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(54) **Air pressure operated toy gun**

(57) A toy gun is improved in the structure of a safety and an air shooting unit. The safety has a lock base to push down an activating rod and to move down to hamper a trigger from pulled. One air shooting unit consists of a front air shooter and a rear air shooter formed with a air guide rod as integral and an air stop valve between the two shooters. The air stop valve pre-

vents air flowing. The front air shooter has a center through hole for the air guide rod to extend therein. Another air shooting unit consists of a front air shooter, a rear air shooter, an air guide rod extending in a center through hole of the front air shooter, and a spring provided at a rear end of the air guide rod.

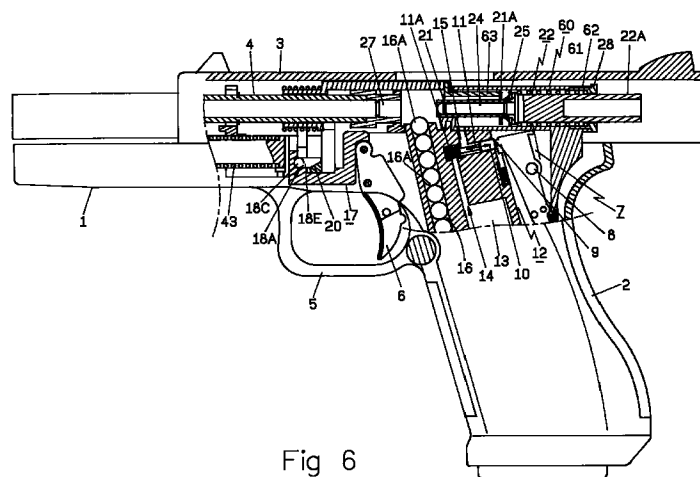


Fig 6

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Description

BACKGROUND OF THE INVENTION

This invention concerns a toy gun, particularly resembling a rear gun in shooting a BB bullet, and then retreat a slide for advancing another bullet and shooting again with enough safety.

At present, most toy guns make use of an air guide rod and a piston located behind the air guide rod to control air flowing direction in an air chamber in the air guide rod so that a bullet may be advanced in an inner barrel for shooting, and the slide may be retreated. However, this structure is too complicated, inconvenient for assembling.

For example, a known toy gun has an air guide rod formed as a flat plate, permitting air leak out before the air guide rod reaches a proper location in retreating. Then a bullet shot out does not have enough force to fly for a long distance.

SUMMARY OF THE INVENTION

This invention has a purpose to offer a kind of toy gun having a simple bullet shooting structure, and a safe and nearly real shooting action.

A feature of the present invention is a safety, which consists of a lock base and a push block, having a hole for an activating rod to pass through. Then the activating rod can be pushed down, forcing the lock base move down to obstruct a trigger from pulled.

Another feature of the invention is two different air shooting units selectably used in a toy gun. A first air shooting unit includes a front air shooter and a rear air shooter and an air stop valve between them, with an air guide rod formed integral with the rear air shooter. A second air shooting unit includes a front air shooter, a rear air shooter and an air guide rod. A spring is provided at a rear end of the air guide rod, and contacts with an inner side of an interconnector. Then air direction of the air in the air chamber is alternately altered to perform functions of shooting, retreating of the slide, and advancement of a next bullet in the inner barrel.

BRIEF DESCRIPTION OF DRAWINGS

This invention will be better understood by reference to the accompanying drawings, wherein:

Figure 1 is a cross-section of a safety of a toy gun in the present invention, showing it in opened condition;

Figure 2 is a partial cross-sectional view of the safety of a toy gun in the present invention, showing it in opened condition;

Figure 3 is a cross-sectional view of the safety of a toy gun in the present invention, showing it in

closed condition;

Figure 4 is a partial cross-sectional view of the safety of a toy gun in the present invention, showing it in closed condition;

Figure 5 is an exploded perspective view of the safety of a toy gun in the present invention;

Figure 6 is a cross-sectional view of a first embodiment of an air shooting unit of a toy gun in the present invention, showing a condition wherein a bullet is not yet advanced in the inner barrel;

Figure 7 is a cross-sectional view of the first embodiment of an air shooting unit of a toy gun in the present invention, showing a condition wherein a bullet is being shot;

Figure 8 is a cross-sectional view of the first embodiment of a barrel unit of a toy gun in the present invention, showing a condition after a bullet is shot;

Figure 9 is a magnified view of the part A in Fig. 7;

Figure 10 is a cross-sectional view of a second embodiment of the air shooting unit of a toy gun in the present invention, showing a condition wherein a bullet is not yet advanced in the inner barrel;

Figure 11 is a cross-sectional view of the second embodiment of the air shooting unit of a toy gun in the present invention, showing a condition wherein a bullet is advanced in the inner barrel but not yet shot out;

Figure 12 is a cross-sectional view of the second embodiment of the air shooting unit of a toy gun in the present invention, showing a condition after a bullet is shot out;

Figure 13 is a partial exploded perspective view of the first embodiment of the air shooting unit of a toy gun in the present invention; and

Figure 14 is a partial exploded perspective view of the second embodiment of the air shooting unit of a toy gun in the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A first embodiment of a toy gun in the present invention, as shown in Fig. 6, includes a barrel housing 1, a grip 2, a slide 3 on the barrel housing 1, an inner barrel 4, a trigger guard 5 under the outer barrel 1, a trigger 6 inside the trigger guard 5, and a hammer 7 to be moved by the trigger 6. The hammer 7 has a shaft

fulcrum 8 at a proper point to force a front protruding edge 9 of the hammer 7 compress a rear valve rod 10, then forcing a air valve 11 push a spring 11A and opening a air outlet 14 of an air chamber 13 of a magazine 12 to let air flow into a first air passageway 15 and into the inner barrel 4.

The magazine 12 has a bullet chamber 16 for storing a plural of BB bullets therein, and a safety 17 as shown in Figs. 1 to 5 consisting of a lock base 18, which has a press block hole 18A for receiving a compress block 18B. The compress block 18B has one end fitted around with a spring 18C, and the compress block hole 18A has an upward opening 18D for fitting a lateral rod 18E therein so that the lateral rod 18E may rotate slopingly upward, permitting the safety 17 open and close, and a lower sloped surface of the lateral rod 18E extends to contact with a surface 20A of an activating rod 20, as shown in Figs. 1 and 2. Thus downward compressed movement of the activating rod 20 produces compressing down force of the compress block 18B and the activating rod 20, forcing the lock base 18 move down, which then hampers the trigger 6 from pulled, as shown in Figs. 3 and 4. In case the activating rod 20 is pushed up, the safety 18 becomes open, permitting the trigger ready to be pulled for shooting.

As shown in Figs. 6 - 9 and 13, a first embodiment of an air shooting unit includes a front air shooter 21 and a rear air shooter 22. The front inner barrel 21 has a center through hole 23 for an air guide rod 24 to extend therein, a large diameter section 21A at a rear end, extending in a center through hole 61 of an outer barrel 60 and stopped by a stop 63 in the center through hole 61 as shown in Figs. 6 and 8. The front air shooter 21 is positioned at a limited distance, facilitating combination of the air guide rod 24 by means of a trumpet-shaped opening 23A formed at an inlet of the center through hole 23, with air flowing being smooth to let air flow into the center through hole 23 in shooting a BB bullet to a farther distance. The air guide rod 24 and the rear air shooter 22 are formed as integral, and the air guide rod 24 has a spherical body 24A at the front end, and an anti-leak ring 24B is fixed around the spherical body 24A to allow the spherical body 24A to move back and forth smoothly in the center through hole 23 of the front inner barrel 21. Further, the air guide rod 24 has a cone-shaped section 24C in a rear portion to cooperate with the trumpet-shaped opening 23A of the front inner barrel 21 to attain air closing function.

Further, an air stop valve 25 is provided between the front air shooter 21 and the rear air shooter 22 with the air guide rod 24, permitting air flow through the first air passageway 15 to force back the rear air shooter 22 with the air guide rod 24 and the slide 3 as well, as shown in Fig. 8. Then air further flows into the center through hole 23 of the front air shooter 12 to shoot out a BB bullet. The air stop valve 25 has a center hole 25A for the air guide rod 24 to fit therein to secure the air stop valve 25 at its position. The rear air shooter 22 has a diameter a little smaller than a center hole 28A of a nut

28 so as to move back and forth therein and bushes back the slide 3 at a proper time.

An outer barrel 60 has a center hole 61 with a female thread 62 to engage with the nut 28 so that the air shooting unit may be positioned. The inner barrel 4 has a C-shaped ring 30 as shown in Fig. 9 to secure the inner barrel 4, preventing it from swaying in shooting.

As described above, when a bullet (BB) is advanced in the bullet chamber 27 and the trigger 6 is pulled, the air stop valve is opened to let air flow through the first air passageway 15 to force the slide 3 to move back. Then the air guide rod 24 completely moves out of the front air shooter 21, permitting air to flow through the center through hole 23 of the front air shooter 21 and shooting the bullet 16A out of the inner barrel 4. After air leaks out in consequence of a bullet shot out, the retreated components will be moved forward back to let the next bullet 16A advance in the inner barrel 4 from the bullet chamber 16 with resilience of a spring 43.

A second embodiment of an air shooting unit is shown in Figs. 10, 11, 12 and 14, consisting of a front air shooter 31 and a rear air shooter 32, an air guide rod 33 and an interconnector 34. The front air shooter 31 has a center through hole 35 for the air guide rod 33 to extend therein, and a large diameter section 31A at a rear end having an air inlet 31B and a female thread 31C. The air guide rod 33 has a rear end fitted around with a spring 36, which functions to control the air flow therein, a plurality of small pieces 33A forming a plurality of air flowing apertures 33B, and an air valve 33C of a cone shape at the rear end. Then a ring 33D is respectively fitted at two sides of the air valve 33C, and the air guide rod 33 combined with the interconnector 34 engaging with the female thread 31C after it is extended in the center through hole 35 of the front air shooter 31. Then the air guide rod 33, the spring 36 and the front air shooter 31 are combined together. The rear air shooter 32 has a large diameter section 32A at a front end to fit in a center hole 61 of the outer barrel 60, and a ring 32B is fitted around behind the large diameter section 32A to stop air leak and help it to move smoothly. The outer barrel 60 has a female thread 62 to engage with a nut 37, securing the air shooting unit. Thus, when a bullet advances into the bullet chamber 40, the bullet may contact with the front end of the air guide rod 33 and force the air guide rod 33 to retreat, permitting the air inlet 31B communicate with the center through hole 35 of the front air shooter 31. After that, when the trigger 6 is pulled, air flows through the first air passageway 15, the air inlet 31B and into the center through hole 35, forcing the bullet 16A move into the inner barrel 4 and shot out. After the bullet is shot out, the air guide rod 33 is pushed forward by the spring 36, letting the center through hole 35 blocked up, diverting air to flow back into the center hole 41 of the rear air shooter 32. Then the slide 3 and the rear air shooter 32 are to be moved back for a proper distance, and will be moved forth back to their original position with resilience of the spring 43 after air leaks out, with a next bullet pushed into the bul-

let chamber 40.

While the preferred embodiments of the invention have been described above, it will be recognized and understood that various modifications may be made therein, and the appended claims are intended to cover all such modifications which may fall within the spirit and scope of the invention.

Claims

1. A toy gun comprising at least a barrel housing, an outer barrel, a grip, a slide on said outer barrel, an inner barrel, and a trigger, etc., and characterized by an air bush unit provided with a safety, by said safety at least having a lock base, said lock base having a push block hole with an upward opening, said push block hole receiving a spring and a bush block therein, by said push block having a lateral rod, by said lateral rod of said push block being in contact with an activating rod with a surface, by said activating rod being gushed down to force said lock base move down to hamper the trigger from pulled in shooting a bullet.
2. The toy gun as claimed in Claim 1, wherein said lateral rod of said push block has a sloped surface.
3. A toy gun comprising a barrel housing, a barrel housing, a grip, a slide, an inner barrel, and a trigger, etc, said barrel housing having an outer barrel, said outer barrel having an air shooting unit;

said air shooting unit consisting of a front air shooter, a rear air shooter, said front air shooter having a center through hole and a trumpet-shaped opening at a rear end, said rear air shooter being formed as integral with an air guide rod, said air guide rod having a spherical body at a front end and a cone-shaped section at a rear portion, said spherical body able to fit in said center through hole of said front air pusher, said cone-shaped section cooperating with said trumpet-shaped opening for obtaining proper shut-off of air flowing, said trigger able to force air to move said slide and the rear air pushed back after pulled and also move into said center through hole of said front air shooter to produce shooting force against a bullet in a bullet chamber, which is then to be shot out of said inner barrel, said slide and said rear air shooter being moved back and permitting a next bullet move into said bullet chamber after air leaks outside.
4. The toy gun as claimed in Claim 3, wherein said front air shooter has a large diameter section to contact with a stop in said center hole of said outer barrel.

5. A toy gun comprising a barrel housing, an outer barrel, a grip, a slide on said barrel housing, an inner barrel, a trigger, etc., and characterized by an air push unit consisting of a front air shooter and a rear air shooter, said front air shooter having a center through hole for receiving an air guide rod therein, an air inlet and a female thread for engaging with an interconnector;

said air guide rod having a plurality of pieces defining a plurality of apertures, a cone-shaped air valve on a rear end, a spring contacting with the rear end, said air guide rod being moved back a little when a bullet moves in a bullet chamber, said rear air shooter having a large diameter section and a ring fitted around said large diameter section; and

a bullet in said bullet chamber being shot out of said inner barrel when said trigger is pulled, letting air in an air chamber of a magazine flow through said air inlet and said apertures of said air guide rod, said air guide rod being moved forward by a spring after a bullet is shot out, said slide and said rear air shooter being moved back by air flowing through said center through hole of said front air shooter, and said spring of said barrel housing moving to force a next bullet (BB) to advance into said bullet chamber.

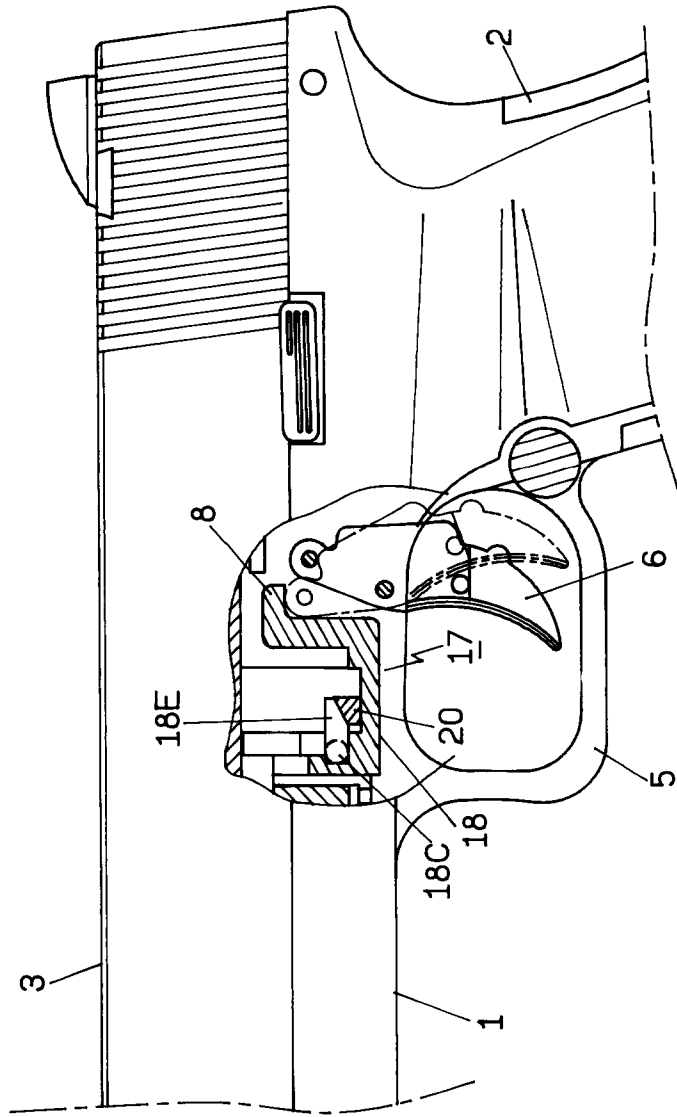


Fig 1

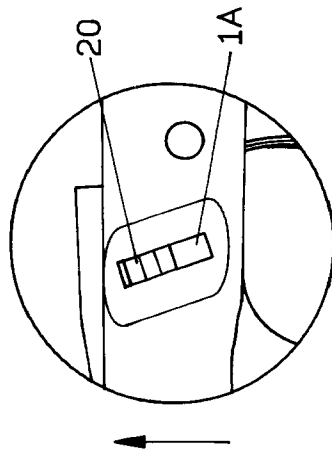


Fig 2

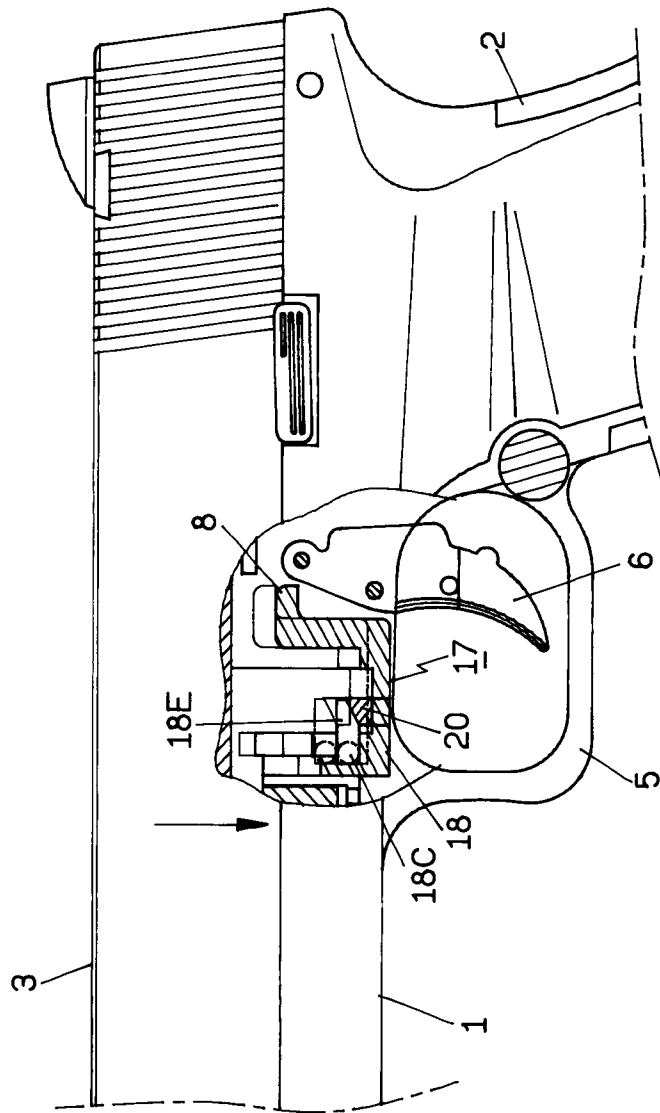


Fig 3

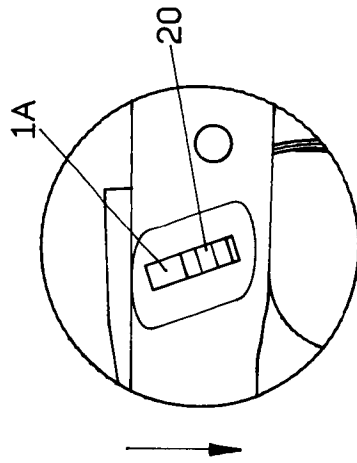


Fig 4

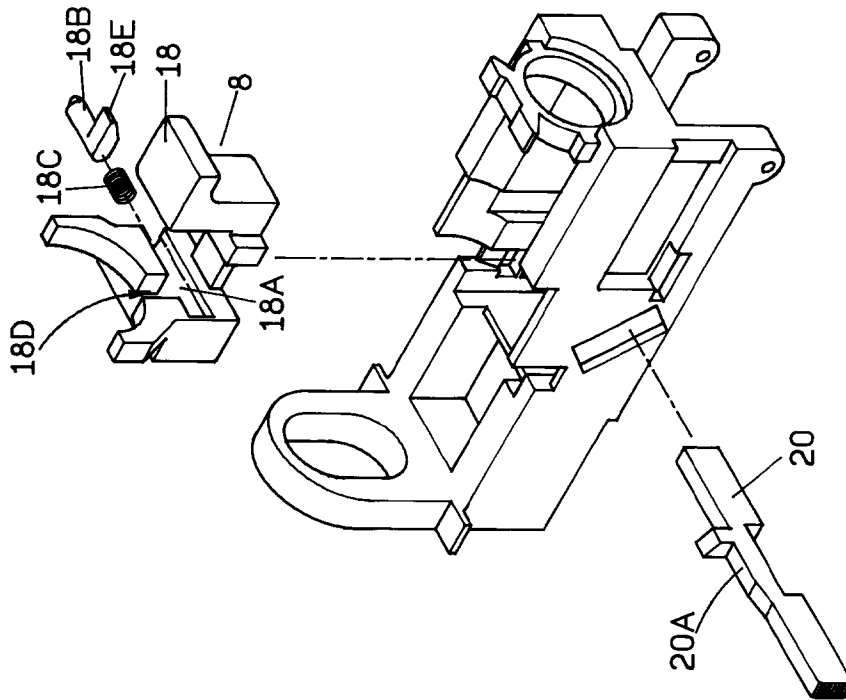
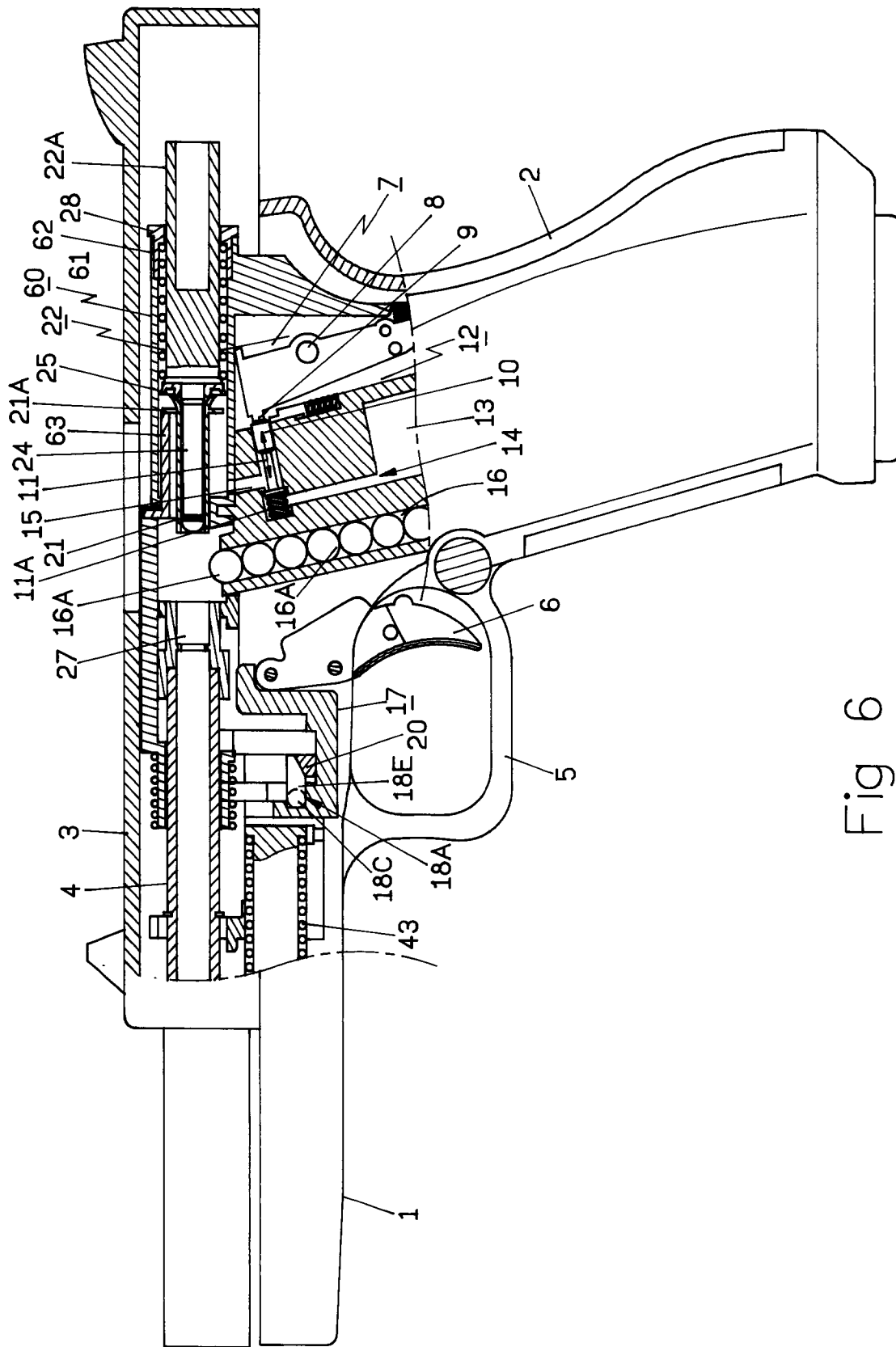


Fig 5



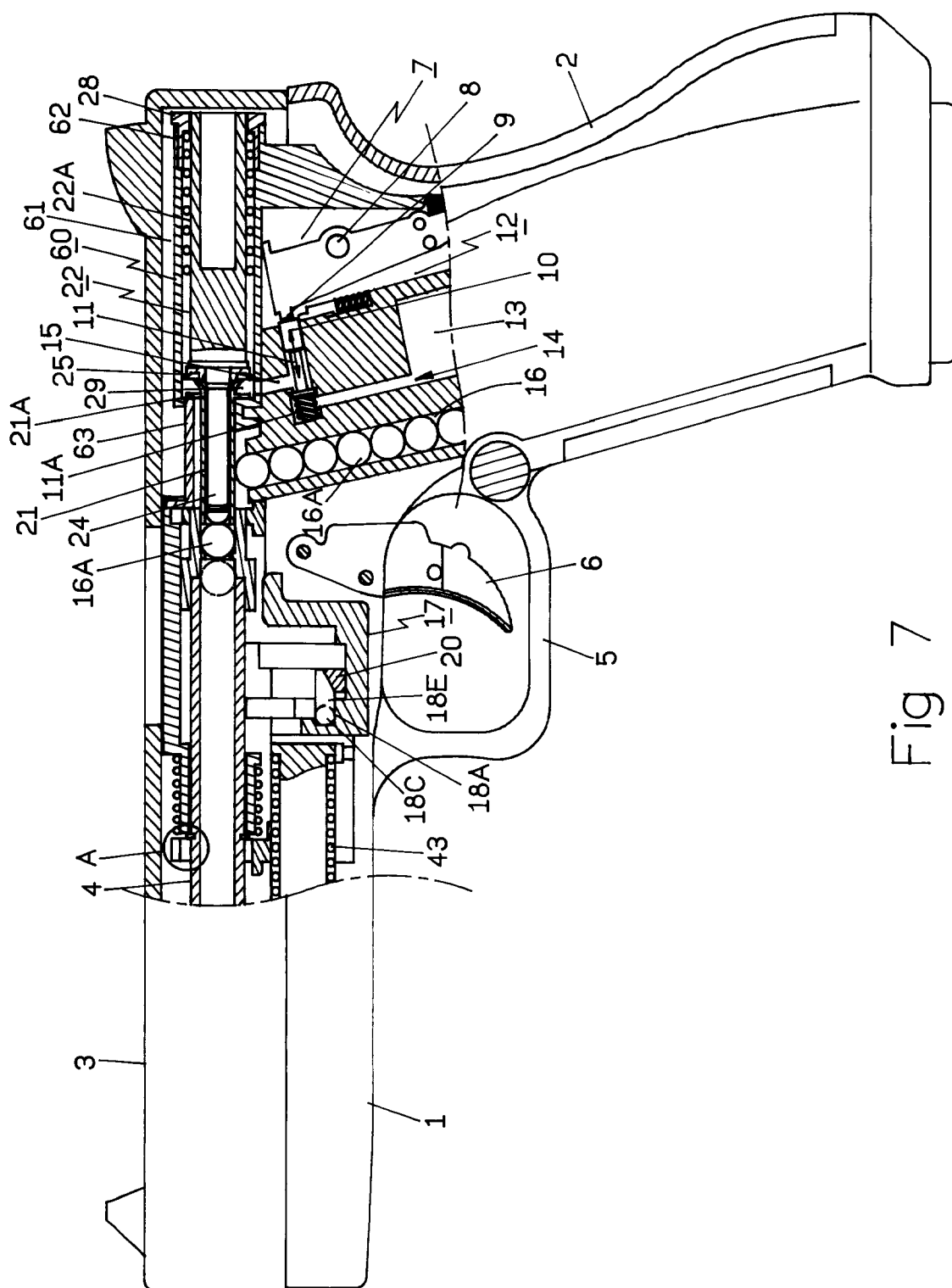
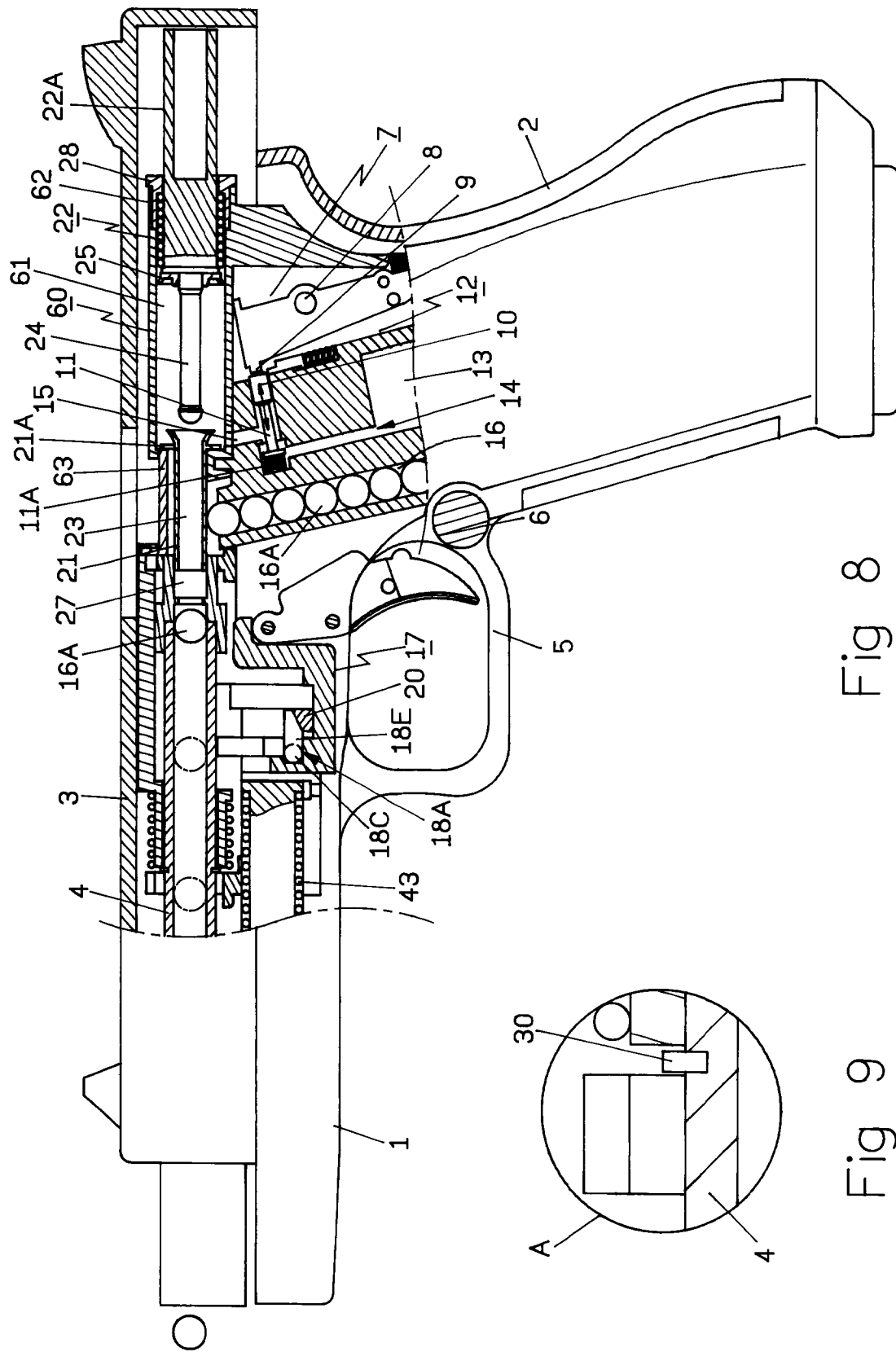


Fig. 7



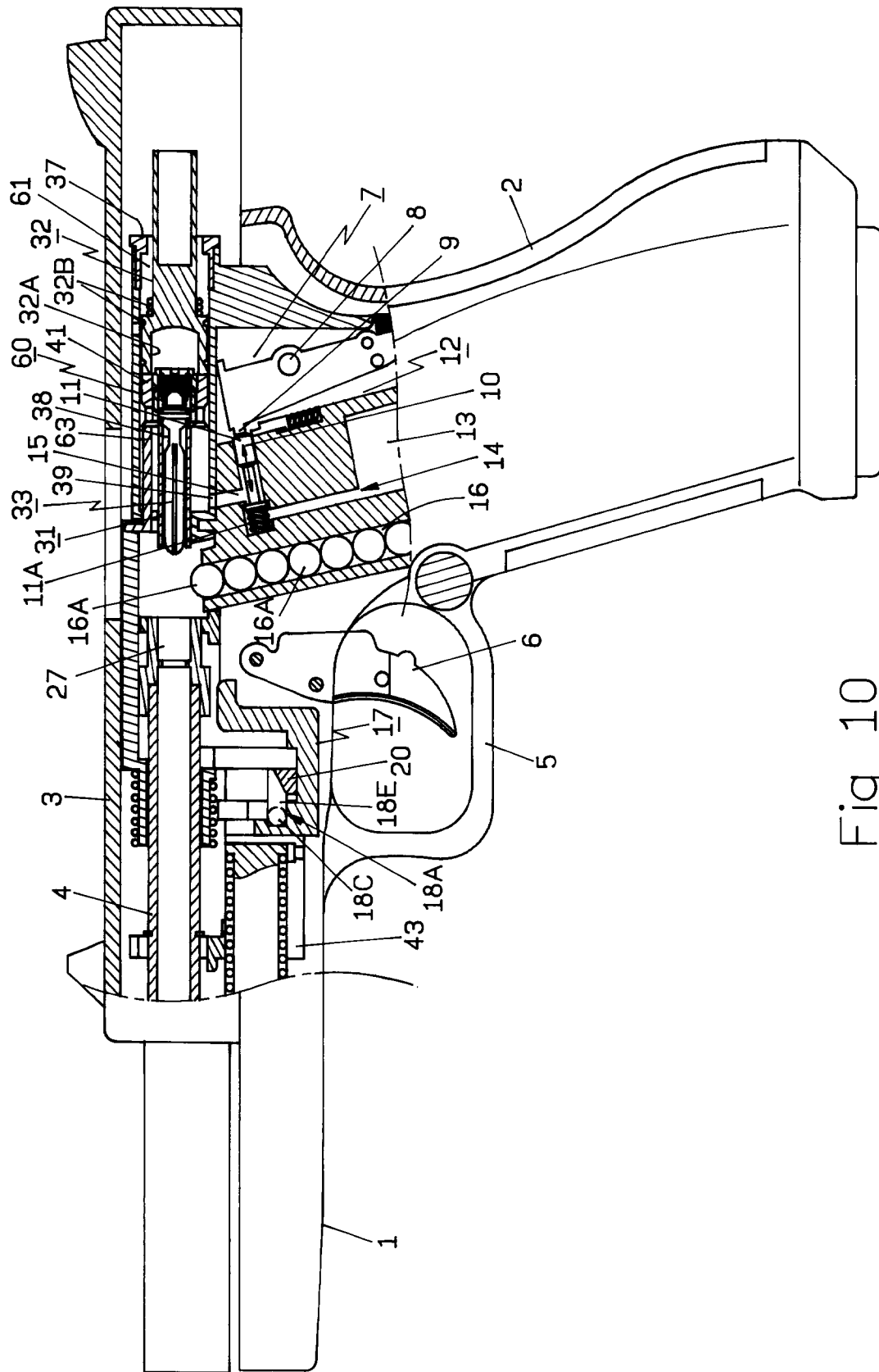
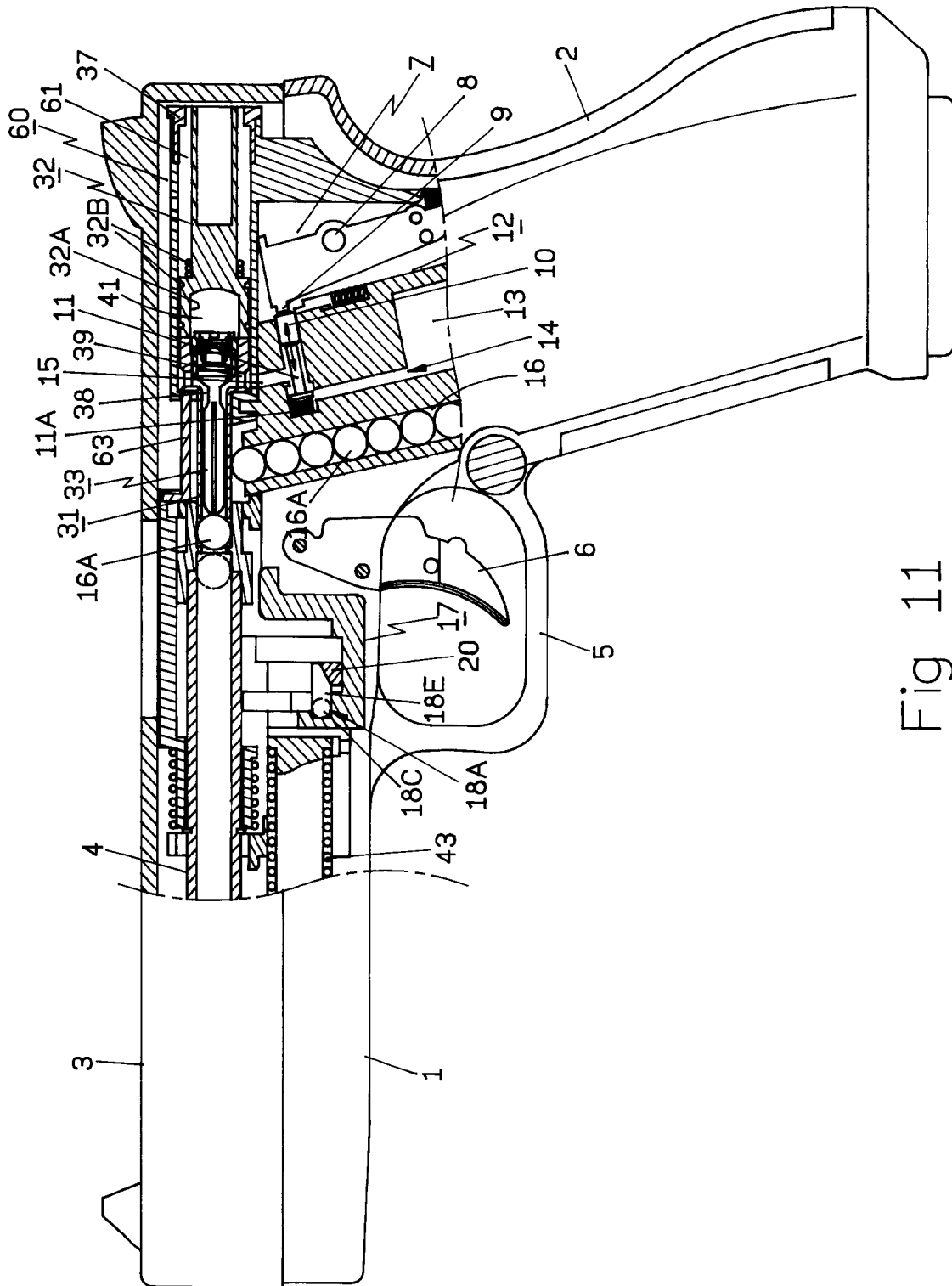
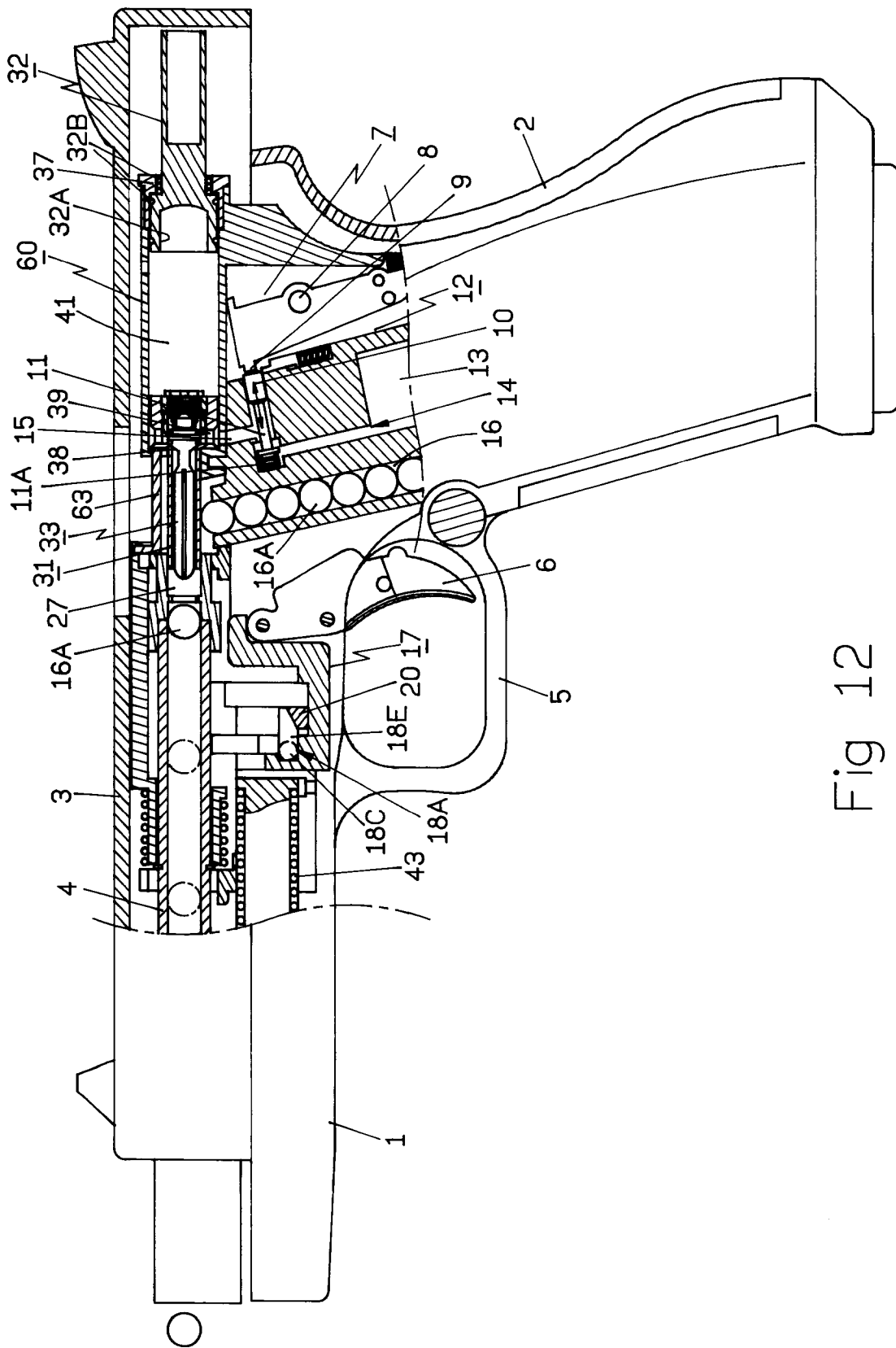


Fig 10





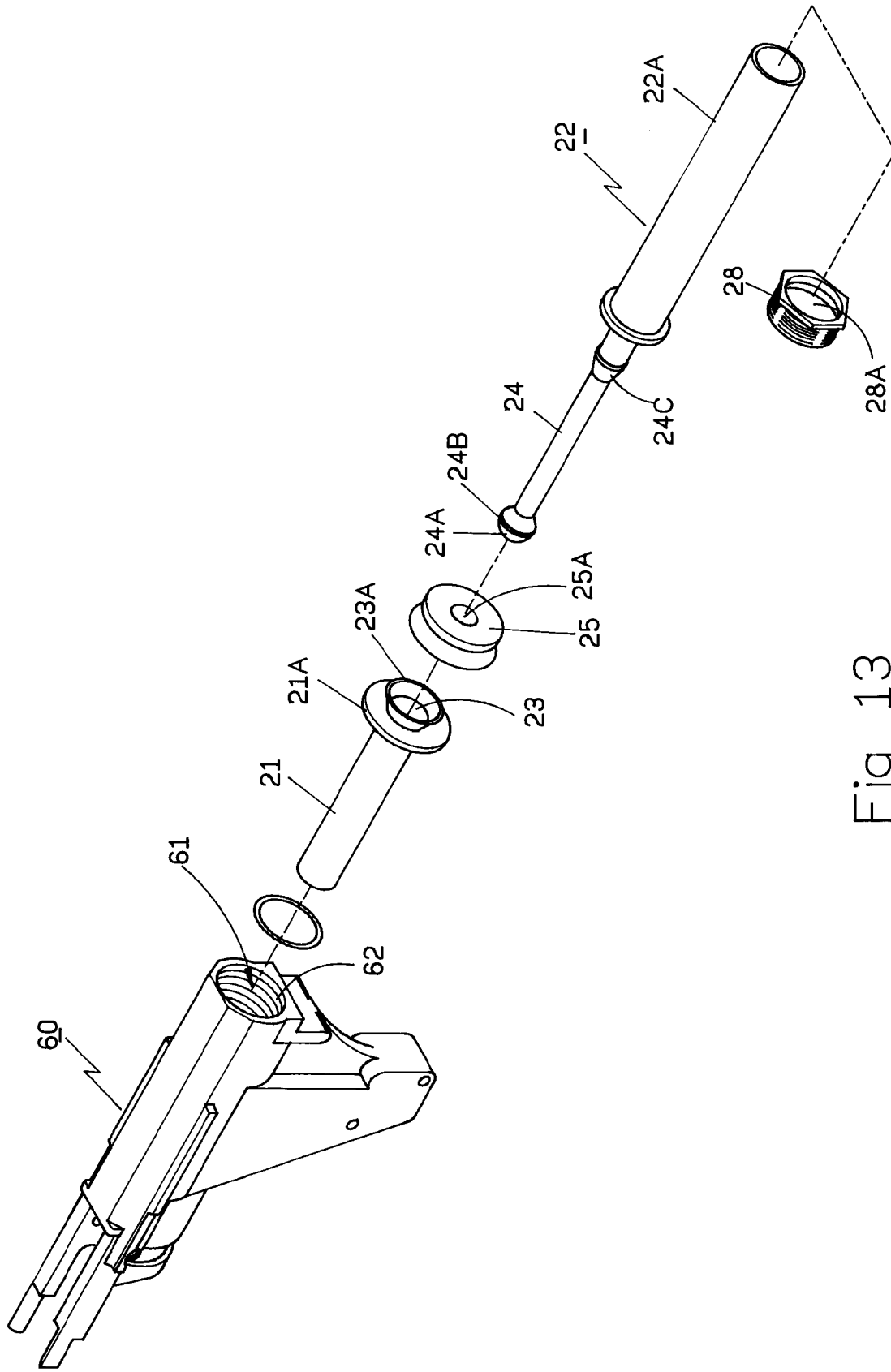


Fig 13

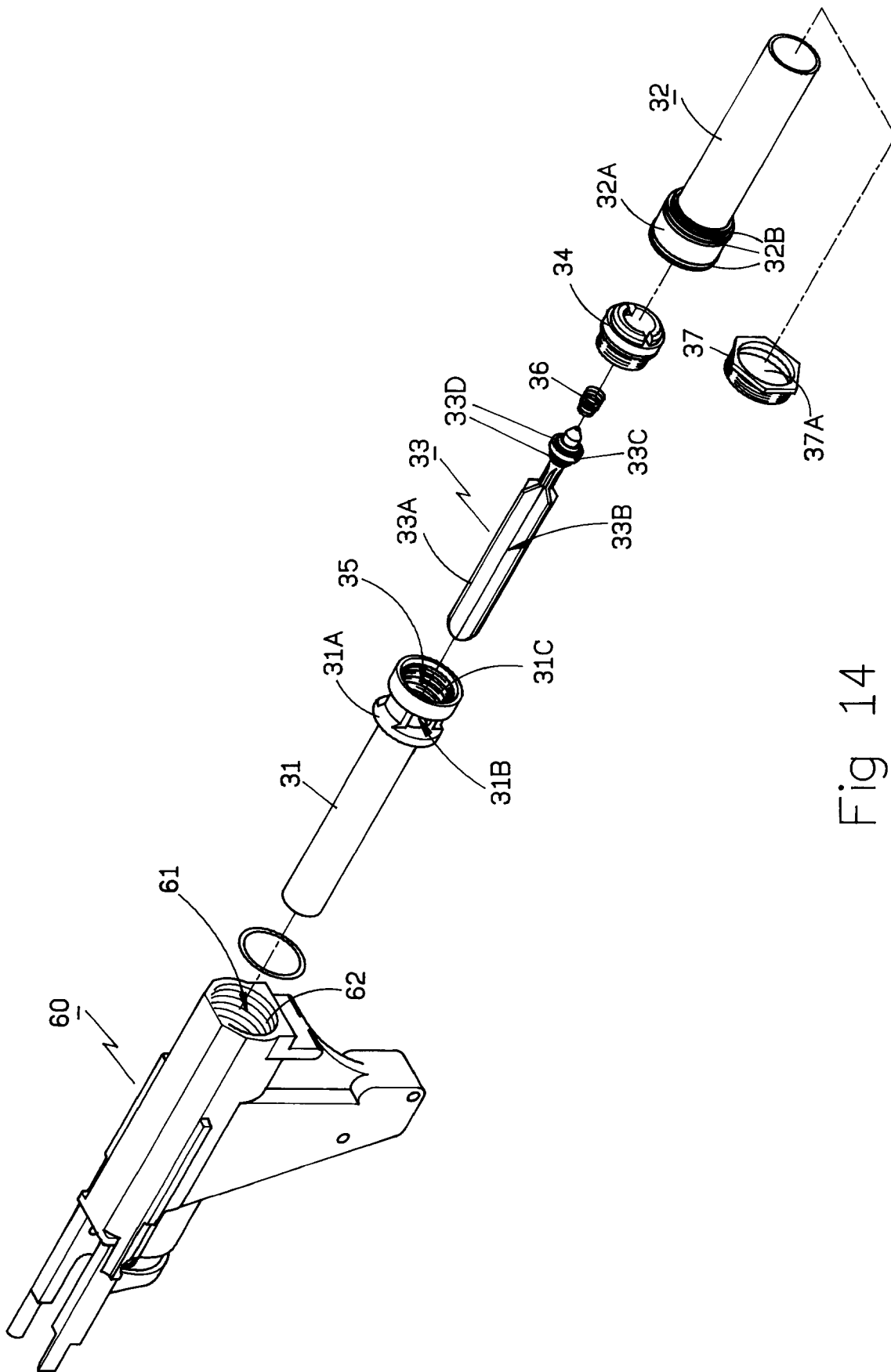


Fig 14



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EUROPEAN SEARCH REPORT

Application Number
EP 95 85 0191

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB-A-2 167 538 (WEBLEY & SCOTT LTD) * page 1, line 95-107; figure * * page 2, line 8-26 * ---	1	F41B11/02 F41B11/32 F41A17/46
A	US-A-2 765 562 (W. ROPER) * column 3, line 30-57; figures 2,3 * ---	1	
X	EP-A-0 625 689 (WESTERN ARMS) * column 10, line 8 - column 13, line 13; figures 1-21C * * column 13, line 39 - column 14, line 45 * * column 23, line 7-26 *	5	
A	---	3,4	
X	EP-A-0 647 825 (WESTERN ARMS) * column 17, line 38 - column 21, line 8; figures 13-16 * ---	5	
A	DE-A-41 03 858 (HÄMMERLI AG) * column 2, line 57 - column 3, line 23; figure 1 * ---	3	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 13, no. 434 (M-875) [3782] , 28 September 1989 & JP-A-01 167596 (FUARUKOON TOO K.K.), 3 July 1989, * abstract *		F41B F41A
A	US-A-3 464 399 (C. FISHER) ---		
A	US-A-2 881 752 (C. BLAHNIK) ---		
A	US-A-4 819 609 (D. TIPPMANN) -----		
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		9 April 1996	Van der Plas, J
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			



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims 1,2: Toy gun with sliding trigger safety
2. Claims 3,5: Toy gun with tubular air guiding and projectile ramming device

As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respects of which search fees have been paid, namely claims:
- ☐ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims