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(54) **A mounting plate for releasably mounting a sight to a handheld firearm**

(57) A mounting plate (4) for releasably mounting a sight (2) to a handheld firearm (3), said mounting plate (4) having a first side (4a) mountable to the sight (2), and a second side (4b) connectable to a support member (5), which support member (5) is attached to the handheld firearm (3) by means of a countersunk screw (13) arranged in a screw hole (10) formed in said support member (5), said second side (4b) of said mounting plate (4) being provided with a stud (7) configured to interact with a locking mechanism in said support member so as to releasably lock the stud to the support member in such a way that relative movement between said mounting plate (4) and said support member (5) in an axial direction of said stud (7) is prevented, wherein said mounting plate (4) further comprises a protrusion (7) on said second side (4b) of the mounting plate (4), said protrusion (7) being configured to be received within and engage with a portion of said screw hole (10) located between a surface of said support member and a head (13a) of said countersunk screw (13) when said mounting plate (4) is locked to the support member (5), so as to prevent relative rotation between the mounting plate (4) and the support member (5) about a longitudinal axis of said stud (7).

The arrangement prevents misalignment of the sight. Furthermore, as the protrusions are received in the existing screw holes, the mounting plate may be used with already commercially available support members, such as the QR-system® from Leupold®, without modifying the support member.

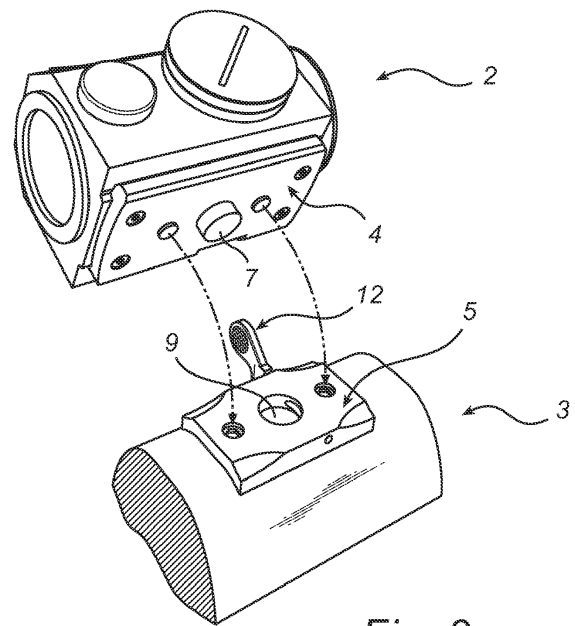


Fig. 3

Description

Technical field

[0001] The present invention relates to a mounting plate for releasably mounting a sight to a handheld firearm. The present invention also relates to a mounting system comprising such a mounting plate.

Background of the invention

[0002] Handheld firearms, such as rifles, pistols and revolvers, are often equipped with sights for improved aiming. Having a sight that can be easily mounted and dismounted is desirable as it allows convenient removal of the sight during transportation and storage of the firearm. It also allows a user to conveniently switch between various sights.

[0003] A previously known mounting system for releasably mounting a sight on a rifle is disclosed in US 5,035,487. This mounting system includes a stud mounted directly or indirectly on the sight and a support member mounted to the rifle. The support member has a locking mechanism for releasably locking the stud to the support member to prevent relative movement between the sight and the support member in an axial direction of the stud. The locking mechanism includes a stud receiving bore formed in the support member and a rotational shaft arranged in such a way that when the stud is received in the stud receiving bore, the rotational shaft may be engaged with a groove in the stud in a locked position and may be disengaged in an unlocked position. This allows the sight to be mounted to the rifle in a rapid and repeatable manner.

[0004] However, in applications where the mounting system only uses a single stud, there is a risk that the sight moves or becomes misaligned, e.g. as a result of recoil upon firing the firearm.

[0005] A solution to overcome this problem has been proposed by Henneberger®, who sells a mounting plate for mounting a stud on a sight from Aimpoint's® product line Micro, which stud is compatible with the support member and locking mechanism in US 5,035,487. In addition to the stud, the mounting plate from Henneberger has a bore formed therein so that a pin can be arranged in the bore in such a way that the pin protrudes from the mounting plate. Provided that the buyer of the mounting system modifies the support member by drilling a bore therein, the pin that protrudes from the mounting plate will engage the bore in the support member and prevent relative rotation between the support member and the mounting plate about a longitudinal axis of the stud.

[0006] However, although this prevents the sight from becoming misaligned, it requires that the buyer drills the bore in the support member, which tends to be a rather complicated procedure. Thus, there is a need for a more convenient solution.

Summary of the invention

[0007] In view of the above, an object of the invention is to alleviate the problems discussed above. In particular, an object is to provide a mounting plate that prevents the sight from becoming misaligned, while being connectable to a commercially available support member without modification of the support member.

[0008] According to an aspect of the invention, there is provided a mounting plate for releasably mounting a sight to a handheld firearm, the mounting plate having a first side mountable to the sight, and a second side connectable to a support member, which support member is attached to the handheld firearm by means of a countersunk screw arranged in a screw hole formed in the support member, the second side of the mounting plate being provided with a stud configured to interact with a locking mechanism in the support member so as to releasably lock the stud to the support member in such a way that relative movement between the mounting plate and the support member in an axial direction of the stud is prevented, wherein the mounting plate further comprises a protrusion on the second side of the mounting plate, the protrusion being configured to be received within and engage with a portion of the screw hole located between a surface of the support member and a head of the countersunk screw when the mounting plate is locked to the support member, so as to prevent relative rotation between the mounting plate and the support member about a longitudinal axis of the stud.

[0009] The present invention is based on the understanding that a portion of the screw hole that is located between a surface of the support member (facing the mounting plate) and a head of a countersunk screw may often be sufficient to receive and engage with a protrusion on the mounting plate to prevent misalignment. This additional functionality of the screw hole allows already commercially available support members, such as the QR-system from Leupold®, to be utilized with the inventive mounting plate without modification thereof.

[0010] The support member may preferably be further attached to the handheld firearm by means of a second countersunk screw arranged in a second screw hole formed in the support member, wherein the mounting plate further may comprise a second protrusion on the second side of the mounting plate, the second protrusion being configured to be received within and engage with a portion of the second screw hole located between the surface of the support member and a head of the second countersunk screw when the mounting plate is locked to the support member, so as to prevent relative rotation between the mounting plate and the support member about the longitudinal axis of the stud. An advantage with two protrusions is that the robustness of the connection can be further improved.

[0011] At least one of the one or more protrusions may preferably have a height that is in the range 0.3 - 2.5 mm, more preferably in the range 0.8 - 1.2 mm, and most

preferably is 1.0 mm. The height is here defined as the extension in the axial direction of the stud, or put differently a distance from a surface from which the protrusion protrudes (i.e. a surface of the second side of the mounting plate), to the tip of the protrusion. Protrusions with a height that falls within these ranges have been found to be sufficiently high to efficiently engage with the screw hole, while being able to fit in a typical cavity formed between the head of the countersunk screw and the surface of the support member. Moreover, a protrusion with a height of 1.0 mm just fits inside the cavity formed between the head of the countersunk screw and the surface of the support member when the QR-system from Leupold® is used.

[0012] At least one of the one or more protrusions may be essentially circular cylindrical. A circular cylindrical protrusion is easy to manufacture, and works well with screw holes where the cavity between the surface of the support member and a head of the countersunk screw is circular cylindrical, as is the case in e.g. the QR-system from Leupold®.

[0013] At least one of the one or more protrusions may have a diameter of 5.4 mm, more preferably the diameter may be in the range 5.38 - 5.45 mm, and most preferably be 5.40 mm with a tolerance of +0.03 mm. A diameter in this range fits tightly in the cavity formed between the surface of the support member and a head of the countersunk in the QR-system from Leupold® and ensures that an accurate alignment of the sight.

[0014] A distance between a centre of the stud and a centre of at least one of the one or more protrusions may preferably be 11 mm. This distance corresponds to the distance between the centre of the stud receiving bore and the centre of the screw hole in the QR-system from Leupold®.

[0015] The stud and the first and second protrusions may be located along an imaginary straight line with the stud in the middle and the first and second protrusions on either side thereof. This arrangement is compatible with the QR-system from Leupold®.

[0016] Furthermore, the mounting plate according to the present invention may advantageously be included in a mounting system, further comprising a support member having a screw hole formed therein, the screw hole being configured to receive a countersunk screw for attaching the support member to the handheld firearm, the support member further comprising a locking mechanism configured to interact with the stud so as to releasably lock the mounting plate to the support member in such a way that relative movement between the mounting plate and the support member in an axial direction of the stud is prevented.

[0017] The stud may have a groove formed therein, wherein the locking mechanism may comprise a stud receiving bore formed in the support member for receiving the stud, and a rotational shaft arranged in the support member, wherein said rotational shaft has a groove formed therein and is configured in such a way that said

rotational shaft is engageable with said groove in the stud in a locked position and disengageable with the groove in the stud in an unlocked position.

[0018] Other objectives, features and advantages will appear from the following detailed disclosure, from the attached dependent claims as well as from the drawings.

Brief description of the drawings

[0019] The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of preferred embodiments of the present invention, with reference to the appended drawings, where the same reference numerals will be used for similar elements, wherein:

Fig. 1 is a schematic exploded perspective view of a mounting system for mounting a sight to a handheld firearm according to an embodiment of the invention; Fig. 2 is a schematic view illustrating the side of the mounting plate that is connectable to the support member;

Fig. 3 is a schematic perspective view illustrating how the mounting system allows mounting of the sight to the rifle by releasably connecting the mounting plate to the support member;

Fig. 4 is a schematic cross-section of the mounting system when the sight is mounted to the rifle.

Detailed description of preferred embodiments

[0020] A mounting system 1 for releasably mounting a sight 2 to a handheld firearm 3 according to a preferred embodiment of the invention will now be described with reference to Figs. 1 to 4. Although the sight is here assumed to be an Aimpoint® MICRO H-1, the mounting system may also be utilized for other sights. Furthermore, although the firearm is here assumed to be a rifle, the mounting system is equally applicable for other types of handheld firearms 3 such as e.g. pistols and revolvers.

[0021] Referring to Fig. 1, the mounting system 1 comprises a mounting plate 4 and a support member 5. The mounting plate 4 here has a first side 4a attached to the sight 2 by means of four screws 6, and a second side 4b (opposite the first side 4a) releasably connectable to the support member 5. The first side 4a of the mounting plate 4 will here be referred to as the upper side as this side faces upwards when the sight 2 is mounted to the rifle 3 and the rifle is properly oriented for use. Similarly, the second side 4b of the mounting plate 4, will be referred to as the lower side 4b. Furthermore, the mounting plate 4 has a stud 7 that protrudes from a surface on the lower side 4b of the mounting plate, which stud has a groove 8 formed therein (as best illustrated in Fig. 2). The diameter of the stud is here 7.9 mm with a tolerance of +0.05 mm.

[0022] The support member is provided with a locking

mechanism comprising a stud receiving bore 9 formed in the support member 5, and a rotational shaft 12 arranged in a rotational shaft receiving bore formed in the support member 5. The rotational shaft 12 has a groove formed therein. The locking mechanism is configured such that the rotational shaft 12 is engageable with the groove 8 in the stud 7 in a locked position (as illustrated in Fig. 4) and disengageable with the groove 8 in the stud 7 in an unlocked position. Through the arrangement the locking mechanism can fasten the mounting plate 4 and the support member 5 to each other so as to prevent movement between the mounting plate 4 and the support member 5 in an axial direction of the stud 7 when the rotational shaft 12 is in the locked position, while allowing the mounting plate 4 to be disconnected from the support member 5 when the shaft is in the unlocked position. The stud 7 and the rotational shaft 12 are preferably made of a material, such as steel, that can stand wear that occurs as the rotational shaft engages the groove in the stud. The mounting plate and the support member may also be made of steel or other suitable metal. The above described locking mechanism for locking the mounting plate 4 to the support member 5 is here based on the QR-, Quick Release, system from Leupold®, and a more detailed description of the locking mechanism can be found in US 5,035,487, which is hereby incorporated by reference.

[0023] Further, the support member 5 preferably has two screw holes 10,11 formed therein. The distance between the centres of the screw holes are here 21,82 mm in accordance with the industry standard. The screw holes are configured such that the screws 13,14 are countersunk. This can be achieved by using screw holes 10,11 with a first (upper) portion with a diameter adapted to receive the head of the screw, and a second (lower) portion with a diameter adapted to receive the body of the screw, but sufficiently small to prevent the screw head to enter. Both upper and lower portions of each screw hole are here circular cylindrical. However, the upper portion of the screw hole may also have other shapes. For example, the upper portion of the screw hole may have the shape of a rectangular, hexagonal, or octagonal cylinder. Furthermore, the depth (i.e. the extension in the axial direction of the screw hole) of the upper portion of the screw hole exceeds the height of the head of the screw so that a cavity is formed between the upper surface 5a of the support member 5 and the head 14a of the screw when the support member 5 is attached to the rifle 3. As is recognized by a person skilled in the art, the distance between the head of the screw and the surface of the support member may vary, but for the QR-system from Leupold®, this distance is typically about 1.1 mm. Moreover, the stud receiving bore 9, and the first 10 and second 11 screw holes are here arranged along an imaginary straight line (extending in the direction of the rifle) with the stud receiving bore 9 in the middle and the first 10 and second 11 screw holes on either side thereof.

[0024] The lower side 4b of the mounting plate 4 pref-

erably comprises first 15 and second 16 protrusions. The protrusions 15,16 are arranged such that their positions corresponds to the respective positions of the first and second screw holes 10,11 in the support member 5. Thus, the protrusions 15,16 are here located along an imaginary straight line (extending in the direction of the rifle) with the stud 7 in the middle and the first 15 and second 16 protrusions on either side thereof. The distance between the centres of the protrusions are here 21,82 mm to be compatible with the screw holes 10,11. Moreover, the shape and size of each protrusion 15,16 preferably corresponds to the shape and size of the portion of the corresponding screw hole 10,11 that is located between the surface 5a of the support member 5 and the head 13a,14a of the screw 13,14, so that each protrusion can be received within and engage with the upper portion of its corresponding screw hole. In this embodiment each protrusion 15,16 is circular cylindrical with a diameter of 5.40 mm (and a tolerance of +0.03 mm) to fit tightly in the respective screw hole provided in the QR-, Quick Release®, system from Leupold®. The height of each protrusion 15,16 (i.e. the extension in the axial direction of the protrusion) is preferably selected such that the complete protrusion 15,16 just fits above the screw head 13a,14a in its corresponding screw hole 10,11, when the lower surface 4b of the mounting plate 4 rests against the upper surface 5a of the support member 5. Here, the height of the protrusion is 1.0 mm.

[0025] Fig. 3 schematically illustrates how a sight 2 attached to the above described mounting plate 4 can be mounted to the above described support member 5 attached to a rifle 3. Initially the rotational shaft 12 of the locking mechanism is in unlocked position, i.e. the groove in the rotational shaft is located such that the stud 7 may be inserted into the stud receiving bore 9. As the stud 7 is arranged in the stud receiving bore 9 in the support member 5, the protrusions 15,16 will be received in and engage with the upper portion of their respective screw holes 10,11. That is, the protrusions 15,16 will be accommodated in the respective cavities that are formed between the upper surface 5a of the support member 5 and the head 13a,14a of the screws 13,14. Next, the rotational shaft 12 is rotated to a locked position (i.e. the position illustrated in Fig. 4). In the locked position the rotational shaft 12 engages the groove 8 in the stud 7 and thereby prevents relative movement between the mounting plate 4 and the support member 5 in an axial direction of the stud. Furthermore, the protrusions 15,16 efficiently prevents relative rotation between the mounting plate 4 and the support member 5 about the longitudinal axis of the stud 7. Thus, the risk of the sight moving or becoming misaligned as a result of recoil upon firing the rifle may be eliminated.

[0026] The invention has mainly been described above with reference to a few embodiments. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the invention, as defined by

the appended claims.

Claims

1. A mounting plate (4) for releasably mounting a sight (2) to a handheld firearm (3), said mounting plate (4) having a first side (4a) mountable to the sight (2), and a second side (4b) connectable to a support member (5), which support member (5) is attached to the handheld firearm (3) by means of a countersunk screw (13) arranged in a screw hole (10) formed in said support member (5), said second side (4b) of said mounting plate (4) being provided with a stud (7) configured to interact with a locking mechanism in said support member so as to releasably lock the stud to the support member in such a way that relative movement between said mounting plate (4) and said support member (5) in an axial direction of said stud (7) is prevented, **characterized in that** said mounting plate (4) further comprises a protrusion (7) on said second side (4b) of the mounting plate (4), said protrusion (7) being configured to be received within and engage with a portion of said screw hole (10) located between a surface of said support member and a head (13a) of said countersunk screw (13) when said mounting plate (4) is locked to the support member (5), so as to prevent relative rotation between the mounting plate (4) and the support member (5) about a longitudinal axis of said stud (7).
2. A mounting plate according to claim 1, wherein said support member (5) is further attached to the handheld firearm (3) by means of a second countersunk screw (14) arranged in a second screw hole (11) formed in said support member (5), wherein said mounting plate (4) further comprises a second protrusion (16) on said second side (4b) of said mounting plate (4), said second protrusion (16) being configured to be received within and engage with a portion of said second screw hole (11) located between the surface of the support member and a head (14a) of said second countersunk screw (14) when said mounting plate (4) is locked to the support member (5), so as to prevent relative rotation between said mounting plate (4) and said support member (5) about said longitudinal axis of said stud (7).
3. A mounting plate according to claim 1 or 2, wherein at least one of said one or more protrusions (15,16) has a height that is in the range 0.3 - 2.5 mm, or more preferably in the range 0.8 - 1.2 mm, and most preferably is 1.0 mm.
4. A mounting plate according to any one of the preceding claims, wherein at least one of said one or

more protrusions (15,16) is essentially circular cylindrical.

5. A mounting plate according to any one of the preceding claims, wherein at least one of said one or more protrusions (15,16) has a diameter of 5.4 mm.
6. A mounting plate according to any one of the preceding claims, wherein a distance between a centre of the stud (7) and a centre of at least one of said one or more protrusions (15,16) is 11 mm.
7. A mounting plate according to any one of claims 2 to 6, wherein said stud (7) and said first (15) and second (16) protrusions are located along an imaginary straight line with said stud (7) in the middle and said first (15) and second (16) protrusions on either side thereof.
8. A mounting system (1) for mounting a sight (2) to a handheld firearm (3), comprising:
 - a mounting plate (4) according to any one of the preceding claims;
 - a support member (5) having a screw hole (10) formed therein, said screw hole being configured to receive a countersunk screw (13) for attaching said support member (5) to said handheld firearm (3), support member (5) further comprising a locking mechanism configured to interact with said stud (7) so as to releasably lock said mounting plate (4) to said support member (5) in such a way that relative movement between said mounting plate (4) and said support member (5) in an axial direction of said stud (7) is prevented.
9. A mounting system according to claim 8, wherein said stud (7) has a groove (8) formed therein, and wherein said locking mechanism comprises a stud receiving bore (9) formed in said support member (5) for receiving said stud (7), and a rotational shaft (12) arranged in said support member, wherein said rotational shaft has a groove formed therein and is configured in such a way that said rotational shaft (12) is engageable with said groove (8) in said stud (7) in a locked position and disengageable with said groove (8) in said stud (7) in an unlocked position.

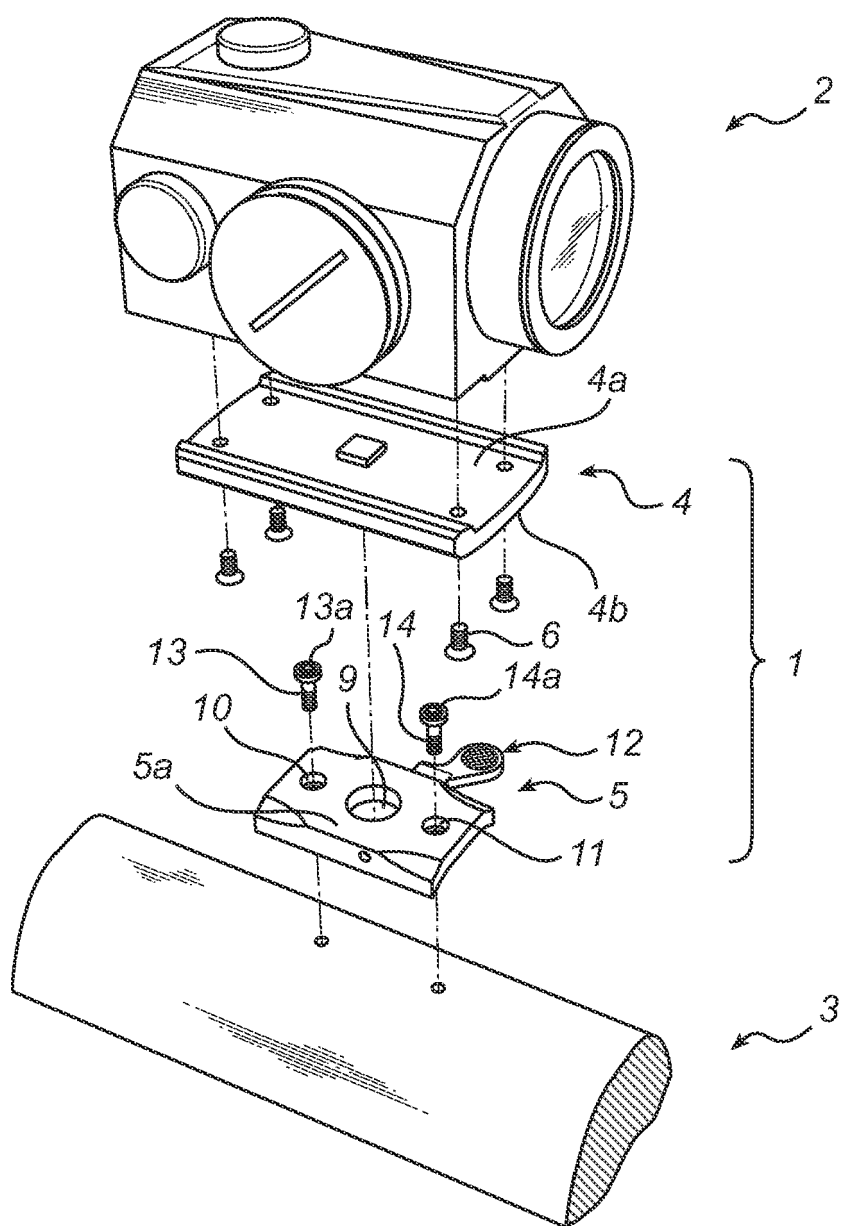


Fig. 1

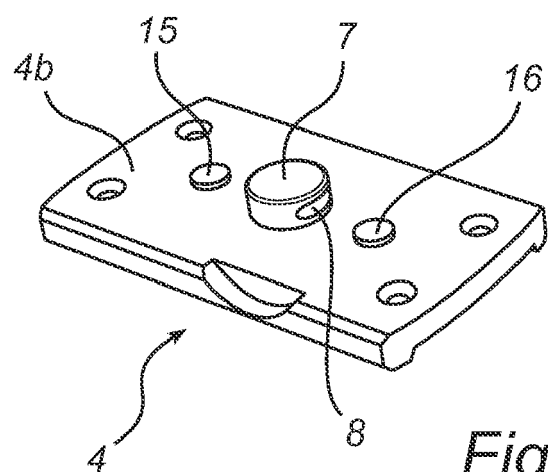


Fig. 2

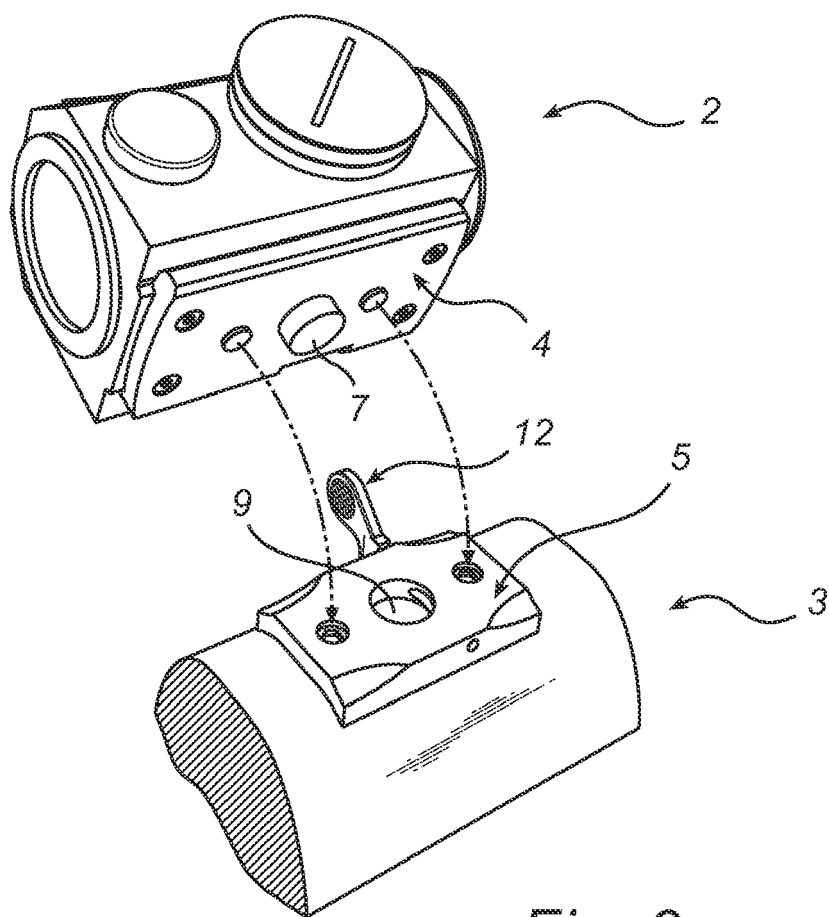
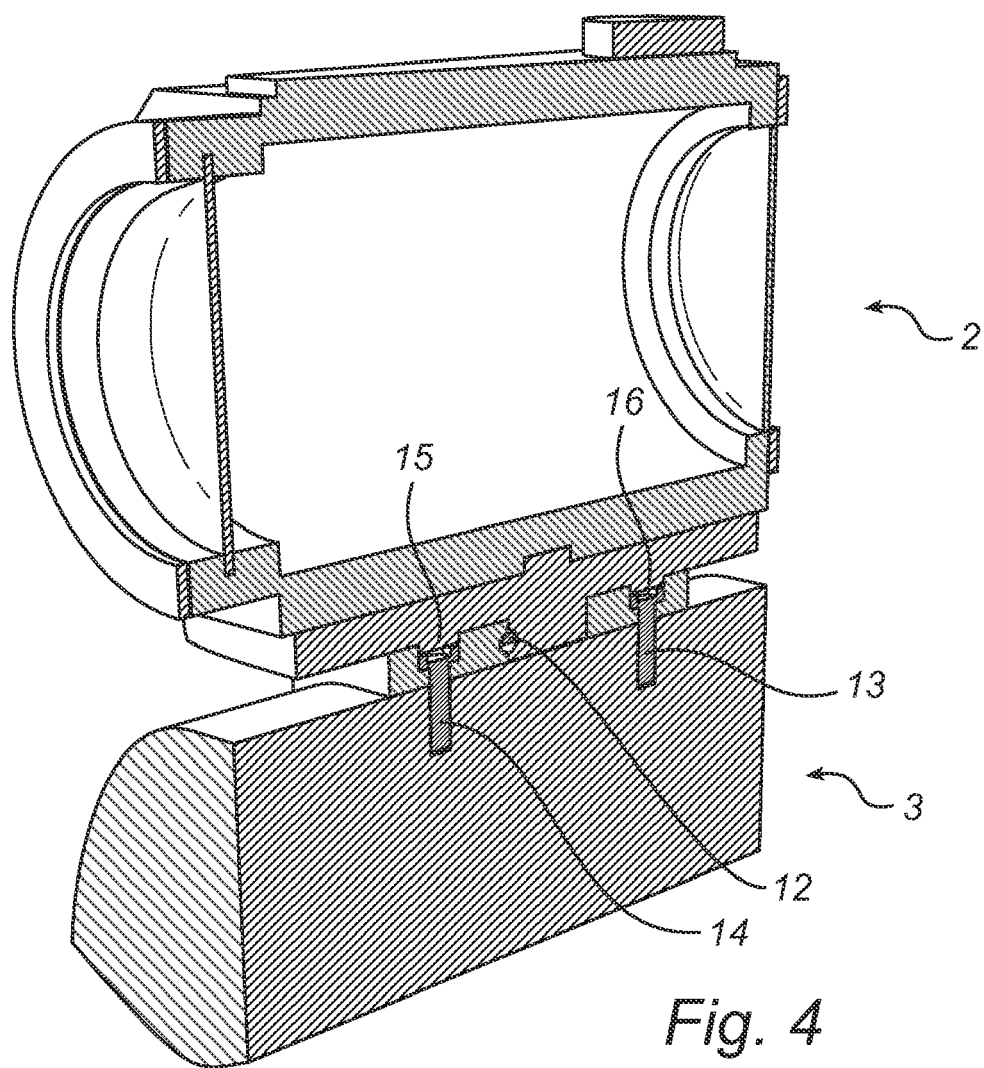


Fig. 3





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 1352

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	Henneberger: "Henneberger Montageteile 2008" 1 January 2008 (2008-01-01), XP002598936 Retrieved from the Internet: URL:http://www.henneberger.de/download/Mont_0308.pdf [retrieved on 2010-08-31] * page 1 * * page 2, top * * page 2, bottom, left-hand side *	1-9	INV. F41G11/00
Y	Precision Scopes: "QR Mounts" 3 August 2008 (2008-08-03), XP002598937 Retrieved from the Internet: URL:http://web.archive.org/web/20080803191516/http://www.precisionscopes.com/leupold_quick_release_mounts [retrieved on 2010-09-01] * The Leupold Quick Release 2-Piece Base *	1-9	TECHNICAL FIELDS SEARCHED (IPC)
Y	DE 580 332 C (GUSTAV GENSCHOW & CO AKT GES) 8 July 1933 (1933-07-08) * page 2, lines 23-25, 34-42 * * figures 1, 5 *	1-9	F41G
A	FR 2 285 590 A1 (KIND ALBRECHT [DE]) 16 April 1976 (1976-04-16) * figures 3-9 *	1-9	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 September 2010	Examiner Van Leeuwen, Erik
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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EPO FORM 1503 03.02 (P04C01)

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

EP 10 16 1352

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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02-09-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 580332	C	08-07-1933	NONE
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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5035487 A [0003] [0005] [0022]