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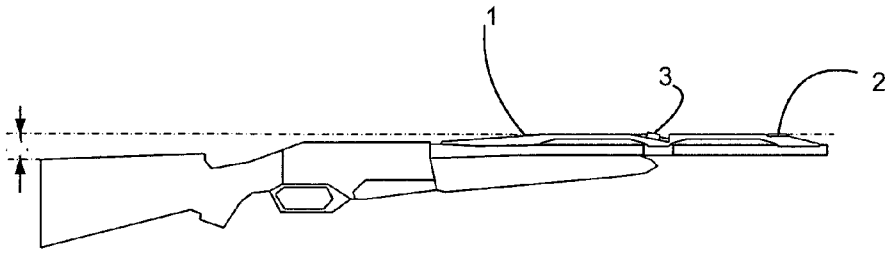

Fig. 1

(57) Abstract: Tracking system for firearms such as guns or the like, comprising at least two luminous sights (2,3) which comprise optic fiber means (202,203,205) provided with appropriately powered lighting means, said luminous (2, 3) sights being arranged on the barrel of the firearm, both of them being positioned on a suitable support (1), said luminous sights (2,3) comprising a first sight (2) arranged near the mouth of the barrel of the firearm, and a second sight (3) arranged along said barrel at a distance from said first sight which is substantially equal to a third of the length of said barrel.

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TITLE

Tracking system for firearms

DESCRIPTION

The present invention relates to tracking systems for firearms, and especially to luminous tracking systems using optic fibres.

Existing tracking systems use luminous sights composed of optic fibres, which are illuminated using either ambient light or, when this is insufficient, artificial light provided by a lighting element powered by a battery.

An example of such devices is described in the document US2002/157298A1, in which is contemplated a tracking system including a window capable of directing the ambient light, an artificial light source, a target screen, and a fibre optic device that transmits the light from the window or from the source to the target screen, the optic fibre appearing as a luminous spot. An embodiment described in the patent includes a front and a rear sight.

A system of this type has a number of drawbacks.

Firstly, it does not address the problem regarding the positioning of the front sight in relation to the barrel of the gun, i.e. whether there is a more suitable position in relation to the plane tangent to the barrel perpendicular to the firearm's longitudinal median plane.

Another aspect that has not been considered is that relating to the mutual positioning of the two sights, where present. Generally, the presence of a front sight and a rear sight is shown, without establishing a distance value between them and without allowing a reasonable distance of the tracking system from the shooter's eye.

In addition, very little emphasis is given to the means of activating the lighting means, relying on the long life of both the battery and the light sources in the case of Light Emitting Diodes (LEDs).

In actual fact, it would be preferable for the user to be able to have more control.

The aim of the present invention is to provide a tracking system for firearms comprising luminous sights that is capable of overcoming the drawbacks of known types of devices, ensuring the possibility of obtaining ever more effective results with a simple and modular structure.

Therefore, the object of the present invention is a tracking system for firearms such as guns or the like, comprising at least two luminous sights which comprise optic fibre means provided with appropriately powered lighting means, said luminous sights being arranged on the barrel of the firearm, both of them being positioned on a suitable support, said luminous sights comprising a first sight arranged near the mouth of the barrel of the firearm, and a second sight arranged along said barrel at a distance from said first sight which is substantially equal to a third of the length of said barrel.

Advantageously, said first and said second sights are arranged on a support that can be connected to said barrel of the firearm, and in which said sights lie in a plane parallel to the plane tangent to the barrel of the firearm and perpendicular to the longitudinal median plane of the firearm; preferably, this plane is at a given distance from the end of the butt of the firearm facing towards the top portion of the firearm.

This distance is in the order of 40 to 90 mm, and preferably in the order of 65 mm.

Said support includes an element substantially formed as a rib connected to said barrel at two or more points.

Advantageously, said second sight is movably mounted on an inclined plane in relation to the supporting plane established by said rib.

Furthermore, the said second sight may be movable in a direction perpendicular to the axis of the barrel of said firearm.

In a preferred embodiment, said lighting means are provided with activation means arranged on the grip of the firearm, for easy access and control by the shooter and adaptable either to right-handed shooters or to left-handed shooters.

Said system is applied instead of the original sights, without altering the characteristics and structure of the firearm, and can be fitted and removed an infinite number of times.

Further advantages and features of the device according to the present invention will emerge from the following description of an embodiment thereof, provided by way of a non-limiting example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of the firearm with the tracking system according to the present invention;

Figure 2 is an enlarged side view of the tracking system shown in Figure 1;

Figure 3a is a side view of the end portion of the rib;

Figure 3b is a sectional view, taken along the vertical plane of Figure 3a.

Figure 4 is a sectional side view of the attachment system of the luminous sight to the end portion of the rib in a first embodiment;

Figure 5a is a sectional side view of the attachment system of the luminous sight to the end portion of the rib in a second embodiment;

Figure 5b is a sectional view, taken along the vertical plane of Figure 5a.

Figure 6a is a side view of the sight arranged in the central part of the rib;

Figure 6b is a sectional view, taken along the vertical plane of Figure 6a;

Figure 7 shows an alternative embodiment, where the sight can be adjusted in relation to a direction perpendicular to the longitudinal median plane of the firearm;

Figure 8 is a side view of the tracking system with a third embodiment of the attachment system of the rib;

Figure 9 shows the various devices that can be mounted on the firearm using the attachment system of Fig. 8;

Figure 10 is a sectional side view of the attachment system of the luminous sight to the end portion of the rib with the attachment system of the third embodiment;

Figure 11 is a sectional side view of the assembled system shown in Figure 10;

Figure 12a is a side view of the system;

Figure 12b is a side view of the system;

Figure 13a represents a detail of the attachment system shown in Fig. 10;

Figure 13b represents the attachment system shown in Fig. 13a in the closed configuration;

Figure 14a represents the locking system shown in Fig.10 in the open configuration;

Figure 14b represents the locking system shown in Fig. 10 in the closed configuration;

Figure 15a represents a detail of the attachment system shown in Fig. 10 in the open configuration;

Figure 15b represents the locking system shown in Fig 15a in the closed configuration.

Figure 1 represents a side view of a firearm fitted with the tracking system according to the present invention. The rib 1 is fixed to the barrel of the firearm and already has the luminous sights 2 and 3 mounted on it and said sights lie in a plane parallel to the plane tangent to the barrel of the firearm and perpendicular to the longitudinal median plane of the firearm.

The luminous sight 3 is located in the middle of the rib 1 on a plane inclined in relation to the supporting plane established by the first rib, while the luminous sight 2 is positioned at the end portion of the first rib 1, near the outlet of the barrel.

The tracking system according to the present invention therefore provides the shooter with a tracking system where the luminous sights 2 and 3 are already positioned on the rib 1 to ensure the best shooting conditions, as the

distances between the luminous sights 2 and 3 and between the luminous sights and the shooter's eye are such as not to put the sights out of focus or to hinder the shooter. In fact, the distances between luminous sight 3 and luminous sight 2 is substantially equal to one third of the barrel's length, to ensure the best shooting conditions.

Furthermore, the rib 1 is configured so that, once placed on the firearm, the plane in which the luminous sights 2 and 3 lie is at a distance, from the end of the butt facing towards the top portion of the firearm, in the order of 40 to 90 mm, and preferably in the order of 65 mm.

This means that the imaginary shooting line, that goes from the eye to the target passing through the luminous sights 2 and 3, is at a distance from the gun butt of between 40 and 90 mm, preferably about 65 mm, and this allows the shooter to find the right shooting line more easily, without lowering or raising to take aim, making tracking more immediate and rapid, especially in moving target conditions, which increases the speed of the shot.

Furthermore, the rib 1 has a non-reflecting opaque surface, so as to prevent the reflection of ambient light which could create glare and disturb the shooter when shooting.

The arrangement of luminous sights 2 and 3 located on the rib 1 creates a distance between luminous sight 3 and luminous sight 2 of substantially about one third of the barrel's length, thus ensuring the best shooting conditions.

Fig. 2 shows a side view of the tracking system, where the rib 1 is attached to the firearm barrel by attachment means 101. Said attachment means 101 are substantially screws, which are screwed into the pre-existing holes of the original sight lens; this allows the tracking system according to the present invention to be mounted on firearms without altering the characteristics and structure thereof and, also, the system can be fitted and removed an infinite number of times.

Fig. 3a shows a side view of the end portion of the rib 1. Note the luminous sight 2, placed inside a protective ring 102.

Said protective ring 102 protects the luminous sight 2 from any impact or collision, especially in environments such as forests or areas with low vegetation.

Note that the protective ring 102 has side openings to allow the ambient light to reach the optic fibre so as to illuminate it.

Fig. 3b represents a section taken along the vertical plane of the drawing shown in Fig. 3a, showing the optic fibre 202 which comprises the luminous sight 2 placed substantially in the middle of the rib. In this embodiment, the optic fibre 202 is substantially red in colour, but the colour of the fibre can be changed at will by the shooter.

Fig. 4 is a side view of the luminous sight placed in the end portion of the rib 1. In this embodiment, the luminous sight 2 is fixed to the rib and must be removed in order to be replaced.

Fig. 5a is a sectional side view of the attachment system of the luminous sight 2 to the rib 1 in a second embodiment. Note that the luminous sight 2, fixed on the rib 1, is secured by the spherical element 212 pressed by a spring.

Figure 5b is a sectional view, taken along the vertical plane of Figure 5a. Note that the luminous sight 2 is substantially shaped as an upturned "T" and the rib 1 has a seat to receive the luminous sight 2 which can then slide along the rib 1. On fitting, the luminous sight 2 is inserted into the seat of the rib 1 and pushed home; the fixing of the portions is ensured by the spherical element 212 which is pressed by the spring into a substantially hemispherical cavity formed in the base of the luminous sight 2, thereby locking said parts. Removal consists in sliding the luminous sight 2 off the rib 1.

Said attachment system allows the luminous sight 2 to be quickly fitted and removed, ensuring its rapid replacement; this facilitates the interchangeability of said luminous sight 2, which may be of different colours.

Figure 6a shows a side view of the middle portion of the rib 1 with the luminous sight 3.

This luminous sight 3 is placed on a plane inclined in relation to the supporting plane established by the rib 1, on a guide along which it can slide, and substantially comprises two optic fibres arranged parallel to each other, through the middle of which passes the imaginary shooting line, helping to confer direction and precision during tracking.

In fact, during tracking, the shooter aims through the luminous sight 2, and automatically centres the target thanks to the luminous sight 3 which provides a reference as to the position of said target, especially if it is moving.

The position of the luminous sight 3 can be adjusted and moved along the inclined guide through the graduated scale at its base; by moving it upwards, the shot is gradually raised, while by moving it downwards, the shot is gradually lowered.

The distance between luminous sight 3 and the eye is important because, if it is too small, the luminous sight is too close to the eye and this disturbs the shooter putting luminous sight 2 out of focus, whereas if it is too great, luminous sight 3 is too close to luminous sight 2 and loses its functionality.

The said distance between luminous sight 3 and luminous sight 2 is substantially about one third of the barrel's length, thus ensuring the best shooting conditions.

Fig. 6b shows a vertical section of the luminous sight 3 shown in Fig. 6a, including the two optic fibres 203 arranged parallel to each other, so that the shooting line passes through the middle of the two.

Fig. 7 shows an alternative embodiment, in which the sight 5 housing the fibre 205 is inserted into a guide 305 which allows the sight to be adjusted in relation to a direction perpendicular to the longitudinal median plane of the firearm.

Fig. 8 shows a second embodiment of the rib 1. Note that the rib 1 comprises two portions: portion 31, to which the luminous sight 3 is fixed, and portion 21, to which the luminous sight 2 is fixed. The connecting elements 111 are fixed into the pre-existing holes of the original sight lens by attachment means 101. The two portions that form the rib 1 are secured to these connecting elements 111 .

The flash suppressor 6, which can be fitted to the barrel of the firearm, is also shown.

Fig. 9 shows the various devices that can be mounted on the connecting element 111. Various optical devices can be connected to said connecting element 111 by means of a dovetail coupling, which enables such devices to be fitted and removed quickly. Device 151 is a universal connection that attaches to element 111 by means of a dovetail coupling, and on it the desired optical device can be fitted. In fact device 151 can accommodate the red dot system 161, the sight lens 171, and the laser tracking system 181 with flashlight.

Fig. 10 shows the attachment system of the luminous sight in a third embodiment. Note that the rib 1 is fixed to the firearm with a different attachment device. Said system includes a connecting element 111, which is fixed to the barrel of the firearm, by screwing the screws 101 into pre-existing holes. The rib 1 is then fixed onto the said connecting elements 111. The connection between the rib and the connecting elements 111 can generally be achieved by forming a dovetail groove in the rib, the connecting member 111 being formed by a complementary section.

Fig.12a shows a side view of the firearm with the rib 1 mounted. The manual control device 4, by which the shooter activates or deactivates the luminous sights 2 and 3, can be seen on the body of the firearm. Said manual control device 4 includes buttons 104, which when pressed close the electrical circuit that powers the LED lights that illuminate the optic fibre; on tracking, all the

shooter needs to do is press said buttons 104 to activate the tracking system according to the present invention.

The manual control device 4 can be positioned anywhere along the body of the firearm, preferably at grip height, either on the right- or left-hand side, making the tracking system according to the present invention suitable for both right- and left-handed shooters.

The figure also shows, by a dotted line, an image recording device 7, such as a video camera with a built-in memory, located near the said first sight 2, so as to record the shooting sequences.

The shooter will thus have a true recording of his performance, enabling him to assess his shooting skills and correct inaccurate shooting.

Also, this image recording device 7 can be positioned near the luminous sight 2, as mentioned above, as well as in an intermediate position between luminous sights 2 and 3, outside the shooting line.

Fig. 12b represents the fibre optic lighting system, comprising a power supply 114 for the LED light, substantially a battery, and a lighting means, substantially a LED light. This lighting system is located beneath each luminous sight, and is built into the rib 1.

Fig 13a is a detail of the attachment system shown in Fig. 10. Note that the rib 1 is fixed to the connecting element 111 by the locking element 121. This configuration enables the rib 1 to be removed, as the locking element 121 allows it to come out.

Fig. 13b is the attachment system shown in Fig.13a in the closed configuration. The locking element 121, rotated substantially through 180°, secures the rib 1 to the connecting element 111 via a connecting system.

Fig 14a represents the locking system shown in Fig. 10 in the open configuration.

Fig. 14b represents the locking system shown in Fig 14a in the closed configuration. Figs. 14a and 14b show how easily and quickly the rib 1 according to the present invention can be fitted and removed .

Fig 15a represents the locking system shown in Fig. 10 in the open configuration. Said locking system comprises a spring element 131 moving parallel to the plane of the section along a channel formed within the rib 1. In the open configuration shown in Fig 15a, said element 131 is pressed until the spring is compressed and the rib 1 can be slid off the connecting element 111.

Fig. 15b represents the attachment system shown in Fig 15a in the closed configuration. Note that in the closed position the spring presses against the element 131, pushing it out of its seat. This movement allows said element 131 to engage and secure the rib 1 to the connecting member 111.

The present invention advantageously provides a tracking system for firearms comprising luminous sights that are controlled manually by means of an activation device, suitable for both right- and left-handed shooters.

Said system is applied in place of the original sights, without altering the characteristics and structure of the firearm, and can be fitted and removed an infinite number of times.

The system according to the present invention provides the shooter with faster alignment and greater visibility, ensuring highly accurate and rapid shooting.

CLAIMS

1. Tracking system for firearms such as guns or the like, comprising at least two luminous sights which comprise optic fibre means provided with appropriately powered lighting means, said luminous sights being arranged on the barrel of the firearm, both of them being positioned on a suitable support, said luminous sights comprising a first sight arranged near the mouth of the barrel of the firearm, and a second sight arranged along said barrel at a distance from said first sight which is substantially equal to a third of the length of said barrel.

2. System according to claim 1, wherein said first and second sights are arranged on a support that can be connected to said barrel of the firearm, and in which said sights lie in a plane parallel to the plane tangent to the barrel of the firearm and perpendicular to the longitudinal median plane of the firearm.

3. System according to claim 2, wherein such plane in which said sights lie is at a given distance from the end of the butt of the firearm facing towards the top portion of the firearm.

4. System according to claim 3, wherein said distance is in the order of 40 to 90 mm, and preferably in the order of 65 mm.

5. System according to any one of the preceding claims 1 to 4, wherein said second sight is movably mounted on an inclined plane in relation to the plane of said support.

6. System according to any one of the preceding claims 1 to 4, wherein said second sight is movable in a direction perpendicular to the longitudinal median plane of the firearm.

7. System according to any one of the preceding claims 1 to 6, wherein said lighting means are provided with activation means arranged on the grip of the firearm, for easy access and control by the shooter and adaptable either to right-handed shooters or to left-handed shooters..

8. Tracking system for firearms according to any one of the preceding claims 1 to 7, wherein the luminous end sight (2) is arranged within a protective ring that has side openings to allow the ambient light to reach the optic fibre so as to illuminate it.

9. System according to any one of the preceding claims 1 to 8, wherein said support comprises an element which is substantially formed as a rib and connected to said barrel at two or more points.

10. Tracking system for firearms according to claim 9, wherein the rib (1) has a non-reflecting opaque surface and is attached to the barrel of the firearm by suitable attachment means (101).

11. Tracking system for firearms according to claim 1, wherein the rib (1) is fixed to the barrel of the firearm by a connecting element (111) which in turn is attached in the pre-existing holes in the barrel of the firearm by attachment means (101).

12. Tracking system for firearms according to claim 11, wherein the rib is detachably connected to the connecting element (111) by means of a locking element (121).

13. Tracking system for firearms according to claim 12, wherein when said locking element (121) is rotated substantially through 180°, it secures the rib (1) to the connecting element (111) via a connecting system (121).

14. Tracking system for firearms according to claim 12, wherein the system for securing the rib (1) to the connecting element (111) comprises a spring element (131) moving parallel to the plane of the section along a channel formed within the rib (1); this movement allows said element (131) to connect and secure the rib (1) to the connecting element (111).

15. Tracking system for firearms according to any one of the preceding claims 9 to 14, wherein the luminous end sight (2) is substantially shaped as an upturned "T" and the rib (1) has a seat to receive the luminous end sight (2); the fixing of the portions is assured by a spherical member (212) which is

pressed by a spring into a substantially hemispherical cavity formed in the base of the luminous end sight (2), thereby locking said parts.

16. Tracking system for firearms according to any one of the preceding claims 1 to 4, wherein the end portion of the rib (1), near the luminous end sight (2), has an image recording device (7), such as a video camera with a built-in memory, so as to frame the shooting zone and record the shooting sequences.

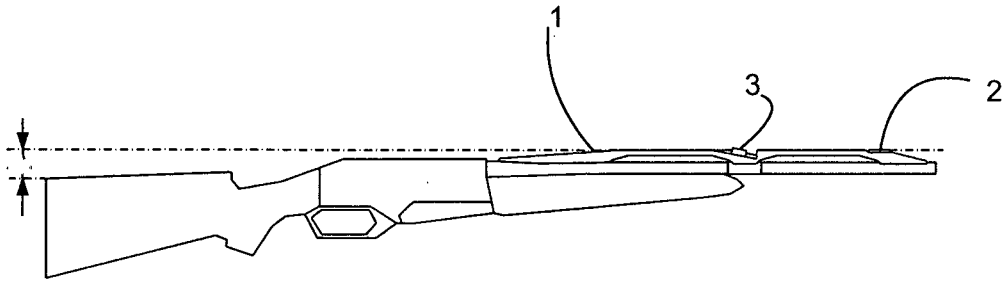


Fig. 1

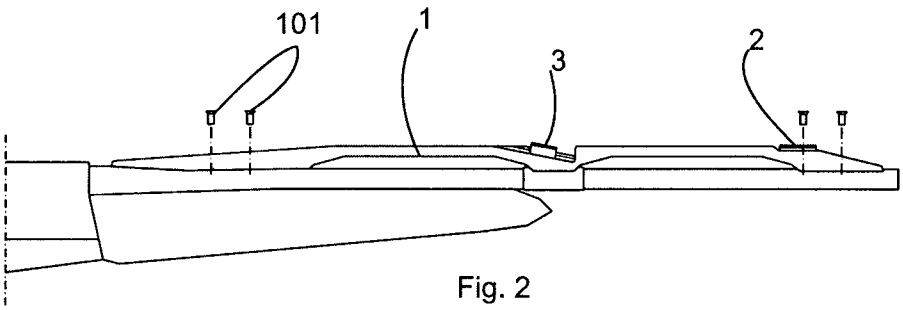


Fig. 2

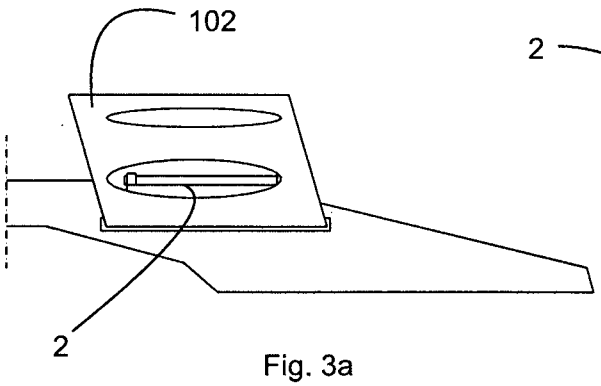


Fig. 3a

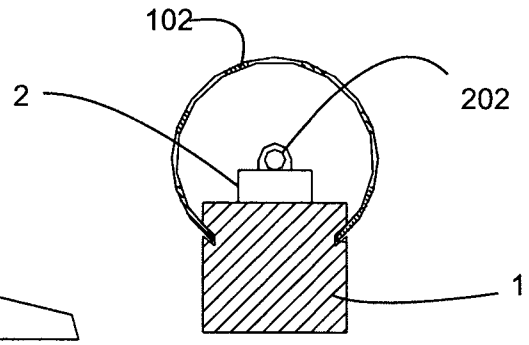
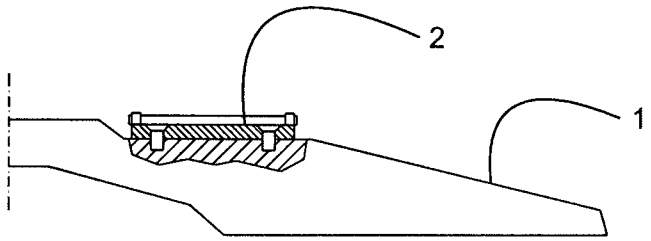


Fig. 3b

Fig.4



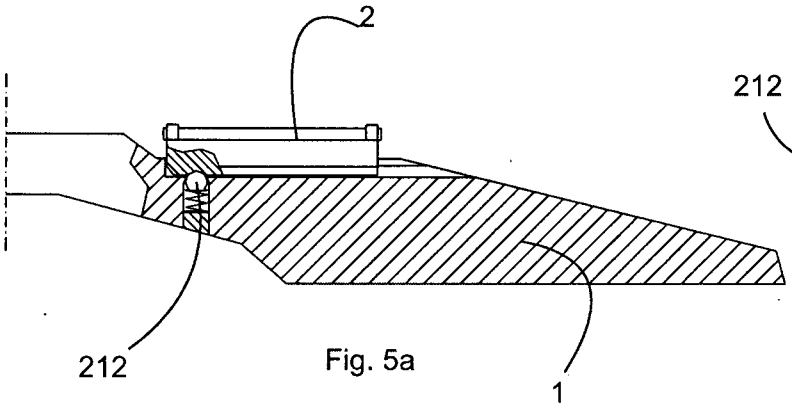


Fig. 5a

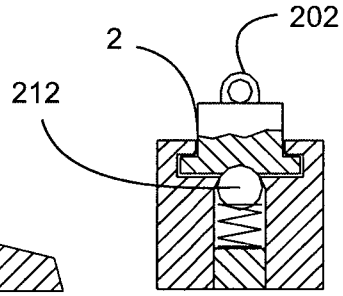


Fig. 5b

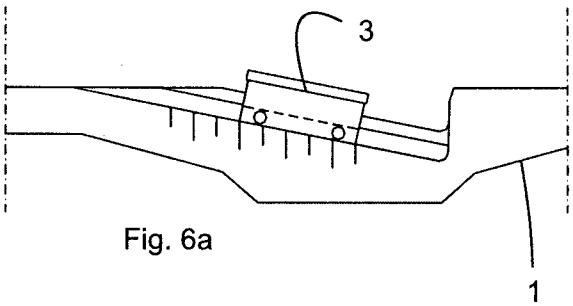


Fig. 6a

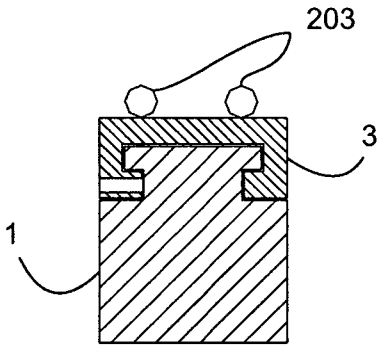


Fig. 6b

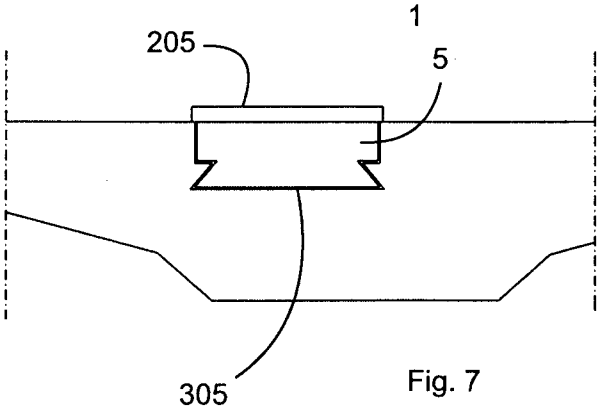


Fig. 7

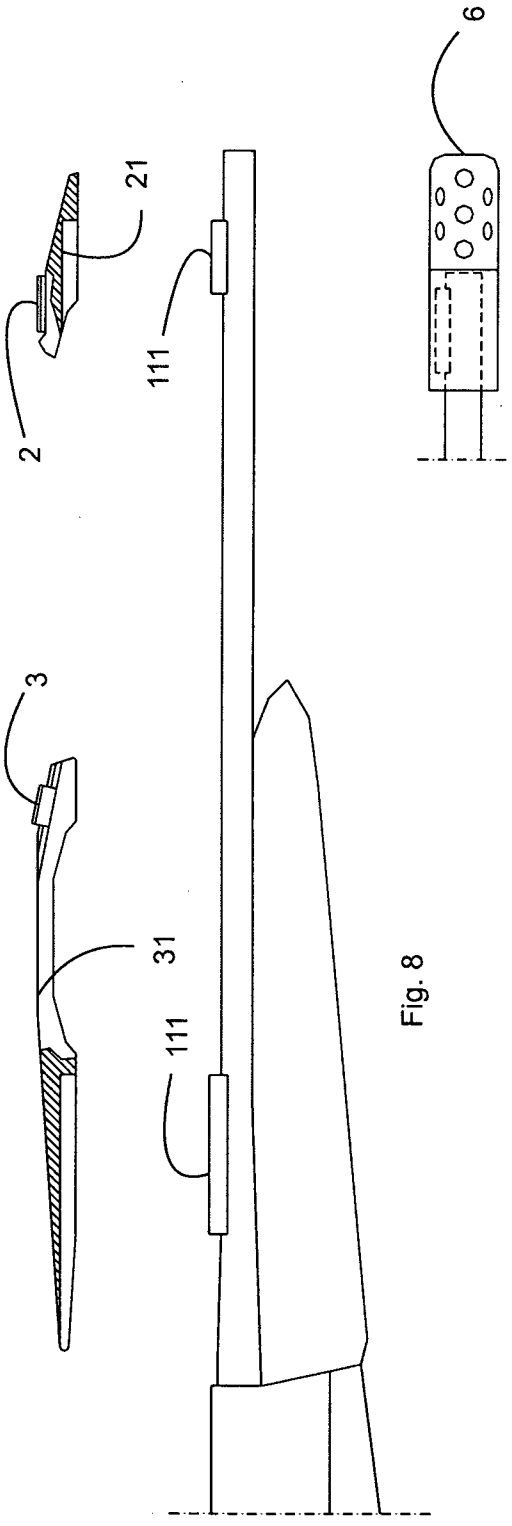


Fig. 8

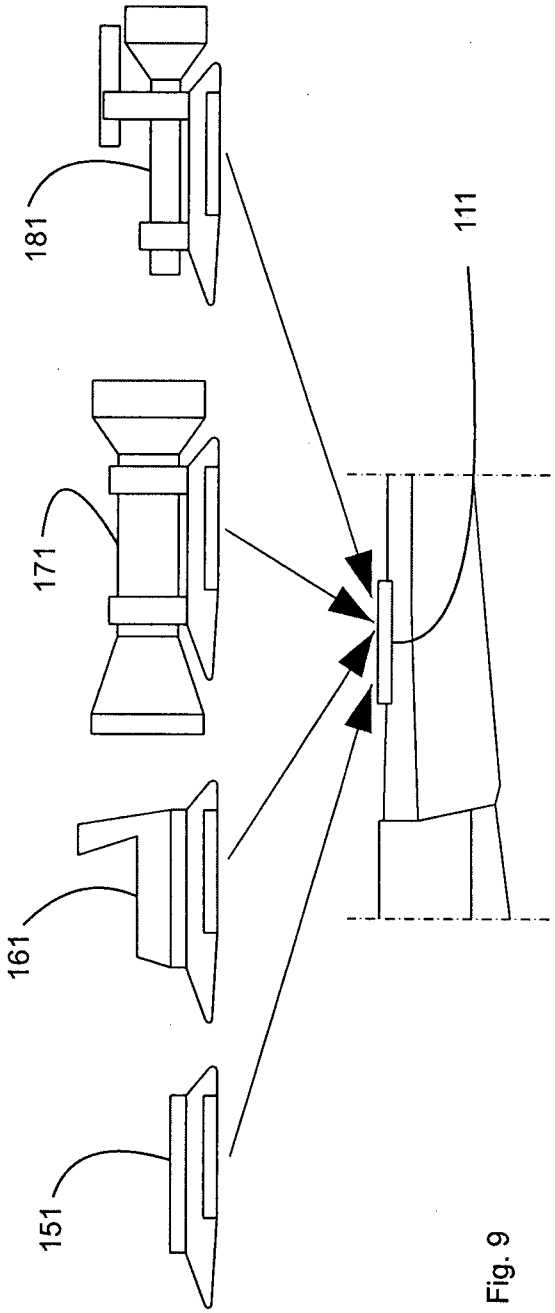


Fig. 9

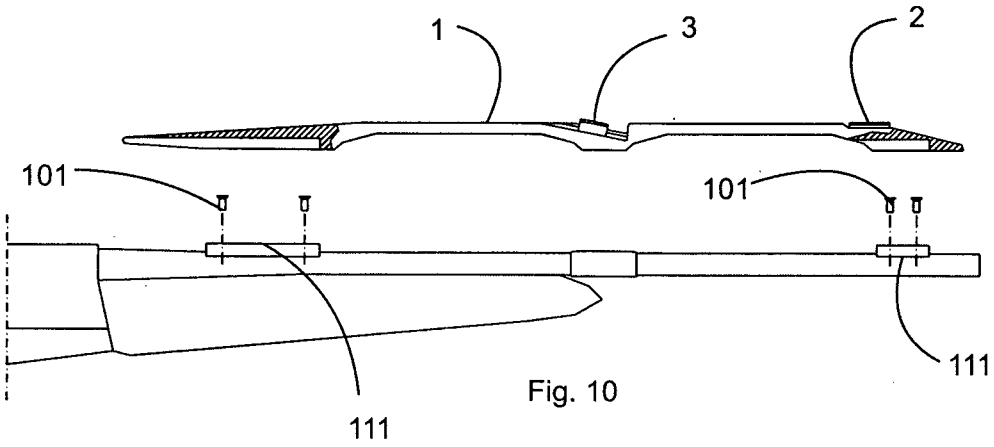


Fig. 10

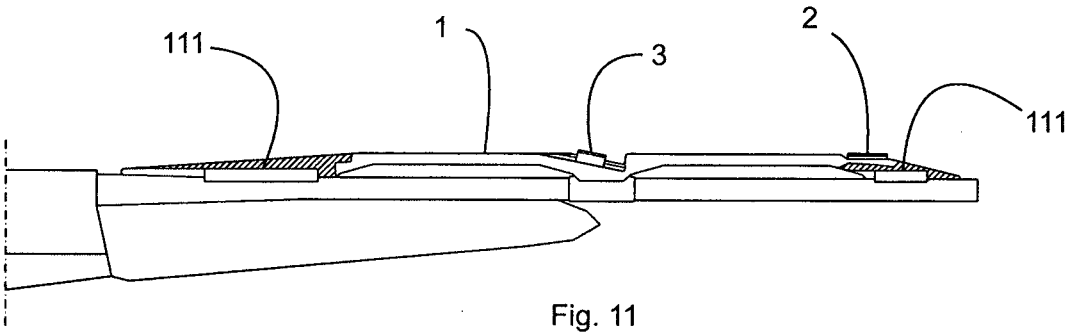


Fig. 11

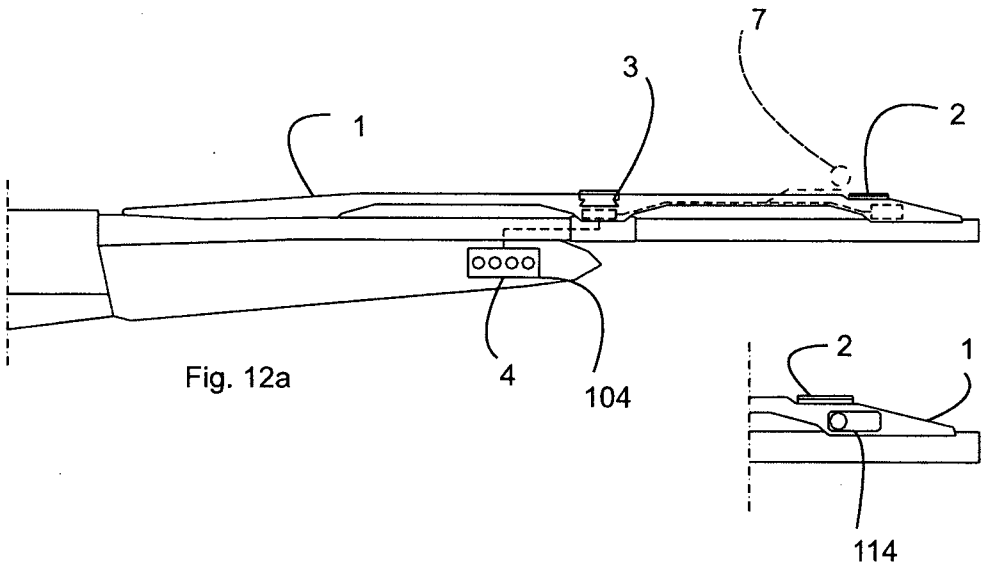


Fig. 12a

Fig. 12b

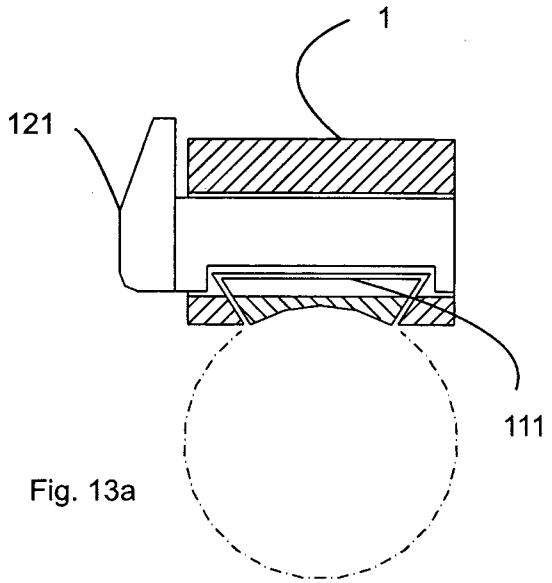


Fig. 13a

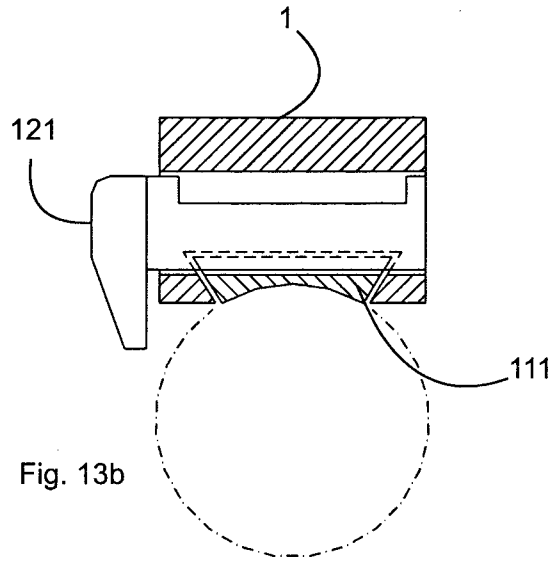


Fig. 13b

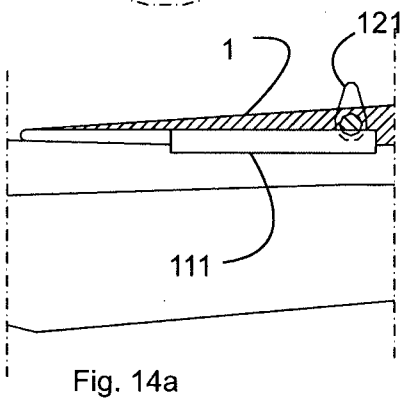


Fig. 14a

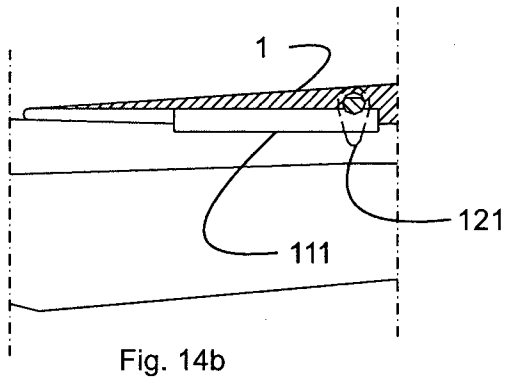


Fig. 14b

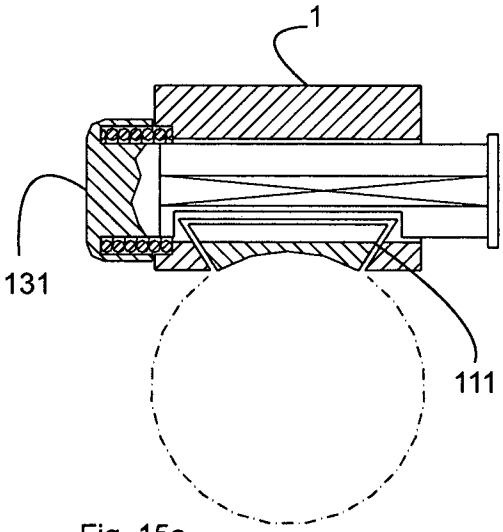


Fig. 15a

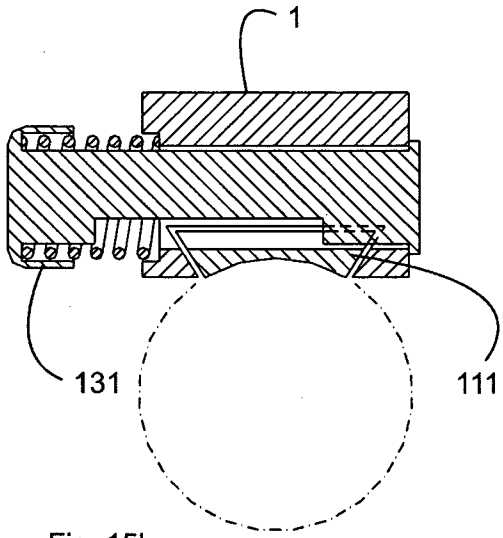


Fig. 15b

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2011/000131

A. CLASSIFICATION OF SUBJECT MATTER
INV. F41G1/04 F41G1/28 F41G1/34
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F41G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/157298 A1 (CARLSON JOHN T [US]) 31 October 2002 (2002-10-31) cited in the application	1-4,6, 9-14
Y	abstract; figures 2,5,6,7 paragraph [0029] paragraph [0037] - paragraph [0039] -----	5,15,16
Y	US 3 199 202 A (WILLIAMS PAUL D) 10 August 1965 (1965-08-10)	5
A	figures 1-5 column 2, line 5 - column 3, line 4 -----	6
Y	US 2 645 017 A (HAASE KURT O) 14 July 1953 (1953-07-14)	15
A	figures 2,4 column 3, line 48 - column 4, line 2 -----	8
	-/--	

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 August 2011	01/09/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Schwingel, Dirk

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2011/000131

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 10 2005 021044 A1 (ELLERMANN KARL-HEINZ [DE]) 9 November 2006 (2006-11-09) abstract; claims 1,2,10 -----	16
X	WO 2008/100268 A2 (WOLF PAC TECH INC [US]; THOMPSON JOHN [US]) 21 August 2008 (2008-08-21) abstract; figures 5,7,8 page 4, line 4 - line 8 page 8, line 18 - page 11, line 5 -----	1-4,7
A	AT 8 555 U1 (GEN HEADQUARTERS OF THE ARMED [AE]) 15 September 2006 (2006-09-15) abstract; figures 1,2 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IT2011/000131

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 3199202 A	10-08-1965	NONE	
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AT 8555 U1	15-09-2006	NONE	