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(54) **Compressed gas rifle**

(57) The invention is a new gas rifle comprising a compressed gas tank (S) and a trigger-operated mechanism (M) for the sampling of the compressed gas volume let out of the tank (S) and for the introduction of said partialized gas volume into the rifle barrel (C). The

mechanism (M) comprises an internal cylinder (M1) having two series of radial holes (M1a) and (M1b), an external cylinder (M2) sliding on said internal cylinder (M1) having on its inner surface an annular chamber (M2a) positioned between the two series of holes (M1a) and (M1b).

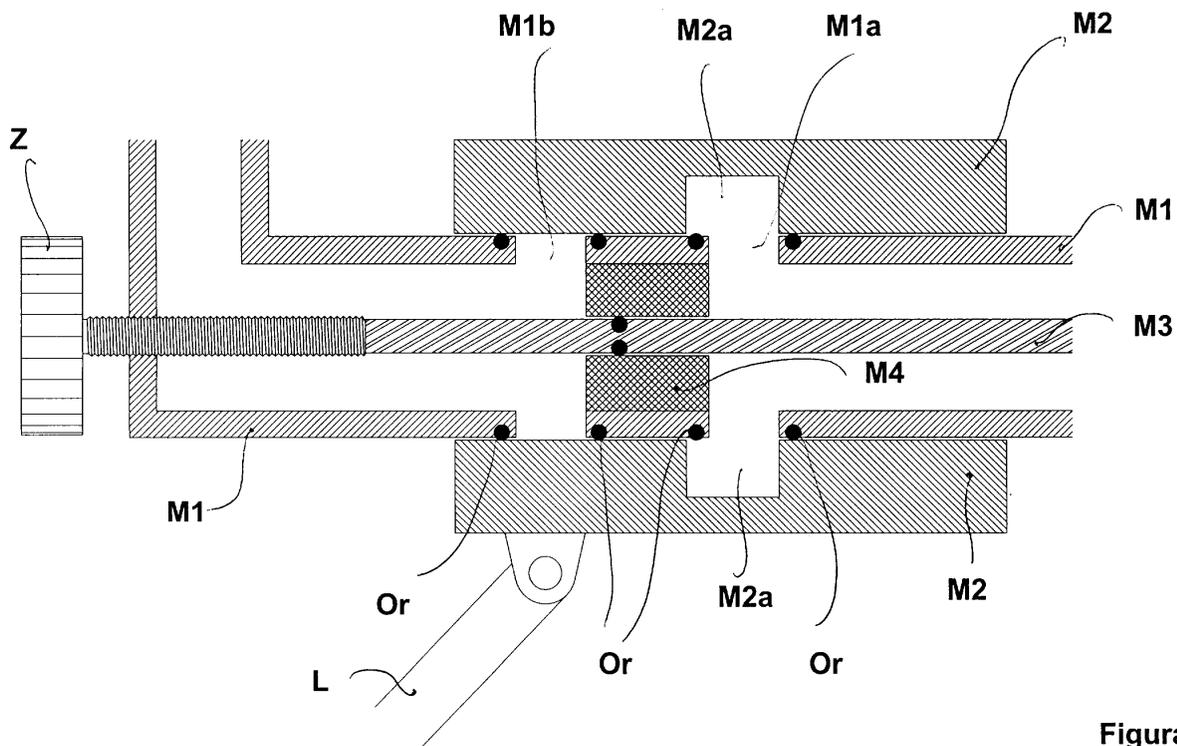


Figura 2

Description

[0001] The present invention concerns rifles and in particular it concerns a new compressed gas rifle.

[0002] In the known weapons percussion shells are used, which are constituted by a projectile inserted into a case containing the blasting charge and having a priming capsule on the bottom.

[0003] In the known types of weapons a percussion pin, controlled by a trigger, strikes the priming capsule that starts the explosion of the blasting charge. The gas generated by the explosion of the charge expands and launches the projectile along the barrel of the rifle.

[0004] The known rifles with blasting projectiles present a series of drawbacks.

[0005] Each shot is an explosion near the head of the marksman, which also provokes a strong and intense noise near the his ears. Antinoise headsets are often used, which however reduce hearing during pauses and are rather uncomfortable.

[0006] In order to overcome all the drawbacks mentioned above, a new type of compressed gas rifle has been designed and implemented.

[0007] One of the aims of the new rifle is to reduce the noise generated by each shot.

[0008] Another aim of the new rifle is to eliminate the empty cases that are left after the various shots.

[0009] A further aim of the new rifle is to limit the quantity of compressed gas used.

[0010] These and other direct and complementary aims are achieved through the implementation of the new compressed gas rifle equipped with a compressed gas tank and comprising a special mechanism for the partialization of the volume of compressed gas let out of the tank and introduced in the rifle barrel.

[0011] A special connection joins said mechanism to the rifle barrel.

[0012] The characteristics of the new compressed gas rifle will be highlighted in greater detail by the following description of one among many possible applications of the invention, with reference to the attached drawings.

[0013] Figure 1 shows a side view of the new rifle, wherein, for clarity's sake, the butt (F) is indicated by a broken line.

[0014] The new rifle comprises a compressed gas tank (S), a mechanism (M) for the partialization of the volume of compressed gas let out of the tank (S) and the introduction of said gas volume into the rifle barrel (C), as well as a connection (R) joining said mechanism (M) to the rifle barrel (C).

[0015] The mechanism (M) is connected to the rifle trigger (G) directly or through levers (L).

[0016] The compressed gas tank (S) is constituted by a small cylinder full of pressurized gas, preferably carbon dioxide. This tank (S) is equipped with an automatic valve in correspondence with its coupling, said valve being suitable for preventing any gas leakage. Said valve

can be opened only by pushing it towards the inside of the tank (S).

[0017] The compressed gas tank (S) is connected or applied directly to the mechanism (M), which, in its turn, is joined to the barrel (C) of the rifle by means of a connection (R).

[0018] Figure 2 shows a cross section of the mechanism (M), while Figures 3a, 3b, 3c, 3d show the various operating phases of the mechanism (M) in sequence.

[0019] The mechanism (M) mainly comprises an internal cylinder (M1), on which an external cylinder (M2) slides, having a rod (M3) and a drilled wall (M4) on its inside.

[0020] The internal cylinder (M1) comprises a tube having two series of radial holes (M1a, M1b) in its wall. The external cylinder (M2) comprises a tube suitable for sliding on the outer surface of the internal cylinder (M1).

[0021] The inner surface of said external cylinder (M2) is provided with an annular chamber (M2a) with size in the same order of magnitude as the size of each hole in the series of holes (M1a) and (M1b) of the internal cylinder (M1). Substantially, the chamber (M2a) communicates only with one series of holes (M1a) and (M1b) of the internal cylinder (M1), never with both at the same time.

[0022] Suitable gaskets (OR) ensure the required tightness between the external cylinder (M2) and the internal cylinder (M1).

[0023] The drilled wall (M4) is constituted by a circular, tight wall having on its circular surface a thorough hole (M4a) suitable for housing the rod (M3) with precision.

[0024] Said drilled wall (M4) is fixed inside the internal cylinder (M1) between the two series of holes (M1a) and (M1b) of the internal cylinder (M1).

[0025] The rod (M3) is coaxial with the internal cylinder (M1) and passes through the hole (M4a) of the drilled wall (M4).

[0026] Said rod (M3) extends from the coupling of the gas tank (S) to the outside of the mechanism (M) and comes out of the connection (R). In correspondence with the connection (R), the end of the rod (M3) is threaded and screwed onto the connection (R) and is equipped with a grip (Z), so that the rod can be moved coaxially with the internal cylinder (M1).

[0027] Suitable gaskets (OR) positioned on the rod (M3) ensure the required tightness in correspondence with the drilled wall (M4).

[0028] The mechanism (M) constituted as described above is applied between the compressed gas tank (S) and the connection (R), the latter being joined to the projectile store (P) and the rifle barrel (C), together with an elastic element (E), typically a spring, suitable for pushing the external cylinder (M2) towards the compressed gas tank (S).

[0029] At the beginning (Fig. 3a), the rod (M3) is in safety position and in this position it is also possible to change the tank (S). The rotation of the knob (Z) makes the rod (M3) advance and its end opposite the knob

reaches and opens the valve of the tank (S), thus allowing the gas to reach the inside of the mechanism (M), while the gaskets (OR) fit in the hole in the wall (M4) (Fig. 3b).

[0030] In normal position, with the external cylinder (M2) pushed towards the compressed gas tank (S) by the elastic element (E), the gas reaches the internal cylinder (M1) of the mechanism (M), passes through the first series of holes (M1a) of the internal cylinder (M1) and fills the annular chamber (M2a) of the external cylinder.

[0031] The gas cannot be let out of the chamber (M2a) towards the barrel (C), since the external cylinder (M2) occludes the second series of holes (M1b) of the internal cylinder (M1) (Figures 2, 3a, 3b).

[0032] When the trigger (G) of the rifle is pulled, the levers (L) make the external cylinder (M2) (Fig. 3c) slide until its annular chamber (M2a) is in correspondence with the second series of holes (M1b) of the internal cylinder (M1) and therefore in communication with the barrel (C) of the rifle (Fig. 3d). The compressed gas contained in the chamber (M2a) of the external cylinder (M2) flows through the connection (R) into the barrel (C) and launches the projectile.

[0033] When the trigger (G) is released, the action of the elastic element (E) brings the external cylinder (M2) back to its original position, so that a further quantity of compressed gas is stored in the chamber (M2a) of the external cylinder (M2).

[0034] If it is necessary to remove the gas tank (S), it is sufficient to unscrew the rod (M3), so that its end closes the valve of the tank (S) and to disconnect the tank (S) itself. The backward movement of the rod (M3) brings the gaskets (M3a) beyond the drilled wall (M4), thus allowing the gas still present inside the mechanism (M) to flow towards the barrel (C) with considerably reduced pressure.

[0035] Therefore, with reference to the above description and the enclosed drawings, the following claims are put forth.

Claims

1. Gas rifle comprising a compressed gas tank (S), **characterized in that** it is provided with a mechanism (M) for the partialization of the gas volume let out of the tank (S) and for the introduction of said partialized gas volume into the rifle barrel (C), and wherein said mechanism (M) is operated by the trigger (G) of the rifle.
2. Compressed gas rifle according to claim 1, **characterized in that** the mechanism (M) comprises an internal cylinder (M1) with two series of radial holes (M1a) and (M1b), an external cylinder (M2) sliding on said internal cylinder (M1) and having an annular chamber (M2a) on its inner surface, a rod (M3) and

a drilled wall (M4) positioned inside the internal cylinder (M1), and wherein said drilled wall (M4) is positioned between the two series of holes (M1a) and (M1b), and wherein said rod (M3) passes through the hole (M4a) of the drilled wall (M4).

3. Compressed gas rifle according to claims 1, 2, **characterized in that** the length of the holes belonging to the two series (M1a) and (M1b) of the internal cylinder (M1) is shorter than the distance between said two series of holes (M1a) and (M1b), and wherein the width of the annular chamber (M2a) inside the external cylinder (M2) is equal to the width of the holes (M1a) and (M1b) of the internal cylinder (M1).
4. Compressed gas rifle according to claims 1, 2, 3, **characterized in that** an elastic element (E) pushes the external cylinder (M2) towards the gas tank (S), so that in the initial phase the annular chamber (M2a) of the external cylinder (M2) is in correspondence with the series of holes (M1a) of the internal cylinder (M1) that are nearest to the tank (S).
5. Compressed gas rifle according to claims 1, 2, 3, 4, 5, **characterized in that** the trigger (G) of the rifle controls the sliding of the external cylinder (M2), in such a way as to bring the annular chamber (M2a) of the internal cylinder from the position in correspondence with the series of holes (M1a) of the internal cylinder (M1) to the position in correspondence with the series of holes (M1b) that are furthest from the tank (S) and in communication with the barrel (C).

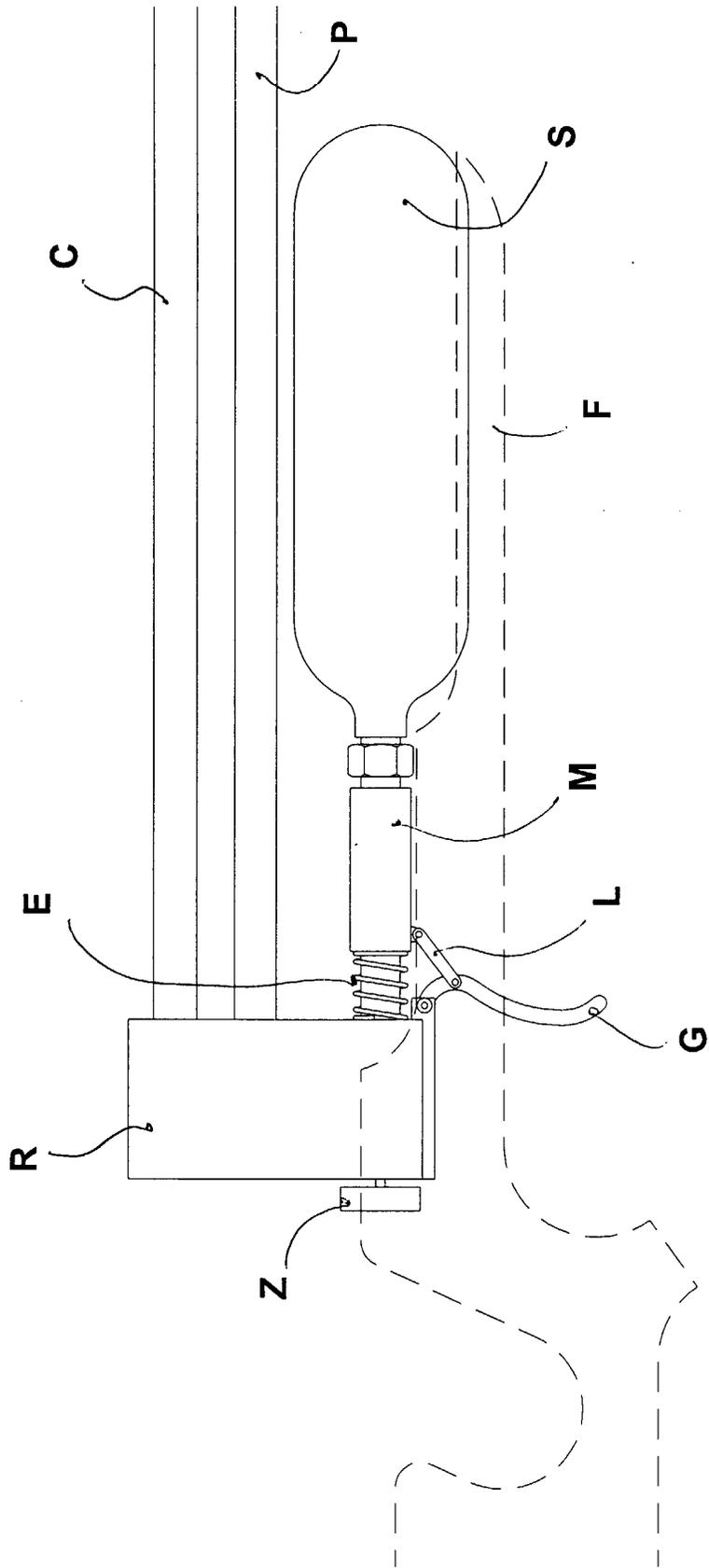


Figura 1

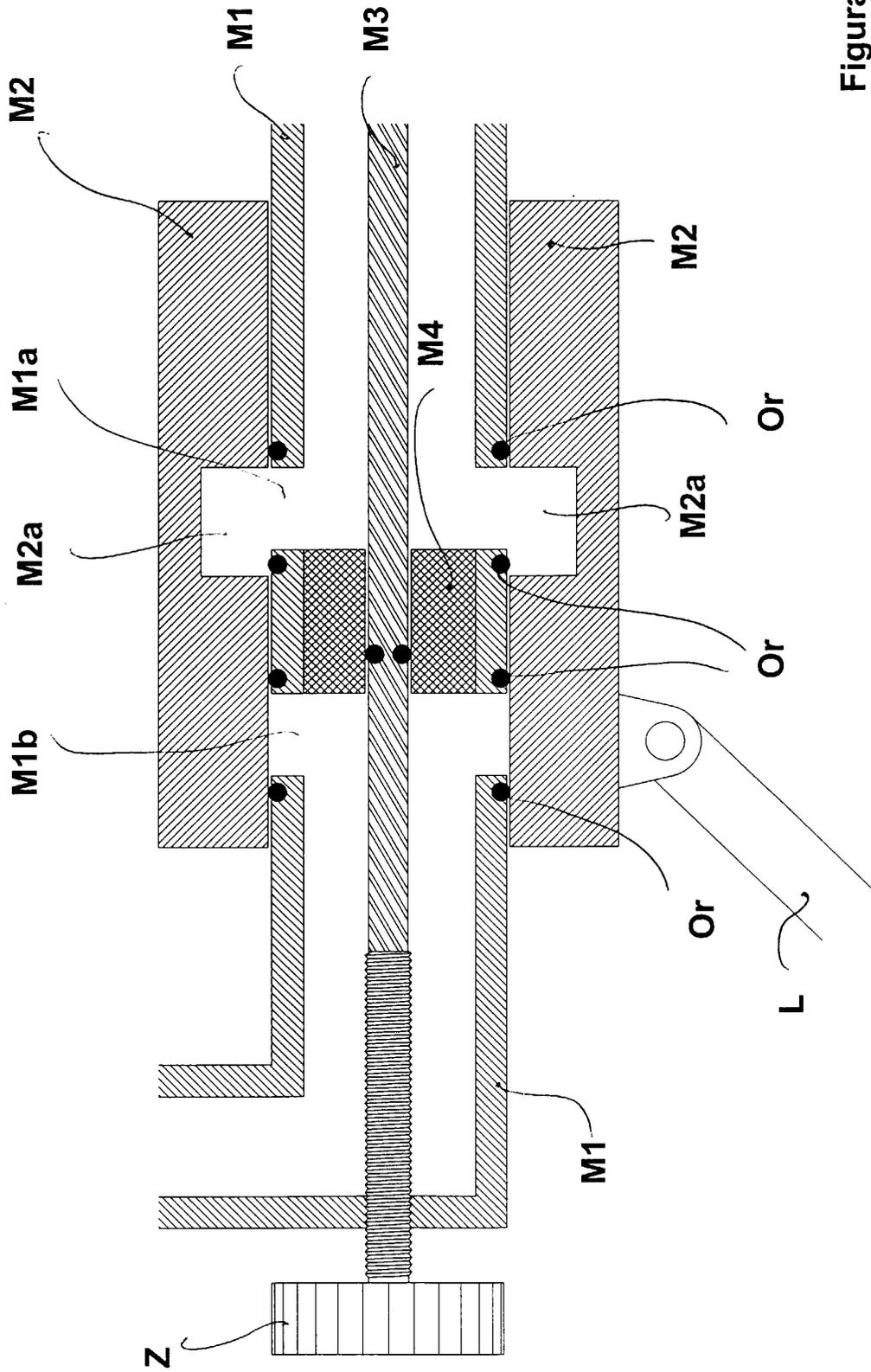


Figura 2

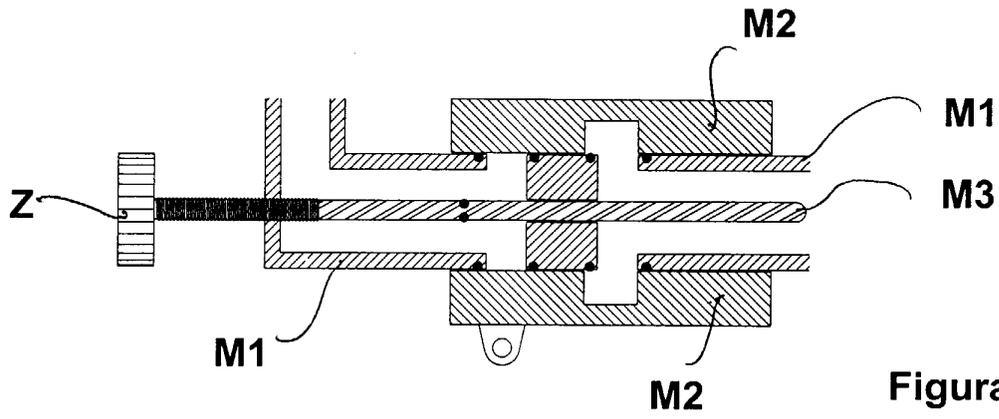


Figura 3a

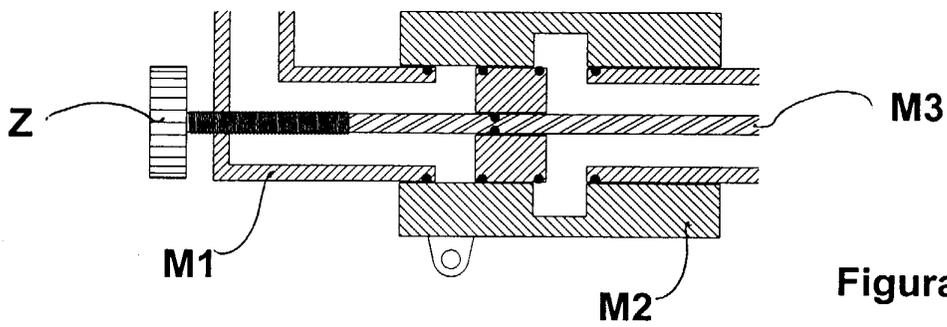


Figura 3b

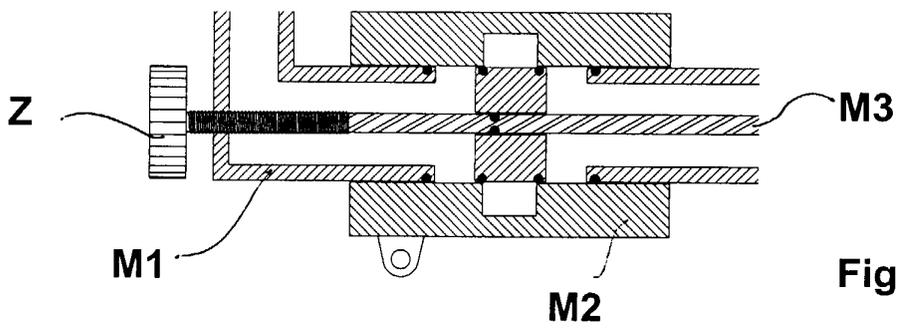


Figura 3c

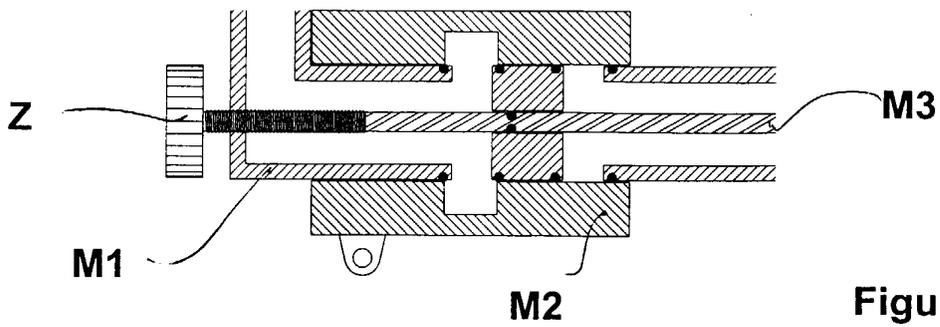


Figura 3d



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 01 0525

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.7)
X	WO 98 13660 A (VIVIANI) 2 April 1998 (1998-04-02)	1	F41B11/06
A	* abstract * * page 11, line 6 - page 12, line 2 * * page 13, line 2 - line 4 * * page 14, line 5 - line 20 * * figures 2-4 *	2-5	

X	US 4 770 153 A (EDELMAN) 13 September 1988 (1988-09-13)	1	
A	* abstract * * column 5, line 25 - column 6, line 21 * * column 7, line 4 * * column 7, line 38 - line 64 * * column 8, line 33 - line 40 * * figures 4,5 *	2-5	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 August 2003	Examiner Menier, R
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	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 01 0525

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08-08-2003

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