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(54) **Pre-compressed gas or air arm**

(57) A pre-compressed gas or air arm, comprising a casing (1), to which a barrel (2) and a valve (12) are attached, suitable to control outflow of pre-compressed gas or air. Valve (12) is coaxially sliding along the axis (AA) of said barrel (2), and is operable to open by rocking means (13) through triggering of a striker (8) which in turn slides within a seat (7) having an axis (BB) parallel to axis (AA) of barrel (2). Opening of the valve relies on rocking means (13), substantially transverse with respect to said axes (AA) and (BB),

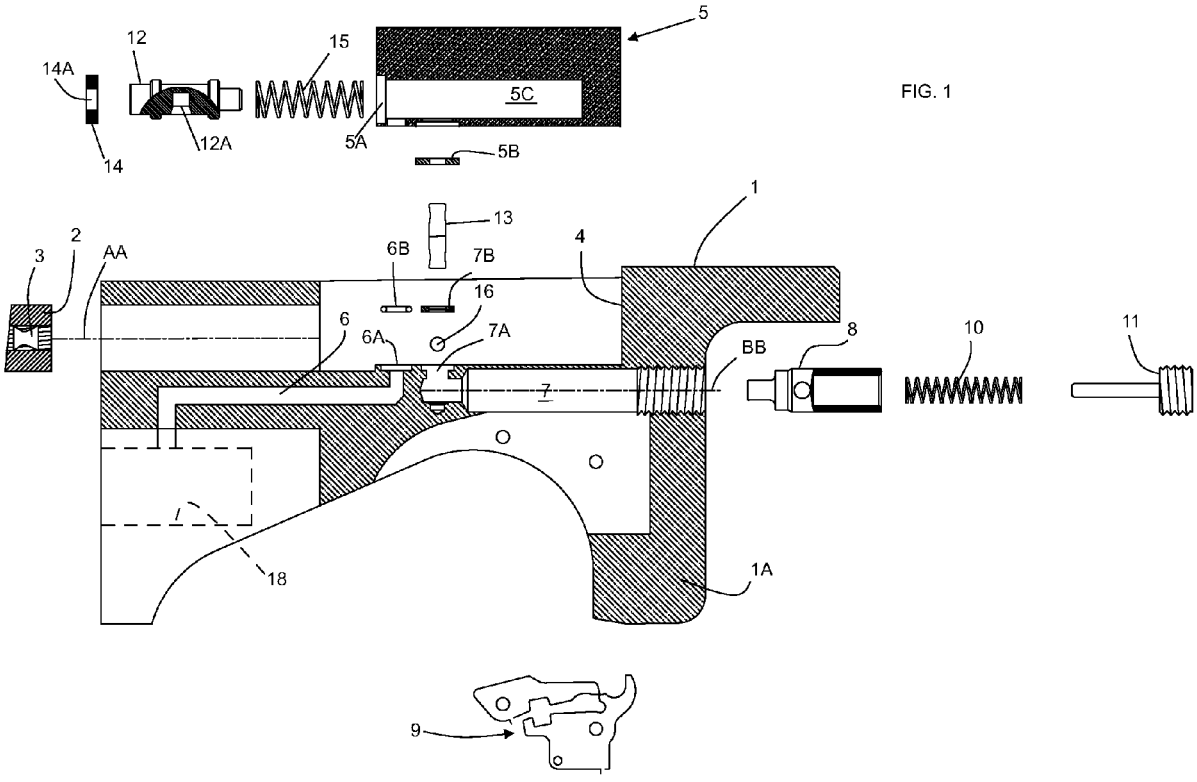

FIG. 1

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Description

FIELD OF APPLICATION OF THE INVENTION

[0001] The object of the present invention is a pre-compressed gas or air operated arm, in particular a weapon suitable for target firing competitions.

STATE OF THE ART

[0002] In sport air (or other gas) operated guns, air (or gas) is not compressed only at the time of firing, but it is compressed in advance; pulling of the trigger causes a sudden expansion resulting in firing of the bullet. These guns can, in turn, be classified in two subcategories:

> Arms in which the shooter him/herself carries out preemptive compression by activating a lever sucking air in a cylinder, also equipped with a piston, and simultaneously compressing a spring; subsequent release of the trigger releases the spring and associated piston generating the firing. These guns are generally single-shot; in some recent design and manufacture arms, though, pre-compression of air can be realized within suitable members, similar to ordinary repetition shooting cartridges, the cartridges being placed within a revolver cylinder, or a semi-automatic pistol longitudinal magazine, or in a lever rifle tank.

[0003] Arms which require using dedicated cans in which a gas (generally carbon dioxide) has already been introduced under pressure by the manufacturer of the same cans. These can allow repeating firing without the need to reload the gun. Each time the trigger is pulled, in fact, a valve releases a small amount of air, sufficient for firing. The bullets are lead balls, usually inserted in a small revolving drum or linear magazine, the movement of which is guaranteed by pulling the trigger itself. In amateur firing arms the cans are commonly housed in the gunstock, whereas in the competition ones, they are situated, instead, underneath the barrel. Examples of the known art according the preamble of the present invention are patent documents US3199501 and US1506995.

DISCLOSURE AND ADVANTAGES OF THE INVENTION

[0004] The present invention aims to make available for the art a pre-compressed air gun, or otherwise pre-compressed gas operated, having a gas outlet control opening valve, sliding coaxially with the barrel axis. The valve is operable to open by rocking means, actuated by a striker sliding in a parallel seat, and opening of the valve relies on oscillating means substantially crosswise with respect to the axis of sliding.

ADVANTAGES

[0005] The advantages of such configuration are, in summary: Load loss reduction with respect to a conventional arm having a non-coaxially positioned valve;
Saving a considerable amount of air available for firing, by coaxial positioning in proximity of the barrel,
[0006] Shortening execution time between control action and shooting of the bullet.
[0007] Said objects and advantages are all achieved by the pre-compressed air or gas operated arm according to the present invention, characterized by what set forth in the appended claims below.

BRIEF DESCRIPTION OF THE FIGURES

[0008] This and other features will become more apparent from the following description of a number of embodiments illustrated, only as a simplifying and non-limiting example, in the drawings of the appended figures.

> Figure 1: Shows an exploded view of the arm internal components, which identify the invention,
> Figure 2: Shows an assembled arm, in sectional view, with the valve closed by the spring and the striker to the rear and ready for firing, or closing step,
> Figure 3: Shows the assembled arm, in sectional view, with the valve opened by the striker, or opening step, resulting in shooting,
> Figure 4: Shows in detail the control assembly during the opening step.

DESCRIPTION OF THE INVENTION

[0009] Particularly referring to the above-mentioned figures, a longitudinal section of the casing of a pre-compressed air gun is indicated as a whole at 1; the pistol portion corresponding to the handgrip, whereas the gun barrel disposed, as known, on the opposite side with respect to the handle, is indicated at 2.
[0010] Barrel 2, disposed along axis AA, is hollow and extends forwardly following a perfectly linear path, suitable for allowing ejection of bullet 3 loaded therein.
[0011] Three seats and/or connections are also formed in gun casing 1, denoted by references 4, 6 and 7:
[0012] An open seat 4, formed above the casing, is placed adjacent barrel 2 and is suitable for receiving a corresponding control assembly 5 described hereinafter, functioning to release air, or gas, sufficient for firing,
[0013] An internal duct, indicated at 6, which communicates, and therefore delivers pre-compressed air, or gas, from a reservoir 18 to control assembly 5, where a suitable valve 12, housed in a seat 5C, regulates the gas output as specified more in detail in the following,
[0014] A seat 7, that is a housing suitable for receiving a striker 8 which can slide along the interior thereof; Sliding movement is activated following release of trigger mechanism 9 of the gun and of a spring 10 having an

adjusting screw 11 on a striker 8 side. As illustrated in figure 2, striker 8 is slidable within seat 7 disposed with axis BB substantially parallel to axis AA of barrel 2.

[0015] Both said duct 6 and seat 7 communicate with seat 4, and thus with control assembly 5: reference character 6A and 7A designate communication mouths thereof.

[0016] Two seals and a metal ring are placed in proximity of said mouths:

> First airtight or gastight seal is indicated at 5B and is disposed on assembly 5 at mouth 7A,
> Second seal is indicated at 6B and is placed at mouth 6A The metal ring is indicated at 7B and is housed within mouth 7A; ring 7B is intended to act as fulcrum, that is an oscillation point for a pivot or means 13, described later.

[0017] Although the aforesaid mouths 6A and 7A are in communication with control assembly 5, more precisely in communication with its cavity 5C, it has to be noted that the same are never in communication with one another, due to the interruption provided by seal 5B and associated pivot 13.

[0018] Further, a slider 12 is axially slidable within said cavity 5C; cavity 5C is coaxial with axis AA of barrel 2, and thus slider 12 as well.

[0019] The above reduces load losses that would occur if said valve was placed in a different position as it is common practice at present. In addition, coaxial positioning in proximity of barrel 2 allows for saving a considerable amount of air which must be available for firing.

[0020] In other words, slider 12 acts as a valve for an outlet hole communicating with barrel 2, said hole, which is indicated at 14A in the figures, forms part of an O-ring 14, for which a corresponding seat is (preferably) formed within assembly 5, as indicated by reference 5A. Slider or valve 12 is normally urged against ring 14 by a spring 15 suitably adjusted. Then, under non-operative conditions, incoming gas from duct 6 is not able to open slider/valve 12 due to the presence of spring 15; slider 12 includes at least a longitudinal hole or passage, carrying and distributing the gas pressure on both sides of slider 12, so as to eliminate a possible thrust effect towards the spring, that is, opening of hole 14A. In the following, the gun, with assembly 5 fitted in seat 4 of casing 1, will be described.

[0021] Seal 5B on assembly 5 prevents pressurized air or gas from leaking through communicating seat 7 and seal 5B is situated adjacent and above metal ring 7B.

[0022] Slider 12 is received in seat 5C.

[0023] Slider 12, urged against ring 14 by its spring 15, has a cavity 12A at mouth 7A, into which the aforesaid pivot 13 is inserted.

[0024] Pivot 13 extends outwardly from mouth 13 about half of its length, and is inserted in cavity 12A, whereas the other half is received in seat 7.

[0025] Pivot 13 is transversely disposed with respect to axes AA and BB and, approximately at the center line thereof, is held by metal ring 7B; in order to facilitate rocking motion, means 13 is supported by evolving means 16, specifically a ball, disposed within seat 7.

[0026] Pivot 13 is controllable for oscillation by striker 8 and slider 12, or more precisely, by its return spring indicated at 15 in the figures, which goes into action only once the energy of the striker is depleted (water hammer).

[0027] Hereinafter, operation of the gun thus fabricated is described.

[0028] Acting on mechanism 9, striker 8 is released and urged by its spring 10 toward pivot 13, causing the lower half of means 13 to advance, and, then, the upper half to go backwards; said rocking motion moves back slider 12, and passage 14A is opened and gas, or air, which was held within control assembly 5, can escape.

Claims

1. Pre-compressed air or gas arm, comprised of a casing (1) and a barrel (2) comprising a valve (12), which controls pre-compressed gas or air outflow from barrel (2), which is slidable and coaxial with axis (AA) of said barrel (2); said valve (12) being operable to open by rocking means (13) through actuation of a striker (8); said striker, in turn, sliding in a seat (7) having an axis (BB) parallel to axis (AA) of barrel (2), **characterized in that** a portion of rocking means (13) is housed in a cavity (12A) of slider (12), whereas the other end of said means (13) is received in the subjacent seat (7), so that said means (13) is transversely disposed with respect to axes (AA) and (BB) and allowing for oscillation by means of a metal ring (7B) housed in proximity of a mouth (7A) of seat (7) and arranged substantially along the center line of said means (13); said rocking motion being controllable in both directions by striker (8) and by slider (12), respectively.

2. Arm according to claim 1, **characterized in that** a control assembly is housed in a first seat (4), formed above casing (1) and adjacent to barrel (2), within which control assembly (5), including slider or valve (12), is inserted.

3. Arm according to claim 1 or 2, **characterized in that** a duct (6), to deliver pre-compressed air or gas therein, and a seat (7), for receiving striker (8) and associated spring (10) acting on a striker side, are connected to said group (5); seat (7) and duct (6) are both in communication with control assembly (5) through respective outlet mouths (6A) and (7A) and respective seal gaskets (6B) and (5B).

4. Arm according to claim 2, **characterized in that** said metal ring (7B) and said seal (5B) are adjacent.

5. Arm according to any of the preceding claims, **characterized in that** means (13) are supported on evolving means (16), specifically, a ball.

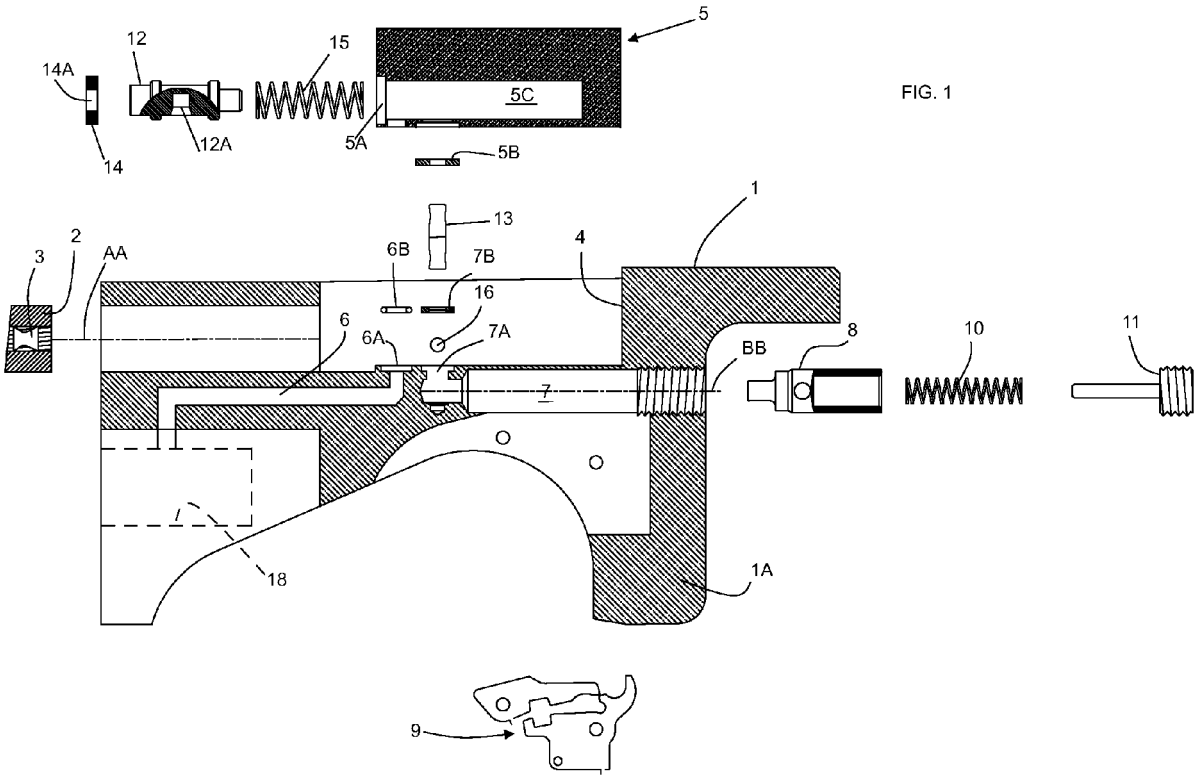

5
12
15
14A
5C
12A
5A
5B
14
1
13
2
AA
6B
7B
4
3
16
6
6A
7A
BB
8
10
11
7
18
1A
9

FIG. 1

FIG. 2

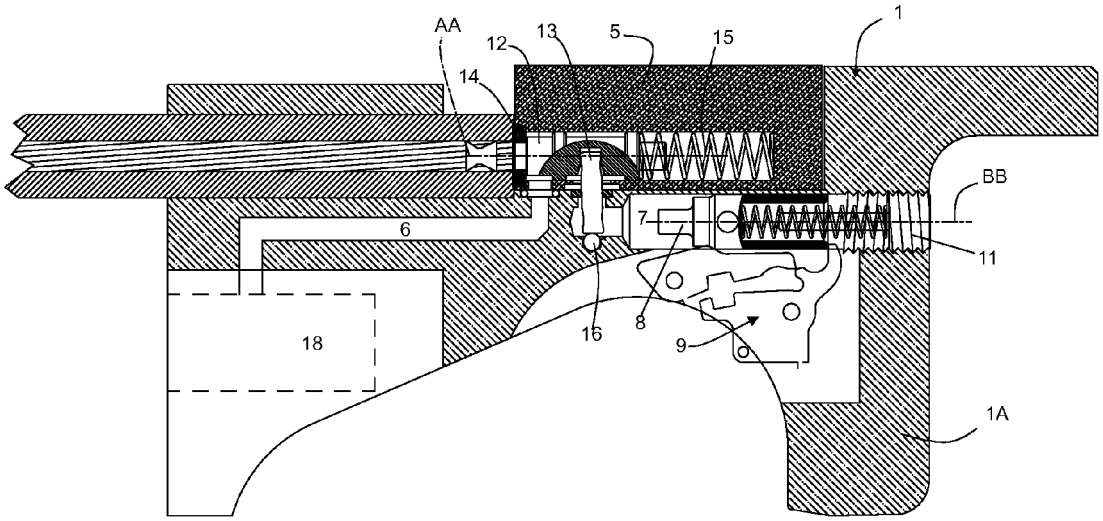


FIG. 3

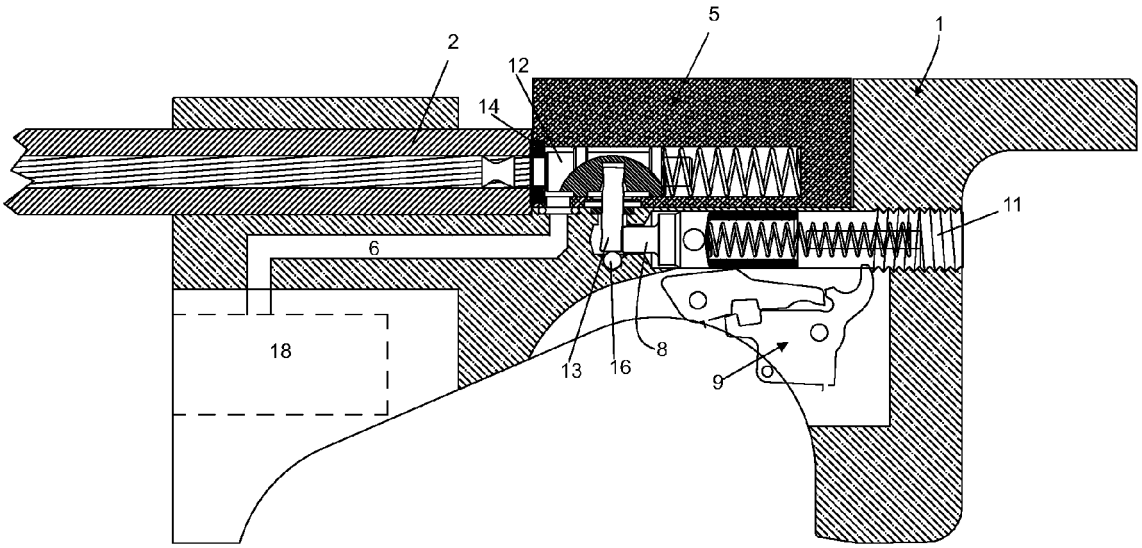
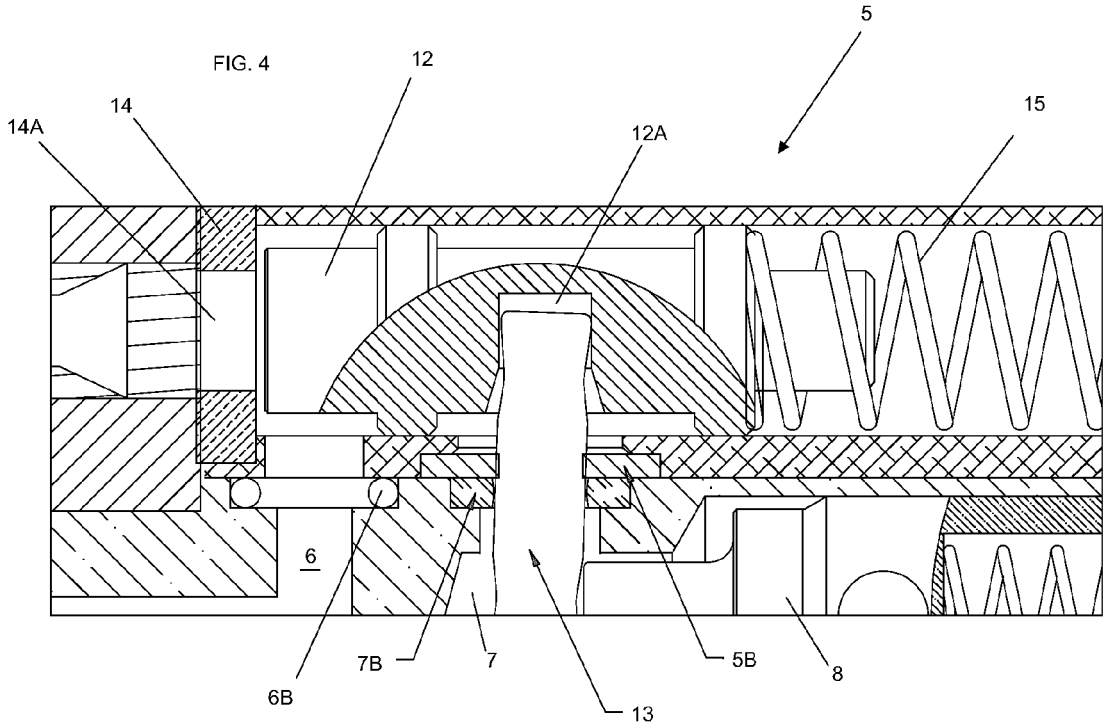


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 7709

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 1 506 995 A (WILLIAM PAUL) 2 September 1924 (1924-09-02) * page 1, line 100 - page 3, line 40; claim 1; figures 1,2,5,7 * -----	1,2,5	INV. F41B11/72
A	US 3 199 501 A (JAKOB BERTSCHINGER) 10 August 1965 (1965-08-10) * column 2, line 1 - column 3, line 36; claim 1; figure 1 * -----	1-3,5	
A	US 2 293 957 A (WELLS WILLIAM S) 25 August 1942 (1942-08-25) * page 1, line 29 - page 2, line 38; figure 1 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC) F41B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	2 April 2013	Beaufumé, Cédric

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 19 7709

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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02-04-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 1506995 A	02-09-1924	NONE	
US 3199501 A	10-08-1965	CH 377685 A	15-05-1964
		US 3199501 A	10-08-1965
US 2293957 A	25-08-1942	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 3199501 A **[0003]**
- US 1506995 A **[0003]**