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

(11) **EP 2 314 975 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
23.04.2014 Bulletin 2014/17

(51) Int Cl.:
F41B 11/72 *(2013.01)*

(21) Application number: **10195024.4**

(22) Date of filing: **14.12.2010**

(54) **Action bolt for air gun**

Verschlussbolzen für ein Luftgewehr

Culasse pour carabine à air comprimé

(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

(30) Priority: **15.12.2009 TW 098223481**

(43) Date of publication of application:
27.04.2011 Bulletin 2011/17

(73) Proprietor: **Cybergun Hong Kong Limited**
Kowloon, Hong Kong (CN)

(72) Inventor: **Liu, Betty**
403, Taichung City (TW)

(74) Representative: **Lang, Christian et al**
LangPatent
Anwaltskanzlei
Rosenheimer Strasse 139
81671 München (DE)

(56) References cited:
EP-A1- 1 416 244
EP-A1- 1 503 166
EP-A2- 0 922 922
EP-A2- 0 928 945

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 314 975 B1

Description

Field of the Invention

[0001] The present invention relates to a bolt for air gun.

Description of the Prior Art

[0002] Conventional bolt assembled in an air gun includes a main body and a cylinder or a piston. For example, TW utility model M368794 discloses a bolt including a main body and a piston. The bolt further includes an elastic gasket which is put around the piston. As such, shooting power is raised.

[0003] However, an overload shooting power may cause danger to users. By developing shooting technology, shooting power is getting greater and greater even pressure of the pressurized air is not really high. That is, user may get hurt when using air gun because of the shooting power which is unexpectedly high.

[0004] From document EP 1 503 166 A1 a gas powered toy gun is known with gas flow adjusting means provided inside a tube-like moveable member.

[0005] The present invention is, therefore, arisen, to obviate or at least mitigate the above mentioned disadvantages.

SUMMARY OF THE INVENTION

[0006] The main object of the present invention is to provide a bolt which is able to limit shooting power of an air gun.

[0007] To achieve the above and other objects, an action bolt for an air gun includes a first tube, a second tube, a positioning tube, a valve member and a main body.

[0008] The first tube is formed with an accommodation hole and a vent. The accommodation hole extends axially. The vent extends radically. The vent communicates with the accommodation hole.

[0009] The second tube is formed with a penetration hole. The penetration hole extends axially. The second tube is inserted in the accommodation hole. The penetration hole communicates with the accommodation hole. The second tube is threaded.

[0010] The positioning tube has a fixation end and an abutting end. The fixation end is threaded to mate with the second tube, so that the fixation end is screwed in the second tube. The positioning tube is located in the accommodation hole. The abutting end is formed with an indentation. The indentation communicates with the vent radially.

[0011] The valve member is received in the accommodation hole. The abutting end abuts against the valve member. The valve member has an axial position corresponding to an axial position of the vent.

[0012] A part of the main body is tube-shaped, so that a chamber and an opening are defined by the main body. The opening communicates with the chamber. The first tube is slidably inserted in the chamber. An end of the first tube is received in the chamber, so that the second tube being located in the main body.

[0013] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment(s) in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Fig. 1 is a combination drawing showing a first embodiment of the present invention;
Fig. 2 is a breakdown drawing showing a first embodiment of the present invention;
Fig. 2A is a stereogram showing a first tube of a first embodiment of the present invention;
Fig. 3 is an AA profile of Fig. 1;
Fig. 3A is a partial enlargement of Fig. 3;
Fig. 4 is a breakdown drawing showing a second embodiment of the present invention;
Fig. 5 is a BB profile of Fig. 1;
Fig. 6 is a cross-sectional profile showing a using state of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] Please refer to Fig. 1 to Fig. 3 for a first embodiment of the present invention. The present invention provides an action bolt which is adapted for an air gun to be assembled therewith. The action bolt for an air gun of the present embodiment includes a main body 10, a weight mechanism and a piston. The action bolt may further comprise a gasket 35.

[0016] A part of the main body 10 is tube-shaped, so that a chamber and an opening 1 are defined by the main body 10. The opening 1 communicates with the chamber. Please refer to Fig. 3 and Fig. 3A, the main body is formed with an annular guide surface 11. The guide surface 11 is tapered toward the chamber from a periphery of the opening 1. In the present embodiment, the guide surface 11 is a conical surface. In other possible embodiments of the present invention, the guide surface 11 may be curved in other similar shapes. An extension section 12 stretches away from an end which is away from the opening 1 of the main body 10.

[0017] The weight mechanism includes a fixation member 20, a mass piece 20' and a fastening member. The fixation member 20 is screwed on the extension section 12. The fixation member 20 is formed with a non-circular groove 21. More particularly, the groove 21 is capsule-shaped. The groove 21 is dented axially. Moreover, the fixation member 20 is formed with a threaded hole extending axially. Preferably, the threaded hole is

located at a central axis of the fixation member 20, communicating with the groove 21. The mass piece 20' has a non-circular protrusion. The protrusion is received in the groove 21. The mass piece 20' is formed with a fixation hole extending axially. The fixation hole is located at a central axis of the mass piece 20' and the protrusion. The fastening member 22 has a head section and a threaded section. The threaded section extends from the head section. The threaded section penetrates through the fixation hole and mates with the threaded bore, so that the mass piece 20' is positioned between the head section of the fastening member 22 and the fixation member 20.

[0018] The piston includes a first tube 31, a valve member 32, a positioning tube 33 and a second tube 34. The first tube 31 is formed with an accommodation hole 311 and a vent 312. The accommodation hole 311 extends axially from one end to the other end of the first tube 31. The vent 312 extends radially, as shown in Fig. 2A. The vent 312 communicates with the accommodation hole 311.

[0019] The valve member 32 is received in the accommodation hole 311.The valve member 32 has an axial position corresponding to an axial position of the vent 312.

[0020] The second tube 34 is formed with a penetration hole 341. The penetration hole 341 extending axially. The second tube 34 is inserted in the accommodation hole 311. The penetration hole 341 communicates with the accommodation hole 311. An air passage is defined by the accommodation hole 311 and the penetration hole 341. Moreover, the air passage is divided by the valve member 32 into a first passage 2 and a second passage 3. The first passage 2 communicates with the chamber. The second tube is threaded.

[0021] The positioning tube 33 has a fixation end and an abutting end. The fixation end is threaded to mate with the second tube 34, so that the fixation end is screwed in the second tube 34. As such, the location of the positioning tube is adjustable. The positioning tube 33 is received in the accommodation hole 311 with the second tube 34, so that the positioning tube 33 is located in the accommodation hole 311. The abutting end is formed with an indentation 331. The indentation 331 communicates with the vent 312 radially, as shown in Fig. 3. Preferably, a width of the indentation 331 is greater than a width of the vent 312.

[0022] The gasket 35 is put around the second tube 34. The gasket 35 is received in the chamber. The gasket 35 abuts the main body 10 so as to prevent leakage. In other possible embodiments of the present invention, the gasket 35 may be put around the first tube 31.

[0023] Please refer to Fig. 4. In another embodiment of the present invention, the abutting end of the positioning tube 33 is formed with a plurality of indentations 331. Preferably, the indentations 331 are annularly arranged on the abutting end. Further, the indentations 331 are equidistantly arranged.

[0024] Please refer to Fig. 5 and Fig. 6. The action bolt can be driven by pressurized air after the action bolt is assembled with an air gun. Pressurized air flows into the first passage 2 and the second passage 3 via the vent 312. The air is partitioned by the valve member 32, so that part of air moves into the second passage 3. Only the rest moves into the first passage 2. Pressurized air moves in to the chamber and pushes the main body 10 to move foreword so as to complete a shooting movement. Then the main body 10 can be moved to return to the initial position by other elastic member of the air gun. When the main body 10 moves to return to the initial position, the guide surface can lead the gasket to be received in the chamber. As such, the guide surface can prevent the gasket 35 and the main body 10 from obstruction.

[0025] Accordingly, only part of pressurized air can flow into the first passage 2, the shooting power is limited. Moreover, the positioning tube 33 can be adjusted by rotating, so that the axial position of the valve is also adjustable. As such, the shooting power can be regulated.

Claims

1. An action bolt for an air gun, comprising:

a first tube (31), formed with an accommodation hole (311) and a vent (312), the accommodation hole (311) extending axially, the vent (312) extending radially, the vent (312) communicating with the accommodation hole (311);
comprising
a second tube (34), formed with a penetration, hole (341), the penetration hole (341) extending axially, the second tube (34) being inserted in the accommodation hole (311), the penetration hole (341) communicating with the accommodation hole (311),
a positioning tube (33), having a fixation end and an abutting end, the positioning tube (33) being located in the accommodation hole (311), the abutting end being formed with an indentation (331), the indentation (331) communicating with the vent (312) radially;
a valve member (32), received in the accommodation hole (311), the abutting end abutting against the valve member (32), the valve member (32) having an axial position corresponding to an axial position of the vent (312);
a main body (10), a part of the main body (10) being tube-shaped, so that a chamber and an opening (1) being defined by the main body (10), the opening (1) communicating with the chamber, the first tube (31) being
slidably inserted in the chamber, an end of the first tube (31) being received

in the chamber, the second tube (34) being located in the main body (10) **characterised in that** the second tube (34) is threaded and the fixation end is threaded to mate with the second tube (34), so that the fixation end is screwed in the second tube (34).

2. The action bolt of claim 1, wherein a width of the indentation (331) is greater than a width of the vent (312).

3. The action bolt of claim 1, wherein the action bolt further comprises a gasket (35), the gasket (35) is put around one of the first tube (31) and the second tube (34), the gasket (35) is received in the chamber, the gasket (35) abuts the main body (10), the main body (10) is formed with a guide surface (11), the guide surface (11) is tapered toward the chamber from a periphery of the opening (1).

4. The action bolt of claim 3, wherein the guide surface (11) is a conical surface.

5. The action bolt of claim 1, wherein the abutting end of the positioning tube (33) is formed with a plurality of indentation (331), the indentations (331) are annularly arranged on the abutting end.

6. The action bolt of claim 1, wherein the action bolt further comprises a weight mechanism, an extension section (12) stretches away from an end of the main body (10), the weight mechanism comprises a fixation member (20), a mass piece (20') and a fastening member (22), the fixation member (20) is screwed on the extension section (12), the fixation member (20) is formed with a non-circular groove (21), the mass piece (20') has a non-circular protrusion, the protrusion is received in the groove (21), the fixation member (20) is formed with a threaded bore extending axially, the
mass piece (20') is formed with a fixation hole extending axially, the fastening member (22) has a head section and a threaded section extending from the head section, the threaded section penetrates through the fixation hole and mates with the threaded bore, so that the mass piece (20') is positioned between the head section and the fixation member (20).

Patentansprüche

1. Auslösebolzen für ein Luftgewehr, umfassend:

ein erstes Rohr (31), welches mit einem Aufnahmeloch (311) und einer Lüftungsöffnung (312) ausgebildet ist, wobei sich das Aufnahmeloch (311) axial erstreckt und sich die Lüftungsöffnung (312) radial erstreckt und die Lüftungsöffnung (312) mit dem Aufnahmeloch (311) in Verbindung steht; und
ein zweites Rohr (34), welches mit einem Eindringloch (341) ausgebildet ist,
wobei das Eindringloch (341) sich axial erstreckt, und wobei das zweite Rohr (34) in das Aufnahmeloch (311) eingeführt ist und das Eindringloch (341) in Verbindung mit dem Aufnahmeloch (311) steht; und
ein Positionierrohr (33), welches ein Fixierungsende und ein Anschlagende umfasst, wobei das Positionierrohr (33) im Aufnahmeloch (311) positioniert ist und das Anschlagende mit einer Vertiefung (331) ausgebildet ist, wobei die Vertiefung (331) radial mit der Lüftungsöffnung (312) verbunden ist; und
ein Ventilelement (32), welches in dem Aufnahmelvvh (311) aufgenommen ist,
wobei das Anschlagende an das Ventilelement (32) anschlägt, wobei das Ventilelement (32) eine axiale Position aufweist, die einer axialen Position der Lüftungsöffnung (312) entspricht; und
einen Hauptkörper (10), wobei ein Teil des Hauptkörpers (10) röhrenförmig ist,
so dass eine Kammer und eine Öffnung (1) durch den Hauptkörper (10) definiert sind, wobei die Öffnung (1) mit der Kammer in Verbindung steht,
wobei das erste Rohr (31) verschiebbar in die Kammer eingesetzt ist, wobei ein Ende des ersten Rohrs (31) in der Kammer aufgenommen ist und wobei das zweite Rohr (34) im Hauptkörper (19) angeordnet ist,**dadurch gekennzeichnet, dass** das zweite Rohr (34) ein Gewinde besitzt und das Fixierungsende ebenfalls ein Gewinde besitzt und mit dem zweiten Rohr (34) zusammenpasst, so dass das Fixierungsende in das zweite Rohr gechraubt ist.

2. Auslösebolzen nach Anspruch 1, wobei eine Breite der Vertiefung (331) größer als eine Breite der Lüftungsöffnung (312) ist.

3. Auslösebolzen nach Anspruch 1, wobei der Auslösebolzen weiter eine Dichtung (35) umfasst, wobei die Dichtung (35) um das erste Rohr (31) und/oder das zweite Rohr (34) gelegt ist und die Dichtung (35) von der Kammer aufgenommen ist, wobei die Dichtung (35) an den Hauptkörper (10) angrenzt und der Hauptkörper (10) mit einer Führungsoberfläche (11) ausgebildet ist, und wobei die FührungsoberFläche (11) konisch von einem Randbereich der Öffnung (1) in Richtung der Kammer verläuft.

4. Auslösebolzen nach Anspruch 3, wobei die Führungsoberfläche (11) eine konische Fläche ist.

5. Auslösebolzen nach Anspruch 1, wobei das An-

schlagende des Positionierrohrs (33) mit einer Vielzahl von Vertiefungen (331) ausgebildet ist und die Vertiefungen (331) ringförmig an dem Anschlagsende angeordnet sind.

6. Auslösebolzen nach Anspruch 1, wobei der Auslösebolzen weiter einen Gewichtsmechanismus umfasst, wobei sich ein Erweiterungsbereich (12)von einem Ende des Hauptkörpers (10) weg erstreckt, wobei der Gewichtsmechanismus ein Fixierungselement (20), ein Masseteil (20') und ein Befestigungselement (22) umfasst, wobei das Fixierungselement (20) am Erweiterungsbereich (12) verschraubt ist und das Fixierungselement (20) mit einer nicht-kreisförmigen Nut (21) ausgebildet ist, wobei das Masseteil (20') eine nicht-kreisförmige Ausbuchtung umfasst, wobei die Ausbuchtung in die Nut (21) aufgenommen ist, wobei das Fixierungselement (20) mit einer sich axial erstreckenden Gewindebohrung ausgebildet ist, wobei das Masseteil (20') mit einem sich axial erstreckenden Fixierungsloch ausgebildet ist, wobei das Befestigungselement (22) ein Kopfteil und ein sich vom Kopfteil erstreckendes Gewindeteil umfasst, wobei das Gewindeteil durch das Fixierungsloch hindurch verläuft und mit der Gewindebohrung zusammenpasst, so dass das Masseteil (20') zwischen dem Kopfteil und dem Fixierelement positioniert ist

Revendications

1. Verrou pour pistolet à air comprenant :

un premier tube (31) formé avec un trou de logement (311) et une aération (312), le trou de logement (311) s'étendant axialement, l'aération (312) s'étendant radialement, l'aération (312) communiquant avec le trou de logement (311),
comprenant un second tube (34) formé avec un trou de pénétration (341), le trou de pénétration (341) s'étendant axialement, le second tube (34) étant inséré dans le trou de logement (311), le trou de pénétration (341) communiquant avec le trou de logement (311),
un tube de positionnement (33) ayant une extrémité de fixation et une extrémité d'about, le tube de positionnement (33) étant situé dans le trou de logement (311), l'extrémité d'about étant formée avec une dentelure (331), la dentelure (331) communiquant avec l'aération (312) dans le sens radial,
un élément de valve (32) logé dans le trou de logement (311), l'extrémité d'about jouxtant l'élément de valve (32), l'élément de valve (32) ayant une position axiale correspondant à une position axiale de l'aération (312),
un corps principal (10), une partie du corps principal (10) étant en forme de tube si bien qu'une chambre et une ouverture (1) sont définies par le corps principal (10), l'ouverture (1) communiquant avec la chambre, le premier tube (31) étant inséré par glissement dans la chambre, une extrémité du premier tube (31) étant logée dans la chambre, le second tube (34) étant situé dans le corps principal (10),
caractérisé en ce que le second tube (34) est fileté et l'extrémité de fixation est filetée pour s'accoupler avec le second tube (34) si bien que l'extrémité de fixation est vissée dans le second tube (34).

2. Verrou selon la revendication 1 dans lequel une largeur de la dentelure (331) est plus grande qu'une largeur de l'aération (312).

3. Verrou selon la revendication 1 dans lequel le verrou comprend de plus un joint (35), le joint (35) est mis autour de l'un des tubes, du premier tube (31) et du second tube (34), le joint (35) est logé dans la chambre, le joint (35) jouxte le corps principal (10), le corps principal (10) est formé avec une surface de guidage (11), la surface de guidage (11) est effilée vers la chambre à partir d'une périphérie de l'ouverture (1).

4. Verrou selon la revendication 3 dans lequel la surface de guidage (11) est une surface conique.

5. Verrou selon la revendication 1 dans lequel l'extrémité d'about du tube de positionnement (33) est formée avec une pluralité de dentelures (331), les dentelures (331) sont agencées de manière annulaire sur l'extrémité d'about.

6. Verrou selon la revendication 1 dans lequel le verrou comprend de plus un mécanisme de poids, une section d'extension (12) s'étire en s'éloignant d'une extrémité du corps principal (10), le mécanisme de poids comprend un élément de fixation (20), une pièce de masse (20') et un élément d'attache (22), l'élément de fixation (20) est vissé sur la section d'extension (12), l'élément de fixation (20) est formé avec une rainure non circulaire (21), la pièce de masse (20') a une saillie non circulaire, la saillie est logée dans la rainure (21), l'élément de fixation (20) est formé avec un alésage fileté qui s'étend dans le sens axial, la pièce de masse (20') est formée avec un trou de fixation qui s'étend dans le sens axial, l'élément de fixation (22) a une section de tête et une section filetée qui s'étend à partir de la section de tête, la section de tête pénètre et traverse le trou de fixation et s'accouple avec l'alésage fileté si bien que la pièce de masse (20') est positionnée entre la section de tête et l'élément de fixation (20).

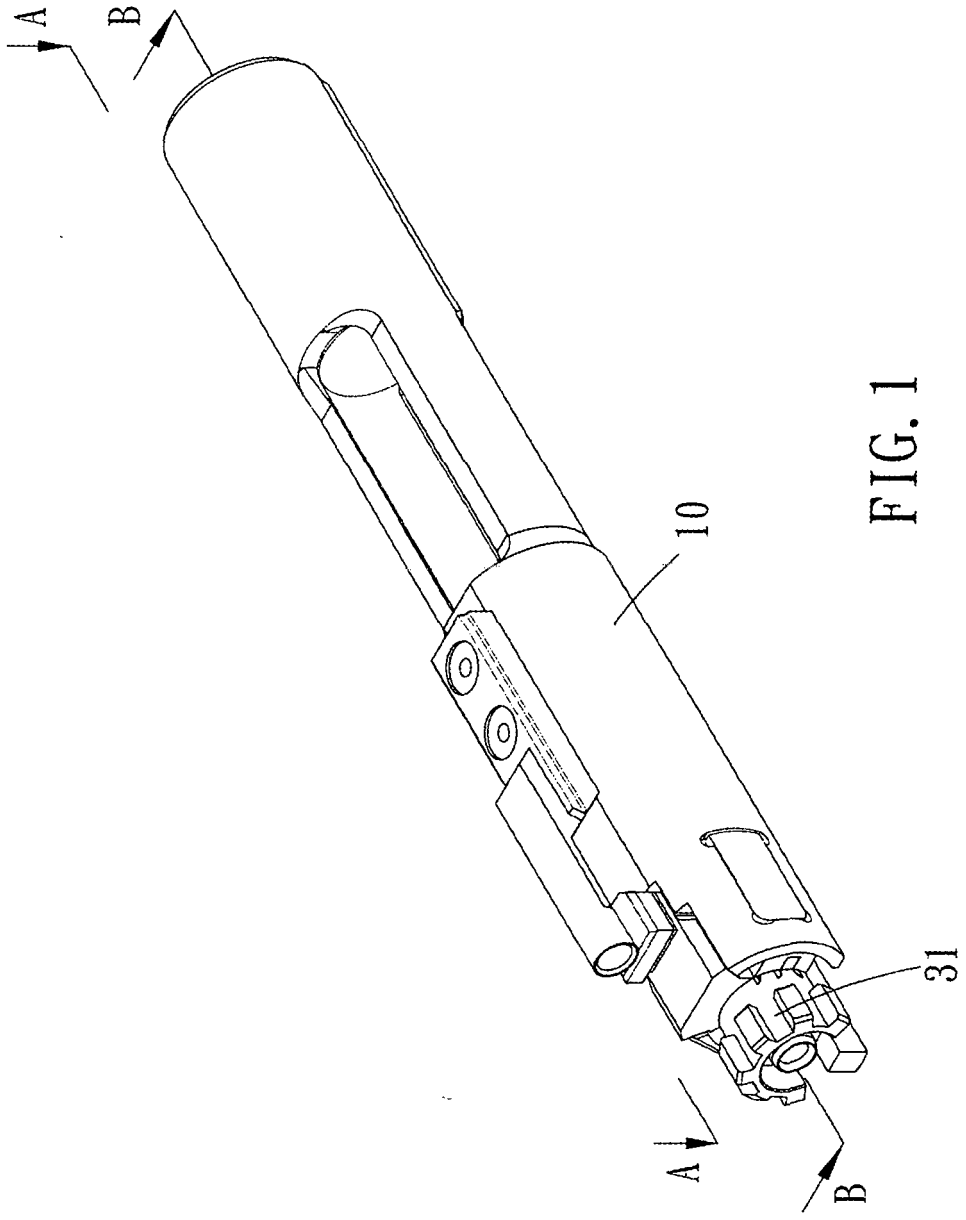


FIG. 1

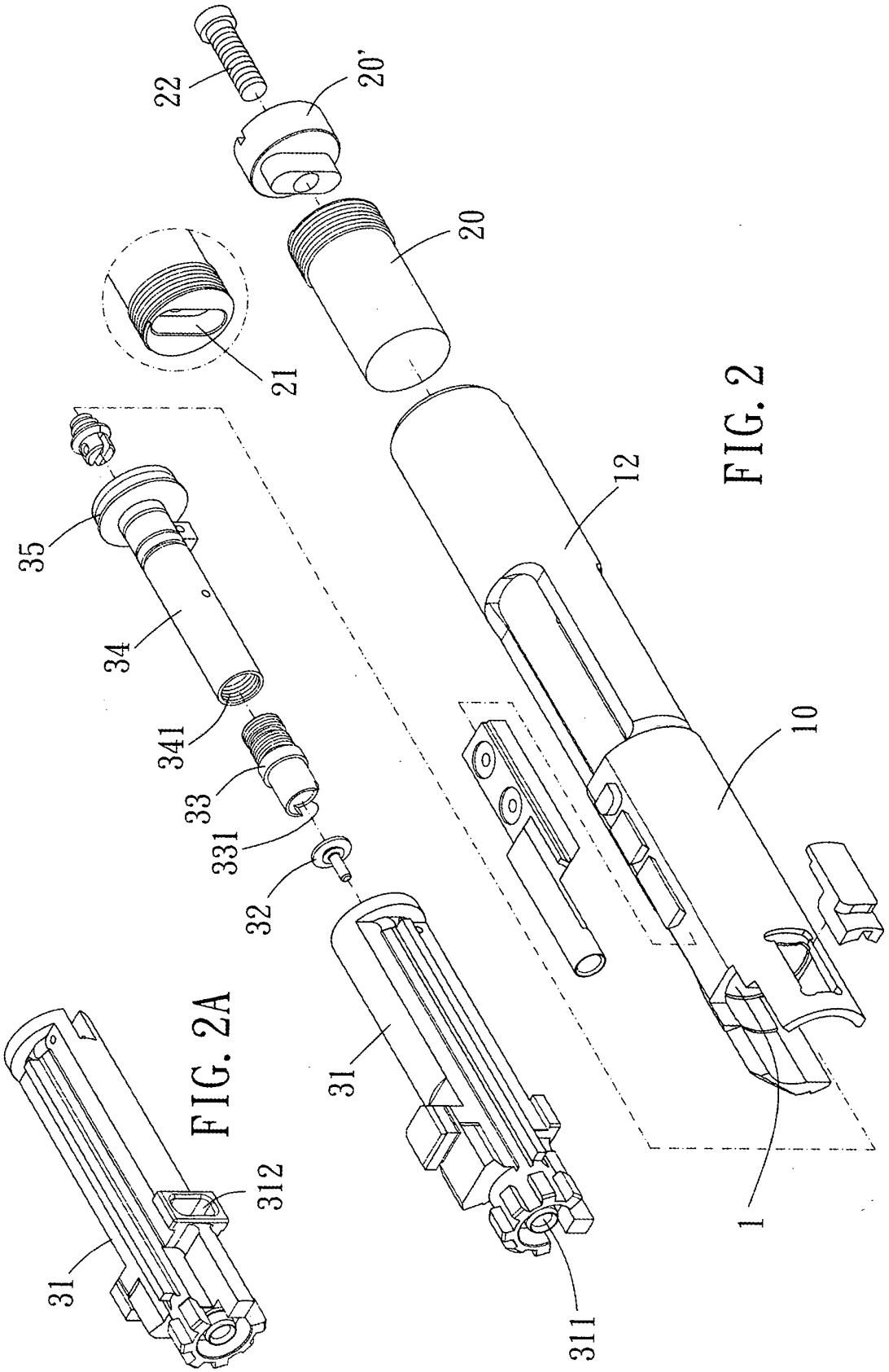


FIG. 2

FIG. 2A

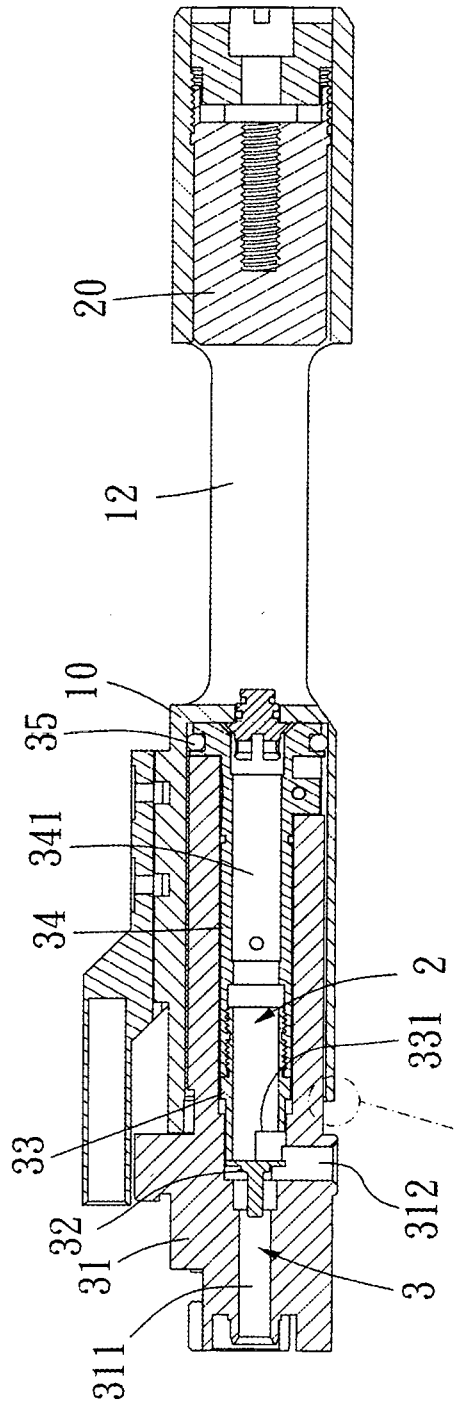


FIG. 3

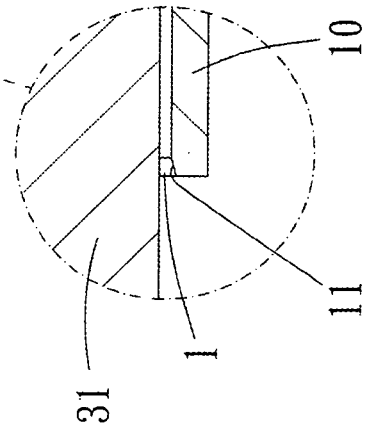


FIG. 3A

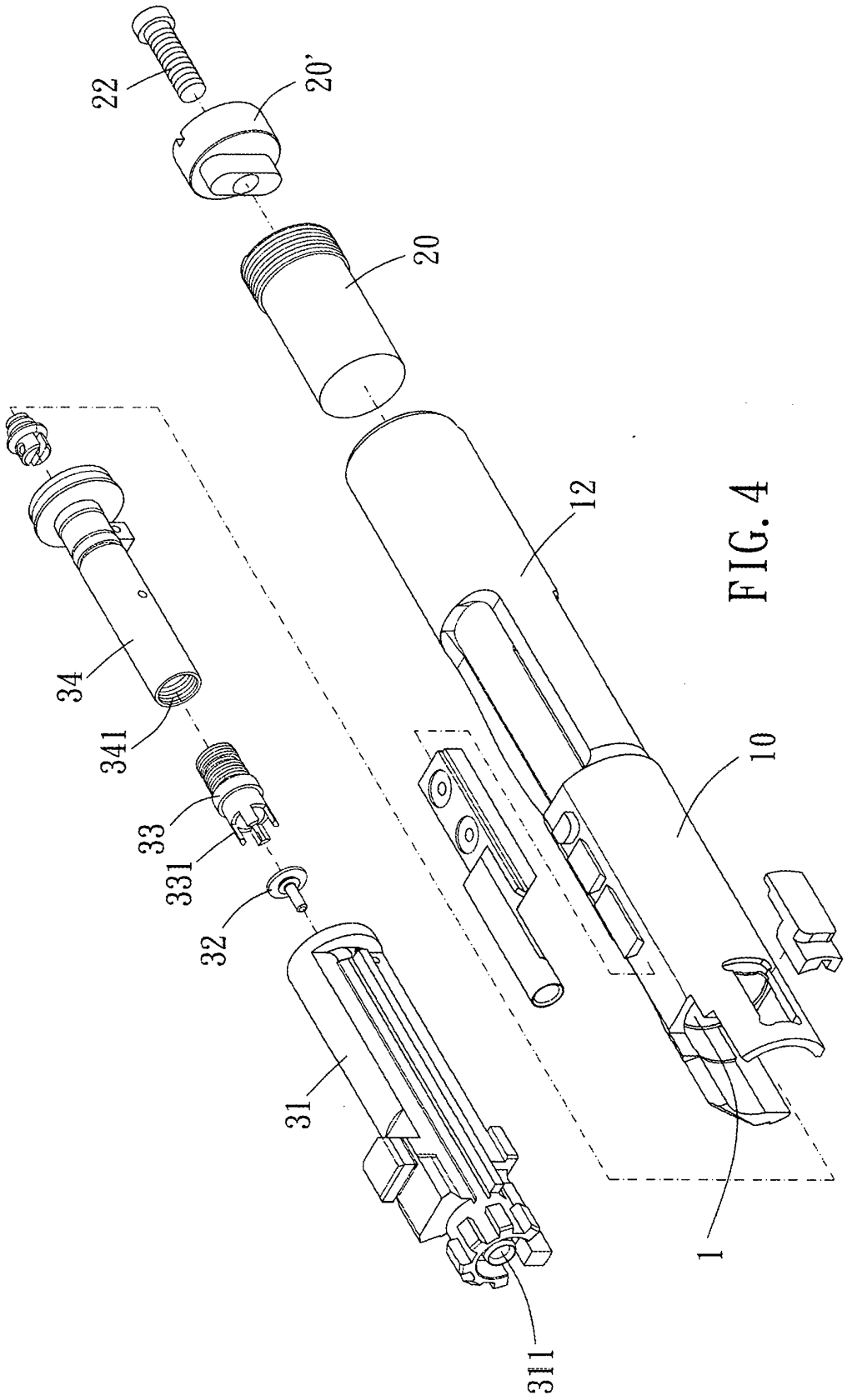


FIG. 4

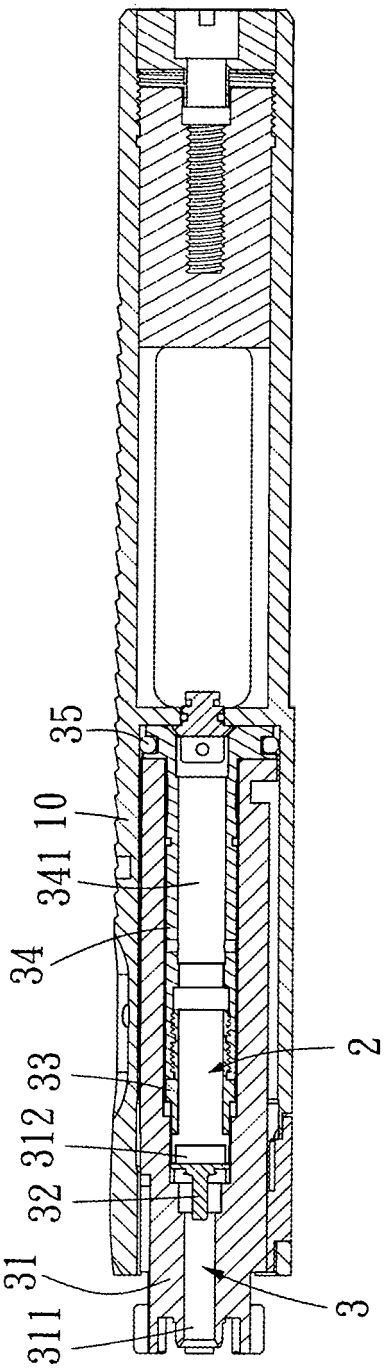


FIG. 5

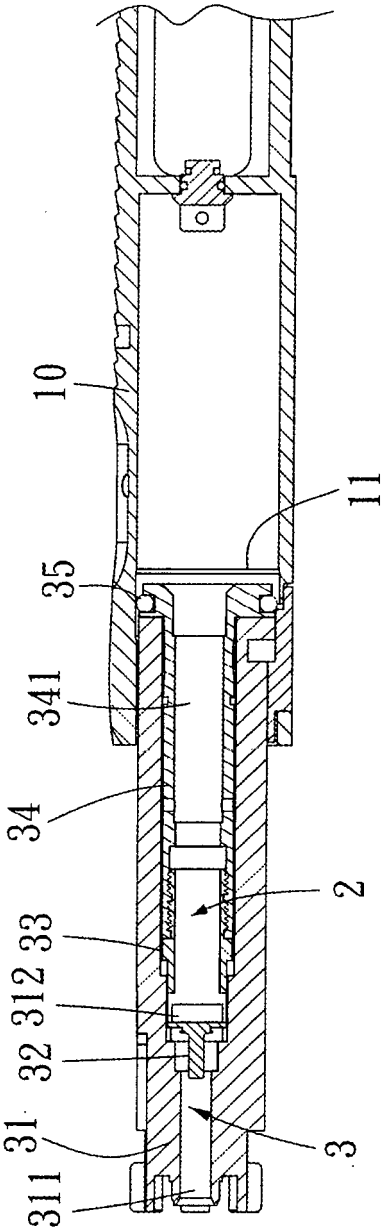


FIG. 6

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

- TW M368794 **[0002]**
- EP 1503166 A1 **[0004]**