(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 343 265 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
27.03.2024 Bulletin 2024/13

(21) Application number: **23821861.4**

(22) Date of filing: **16.02.2023**

(51) International Patent Classification (IPC):
F41A 19/10 *(2006.01)* ***F41A 19/16*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F41A 19/10; F41A 19/16

(86) International application number:
PCT/JP2023/005395

(87) International publication number:
WO 2024/018669 (25.01.2024 Gazette 2024/04)

(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 ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **17.07.2022 JP 2022114421**

(71) Applicant: **Kubota, Osamu**
Ina-shi, Nagano 396-0010 (JP)

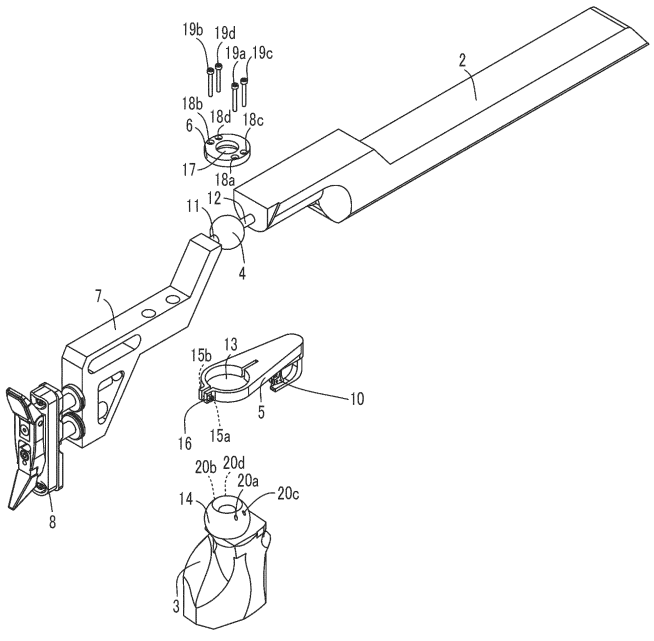
(72) Inventor: **Kubota, Osamu**
Ina-shi, Nagano 396-0010 (JP)

(74) Representative: **Reitstötter Kinzebach**
Patentanwälte
Sternwartstraße 4
81679 München (DE)

(54) **GUN AND TRIGGER MECHANISM**

(57) There is provided with a gun and a trigger mechanism allowing to stably aim the gun and pull a trigger, with a simple configuration. A rifle 1 allows to adjust a direction of pulling the trigger to left or right, and/or front or rear, and/or upward or downward, and/or roll, and/or pitch, and/or yaw. Further, a shooter can pull a trigger 10 in a direction from a wrist to an elbow of an arm pulling the trigger 10, in a state where the shooter holds the rifle 1 at the ready.

FIG. 5



EP 4 343 265 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a gun and a trigger mechanism.

BACKGROUND ART

[0002] A rifle stabilization system against hand shake and the like has been proposed. A control system for rifle stabilization based on fuzzy logic uses a rifle in which a barrel freely rotates on a stock.

[0003] The stock is held by a person who fires a rifle, and a shooter may shoot from a moving vehicle or a helicopter. Further, there is a possibility that a hand of the shooter may shake or the body may erroneously shake.

[0004] In a tracking mode, when a target is seen, an undesirable movement is detected by a position sensor, and the barrel of the rifle is locked so as to be aligned with the stock.

[0005] In a stabilization mode, the barrel is unlocked immediately before the trigger is pulled to fire the rifle, and an inertial rate sensor relatively immunizes the barrel against the movement of the stock so that the barrel continues to track the target.

[0006] A firing control system includes a fuzzy logic control means, and in the fuzzy logic control means, the barrel is aligned with the stock during the tracking based on a group of inference rules, and the barrel is stabilized immediately before the firing. (Patent Literature 1)

CITATION LIST

PATENT LITERATURE

[0007] Patent Literature 1: JPH11-118394A

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0008] In the technique of Patent Literature 1, the system for rifle stabilization is complicated. The complicated system causes failure and is difficult to be manufactured.

[0009] Accordingly, an object of the present invention is to provide a gun and a trigger mechanism allowing to stably aim the gun and pull a trigger, with a simple configuration.

SOLUTION TO PROBLEM

[0010] In order to achieve the above object, a gun of the present invention allows a shooter to pull a trigger in a direction from a finger pulling the trigger to an elbow of an arm pulling the trigger, in a state where the shooter holds the gun at the ready.

[0011] In order to achieve the above object, the gun of the present invention allows to adjust a direction of pulling the trigger to left or right, and/or front or rear, and/or upward or downward, and/or roll, and/or pitch, and/or yaw.

[0012] In order to achieve the above object, the trigger mechanism of the present invention allows to adjust a direction of pulling the trigger to left or right, and/or front or rear, and/or upward or downward, and/or roll, and/or pitch, and/or yaw.

ADVANTAGEOUS EFFECTS OF INVENTION

[0013] According to the present invention, it is possible to provide a gun and a trigger mechanism allowing to stably aim the gun and pull a trigger, with a simple configuration.

BRIEF DESCRIPTION OF DRAWINGS

[0014]

FIG. 1 is a perspective view of a rifle of a present embodiment.
FIG. 2 is a simplified perspective view of a configuration of the rifle in FIG. 1.
FIG. 3 is a plan view of FIG. 2.
FIG. 4 is a schematic cross-sectional view taken along a line A-A in FIG. 3 (a shoulder rest is not shown).
FIG. 5 is an exploded perspective view of FIG. 2.
FIG. 6 is an exploded perspective view of a trigger assembly shown in FIG. 5.
FIG. 7 is a perspective view showing an assembled state of the trigger assembly shown in FIG. 6.
FIG. 8 is a view showing a state where a grip and the trigger assembly shown in FIG. 5 are combined.
FIG. 9 is an exploded perspective view of a shoulder rest of the rifle shown in FIG. 2.
FIG. 10 is a diagram in which a direction of pulling a trigger of the rifle having a simplified configuration of FIG. 2 is adjusted in roll, pitch, and yaw.
FIG. 11 is an enlarged front view when FIG. 10 is a plan view.
FIG. 12 is a schematic plan view showing a state of a fingertip, a wrist, to an elbow of a person when a related-art rifle in which a direction of pulling a trigger is the rear of a barrel is held at the ready.
FIG. 13 is a schematic front view showing a state of the fingertip, the wrist, to the elbow of the person when the related-art rifle in which the direction of pulling the trigger is the rear of the barrel is held at the ready.
FIG. 14 is a diagram in which an X-Y plane is superimposed on a schematic plan view showing a state of a fingertip, a wrist, to an elbow of a person when the rifle of the present embodiment in which the direction of pulling a trigger is adjusted in the roll, pitch and yaw directions is held at the ready.
FIG. 15 is a diagram in which an X-Y plane is super-

imposed on a schematic front view showing the state of the fingertip, the wrist, to the elbow of the person when the rifle of the present embodiment in which the direction of pulling the trigger is adjusted in the roll, pitch and yaw directions is held at the ready.

FIG. 16 is a diagram in which an X-Y plane is superimposed on a schematic rear view showing a state where the direction of pulling the trigger is adjusted in the roll, pitch and yaw directions, when the rifle of the present embodiment is held at the ready and viewed from right behind the shooter, in other words, from the rear of the barrel to a muzzle direction.

FIG. 17 is an exploded perspective view of a pistol according to the present embodiment.

FIG. 18 is a perspective view showing an assembled state of the pistol according to the present embodiment.

DESCRIPTION OF EMBODIMENTS

(Configuration, Operation, and Effect of Rifle)

[0015] Hereinafter, a configuration, an operation, and an effect of a rifle 1 of the present embodiment will be described based on FIGs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16. As shown in FIG. 2, the rifle 1 allows to rotationally adjust a direction of pulling a trigger 10 to roll in a rotation direction around an X axis, pitch in the rotation direction around a Y axis, and yaw in the rotation direction around a Z axis. Rotation adjustment to roll, pitch, and yaw is performed along a spherical surface of a spherical portion 4 and a spherical surface of a second spherical portion 14 to be described later. Incidentally, in a related-art rifle as a whole, a direction of puling a trigger 10 is a rear of a barrel.

[0016] In the present embodiment, both the terms "rotation adjustment" and simple "adjustment" are used. "rotation adjustment" is used when adjustment is performed along the spherical surfaces of the spherical portion 4 and the second spherical portion to be described later, as shown in FIGs. 3 and 4. The simple "adjustment" is a concept including "rotation adjustment", and includes adjustment not along the spherical surfaces of the spherical portion 4 and the second spherical portion.

[0017] As shown in FIGs. 4 and 5, the rifle 1 roughly includes a fore-end 2, a grip 3, the spherical portion 4, a trigger assembly 5, a clamp 6, a stock 7, and a shoulder rest 8. The spherical portion 4 is configured to couple the fore-end 2 to the stock 7 by joints 11, 12.

[0018] Then, an annular portion 13 of the trigger assembly 5 is fitted into the second spherical portion 14 of the grip 3, a screw 16 is inserted and screwed into both screw holes 15a, 15b of the trigger assembly 5 facing each other, the second spherical portion 14 is tightened by the annular portion 13, and the trigger assembly 5 is fixed to the grip 3.

[0019] Then, a hole 17 of the clamp 6 is brought into contact with the spherical surface of the spherical portion 4, and screws 19a, 19b, 19c, and 19d are passed through screw holes 18a, 18b, 18c, and 18d in the clamp 6, respectively. Then, the passed screws 19a, 19b, 19c, and 19d are screwed into screw holes 20a, 20b, 20c, and 20d, respectively, which are formed in an upper edge of the second spherical portion 14 of the grip 3, and are fixed to each other.

[0020] When the screws 19a, 19b, 19c, and 19d are screwed into the screw holes 20a, 20b, 20c, and 20d, respectively, which are formed in the upper edge of the second spherical portion 14 of the grip 3, and are fixed to each other, the direction of pulling the trigger can be rotationally adjusted mainly from the rear of the barrel in the yaw, that is, to the left or the right as shown in FIG. 3. This is because, when the hole 17 of the clamp 6 is brought into contact with the spherical surface of the spherical portion 4, by changing (adjusting) a contact position, the direction of pulling the trigger 10 can be rotationally adjusted mainly in the yaw direction, that is, to the left or the right from the rear of the barrel by 5° to 20°. This is the trigger 10 mechanism of the rifle 1.

[0021] FIGs. 6 and 7 show details of the trigger assembly 5. The trigger assembly 5 includes a front-rear adjustment block 31. The front-rear adjustment block 31 can be fixed at any position of a rail 32a by hooking a groove 31a on the rail 32a of a base 32, moving the front-rear adjustment block 31 in an arrow X1, inserting a screw 33 into the screw hole 31b, and narrowing the width of the groove 31a by screwing the screw 33. That is, the front-rear adjustment block 31 can adjust a front-rear position (a position in the arrow X1 direction).

[0022] The trigger assembly 5 includes a left-right adjustment block 35. The left-right adjustment block 35 has a groove 35a that engages with a protruding portion 31c of the front-rear adjustment block 31. The left-right adjustment block 35 can be fixed at any position of a rail 31d by hooking a groove 35a on the rail 31d of the front-rear adjustment block 31 and moving the rail 31d in an arrow Y1, inserting a screw 36 into a screw hole 35b, and narrowing the width of the groove 35a by screwing the screw 36. That is, the left-right adjustment block 35 can adjust a left-right position (a position in the arrow Y1 direction).

[0023] The trigger assembly 5 includes an upper-lower adjustment block 37. The upper-lower adjustment block 37 has a groove 37a into which a pawl 35c of the left-right adjustment block 35 is inserted. The upper-lower adjustment block 37 can be fixed at an any position of the pawl 35c by moving the groove 37a along the pawl 35c of the left-right adjustment block 31 in an arrow Z1, inserting a screw 38 into a screw hole 37b, and narrowing the width of the groove 37a by screwing the screw 38. That is, the upper-lower adjustment block 37 can adjust an upper-lower position (a position in the arrow Z1 direction). The upper-lower adjustment block 37 serves as the trigger 10.

[0024] Further, FIG. 8 shows a state where the trigger assembly 5 is attached to the grip 3. The annular portion

13 of the trigger assembly 5 is disposed and fixed to a spherical surface portion of a peripheral surface of the second spherical portion 14 of the grip 3. Accordingly, when the annular portion 13 of the trigger assembly 5 is brought into contact with the spherical surface of the second spherical portion 14, by changing (adjusting) the contact position, the direction of pulling the trigger 10 can be rotationally adjusted to roll in the rotational direction around the X axis, pitch in the rotational direction around the Y axis, and yaw in the rotational direction around the Z axis.

[0025] Further, FIG. 9 shows a configuration of the shoulder rest 8. First, a front-rear adjustment bar 41a, a recessed portion 42a into which the front-rear adjustment bar 41a is inserted, a front-rear adjustment bar 41b, and a recessed portion 42b into which the front-rear adjustment bar 41b is inserted are provided. The position of the shoulder rest 8 in the front-rear direction Y1 can be adjusted in correspondence with the extent to which the front-rear adjustment bars 41a, 41b are inserted into the recessed portion 42a, 42b.

[0026] A left-right adjustment screw 43a, a horizontally long hole 44a through which the left-right adjustment screw 43a passes, and a screw fastening hole 45a into which the left-right adjustment screw 43a passing through the horizontally long hole 44a is screwed are provided. A left-right adjustment screw 43b, a horizontally long hole 44b through which the left-right adjustment screw 43b passes, and a screw fastening hole 45b into which the left-right adjustment screw 43b passing through the horizontally long hole 44b is screwed are provided. When the left-right adjustment screws 43a, 43b are screwed into the screw fastening holes 45a, 45b, respectively, the position of the shoulder rest 8 in the left-right direction X1 can be adjusted in correspondence with at which position of the horizontally long holes, which are the horizontally long holes 44a, 44b, the left-right adjustment screws 43a, 43b are screwed.

[0027] An upper-lower adjustment screw 46, a screw hole 47 through which the upper-lower adjustment screw 46 passes, and a block 49 into which the upper-lower adjustment screw 46 passing through a vertically long hole 48 is screwed are provided. When the upper-lower adjustment screw 46 is screwed into the screw hole 47 and the block 49, the position of the shoulder rest 8 in the upper-lower direction Z 1 can be adjusted by determining at which position of the vertically long hole, which is the vertically long hole 48, the block 49 is disposed and screwed.

[0028] FIGs. 10 and 11 show a state where the direction of pulling the trigger 10 is rotationally adjusted in roll, pitch and yaw directions from the rear of the barrel. The trigger 10 is a so-called electronic trigger. By rotationally adjusting the direction of pulling the trigger 10 from the rear of the barrel to the left, it becomes possible for a right-handed person to pull the trigger 10 in the direction from a wrist to an elbow of an arm that pulls the trigger 10 when the person holds the rifle 1 at the ready.

[0029] Due to the structure of the human body, the movement of a finger caused by contraction of muscle existing on a wrist side of the elbow is transmitted to the finger through a tendon. A state where a flow line of the tendon becomes linear has the best response sensitivity from the point of view of human engineering. The bending of the wrist is eliminated and the flow line of the tendon becomes linear by the trigger 10 having a structure in which pulling is performed in the direction from the wrist to the elbow of the arm that pulls the trigger 10 rather than from the rear of the barrel. A state where the muscle and the tendon moving the finger for pulling the trigger including the trigger 10 are linear is a best mode state where the response sensitivity of the finger is maximized and high hit accuracy can be realized. An optimum solution of an adjustment angle of the grip 3 and/or the trigger 10 is different depending on the shape and size of the gun, the physique of a shooter, the state of clothing that the shooter wears, and the like. Accordingly, the adjustment angle is made to have a variable structure, or an optimum value is selected from a plurality of fixed numerical models produced by assigning numerical values to a plurality of types by fitting as in the case of selecting the size of clothing.

[0030] FIGs. 12 and 13 show the posture of a person who holds a related-art rifle 21 at the ready in which the direction of pulling the trigger 10 is the rear of the barrel. As indicated by an arm curve a1, since the trigger 10 is pulled in a state where the wrist is bent, the trigger 10 is pulled in an obviously unstable state.

[0031] FIGs. 14 and 15 show the posture of a person who holds the rifle 1 at the ready in which the direction of pulling the trigger 10 is rotationally adjusted from the rear of the barrel to the right and the trigger is pulled in the direction from the wrist to the elbow of the arm that pulls the trigger 10. In other words, FIGs. 14 and 15 show a posture in which the muscle and the tendon moving the finger that pulls the trigger including the trigger 10 are on a straight line or an approximate straight line. As indicated by an arm curve a2, since the trigger 10 is pulled in a natural state where the wrist is not bent, the trigger 10 is pulled in a stable state. In other words, FIGs. 14 and 15 show the posture of the person who holds the rifle 1 at the ready in which the trigger can be pulled in a direction from the finger that pulls the trigger including the trigger 10 or the trigger 10 toward the elbow.

[0032] In a case where a gun is overlappingly placed on an X-Y plane that includes an X axis whose value increases toward a right side and a Y axis whose value increases toward an upper side and where the trigger 10 is at the origin thereof as shown in FIG. 14, for a right-handed shooter, a direction of pulling the trigger 10 is within the range of a third quadrant (Q3) of the coordinates. As shown in FIG. 14, when the gun is placed, for a left-handed shooter, the direction of pulling the trigger 10 is within the range of a second quadrant (Q2) of the coordinates with the trigger 10 as the origin. In a case where the gun is overlappingly placed on the X-Y plane

where the trigger 10 is at the origin thereof as shown in FIG. 15, the direction of pulling the trigger 10 is within the range of the third quadrant (Q3) of the coordinates with the trigger 10 as the origin regardless of a dominant hand. In a case where the gun is overlappingly placed on the X-Y plane where the trigger 10 is at the origin thereof as shown in FIG. 16 (when the gun is viewed from right behind the shooter, in other words, from the rear of the barrel to a muzzle direction), for the right-handed shooter, the direction of pulling the trigger 10 is within the range of a fourth quadrant (Q4) of the coordinates with the trigger 10 as the origin. In a case where the gun is overlappingly placed on the X-Y plane where the trigger 10 is at the origin thereof as shown in FIG. 16, for the left-handed shooter, the direction of pulling the trigger 10 is within the range of the third quadrant (Q3) of the coordinates with the trigger 10 as the origin.

(Main Effects Obtained by Present Embodiment)

[0033] It is possible to provide the rifle 1 and the trigger 10 mechanism allowing a shooter to stably aim the rifle 1 and pull the trigger 10, with a simple configuration that the direction of pulling the trigger 10 can be rotationally adjusted from the rear of the barrel to the left.

[0034] The rifle 1 and the trigger 10 mechanism not only make it possible to adjust the direction of pulling the trigger 10 in the left-right direction, that is, in the yaw direction, but also in the roll and pitch directions. That is, the rifle 1 and the trigger 10 mechanism can adjust the direction of pulling the trigger 10 in the X, Y, and Z-axis directions. For example, as shown in FIGs. 6 and 7, the trigger assembly 5 itself can adjust the direction of pulling the trigger 10 in the X1, Y1, and Z1-axis directions.

[0035] As shown in FIG. 8, in a state where the trigger assembly 5 is attached to the grip 3, the annular portion 13 of the trigger assembly 5 is disposed and fixed to the spherical surface portion of the peripheral surface of the second spherical portion 14 of the grip 3. This state means that the grip 3 can be adjusted in the directions of roll, pitch, yaw (RPY). Further, from the above, it is possible to adjust a relative position of the grip 3 and the trigger 10 in the XYZ directions and a relative posture in the RPY directions to six degrees of freedom in total.

[0036] Further, as shown in FIG. 9, the shoulder rest 8 can be adjusted in the X2, Y2, and Z2-axis directions. Accordingly, it is possible to solve the problem or the like in which an optimum value of the relative position between the shoulder rest 8 and the grip 3 is different due to a physique difference or the like which is different for each shooter.

(Other Embodiments)

[0037] The above-described rifle 1 according to the present embodiment is an example of a preferred embodiment of the present invention, but the present invention is not limited thereto, and various modifications can be made without changing the gist of the present invention.

[0038] For example, since the rifle 1 of the present embodiment is for a right-handed person, the direction of pulling the trigger 10 is rotationally adjusted from the rear of the barrel to the left on the assumption that the trigger 10 is pulled with an index finger of a right hand. However, in the rifle 1 for the left-handed shooter, and the direction of pulling the trigger 10 is rotationally adjusted from the rear of the barrel to the right on the assumption that the trigger 10 is pulled with an index finger of a left hand.

[0039] Further, in the rifle 1 of the present embodiment, the direction of pulling the trigger 10 is adjusted to the left. However, the direction of pulling the trigger 10 may be adjusted to the left or the right, and/or the front or the rear, and/or upward or downward. Further, in the rifle 1 of the present embodiment, the direction of pulling the trigger may be adjusted to roll, and/or pitch, and/or yaw.

[0040] Therefore, the second spherical portion 14 is not necessarily spherical. However, when it is desired to rotationally adjust the trigger assembly 5, the second spherical portion 14 may be spherical. Further, since an adjustment mechanism of X2, Y2, Z2 directions of the shoulder rest 8 shown in FIG. 9 is not an essential component, the adjustment mechanism can be omitted.

[0041] Further, in the rifle 1 of the present embodiment, the direction of pulling the trigger 10 can be rotationally adjusted by 5° to 20° to the left or the right from the rear of the barrel. However, this angle can be changed from, for example, more than 0° to 75°, 1° to 10°, 1° to 30°, or 5° to 45°, that is, an adjustment range can be set. Further, in the rifle 1 of the present embodiment, the direction of pulling the trigger 10 can be set to an adjustment range of more than 0° to 30° upward from the rear of the barrel and more than 0° to 75° downward. The adjustment ranges are ranges in which the trigger can be stably pulled by every person in view of human engineering. For example, the reason why the adjustment ranges are set such that the direction of pulling the trigger 10 is wider from the rear side of the barrel to the lower side than the upper side is that the posture in which the elbow of the arm that pulls the trigger 10 is positioned below the shoulder and on the shoulder side of the trigger is natural and is not forced for the shooter who holds the rifle 1 at the ready. This generally applies to a shooter with a standard body type.

[0042] Further, although the present embodiment has been described using the rifle 1 as an example, it is needless to say that the present embodiment can be applied to other guns, for example, a pistol (short gun, handgun), a machine gun, and a sports gun. The present invention can also be applied to small guns other than the rifle. In general, a military gun or the like is not required to have a limit hit accuracy and it is important that the military gun or the like is inexpensive, can be mass-produced, is easy to handle, and does not fail, and. Under these conditions, a model with good hit accuracy is often selected for sharpshooting. Further, the present embodiment is suitably ap-

plied to firearms for sports, that is, for the purpose of target shooting competition and hunting. The gun for target shooting competition and the hunting gun are not bound to the requirements of the military gun, and high hitting accuracy is required. Among them, the gun for target shooting competition is not bound to the requirements of the military gun, and a limit hitting accuracy is required. It should be noted that a low-grade and inexpensive gun for target shooting competition may be diverted to military use.

[0043] For example, a pistol 51 according to the present embodiment will be described with reference to FIGs. 17 and 18. Since the pistol 51 basically has substantially the same configuration as that of the rifle 1, the same reference numerals as those given to the members of the rifle 1 having the same functions as those of components of the pistol 51 are given to the components of the pistol 51, and description of the members will be omitted.

[0044] Further, in the case of the pistol, when the pistol is held in a state of maximum response sensitivity from the point of view of human engineering, a muzzle does not face the direction of a target. It should be noted that it has been found that, in a case where the grip of the pistol is gripped by the right arm and the trigger is pulled by the index finger of the right hand, the direction of pulling the trigger being rotated clockwise around the Z3 axis, slightly rotated clockwise around the X3 axis, and slightly rotated counterclockwise around the Y3 axis shown in FIG. 18 is most stable, so that the aiming of the pistol can be stable.

[0045] Although the trigger 10 of the rifle 1 adopts a so-called electronic trigger, a so-called mechanical trigger of a hydraulic pressure, a wire, or a link may be adopted for the following reason. For example, the hydraulic trigger can be adopted by connecting a hydraulic tube from the trigger assembly 5 to an engine portion of the gun. Further, the wire-type trigger can be adopted by connecting a brake of an automobile or a transmission wire-shaped wire from the trigger assembly 5 to the engine portion of the gun. Further, the link mechanism type trigger can be adopted by connecting the movement of the trigger to the engine portion of the gun via a lever or a link. However, in the case of the electronic trigger, mechanical connection between the engine portion and the trigger is not required, and the rifle 1 can be configured more easily.

[0046] Further, in the rifle 1 of the present embodiment, the direction of pulling the trigger 10 can be rotationally adjusted from the rear of the barrel to the left or the right. However, the direction of pulling the trigger 10 may be fixed after rotational adjustment to the left or the right from the rear of the barrel. Further, the adjustment mechanism may be omitted, and molding may be performed by setting a rotation angle in advance. That is, the cost may be reduced by omitting the adjustment mechanism in a state where the adjustment is performed in the XYZRPY directions in advance in accordance with an average physique of shooters.

[0047] Further, in the trigger 10 mechanism of the rifle 1 of the present embodiment, when the hole 17 of the clamp 6 is brought into contact with the spherical surface of the spherical portion 4, the direction of pulling the trigger 10 is rotationally adjusted from the rear of the barrel to the left or the right by changing (adjusting) the contact position. However, the trigger 10 mechanism of the rifle 1 is not limited to such a mechanism, and various mechanisms capable of adjusting the direction of pulling the trigger 10 to rotate in roll, pitch, and yaw can be adopted.

[0048] The X axis, the Y axis, and the Z axis shown in FIG. 2, the arrow X1, the arrow Y1, and the arrow Z1 shown in FIG. 6, the X2 direction, the Y2 direction, and the Z2 direction shown in FIG. 9, and XYZ around the X3 axis, the Y3 axis, and the Z3 axis shown in FIGs. 16 and 17 are generally characters representing three-dimensional coordinates.

REFERENCE SIGNS LIST

[0049]

1 rifle (gun)
10 trigger

Claims

1. A gun allowing a shooter to pull a trigger in a direction from a finger pulling the trigger to an elbow of an arm pulling the trigger, in a state where the shooter holds the gun at the ready.

2. A gun, wherein a direction of pulling a trigger is adjustable to left or right, and/or front or rear, and/or upward or downward, and/or roll, and/or pitch, and/or yaw.

3. A trigger mechanism, wherein a direction of pulling a trigger is adjustable to left or right, and/or front or rear, and/or upward or downward, and/or roll, and/or pitch, and/or yaw.

FIG. 1

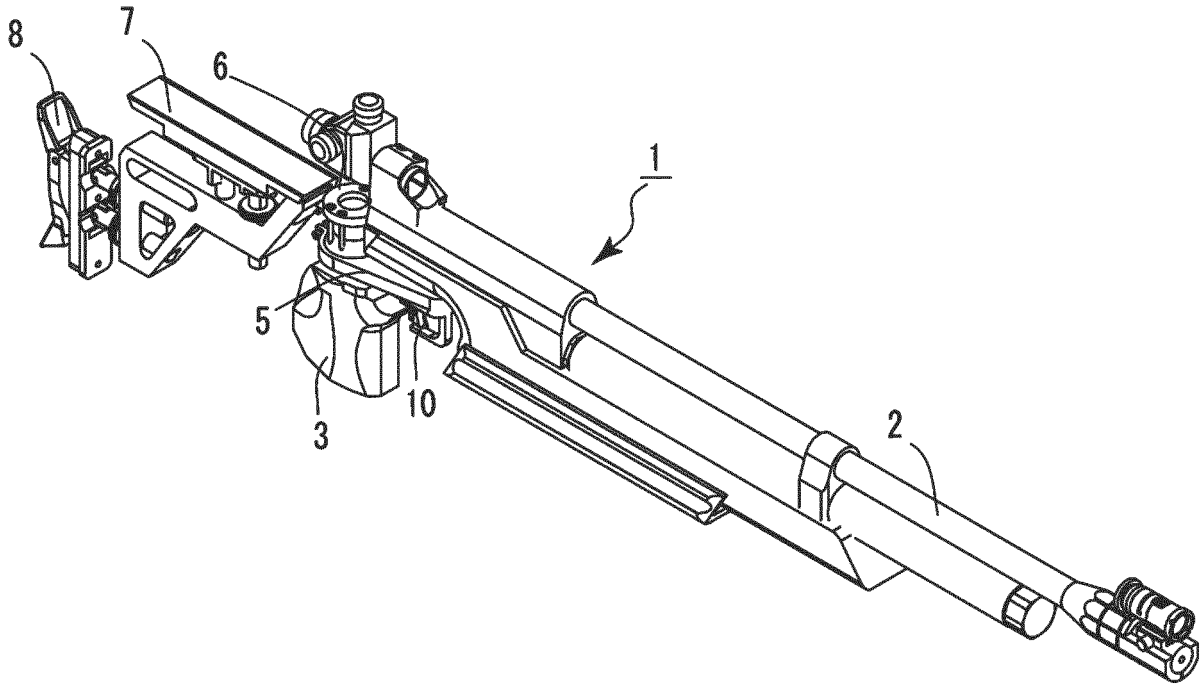
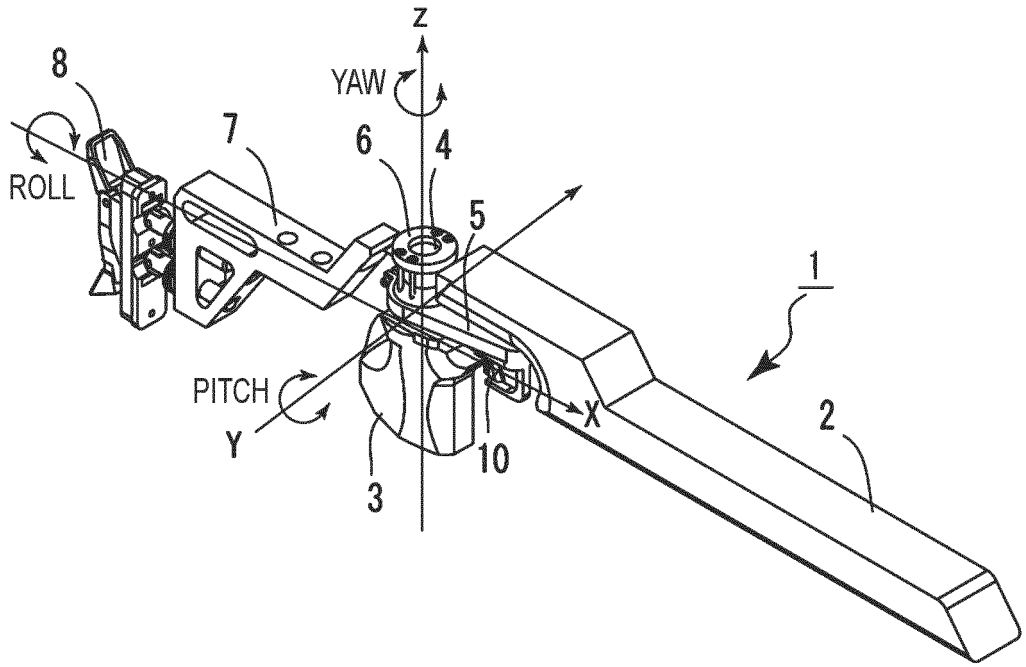


FIG. 2



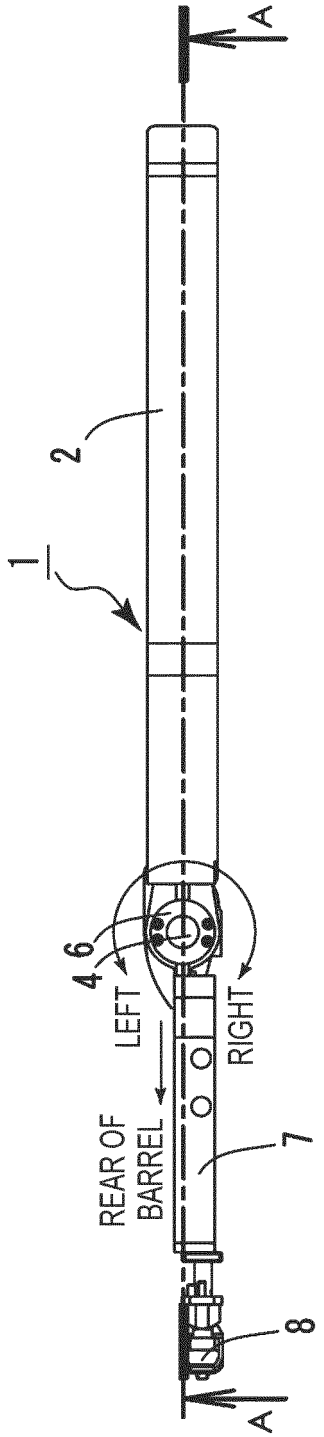


FIG. 3

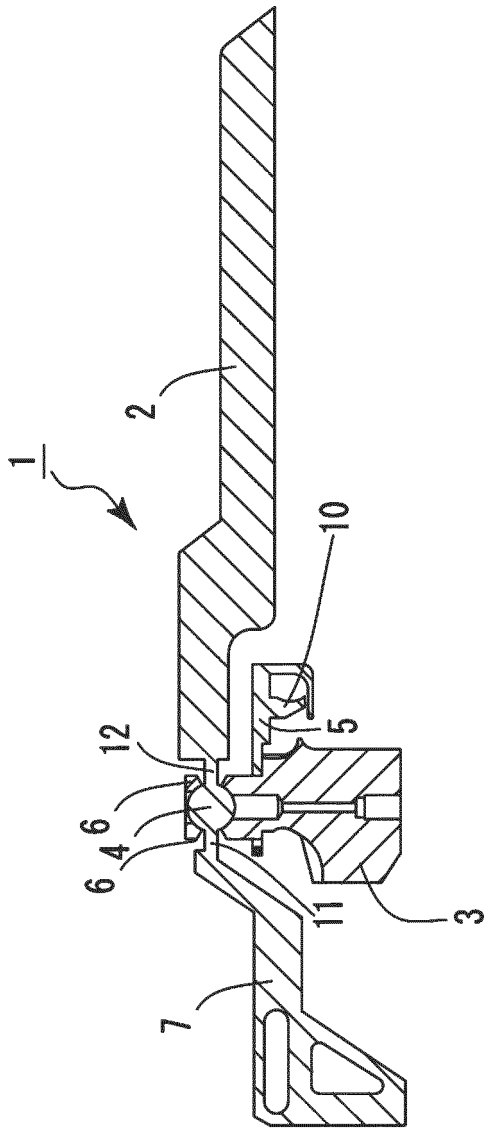


FIG. 4

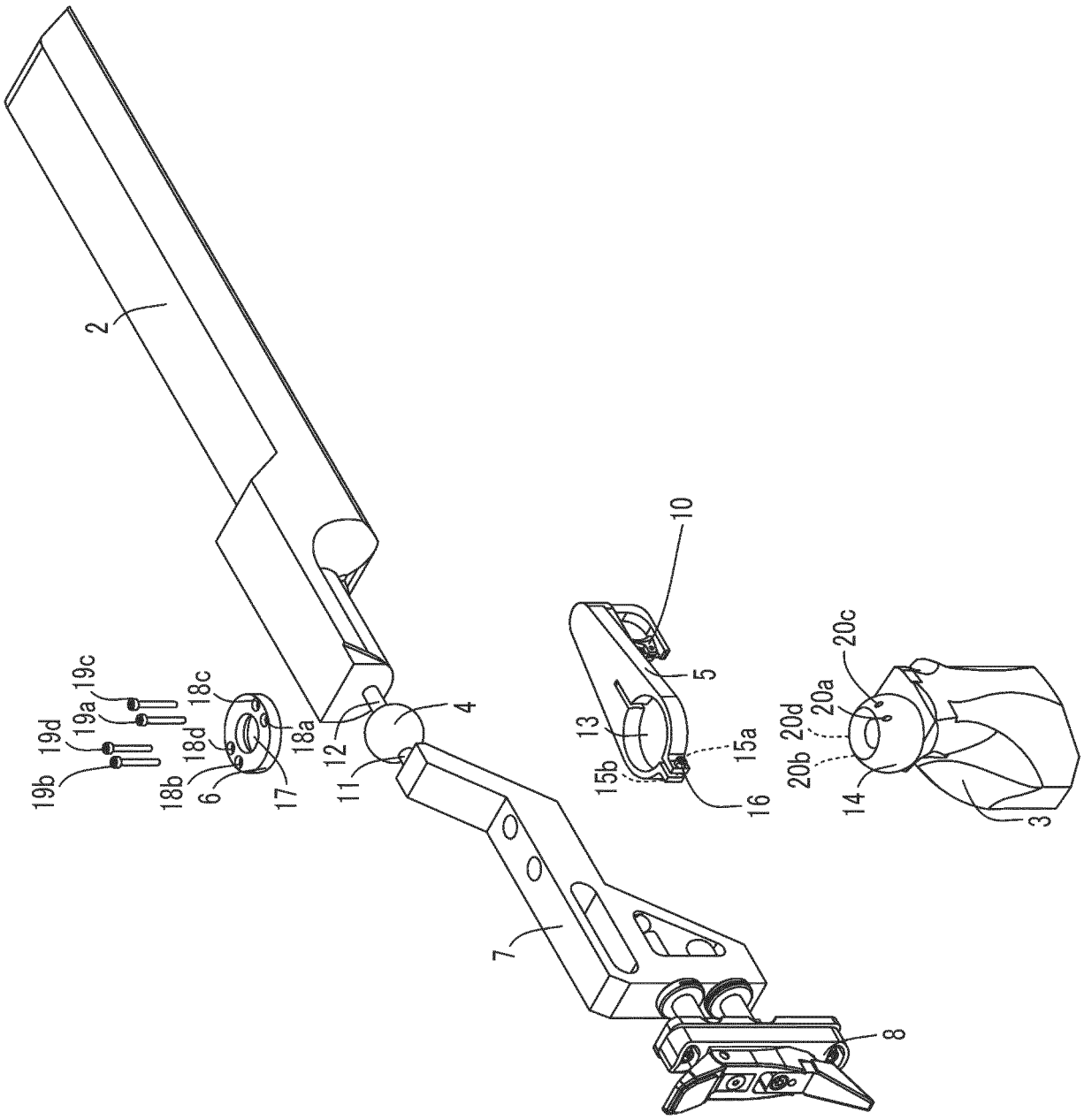

2
19b
19d
19a
19c
18b
18d
18c
6
17
18a
12
11
4
7
8
10
5
13
15b
15a
16
20b
20d
20a
20c
14
3

FIG. 5

FIG. 6

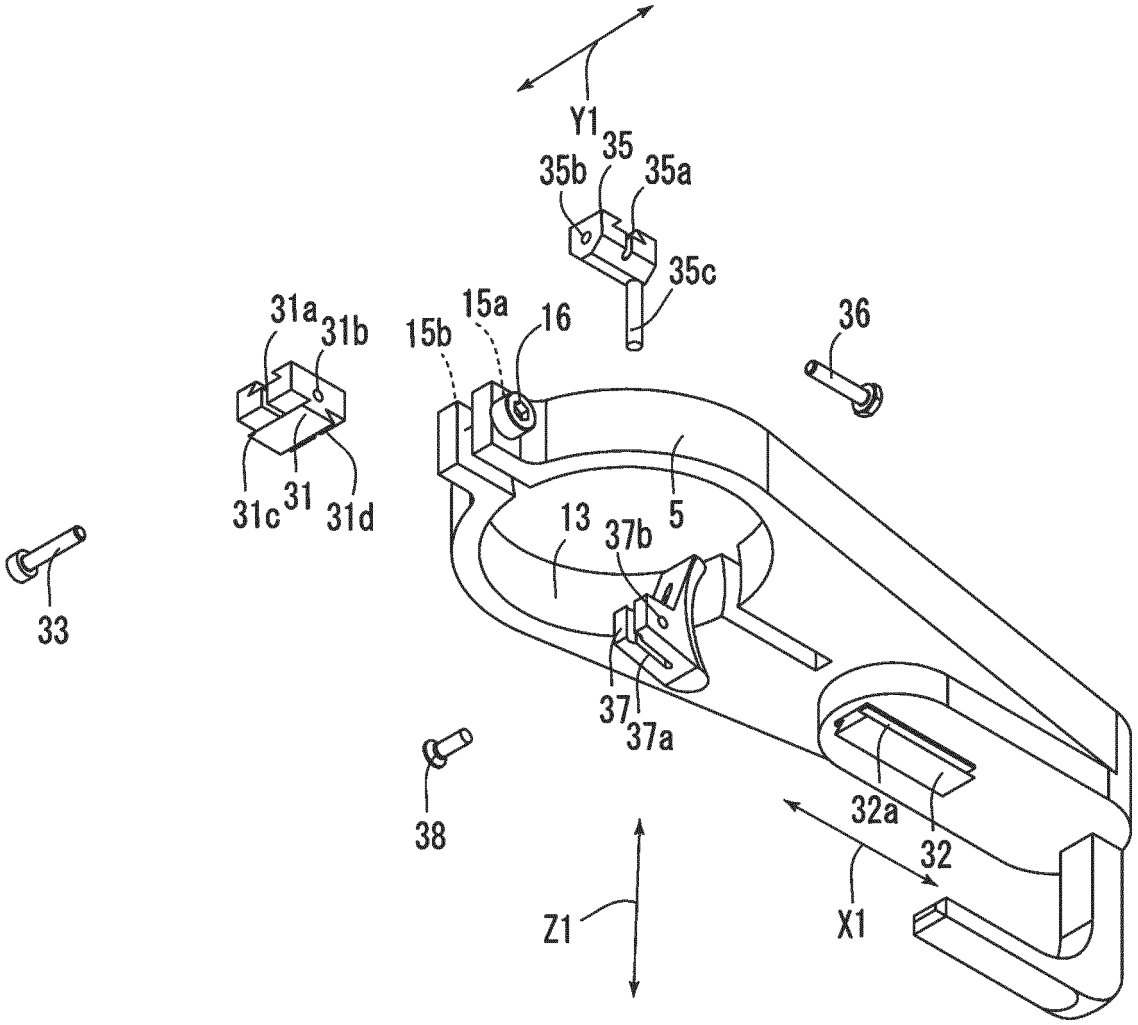

Y1
35
35b
35a
35c
31a
31b
15a
15b
16
36
31c
31
31d
13
37b
5
33
37
37a
38
32a
32
Z1
X1

FIG. 7

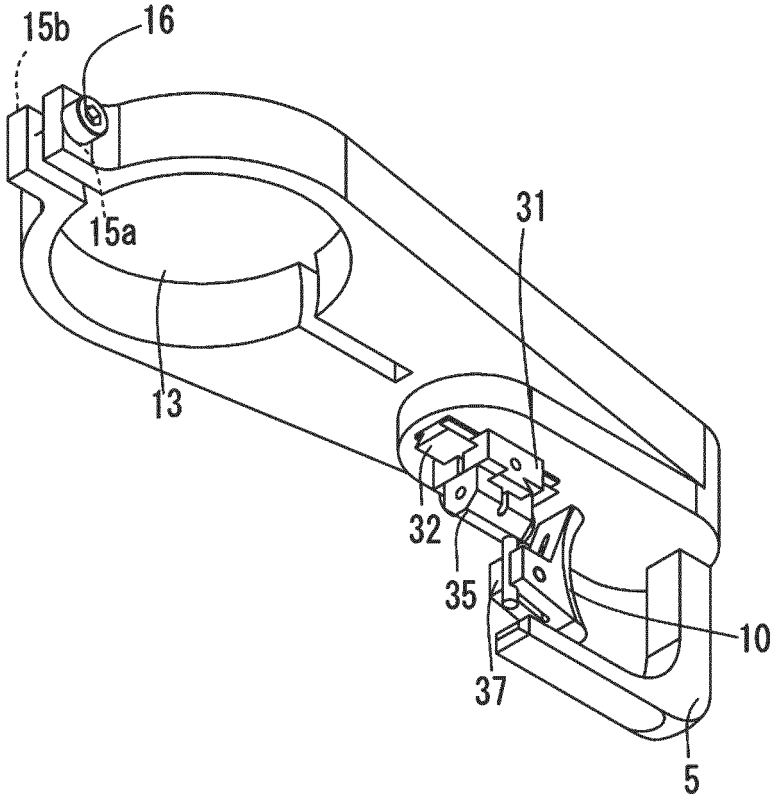
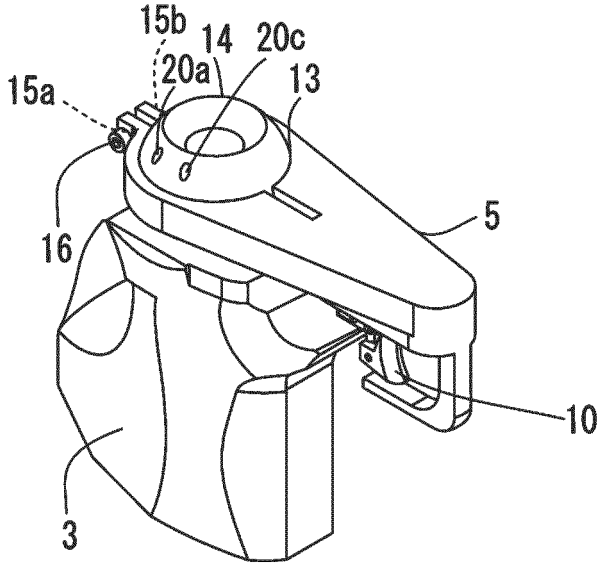


FIG. 8



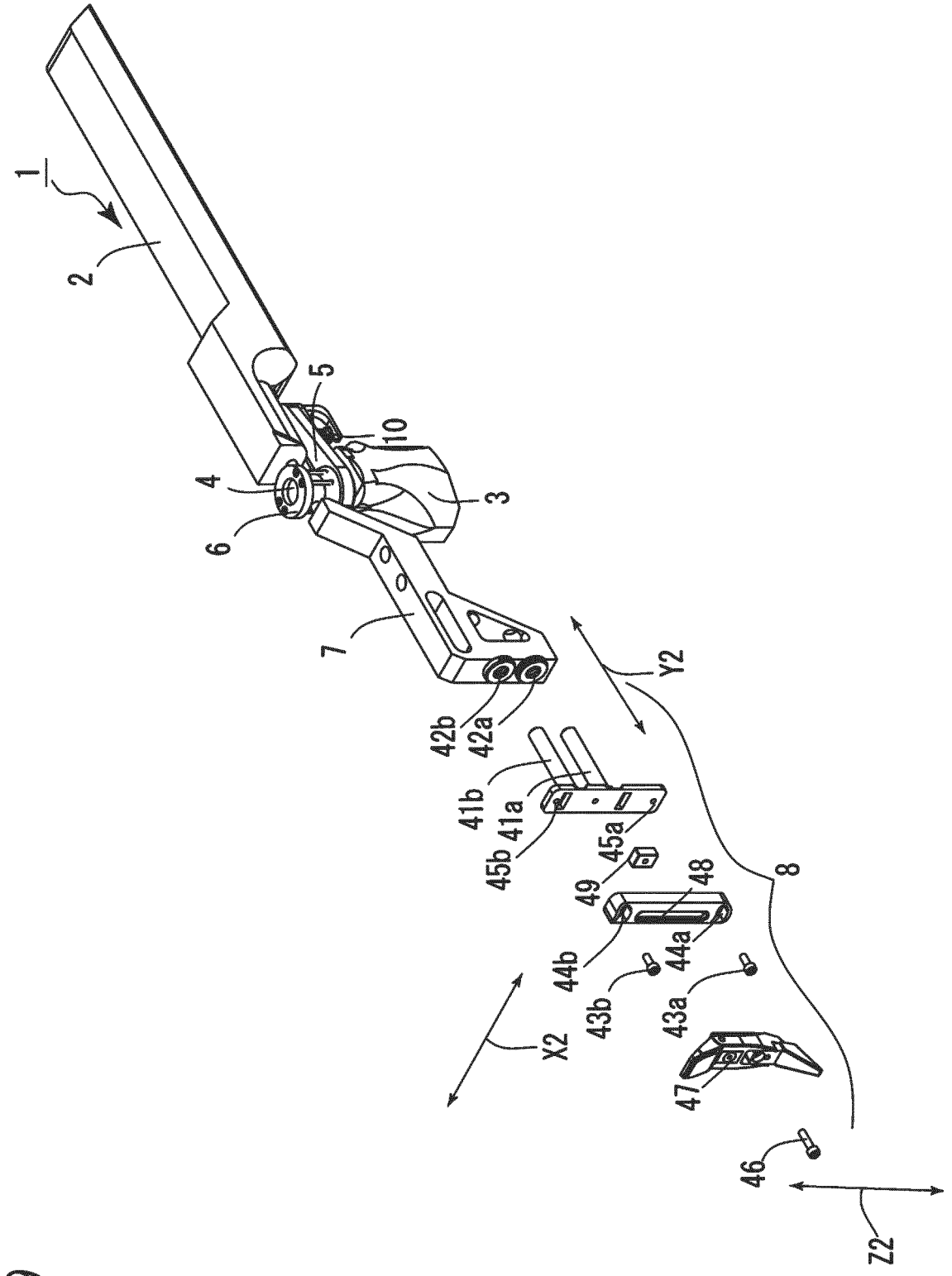

1
2
5
10
4
3
6
7
42b
42a
Y2
41b
41a
45b
45a
49
48
8
44b
44a
43b
43a
X2
47
46
Z2

FIG. 9

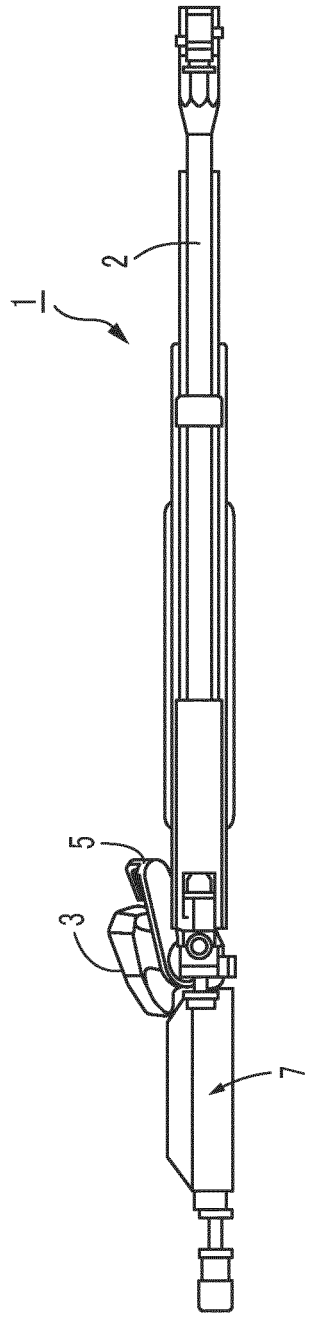


FIG. 10

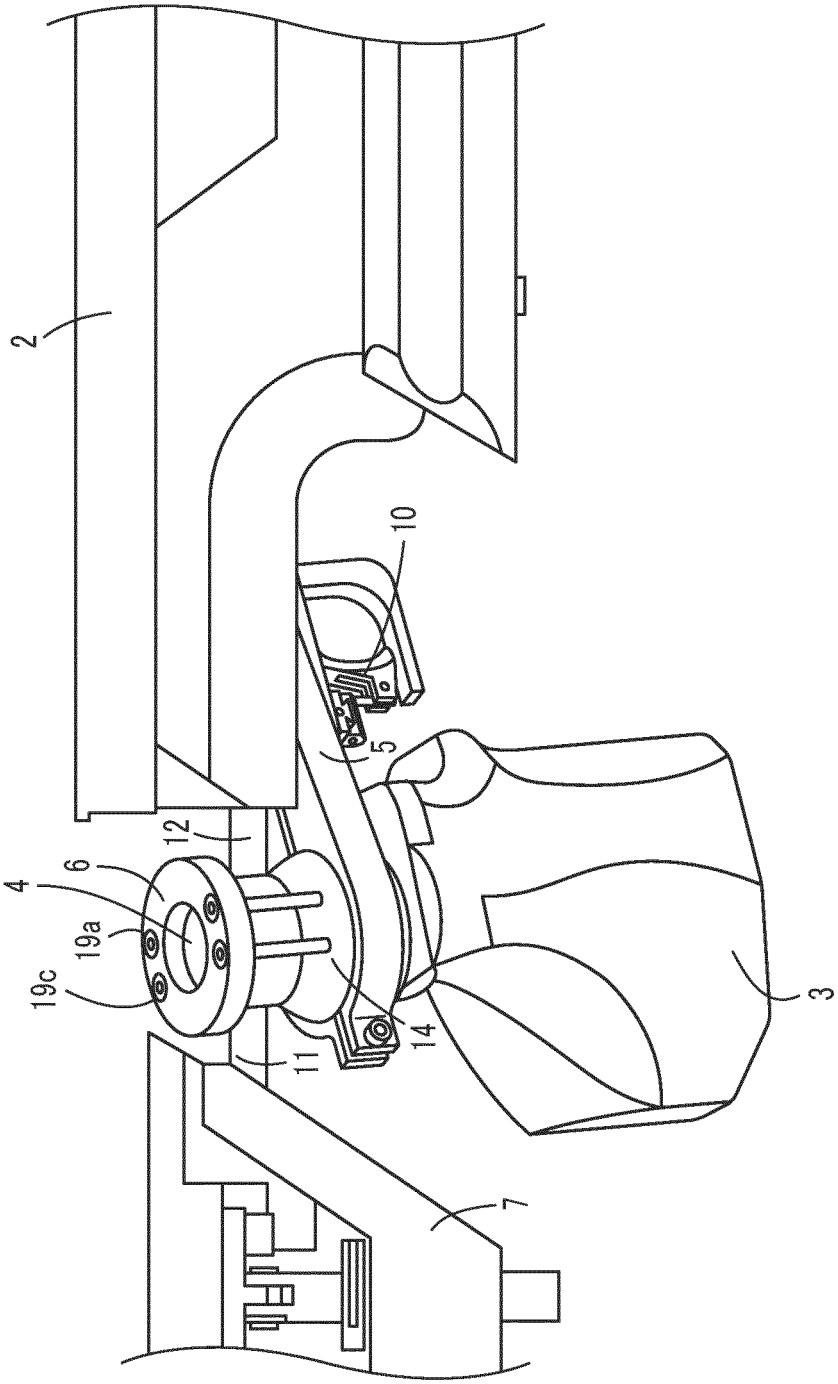


FIG. 11

FIG. 12

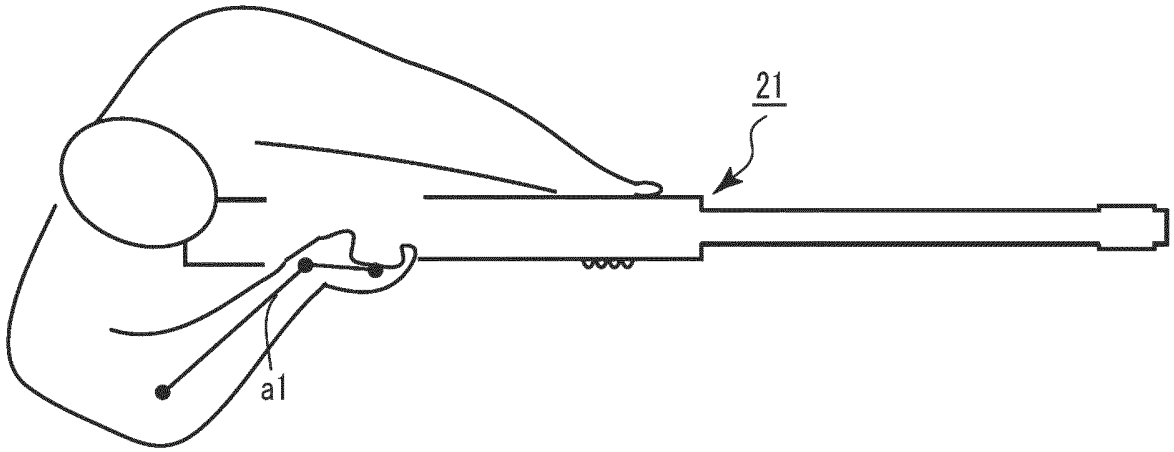


FIG. 13

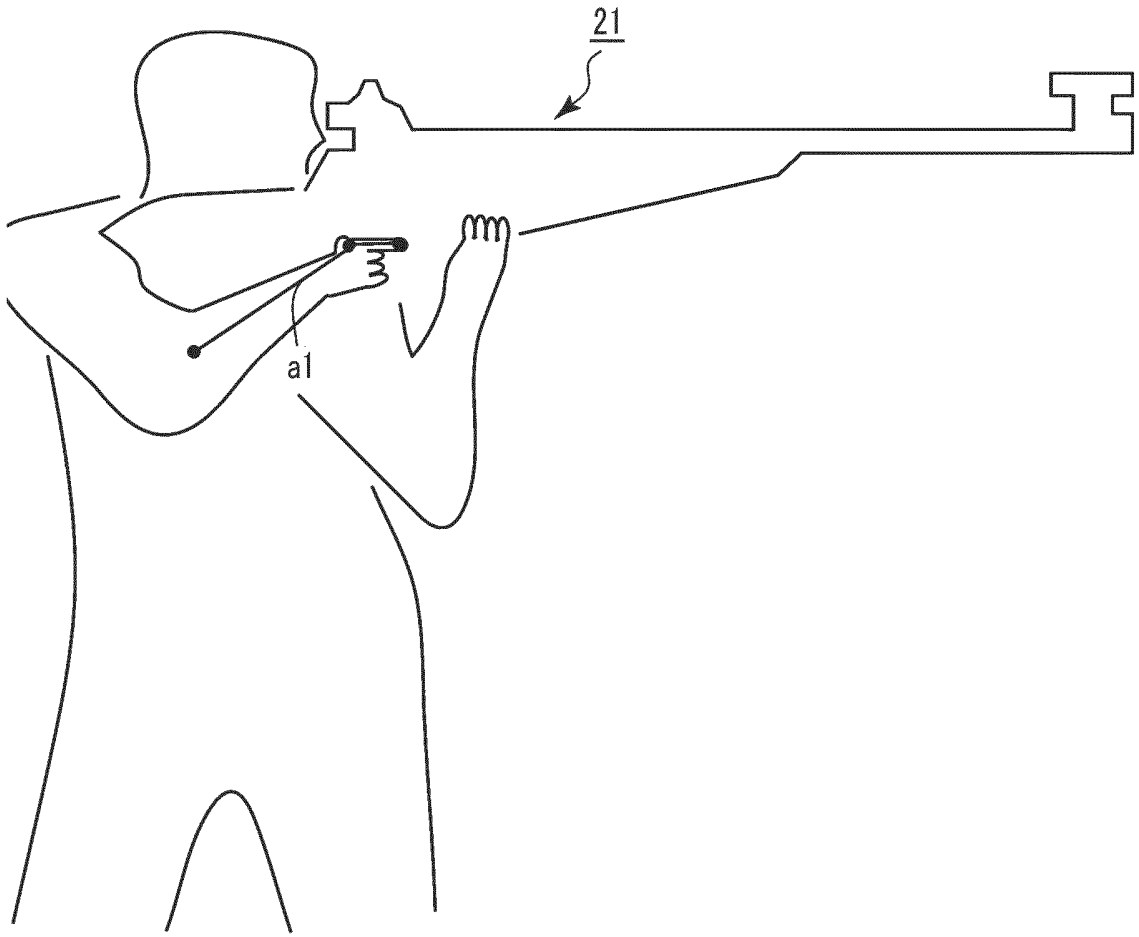


FIG. 14

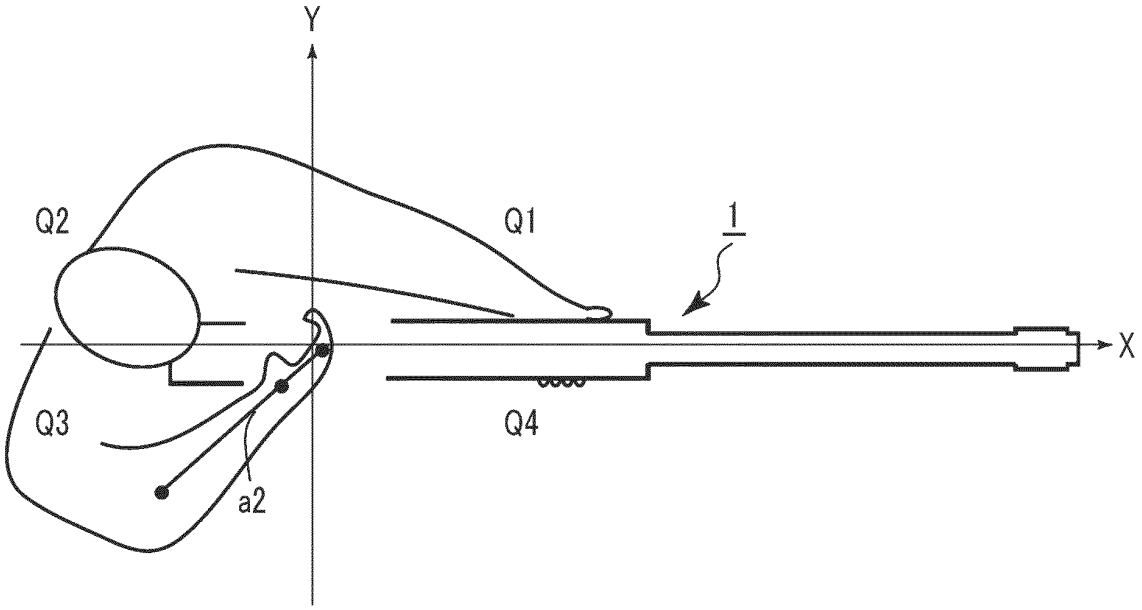


FIG. 15

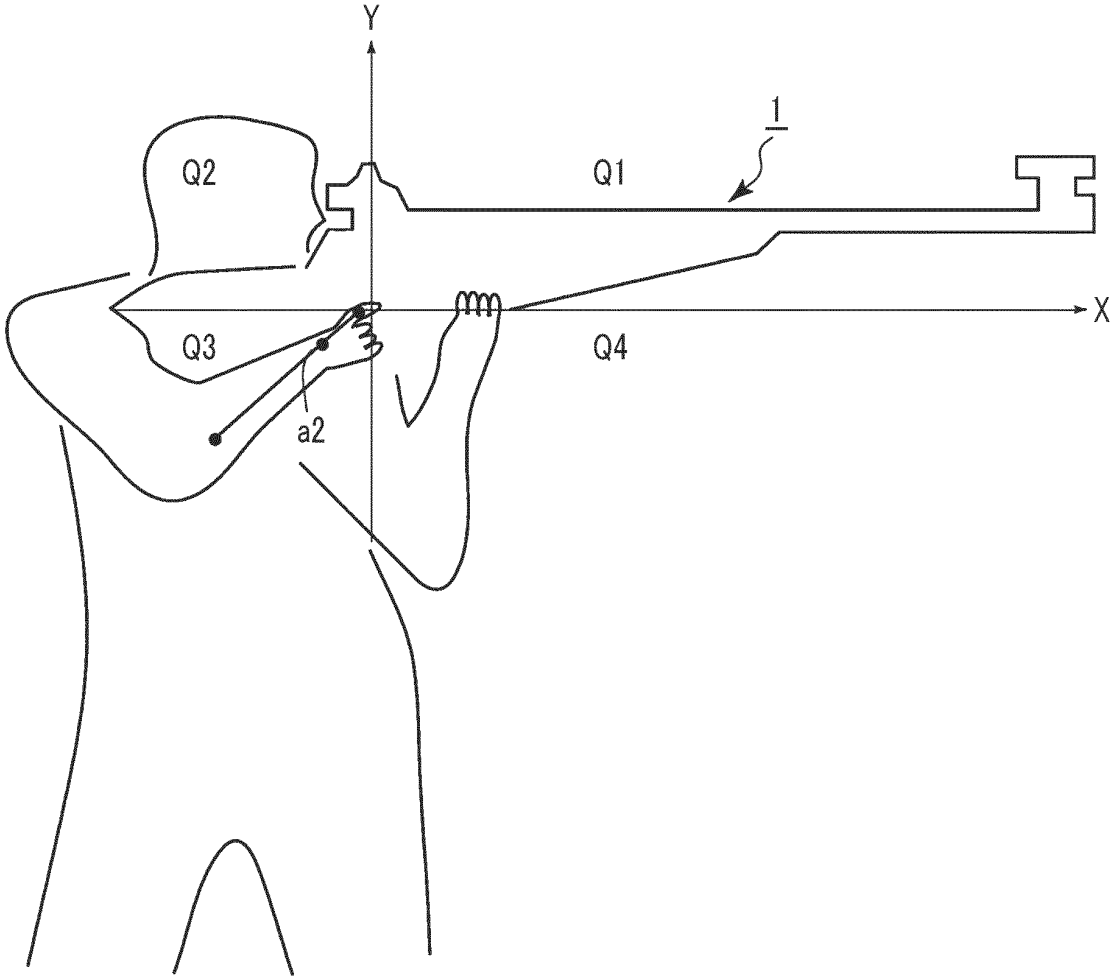


FIG. 16

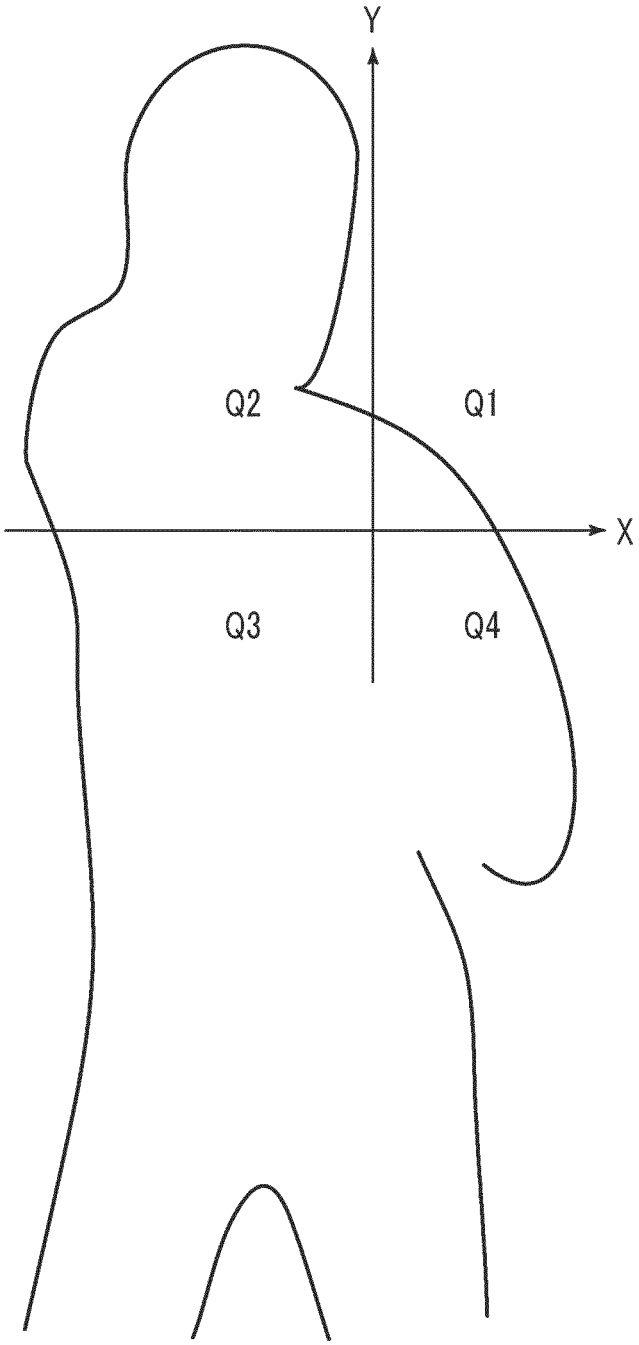


FIG. 17

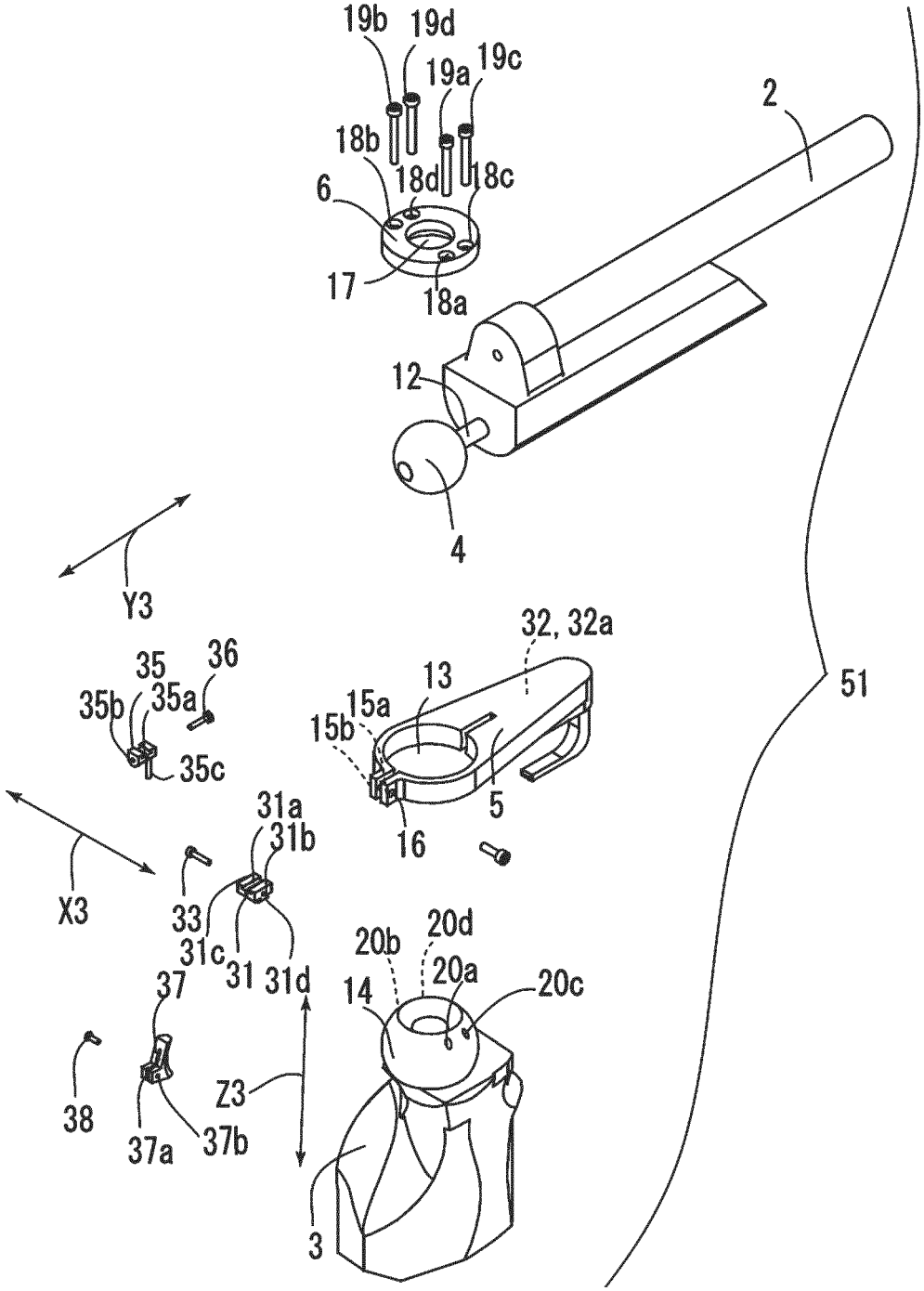
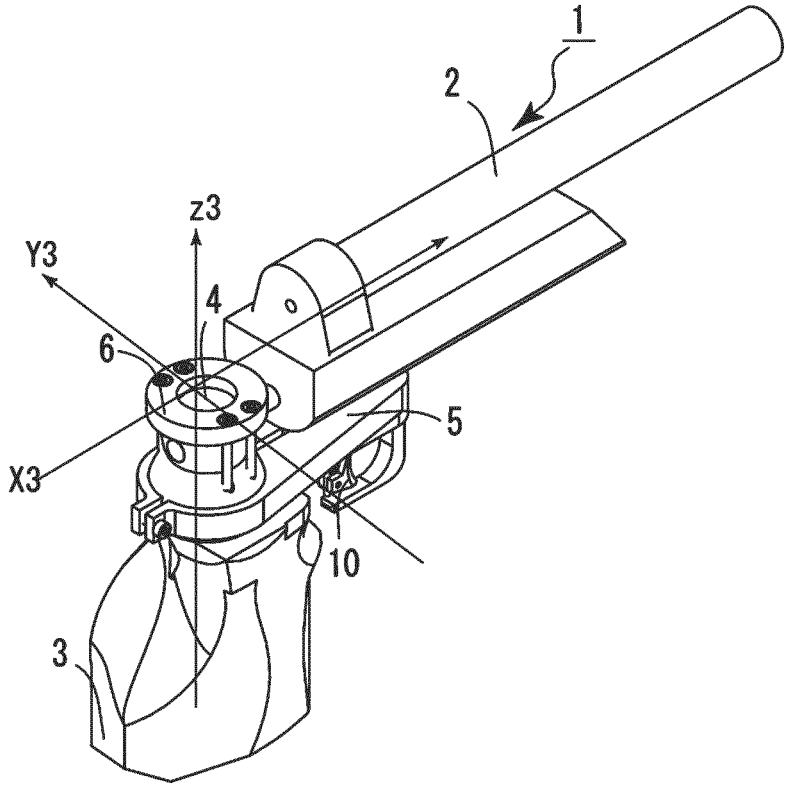

19b
19d
19a
19c
2
18b
18d
18c
6
17
18a
12
4
Y3
32, 32a
35
36
35b
35a
13
15a
15b
51
35c
5
16
31a
31b
X3
33
31c
31
31d
20b
20d
20a
20c
37
14
38
Z3
37a
37b
3

FIG. 18



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2023/005395

A. CLASSIFICATION OF SUBJECT MATTER

F41A 19/10(2006.01)i; ***F41A 19/16***(2006.01)i
FI: F41A19/16; F41A19/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F41A19/10; F41A19/16

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2023
Registered utility model specifications of Japan 1996-2023
Published registered utility model applications of Japan 1994-2023

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 11-118394 A (BEI SENSORS & SYST CO INC) 30 April 1999 (1999-04-30) paragraphs [0006]-[0007], [0015], fig. 1-3, 8	1-3
A	US 2018/0224232 A1 (VARANGIAN INVESTMENTS LLC) 09 August 2018 (2018-08-09)	1-3

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 March 2023	**28 March 2023**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2023/005395

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 11-118394 A	30 April 1999	US 5974940 A column 2, line 23 to column 3, line 10, column 6, lines 5-15, fig. 1-3, 8	
US 2018/0224232 A1	09 August 2018	WO 2018/144338 A1	

Form PCT/ISA/210 (patent family annex) (January 2015)

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 H11118394 A **[0007]**