



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication: **14.12.2011 Bulletin 2011/50** (51) Int Cl.: **A63H 33/00 (2006.01)**

(21) Application number: **11168705.9**

(22) Date of filing: **03.06.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **09.06.2010 JP 2010132032**
09.06.2010 JP 2010003918 U

(71) Applicant: **Tomy Company, Ltd.**
Katsushika-ku
Tokyo (JP)

(72) Inventor: **Kunihiro, Takashi**
Tokyo (JP)

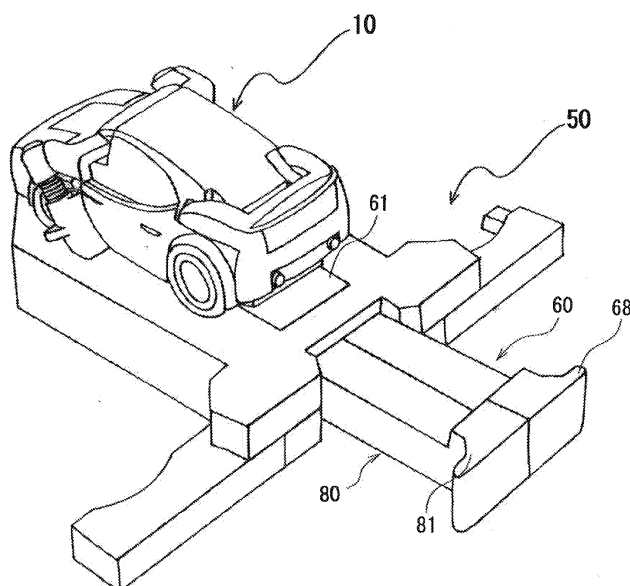
(74) Representative: **Bates, Philip Ian**
Reddie & Grose
16 Theobalds Road
London
WC1X 8PL (GB)

(54) **Toy device**

(57) A toy device that enables a transformable toy to be played with by itself and to be played in combination with another transformable toy and makes a novel impression is provided. The toy device includes a transformable toy (10) with a form which can be reversibly changed by turning a plurality of pivotable members (20), and a base unit (50) on which the transformable toy (10) is mountable. The transformable toy (10) includes a pivoting mechanism for turning the plurality of pivotable

members (20) and an actuator (14) for actuating the pivoting mechanism. The base unit (50) includes an actuating part (64) to which the actuator (14) is coupled and an operating part (68) for externally operating the actuating part (64). When the operating part (68) is operated, the actuator (14) operates accordingly via the actuating part (64), and the pivoting mechanism is actuated to turn the plurality of pivotable members (20), thereby changing the form of the transformable toy (10).

FIG. 15



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a toy device having a transformable toy with a reversibly changeable form and a base unit on which the transformable toy is mountable and, in particular, a toy device in which the form of the transformable toy is changed by operating an operating part provided on the base unit.

2. Description of the Related Art

[0002] Conventionally, a transformable toy with its form reversibly changeable from one form, such as a vehicle or an animal, to another form, such as a robot, has been known. Since this transformable toy is basically played with by its components being sequentially operated by hand to change the form, the operation procedure is cumbersome. Thus, a transformable toy which can have its form being changed by a simple operation has been proposed. For example, Japanese Patent Application Laid-Open Publication No. 9-10442 discloses a transformable toy with its form being changed by operating an operation element to slide a sliding member forward.

[0003] However, the transformable toy disclosed in this reference is a mere one that can have its form being changed by a simple operation of the operation element, and is not one which can be played in combination with another transformable toy. Moreover, since the operation element in this transformable toy is of a sliding type, a sufficient area or region in which the operation element is slid has to be ensured on an outer surface of the toy, thereby disadvantageously restricting the function and design of the toy. Also, since the operation element in this transformable toy is of a sliding type, the operation element can move only within a width in which it can be slid and, in some cases, a driving force sufficient to actuate a pivoting mechanism may not be obtained.

SUMMARY OF THE INVENTION

[0004] The present invention has been made in order to solve the above problems. Therefore, an object of the present invention is to provide a toy device that enables a transformable toy to be played with by itself and to be played in combination with another transformable toy and makes a novel impression.

[0005] Another object of the present invention is to provide a toy device in which the form of a toy can be changed by a simple operation without restricting the design or function of the toy.

[0006] The present invention has been devised to achieve the above objects, and a toy device according to the present invention includes: a transformable toy with

a reversibly changeable form, the transformable toy including a plurality of pivotable members that are turned to change the form of the transformable toy, a pivoting mechanism for turning the plurality of pivotable members, and an actuator for actuating the pivoting mechanism; and a base unit on which the transformable toy is mountable, the base unit including an actuating part to which the actuator is coupled and an operating part for externally operating the actuating part, wherein when the operating part is operated, the actuator operates accordingly via the actuating part, and the pivoting mechanism is actuated.

[0007] In a preferred embodiment of the present invention, the form of the transformable toy is reversibly changed from a first form to a second form, and the actuator is provided on a surface serving as a bottom surface in both the first form and the second form of the transformable toy.

[0008] In a preferred embodiment of the present invention, the base unit includes a base body and a toy mounting part on which the transformable toy is removably mounted, the toy mounting part being slidable relatively to the base body, and the actuating part being formed on the toy mounting part, and when the operating part is operated, the actuating part is actuated, and the toy mounting part slides.

[0009] In a preferred embodiment of the present invention, the base unit further includes an auxiliary operating part that can be externally operated, and the actuating part is actuated when a change in relative position between the auxiliary operating part and the operating part occurs.

[0010] In a preferred embodiment of the present invention, the base unit has a tip provided with a coupling part for coupling to another base unit, and the toy mounting part can slide in a direction of the tip of the base unit.

[0011] In a preferred embodiment of the present invention, the actuator is rotatably provided on the transformable toy, and the actuating part is rotatably provided on the base unit and, when the actuating part is rotated upon an operation of the operating part, the pivoting mechanism is actuated via the actuator to change the form of the transformable toy.

[0012] In a preferred embodiment of the present invention, the transformable toy includes a base member in which the actuator is rotatably disposed, each of the plurality of pivotable members is pivotably coupled to the base member or at least one of other pivotable members of the plurality of pivotable members, and the pivoting mechanism includes a gear device for converting a rotation of the actuator to a turning movement of one of the plurality of pivotable members.

[0013] In a preferred embodiment of the present invention, the actuator is rotatably provided on the transformable toy, the base unit includes a rack linked to the auxiliary operating part and a pinion linked to the operating part and meshing with the rack and, when a change in relative position between the auxiliary operating part and

the operating part occurs, the pinion is rotated by the rack, and the actuating part is rotatably provided on the base unit, and the pinion is engaged with the actuating part so as to rotate the actuating part.

[0014] In a preferred embodiment of the present invention, the base unit includes a lock mechanism for locking the operating part so as to position and hold the toy mounting part in a direction of a tip of the base unit, and the actuating part is actuated to change the form of the transformable toy by operating the auxiliary operating part to change a relative position of the auxiliary operating part with respect to the locked operating part.

[0015] According to the present invention, the toy device includes a base unit on which the transformable toy is mountable. When the operating part of the base unit is operated, the actuator of the transformable toy is operated accordingly, and the pivoting mechanism is actuated to turn the plurality of pivotable members, thereby changing the form of the transformable toy. That is, the form of the transformable toy can be changed by operating the base unit designed for form change. Therefore, irrespectively of a type of form change, even when a different transformable toy is mounted on the base unit, the form can be changed with the same operation.

[0016] According to an embodiment of the present invention, the form of the transformable toy is changed from a first form to a second form, and the actuator is provided on a surface serving as a bottom surface in both the first form and the second form of the transformable toy. Therefore, an influence of the actuator on the design and function of the transformable toy can be minimized. Also, when the transformable toy is mounted on the base unit, a member having the surface serving as a bottom surface is fixed to the base unit. With this fixed member as a base part, the plurality of pivotable members turn to change the form of the transformable toy. Therefore, the form of the transformable toy can be changed so that, for example, the toy stands on the base part, thereby providing a toy device that makes a novel impression.

[0017] According to an embodiment of the present invention, when the operating part is operated, the actuating part is actuated, and the toy mounting part where the actuating part is formed slides. Therefore, the transformable toy slides while changing its form on the base unit, thereby providing a toy device that makes a novel impression.

[0018] According to an embodiment of the present invention, the base unit further includes an auxiliary operating part that can be externally operated, and the actuating part is actuated when a change in relative position between the auxiliary operating part and the operating part occurs. Wherefore, when the auxiliary operating part and the operating part are simultaneously operated, the toy mounting part can be caused to slide without actuating the actuating part. Also, when the auxiliary operating part is operated after the operating part is operated, the actuating part can be actuated with the toy mounting part remaining in a state after sliding. In this manner, the trans-

formable toy can be provided with a variety of form changes and sliding operations, thereby providing a toy device that makes a novel impression.

[0019] According to an embodiment of the present invention, the base unit has a tip provided with a coupling part for coupling to another base unit, and the toy mounting part is formed so as to be slidable in a direction of the tip of the base unit. Therefore, by coupling a plurality of base units, transformable toys each mounted on a base unit can be played together with another transformable toy facing it.

[0020] In this case, by performing a form change and a sliding operation as described above in the transformable toy, a fight with another transformable toy may be performed. For example, transformable toys may be collided against each other while a form change and a sliding operation are being performed, and a win may be determined by toppling the counterpart transformable toy, such as removing it from the base unit by a collision. With this, a toy device that allows a player to not simply enjoy changes in form but also enjoy the toys as a fighting game can be provided.

[0021] According to an embodiment of the present invention, the actuator is rotatably provided on the transformable toy, and the actuating part is rotatably provided on the base unit and, with the actuating part being rotated with an operation of the operating part, and the pivoting mechanism is actuated via the actuator to change the form of the transformable toy. Therefore, only the actuator is formed on an outer surface of the transformable toy. Therefore, a toy device capable of changing the form of a toy with a simple operation without restricting the design and function of the toy can be provided.

[0022] Also, since the actuator is of a rotatable type, unlike an operating element of a sliding type, a pressing type, or the like, the operation range of the actuator is unrestricted by the actuator. That is, when an operating element of a sliding type or a pressing type is adopted, the operating element can be operated only within a width range in which the operating element can slide or be pressed. By contrast, the actuator of a rotatable type has no restriction on a width in which the actuator is moved, and a driving force can be given to the pivoting mechanism according to the number of revolutions of the actuator. Therefore, the structure of the pivoting mechanism is unrestricted, and a variety of changes of the form of the transformable toy can be provided.

[0023] Furthermore, since the actuator is on the bottom surface before and after a form change, the actuator can be operated by a base unit fixing this bottom surface. With this mode adopted, the form can be changed by operating the base unit specifically designed for form change. Therefore, the form of the toy can be changed with a simpler operation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Fig. 1 is an external view of a first transformable

toy in an automobile form which constitutes a toy device according to an embodiment exemplarily implementing the present invention;

[0025] Fig. 2 is a bottom view of the first transformable toy shown in Fig. 1;

[0026] Fig. 3 is an illustration showing a process of changing the form of the first transformable toy;

[0027] Fig. 4 is an illustration showing a pivoting mechanism of the first transformable toy;

[0028] Figs. 5A to 5D are explanation drawings that show the state where an arm member of the first transformable toy moves;

[0029] Fig. 6 is an external view showing the first transformable toy after the form thereof is changed into a robot form;

[0030] Fig. 7 is an external view of a second transformable toy which constitutes the toy device according to the embodiment of the present invention;

[0031] Fig. 8 is a bottom view of the second transformable toy shown in Fig. 7;

[0032] Fig. 9 is an illustration showing a process of changing the form of the second transformable toy;

[0033] Fig. 10 is an illustration showing a pivoting mechanism of the second transformable toy;

[0034] Fig. 11 is an external view showing the second transformable toy after the form thereof is changed to a robot form;

[0035] Fig. 12 is a perspective view showing an example of a base unit for use in the toy device according to the embodiment of the present invention;

[0036] Fig. 13 is an exploded perspective view of the base unit shown in Fig. 12;

[0037] Figs. 14A to 14C are schematic diagrams showing the state in which the base unit is actuated;

[0038] Fig. 15 is a perspective view showing the state in which the first transformable toy in an automobile form is mounted on the base unit;

[0039] Fig. 16 is a perspective view showing the state in which the form of the first transformable toy is changed to a robot form on the base unit;

[0040] Fig. 17 is a perspective view showing the state in which the first transformable toy is actuated by an auxiliary operating part of the base unit;

[0041] Fig. 18 is a perspective view showing the state in which the second transformable toy in an airplane form is mounted on the base unit;

[0042] Fig. 19 is a perspective view showing the state in which the form of the second transformable toy is changed to a robot form on the base unit;

[0043] Fig. 20 is a perspective view showing the state in which the second transformable toy is actuated by an auxiliary operating part of the base unit;

[0044] Fig. 21 is a perspective view showing the state in which base units on which the first transformable toy and the second transformable toy are respectively mounted are coupled together;

[0045] Fig. 22 is a perspective view showing the state in which the coupled base units of Fig. 21 are turned on

a coupling part thereof;

[0046] Fig. 23 is a perspective view showing the state in which the first transformable toy is transformed on one of the coupled base units shown in Fig. 22;

[0047] Fig. 24 is a perspective view showing the state in which the second transformable toy is transformed on the other of the coupled base units shown in Fig. 22; and

[0048] Fig. 25 is a perspective view showing the state in which the forms of the first and second transformable toys facing each other on the coupled base units shown in Fig. 21 are both changed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0049] An embodiment of the present invention is described below with reference to the drawings. A toy device according to an embodiment of the present invention includes a transformable toy and a base unit on which the transformable toy is mounted. As examples of the transformable toy of the toy device of the embodiment, two transformable toys are described, namely, a first transformable toy 10 shown in Figs. 1 to 6 and a second transformable toy 10 shown in Figs. 7 to 11. These two transformable toys 10 can not only be each played with by itself with its form being changed, but also be played together with in combination.

(First Transformable Toy)

[0050] First, the first transformable toy 10 is described. The first transformable toy 10 reversibly changes its form from a first form to a second form with turning of a plurality of pivotable members 20 as shown in Figs. 1 to 6. This first transformable toy 10 is formed to take the form of a vehicle (specifically, an automobile) as a first form (see Fig. 1) and the form of a robot as a second form (see Fig. 6).

[0051] As shown in Figs. 1 and 2, the first transformable toy 10 is provided on a rear side thereof with a base member 11 having a bottom surface 12 serving as a mounting surface or an installation surface with respect to a supporting base or a supporting surface of the transformable toy 10, and the plurality of pivotable members 20 pivotably coupled to this base member 11.

[0052] Inside the base member 11, a horizontal gear 14 having an axis in a vertical direction is provided so as to serve as an actuator that actuates a pivoting mechanism, which will be described further below. When this horizontal gear 14 is rotated, the plurality of pivotable members 20 are turned to change the form of the transformable toy 10. The horizontal gear 14 has a lower end protruding from the bottom surface 12 to the outside of the base member 11 as shown in Figs. 1 to 4, thereby forming an externally-operable protruding part 14a. That is, when this protruding part 14a is operated, the horizontal gear 14 rotates and, with the rotation of this horizontal gear 14, the pivoting mechanism is actuated,

thereby turning the plurality of pivotable members 20.

[0053] The first transformable toy 10 includes the following pivotable members 20, as shown in Figs. 1 to 4. That is, the pivotable members 20 include a rear member 30 coupled to the base member 11 through a shaft 33 to form an upper portion of an automobile form, two arm members 44 coupled to this rear member 30 to form both sides of the automobile form, a front member 21 coupled to the base member 11 through a lower shaft 23 to be accommodated inside the automobile form, and a link member 40 coupling the rear member 30 and the front member 21 together to form a front portion of the automobile form. In Figs. 1. to 3 and Fig. 6, each pivotable member 20 is shown as being hatched with a different pattern so as to be easily distinguishable from another pivotable member 20.

[0054] These pivotable members 20 are turned or pivoted with the rotation of the horizontal gear 14, and each moves from a position in the first form of the transformable toy 10 to a position in the second form thereof broadly as follows. That is, as shown in Figs. 3 and 4, the rear member 30 is raised by the rotational force of the horizontal gear 14 as a driving force, and also the front member 21 is raised with this rear member 30 in an interlocked manner. Furthermore, with turning movements of the rear member 30 and the front member 21, the link member 40 moves to contact two arm members 44. Each of the two arm members 44 is then rotated about a shaft 45 to protrude forward.

[0055] The structure and actuation of the pivoting mechanism causing a change of the form of the first transformable toy 10 are described in detail below. Fig. 4 is an illustration of the pivoting mechanism in the first transformable toy 10. As shown in Fig. 4, an integrally-formed gear 16 having a crown gear 16a and a spur gear 16b integrally formed is provided so as to be rotatable about a horizontal shaft. The crown gear 16a of this integrally-formed gear 16 is disposed so as to mesh with the horizontal gear 14 described above. Therefore, when the protruding part 14a of the horizontal gear 14 is rotated, the integrally-formed gear 16 is rotated via the crown gear 16a meshing with the horizontal gear 14.

[0056] Furthermore, on a base part (a rear end part in the automobile form) of the rear member 30, a base part gear 32 meshing with the spur gear 16b of the integrally-formed gear 16 described above is formed about the shaft 33. When the integrally-formed gear 16 rotates in a counterclockwise direction in Fig. 4, the base part gear 32 rotates in a clockwise direction, and the rear member 30 pivots on the shaft 33 in a rising direction. Also, a portion of the rear member 30 near a tip (a front end part in the automobile form) is coupled to the link member 40 through a shaft 43.

[0057] The front member 21 has one end pivotably coupled to the base member 11 via the lower shaft 23 and has another end pivotably coupled to the link member 40 via an upper shaft 22. Since this link member 40 couples the front member 21 and the rear member 30 to-

gether, these four members, that is, the base member 11, the front member 21, the rear member 30, and the link member 40, form a link mechanism with four coupled members. In this link mechanism, since the base member 11 serves as a stationary member and the rear member 30 serves as a driver, as described above, when the rear member 30 turns in a rising direction, the front member 21 is actuated accordingly to turn in a rising direction on the lower shaft 23.

[0058] when the front member 21 and the rear member 30 rise approximately vertically, an inner side surface of the front member 21 and an inner side surface of the rear member 30 abut each other, thereby preventing any further turning. For this reason, turning movements of the front member 21 and the rear member 30 stop at a position where the front member 21 and the rear member 30 just rise on the base member 11, thereby completing a change of the form of the first transformable toy 10 to the second form.

[0059] As shown in Fig. 4, in the course of actuating this link mechanism, the tip or the rear member 30 accommodated inside the link member 40 is exposed to the outside, the tip of the rear member 30 serving as a head part 31 in a robot form after a form change.

[0060] With the change of the form of the first transformable toy 10, when the front member 21 and the rear member 30 turn so as to be raised as described above, the arm members 44 on both sides of the toy 10 contact the link member 40 moving with the actuation of the link mechanism, thereby being rotated so as to protrude forward.

[0061] That is, as shown in Fig. 4, each of the arm members 44 is pivotably mounted on the rear member 30 with the shaft 45 as an axis. When the first transformable toy 10 is in the first form, each of the arm members 44 is urged by a torsion coil spring 49 to a position suitable for an automobile form. However, as shown in Figs. 5A to 5D, when the horizontal gear 14 is rotated and the link member 40 moves with the turning movements of the rear member 30 and the front member 21 in an interlocked manner, each of the arm members 44 contacts the link member 40 and is pushed thereby so as to rotate about the shaft 45 against a pressing force of the torsion coil spring 49.

[0062] Figs. 5A to 5D are schematic views that each show the state in which the above-described link mechanism is actuated to cause the link member 40 and the arm member 44 to contact each other, with their contact portions viewed from a bottom side as in Fig. 2. When the link mechanism is actuated, as shown in Fig. 5A, a front wheel part 41 formed on the link member 40 moves in a direction of the arm member 44. As shown in Fig. 5B, an outer periphery 41a of the front wheel part 41 abuts a first contact part 46 of the arm member 44, and causes the arm member 44 to rotate approximately 90 degrees against the pressing force of the torsion coil spring 49.

[0063] At this time, a second contact part 47 of the arm

member 44 enters inside the front wheel part 41. Therefore, when the front wheel part 41 moves in a direction of the arm member 44, as shown in Fig. 5C, an inner periphery 41b of the front wheel part 41 abuts the second contact part 47 of the arm member 44, and further causes the arm member 44 to rotate approximately 90 degrees. In this manner, as shown in Fig. 5D, the arm member 44 rotates about the shaft 45 approximately 180 degrees, and then stops.

[0064] Here, as shown in Figs. 1. and 4, the arm member 44 extends in a direction approximately 45 degrees with respect to the shaft 45. Therefore, when rotating approximately 180 degrees in a plan view as described above, the arm member 44 rotates approximately 90 degrees in a side view. Therefore, when a change of the form of the first transformable toy 10 to the second form is completed, the arm members 44 are in the state in which they protrude forward as shown in Fig. 6.

[0065] As described above, when the protruding part 14a of the horizontal gear 14 is rotated, the rear member 30 is pivoted, the link mechanism is actuated, and further the arm members 44 are rotated, thereby changing the form of the first transformable toy 10 to the second form, that is, the robot form, as shown in Fig. 6.

[0066] In the second form, as shown in Fig. 6, the base member 11 forms a below-knee part, the rear member 30 forms a back and head part 31, the arm members 44 form arms, the front member 21 forms a front body part, and the link member 40 forms a chest part, thereby constructing a robot form standing up with both arms protruding forward.

[0067] The above description has been made regarding a mode in which the form of the first transformable toy 10 is changed from the first form, that is, the automobile form, to the second form, that is, the robot form. When the protruding part 14a of the horizontal gear 14 is rotated in reverse, the form is changed from the robot form to the automobile form, as a matter of course. That is, when the protruding part 14a of the horizontal gear 14 is rotated in reverse, the link mechanism is actuated in reverse, and the front member 21, the rear member 30, and the link member 40 are pivoted to positions constructing the first form, that is, the automobile form. Then, with the turning movement of the link member 40, each arm member 44 and the front wheel part 41 disengage from each other. Therefore, due to the pressing force of the torsion coil spring 49, the arm members 44 are rotated to the positions constructing the first form, thereby completing the change of the form to the first form.

[0068] As described above, in the first transformable toy 10, by rotating the horizontal gear 14 formed so as to be externally operable, the pivoting mechanism is actuated to change the form of the first transformable toy 10. In this manner, only the horizontal gear 14 appears on the outer surface of the transformable toy 10 as an operating part for changing the form of the transformable toy 10. Thus the form of the transformable toy can be changed with a simple operation without restricting the

design and function of the toy.

[0069] Also, the horizontal gear 14 serving as an actuator in the present embodiment is of a rotatable type. Therefore, unlike an operating element of a sliding type, a pressing type, or the like, the operation range is substantially unrestricted. That is, the moving width and the like of the actuator are not restricted, and the driving force can be applied to the pivoting mechanism according to the number of revolutions of the horizontal gear 14. Therefore, the structure of the pivoting mechanism is unrestricted, and a variety of changes of the form of the transformable toy can be provided.

[0070] The protruding part 14a of the horizontal gear 14 serving as an operating part is disposed on the surface 12 serving as a bottom surface of the transformable toy in both the first form and the second form. Therefore, an influence of the operating part on the design and function or the toy can be minimized.

(Second Transformable Toy)

Next, a second transformable toy 10 is described.

[0071] As shown in Figs. 7 to 11, with turning movements of a plurality of pivotable members 20, the form of the second transformable toy 10 is reversibly changed from a first form to a second form. This second transformable toy 10 is formed so as to take the form of a vehicle (specifically, an airplane) (see Fig. 7) as a first form, and a robot form as a second form (see Fig. 11).

[0072] As shown in Figs. 7 and 8, the second transformable toy 10 is provided on a rear side thereof with a base member 11 having a bottom surface 12 serving as a mounting surface or an installation surface with respect to a supporting base or a supporting surface of the transformable toy 10, and the plurality of pivotable members 20 pivotably coupled to this base member 11.

[0073] Inside the base member 11, as with the first transformable toy 10, a horizontal gear 14 having an axis in a vertical direction is provided, this gear serving as an actuator that actuates a pivoting mechanism, which will be further described below. When this horizontal gear 14 is rotated, the plurality of pivotable members 20 are turned to change the form of the transformable toy 10. Also, as with the first transformable toy 10, the horizontal gear 14 has a lower end protruding from the bottom surface 12 to the outside of the base member 11 as shown in Figs. 7 to 11, thereby forming an externally-operable protruding part 14a. That is, when the protruding part 14a is operated, the horizontal gear 14 rotates and, with the rotation of the horizontal gear 14, the pivoting mechanism is actuated, thereby turning the plurality of pivotable members 20.

[0074] The second transformable toy 10 includes the following pivotable members 20, as shown in Figs. 7 to 10. That is, the pivotable members 20 include a rear member 30 coupled to the base member 11 through a shaft 33 to form an upper portion of an airplane form, two

arm members 44 coupled to the rear member 30 to form both wings of the airplane form, a front member 21 coupled to the base member 11 through a lower shaft 23 to form a lower part of the airplane form, and a link member 40 coupling the rear member 30 and the front member 21 together to form a nose portion of the airplane form. In Figs. 7 to 9 and Fig. 11, each pivotable member 20 is shown as being hatched with a different pattern so as to be easily distinguishable from another pivotable member 20.

[0075] These pivotable members 20 are pivoted or turned with the rotation of the horizontal gear 14, and each moves from a position in the first form of the second transformable toy 10 to a position in the second form thereof broadly as follows. That is, as shown in Figs. 9 and 10, the rear member 30 is raised due to the rotational force of the horizontal gear 14 as a driving force, and also the front member 21 is raised with this rear member 30 in an interlocked manner. Furthermore, by the pivoting mechanism provided inside the second transformable toy 10, the two arm members 44 are rotated so as to protrude forward.

[0076] The structure and actuation of the pivoting mechanism causing a change of the form of the second transformable toy 10 are described in detail below. Fig. 10 is an illustration of the pivoting mechanism in the second transformable toy 10. As shown in Fig. 10, an integrally-formed gear 16 having a crown gear 16a and a spur gear 16b integrally formed is provided. The crown gear 16a of this integrally-formed gear 16 is disposed so as to mesh with the horizontal gear 14 described above. Therefore, when the protruding part 14a of the horizontal gear 14 is rotated, the integrally-formed gear 16 meshing with the horizontal gear 14 rotates.

[0077] Furthermore, on a base part (a rear end part in the airplane form) of the rear member 30, a base part gear 32 meshing with the spur gear 16b of the integrally-formed gear 16 described above is formed about a shaft 33. When the integrally-formed gear 16 rotates in a counterclockwise direction in Fig. 10, the base part gear 32 rotates in a clockwise direction, and the rear member 30 pivots on the shaft 33 in a rising direction. Also, a portion of the rear member 30 near a tip (a front end part in the airplane form) is coupled to the link member 40 through a shaft 43.

[0078] The front member 21 has one end pivotably coupled to the base member 11 via the lower shaft 23 and has another end pivotably coupled to the link member 40 via an upper shaft 22. Since this link member 40 couples the front member 21 and the rear member 30 together, these four members, that is, the base member 11, the front member 21, the rear member 30, and the link member 40, form a link mechanism with four coupled members. In this link mechanism, since the base member 11 serves as a stationary member and the rear member 30 serves as a driver, as described above, when the rear member 30 turns in a rising direction, the front member 21 is actuated accordingly to pivot in a rising direction on

the lower shaft 23.

[0079] When the front member 21 and the rear member 30 rise approximately vertically, an inner side surface of the front member 21 and an inner side surface of the rear member 30 abut each other, thereby preventing any further turning. For this reason, turning movements stop at a position where the front member 21 and the rear member 30 just rise on the base member 11, thereby completing a change of the form of the second transformable toy 10 to the second form.

[0080] As shown in Fig. 10, in the course of actuating the link mechanism, the tip of the rear member 30 accommodated inside the link member 40 is exposed to the outside, so that the tip of the rear member 30 can serve as a head part 31 in a robot form after a form change.

[0081] With the change of the form of the second transformable toy 10, when the front member 21 and the rear member 30 turn so as to be raised as described above, the pivoting mechanism disposed inside the transformable toy 10 causes the arm members 44 on both sides of the transformable toy 10 to rotate so as to protrude forward.

[0082] That is, shown in Fig. 10, inside the transformable toy 10, a gear plate 42 in a half-arc shape having an internal gear is provided. This gear plate 42 is coupled to the front member 21 and the rear member 30 through the upper shaft 22 and the shaft 43. Therefore, when the protruding part 14a of the horizontal gear 14 is rotated to cause a change in relative position between the front member 21 and the rear member 30, the gear plate 42 also rotates accordingly about the shaft 43. A through hole not shown is formed on a back surface side of the rear member 30, so that a part of the gear plate 42 that cannot fit inside the transformable toy 10 due to the rotation of the gear plate 42 protrudes through this through hole.

[0083] As shown in Fig. 10, an arm part gear 48 provided near a base end of both of the arm members 44 meshes with the internal gear of the gear plate 42. Therefore, when the gear plate 42 moves, the arm part gear 48 rotates, and the arm members 44 turn. That is, as shown in Fig. 10, when the front member 21 and the rear member 30 turn in a rising direction, the gear plate 42 moves so as to protrude to a back surface side. Therefore, the arm part gear 48 is rotated in a counterclockwise direction, and the arm members 44 turn upward and forward. Then, as shown in Fig. 11, the arm members 44 eventually turn approximately 270 degrees with respect to the rear member 30 and, when a change of the form of the second transformable toy 10 to the second form is completed, the arm members 44 are in the state of protruding forward. Each of the arm members 44 rotated approximately 270 degrees has a lower part supported by an engaging part 24 provided on the front member 21, and therefore does not rotate any further.

[0084] As described above, when the protruding part 14a of the horizontal gear 14 is rotated, the rear member

30 turns, the link mechanism is actuated, and further the arm members 44 are rotated, thereby changing the form of the second transformable toy 10 to the second form, that is, the robot form, as shown in Fig. 11.

[0085] In the second form, as shown in Fig. 11, the base member 11 forms a leg part, the rear member 30 forms a back and head part 31, the arm members 44 form arms, the front member 21 forms a front body part, and the link member 40 forms a chest part, thereby constructing a robot form standing up with both arms protruding forward.

[0086] The above description has been made about a mode in which the form of the second transformable toy 10 is changed from the first form, that is, the airplane form, to the second form, that is, the robot form. When the protruding part 14a of the horizontal gear 14 is rotated in reverse, the form is changed from the robot form to the airplane form, as a matter of course. That is, when the protruding part 14a of the horizontal gear 14 is rotated in reverse, the link mechanism is actuated in reverse, and the front, member 21, the rear member 30, and the link member 40 turn to positions constructing the first form, that is, the airplane form. Then, since the gear plate 42 moves in a direction in which it is accommodated inside the transformable toy 10, the arm members 44 rotate to the positions constructing the first form, thereby completing the change of the form to the first form.

[0087] As described above, in the second transformable toy 10, by rotating the horizontal gear 14 formed so as to be externally operable, the pivoting mechanism is actuated to change the form of the second transformable toy 10. In this manner, only the horizontal gear 14 appears on the outer surface of the transformable toy 10 as an operating part for changing the form of the transformable toy 10. Thus the form of the transformable toy can be changed with a simple operation without restricting the design and function of the toy.

[0088] Also, the horizontal gear 14 serving as an actuator in the present embodiment is of a rotatable type. Therefore, unlike an operating element of a sliding type or a pressing type, the operation range is unrestricted. That is, the moving width and the like of the actuator are not restricted, and the driving force can be applied to the pivoting mechanism according to the number of revolutions of the horizontal gear 14. Therefore, the structure of the pivoting mechanism is unrestricted, and a variety of changes of the form of the transformable toy can be provided.

[0089] The protruding part 14a of the horizontal gear 14 serving as an operating part is disposed on the surface 12 serving as a bottom surface of the transformable toy 10 in both the first form and the second form. Therefore, an influence of the operating part on the design and function of the toy can be minimized.

(Change of Form of Transformable Toy Using Base Unit)

[0090] As described above, the first and second trans-

formable toys 10 have each the protruding part 14a of the horizontal gear 14 on the surface 12 serving as a bottom surface in both the first form and the second form. Thus a base unit 50 fixing this bottom surface 12 is provided and, with the use of this base unit 50, the protruding part 14a of the horizontal gear 14 can be operated. That is, with the use of the base unit 50, the form of the first and second transformable toys 10 can be changed with a simple operation.

[0091] As shown in Fig. 12, the base unit 50 includes a plate-shaped base body 51, a first sliding body 60 and a second sliding body 80 disposed inside the base body 51 so as to be pushed in, and handles 54 provided on both sides of a base part of the base body 51.

[0092] As shown in Fig. 13, the base body 51 is configured with an upper cover 52 and a lower cover 53 connected together vertically, and an opening 51a is provided at the center of an upper surface of the upper cover 52. Inside the base body 51, the first sliding body 60 and the second sliding body 80 are accommodated. From the opening 51a mentioned above, an upper surface of a toy part 61, which will be described further below, is exposed. Also, as shown in Fig. 12, an operating-part projection opening 51b is provided at an end face of the base body 51 on a base part side. From this operating-part projection opening 51b, an operating part 68 of the first sliding body 60 and an auxiliary operating part 81 of the second sliding body 80 protrude.

[0093] As shown in Figs. 12 and 13, the first sliding body 60 includes the operating part 68 protruding from the operating-part projection opening 51b and the toy mounting part 61 provided at a forward end of the operating part 68. The toy mounting part 61 is for mounting the transformable toy 10 and is provided so as to be relatively slidable with respect to the base body 51 upon the operating part 68 being pressed.

[0094] As described above, the upper surface of the toy mounting part 61 is exposed from the opening 51a of the base body 51. As shown in Fig. 12, an insertion fixing part 62 for mounting the transformable toy 10 and a rotating barrel 64 (an actuating part) having a fit-in hole 64a in an axial direction are provided so as to protrude from the inside of the toy mounting part 61. The insertion fixing part 62 and the rotating barrel 64 are coupled to the transformable toy 10. That is, the insertion fixing part 62 engages with insertion nails 13 of the transformable toy 10, and the rotating barrel 64 is coupled to the horizontal gear 14 of the transformable toy 10. Coupling between the rotating barrel 64 and the horizontal gear 14 is made by inserting the protruding part 14a of the horizontal gear 14 in the fit-in hole 64a of the rotating barrel 64. The fit-in hole 64a and protruding part 14a are each formed in a D shape. Therefore, when the rotating barrel 64 is rotated after coupling to the horizontal gear 14, its rotational force can be transmitted to the horizontal gear 14.

[0095] As shown in Fig. 12, the operating part 68 for sliding the toy mounting part 61 is a bar-shaped part pro-

truding from the operating-part projection opening 51b of the base body 51, and is formed so as to be externally operable. That is, when the operating part 68 is pushed into the inside of the base body 51, the toy mounting part 61 described above slides in a direction of a tip of the base unit 50. For this reason, when the operating part 68 is pushed in, with the transformable toy 10 mounted on the toy mounting part 61, the transformable toy 10 also moves together with the toy mounting part 61 in a direction of the tip of the base unit 50.

[0096] On the other hand, the second sliding body 80 is accommodated inside the base body 51 in juxtaposition with the first sliding body 60 and, as with the operating part 68 of the first sliding body 60, has a bar-shaped auxiliary operating part 81. As shown in Fig. 12, the auxiliary operating part 81 also protrudes from the operating-part projection opening 51b of the base body 51 so as to be externally operable.

[0097] As shown in Fig. 13, in the second sliding body 80, a rack 83 is formed on a surface facing the first sliding body 60 inside the base body 51 so as to mesh with a pinion 63 disposed inside the first sliding body 60. Due to this, the rotating barrel 64 rotates when a change in relative position between the operating part 68 and the auxiliary operating part 81 occurs.

[0098] That is, when a change in relative position between the operating part 68 and the auxiliary operating part 81 occurs upon either the operating part 68 or the auxiliary operating part 81 being operated, a rotational force is applied by the rack 83 of the second sliding body 80 to the pinion 63 of the first sliding body 60. As shown in Fig. 13, the pinion 63 meshes with a gear part 64b integrally formed with a lower portion of the rotating barrel 64 inside the toy mounting part 61. Therefore, when the pinion 63 rotates, the rotating barrel 64 rotates.

[0099] Therefore, when a change in relative position between the operating part 68 and the auxiliary operating part 81 occurs with the transformable toy 10 mounted on the toy mounting part 61, the horizontal gear 14 coupled to the rotating barrel 64 is rotated to change the form of the transformable toy 10.

[0100] The sliding operation of the toy mounting part 61 and the rotating operation of the rotating barrel 64 are described in detail below with reference to Figs. 14A to 14C.

[0101] As shown in Fig. 14A, the first sliding body 60 and the second sliding body 80 are constantly biased rearward by springs 84, respectively. In other words, the operating part 68 and the auxiliary operating part 81 are urged in a direction in which they protrude from the operating-part projection opening 51b of the base body 51.

[0102] In this state, when only the operating part 68 is pushed in, as shown in Fig. 14B, the toy mounting part 61 slides in a direction of the tip, and the pinion 63 moves while rotating on the rack 83. With this, the rotating barrel 64 rotates in a clockwise direction in a plan view. Therefore, when the horizontal gear 14 of the transformable toy 10 is coupled to the rotating barrel 64, the horizontal

gear 14 of the transformable toy 10 rotates in a direction in which the form of the transformable toy 10 is changed from the first form to the second form.

[0103] Also, when the auxiliary operating part 81 is further operated to be pressed in the state shown in Fig. 14B, as shown in Fig. 14C, with the toy mounting part 61 staying at the position in the direction of the tip, the pinion 63 is rotated by the rack 83 being moving, thereby causing the rotating barrel 64 to rotate in a counterclockwise direction in a plan view. That is, the rotating barrel 64 rotates in a direction in reverse to the rotating direction when only the operating part 68 is pressed. Therefore, when the horizontal gear 14 of the transformable toy 10 is coupled to the rotating barrel 64, the horizontal gear 14 of the transformable toy 10 rotates in a direction in which the form of the transformable toy 10 is changed from the second form to the first form.

[0104] As shown in Figs. 13 and 14A, a guide protrusion 69 is formed on a side surface of the operating part 68, and a slit 82 in which the guide protrusion 69 fits is formed on a side surface of the auxiliary operating part B-1. The operating part 68 slides while the guide protrusion 69 is guided by the slit 82. In the state shown in Fig. 14A, an end of the slit 82 abuts on the guide protrusion 69. Therefore, when the auxiliary operating part 81 is pressed in the state shown in Fig. 14A, the operating part 68 is also pushed in together with the auxiliary operating part 81. That is, when the auxiliary operating part 81 is pressed in the state shown in Fig. 14A, the toy mounting part 61 slides in a direction of the tip, but a change in relative position between the operating part 68 and the auxiliary operating part 81 does not occur. Therefore, the rotating barrel 64 does not rotate, whereby the form of the transformable toy 10 is not changed. In this manner, upon the auxiliary operating part 81 being pressed, the toy mounting part 61 can be caused to slide without changing the form of the transformable toy 10.

[0105] Figs. 15 to 20 are illustrations showing the states in which the transformable toy 10 is mounted on the base unit 50. Figs. 15 to 17 are illustrations regarding the first transformable toy 10, and Figs. 18 to 20 are illustrations regarding the second transformable toy 10.

[0106] As shown in Figs. 15 and 18, when the operating part 68 and the auxiliary operating part 81 are not operated, the transformable toy 10 takes the first form.

[0107] As shown in Figs. 16 and 19, when the operating part 68 is pressed as deeply as possible, the toy mounting part 61 slides together with the transformable toy 10 in a direction of the tip of the base unit 50, and the form of the transformable toy 10 is changed to the second form.

[0108] As shown in Figs. 17 and 20, when the auxiliary operating part 81 is pressed after the operating part 68 is pressed as deeply as possible, the form of the transformable toy 10 is changed to a form in the course of form change between the first form and the second form. With the operation of the auxiliary operating part 81, it is possible to produce an additional movement of the transformable toy 10. That is, by pressing the auxiliary oper-

ating part 81, the transformable toy 10 in the robot form as shown in Figs. 17 and 20 is caused to topple forward. By releasing the pressing of the auxiliary operating part 81, the transformable toy 10 can be returned to be in an upright posture as shown in Figs. 16 and 19. At this time, since the arm members 44 rotate forward and backward, it is possible to cause the robot to make a motion of bringing its arms down forward.

[0109] As shown in Fig. 12, a lock protrusion 54a is provided at a tip of one handle 54 and, with this lock protrusion 54a inserted in a lock insertion hole 53a of the base body 51, the operating part 68 can be kept pressed. That is, since this handle 54 is formed so as to be rotatable about a handle rotating shaft 55, when the handle 54 is rotated while the operating part 68 is being pressed as deeply as possible and the lock protrusion 54a is inserted in the lock insertion hole 53a, the lock protrusion 54a engages with a rear end face 70a (Fig. 13) of a lock engaging part 70 provided on a side surface of the operating part 68, so that the operating part 68 is locked so as to prevent the operating part 68 from being pressed back with a pressing force of the spring 84. With the operating part 68 locked in this manner, only the auxiliary operating part 81 is pressed, so that the motion of the transformable toy 10 as described above can be produced with the toy mounting part 61 positioned in the direction of the tip.

[0110] As described above, in the toy device according to this embodiment, the transformable toy 10 is formed so that its form is changeable upon the operation of the base unit 50. Therefore, even when a different transformable toy is mounted on the base unit 50, the form thereof can be changed with the same operation.

[0111] Also, the transformable toy 10 has its bottom surface 12 set on the base unit 50, and the form of the transformable toy 10 is changed so that the transformable toy 10 rises on the base member 11. Moreover, the toy mounting part 61 can be caused to slide on the base unit 50, or the base body 51 can be rotated. Therefore, by performing these operations singly or in combination, a variety of unprecedented operations can be performed.

(How to Play with the Toy as Fighting Toy)

[0112] As described above, according to the embodiment, the form of the transformable toy 10 can be changed by operating the base unit 50 designed for form change, and therefore the form of the transformable toy 10 can be changed with a simple operation. Also, it is possible to not only change the form of the transformable toy 10 but also move the transformable toy 10 forward and backward. Furthermore, by further operating the auxiliary operating part 81 after the operating part 68 is operated, the additional movement of the transformable toy 10 can be produced. With the use of these features, by combining a plurality of transformable toys according to the embodiment, they can be used as fighting-type toys.

[0113] That is, as shown in Fig. 13, the base unit 50 is

provided at the tip thereof with a coupling part 56 for coupling another base unit 50. On an end face of the coupling part 56, as shown in Figs. 13 and 21, a mating part 58 is formed, including a fit-in groove and a fit-in projection so as to engage with those of the coupling part 56 of another base unit 50. By engaging the fit-in groove and the fit-in projection of this mating part 58 with the fit-in projection and the fit-in groove of the mating part 58 of another base unit 50, as shown in Fig. 21, the tips of the two base units 50 are coupled together, and two transformable toys 10 mounted on these two base units 50 are disposed so as to face each other.

[0114] The coupling part 56 is mounted on the base body 51 so as to be rotatable in a horizontal direction with a shaft hole 57 as a rotating center. Therefore, even when the base units 50 are coupled to each other, as shown in Figs. 21 and 22, the base body 51 is rotatable in a horizontal direction with respect to another base body 51, with the shaft hole 57 as the center.

[0115] In this manner, when each operating part 68 is operated while the tips of two base units 50 are coupled together via the coupling parts 56, the transformable toy 10 is changed to a robot form while moving in a direction of the tip as shown in Figs. 23 and 24.

[0116] With two transformable toys 10 on the base units 50 coupled together facing each other and caused to be changed to a robot form, they are in a state of wrestling each other as shown in Fig. 25. In this state, when the auxiliary operating part 81 is operated, the arm members 44 rotate forward and backward as described above. Therefore, two robots make their arms hit each other.

[0117] Accordingly, by operating the operating part 68 to move the transformable toy 10 forward and backward, operating the auxiliary operating part 81 to impart a motion of hitting the arms on the counterpart transformable toy 10, or rotating the base body 51 in a horizontal direction, the transformable toys 10 are collided against each other or a collision therebetween is prevented. In this manner, the transformable toys 10 can be played with to fight each other. In an example of a way of playing with this fighting-type toy, a win may be determined when one of the transformable toys 10 is toppled from the base unit 50.

[0118] As described in the foregoing, since the transformable toy 10 according to the embodiment: can be played with while the plurality of base units 50 are coupled together it can be played together with another transformable toy 10 facing it. Therefore, it is possible to not simply enjoy changes in form but also enjoy the toys as a fighting game.

Claims

1. A toy device comprising:

a transformable toy (10) with a reversibly changeable form, the transformable toy (10) in-

- cluding a plurality of pivotable members (20) that are turned to change the form of the transformable toy (10), a pivoting mechanism for turning the plurality of pivotable members (20), and an actuator (14) for actuating the pivoting mechanism; and
 a base unit (50) on which the transformable toy (10) is mountable, the base unit (50) including an actuating part (64) to which the actuator (14) is coupled and an operating part (68) for externally operating the actuating part (64), wherein when the operating part (68) is operated, the actuator (14) operates accordingly via the actuating part (64), and the pivoting mechanism is actuated.
2. The toy device according to claim 1, wherein the form of the transformable toy (10) is reversibly changed from a first form to a second form, and the actuator (14) is provided on a surface serving as a bottom surface in both the first form and the second form of the transformable toy.
 3. The toy device according to claim 1 or 2, wherein the base unit (50) includes a base body (51) and a toy mounting part (61) on which the transformable toy (10) is removably mounted, the toy mounting part (61) being slidable relatively to the base body (51), and the actuating part (64) being formed on the toy mounting part (61), and
 when the operating part (68) is operated, the actuating part (64) is actuated, and the toy mounting part (61) slides.
 4. The toy device according to claim 3, wherein the base unit (50) further includes an auxiliary operating part (81) that can be externally operated, and the actuating part (64) is actuated when a change in relative position between the auxiliary operating part (81) and the operating part (68) occurs.
 5. The toy device according to claim 3 or 4, wherein the base unit (50) has a tip provided with a coupling part (56) for coupling to another base unit (50), and the toy mounting part (61) can slide in a direction of the tip of the base unit (50).
 6. The toy device according to any one of claims 1 to 5, wherein the actuator (14) is rotatably provided on the transformable toy (10), and
 the actuating part (64) is rotatably provided on the base unit (50) and, when the actuating part (64) is rotated upon an operation of the operating part (68), the pivoting mechanism is actuated via the actuator (14) to change the form of the transformable toy (10).
 7. The toy device according to claim 6, wherein the transformable toy (10) includes a base member (11)
- in which the actuator (14) is rotatably disposed, each of the plurality of pivotable members (20) is rotatably coupled to the base member (11) or at least one of other pivotable members of the plurality of pivotable members (20), and
 the pivoting mechanism includes a gear device for converting a rotation of the actuator (14) to a turning movement of one of the plurality of pivotable members (20).
8. The toy device according to claim 4, wherein the actuator (14) is rotatably provided on the transformable toy (10),
 the base unit (50) includes a rack (83) linked to the auxiliary operating part (81) and a pinion (63) linked to the operating part (68) and engaged with the rack (83) and, when a change in relative position between the auxiliary operating part (81) and the operating part (68) occurs, the pinion (63) is rotated by the rack (83), and
 the actuating part (64) is rotatably provided on the base unit (50), and the pinion (63) is engaged with the actuating part (64) so as to rotate the actuating part (64).
 9. The toy device according to claim 4, wherein the base unit (50) includes a lock mechanism for locking the operating part (68) so as to position and hold the toy mounting part (61) in a direction of a tip of the base unit (50), and the actuating part (64) is actuated to change the form of the transformable toy (10) by operating the auxiliary operating part (81) to change a relative position of the auxiliary operating part (81) with respect to the locked operating part (68).

FIG. 1

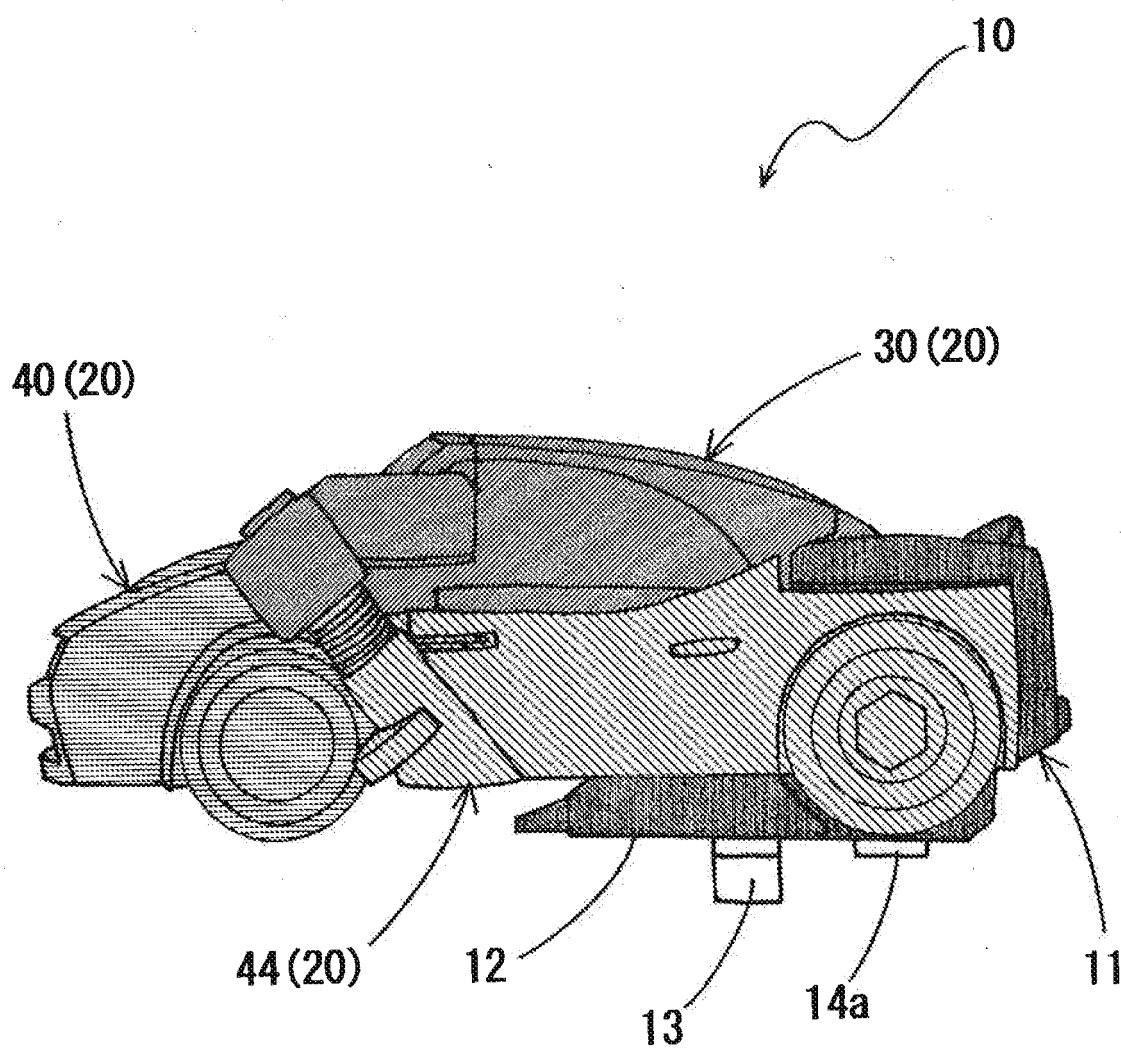


FIG. 2

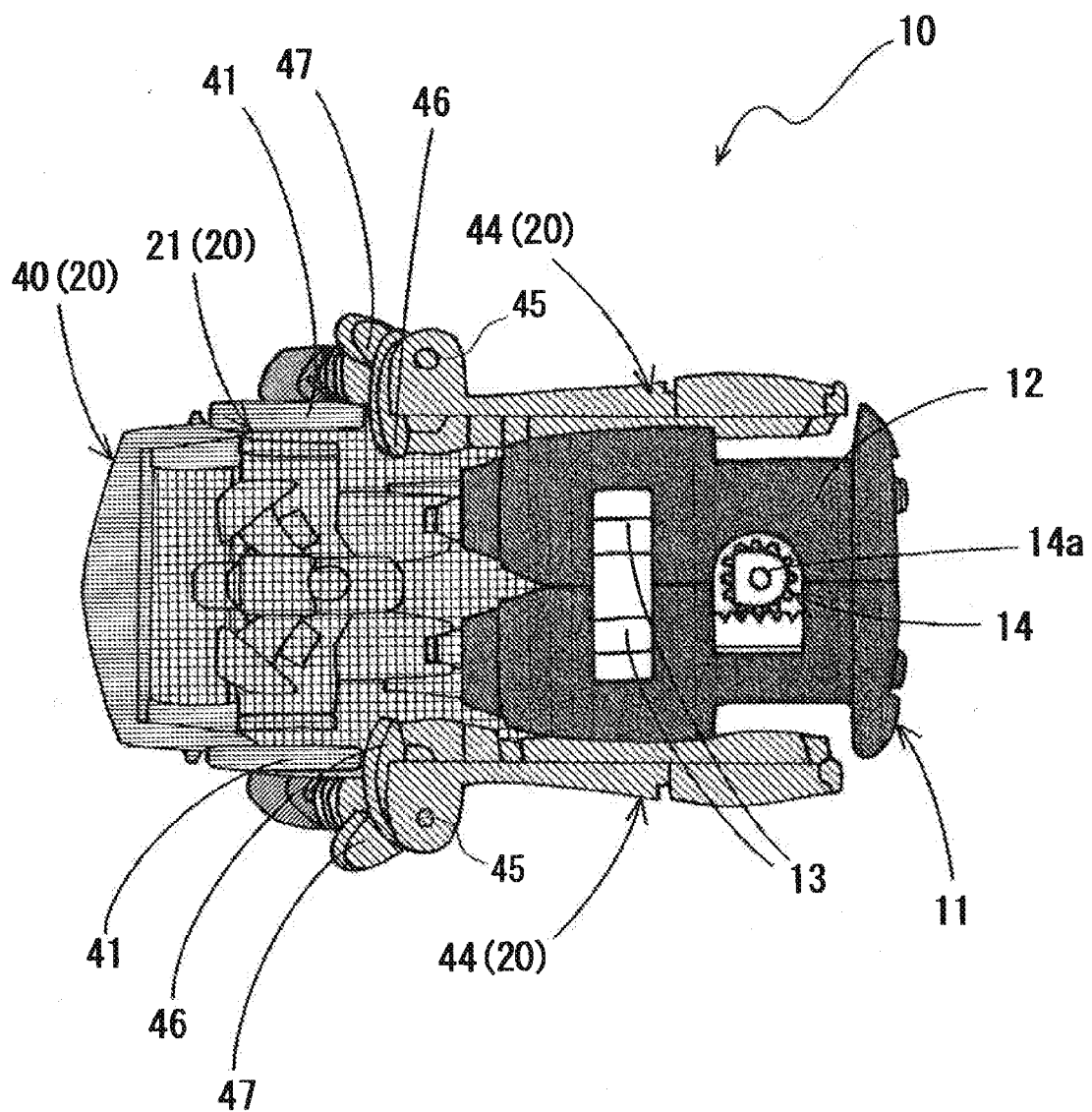


FIG. 3

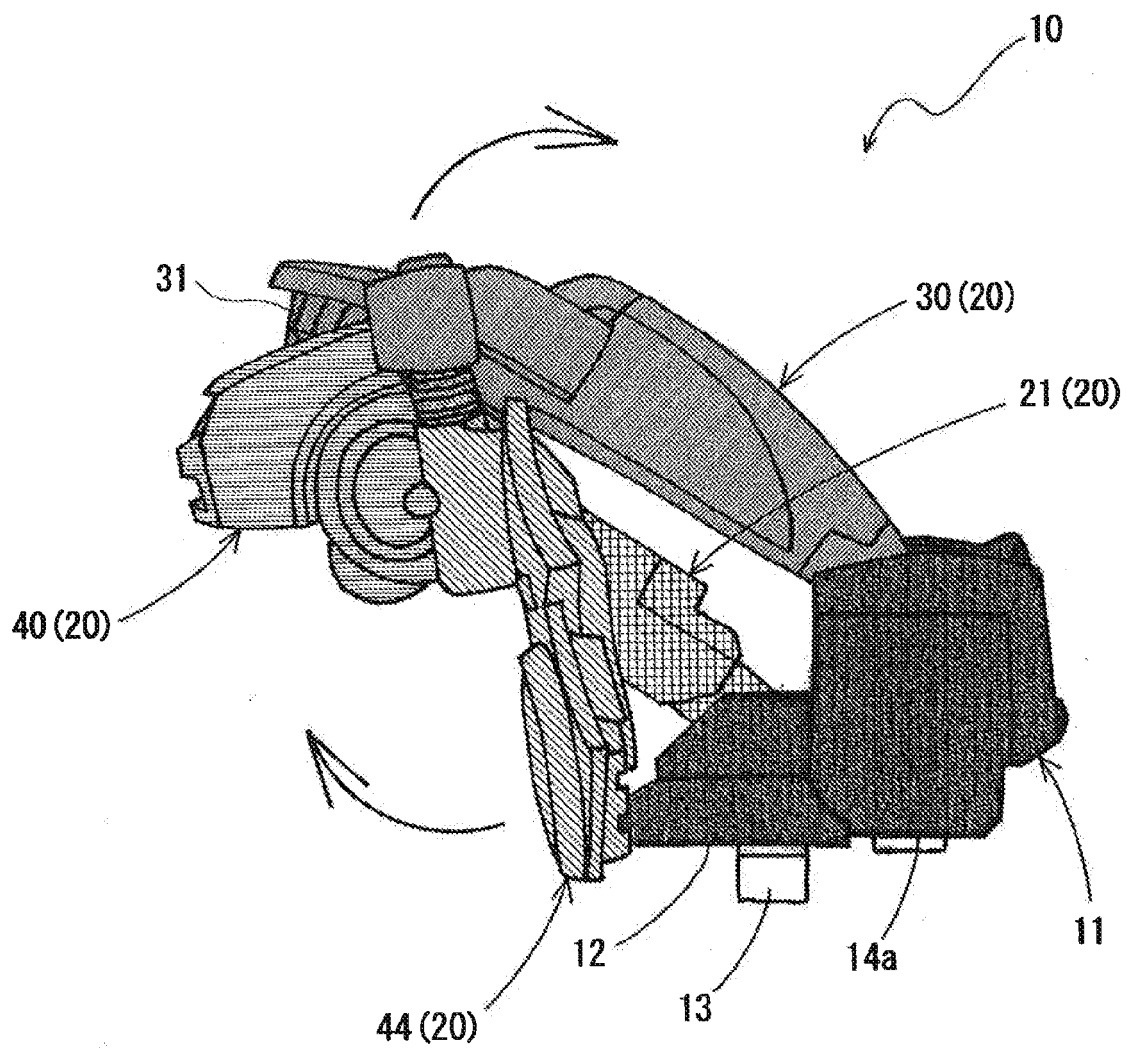


FIG. 4

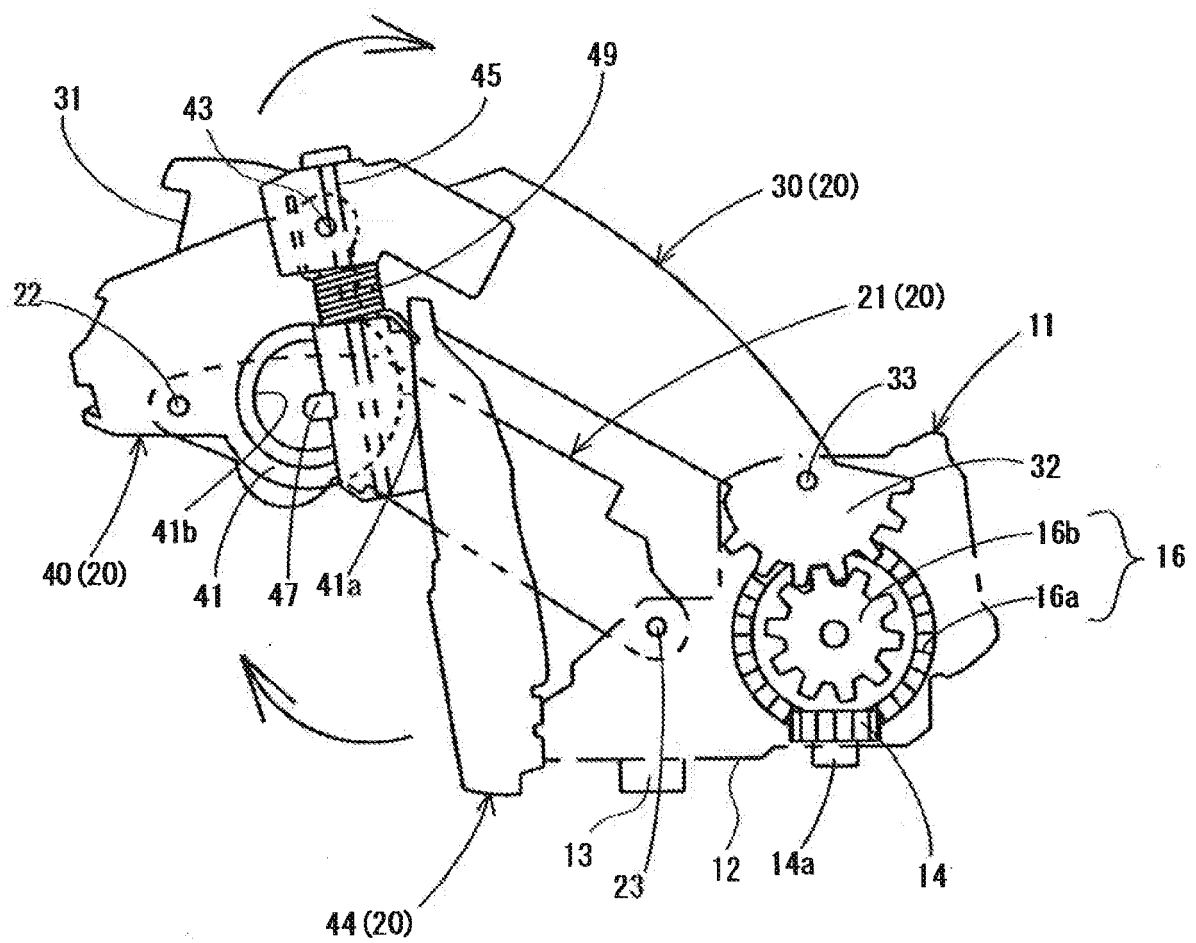


FIG. 5A

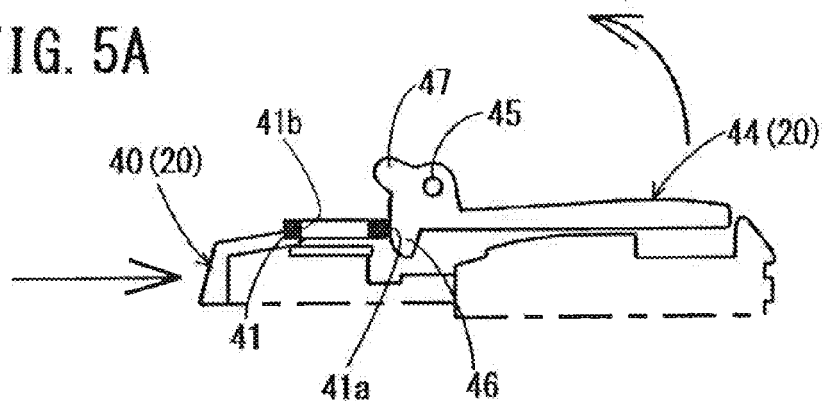


FIG. 5B

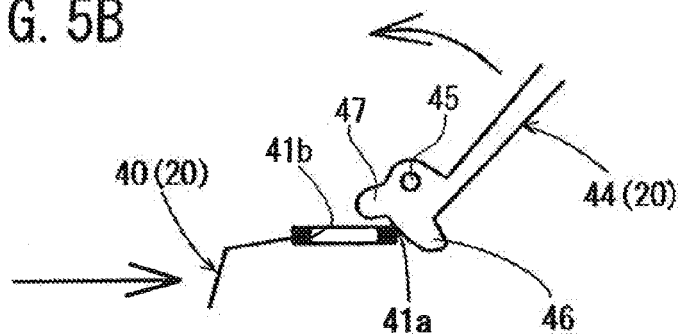


FIG. 5C

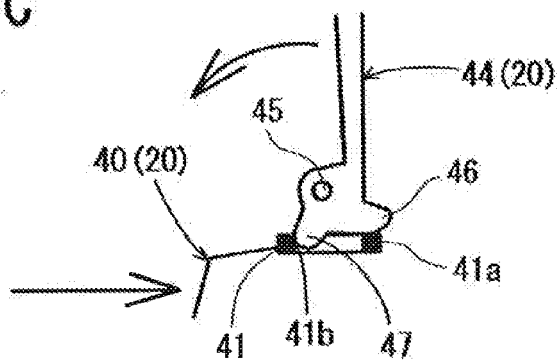


FIG. 5D

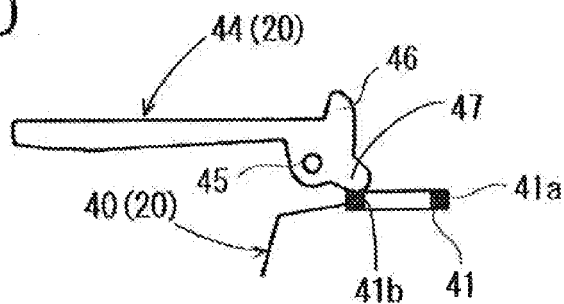


FIG. 6

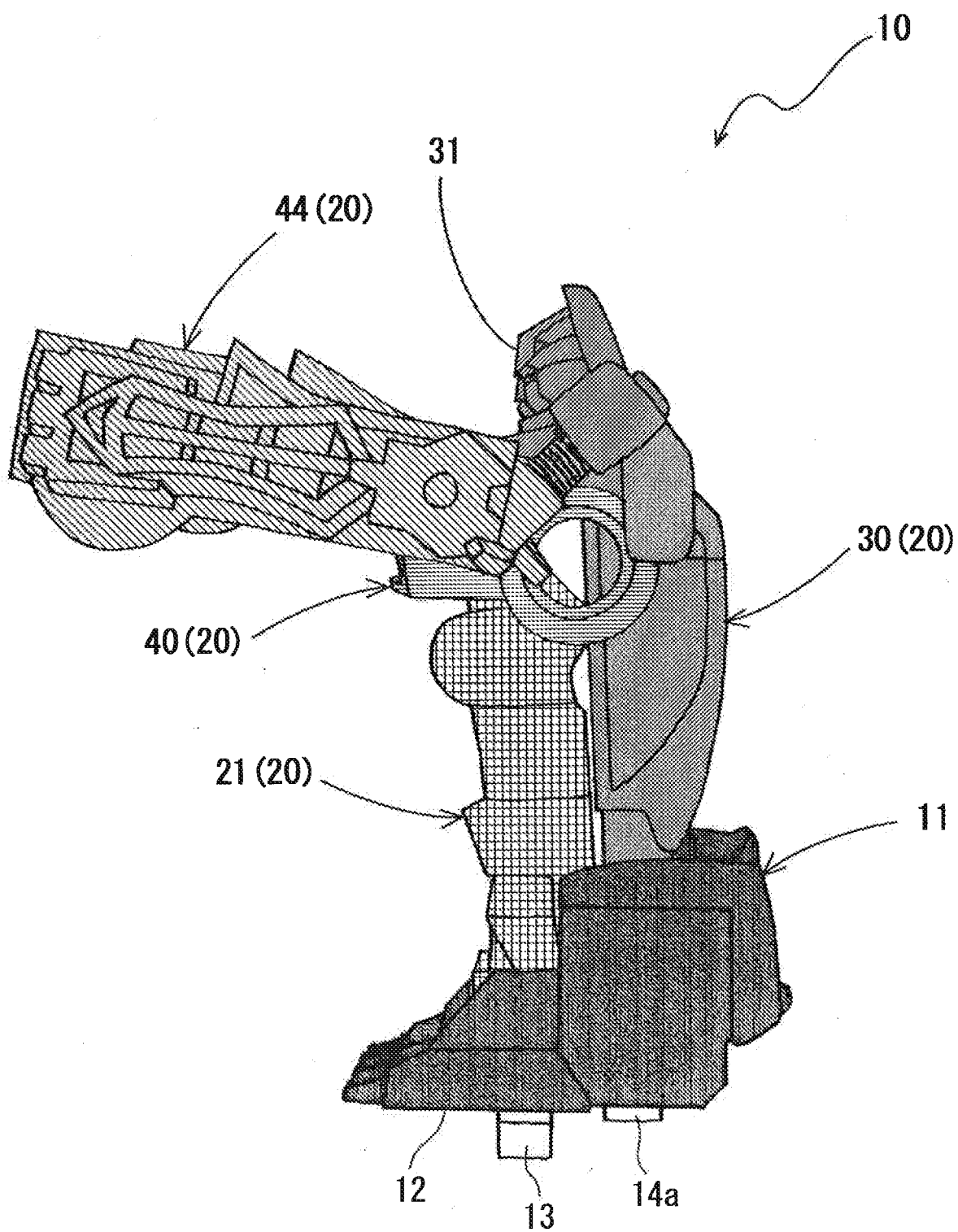


FIG. 7

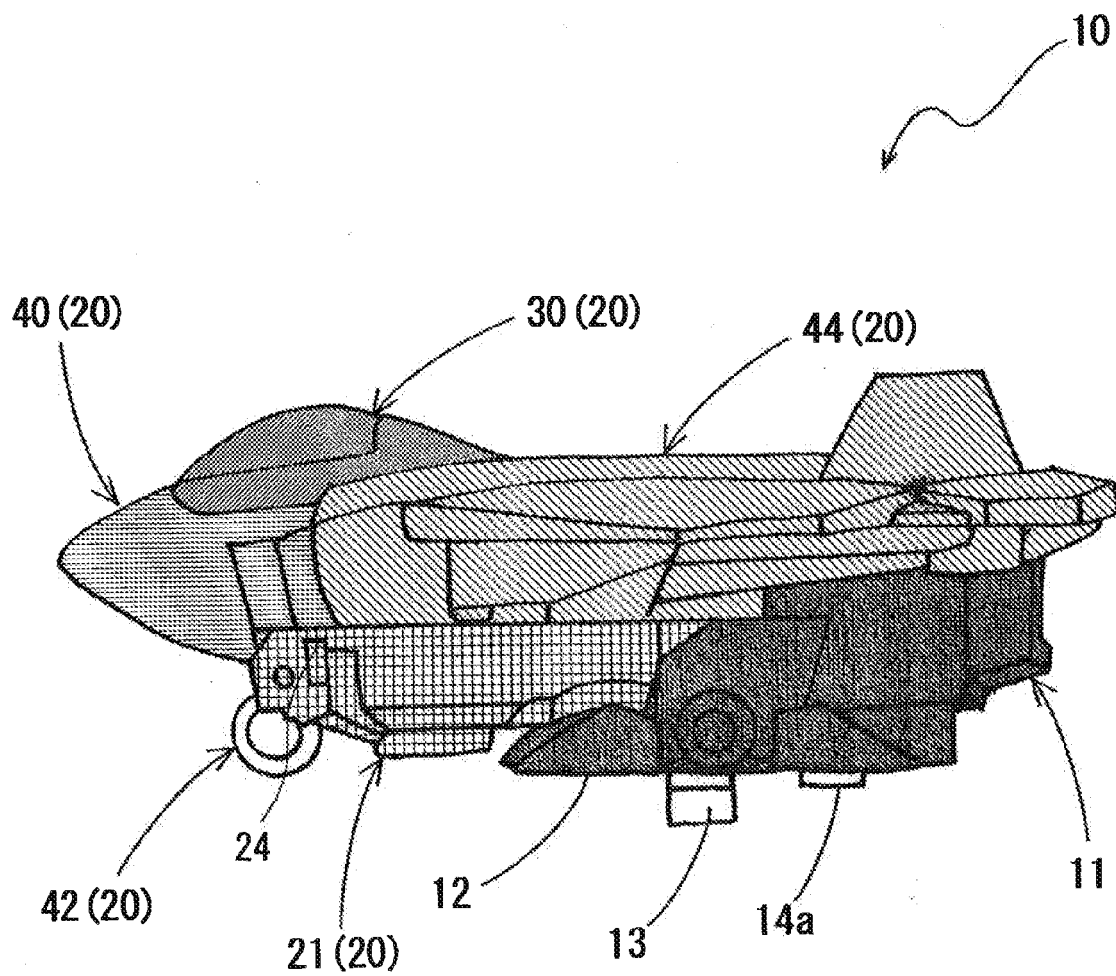


FIG. 8

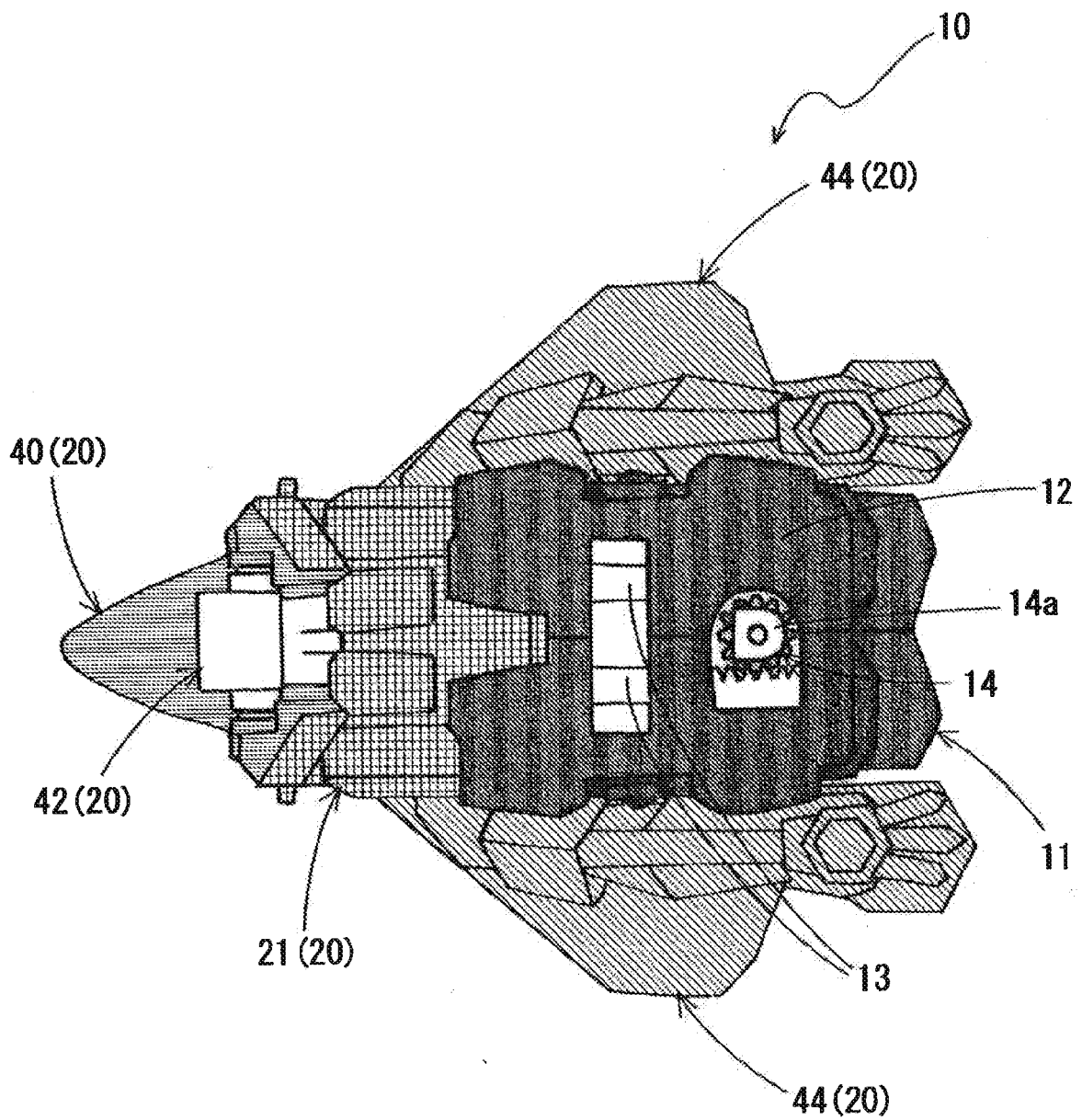


FIG. 9

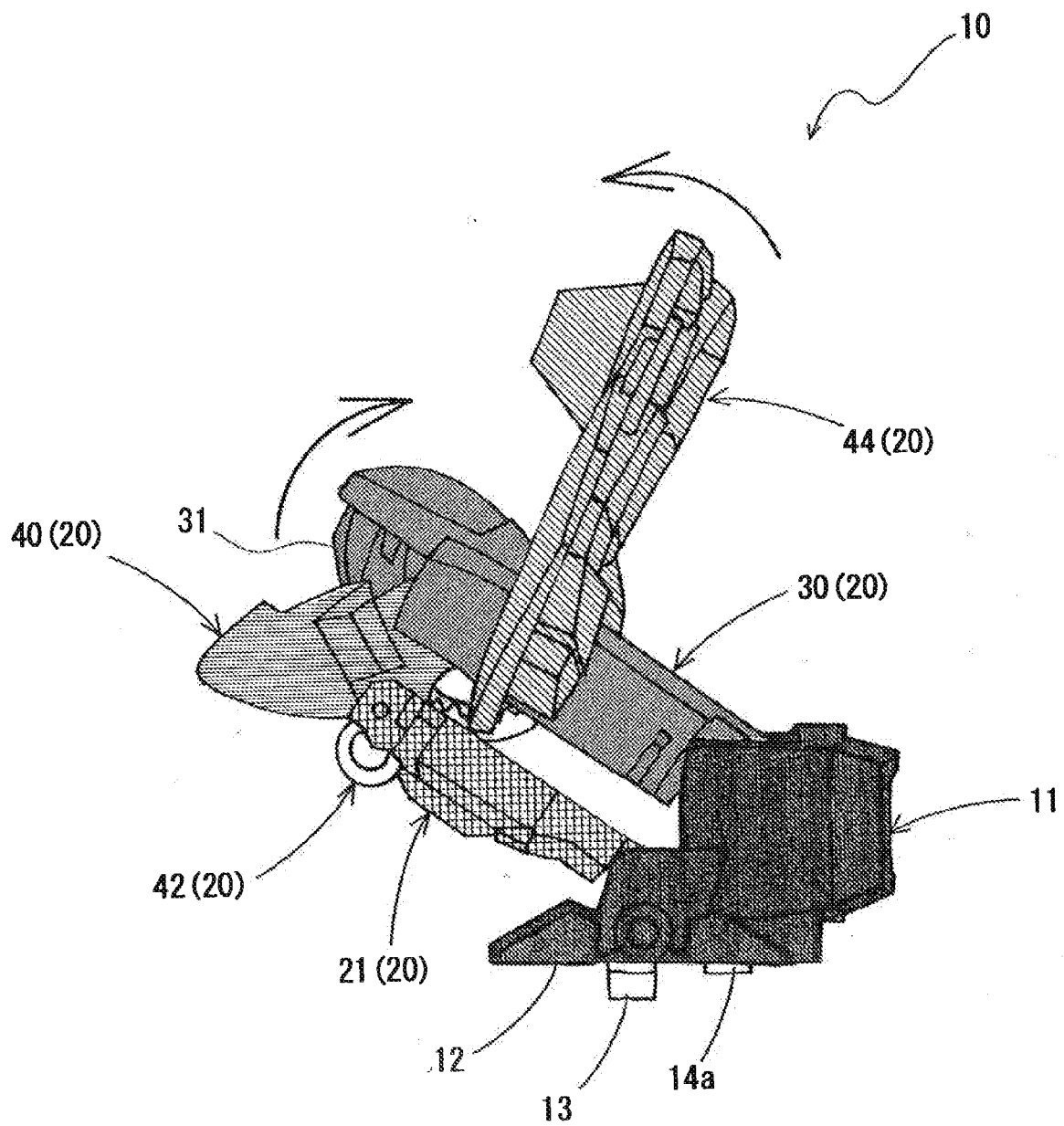


FIG. 10

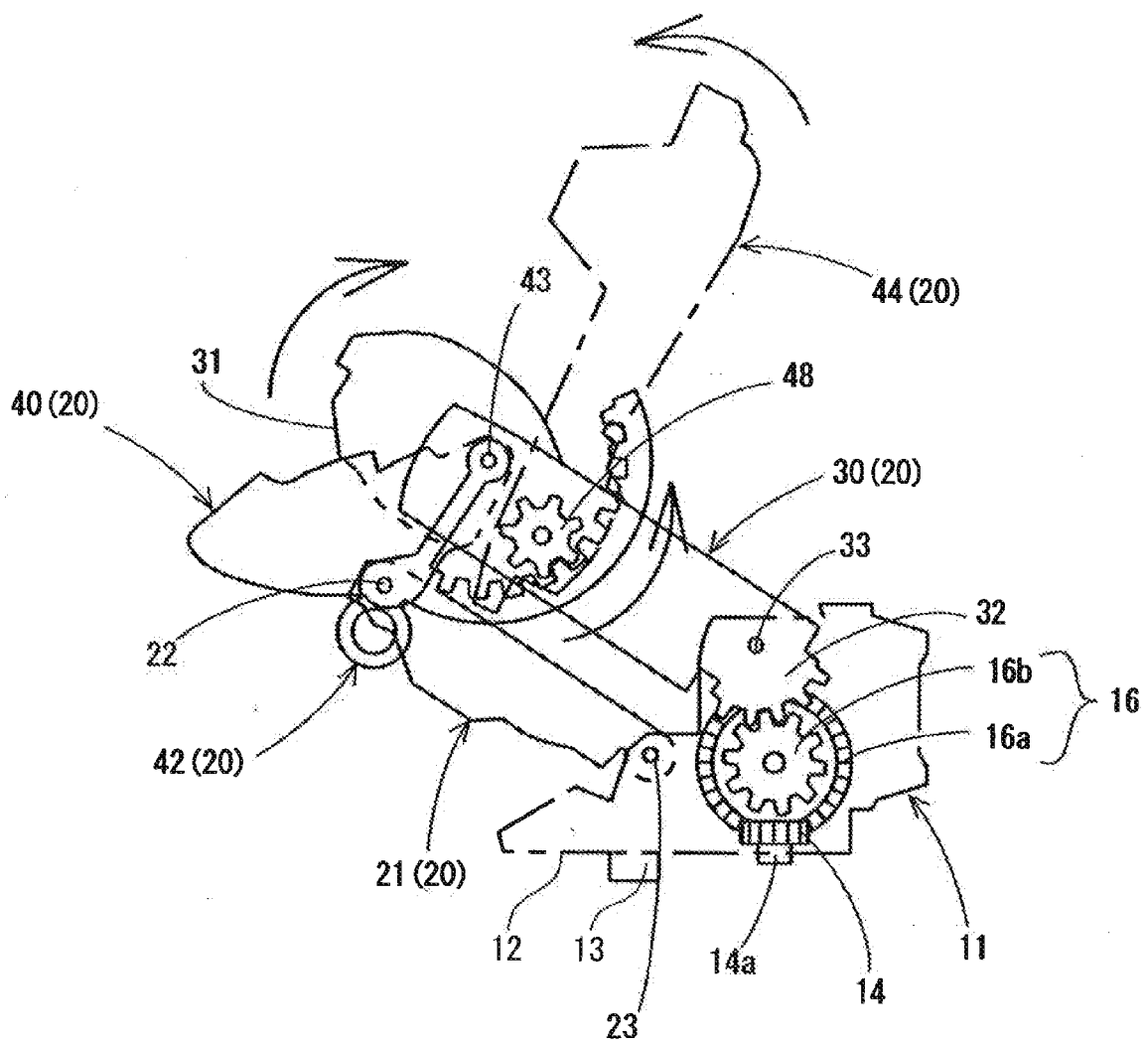


FIG. 11

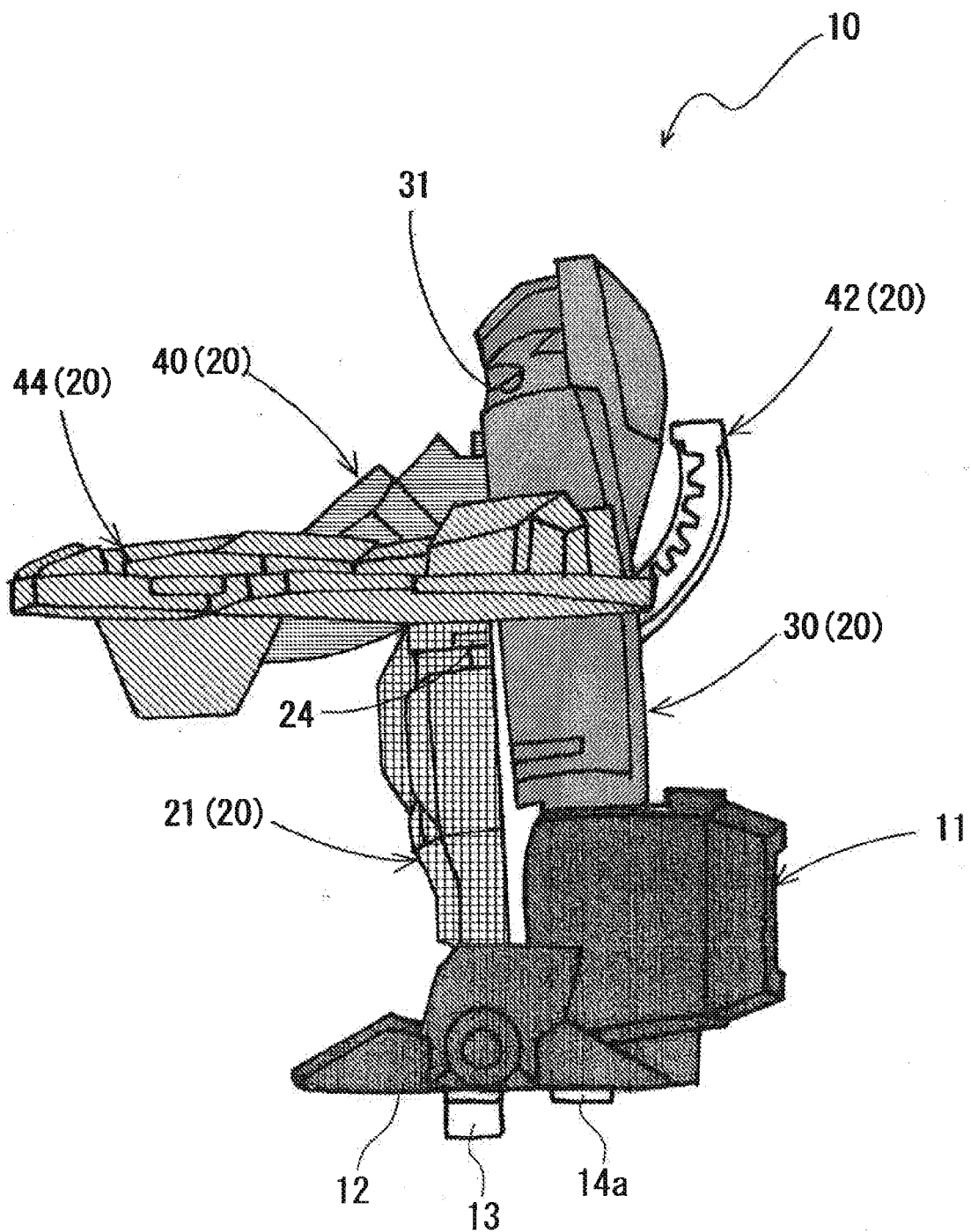


FIG. 12

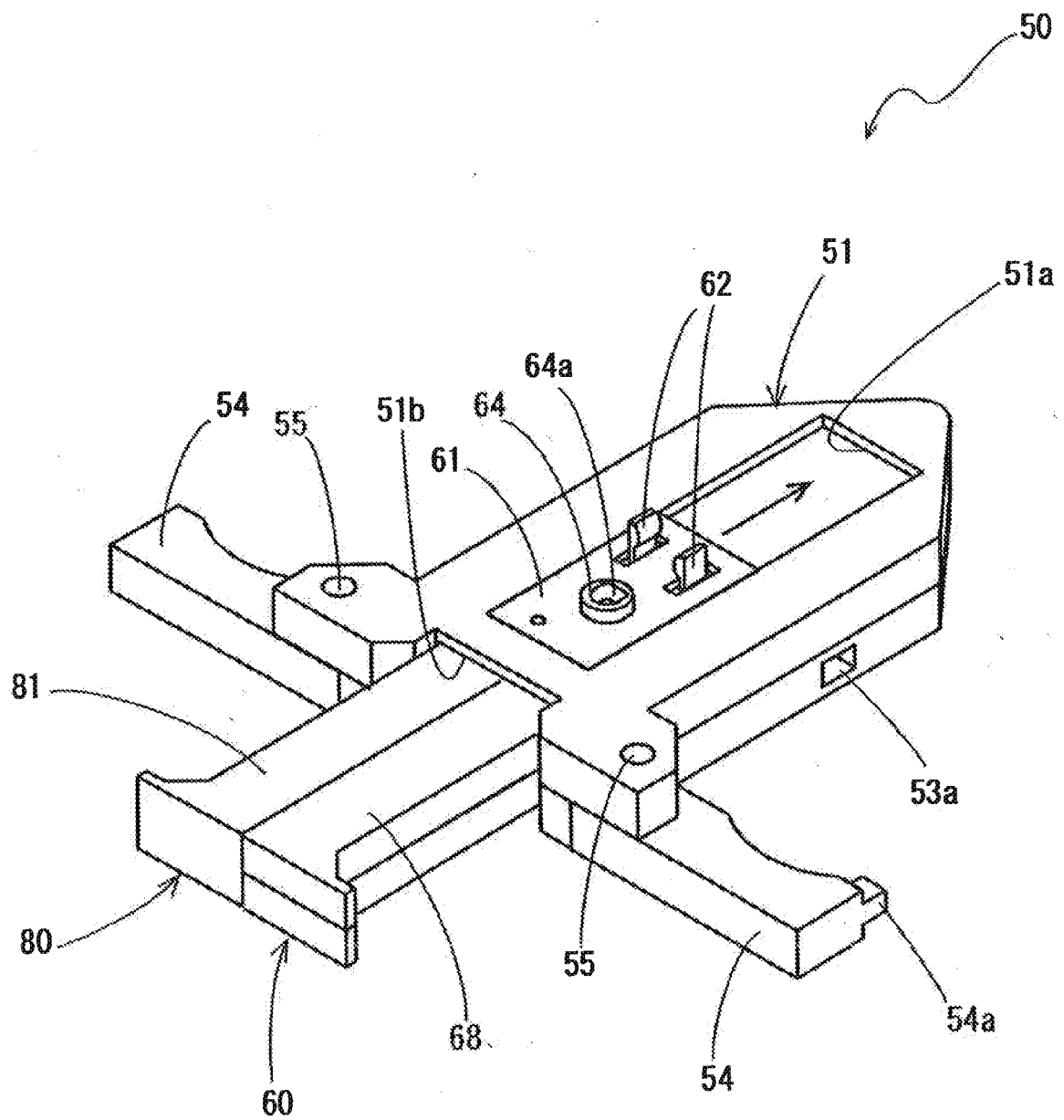


FIG. 13

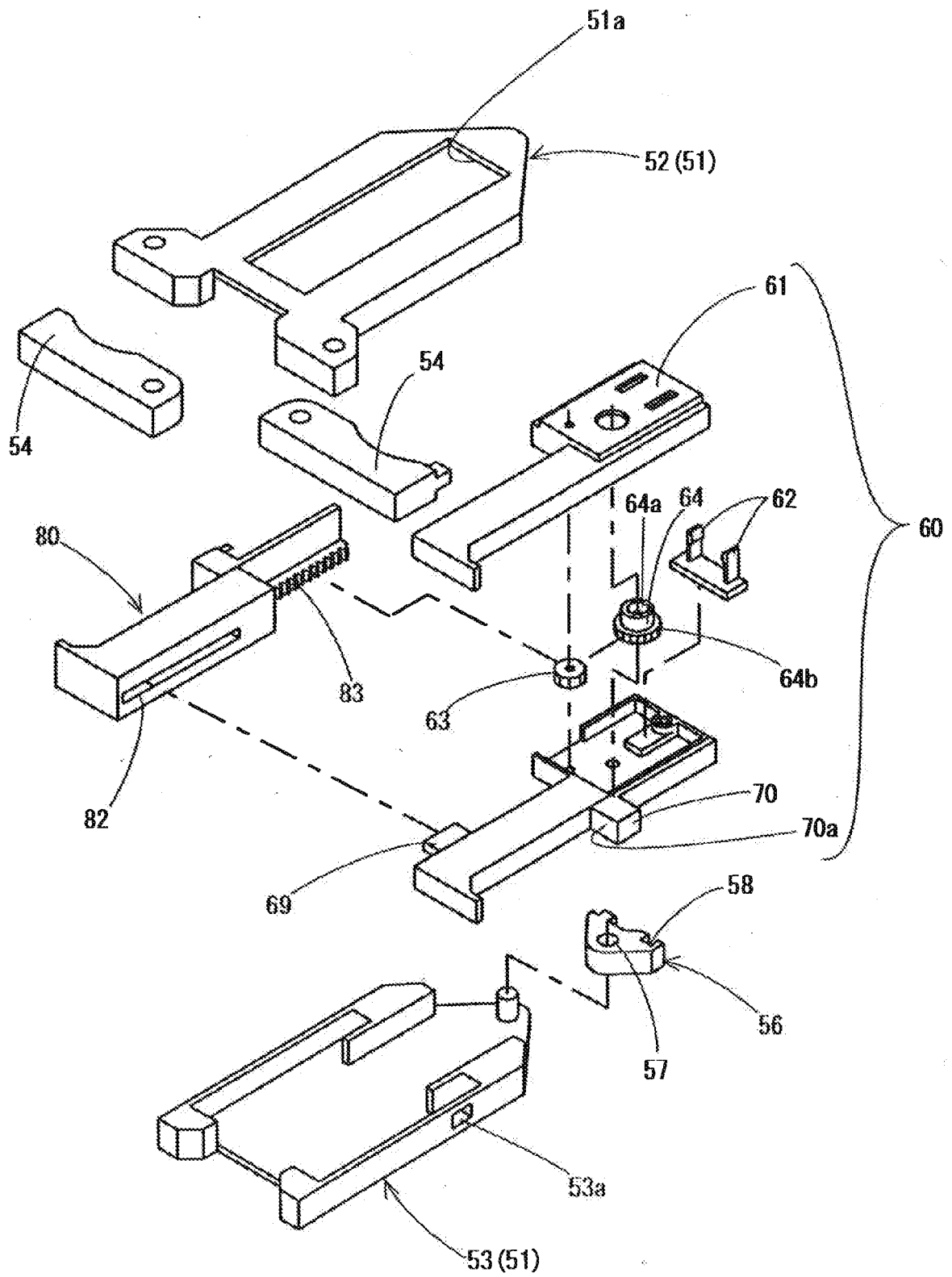


FIG. 14A

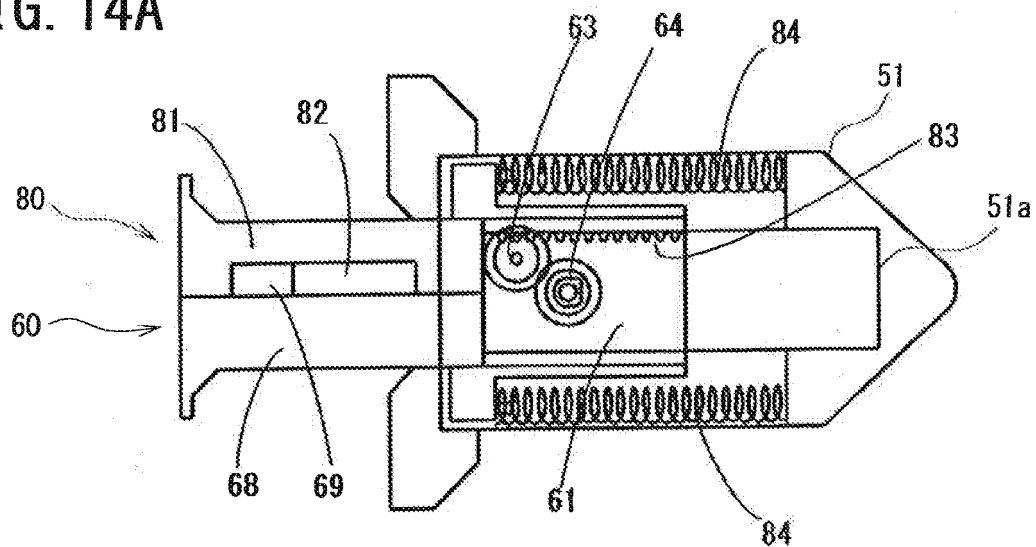


FIG. 14B

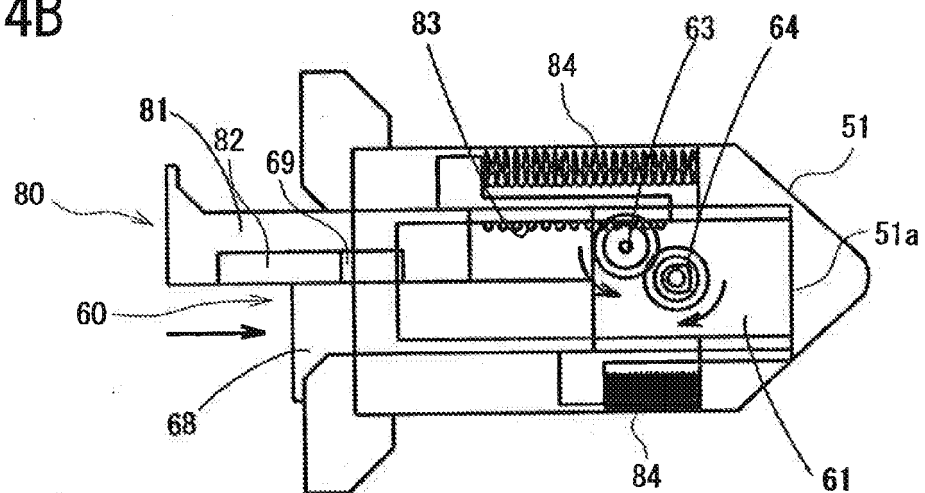


FIG. 14C

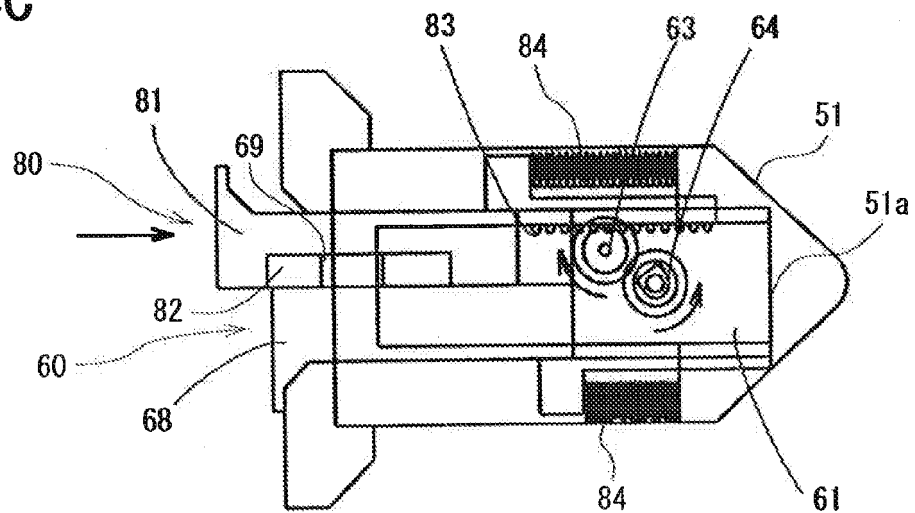


FIG. 15

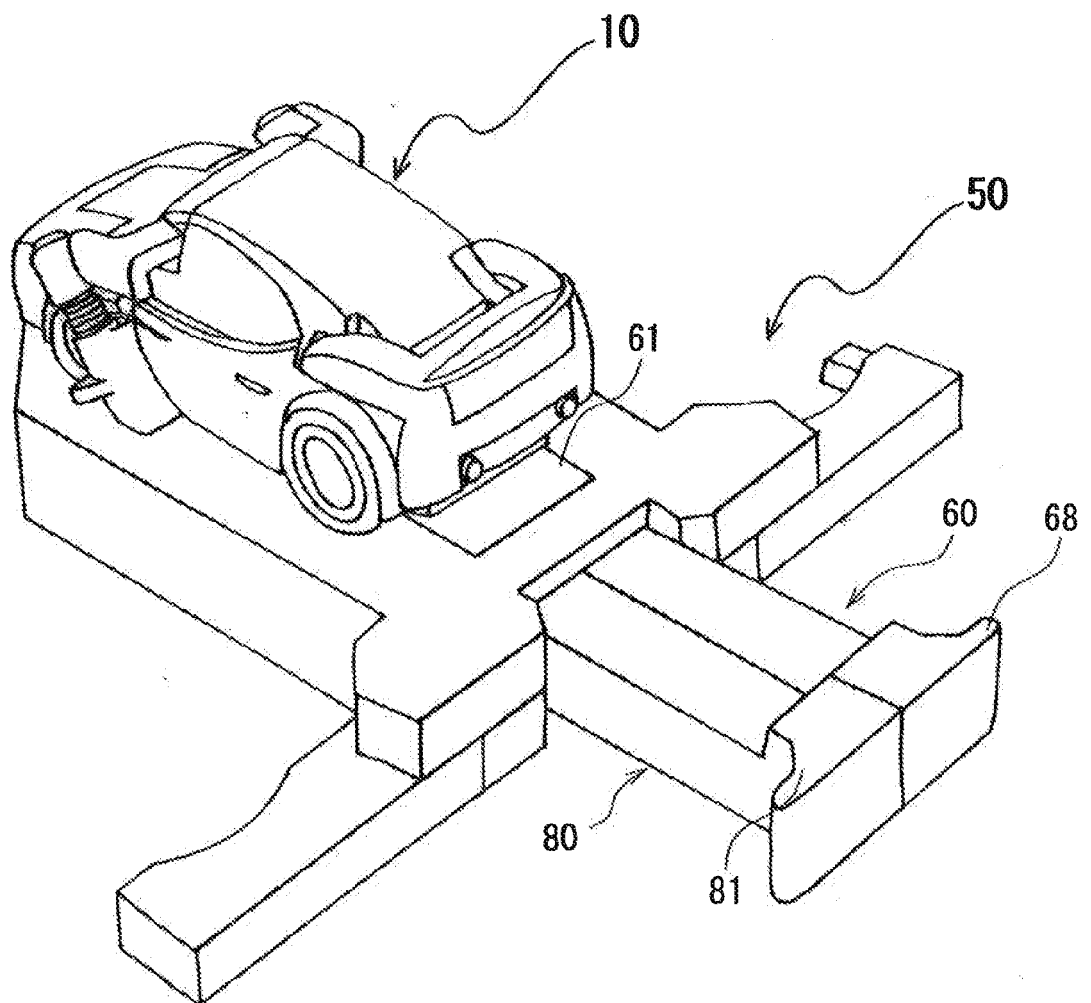


FIG. 16

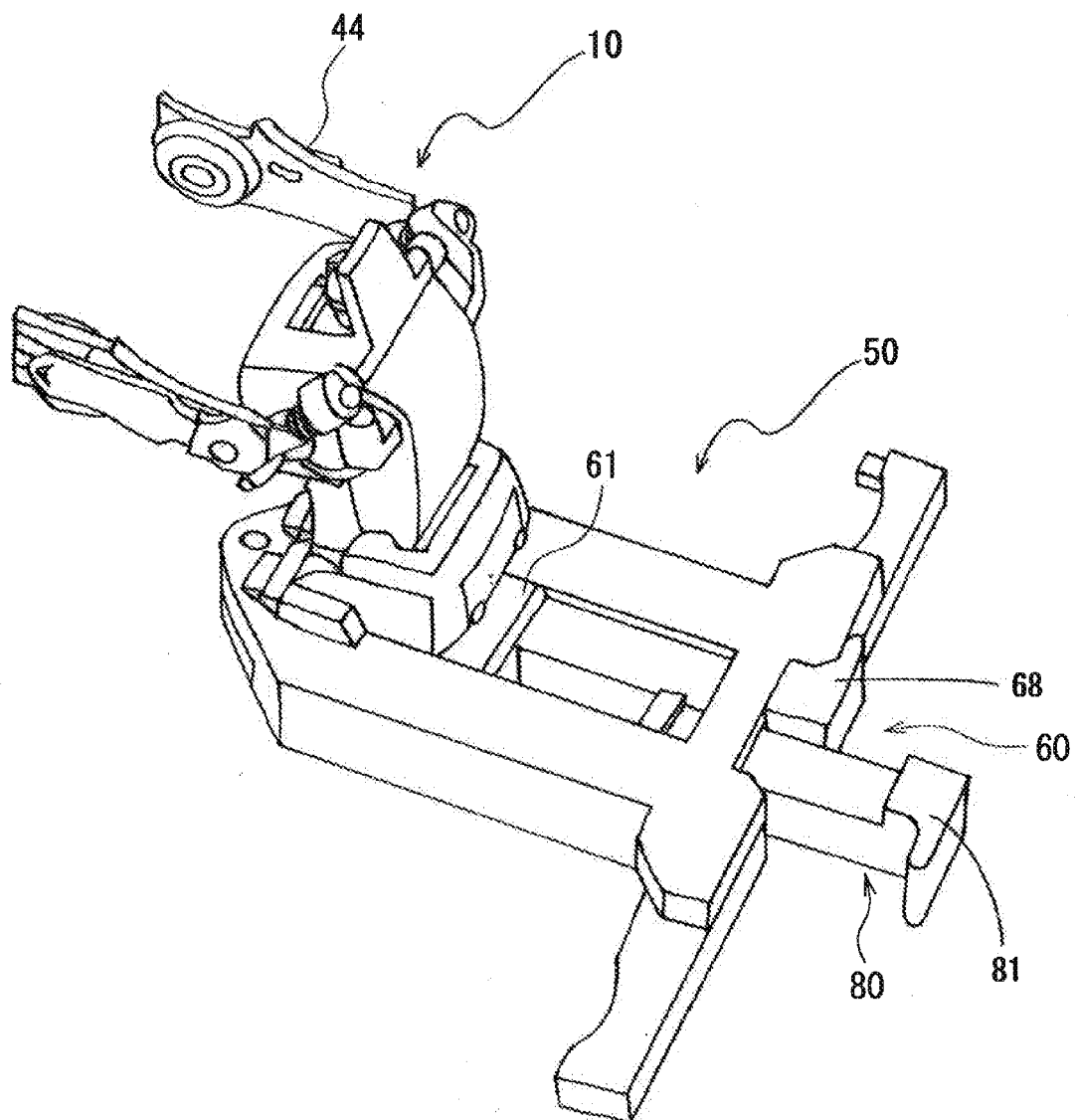


FIG. 17

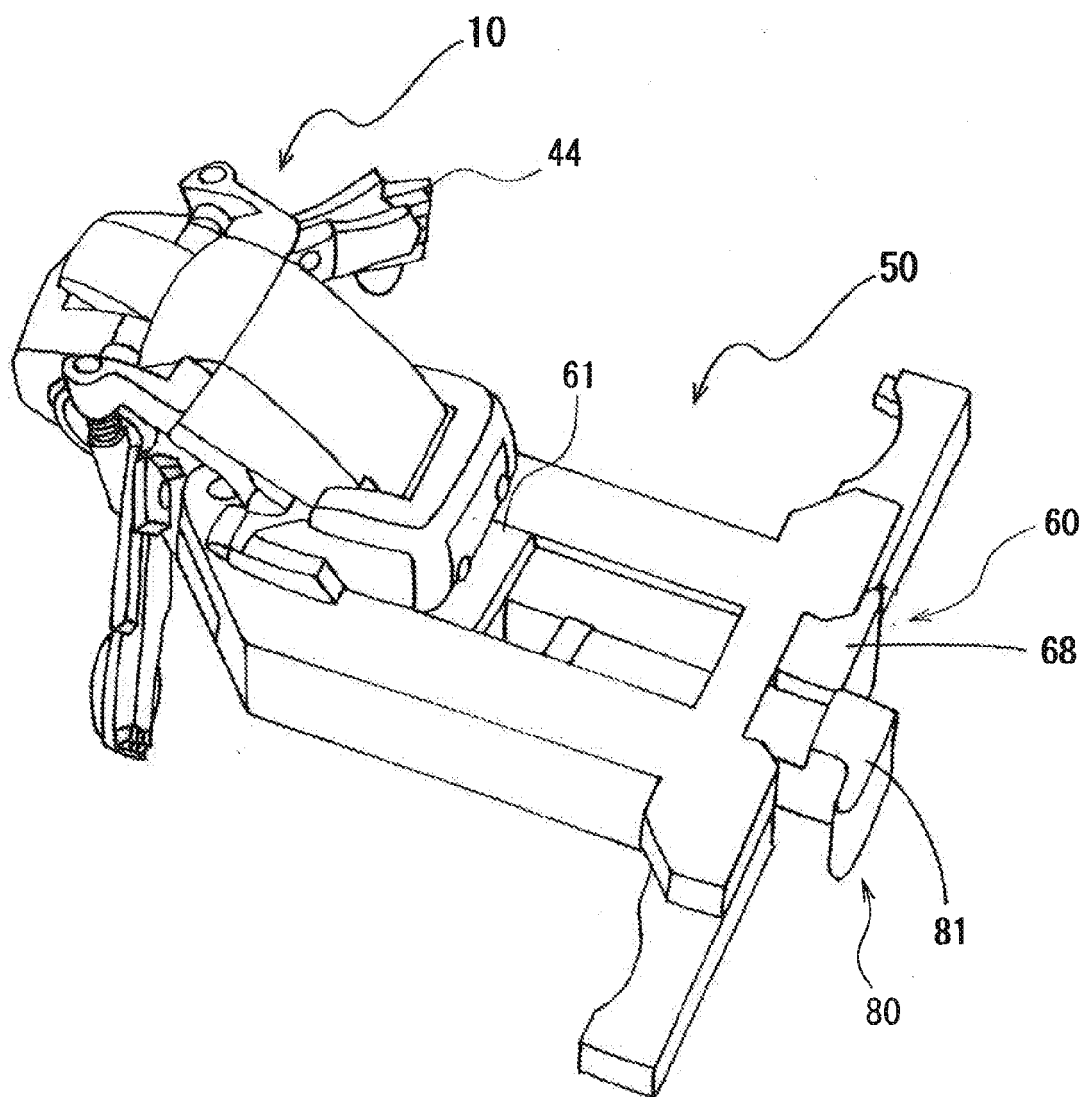


FIG. 18

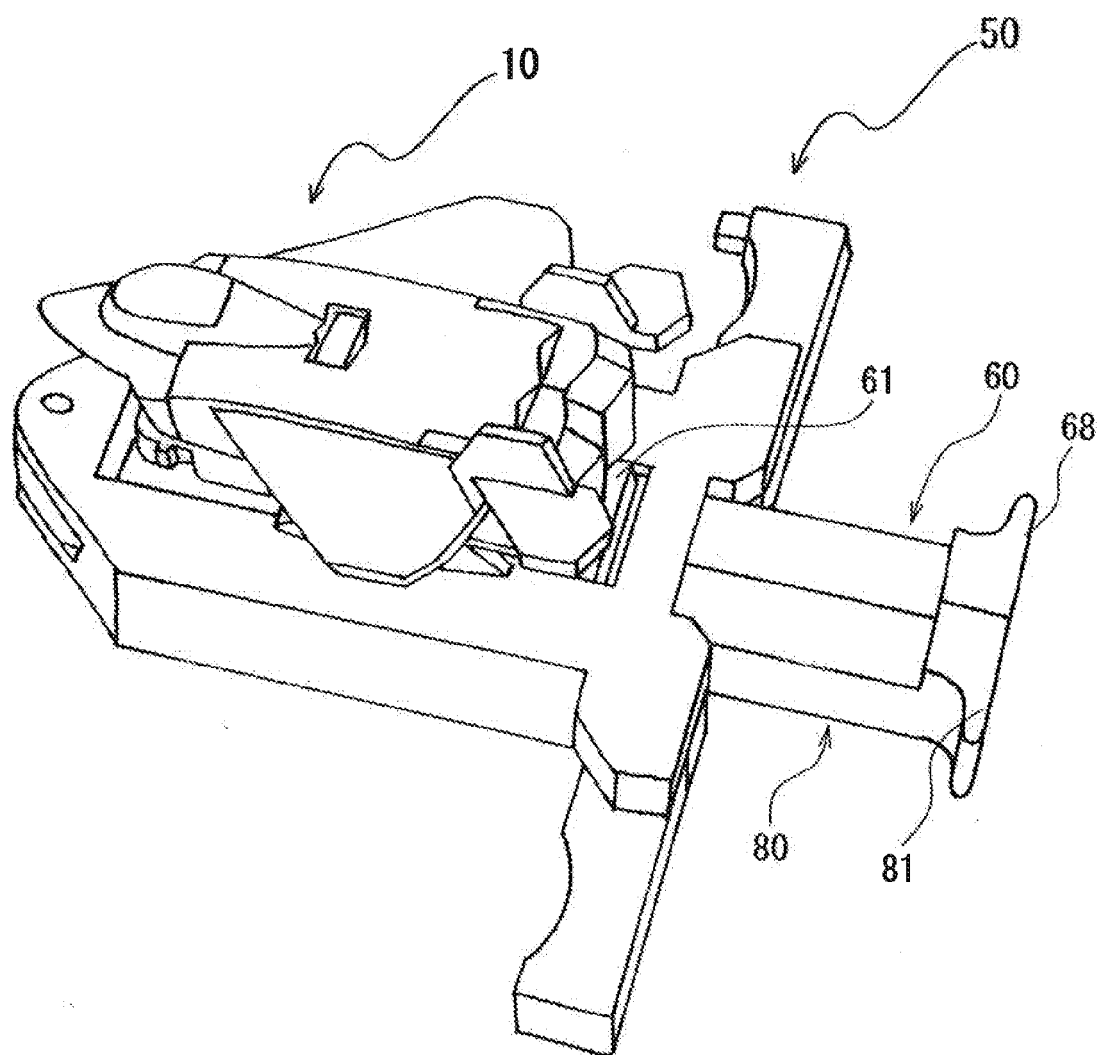


FIG. 19

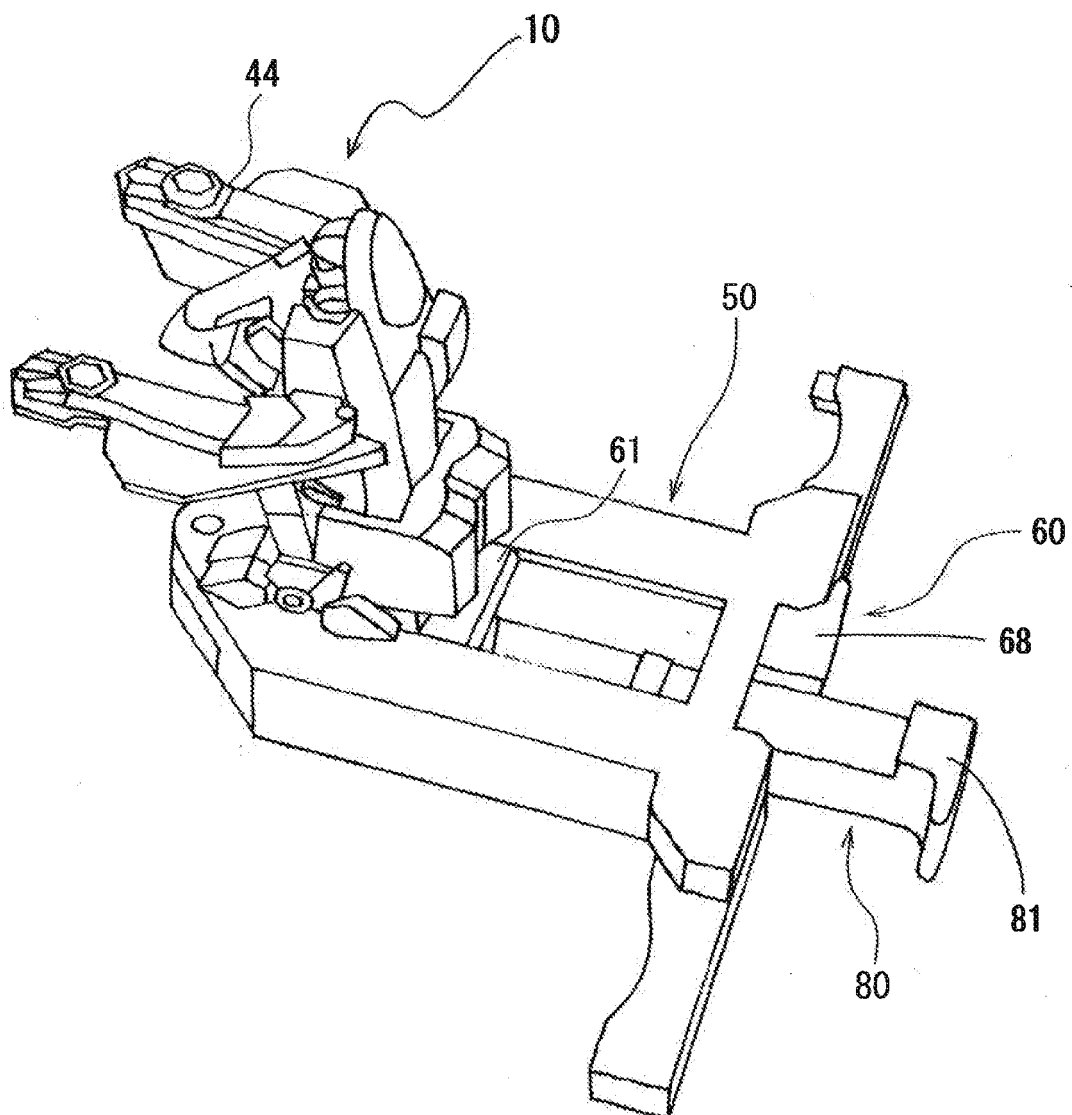


FIG. 20

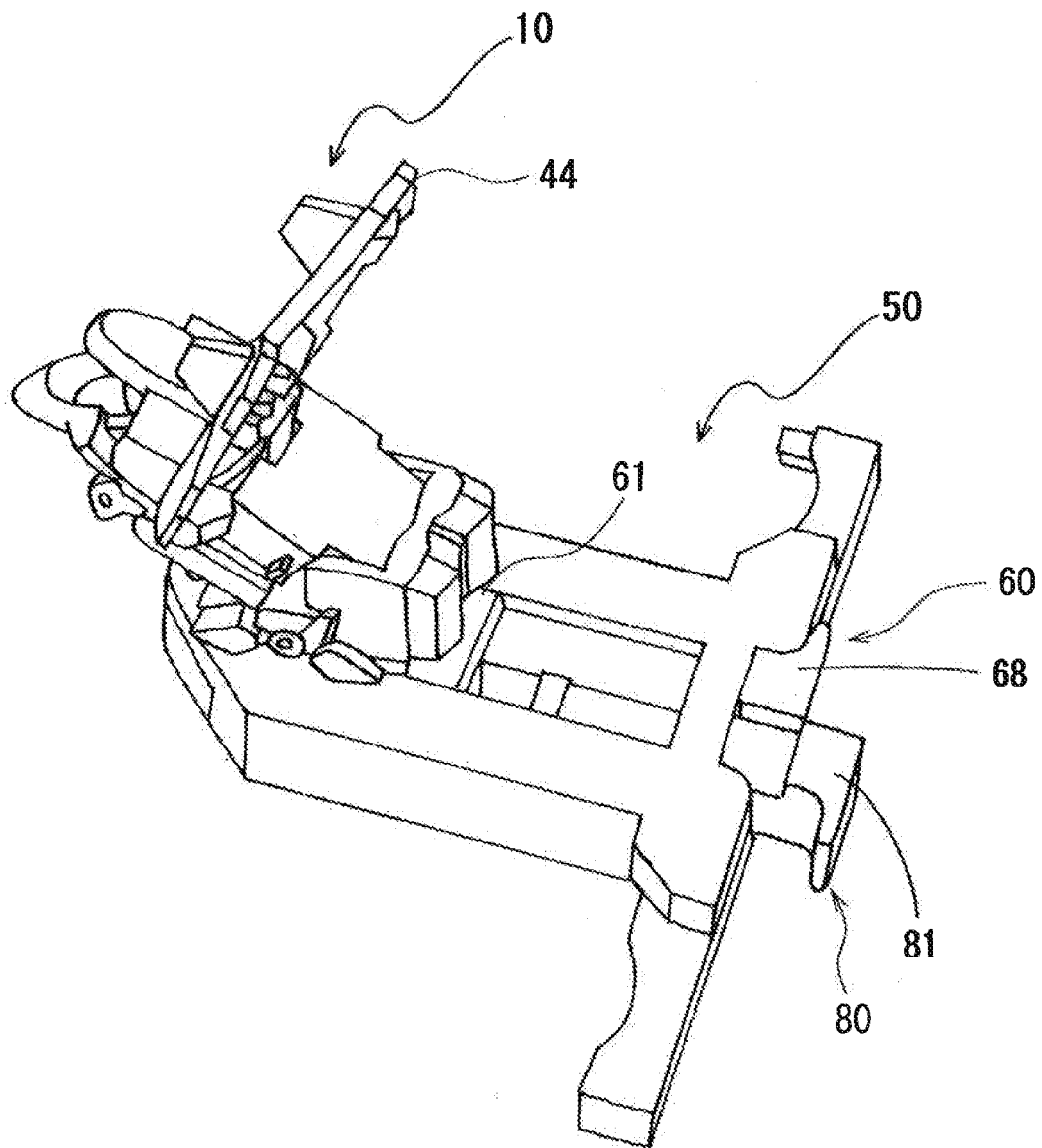


FIG. 21

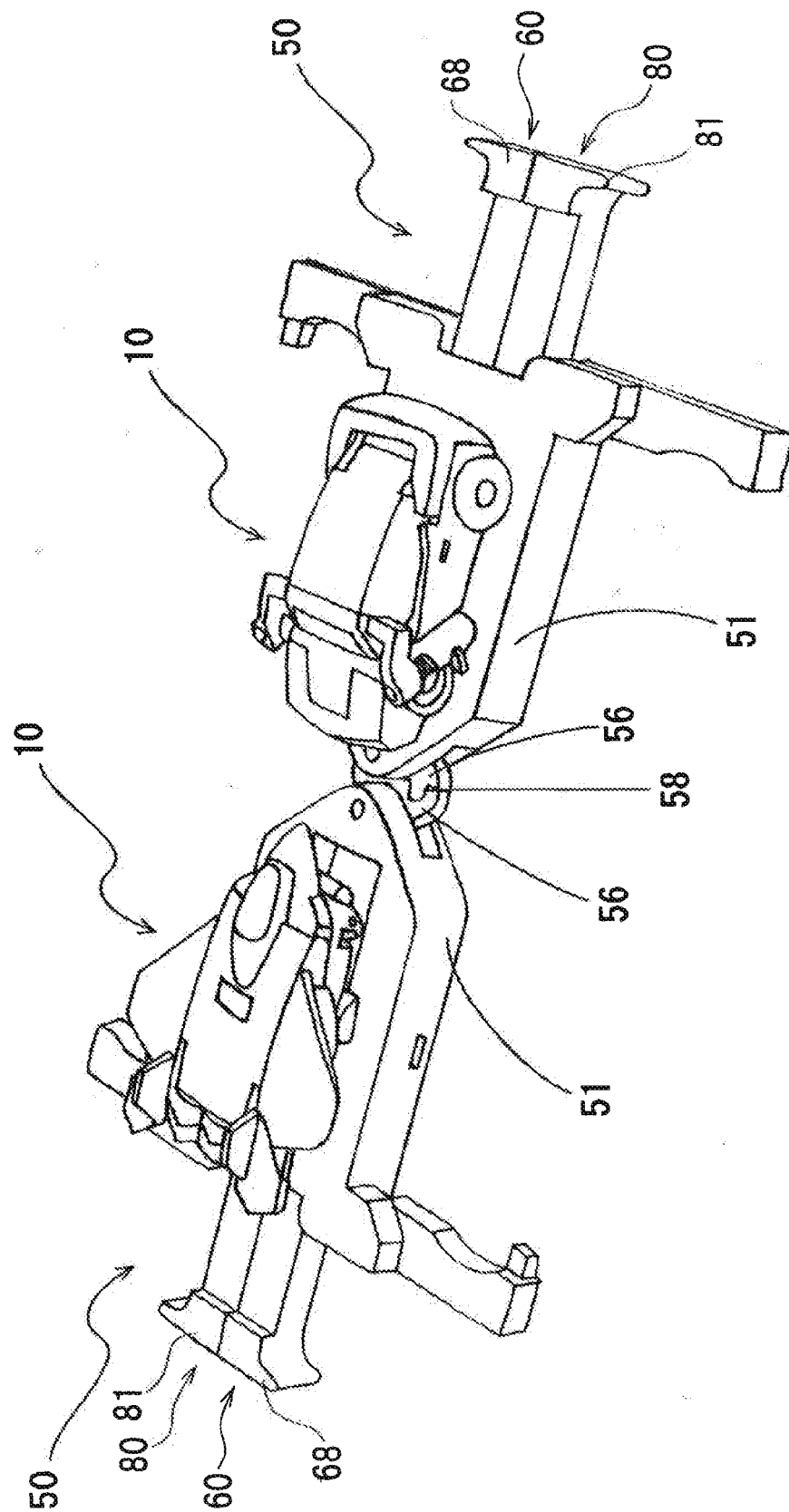


FIG. 22

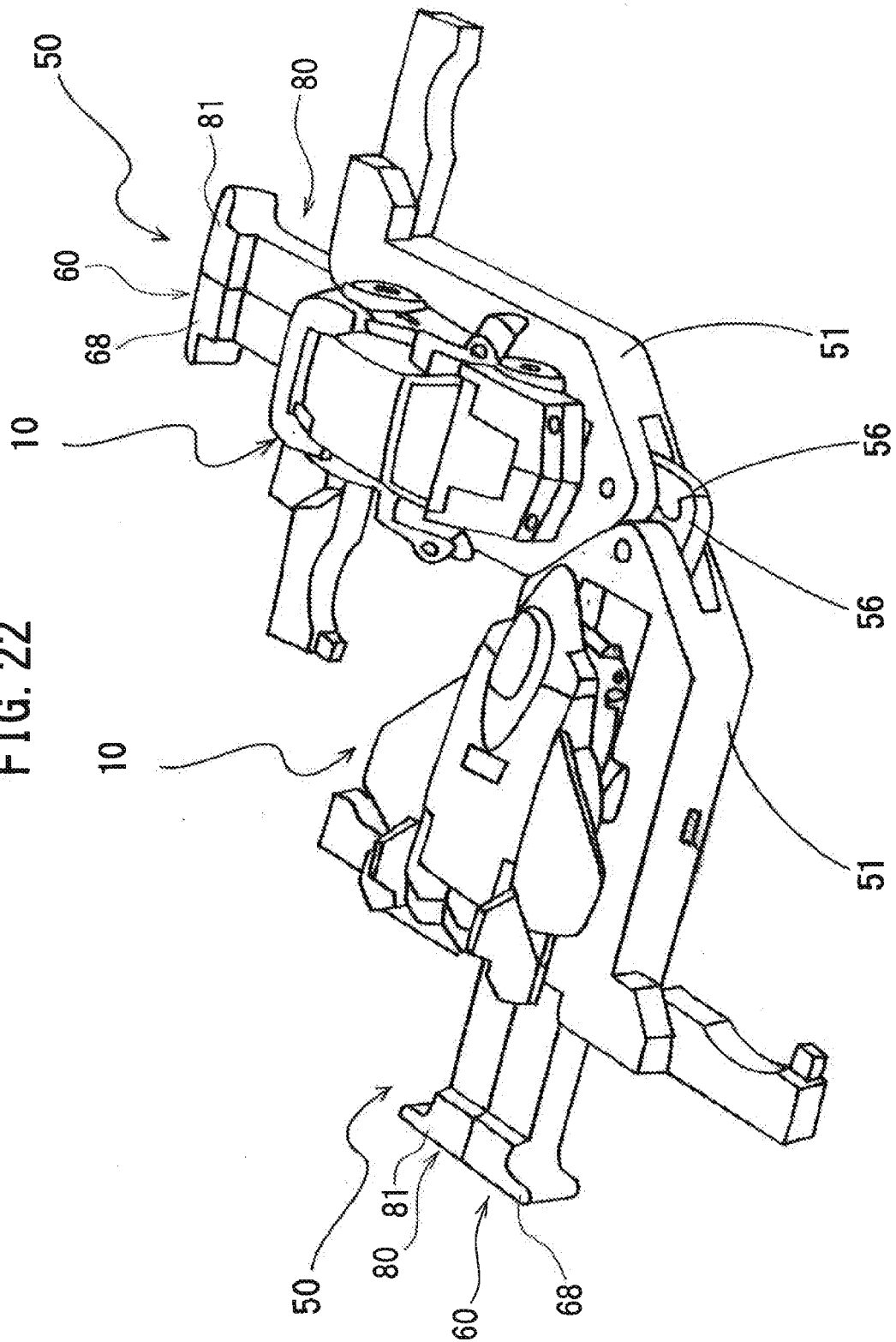
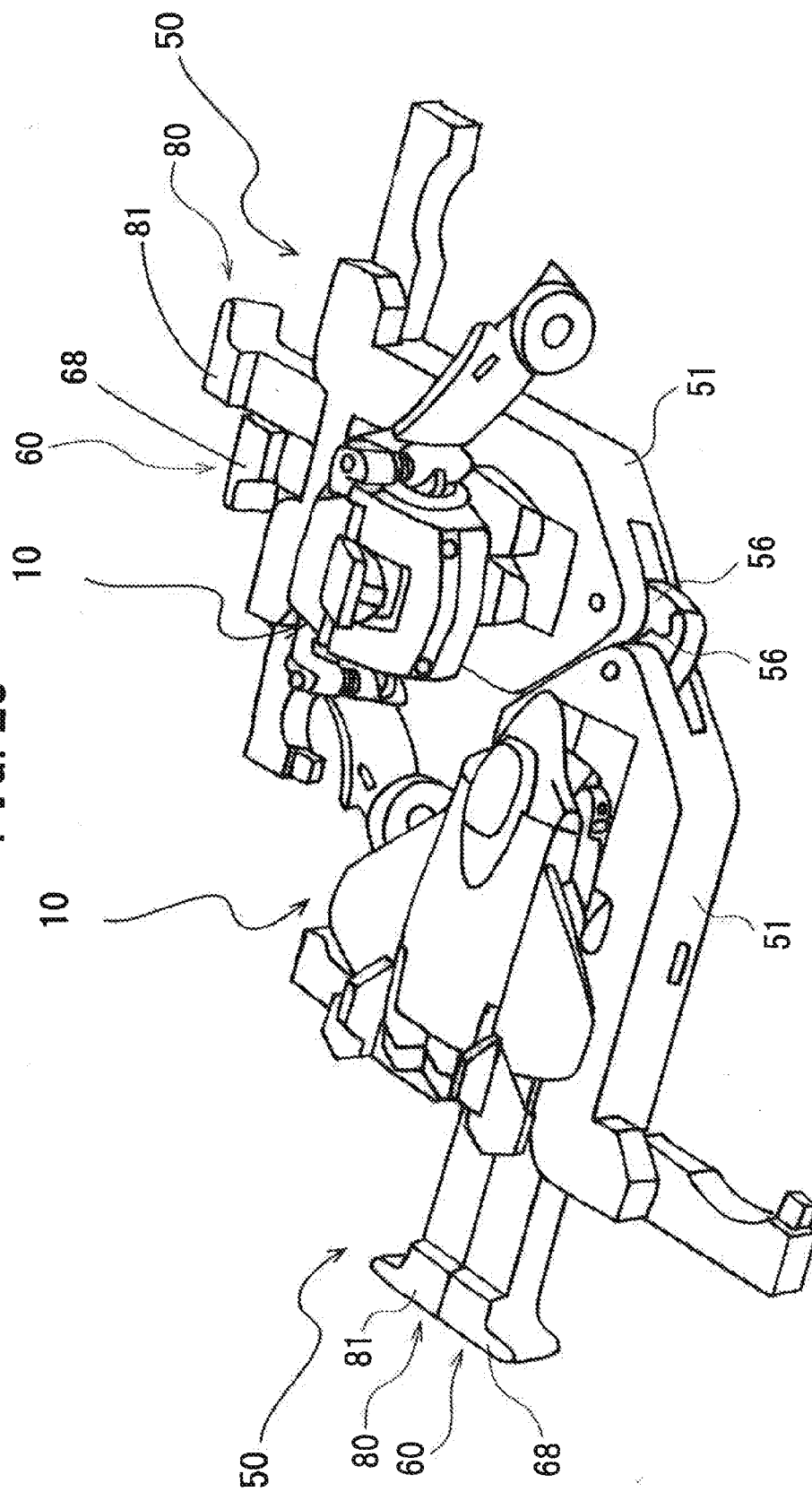


FIG. 23



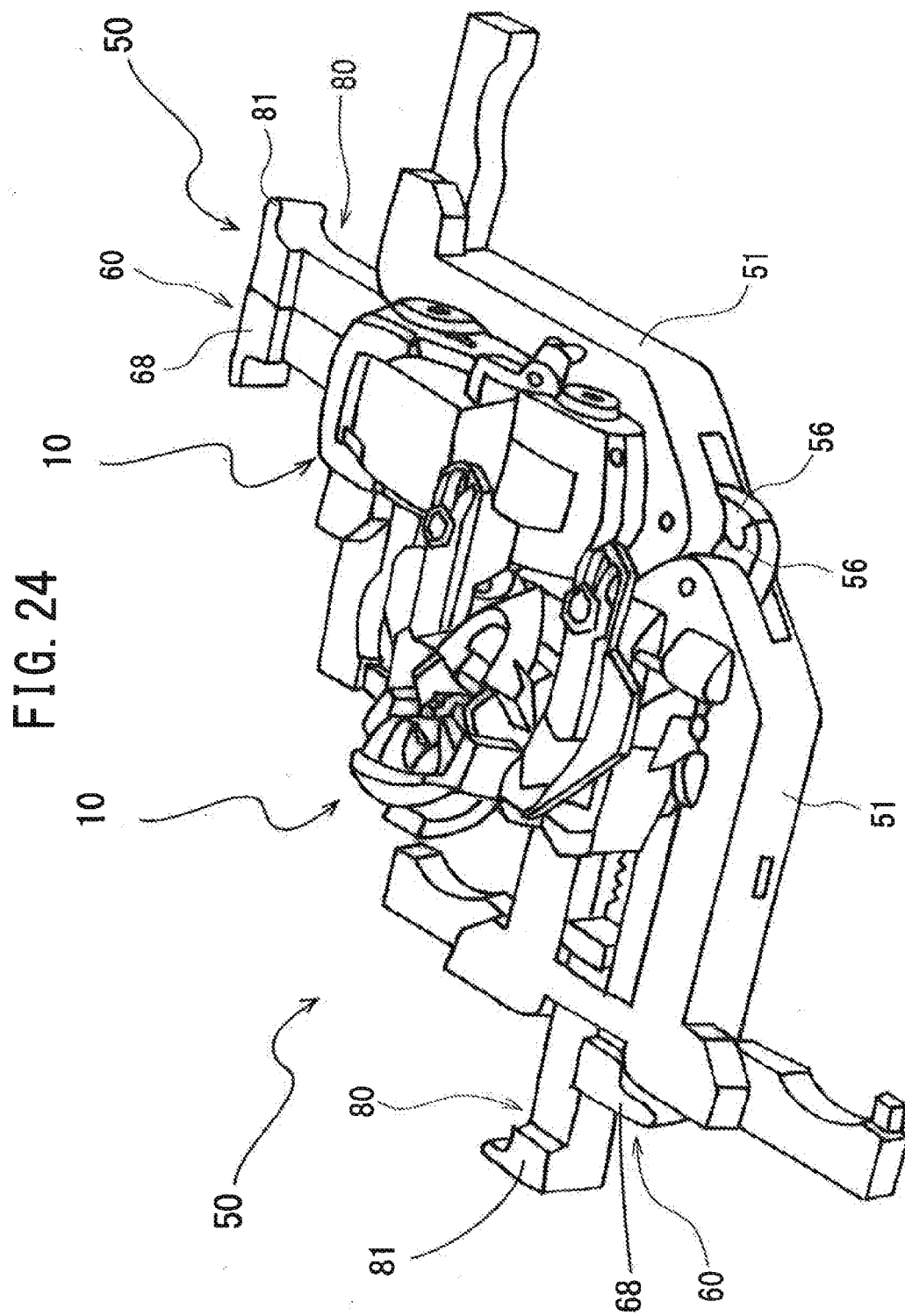
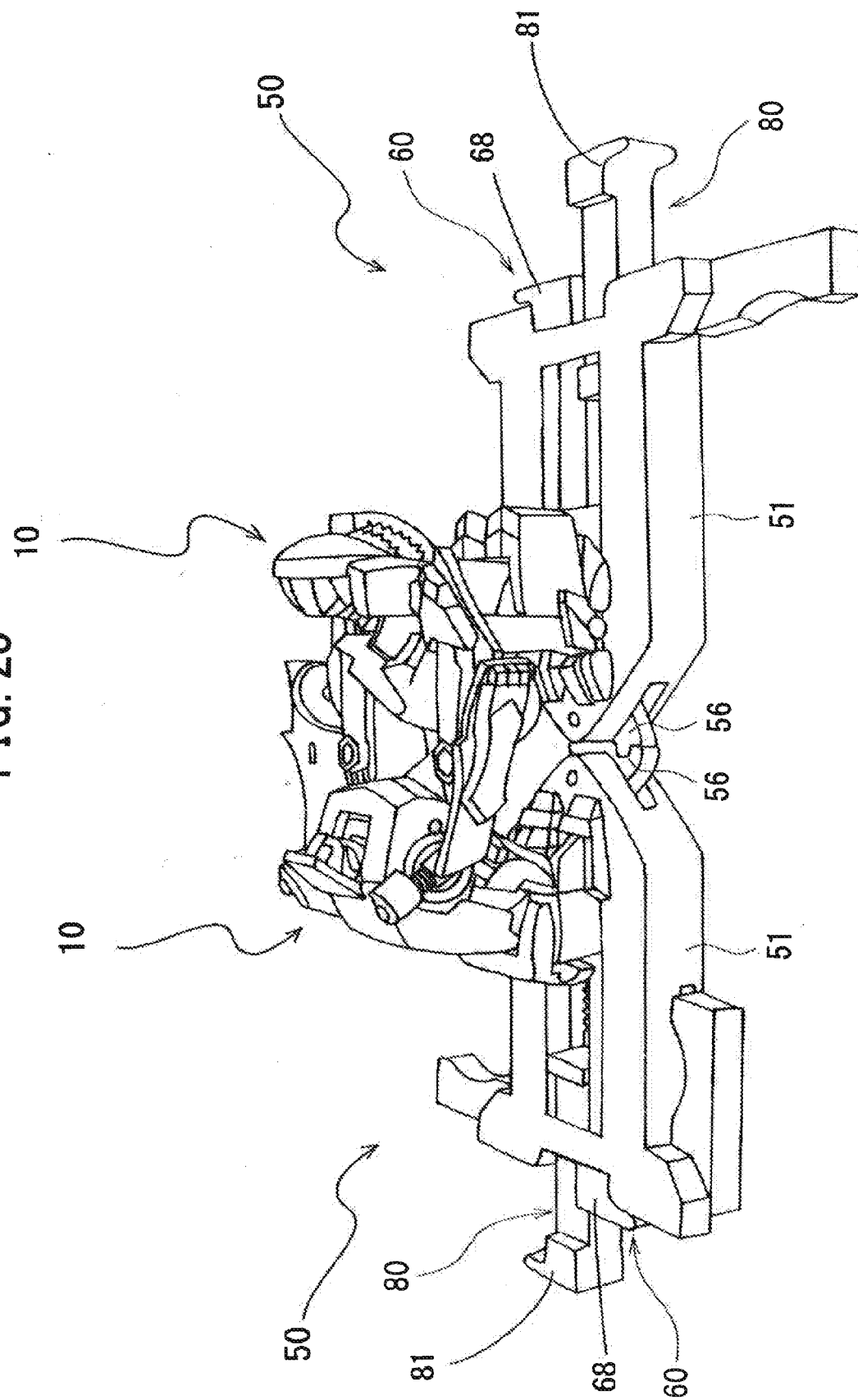


FIG. 25





EUROPEAN SEARCH REPORT

Application Number
EP 11 16 8705

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2009/209168 A1 (EJIMA TAKIO [JP]) 20 August 2009 (2009-08-20) * paragraphs [0002], [0037], [0038]; figures *	1-9	INV. A63H33/00
A,D	JP 9 010442 A (TAKARA CO LTD) 14 January 1997 (1997-01-14) * abstract; figures *	1-9	
A	WO 01/56674 A1 (MATTEL INC [US]) 9 August 2001 (2001-08-09) * page 10, line 31 - page 12, line 26; figures *	1-9	
A	GB 2 151 149 A (TAKARA CO LTD) 17 July 1985 (1985-07-17) * page 3, line 47 - page 3, line 71; figures *	1-9	
A	KR 100 425 921 B1 (LEE YONG HUI) 23 March 2004 (2004-03-23) * abstract; figures *	1-9	
			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 20 September 2011	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			

2
EPO FORM 1503 03.82 (P04C01)

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

EP 11 16 8705

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-09-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009209168 A1	20-08-2009	CN 101507877 A	19-08-2009
		JP 2009189520 A	27-08-2009
JP 9010442 A	14-01-1997	JP 3152590 B2	03-04-2001
WO 0156674 A1	09-08-2001	AT 303854 T	15-09-2005
		AU 765609 B2	25-09-2003
		AU 3106601 A	14-08-2001
		CA 2394998 A1	09-08-2001
		DE 60113229 D1	13-10-2005
		DE 60113229 T2	29-06-2006
		EP 1233825 A1	28-08-2002
		ES 2248276 T3	16-03-2006
		MX PA02006357 A	21-06-2004
		US 6350171 B1	26-02-2002
GB 2151149 A	17-07-1985	CA 1200389 A1	11-02-1986
		DE 8436505 U1	02-05-1985
		FR 2559397 A1	16-08-1985
		HK 82490 A	19-10-1990
		IT 1178291 B	09-09-1987
		SG 3689 G	02-06-1989
KR 100425921 B1	23-03-2004	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 9010442 A [0002]