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(54) **Action toy and movable member**

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JOUET D'ACTION et un membre mobile

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to an action toy comprising a movable member.

2. Description of the Related Art

[0002] A variety of toys that create a dramatic effect, for example, sound on the basis of read identification information have been developed (refer to, for example, Japanese Unexamined Patent Application Publication No. 2002-123276 (in particular, Fig. 3)).

[0003] In Japanese Unexamined Patent Application Publication No. 2002-123276, in order to identify items, such as a trading card and a figure, a non-contact IC tag is attached to each of the items. The non-contact IC tag serves as storage means for storing identification data (ID) that identifies each of the items, audio data played back when the item is used alone, and audio data played back when the item is used together with another item in a combined fashion. The data stored in the non-contact IC tag is read using a tag reader. Thereafter, sound is generated on the basis of the read ID and a sound playback rule.

[0004] In this way, a variety of sounds can be generated in accordance with the playback rule and the type of sound data and, thus, the item can allow the user to enjoy, for example, a sense of reality, a story line, and a game element.

[0005] In recent years, the need for a technique that allows a user to directly operate a toy that creates a variety of dramatic effects, such as sounds, through a simple operation has been increased.

[0006] US 6,353,168 B1 discloses an educational musical instrument for children, which is a musical toy. The toy includes a base with a signal processing unit and five receiving portions. The toy also includes five blocks which are configured to be inserted to the receiving portions. When the blocks are engaged with the receiving portions, a musical sequence or phrase is played by the toy. The musical sequence played by the toy is dependent upon which face of the block is engaged with the receiving portion.

SUMMARY OF THE INVENTION

[0007] However, although, like the toy described in Japanese Unexamined Patent Application Publication No. 2002-123276, existing toys can generate a variety of sounds, the user cannot create their own dramatic effect through their direct operation. Accordingly, the user who wants to create a dramatic effect at an intended point in time through their operation and enjoy more realistic dramatic effect is not satisfied by the toy.

[0008] Accordingly, the present invention provides an entertaining toy that allows a user to enjoy a variety of dramatic effects, such as various sounds, and that allows the user to create a dramatic effect through an operation performed by the user.

[0009] According to an embodiment of the present invention, the action toy includes a moveable member and a toy body including at least one mounting unit, detection means disposed in the toy body, where the detection means detects that the movable member to be removably mounted to the mounting unit is mounted, a dramatic effect unit disposed in the toy body, where the dramatic effect unit creates a dramatic effect using light or sound, and a control unit disposed in the toy body. When the detection means detects that the movable member is mounted to the toy body, the control unit causes the dramatic effect unit to create a first dramatic effect. Thereafter, when a first operation unit of the movable member is operated, the control unit causes the dramatic effect unit to create a second dramatic effect.

[0010] The mounting unit can have the movable member removably mounted thereto, and the movable member can include an identification unit that indicates a type of the movable member. The toy body can include acquiring means that acquires identification information used for identifying the type of the movable member from the identification unit, and the control unit can create the first dramatic effect on the basis of the identification information acquired by the acquiring means. In addition, the mounting unit can have the movable member removably attached therein, and the movable member can include the first operation unit. The control unit can create the second dramatic effect when the first operation unit of the movable member is operated.

[0011] The toy body can include a second operation unit, and the control unit can cause the dramatic effect unit to create a third dramatic effect when the second operation unit is operated after the first dramatic effect has been created.

[0012] The toy body can include a third operation unit, and the control unit can cause the dramatic effect unit to create a fourth dramatic effect when the third operation unit is operated after the second dramatic effect has been created.

[0013] The toy body can include a plurality of the mounting units at different locations and a display device forming the dramatic effect unit, and the control unit can change part of an image that is displayed on the display device and that corresponds to the location of one of the movable members when the movable member is operated.

[0014] The toy body can be mounted on the waist of a user using a belt. An image representing the human body can be displayed on the display device. At least four of the mounting units can be provided at different locations. Each of four of the movable members mounted to the four mounting units can correspond to one of four parts of the image representing the right and left legs and the

right and left arms and be used to change the corresponding part of the image. The display device can be disposed in the middle of the belt from the user's perspective, and the movable member for the right leg can be disposed to the right of the display device. The movable member for the right arm can be disposed to the right of the movable member for the right leg from the user's perspective. The movable member for the left leg can be disposed to the left of the display device, and the movable member for the left arm can be disposed to the left of the movable member for the left leg from the user's perspective. The at least four mounting units can be arranged along a circular arc so that the movable member for the right arm and the movable member for the left arm are close to the user.

[0015] The toy body can be mounted on the waist of a user using a belt, and an upper surface of the toy body can be tilted forward and downward from the user's perspective. The upper surface can have the at least one, optionally at least four, mounting units and the display device disposed thereon. In addition, a movable member removably attached to a mounting unit of the toy body is provided. The movable member includes an operation unit operable by a user, a first identification unit used by detection means disposed in the toy body to detect that the movable member is attached to the mounting unit, and a second identification unit that allows a control unit disposed in the toy body to detect an operation performed on the operation unit. In addition, the second identification unit can perform a stick-out operation caused by the operation performed on the operation unit, and a control unit disposed in the toy body can detect the stick-out operation.

[0016] The toy body can be arranged such that the dramatic effect unit comprises a display device.

[0017] According to the present invention, an entertaining toy that allows the user to enjoy a variety of dramatic effects and that allows the user to create a dramatic effect through their own operation can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 illustrates a toy and the usage of the toy according to an embodiment of the present invention;
Fig. 2 is a perspective view of the toy;
Fig. 3 is a plan view of the toy;
Fig. 4 is a front view of the toy;
Fig. 5A is a perspective view illustrating the structure of a right arm switch;
Fig. 5B is a side view illustrating the structure of the right arm switch;
Fig. 5C is a cross-sectional view taken along a line VC - VC of Fig. 5B;
Fig. 6A is a perspective view illustrating the structure of a right leg switch;
Fig. 6B is a side view illustrating the structure of the right leg switch;
Fig. 6C is a cross-sectional view taken along a line VIC - VIC of Fig. 6B;
Fig. 7A is a perspective view illustrating the structure of a left leg switch;
Fig. 7B is a side view illustrating the structure of the left leg switch;
Fig. 7C is a cross-sectional view taken along a line VIIC - VIIC of Fig. 7B;
Fig. 8A is a perspective view illustrating the structure of a left arm switch;
Fig. 8B is a side view illustrating the structure of a left arm switch;
Fig. 8C is a cross-sectional view taken along a line VIIIC - VIIIC of Fig. 8B;
Fig. 9 is a perspective view of a function switch when viewed from the bottom surface of the function switch;
Fig. 10 is a cross-sectional view of a mounting unit with the function switch being attached;
Fig. 11 is a block diagram illustrating the internal configuration of a toy body;
Fig. 12 is a flowchart illustrating creation of a first dramatic effect and a second dramatic effect;
Fig. 13 is a flowchart illustrating creation of a third dramatic effect and a fourth dramatic effect;
Fig. 14 is a flowchart illustrating creation of another second dramatic effect and another fourth dramatic effect; and
Fig. 15 illustrates operations of the arrangement of the function switches.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] Exemplary embodiments of the present invention are described in detail below with reference to the accompanying drawings. In the drawings, the same reference symbol is used for convenience to indicate elements which are the same or which perform the same or a similar function. Note that the terms "front", "back", "right", and "left" refer to the front, back, right, and left of the user of a toy.

[0020] As illustrated in Figs. 1 and 2, according to the present exemplary embodiment, a toy 10 is mounted on the waist of a user 1 using a belt 11 encircling the waist of the user. The toy 10 includes a dramatic effect unit 12 that emits light and sound. The dramatic effect unit 12 includes a display device 13. The display device 13 can display an image 14 representing the human body (a character image in the present exemplary embodiment) .

[0021] The user 1 can virtually experience the action performed by the character by operating a variety of switches and changing the image 14 and the sounds. Examples of the action include changing the entirety or part of the body into a different form (so-called transformation or a form change) and launching a special weapon from a transformed arm or leg cannon.

[0022] The overall configuration of the toy 10 is de-

scribed in detail below with reference to Figs. 3 and 4. As illustrated in Figs. 3 and 4, a toy body 20 includes a body base 22 that is arc-curved along the waist of the human body (refer to a circular arc 21 in Fig. 3). The toy body 20 further includes five mounting units 23A, 23B, 23C, 23D, and 23E each protruding forward from the body base 22.

[0023] The upper surface of each of the mounting units 23A to 23E is an inclined surface extending downwardly and forwardly from the upper end thereof. In addition, the mounting units 23A to 23D are arranged along the circular arc 21. When viewed from the user's perspective, the mounting units 23A and 23B are disposed on the right, and the mounting units 23C and 23D are disposed on the left.

[0024] A liquid crystal display device 13 is mounted on the upper surface of the mounting unit 23E. The display device 13 can emit multi-color using a plurality of light-emitting diodes (LEDs). The image 14 is displayed on the display device 13 in the form of an upstanding character. When viewed from the front, the character stands upright, facing in the same direction as the user.

[0025] The switches fall in the following three categories: four function switches 31A, 31B, 31C, and 31D corresponding to the parts (the right arm, the right leg, the left leg, and the left arm) of the image 14, four transformation switches 32 used for creating a dramatic effect before transformation is initiated, and an OK switch 33 for confirming actions related to transformation and a special weapon.

[0026] The function switches 31A to 31D correspond to parts of the image 14. That is, the function switches 31A serves as a right arm switch 31A, the function switches 31B serves as a right leg switch 31B, the function switches 31C serves as a left leg switch 31C, and the function switches 31D serves as a left arm switch 31D. The shapes of function switches 31A to 31D are associated to a circle, a cross, a triangle, and a square. In this way, the four switches can be visually easily distinguished from one another.

[0027] Hereinafter, when the function switches 31A to 31D are described in association with parts of the human body, the function switches 31A to 31D are referred to as a "right arm switch 31A", a "right leg switch 31B", a "left leg switch 31C", and a "left arm switch 31D", respectively.

[0028] In addition, the parts of the image 14 also have circle, cross, a triangle, and square symbols superimposed thereon. In this way, as indicated by a dashed line arrow in Fig. 3, a correspondence between each of the parts of the image 14 and one of the function switches 31A to 31D can be easily recognized.

[0029] Furthermore, the function switches 31A to 31D are disposed on the upper surfaces of the mounting units 23A to 23D, respectively. Thus, the function switches 31A to 31D are arranged along the circular arc 21. The right leg switch 31B is disposed to the right of the display device 13. The right arm switch 31A is disposed to the right of the right leg switch 31B. In contrast, the left leg switch 31C is disposed to the left of the display device 13, and the left arm switch 31D is disposed to the left of the left leg switch 31C.

[0030] Still furthermore, the function switches 31A to 31D are removably and replaceably mounted on the mounting units 23A to 23D. For example, the right arm switch 31A being used may be removed, and another right arm switch (refer to a right arm switch 41A in Fig. 4) may be mounted. According to the present exemplary embodiment, switches for the same part (e.g., a right leg switch and another right leg switch) are replaceable. However, switches for different parts (e.g., a right leg switch and a left leg switch) are not replaceable.

[0031] The four transformation switches 32 are disposed on the top ends of the mounting units 23A to 23D. Each of the transformation switches 32 includes a base portion 32a rotatably supported by a top end opening portion 26 of one of the mounting units 23A to 23D and an operation portion 32b that protrudes forward from the base portion 32a. The operation portion 32b is rotatable in the vertical direction (refer to an arrow (1) in Fig. 4). The user operates the operation portion 32b to turn on or off the transformation switch 32.

[0032] The OK switch 33 is disposed on the side surface of the body base 22 (to the right of the right arm switch 31A). The OK switch 33 includes a base portion 33a rotatably disposed on the body base 22 and a curved operation portion 33b that upwardly extends from the base portion 33a and that operates as a lever. The operation portion 33b is rotatable towards the user (refer to an arrow (2) in Fig. 3). The user operates the operation portion 33b to turn on or off the OK switch 33.

[0033] The structures of the four function switches (the right arm switch 31A, the right leg switch 31B, the left leg switch 31C, and the left arm switch 31D) are described in detail below with reference to Figs. 5A to 5C, Figs. 6A to 6C, Figs. 7A to 7C, and Figs. 8A to 8C.

[0034] As illustrated in Fig. 5A, the right arm switch 31A includes an insertion portion 34A that is inserted into the mounting unit 23A, a lid cover portion 35A disposed on the upper end of the insertion portion 34A, a push button portion 36A disposed on the lid cover portion 35A, right and left terminals 37 that protrude from the lower end of the insertion portion 34A, and an engagement portion 38 provided in a lower back portion of the insertion portion 34A. The engagement portion 38 has an engagement groove 38a that has a U-shaped cross section and that extends in the right-left direction.

[0035] As illustrated in Fig. 5B, the push button portion 36A is movable in the vertical direction (refer to an arrow (3) in Fig. 5B). The user operates the push button portion 36A to turn on or off the right arm switch 31A. In addition, the upper surface of the lid cover portion 35A is tilted forward. Furthermore, as illustrated in Fig. 5C, the outer shape of the insertion portion 34A is substantially circular so as to correspond to a circle symbol (refer to Fig. 3).

[0036] As illustrated in Fig. 6A, the right leg switch 31B

includes an insertion portion 34B that is inserted into the mounting unit 23B, a lid cover portion 35B disposed on the upper end of the insertion portion 34B, a handle portion 36B disposed on the lid cover portion 35B, right and left terminals 37 that protrude from the lower end of the insertion portion 34B, and an engagement portion 38 provided in a lower back portion of the insertion portion 34B.

[0037] As illustrated in Fig. 6B, the handle portion 36B is movable in a front-back direction (refer to an arrow (4) in Fig. 6B). The user operates the handle portion 36B to turn on or off the right leg switch 31B. In addition, the upper surface of the lid cover portion 35B is tilted forward. Furthermore, as illustrated in Fig. 6C, the outer shape of the insertion portion 34B is substantially cross-shaped so as to correspond to a cross symbol (refer to Fig. 3).

[0038] As illustrated in Figs. 7A and 7B, the left leg switch 31C includes an insertion portion 34C that is inserted into the mounting unit 23C, a lid cover portion 35C disposed on the upper end of the insertion portion 34C, a dial portion 36C disposed on the lid cover portion 35C, right and left terminals 37 that protrude from the lower end of the insertion portion 34C, and an engagement portion 38 provided in a lower back portion of the insertion portion 34C.

[0039] The dial portion 36C is rotatable about a vertical axis (refer to an arrow (5) in Fig. 7A). The user operates the dial portion 36C to turn on or off the left leg switch 31C. In addition, the upper surface of the lid cover portion 35C is tilted forward. Furthermore, as illustrated in Fig. 7C, the outer shape of the insertion portion 34C is substantially triangular so as to correspond to a triangle symbol (refer to Fig. 3).

[0040] As illustrated in Fig. 8A, the left arm switch 31D includes an insertion portion 34D that is inserted into the mounting unit 23D, a lid cover portion 35D disposed on the upper end of the insertion portion 34D, a wheel portion 36D that is rotatably supported by the insertion portion 34D and that has an upper half portion exposed through the lid cover portion 35D, right and left terminals 37 that protrude from the lower end of the insertion portion 34D, and an engagement portion 38 provided in a lower back portion of the insertion portion 34D.

[0041] As illustrated in Fig. 8B, the wheel portion 36D is rotatable about a horizontal axis (refer to an arrow (6) in Fig. 8B). The user operates the wheel portion 36D to turn on or off the left arm switch 31D. In addition, the upper surface of the lid cover portion 35D is tilted forward. Furthermore, as illustrated in Fig. 8C, the outer shape of the insertion portion 34D is substantially square so as to correspond to a square symbol (refer to Fig. 3).

[0042] The bottom structure of each of the function switches 31A to 31D is described next with reference to Fig. 9. As illustrated in Fig. 9, a bottom surface 42 of each of the function switches 31A to 31D has an identification unit 43 and an identification unit 44.

[0043] The identification unit 43 has a plurality of identification points 43a (four points in the present exemplary embodiment). A convex portion 43b is formed or is not formed at each of the identification points 43a. That is, the identification unit 43 has identification information determined by a combination of the presence/absence of the convex portion 43b and the number of the identification points 43a. According to the present exemplary embodiment, the identification unit 43 has identification information indicating the type of movable member. For example, if the right arm switch 31A has four identification points 43a, 2^4 (= 16 (type)) identification information items can be obtained. In this way, 16 types of right arm switches 31A having different identification information can be provided. Thus, for four function switches 31A to 31D, 16^4 information items can be obtained. According to the present exemplary embodiment, the identification unit 43 identifies identification information items determined by a combination of the presence/absence of the convex portion 43b and the number of the identification points 43a. However, the identification technique is not limited thereto. For example, identification information may be stored in, for example, an IC tag, and the toy body may read the identification information. However, by using the structure of the present exemplary embodiment, the identification information of the identification unit can be sent to the toy body in a more simplified manner.

[0044] The identification unit 44 moves in the vertical direction (refer to an arrow (7) in Fig. 9) in conjunction with the operations performed on each of the operation units (the push button portion 36A, the handle portion 36B, the dial portion 36C, and the wheel portion 36D) of the function switches 31A to 31D. According to the present exemplary embodiment, when one of the operation units (the push button portion 36A, the handle portion 36B, the dial portion 36C, and the wheel portion 36D) of the function switches 31A to 31D is operated, the identification unit 44 projects upward and, thus, one of the function switches 31A to 31D is turned on. That is, the movement of the identification unit 44 is detected in the form of an ON/OFF signal, which is sent to a control unit (described in more detail below). Note that according to the present exemplary embodiment, when the operation unit of a movable member is operated, the identification unit 44 projects upward, and the projection is detected as an ON/OFF signal. The ON/OFF signal is sent to the control unit. However, the detection technique is not limited thereto. For example, the identification unit may be configured as a light emitting unit or a signal output unit. If the operation unit is operated, light or a signal may be output. However, by using the structure of the present exemplary embodiment, the identification information of the identification unit can be sent to the toy body in a more simplified manner.

[0045] A technique for mounting each of the function switches 31A to 31D is described next with reference to Fig. 10. Hereinafter, a technique for mounting the right arm switch 31A is described. Since techniques for mounting the right leg switch 31B, the left leg switch 31C, and the left arm switch 31D are the same as the technique

for mounting the right arm switch 31A except for the inner shapes of insertion holes, description of the techniques is not repeated.

[0046] As illustrated in Fig. 10, an insertion hole 27 is formed in the upper portion of the mounting unit 23A so as to have a vertical axis. The inner shape of the insertion hole 27 is formed so as to be the same as the outer shape of the insertion portion 34A of the right arm switch 31A (refer to Fig. 5C). Accordingly, any one of the other switches 31B to 31D cannot be inserted into the insertion hole 27 to which the right arm switch 31A is to be attached. That is, the insertion hole 27 is dedicated to the right arm switch 31A. Similarly, as insertion holes for the other function switches 31B to 31D, dedicated insertion holes are provided.

[0047] A protrusion member 29 urged forward by a compression coil spring 28 is protrudably disposed in the lower back portion of the insertion hole 27. If the right arm switch 31A is inserted into the insertion hole 27, the top end of the protrusion member 29 is fit to the engagement groove 38a and, therefore, the right arm switch 31A is firmly fit to the insertion hole 27. When the right arm switch 31A is attached, the upper surface of the lid cover portion 35A has substantially the same tilt angle as the upper surface of the mounting unit 23A.

[0048] The internal structure of the toy body is described next with reference to Fig. 11. As illustrated in Fig. 11, the toy body 20 has a control unit 45 and a battery 46 inside thereof. The control unit 45 and the battery 46 are connected to each other via a power switch 47. Accordingly, if the power switch 47 is turned on, an electric current flows in the control unit 45. Thus, the control unit 45 starts a control operation.

[0049] First detection means 48, second detection means 49, and acquiring means 51 are connected to the control unit 45. The first detection means 48 detects whether each of the function switches 31A to 31D is mounted and sends detected information to the control unit 45. The protrusion member 29 (refer to Fig. 10) may be used as the first detection means 48. The acquiring means 51 detects the shape of the identification unit 43 of each of the function switches 31A to 31D and sends the identification information to the control unit 45. The second detection means 49 detects whether each of the function switches 31A to 31D is operated by detecting the movement of the identification unit 44 and sends the detected information to the control unit 45. In addition, the transformation switches 32 and the OK switch 33 are connected to the control unit 45. The ON/OFF information regarding the transformation switches 32 and the OK switch 33 is sent to the control unit 45. Furthermore, a memory 52 is connected to the control unit 45. Operations corresponding to predetermined identification information and a combination of the identification information items are predetermined and are set in the memory 52. In addition, the memory 52 temporarily stores acquired identification information. Still furthermore, the dramatic effect unit 12 is connected to the control unit 45. The display device 13 and a sound emitting unit 15 are connected to the dramatic effect unit 12. Note that it is desirable that the sound emitting unit 15 be disposed in the vicinity of the display device 13. However, the sound emitting unit 15 may be disposed at any point of the toy body 20.

[0050] The operation performed by the toy is described with reference to Figs. 12 and 13. First and second dramatic effects according to the present invention are described first with reference to Fig. 12. As the first and second dramatic effects, when one of the function switches (the right arm switch 31A, the right leg switch 31B, the left leg switch 31C, and the left arm switch 31D) is replaced with a new one, the toy is changed into a different form or color.

[0051] As illustrated in Fig. 12, when the operation is started (step SAS) and if one of the function switches 31A to 31D to be removed is turned off (step SA1), the sound emitting unit 15 emits a sound effect indicating that the function switch is turned off (step SA2). If the function switch is removed (step SA3) and a new function switch is attached (step SA4), the first detection means 48 detects that the new function switch is attached. Thereafter, the acquiring means 51 acquires the identification information of the function switch (step SA5). As the first dramatic effect, the sound emitting unit 15 emits, on the basis of the acquired identification information, guidance speech sound and a waiting tone to notify the user of replacement with a new function switch (step SA6). For example, if a function switch having information indicating white color is replaced with a function switch having information indicating red color, the color guidance speech sound "The red ..." is emitted and, subsequently, the waiting tone is emitted. If the function switch is turned on within a predetermined period of time after the function switch is attached (step SA7), a form change tone is emitted on the basis of the identification information. In addition, a corresponding part of the image 14 (e.g., the right arm part of the image 14 if the right arm switch 31A is replaced) is lit, blinked, or color-changed as a dramatic effect (step SA8). Thereafter, the dramatic effect is completed (step SA9). However, if, in step SA7, the function switch is not turned on within the predetermined period of time after the function switch is attached, the dramatic effect is immediately completed (step SA9). While the present exemplary embodiment has been described with reference to replacement of one of the function switches, the technique is applicable to another case. For example, a function switch may be attached to the toy body without a function switch being attached. In such a case, the first and second dramatic effects can be created in a step after step SA4 of the present exemplary embodiment.

[0052] Third and fourth dramatic effects according to the present invention are described next with reference to Fig. 13. According to the present exemplary embodiment, transformation of the entirety of the image is performed as the dramatic effects. As illustrated in Fig. 13,

if all of the four transformation switches 32 are turned on (step SB2) after a function switch is replaced (step SB1), as the third dramatic effect, the sound emitting unit 15 emits, on the basis of the identification information items of the function switches 31A to 31D and a combination thereof, a sound effect indicating that the transformation switches 32 have been operated (e.g., "beep, beep, beep-beep") and transformation waiting speech sound (e.g., count down speech sound "three, two, one, ...") (step SB3). Subsequently, as the fourth dramatic effect, if the OK switch 33 is turned on within a predetermined period of time after the sound effect for the operation is emitted (step SB4), the sound emitting unit 15 emits, on the basis of the identification information items of the function switches 31A to 31D and a combination thereof, a transformation speech sound (e.g., "orange, black, ..."). At the same time, the image 14 is transformed (step SB5). In this way, the transformation dramatic effects are completed (step SB6). However, if the OK switch 33 is not turned on within the predetermined period of time after the sound effect is emitted, the dramatic effects are immediately completed (step SB7).

[0053] Other forms of the second dramatic effect and the fourth dramatic effect are described with reference to Fig. 14. In this example, a dramatic effect to fire a special weapon by actuating an attack function is created.

[0054] As illustrated in Fig. 14, as the second dramatic effect, when replacement of a function switch is completed (step SC1) and if at least one of the function switches is turned on (step SC2), the sound emitting unit 15 emits, on the basis of the identification information items of the function switches and a combination thereof, function actuation speech sound indicating that an attack function is actuated (e.g., "A red missile ..."). At the same time, the display device 13 lights up or blinks the corresponding part of the image 14 (e.g., the left arm portion of the image if the left arm switch is turned on) or changes the color of the part of the image 14 (step SC3). If the OK switch 33 is turned on within a predetermined period of time after the attack function actuation sound is emitted (step SC4), the processing proceeds to step SC5. However, if the OK switch 33 is not turned on within the predetermined period of time after the attack function actuation sound is emitted (step SC4), the processing is completed (step SC11).

[0055] In step SC5, it is determined whether all of the four function switches 31A to 31D are turned on. If all of the four function switches 31A to 31D are turned on, the processing proceeds to step SC6, where, as the fourth dramatic effect, the sound emitting unit 15 emits a special special-weapon sound on the basis of the identification information items of the function switches and a combination thereof. In addition, the display device 13 changes the image 14 with a special effect. Thereafter, the dramatic effect is completed (step SC8). However, if at least any one of the function switches 31A to 31D is not turned on, the processing proceeds to step SC7, where, as the fourth dramatic effect, the sound emitting unit 15 emits a normal special-weapon sound in accordance with a combination of the function switches 31A to 31D. In addition, the display device 13 normally changes the image 14. Thereafter, the dramatic effect is completed (step SC8).

[0056] As described above, according to the present exemplary embodiment, the user can enjoy the first dramatic effect created when one of the function switches 31A to 31D is attached or replaced. In addition, by operating the function switches 31A to 31D, the user can enjoy the second dramatic effect whenever the user wants.

[0057] In addition, by operating the transformation switches 32 or the OK switch 33, the user can enjoy virtual experience, such as actuation of attack function or transformation, with the third dramatic effect and the fourth dramatic effect.

[0058] Furthermore, since the function switches 31A to 31D have their own identification information, the user can collect a plurality of types of function switch for each of the function switches 31A to 31D. By freely combining the collected function switches, the user can enjoy a variety of patterns of a dramatic effect.

[0059] Still furthermore, as illustrated in Fig. 15, by arranging the function switches 31A to 31D along a circular arc, the left arm switch 31D and the right arm switch 31A are located close to the user, and the left leg switch 31C and the right leg switch 31B are located remote from the user with respect to the left arm switch 31D and the right arm switch 31A. Accordingly, when the user views the toy 10 from above, the positions of a right arm 2, a right leg 3, a left leg 4, and the left arm 5 of the user are similar to the positions of the function switches 31A, 31B, 31C and 31D. In this way, the user can easily recognize which one of the parts of the image 14 corresponds to which one of the four function switches 31A to 31D. Consequently, the user can easily operates one of the function switches 31A to 31D corresponding to the part of the image 14 that the user wants to change.

[0060] In addition, since the display device 13 and the function switches 31A to 31D are disposed on the upper surface of the toy body 20 that is tiled forward, the display device 13 and the function switches 31A to 31D can be easily viewed from the front side, as illustrated in Fig. 4. Accordingly, the viewer other than the user of the toy 10 can also enjoy a change in the image 14 and the operated switches.

[0061] While the present invention has been described with reference to exemplary embodiments, it is to be understood that the scope of the invention is not limited to the scopes of the disclosed exemplary embodiments. It will be appreciated by those skilled in the art that numerous modifications and improvements could be made to the embodiments described above. The scope of the invention is defined by the following claims.

Claims

1. An action toy comprising:

   a moveable member and a toy body (20) including at least one mounting unit;
   detection means (48) disposed in the toy body (20), the detection means (48) detecting that the movable member to be removably mounted to the mounting unit is mounted;
   a dramatic effect unit (12) disposed in the toy body (20), the dramatic effect unit (12) creating a dramatic effect using light or sound; and
   a control unit (45) disposed in the toy body (20);
   wherein when the detection means (48) detects that the movable member is mounted to the toy body (20), the control unit (45) causes the dramatic effect unit (12) to create a first dramatic effect, and **characterized in that**
   when a first operation unit of the movable member is operated, the control unit (45) causes the dramatic effect unit (12) to create a second dramatic effect.

2. The action toy according to Claim 1, wherein the movable member includes an identification unit (43) that indicates a type of the movable member, and wherein the toy body (20) includes an acquiring means (51) that acquires identification information used for identifying the type of the movable member from the identification unit (43), and wherein the control unit (45) creates the first dramatic effect on the basis of the identification information acquired by the acquiring means (51).

3. The action toy according to Claim 1 or 2, wherein the movable member includes the first operation unit, and wherein the control unit (45) creates the second dramatic effect when the first operation unit of the movable member is operated.

4. The action toy according to any one of Claims 1 to 3, wherein the toy body (20) includes a second operation unit (32), and wherein the control unit (45) causes the dramatic effect unit (12) to create a third dramatic effect when the second operation unit (32) is operated after the first dramatic effect has been created.

5. The action toy according to any one of Claims 1 to 4, wherein the toy body (20) includes a third operation unit (33), and wherein the control unit (45) causes the dramatic effect unit (12) to create a fourth dramatic effect when the third operation unit (33) is operated after the second dramatic effect has been created.

6. The action toy according to any one of Claims 1 to 5, wherein the toy body (20) includes a plurality of the mounting units at different locations and a display device (13) forming the dramatic effect unit (12), and wherein the control unit (45) changes part of an image that is displayed on the display device (13) and that corresponds to the location of one of the movable members when the movable member is operated.

7. The action toy according to any one of Claims 1 to 6, wherein the toy body (20) is mounted on the waist of a user using a belt, and wherein an image representing the human body is displayed on the display device (13), at least four of the mounting units are provided at different locations, and wherein each of four of the movable members mounted to the four mounting units corresponds to one of four parts of the image representing the right and left legs and the right and left arms and is used to change the corresponding part of the image, and wherein a display device (13) is disposed in the middle of the belt from the user's perspective, and wherein the movable member for the right leg is disposed to the right of the display device (13), and the movable member for the right arm is disposed to the right of the movable member for the right leg from the user's perspective, and wherein the movable member for the left leg is disposed to the left of the display device (13), and the movable member for the left arm is disposed to the left of the movable member for the left leg from the user's perspective, and wherein the at least four mounting units are arranged along a circular arc so that the movable member for the right arm and the movable member for the left arm are close to the user.

8. The action toy according to any one of Claims 6 or 7, wherein the toy body (20) is mounted on the waist of a user using a belt, and wherein an upper surface of the toy body (20) is tilted forward and downward from the user's perspective, and wherein the upper surface has the at least one mounting unit and the display device (13) disposed thereon.

9. The action toy according to claim 8 wherein the movable member comprises:

   an operation unit operable by a user;
   a first identification unit (43) used by detection means (48) disposed in the toy body (20) to detect that the movable member is attached to the mounting unit; and
   a second identification unit (43) that allows a control unit (45) disposed in the toy body (20) to detect an operation performed on the operation unit.

10. The action toy according to Claim 9, wherein the sec-

ond identification unit (43) performs a stick-out operation caused by the operation performed on the operation unit, and the control unit (45) disposed in the toy body (20) detects the stick-out operation.

11. The action toy according to any of the previous claims wherein the dramatic effect unit comprises a display device.

Patentansprüche

1. Aktionsspielzeug, umfassend:

ein bewegliches Modul und einen Spielzeugkorpus (20), der mindestens eine Befestigungseinheit aufweist;
eine in dem Spielzeugkorpus (20) angeordnete Erkennungseinrichtung (48), wobei die Erkennungseinrichtung (48) feststellt, dass das bewegliche Modul, das entfernbar an der Befestigungseinheit befestigt werden kann, befestigt ist;
eine Einheit für dramatische Effekte (12), die in dem Spielzeugkorpus (20) angeordnet ist, wobei die Einheit für dramatische Effekte (12) einen dramatischen Effekt unter Verwendung von Licht oder Geräuschen erzeugt, und
eine in dem Spielzeugkorpus (20) angeordnete Steuereinheit (45),
wobei die Steuereinheit (45) veranlasst, dass die Einheit für dramatische Effekte (12) einen ersten dramatischen Effekt erzeugt, wenn die Erkennungseinrichtung (48) feststellt, dass das bewegliche Modul an dem Spielzeugkorpus (20) befestigt ist, **dadurch gekennzeichnet, dass** die Steuereinheit (45) veranlasst, dass die Einheit für dramatische Effekte (12) einen zweiten dramatischen Effekt erzeugt, wenn eine erste Bedieneinheit des beweglichen Moduls betätigt wird.

2. Aktionsspielzeug nach Patentanspruch 1, bei dem das bewegliche Modul eine Identifizierungseinheit (43) aufweist, die eine Art des beweglichen Moduls anzeigt, und bei dem der Spielzeugkorpus (20) eine Erfassungseinrichtung (51) aufweist, die von der Identifizierungseinheit (43) kommende Identifizierungsinformationen erfasst, die verwendet werden, um die Art des beweglichen Moduls zu identifizieren, und bei dem die Steuereinheit (45) einen ersten dramatischen Effekt auf der Basis der von der Erfassungseinrichtung (51) erfassten Identifizierungsinformationen erzeugt.

3. Aktionsspielzeug nach Patentanspruch 1 oder 2, bei dem das bewegliche Modul die erste Bedieneinheit aufweist und bei dem die Steuereinheit (45) den zweiten dramatischen Effekt erzeugt, wenn die erste Bedieneinheit des beweglichen Moduls betätigt wird.

4. Aktionsspielzeug nach einem der Patentansprüche 1 bis 3, bei dem der Spielzeugkorpus (20) eine zweite Bedieneinheit (32) aufweist und bei dem die Steuereinheit (45) veranlasst, dass die Einheit für dramatischen Effekte (12) einen dritten dramatischen Effekt erzeugt, wenn die zweite Bedieneinheit (32) betätigt wird, nachdem der erste dramatische Effekt erzeugt wurde.

5. Aktionsspielzeug nach einem der Patentansprüche 1 bis 4, bei dem der Spielzeugkorpus (20) eine dritte Bedieneinheit (33) aufweist und bei dem die Steuereinheit (45) veranlasst, dass die Einheit für dramatischen Effekte (12) einen vierten dramatischen Effekt erzeugt, wenn die dritte Bedieneinheit (33) betätigt wird, nachdem der zweite dramatische Effekt erzeugt wurde.

6. Aktionsspielzeug nach einem der Patentansprüche 1 bis 5, bei dem der Spielzeugkorpus (20) eine Mehrzahl von Befestigungseinheiten an unterschiedlichen Positionen und eine die Einheit für dramatische Effekte bildende Bildschirmeinheit (13) umfasst, und bei dem die Steuereinheit (45) einen Teil eines Bildes verändert, das auf der Bildschirmeinheit (13) angezeigt wird und das der Position von einem der beweglichen Module entspricht, wenn das bewegliche Modul betätigt wird.

7. Aktionsspielzeug nach einem der Patentansprüche 1 bis 6, bei dem der Spielzeugkorpus (20) unter Verwendung eines Gürtels in der Taille eines Benutzers befestigt wird und bei dem ein Bild, das den menschlichen Körper darstellt, auf der Bildschirmeinheit (13) angezeigt wird, wobei mindestens vier der Befestigungseinheiten an unterschiedlichen Positionen vorgesehen sind, und bei dem jedes der vier beweglichen Module, die an den vier Befestigungseinheiten befestigt sind, einem von vier Teilen des Bildes entspricht, die das rechte und das linke Bein und den rechten und den linken Arm darstellen, und verwendet wird, um den entsprechenden Teil des Bildes zu ändern, und bei dem, aus der Perspektive des Benutzers gesehen, eine Bildschirmeinheit (13) in der Mitte des Gürtels angeordnet ist, und bei dem, aus der Perspektive des Benutzers gesehen, das bewegliche Modul für das rechte Bein rechts von der Bildschirmeinheit angeordnet ist und das bewegliche Modul für den rechten Arm rechts von dem beweglichen Modul für das rechte Bein angeordnet ist, und bei dem, aus der Perspektive des Benutzers gesehen, das bewegliche Modul für das linke Bein links von der Bildschirmeinheit (13) angeordnet ist und das bewegliche Modul für den linken Arm links von dem beweglichen Modul für das linke Bein angeord-

net ist, und bei dem die mindestens vier Befestigungseinheiten entlang einem kreisförmigen Bogen angeordnet sind, so dass das bewegliche Modul für den rechten Arm und das bewegliche Modul für den linken Arm dicht bei dem Benutzer angeordnet sind.

8. Aktionsspielzeug nach einem der Patentansprüche 6 oder 7, bei dem der Spielzeugkorpus (20) unter Verwendung eines Gürtels an der Taille eines Benutzers befestigt ist, und bei dem eine obere Fläche des Spielzeugkorpus (20) aus der Perspektive des Benutzers gesehen nach vorn und unten geneigt ist, und bei dem die mindestens eine Befestigungseinheit und die Bildschirmeinheit (13) auf der oberen Fläche angeordnet sind.

9. Aktionsspielzeug nach Patentanspruch 8, bei dem das bewegliche Modul aufweist:

eine von einem Benutzer zu betätigende Bedieneinheit;
eine erste Identifizierungseinheit (43), die von einer in dem Spielzeugkorpus (20) angeordneten Erkennungseinrichtung (48) verwendet wird, um festzustellen, ob das bewegliche Modul an der Befestigungseinheit befestigt ist, und
eine zweite Identifizierungseinheit (43), die es einer in dem Spielzeugkorpus (20) angeordneten Bedieneinheit (45) ermöglicht, eine an der Bedieneinheit ausgeführte Betätigung zu erfassen.

10. Aktionsspielzeug nach Patentanspruch 9, bei dem die zweite Identifizierungseinheit (43) als Ergebnis der an der Bedieneinheit ausgeführten Betätigung einen Vorgang des Herausschiebens durchführt und die in dem Spielzeugkorpus (20) angeordnete Bedieneinheit (45) diesen Vorgang des Herausschiebens erfasst.

11. Aktionsspielzeug nach irgendeinem der vorstehenden Patentansprüche, bei dem die Einheit für dramatische Effekte eine Bildschirmeinheit aufweist.

Revendications

1. Jouet d'action comprenant :

un élément mobile et un corps de jouet (20) incluant au moins une unité de montage ;
des moyens de détection (48) disposés dans le corps de jouet (20), les moyens de détection (48) détectant que l'élément mobile destiné à être monté de manière amovible est monté ;
une unité d'effet spectaculaire (12) disposée dans le corps de jouet (20), l'unité d'effet spectaculaire (12) créant un effet spectaculaire en utilisant de la lumière ou du son ; et
une unité de commande (45) disposée dans le corps de jouet (20) ;
dans lequel quand les moyens de détection (48) détectent que l'élément mobile est monté sur le corps de jouet (20), l'unité de commande (45) provoque la création d'un premier effet spectaculaire par l'unité d'effet spectaculaire (12), et **caractérisé en ce que**
quand une première unité fonctionnelle de l'élément mobile est actionnée, l'unité de commande (45) provoque la création d'un second effet spectaculaire par l'unité d'effet spectaculaire (12).

2. Jouet d'action selon la revendication 1, dans lequel l'élément mobile inclut une unité d'identification (43) qui indique un type d'élément mobile, et dans lequel le corps de jouet (20) inclut des moyens d'acquisition qui acquièrent une information d'identification utilisée pour identifier le type de l'élément mobile à partir de l'unité d'identification (43), et dans lequel l'unité de commande (45) crée le premier effet spectaculaire en fonction de l'information d'identification acquise par les moyens d'acquisition (51).

3. Jouet d'action selon la revendication 1 ou 2, dans lequel l'élément mobile inclut la première unité fonctionnelle, et dans lequel l'unité de commande (45) crée le second effet spectaculaire quand la première unité fonctionnelle de l'élément mobile est actionnée.

4. Jouet d'action selon l'une quelconque des revendications 1 à 3, dans lequel le corps de jouet (20) inclut une seconde unité fonctionnelle (32), et dans lequel l'unité de commande (45) provoque la création d'un troisième effet spectaculaire par l'unité d'effet spectaculaire (12) quand la seconde unité fonctionnelle (32) est actionnée après que le premier effet spectaculaire a été créé.

5. Jouet d'action selon l'une quelconque des revendications 1 à 4, dans lequel le corps de jouet (20) inclut une troisième unité fonctionnelle (33), et dans lequel l'unité de commande (45) provoque la création d'un quatrième effet spectaculaire par l'unité d'effet spectaculaire (12) quand la troisième unité fonctionnelle (33) est actionnée après que le second effet spectaculaire a été créé.

6. Jouet d'action selon l'une quelconque des revendications 1 à 5, dans lequel le corps de jouet (20) inclut une pluralité des unités de montage en différents emplacements et un dispositif d'affichage (13) formant l'unité d'effet spectaculaire (12), et dans lequel l'unité de commande (45) change une partie d'une image qui est affichée sur le dispositif d'affichage

(13) et qui correspond à l'emplacement de l'un des éléments mobiles quand l'élément mobile est actionné.

7. Jouet d'action selon l'une quelconque des revendications 1 à 6, dans lequel le corps de jouet (20) est monté sur la taille d'un utilisateur en utilisant une ceinture, et dans lequel une image représentant le corps humain est affichée sur le dispositif d'affichage (13), au moins quatre des unités de montage sont placée en différents emplacements, et dans lequel chacun des quatre éléments mobiles montés sur les quatre éléments de montage correspond à l'une des quatre parties de l'image représentant les jambes droite et gauche et les bras droit et gauche et est utilisé pour changer la partie correspondante de l'image, et dans lequel un dispositif d'affichage (13) est disposé au milieu de la ceinture du point de vue de l'utilisateur, et dans lequel l'élément mobile pour la jambe droite est disposé à droite du dispositif d'affichage (13), et l'élément mobile pour le bras droit est disposé à droite de l'élément mobile pour la jambe droite du point de vue de l'utilisateur, et dans lequel l'élément mobile pour la jambe gauche est disposé à gauche du dispositif d'affichage (13), et l'élément mobile pour le bras gauche est disposé à gauche de l'élément mobile pour la jambe gauche du point de vue de l'utilisateur, et dans lequel les au moins quatre unités de montage sont agencées le long d'un arc circulaire de telle manière que l'élément mobile pour le bras droit et l'élément mobile pour le bras gauche sont proches de l'utilisateur.

8. Jouet d'action selon l'une quelconque des revendications 6 ou 7, dans lequel le corps de jouet (20) est monté sur la taille d'un utilisateur en utilisant une ceinture, et dans lequel une surface supérieure du corps de jouet (20) est inclinée vers l'avant et vers le bas du point de vue de l'utilisateur, et dans lequel la surface supérieure a l'au moins une unité de montage et le dispositif d'affichage (13) disposés sur elle.

9. Jouet d'action selon la revendication 8, dans lequel l'élément mobile comprend :

une unité fonctionnelle pouvant être actionnée par un utilisateur ;
une première unité d'identification (43) utilisée par des moyens de détections (48) disposés dans le corps de jouet (20) pour détecter que l'élément mobile est fixé sur l'unité de montage ; et
une seconde unité d'identification (43) qui permet à une unité de commande (45) disposée dans le corps de jouet (20) de détecter une action réalisée sur l'unité fonctionnelle.

10. Jouet d'action selon la revendication 9, dans lequel la seconde unité d'identification (43) réalise une action de saillie provoquée par l'action réalisée sur l'unité fonctionnelle, et l'unité de commande (45) disposée dans le corps de jouet (20) détecte l'action de saillie.

11. Jouet d'action selon l'une quelconque des revendications précédentes, dans lequel l'unité d'effet spectaculaire comprend un dispositif d'affichage.

FIG. 1

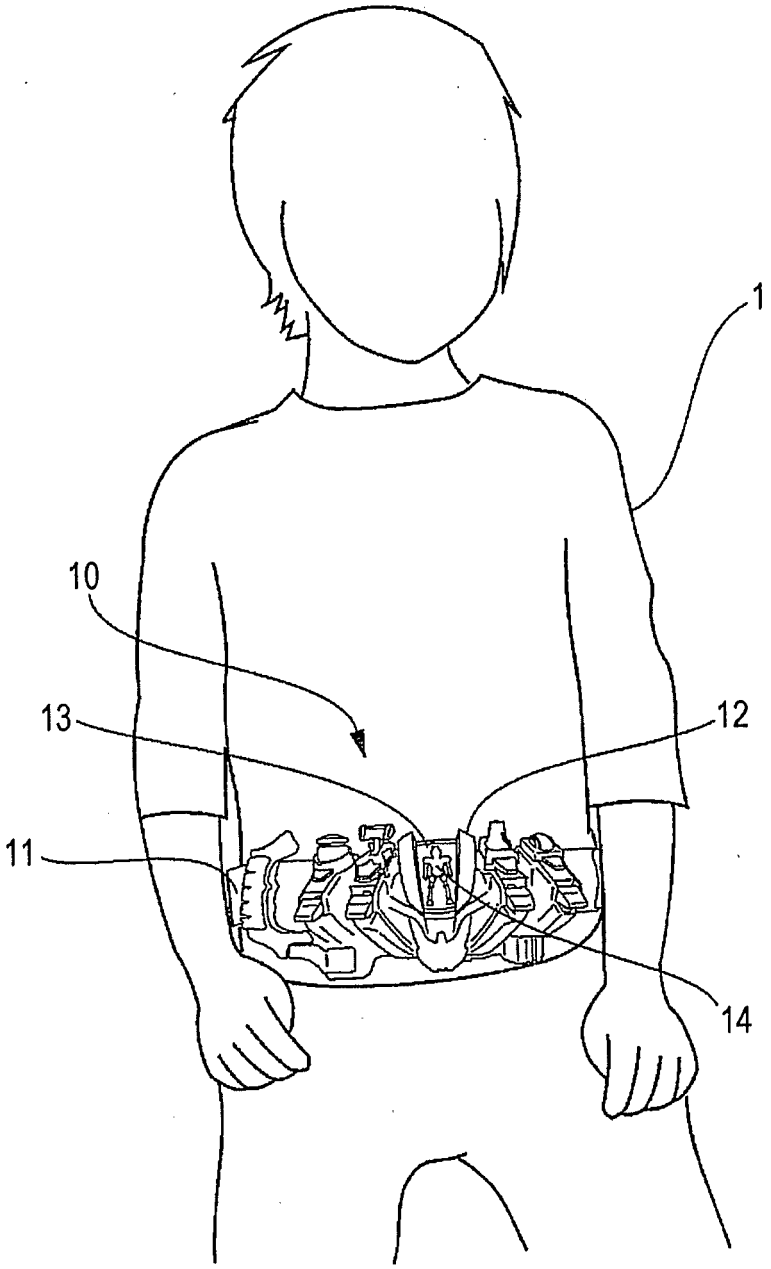


FIG. 2

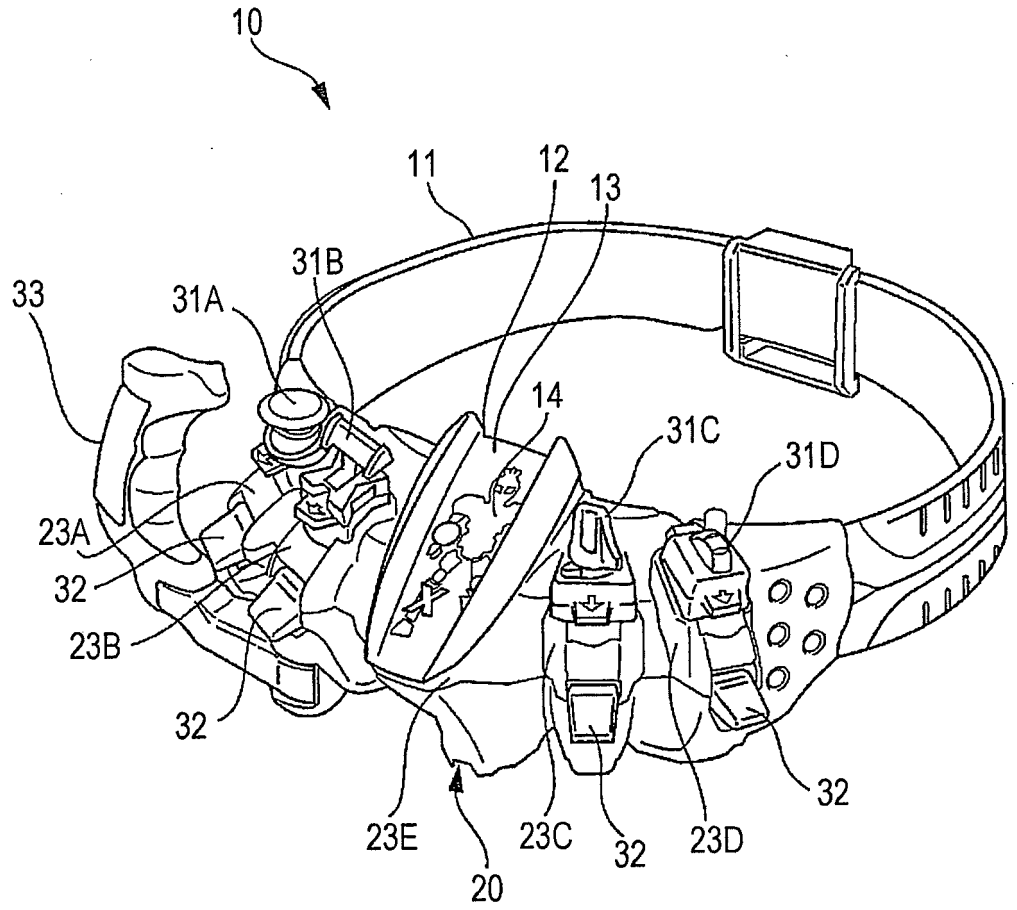


FIG. 3

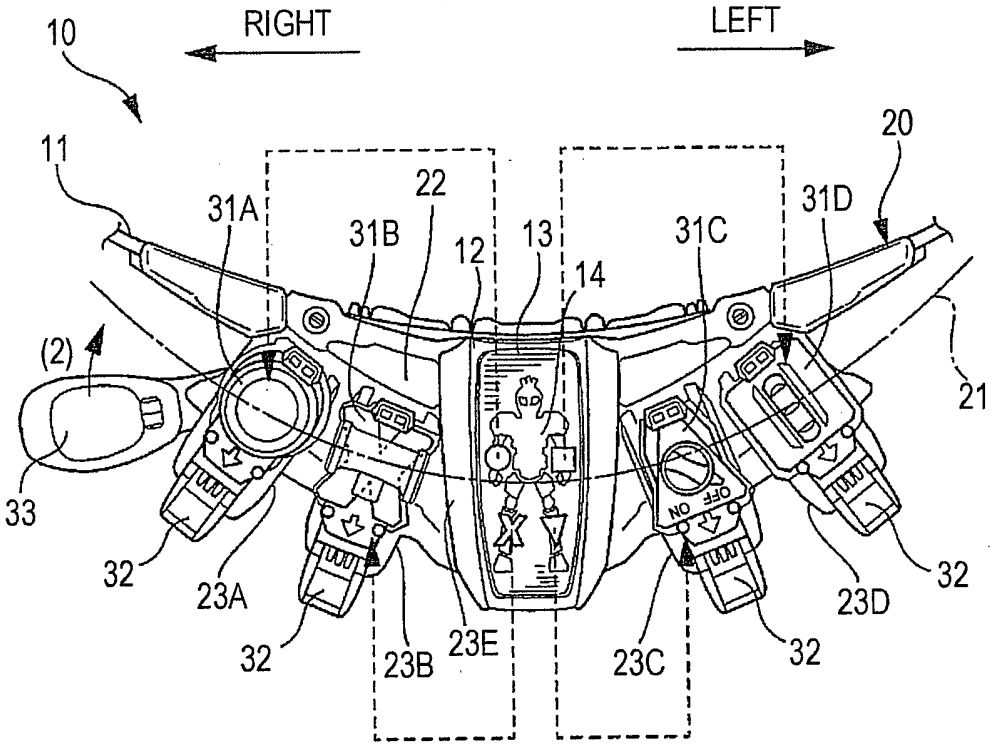

10
RIGHT
LEFT
11
20
31A
22
31B
12
13
31C
31D
14
(2)
21
33
32
23A
32
23B
23E
23C
32
23D
32

FIG. 4

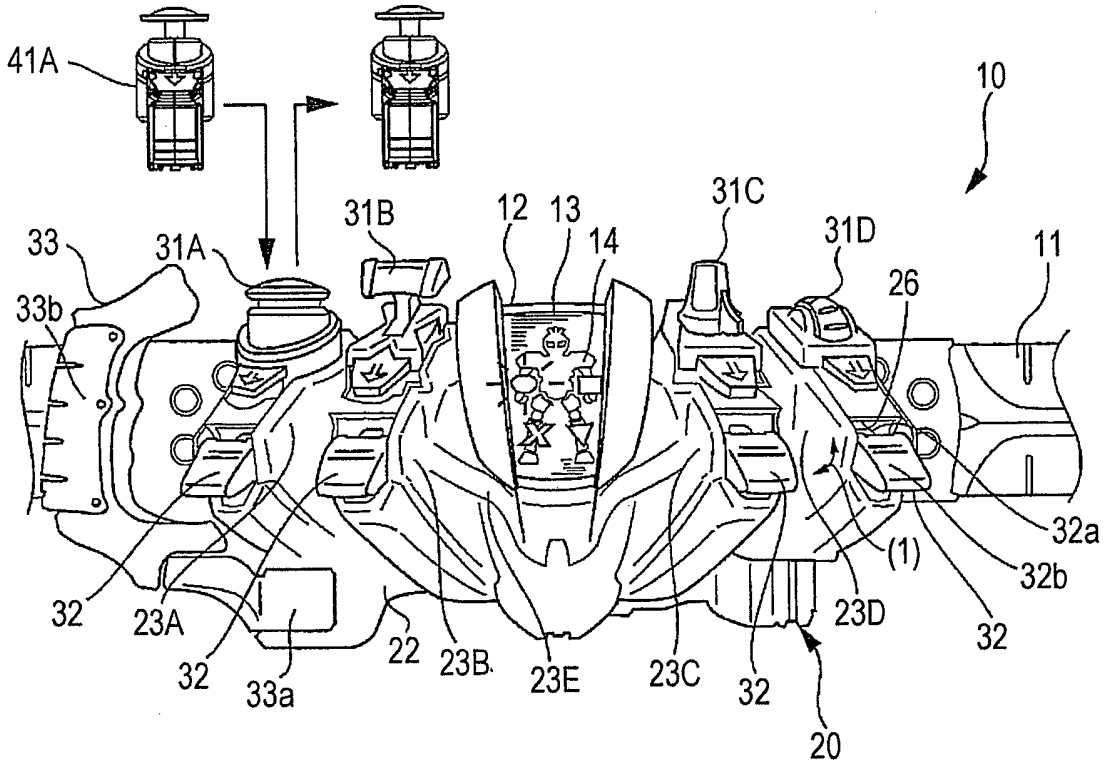

41A
10
31B
12
13
31C
31D
33
31A
14
11
33b
26
32a
(1)
32b
32
23A
22
23B
23E
23C
23D
32
32
33a
32
20

FIG. 5A

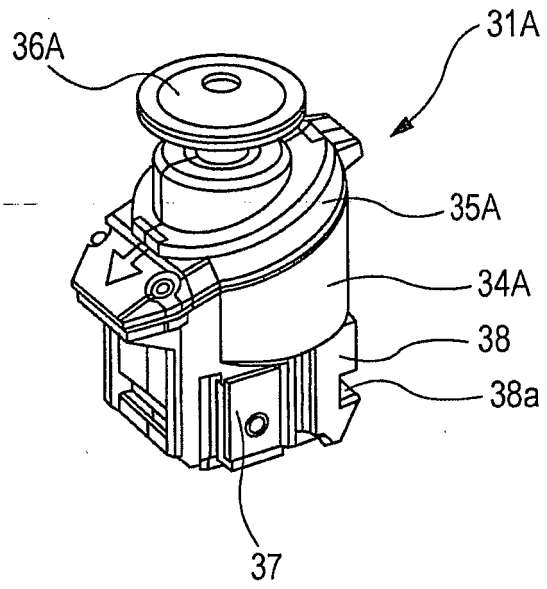


FIG. 5B

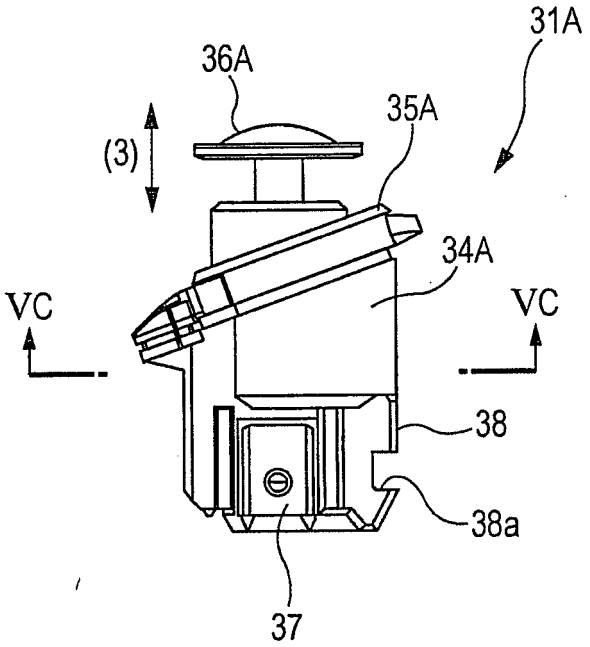


FIG. 5C

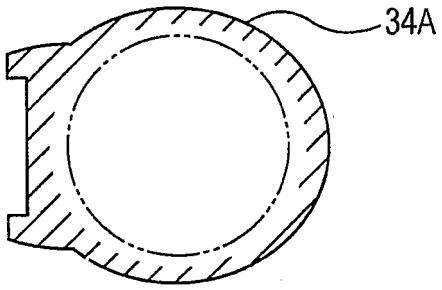


FIG. 6A

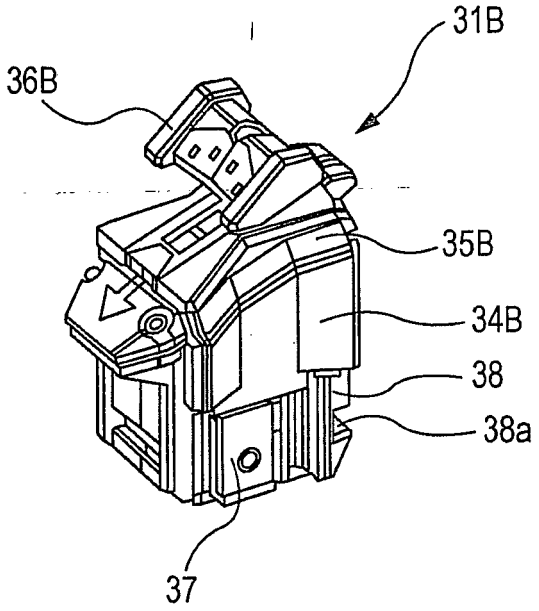


FIG. 6B

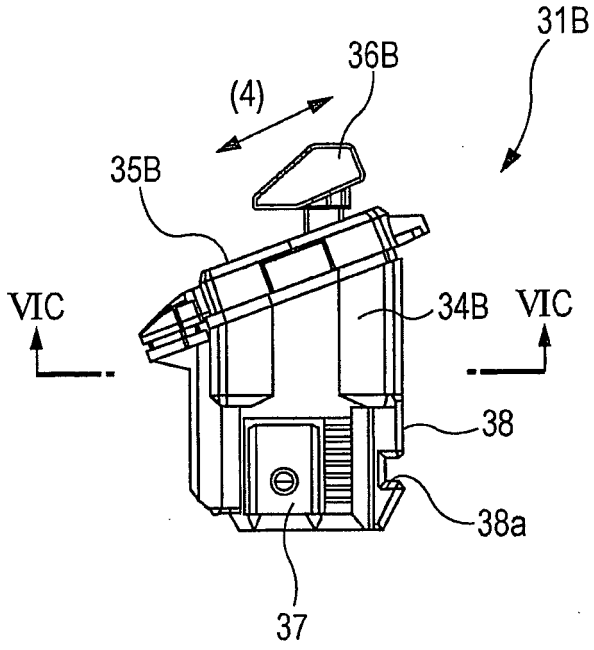


FIG. 6C

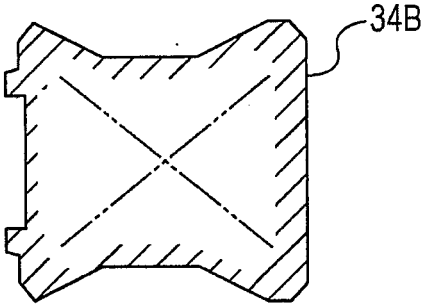


FIG. 7A

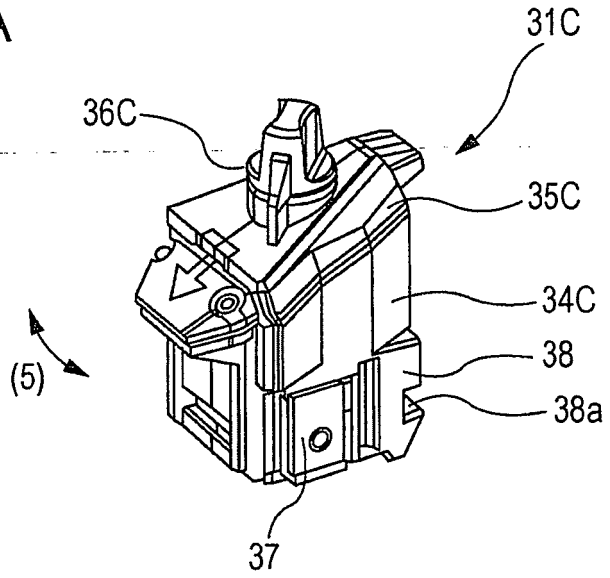


FIG. 7B

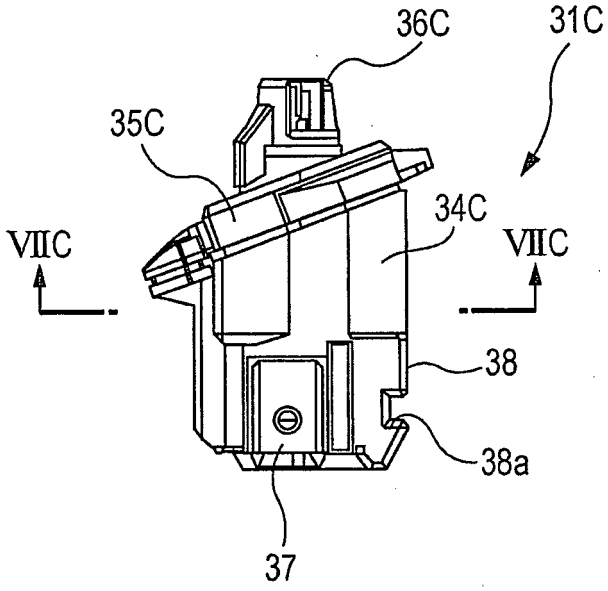


FIG. 7C

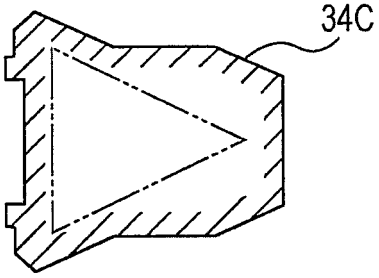


FIG. 8A

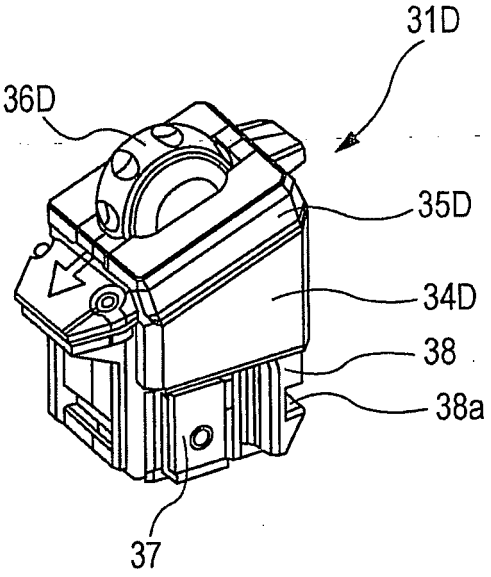


FIG. 8B

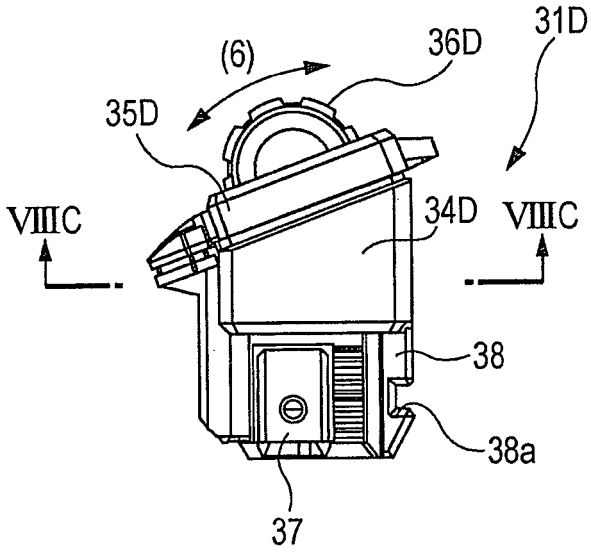


FIG. 8C

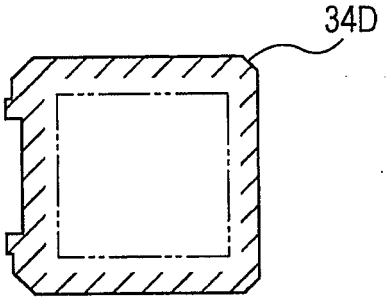


FIG. 9

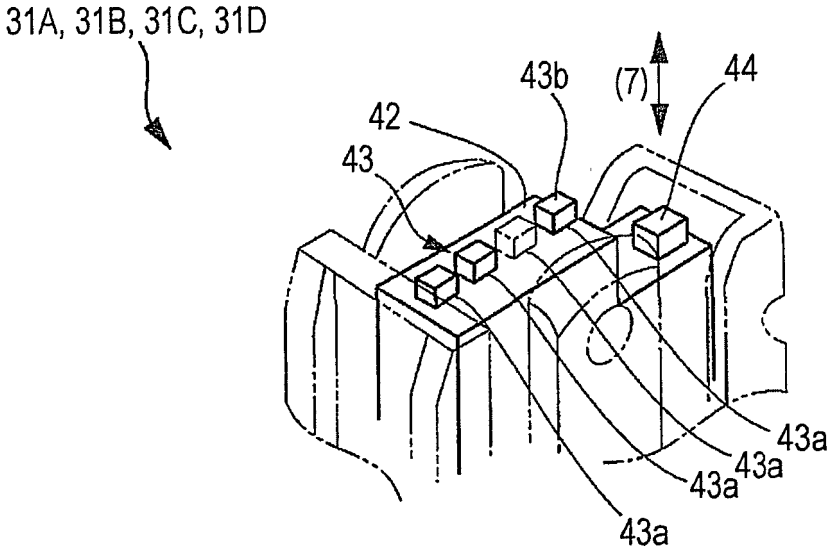

31A, 31B, 31C, 31D
43b
(7)
44
42
43
43a
43a
43a
43a

FIG. 10

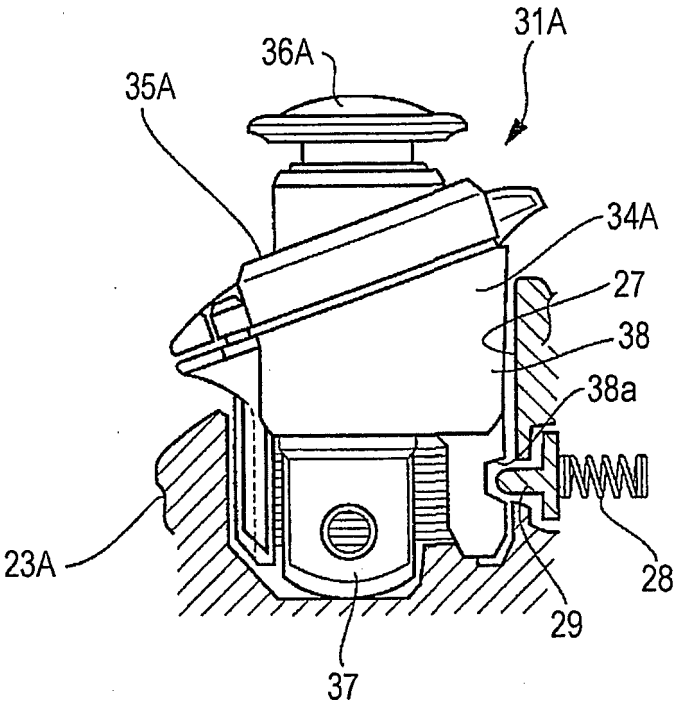

31A
36A
35A
34A
27
38
38a
23A
28
29
37

FIG. 11

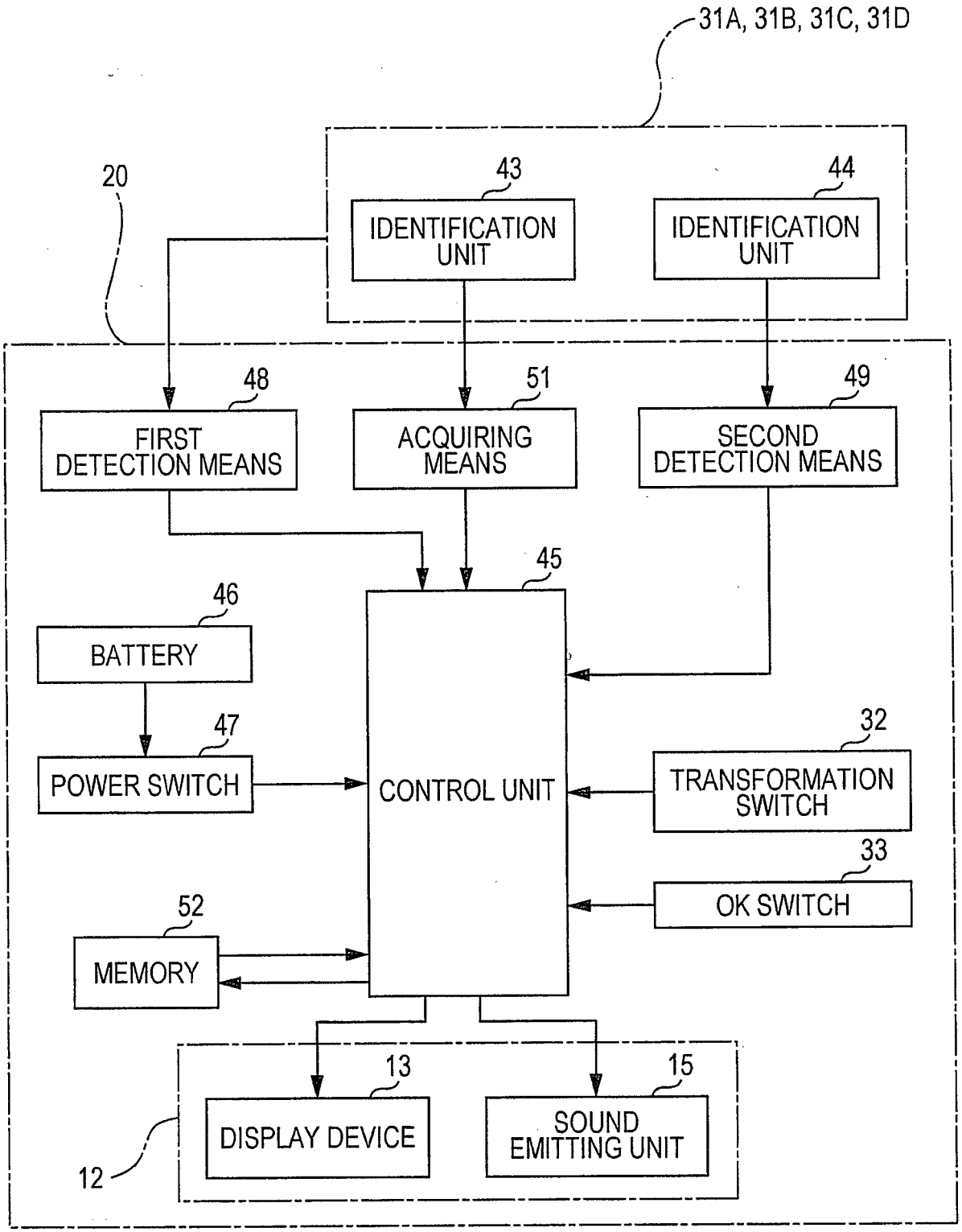

31A, 31B, 31C, 31D
20
43
IDENTIFICATION UNIT
44
IDENTIFICATION UNIT
48
FIRST DETECTION MEANS
51
ACQUIRING MEANS
49
SECOND DETECTION MEANS
45
46
BATTERY
47
POWER SWITCH
CONTROL UNIT
32
TRANSFORMATION SWITCH
33
OK SWITCH
52
MEMORY
13
DISPLAY DEVICE
15
SOUND EMITTING UNIT
12

FIG. 12

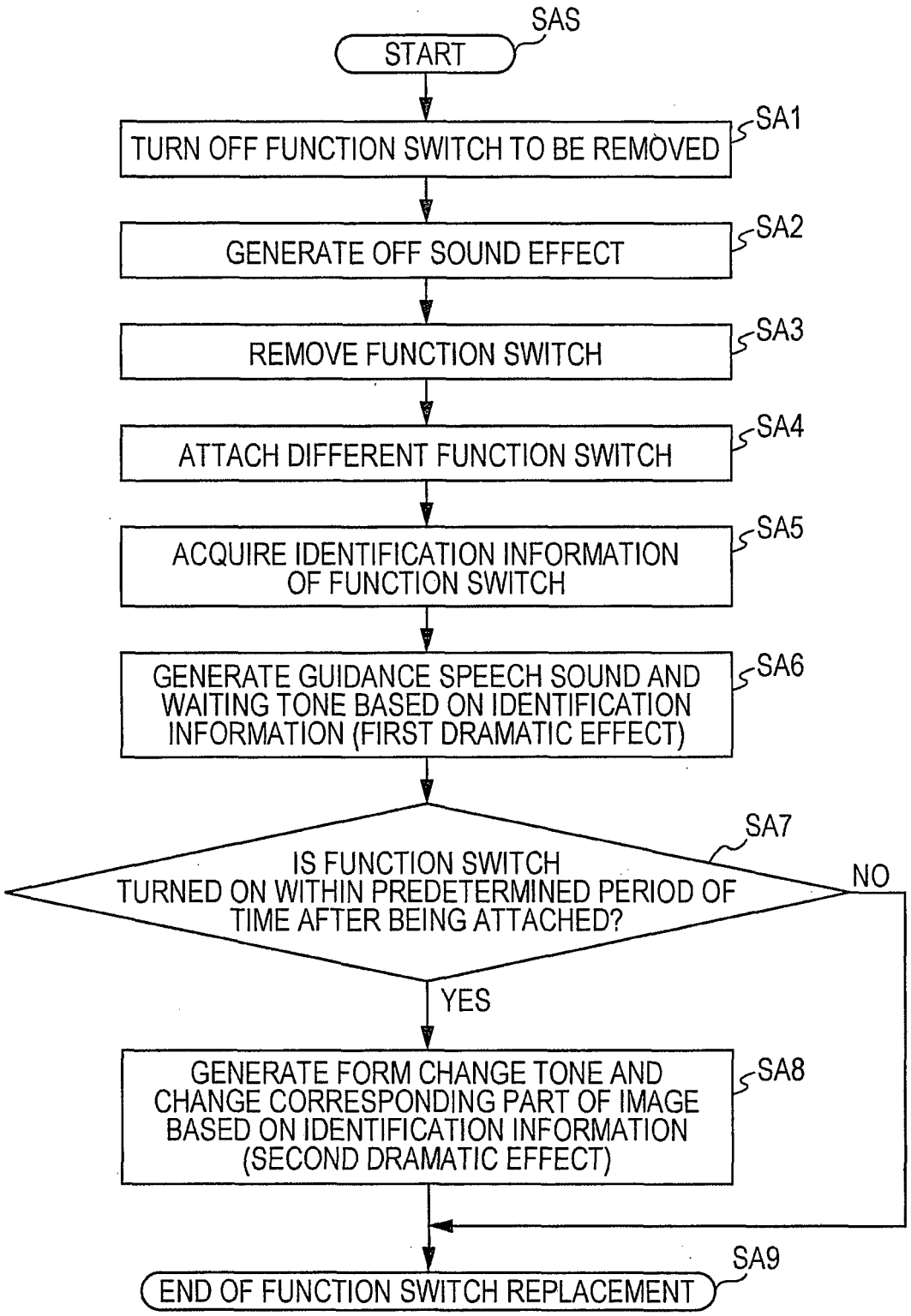

SAS
START
SA1
TURN OFF FUNCTION SWITCH TO BE REMOVED
SA2
GENERATE OFF SOUND EFFECT
SA3
REMOVE FUNCTION SWITCH
SA4
ATTACH DIFFERENT FUNCTION SWITCH
SA5
ACQUIRE IDENTIFICATION INFORMATION OF FUNCTION SWITCH
SA6
GENERATE GUIDANCE SPEECH SOUND AND WAITING TONE BASED ON IDENTIFICATION INFORMATION (FIRST DRAMATIC EFFECT)
SA7
IS FUNCTION SWITCH TURNED ON WITHIN PREDETERMINED PERIOD OF TIME AFTER BEING ATTACHED?
NO
YES
SA8
GENERATE FORM CHANGE TONE AND CHANGE CORRESPONDING PART OF IMAGE BASED ON IDENTIFICATION INFORMATION (SECOND DRAMATIC EFFECT)
SA9
END OF FUNCTION SWITCH REPLACEMENT

FIG. 13

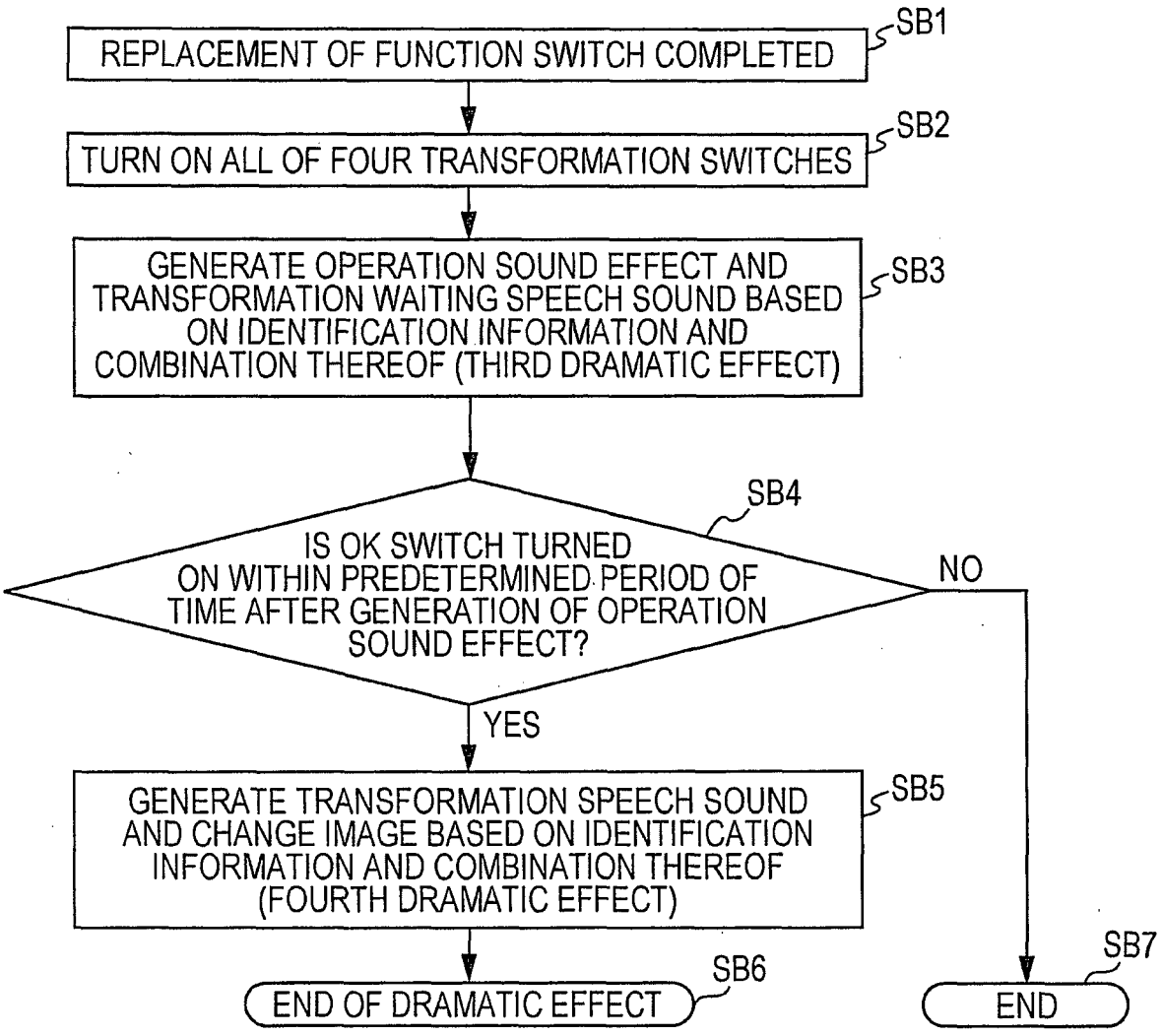

REPLACEMENT OF FUNCTION SWITCH COMPLETED
SB1
TURN ON ALL OF FOUR TRANSFORMATION SWITCHES
SB2
GENERATE OPERATION SOUND EFFECT AND TRANSFORMATION WAITING SPEECH SOUND BASED ON IDENTIFICATION INFORMATION AND COMBINATION THEREOF (THIRD DRAMATIC EFFECT)
SB3
SB4
IS OK SWITCH TURNED ON WITHIN PREDETERMINED PERIOD OF TIME AFTER GENERATION OF OPERATION SOUND EFFECT?
NO
YES
GENERATE TRANSFORMATION SPEECH SOUND AND CHANGE IMAGE BASED ON IDENTIFICATION INFORMATION AND COMBINATION THEREOF (FOURTH DRAMATIC EFFECT)
SB5
END OF DRAMATIC EFFECT
SB6
END
SB7

FIG. 14

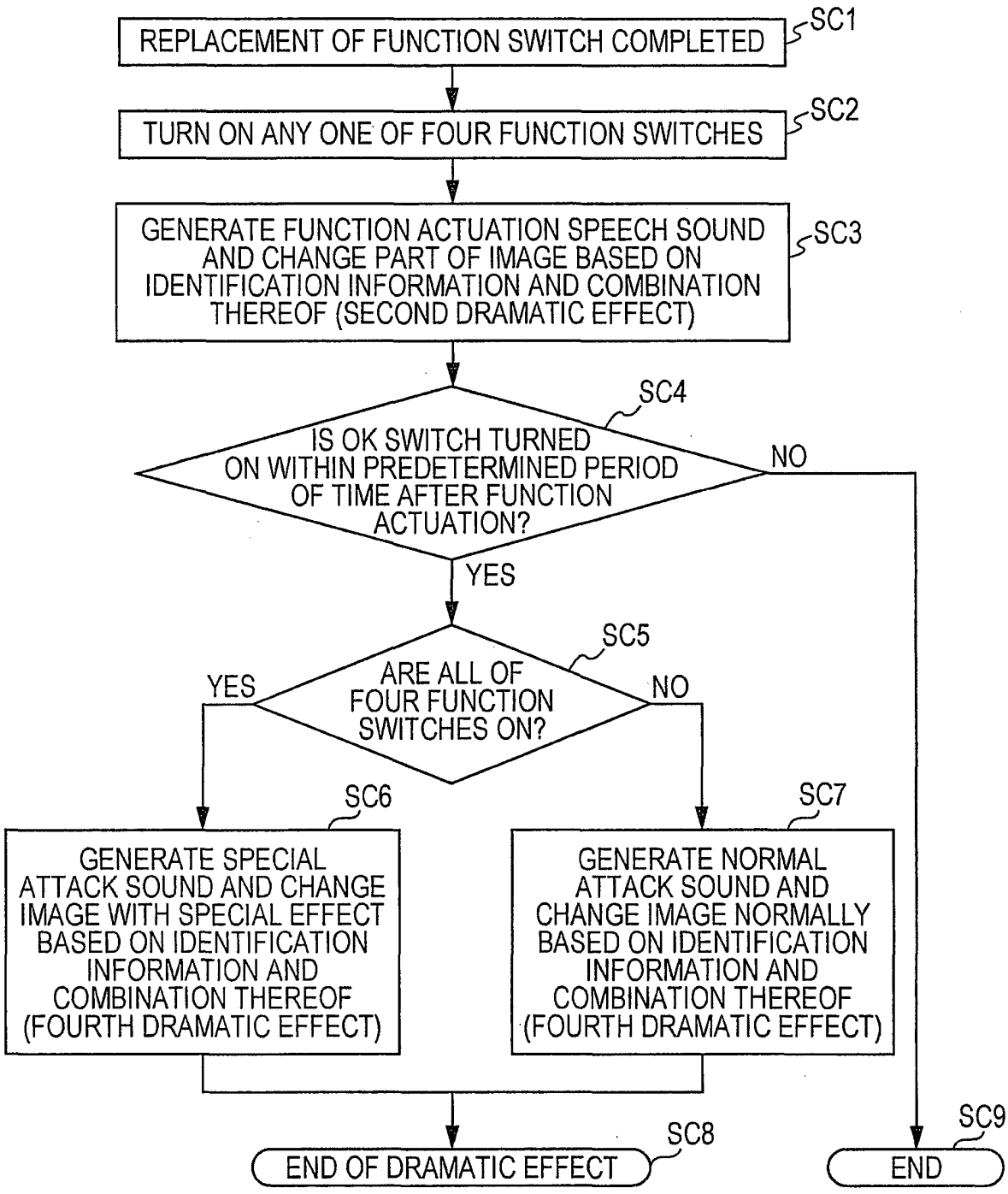
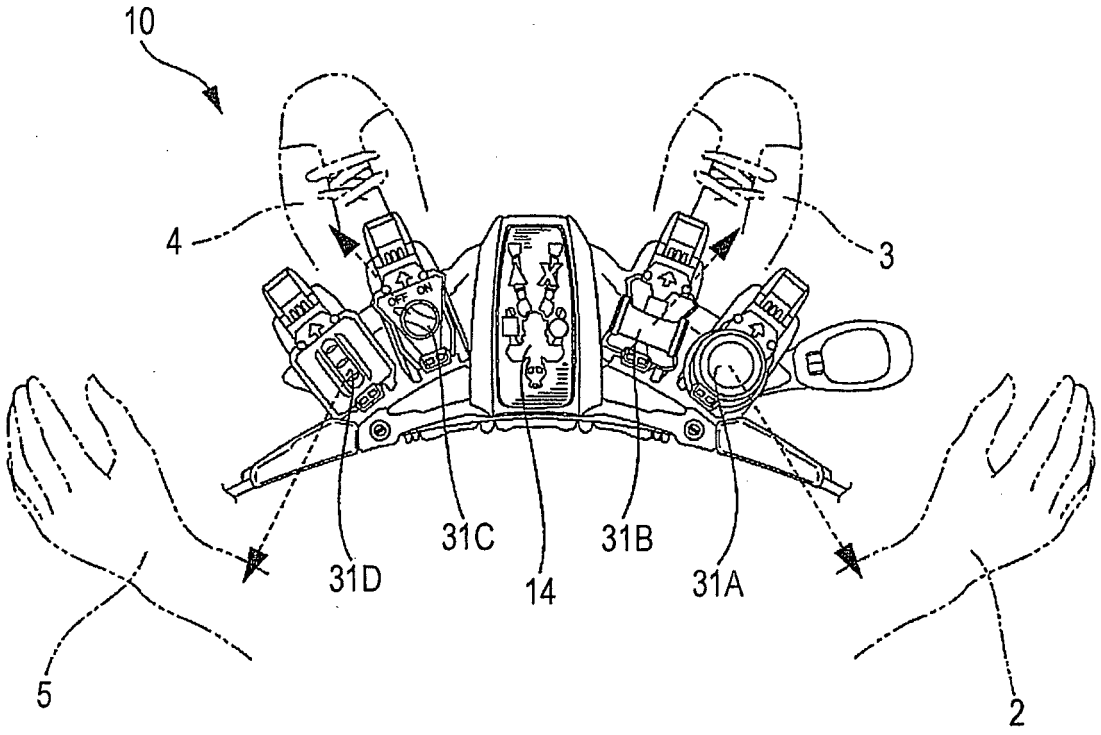

REPLACEMENT OF FUNCTION SWITCH COMPLETED
SC1
TURN ON ANY ONE OF FOUR FUNCTION SWITCHES
SC2
GENERATE FUNCTION ACTUATION SPEECH SOUND AND CHANGE PART OF IMAGE BASED ON IDENTIFICATION INFORMATION AND COMBINATION THEREOF (SECOND DRAMATIC EFFECT)
SC3
SC4
IS OK SWITCH TURNED ON WITHIN PREDETERMINED PERIOD OF TIME AFTER FUNCTION ACTUATION?
NO
YES
SC5
ARE ALL OF FOUR FUNCTION SWITCHES ON?
YES
NO
SC6
GENERATE SPECIAL ATTACK SOUND AND CHANGE IMAGE WITH SPECIAL EFFECT BASED ON IDENTIFICATION INFORMATION AND COMBINATION THEREOF (FOURTH DRAMATIC EFFECT)
SC7
GENERATE NORMAL ATTACK SOUND AND CHANGE IMAGE NORMALLY BASED ON IDENTIFICATION INFORMATION AND COMBINATION THEREOF (FOURTH DRAMATIC EFFECT)
SC8
END OF DRAMATIC EFFECT
SC9
END

FIG. 15



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2002123276 A **[0002] [0003] [0007]**
- US 6353168 B1 **[0006]**