkehrung der Drehrichtung des Motors (M) die Antriebsrichtung der Räder (14, 15) aufrechterhält, jedoch die Seiten wechselt, auf der die Räder (14, 15) schneller angetrieben werden.
2. Spielfahrzeug nach Anspruch 1, dadurch gekennzeichnet, daß der Spielzeugzug (3) mehrere Wagen (4a) aufweist, die aneinander und an den Hauptkörper (4) gekuppelt sind, mit einer Kuppelungsvorrichtung (70), die benachbarte Wagen wirksam miteinander verbindet zur Bewegung in einer horizontalen Ebene, damit die Wagen (4a) sich meanderförmig auf der Fläche längs welcher sie fahrbar sind, bewegen können.
3. Spielfahrzeug nach Anspruch 1, gekennzeichnet desweiteren durch eine Fernsteuervorrichtung (2) zum Aktivieren der Betätigungseinrichtung zur Änderung der Drehrichtung des Motors (M) des Hauptkörpers (4).

Revendications

1. Véhicule jouet (3) comportant un corps principal (4) équipé de roues (14, 15) sur ses deux côtés, un moteur réversible (M), un mécanisme d'entraînement (10) pour entraîner les roues (14, 15) en vue de tourner le corps principal (4) dans une première direction lorsque le moteur (M) tourne dans une première direction et pour tourner le corps principal (4) dans une seconde direction lorsque le moteur (M) tourne dans la direction opposée, et un mécanisme de commande pour activer le mécanisme d'entraînement (10), caractérisé en ce que le véhicule jouet est un train jouet (3) et le mécanisme d'entraînement (10) est formé de sorte que les roues (14, 15) sur les deux côtés du corps principal

(4) sont constamment entraînées, mais les roues sur l'un des côtés plus vite que les roues sur l'autre côté, et en ce que l'inversion de la direction de rotation du moteur (M) maintient la direction d'entraînement des roues (14, 15) mais change le côté sur lequel les roues (14, 15) sont entraînées plus vite. 5

2. Véhicule jouet selon la revendication 1, caractérisé en ce que le train jouet (3) comporte plusieurs wagons (4a) couplés ensemble et au corps principal (4), incluant un dispositif de couplage (70) raccordant activement les wagons adjacents (4a) et conçu pour mouvement dans un plan horizontal permettant aux wagons (4a) de mouvoir en serpents sur la surface sur laquelle ils se déplacent. 10 15

3. Véhicule jouet selon la revendication 1, caractérisé en ce qu'il comporte en outre un dispositif de réglage à distance (2) pour activer le mécanisme de commande en vue de changer la direction de rotation du moteur (M) du corps principal (4). 20

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FIG. 1

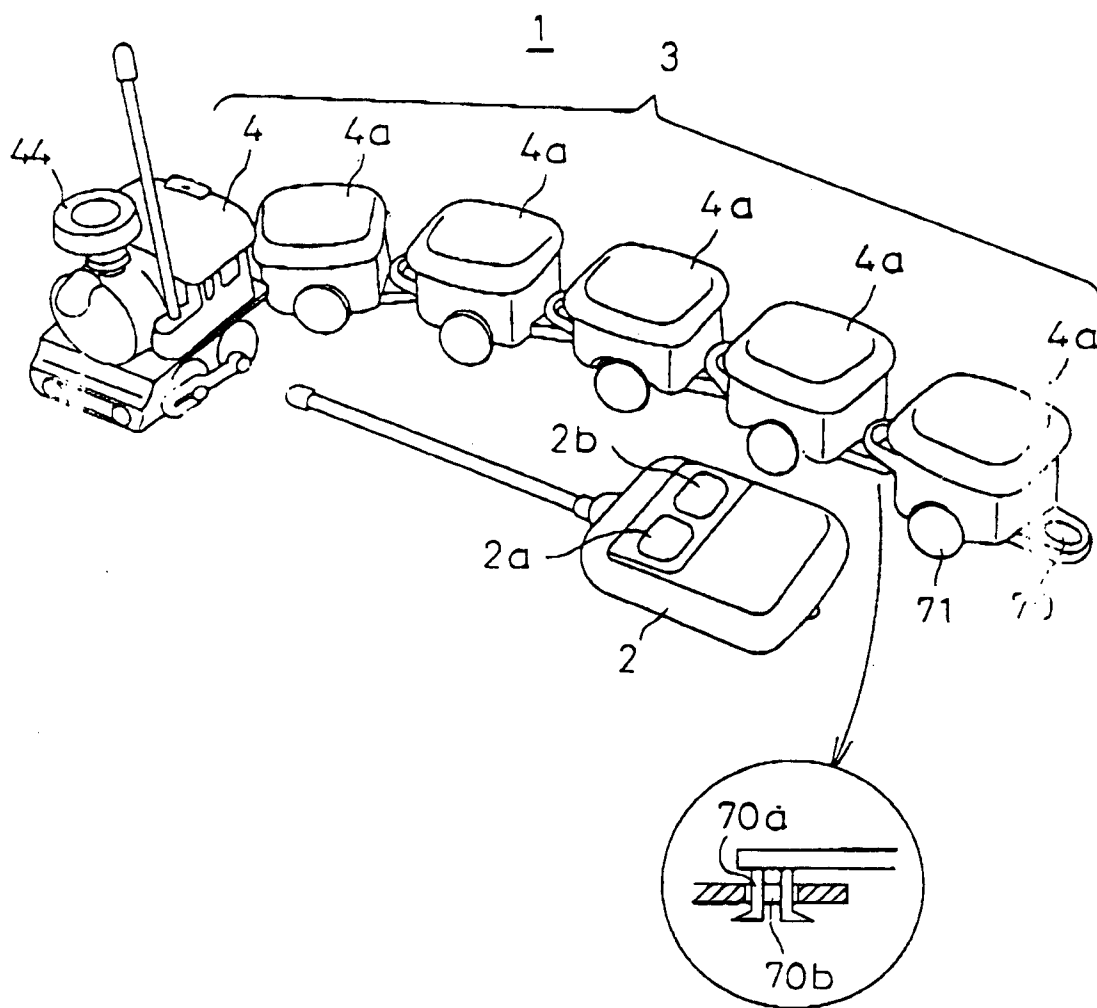


FIG. 2

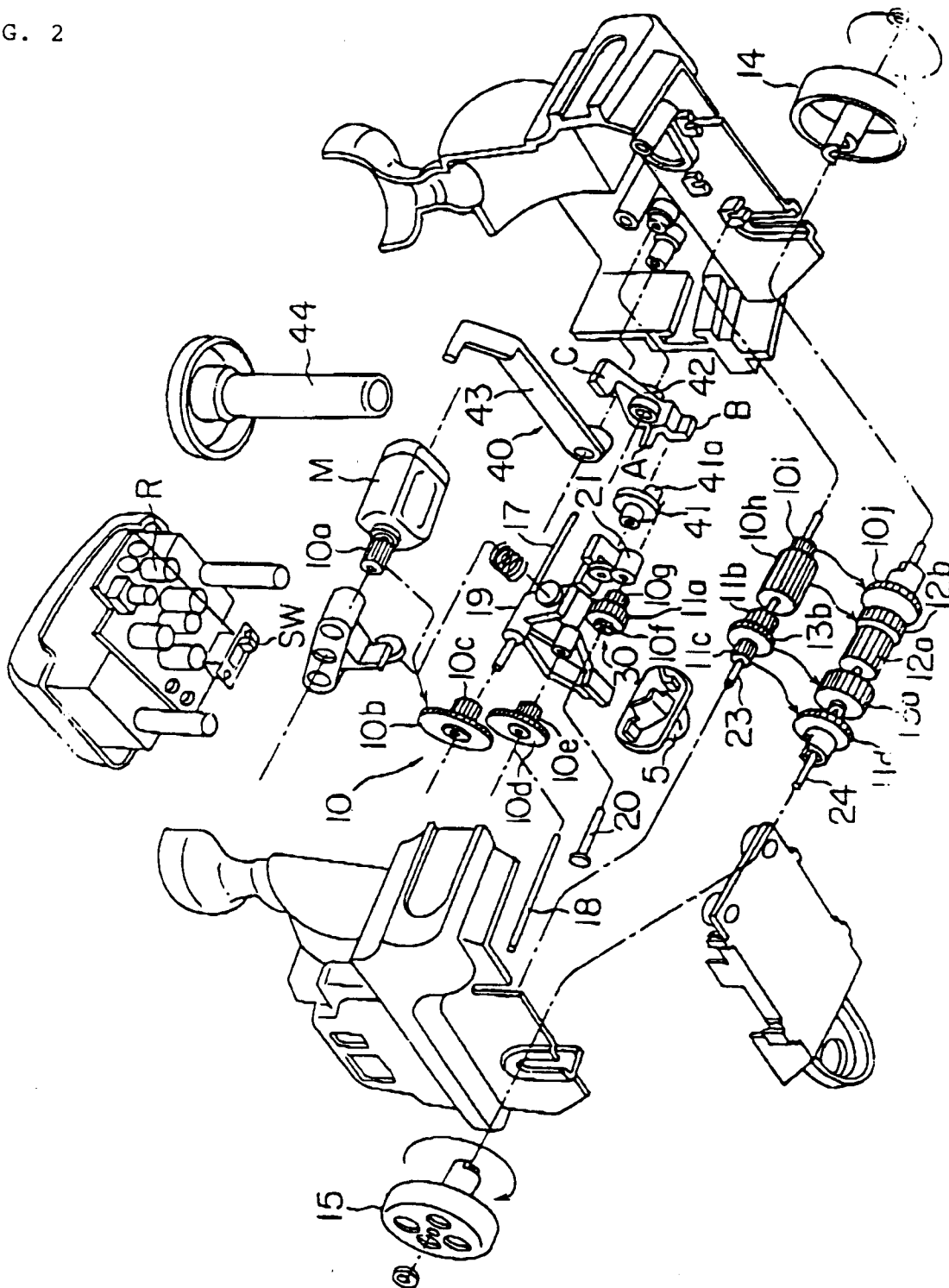


FIG. 3

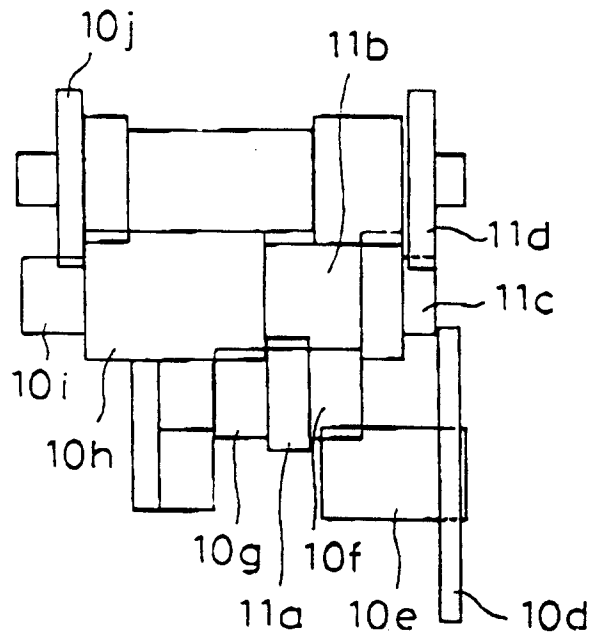


FIG. 4

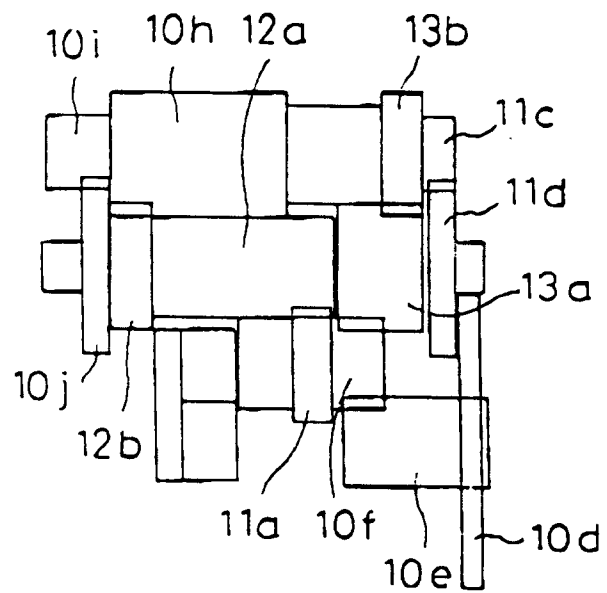


FIG. 5

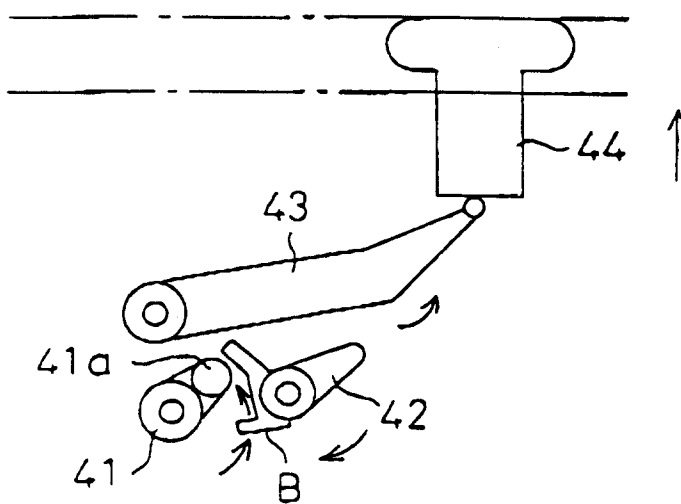


FIG. 6

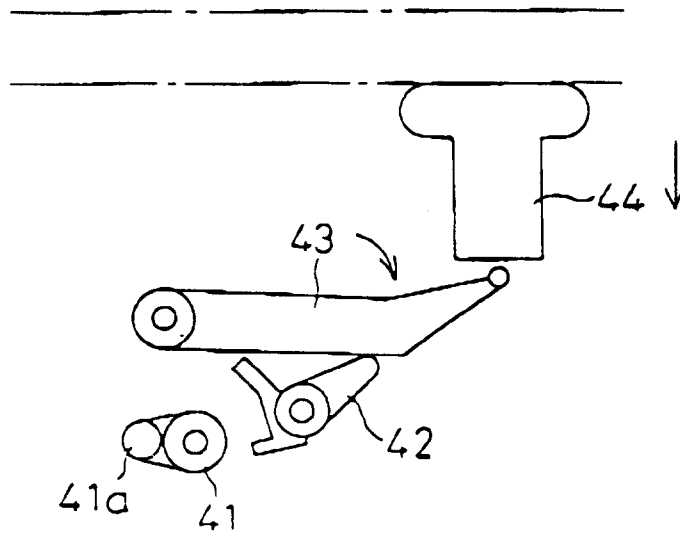


FIG. 7

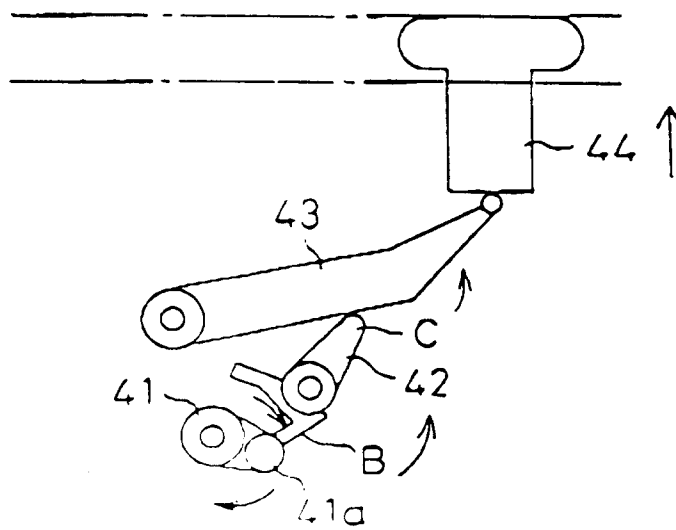


FIG. 8

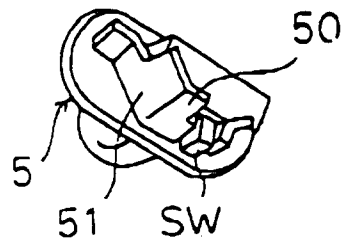


FIG. 9

(ON)

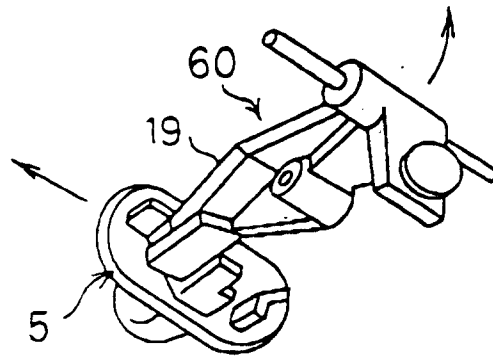


FIG. 10

(OFF)

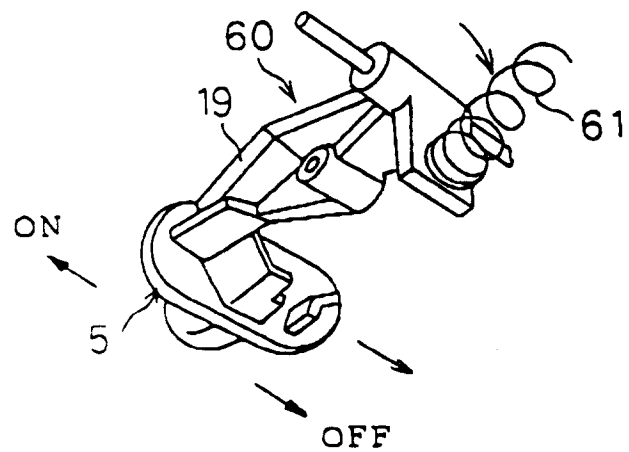


FIG. 11 (ON)

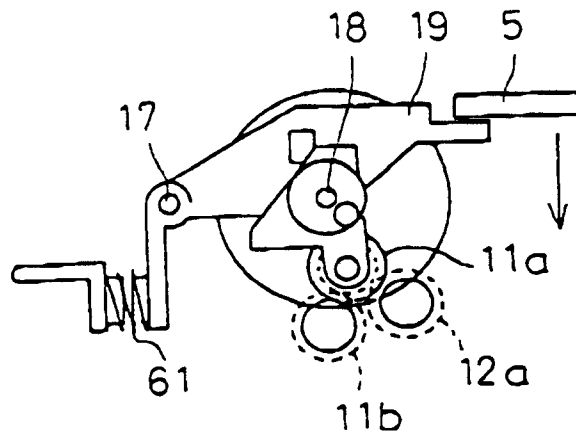


FIG. 12 (OFF)

