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

(11) EP 0 524 129 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
11.09.1996 Bulletin 1996/37

(51) Int Cl.[6]: **F41B 11/02**

(21) Application number: **92500091.1**

(22) Date of filing: **17.07.1992**

(54) Ammunition loading system for an air gun

Munitionsladesystem für eine Druckluftwaffe

Dispositif pour le chargement de munitions pour arme à air comprimé

(84) Designated Contracting States:
DE FR GB SE

(30) Priority: **18.07.1991 ES 9101685**

(43) Date of publication of application:
20.01.1993 Bulletin 1993/03

(73) Proprietor: **INDUSTRIAS EL GAMO, S.A.**
E-08830 Sant Boi de Llobregat (Barcelona) (ES)

(72) Inventor: **Casas Salva, Francisco**
E-08017 Barcelona (ES)

(74) Representative: **Manresa Val, Manuel**
Girona n. 34
08010 Barcelona (ES)

(56) References cited:
DE-C- 85 325
DE-C- 715 010
DE-C- 722 537
FR-A- 2 600 408

EP 0 524 129 B1

Description

This invention relates to a pressured fluid propelled gun which admits two modalities of ammunition loading as well as to the use of several types of ammunition, such as spherical projectiles, with self loading (magazine gun modality) and pellets or other of suitable projectiles, hand fed, placing said ammunition at the barrel inlet each time it is fired (single shot modality).

The invention is based on a particular mounting and operative link to the body of the gun, and to the barrel, or barrel shell, of an already known ammunition loading device, which comprises a tube closed at one end, a spring being supported on its bottom and which has an actuator of said spring, allowing to store ammunition which is delivered unit by unit through an opposite end of said open tube, a slide placed in front thereof which has a recess fit to receive a single projectile, from a set of them, accommodated in the loading device. When the gun is closed, a displacement occurs through the thrust of said slide, until said recess receives said projectile aligned between the barrel rear end and the pressure air duct outlet end, ready to be fired.

BACKGROUNDS OF THE INVENTION

Utility model ES 290 417 discloses a feeding projectile device for air guns which having a similar structure to the above mentioned, with the loading device located close to the buttstock, where, in the event no ammunition in the loading device exists it is possible to fire other projectiles, hand loaded at the mouthpiece of the barrel inlet, i.e. the gun can be used with hand load or as a magazine-gun.

On the other hand, patent of invention ES 556 902 discloses an ammunition automatic loading system for air guns, consisting of the association of a sliding part to barrel end, said sliding part being provided with an ammunition unit receiving recess, so that said slide may move perpendicularly to the barrel between two positions, in such a way that said recess is aligned in a first position with the outlet hole of a spring loading device, and in a second firing position, is located in front of the barrel entrance hole, in a correct position to be fired, the barrel and said loading device being adjacent and integral with each other.

Above systems, as they include a sliding part, arranged between the air pressure outlet and the barrel, require joining means placed at both sides of said slide and a perfect alignment of the three parts, to prevent fluid leaks, and a lower performance of the gun increasing production costs.

Patent DE-C-722537 discloses a double ammunition loading gun including a tiltable barrel having integral thereof, and parallel to the axis of said barrel a loading device of the kind above disclosed allowing to store ammunition. A strong plate spring permanently acts below a rear part of said barrel so as to urge it to a limit position guaranteed by a stop at which point the open end of said ammunition device faces a suitable sized recess in order to transfer to it a single ammunition unit. Mentioned recess communicates with a fluid propellant source and in a firing position the barrel is aligned at its turn with said recess.

This system has the drawback that the movement of the barrel is limited to the same angle as the loading device, so that the barrel can not have additional functions for example acting as a cocking lever, as it would be of interest to compress the spring of a compression chamber, and an additional lever set should be provided. Additionally if any problem arises in the loading device, or it should to be replaced, the actuation is complicated and onerous, demanding in some circumstances the dismounting of the barrel.

DESCRIPTION OF THE INVENTION

To solve above problem an in order to lower the production cost of the gun, and to increase performances, the invention proposes the loading device, be movable, articulated by one of its ends, and whose movement is obtained on the request of the thrust caused by the barrel or barrel shell when closing the gun, in such a way that said loading device will deposit, when opening the gun and while there is ammunition therein, a projectile in a recess formed on the bottom of a groove acting as a guide of the loading device opening.

A pressure fluid supply duct ends in said recess and against the recess the barrel geometrical axis is aligned, end-to-end when the gun in firing position and the loading device displaced.

Accordingly, the invention provides a gun as defined in claim 1.

The invention can be applied to any kind of guns propelled by a fluid under pressure, either comprising a container high pressure liquified stable gas with a such as CO_2, or a plunger associated to a spring, or bearing a stem installed in a chamber and associated to devices for compressing the air therein or loading said spring.

In particular, in the drawings, we are referring to below, an embodiment is disclosed consisting of a gun with a compression chamber with plunger an stem, linked to a plunger compressing device such as the one disclosed in utility model nº 295 545, owned by the same applicant.

The characteristics and advantages of the object of the invention will appear clearer from the detailed description below, referring to 2 sheets of drawings attached, showing a materialization of the invention for example purpose, not limitative, according to following detail:

- Fig. 1 is an elevation view, with partial section, showing the loading device in a position of transfer of an ammunition unit to a recess with which the barrel will be aligned, in firing position;

- Fig, 2 shows precisely the aligning position, end-to-end, of the barrel with said recess, and it can be seen that said barrel is articulated to the support body and is arranged on the same articulating plane as the loading device;
- Fig. 3 is a side elevation view, of the piece closing one end of a compression chamber;
- Fig. 4 indicates, in front elevation view, the same piece of the prior figure, showing the guiding groove of the loading device free end;
- Fig. 5 shows in side elevation a view a detail of the compressing chamber titled articulated associated to the barrel support shell; and
- Fig. 6 shows in side elevation view an example wherein the fluid propellant means are constituted by a bottle of high pressure liquified gas.

Fig. 1 and 2, show in full details, a loading device -11-, ready to automatically feed, unit by unit, ammunition -13-, advantageously spherical, to a recess -12- with which a barrel -10- may be aligned in the gun firing position. Said loading device -11- of a well-known constitution in this sector of the art, comprises a tubular body -11a- closed at one end, on whose bottom is supported a spring -11b- and an actuator -11c- linked to said spring and which allows the ammunition -13-loading, which is delivered accordingly unit by unit, to recess -12-.

The invention is characterized in that above loading device -11- is articulated by one end -14- and its distal end portion remains free, located within a groove - 15- formed in a piece -21-. Said groove -15- includes a stop -16- limiting the displacement of said the loading device end portion -11- which is pushed against said stop -16-, by the action of one of the branches of a spring -17-, attached to a side pivot -34- of said part -21-, in such a way that the geometrical axis of the loading device -11- is perfectly aligned with a recess -12- formed on the bottom of said groove -15-, suitably sized, in order to receive, when facing the loading device, -11- a single ammunition unit -13-, said recess -12- communicating through a duct -22- with the fluid propellant source, with the particularity that the barrel -10- is likewise articulated at one end -32- to the barrel shell -18- and is movable on the same articulating plane as the loading device, in such a way that in the gun firing position, said loading device -11- is displaced by the barrel -10- which remains then facing end-to-end with said recess -11- with a maximum adjustment, ready foot firing.

The simplicity and effectiveness of the solution proposed are obvious, which likewise means a quite reasonable production cost, and which is shown in details in fig. 1 and 2, wherein the articulating point -32- of the barrel -10-, must be understood as indicative of a possible solution, though said barrel may be interrelated to the support body by means of another embodiment such as for instance the one described in the utility model ES 295 545 of the same owner, for example.

In a possible embodiment materialization of above solution, said loading device -11- is articulated by one end to a compression chamber -20- (that comprises a stem -27- and a plunger -28- with an annular joining means -29-), advantageously close to one of its ends, and the stop and guiding groove -15- thereof are shaped in a piece -21- which will close said chamber -20- distal end. The spring -17- is linked to that chamber and adjusted in a pivot -34- which tends to continually push the loading device -11- to the loading position, facing said stop -16-and its end being aligned with the recess -12-. Under such circumstances, said part -21- comprises a tubular portion -23- which is tightly fit to the mouthpiece of the compression chamber -20-, with an annular offset where a tight joint -24- is fitted and a cross hole -25- through which is arranged a locking pin -19-, which, in addition, will permit the rotation of said chamber and its operating association to a fluid pre-compression device, such as the one described in the utility model ES 295 545 above mentioned, as it can be seen in fig. 5 of the drawings attached. Piece -21- can comprise, in addition an axial duct -26- for the passage through it of a fluid, which is connected to the duct -22-, and a side passage -26a- of pressure relief.

At the cross sectioned portion of the piece -21- of figs. 1 and 2, it can be seen that the duct -22-has an enlarged portion -33- wherein a valvular means can be located (no shown) to control the passage of the fluid from the chamber -20- through the duct -25- to the recess -12- at the ammunition -13- firing phase.

Also, said part -21- has an appendage -30- with a hole -31- to articulate a lever for controlling said valvular means (not shown).

Lastly, fig. 6 indicates an example of embodiment of the object of the invention adapted to a gun un which the fluid propellant source is a stable, high pressure liquified gas, such as CO_2 , contained in a receptacle -35- the loading device -11- being articulated to the gun body -18- and displaced from its loading position by a coplanar barrel -10-, as it was stated above movable along a plane coplanar, to the articulating plane of said loading device -11-, to which it remains adjacent in the firing position of the gun.

Sufficiently disclosed the object of the invention, in order it can be understood and put into practise by an expert of the art, it is requested to extend the detailed description to any variation of detail which do not alter its essentiality, as it is stated in the following claims.

Claims

1. Double ammunition loading gun, said ammunition (13) being hand placed at the barrel (10) rear mouthpiece, or automatically fed by a loading device (11), to a suitably sized recess (12) that may receive, when facing said loading device (11), a single ammunition unit (13), said barrel (10) being also

aligned in a firing position with said recess (12) that communicates with a fluid propellant source, said loading device (11) comprising a tubular body (11a) closed at one end with a spring (11b) supported on its bottom and an actuator (11c) linked to said spring allowing to store ammunition which is delivered, unit by unit, through the opposite open end of said tubular body, **characterized in that** said tubular loading device is articulated by one end (14) to the gun body, and its distal end portion remain located, floating within a guiding groove (15), said distal end portion being pushed against a limiting stop (16) by the action of a spring (17), in such a way that the geometrical axis of the loading device (11) is facing said recess (12) formed on the bottom of said groove, and in that the gun barrel (10) which is tiltable articulated by an end portion (32) thereof to another part (18) of the gun body, is arranged in such a way that in a gun firing position said loading device (11) is displaced downwardly by said barrel (10), which remains then facing end-to-end said recess (12), with a maximum adjustment, prepared for firing.

2. Double ammunition loading gun, according to claim 1 characterized in that said loading device (11) is articulated by one end (14) to a compression chamber (20) advantageously close to one of its ends, and the guiding groove (15) and the stop (16) of the free end of the loading device (11) are embodied in a piece (21) that closes the distal end of said chamber (20), to which piece (21) is likewise linked the spring (17) that pushes said free end of the loading device (11) in the ammunition loading position, against said stop (16).

3. Double ammunition loading gun, according to claim 2, characterized in that said compression chamber (20) to which the loading device (11) is articulated is closed at its distal end remote to the articulating point by a piece (21) comprising a tubular portion (23) which is tight socketed witin said compression chamber mouthpiece, with an annular offset where is arranged a tight joining means (24) and a cross hole (25) through which is arranged a locking pin (19) which, in addition constitutes a shaft allowing a pivotal movement of said chamber and its operation association to a fluid precompression device, said piece (21) including, in addition, a duct (26) which communicates the compression chamber (20) with a valvular body, intercalated in a duct (22) which ends on the bottom of the loading device guiding groove (15), where said duct (22) is enlarged forming said recess (12) fit to receive and accommodate a spherical ammunition, when the loading device (11) faces it.

4. Double ammunition loading gun, according to claim 1, characterized in that the fluid propellant source is a stable high pressure liquified gas, such as CO_2 , the loading device (11) being articulated to the gun body so that it is displaced from the loading position by the barrel (10) coplanar to the articulating plane of said loading device, when said barrel in firing position.

Patentansprüche

1. Doppelartiges Munitionsladesystem für eine Druckgaswaffe, wobei besagte Munition (13) mit der Hand in das Hinterende des Laufes (10) eingeführt wird oder automatisch mittels einer Ladevorrichtung (11) oder Magazin in eine dementsprechend ausgelegte Aufnahme (12) zugeführt wird, welche, eben genannter Ladevorrichtung (11) gegenüber gestellt, eine einzelne Muntitionskugel (13) aufnimmt, wobei oben erwähnter Lauf (10), in Feuerstellung, ebenso mit besagter Aufnahme (12) ausgerichtet ist, die mit einer ein Treibgas spendenden Quelle verbunden ist, und wobei obig genannte Ladevorrichtung (11) aus einem an einem seiner Enden, an welchem einer Feder (11b) befestigt ist, geschlossenen, rohrförmigen Körper (11a) besteht, der ein an genannte Feder gekoppelten Schubstock (11c) beinhaltet, so daß dieser Körper Munition bevorraten kann, welche, Kugel für Kugel, durch das entgegengesetzte, offene Ende mehrmals erwähnten rohrförmigen Körpers zugeführt wird, dadurch gekennzeichnet, daß obig erwähnte rohrförmige Ladevorrichtung an einem ihrer Enden (14) gelenkig mit dem Waffenkörper verbunden ist und deren anderer Endabschnitt in einer Führungsnut (15) frei gelagert ist, wobei letzterer Endabschnitt mittels einer Feder (17) gegen einen Begrenzungsanschlag (16) gedrückt wird, so daß die Längsachse der Ladevorrichtung (11), gegenüber bekannter Aufnahme (12), welche am Boden besagter Nute angebracht ist, gelagert ist, wobei der Waffenlauf (10), welcher an einem seiner Endabschnitte (32) gelenkig zu einem anderen Teil (18) des Waffenkörpers kippbar ist, so angebracht ist, daß eben genannte Ladevorrichtung (11), in Feuerstellung, abwärts von besagtem Lauf (10) verschoben wird, welche dann an ihrem Ende genau gegenüber der Ausmündung besagter Aufnahme (12) zu liegen kommt, so daß die Waffe feuerbereit ist.

2. Doppelartiges Munitionsladesysthem für eine Druckgaswaffe nach Anspruch 1, dadurch gekennzeichnet, daß bekannte Ladevorrichtung (11) an einem ihrer Enden (14) gelenkig mit einer Verdichtungskammer (20), vorzugsweise in Nähe eines ihrer Enden, verbunden ist, wobei die Führungsnut (15) und der Anschlag (16) am freien Ende der Ladevorrichtung einteilig in einem Abschnitt (21) ausgeführt sind, welcher das entgegengesetzte Ende

besagter Verdichtungskammer (20) schließt, wobei die Feder (17) ebenso mit eben genanntem Teil (21) verbunden ist, so daß diese obig erwähntes freies Ende der Ladevorrichtung (11) in Muntionsaufnahmestellung gegen eben erwähnten Anschlag (16) drückt.

3. Doppelartiges Munitionsladesysthem einer Druckgaswaffe nach Anspruch 2, dadurch gekennzeichnet, daß besagte Verdichtungskammer (20), an welche die Ladevorrichtung (11) gelenkig verbunden ist, an dem dem Gelenk entgegengesetzten Ende mittels eines Teiles (21) verschlossen wird, welches einen rohrförmigen Abschnitt (23) beinhaltet, der luftdicht zu dem Eingang besagter Verdichtungskammer angeschlossen ist, mit einem ringförmigen Absatz an welchem Dichtungsmittel (24)und eine durchgehende Bohrung (25), welche einen Haltebolzen (19) aufnimmt, angebracht sind, wobei letzterer außerdem eine Achse darstellt, die eine Kippbewegung besagter Kammer erlaubt, die mit einem Druckgas spendenden Mittel verbunden ist, wobei eben erwähnter Teil (21) einen Kanal (26) aufweist, welcher die Verdichtungskammer (20) mit einem Ventilkörper verbindet, eingesetzt in einen Kanal (22) welcher an einem der Böden der Führungsnut (15) der Ladevorrichtung ausmündet, wo besagter Kanal (22) ausgeweitet ist, so daß die Aufnahme (12) geformt wird, welche Luftgewehrkugeln aufnehmen und lagern kann, wenn die Ladevorrichtung (11) diesem gegenüber liegt.

4. Doppelartige Ladevorrichtung einer Druckgaswaffe nach Anspruch 1, dadurch gekennzeichnet, daß sich in der Treibgas spendenden Quelle ein unter Hochdruck verflüssigtes reaktionsarmes Gas, wie etwa Kohlendioxid, befindet, wobei die Ladevorrichtung (11) gelenkig mit dem Waffenkörper verbunden ist, so daß diese durch den Waffenlauf (10) in Ladestellung verschoben wird und sich auf gleicher Ebene mit diesem befindet, wenn die Waffe in Feuerstellung ist.

Revendications

1. Arme à double chargement de munition, ladite munition (13) étant placée manuellement à l'embouchure arrière du canon (10) ou bien automatiquement alimentée 5 par un dispositif (11) de chargement, à un évidement (12) ayant la taille appropriée qui peut recevoir, lorsqu'il se trouve en face de ce dispositif (11) de chargement, une seule unité (13) de munition, ce canon (10) étant également aligné en position de tir avec ledit évidement 0 (12) communiquant avec une source de propulsion de fluide, ledit dispositif (11) de chargement comprenant un corps (11a) tubulaire fermé à une de ses extrémités avec un ressort (11b) appuyé sur son fond et un actionneur (11c) relié audit ressort permettant de stocker la munition qui est délivrée, unité par unité, à travers l'extrémité opposée ouverte dudit corps tubulaire, caractérisé en ce que ce dispositif de chargement tubulaire est articulé par l'une de ses extrémités (14) au corps de l'arme, et sa portion d'extrémité distale reste située, flottante à l'intérieur d'une rainure (15) de guidage, ladite portion d'extrémité distale étant poussée contre une butée (16) de limitation par l'action d'un ressort (17), de telle sorte que l'axe géométrique du dispositif (11) de chargement se trouve en face dudit évidement (12) formé sur le fond de ladite rainure, et en ce que le canon (10) de l'arme qui est articulé basculable par une portion (32) d'extrémité de celui-ci à une autre partie (18) du corps de l'arme, est agencé de telle sorte que dans une position de tir de l'arme, ce 30 dispositif (11) de chargement est déplacé en aval par ledit canon (10), qui reste alors en face bout à bout dudit évidement (12), avec un réglage maximum, prêt à tirer.

2. Arme à double chargement de munition, selon la 35 revendication 1 caractérisé en ce que ledit dispositif (11) de chargement est articulé par une extrémité (14) à une chambre de compression (20) avantageusement près d'une de ses extrémités, et la rainure (15) de guidage et la butée (16) de l'extrémité libre du dispositif de chargement (11) sont réalisés sous la forme d'une pièce (21) qui ferme l'extrémité distale de ladite chambre (20), à cette pièce (21) est également reliée le ressort (17) qui pousse ladite extrémité libre du dispositif (11) de chargement dans la position de chargement de munition, contre ladite butée (16).

3. Arme à double chargement de munition, selon la revendication 2, caractérisé en ce que ladite chambre (20) de compression à laquelle le dispositif (11) de chargement est articulé est fermée à son extrémité distale loin du point d'articulation par une pièce (21) comprenant une portion (23) tubulaire qui est fermement emboîtée dans l'embouchure de ladite chambre de compression, avec un déport annulaire dans lequel est agencé un moyen (24) de jonction hermétique et un orifice transversal (25) à travers lequel est agencée une broche de verrouillage (19) qui, de plus, constitue un arbre permettant un mouvement pivotant de ladite chambre et son association en fonctionnement à un dispositif de compression préalable du fluide, ladite pièce (21) comportant, de plus, un conduit (26) qui communique la chambre (20) de compression avec un corps valvulaire, intercalé dans un conduit (22) qui finit au fond de la rainure (15) de guidage du dispositif de chargement, où ledit conduit (22) est élargi en formant ledit évidement (12) approprié pour recevoir et loger

une munition sphérique, lorsque le dispositif (11) de chargement est en face de celui-ci.

4. Arme à double chargement de munition, selon la revendication 1, caractérisé en ce que la source de propulsion du fluide est un gaz liquéfié à haute pression stable, tel que CO_2, le dispositif (11) de chargement étant articulé au corps de l'arme de sorte qu'il est déplacé de la position de chargement par le canon (10) coplanaire au plan d'articulation dudit dispositif de chargement, lorsque ledit canon est en position de tir.

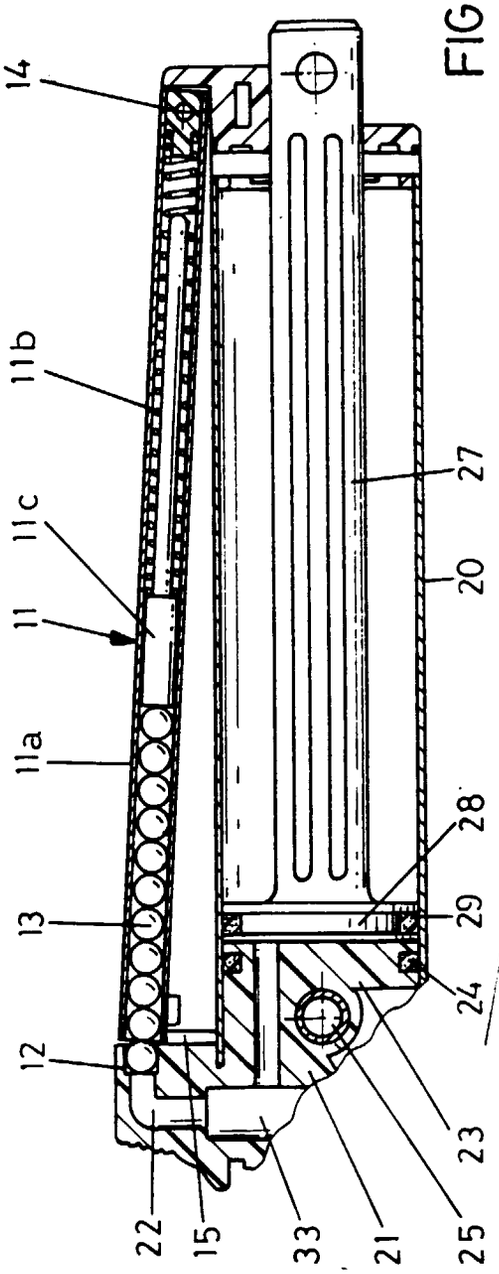

14
11b
11c
11
11a
13
12
22
15
33
21
25
23
24
29
28
27
20

FIG. 1

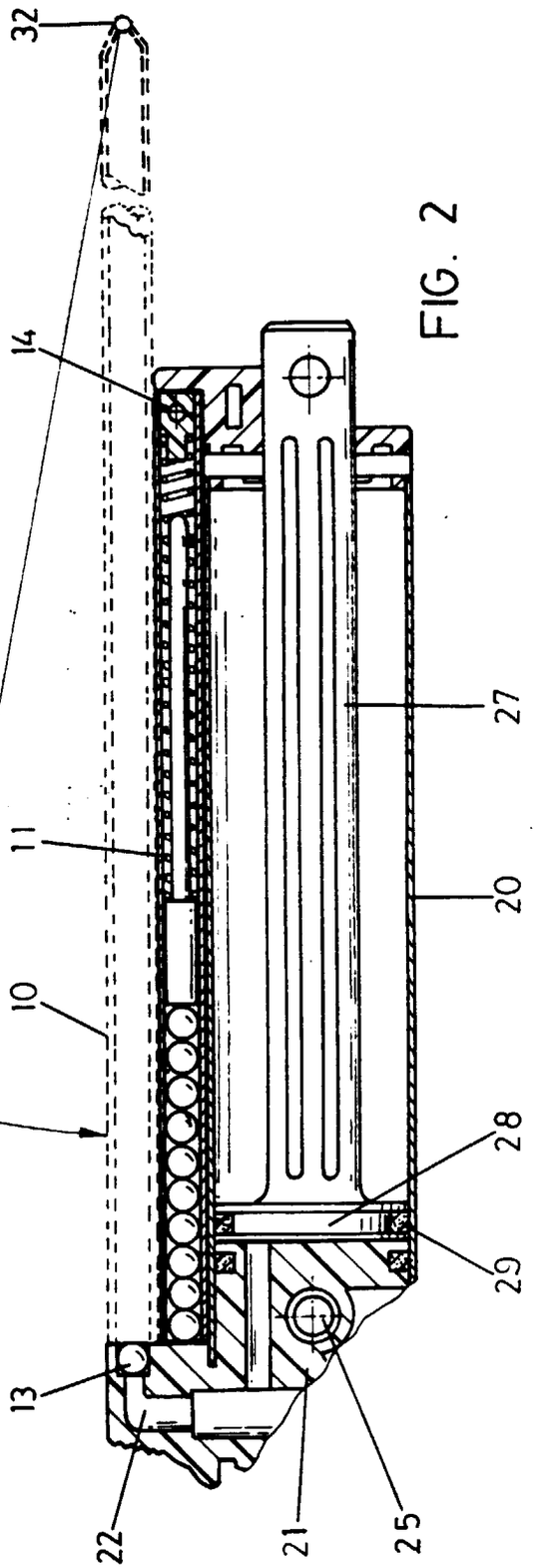

32
14
11
10
13
22
21
25
29
28
27
20

FIG. 2

FIG. 3

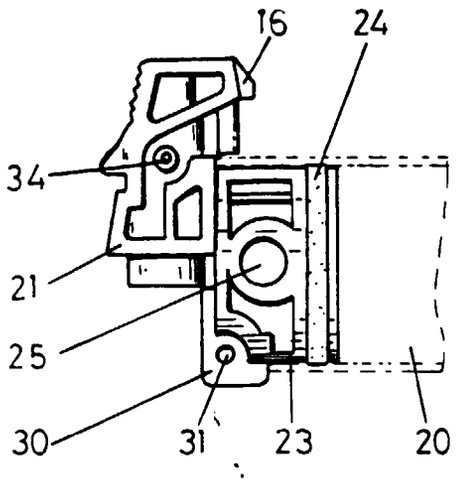


FIG. 4

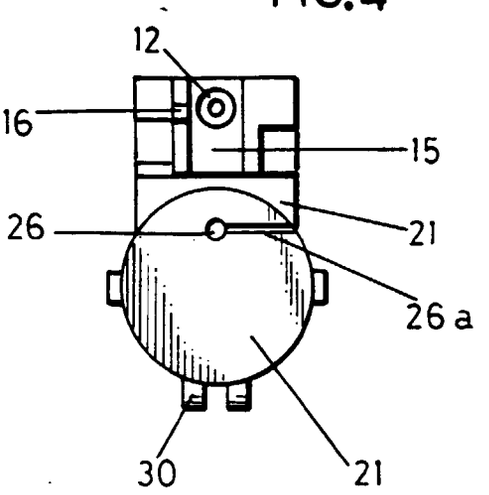
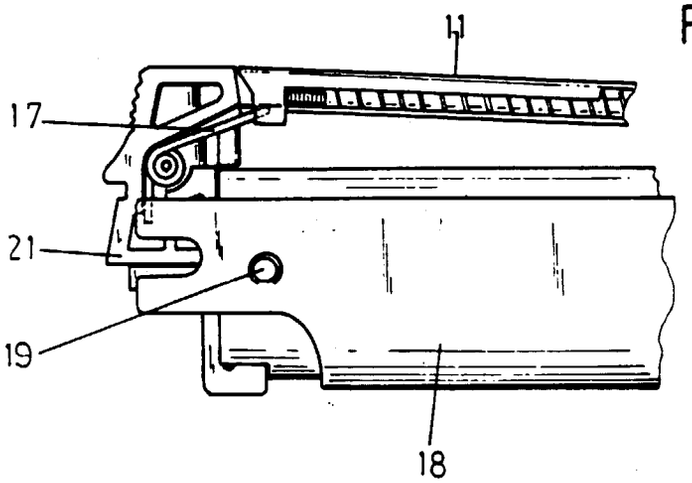


FIG. 5



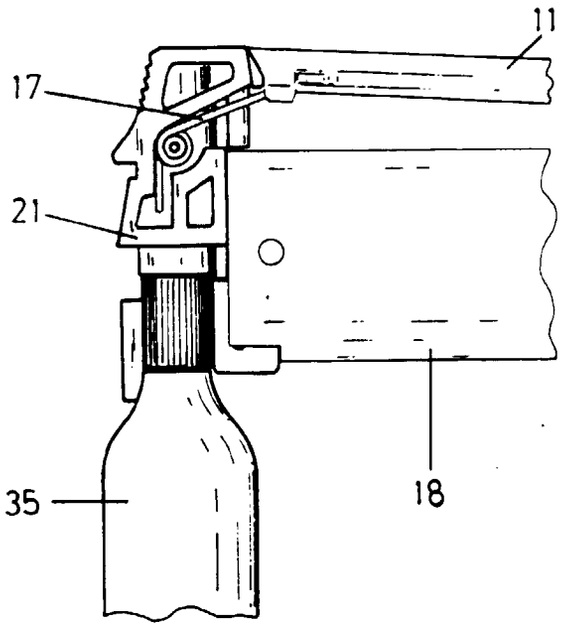


FIG. 6