(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 923 657 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
03.05.2017 Bulletin 2017/18

(51) Int Cl.:
F41G 3/16 *(2006.01)* ***F41G 3/22*** *(2006.01)*
F41G 5/14 *(2006.01)*

(21) Application number: **06124200.4**

(22) Date of filing: **16.11.2006**

(54) **A compact, fully stabilised, four axes, remote weapon station with independent line of sight**

Eine kompakte und vollstabilisierte, mit vier Achsen ausgerüstete, Fernwaffestelle mit unabhängiger Visierlinie

Une base d'arme éloignée compacte, intégralement stabilisée et équipée de quatre axes, avec ligne de visée indépendante

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

(43) Date of publication of application:
21.05.2008 Bulletin 2008/21

(73) Proprietor: **SAAB AB**
581 88 Linköping (SE)

(72) Inventors:
- **Svensson, Robert**
  177 60 Järfälla (SE)
- **Stalfors, Martin**
  162 44 Vällingby (SE)

(74) Representative: **Zacco Sweden AB**
P.O. Box 5581
114 85 Stockholm (SE)

(56) References cited:
EP-A- 0 396 822
EP-A1- 0 111 192
WO-A-02/33342
WO-A-99/28696
FR-A1- 2 484 626
US-A- 4 576 346
US-A- 5 273 236
US-B1- 6 499 382

EP 1 923 657 B1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a remote weapon station according to the precharacterising part of claim 1. The present invention relates, but not limited, to industries making remotely controlled weapon stations, machine-guns, automatic grenade launchers, missile firing equipment etc.

BACKGROUND OF THE INVENTION

[0002] Remote weapon stations of the type indicated in the introduction are available on the market today. A three axes remote weapon station comprises a gun being turnable about a first transverse axis and a second elevation axis and a sight unit rotatable about a third elevation axis, wherein the third axis is primary used when firing grenade launcher type weapons. The four axes weapon stations is provided for that the line of sight can be controlled independently of the bore axis of the weapon, wherein the bore axis weapon is stabilised in two axes. However, in such a station according to prior art the freedom of movement of the sight unit is limited, since the sight unit must be moved together with the gun, limiting the usage of the sight and weapon station when the relative speed between the target and the weapon station is high since a high relative speed requires large offset angles between the line of sight and the bore axis of the gun in order to hit the target. Also the use of such prior art systems is limited when the platform on which the weapon station is mounted is performing a roll motion relative to the bore axis of the gun when the gun is directed to hit the target. Furthermore prior art weapon stations with three or four axes all make a change of silhouette when the sight unit and thus the weapon support rotates.

[0003] Known systems having four axes stabilizing arrangements are bulky in width or height. This since the sight unit is placed above or attached onto the side of the weapon support. Prior art systems with the sight unit attached onto the side of the weapon, wherein the concentration of masses asymmetrically will cause the station to be unbalanced, are also difficult to stabilise without the use of undesired counter weights or larger and thus heavier drives. Also prior art systems being three axes stabilizing arrangements, wherein the bore axis of the weapon is stabilised in two axes and the line of sight line of the sight unit is stabilised in one axis, suffer from the disadvantages that an image generating sensor (such as TV, IR etc.) field of vision must be adapted for holding the target within said field of vision, which is extremely difficult when a vehicle comprising the station is moving since the system must be directed towards the target for facilitating the determination of the distance to the target, requiring a long time.

[0004] Prior art systems having four axes arrangement wherein solely the weapon's bore axis is two axes stabilized, involve that the field of vision must be selected such that the target remain within the field of vision when the vehicle is moving (roll/pitch/heading). Also this means that it is difficult to measure the distance to the target when the vehicle moves, especially when angles for super elevation and lead angles are added to compensate for relative motion between the target and the weapon station. Furthermore, prior art systems wherein solely the sight unit's line of sight is two axes stabilized involve that it is difficult to hit the target with fired ammunition.

[0005] US 5273236 discloses an apparatus provided for designating a plurality of objects within a field of view and thereafter simultaneously tracking each of the objects. A further document, US 4576346, describes a seeker head for a target seeking missile, which comprises a seeker adapted to be directed to a target.

[0006] EP 111 192 discloses a weapon control system including target search and tracking means wherein the target search means are mounted on a column connected with the gun turret, and wherein the target tracking means are mounted on the gun and are able to slew about two mutually perpendicular axes.

[0007] The object of the present invention is to overcome the drawbacks of known techniques.

SUMMARY OF THE INVENTION

[0008] This has been solved by a remote weapon station being defined in the introduction, the remote weapon station is characterised by the features of claim's 1 characterising part. In such a way a not bulky remote weapon station is achieved at the same time as the operator of the remote weapon station is able to perform targeting and surveillance without changing the remote weapon station's silhouette and thus reducing the risk of being detected by visual means. The concentration of masses will also be symmetrically arranged which will make the remote weapon station possible to stabilise without adding extra weight in the form of undesired counter weights or larger drives. Thereby increase the usage of the weapon station when the platform on which the weapon station is mounted is moving. Thereby is also achieved a possibility to utilise the sensor without pointing a gun directly at the object of interest. Also there is a possibility to start searching for a new target while firing the gun at the first acquired target. A positive effect is that a weapon station can be provided with a high precision stabilised system having a sighting function with an unitary installation of a sight unit matching the performance of the weapon and at the same time providing a sufficient performance for e.g. missile guidance. Thereby is also achieved that the sight unit in an effective manner can follow a target by controlling the weapon via a control unit for aiming-off, at the same time as compensation means provides for compensation of eventual uneven motion of the remote weapon station, for example being mounted at a gun boat. This is achieved by that the control unit can control

the sight unit independently of the gun aiming by means of the arrangement of the remote weapon station according to the present invention. A compact remote weapon station is thus achieved having a sight unit with a totally independent line of sight relatively the pointing of the gun having the sight unit correctly balanced relatively the weapon and providing an exact line of sight. Thus is also achieved a remote weapon station having a sight unit, which weapon station can be used utilizing the sight unit without the need of other kinds of compensation for lead angles and/or super elevation.

[0009] Thus, the objects of the invention is to provide a compact remote weapon station, wherein the assembly permits that the angle between the bore axis of the weapon and the line of sight of the sight in a controllable manner can be made independently of each other. The weapon's bore axis being stabilized in two axes and the sight unit's line of sight being stabilized in two axes.

[0010] The effects being provided by such an arrangement is for example that the target can be placed in the centre of a image generating display and the distance to the target continuously can be measured by a laser range finder etc, wherein the weapon's bore axis can be directed in such a way that the fired ammunition hits the target with precision. Also is achieved that the bore axis of the weapon and the line of sight of the sight unit can be oriented relative each other in such a way that the sight unit can be used without the need of directing the weapon towards the target.

[0011] Also is achieved the advantage that the sight unit's line of sight can be stabilized and directed with a higher accuracy than being provided by systems only stabilising the weapon's bore axis.

[0012] Preferably, the weapon support is rotatable about the first transverse axis independently of the rotatable motion of the sight unit about the third transverse axis such that the weapon can be directed essentially in another direction relatively the search direction of the sight unit.

[0013] In such a way is achieved that the weapon can be rotated to the opposite direction relatively to the sight unit's target tracking(or search) direction. This is also a beneficial feature for shortening the time when for example a supporting leg of the weapon carriage covers the line of sight, by controlling the weapon support's and sight unit's relative rotation.

[0014] Suitably, the weapon support also is arranged to be controlled to rotate about the first transverse axis dependent upon the rotatable motion of the sight unit about the third transverse axis.

[0015] Thereby is provided an alternative mode for controlling the weapon support to follow the sight unit's rotational movement, at the same time as the weapon support can be disconnected from following the target.

[0016] Suitably, the first axis coincides with the third axis.

[0017] Thereby is provided a remote weapon station being capable to utilize a compact motor driving system using the same axis for the transverse rotations.

[0018] Preferably, the sight unit comprises a first essentially spherical, hollow body which interacts with a second essentially rotationally symmetrical body, both bodies being rotatable in relation to one another about the transverse axis, the spherical body accommodating at least one electro-optical sensor, being rotatable about the fourth elevation axis.

[0019] Thus is also achieved that the sight unit can be independently stabilised, thereby making the remote weapon station optimized for high precision sensor systems, e.g. laser illumination at long ranges. The use of a sensor sight system with a spherical form arranged in the remote weapon station provides independent 360° traverse operation with an optimal configuration of the remote weapon station with regard to overall volume, interior sensor volume utilisation, ballistic protection, signature management, and weapon dumping/elevation angles.

[0020] Alternatively, the weapon support comprises a tiltable leg arrangement supporting the weapon attachment device, the leg arrangement being tiltable over the first essentially spherical, hollow body.

[0021] In such a way the remote weapon station can be made lower for transportation purposes by tilting the weapon attachment device over the sight unit. The tilting action performing an imaginary circular arc essentially with the same radius as the radius of the first essentially spherical, hollow body.

[0022] Preferably, the sight unit comprises a first essentially cylindrical, hollow body accommodating at least one electro-optical sensor.

[0023] Thereby is achieved a large volume for sight equipment even still performing an optimal signature management, that is having essentially the same silhouette independently the sensor transverse motion about the third axis.

[0024] Alternatively, the hollow body encloses all interior movable parts, such as electro-optical sensors, of the sight unit for hiding said parts. The body is preferably armour cased and transparent and/or partly transparent.

[0025] In such a way, on one hand the interior equipment is protected from splinters, small arms fire or ricochets etc., and on the other hand hidden from being detected by the object/target.

[0026] Alternatively, the weapon support being comprised in a motorized gun control system.

[0027] Thereby is achieved that the remote weapon station is applicable to an available platform, such as a truck, an armoured car, gun boat, tank, helicopter etc.

[0028] Suitably, the sight unit is arranged for controlling at least one weapon disposed at a distance from the remote weapon station.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The present invention will now be described by way of example with reference to the accompanying

schematic drawings of which:

FIG. 1a schematically illustrates a remote weapon station in a front view,
FIG. 1b schematically illustrates the station in FIG. 1a in a side view,
FIG. 1c schematically illustrates the station in FIG. 1a in a plane view,
FIGS 2a-2c schematically illustrate the station in FIG. 1c in motion,
FIGS. 3a-3c schematically illustrate a remote weapon station according to a second embodiment,
FIGS 3d-3f schematically illustrate a remote weapon station according to a further embodiment,
FIG. 4 schematically illustrates parts of a sight unit shown in FIGs 1a-2c,
FIGS. 5a-5b schematically illustrate a leg arrangement of a remote weapon station,
FIG. 6 schematically illustrates a motor driving system of the remote weapon station in FIG. 4, and
FIG. 7 schematically illustrates the aiming of the remote weapon station at a moving target.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0030] Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings related to the embodiments, wherein for the sake of clarity and understanding of the invention some details of no importance are deleted from the drawings.

[0031] Referring to FIGS. 1a, 1b, 1c, a remote weapon station 1 is schematically illustrated. The remote weapon station 1 is mountable onto a gun boat (not shown) or the like. The remote weapon station 1 comprises a weapon support 3 adapted for rotatable motion about a frst transverse axis X1.

[0032] The weapon support 3 supports a weapon attachment device 5 being rotatable about a second elevation axis X2. The second elevation axis X2 comprises an U-shaped part 7 for accommodation of a gun 9. The gun 9 is mounted onto the weapon attachment device 5, such as a bayonet fitting (not shown) connected to the second elevation axis X2, wherein the gun 9 easily can be disconnected from the weapon attachment device 5.

[0033] The weapon support 3 supports two legs 11 extending from a platform 13 of the weapon support 3, which platform 13 being rotatable about the axis X1. Between the legs 11 and at their upper ends 15 is the U-shaped part 7 mounted. One of the legs 11 accommodates an ammunition belt guide (not shown).

[0034] The remote weapon station 1 comprises a sight unit 17 for observation of the surroundings and for measuring in a detected target, tracking, classifying the type of target, identifying the target etc. The sight unit 17 is rotatable about a third transverse axis X3 and about a fourth elevation axis X4. The sight unit 17 has at least one electro-optical sensor 19 with associated apertures 21 arranged in the sight unit's 17 spherical hollow body 23. The sight unit 17 is mounted between the weapon support 3 (platform or fundament) and the weapon (gun) attachment device 5, whereby is achieved a compact remote weapon station 1 having a sight unit 17 with a totally independent line of sight relatively the bore axis of the gun 9. It also means that the sight unit 17 can be correctly stabilized/directed relatively the gun 9 and providing an exact line of sight. Since the gun 9 is dispensed in a vertical plane comprising the first transverse axis X1 and essentially the third transverse axis X3, an optimal aiming can be achieved. A control unit 25 is arranged remote from the weapon station 1 and is adapted to control a weapon driving means 27 for rotating the gun 9 about the first transverse axis X1 and the second elevation axis X2 and also to control a sight unit driving means 29 for rotation about the third transverse axis X3 and the fourth elevation axis X4. By arranging the sight unit 17 between the weapon support 3 (fundament or platform) and the weapon (gun 9) cables and wires can be hidden and protected and easy to mount during the manufactory of the station.

[0035] In FIGS. 2a, 2b, 2c are shown in a plane view the remote weapon station 1 performing a sight unit rotation towards a target/object 31 while pointing the gun 9 in a somewhat opposite direction. In FIG. 2a both the gun 9 and the sight unit 17 are directed in the same direction. In FIG. 2b the sight unit 17 has started it's rotation r for localising the target 31 without pointing the gun 9 at the target 31. In some cases this performance can be beneficial since pointing a gun at an object may result in a non-desirable reaction.

[0036] Meanwhile the sight unit 17 rotates, the sight unit's 17 sensors 19 perform a scanning of the surroundings. In FIG. 2b is shown how the sight line L will be covered by one of the legs 11 of the weapon support 3. This problem is partly solved by using e.g. two sensors or two in pair arranged sensors 19, such as one TV- and one IR-sensor or two in pair arranged TV- and IR-sensors. Meanwhile the first sensor or pair of sensors observes the surroundings, the second sensor or pair of sensors instantaneously will lose contact with the target 31 since the sight line L is covered by the leg 11. When the first sensor or pair of sensors has lost contact with the target 31, the second sensor or pair of sensors pick up the line of sight to the target L. For even more shortening the time, when the leg 11 covers the sensors 19, the control unit 25 (see FIG. 1a) controls the weapon support 3 to rotate in an opposite direction marked with arrow r2, see FIG. 2c (an overlapping function). For even better visibility of the sensors 19, the legs 11 can be arranged as a system of framework. For protection of the sensors the apertures and sensors can be parked occasionally behind one of the legs 11.

[0037] The sight unit 17 is rotatable about the third transverse axis X3 and about, perpendicular to the third axis X3, the fourth elevation axis X4, independently of

the position or rotation of the weapon support 3 about the first transverse axis X1 and the second elevation axis X2. By using a spherical hollow body 23 embodying the sight sensors 19, an independent 360° traverse operation of the sight unit 17 is possible without moving the gun 9, wherein the silhouette of the remote weapon station 1 not being changed, thus minimizing the risk of being detected by the object/target 31 by visual means.

[0038] Whereas the FIGS. 1 and 2 show a sight unit 17 comprising an spherical hollow body 23 embodying the sensors 19, as an alternative the sight unit 17 may comprise a first essentially cylindrical or cubical, hollow body 23 accommodating at least one electro-optical sensor 19. Such an embodiment is shown in FIGS. 3a, 3b, 3c. Thereby is achieved a large volume for sight equipment even still performing an optimal signature management, that is having essentially the same silhouette independently of the sensor transverse motion about the third axis X3. The FIG. 3c shows the sight unit 17 directed to the opposite direction relatively the gun 9 in a horizontal action.

[0039] The embodiment of FIGS. 3a, 3b, 3c is arranged such that the first transverse axis X1 coincides with the third transverse axis X3 of the sight unit 17, whereby is provided a remote weapon station 1 being capable to utilize a compact motor driving system using the same axis for the transverse rotations as being described below with reference to FIG. 6.

[0040] A cylindrical hollow body 33 encloses all interior movable parts, such as electro-optical sensors, of the sight unit for protecting said parts. The body is transparent and armour cased. In such a way, on one hand the interior equipment is protected from splinters, small arms fire or ricochets etc., and on the other hand hidden from being detected by the object/target.

[0041] In FIG. 4 is shown the sight unit 17 in FIGS. 1a, 1b, 1c more in detail. The sight unit 17 comprises an essentially spherical body 23 adjacent to one end of a rotationally symmetrical body 35, preferably of circular cylindrical shape. The spherical body 23 comprises a circular central section 37 surrounded by two peripheral half sections 39 on each side (only one section 39 is illustrated with broken line). Each peripheral half section is provided with two apertures 21. Of course can according to other embodiments the sections each only have one aperture.

[0042] The spherical hollow body 23 is rotatable in relation to the rotationally symmetrical body 35 about the third transverse axis X3. By the rotation about the third transverse axis X3 it is possible to bring about 360° rotation. The two peripheral half sections 39 are rigidly mechanically interconnected and arranged rotatable so as to be capable of being rotated about the fourth elevation axis X4. The elevation can be limited to a range wherein the apertures 21 are in one end position oriented at an angle downwards relative to the horizontal plane and, in the other end position, oriented at an angle upwards relative to the horizontal plane.

[0043] The electro-optical sensors 19 can be selected from a variety of sensors, e.g. TV, IRV, laser rangefinder and laser illuminator.

[0044] The use of the sight unit 17 with a spherical form arranged in the remote weapon station 1 provides independent 360° traverse operation with an optimal configuration of the remote weapon station 1 with regard to overall volume, interior sensor volume utilisation, ballistic protection, signature management, and weapon dumping/elevation angles.

[0045] In FIG. 5a and 5b are shown an embodiment of the remote weapon station 1, wherein the weapon support 3 comprises a tiltable leg arrangement 41 supporting the weapon attachment device 5. The leg arrangement 41 comprises two legs 11 being tiltable about a tilting point p over the essentially spherical, hollow body 23 being also shown in FIG. 4. In such a way the remote weapon station 1 can be made lower for transportation purposes by tilting the weapon attachment device 5 over the sight unit 17. The tilting action of the weapon attachment device 5 over the sight unit 17 performs an imaginary circular arc c essentially with the same radius as the radius of the circumference of the essentially spherical, hollow body 23. Thereby is achieved that the remote weapon station 1 can be made lower in a transportation mode without the need of making the volume of the sight equipment smaller.

[0046] In FIG. 6 is schematically illustrated a compact motor driving system 43 using the same axis X1, X3 for the transverse rotations of both the sensor unit 17 and the weapon support 3. The first axis X1 coincides with the third axis X3. A first rotor 45 is arranged rotatable about the common transverse axis X1 and X3 and is connected to the legs 11 of the weapon support 3 and via a first bearing 47 connected to the weapon carrier 49, such as a gun boat.

[0047] A first stator 51 actuates the first rotor 45 for transverse rotation of the gun 9. A further second bearing 53 is arranged between the first rotor 45 and a second rotor 55 carrying the circular central section 37, within which the electro-optical sensors 19 are rotatable arranged for elevation rotation about the fourth elevation axis X4. A second stator 57 actuates the second rotor 55 for the transverse rotation of the circular central section 37 and the peripheral sections (not shown) of the sight unit 17.

[0048] In FIG. 7 is shown schematically the aiming of the remote weapon station 1 at a moving target 31. The gun's 9 pointing direction and the sight line L of the sight unit 17 is broken for sake of clarity and the target 31 is drawn smaller than the remote weapon station 1 for the sake of illustration. An aiming-off angle α is required as the target 31 is moving. The compact remote weapon station's 1 sight unit 17 detecting the target 31 is rotated independently of the gun's 9 motion. By means of the control unit 25 is estimated the required aiming-off angle α, dependent upon the velocity of the target 31 and eventually the velocity of the carrier carrying the remote weap-

on station 1. Also parameters as wind direction and speed etc. are considered. An uniaxial rate gyro is stabilizing the gun 9 via an elevation drive unit 27 and a transverse drive unit arranged at the second elevation axis X2 and the transverse axis, and the electro-optical sensors 19 are stabilized via a sensor unit elevation drive system (not shown) of an elevation drive system and transverse drive system arranged within the circular central section 37 of the sight unit 17.

[0049] The remote weapon station 1 is according to one embodiment of the invention provided with a weapon support 3 being comprised in a motorized gun control system. Thereby is achieved that the remote weapon station 1 is applicable to an available carrier, such as a truck, car, gun boat, tank, helicopter etc.

[0050] The sight unit 17 of the remote weapon station 1 can control at least one separate weapon 60 placed at a distance from the remote weapon station 1.Control is achieved by means of being directly connected to the weapon, illuminating the target for the weapon or providing in-the-air guidance to the weapon or a combination of any of these means.

[0051] The invention is not limited to a specific embodiment herein, but may also consist of several combinations of the presented embodiments. For example, only one peripheral half section can provide an aperture and none in the other section. Alternatively, the elevation drive system and transverse drive system may be arranged in one of the supports of the sight unit. For example, the sight unit's hollow body can have a central section being rotatable and two outer section acting as supports (fork-shaped assembly) or the section being supported by only one peripheral support. Of course, the sight unit may be placed between the weapon support and the weapon attachment device by mounting the sight unit "hanging" under the weapon attachment device or adjacent the same.

Claims

1. A remote weapon station comprising a weapon support (3) adapted for rotatable motion about a first transverse axis (X1), the weapon support (3) including a platform (13) supporting a weapon attachment device (5) supporting a weapon (9), said weapon attachment device being rotatable about a second elevation axis (X2) perpendicular to the first transverse axis (X1), the remote weapon station (1) further comprising a sight unit (17) rotatable about a third transverse axis (X3) and about a fourth elevation axis (X4), perpendicular to the third transverse axis,
characterized in that
said sight unit (17) is rotatable about said third transverse axis (X3) and said fourth elevation axis (X4) independently of the position or rotation of the weapon support (3) about the first transverse axis (X1) and of the weapon attachment device (5) about the second elevation axis (X2),
and **in that** the sight unit (17) is mounted to the platform and arranged between the platform (13) of the weapon support (3) and the weapon (9) attached to the weapon attachment device (5) and **in that** the weapon's bore axis is stabilized in two axes and the sight unit's line of sight is stabilized in two axes.

2. The remote weapon station according to claim 1, wherein the weapon support (3) is rotatable about the first transverse axis (X1) independently of the rotatable motion of the sight unit (17) about the third transverse axis (X3) such that the weapon (9) can be directed in essentially another direction relatively the line of sight of the sight unit (17).

3. The remote weapon station according to any of claims 1 or 2, wherein the weapon support (3) also is arranged to be controlled to rotate about the first transverse axis (X1) dependent upon the rotatable motion of the sight unit (17) about the third transverse axis (X3).

4. The remote weapon station according to any of the preceding claims, wherein the first axis (X1) coincides with the third axis (X3).

5. The remote weapon station according to any of the preceding claims, wherein the sight unit (17) comprises a first essentially spherical, hollow body (23) which interacts with a second essentially rotationally symmetrical body (35), both bodies being rotatable in relation to one another relative to the third transverse axis (X3), the spherical body (23) accommodating at least one electro-optical sensor (19), the sensor (19) being rotatable about the fourth elevation axis (X4).

6. The remote weapon station according to claim 5, wherein the weapon support (3) comprises a tiltable leg arrangement (41) supporting the weapon attachment device (5), the leg arrangement (41) being tiltable over the first essentially spherical, hollow body (23).

7. The remote weapon station according to any of claims 1-4, wherein the sight unit (17) comprises a first essentially cylindrical, hollow body (33) accommodating at least one electro-optical sensor (19).

8. The remote weapon station according to any of the preceding claims, wherein an essentially transparent hollow body (23, 33) encloses all interior movable parts, such as electro-optical sensors, of the sight unit (17) for protecting and hiding said parts.

9. The remote weapon station according to any of the

preceding claims, wherein the weapon support (3) being comprised in a gun control system.

10. The remote weapon station according to any of the preceding claims, wherein the sight unit (17) is adapted for controlling or guiding at least one weapon (60) disposed at a distance from the remote weapon station (1).

Patentansprüche

1. Fernwaffenstation, umfassend einen Waffenträger (3), geeignet für eine Drehbewegung um die erste Querachse (X1), wobei der Waffenträger (3) eine Plattform (13) einschließt, die eine Waffenbefestigungsvorrichtung (5) trägt, die eine Waffe (9) trägt, wobei die Waffenbefestigungsvorrichtung um eine zweite Höhenachse (X2), senkrecht verlaufend zu der ersten Querachse (X1), drehbar ist, wobei die Fernwaffenstation (1) des Weiteren eine Visiereinheit (17) umfasst, die um eine dritte Querachse (X3) und um eine vierte Höhenachse (X4), senkrecht verlaufend zu der dritten Querachse, drehbar ist,
dadurch gekennzeichnet, dass
die Visiereinheit (17) um die dritte Querachse (X3) und die vierte Höhenachse (X4) drehbar ist, unabhängig von der Position oder der Drehung des Waffenträgers (3) um die erste Querachse (X1) und der Position oder der Drehung der Waffenbefestigungsvorrichtung (5) um die zweite Höhenachse (X2),
und dass
die Visiereinheit (17) an die Plattform montiert und zwischen der Plattform (13) des Waffenträgers (3) und der an die Waffenbefestigungsvorrichtung (5) befestigten Waffe (9) angeordnet ist,
und dass
die Bohrungsachse der Waffe in zwei Achsen stabilisiert ist und die Visierlinie der Visiereinheit in zwei Achsen stabilisiert ist.

2. Fernwaffenstation nach Anspruch 1, wobei der Waffenträger (3) um die erste Querachse (X1) drehbar ist, unabhängig von der Drehbewegung der Visiereinheit (17) um die dritte Querachse (X3), so dass die Waffe (9) in eine wesentlich andere Richtung, bezogen auf die Visierlinie der Visiereinheit (17), gerichtet werden kann.

3. Fernwaffenstation nach einem der Ansprüche 1 oder 2, wobei der Waffenträger (3) auch angeordnet ist, dass er gesteuert werden kann, sich, in Abhängigkeit von der Drehbewegung der Visiereinheit (17) um die dritte Querachse (X3), um die erste Querachse (X1) zu drehen.

4. Fernwaffenstation nach einem der vorstehenden Ansprüche, wobei die erste Achse (X1) mit der dritten Achse (X3) zusammenfällt.

5. Fernwaffenstation nach einem der vorstehenden Ansprüche, wobei die Visiereinheit(17) einen ersten, im Wesentlichen kugelförmigen Hohlkörper (23) umfasst, der mit einem zweiten, im Wesentlichen rotationssymmetrischen Körper (35) interagiert, wobei beide Körper in Bezug aufeinander relativ zu der dritten Querachse (X3) drehbar sind, wobei der kugelförmige Körper (23) mindestens einen elektrooptischen Sensor (19) beherbergt, wobei der Sensor (19) um die vierte Höhenachse (X4) drehbar ist.

6. Fernwaffenstation nach Anspruch 5, wobei der Waffenträger (3) eine kippbare Schenkelanordnung (41) umfasst, die die Waffenbefestigungsvorrichtung (5) trägt, wobei die Schenkelanordnung (41) über den ersten, im Wesentlichen kugelförmigen Hohlkörper (23) gekippt werden kann.

7. Fernwaffenstation nach einem der Ansprüche 1 bis 4, wobei die Visiereinheit (17) einen ersten, im Wesentlichen zylindrischen Hohlkörper (33) umfasst, der mindestens einen elektrooptischen Sensor (19) beherbergt.

8. Fernwaffenstation nach einem der vorstehenden Ansprüche, wobei ein im Wesentlichen transparenter Hohlkörper (22, 33) alle inneren beweglichen Teile, wie elektrooptische Sensoren, der Visiereinheit (17) zum Schutz und zum Verbergen der Teile umschließt.

9. Fernwaffenstation nach einem der vorstehenden Ansprüche, wobei der Waffenträger (3) in einem Geschützsteuersystem enthalten ist.

10. Fernwaffenstation nach einem der vorstehenden Ansprüche, wobei die Visiereinheit (17) zum Steuern oder Führen von mindestens einer Waffe (60), die in einer Distanz zu der Fernwaffenstation (1) angeordnet ist, geeignet ist.

Revendications

1. Base d'arme éloignée comprenant un support (3) d'arme adapté en vue d'un mouvement rotatif autour d'un premier axe transversal (X1), le support (3) d'arme incluant une plateforme (13) supportant un dispositif de fixation (5) d'arme supportant une arme (9), ledit dispositif de fixation d'arme pouvant tourner autour d'un deuxième axe d'élévation (X2) perpendiculaire au premier axe transversal (X1), la base d'arme éloignée (1) comprenant en outre une unité de visée (17) pouvant tourner autour d'un troisième axe transversal (X3) et autour d'un quatrième axe d'élévation (X4), perpendiculaire au troisième axe

transversal, **caractérisée en ce que** ladite unité de visée (17) peut tourner autour dudit troisième axe transversal (X3) et dudit quatrième axe d'élévation (X4), indépendamment de la position ou de la rotation du support (3) d'arme autour du premier axe transversal (X1) et du dispositif de fixation (5) d'arme autour de la deuxième axe d'élévation (X2), et **en ce que** l'unité de visée (17) est montée sur la plateforme et agencée entre la plateforme (13) du support (3) d'arme et l'arme (9) montée sur le dispositif de fixation (5) d'arme et **en ce que** l'axe de trou de l'arme est stabilisé sur deux axes et la ligne de visée de l'unité de visée est stabilisée sur deux axes.

2. Base d'arme éloignée selon la revendication 1, dans laquelle le support (3) d'arme peut tourner autour du premier axe transversal (X1) indépendamment du mouvement rotatif de l'unité de visée (17) autour du troisième axe transversal (X3) de telle sorte que l'arme (9) peut être dirigée essentiellement dans une autre direction par rapport à la ligne de visée de l'unité de visée (17).

3. Base d'arme éloignée selon l'une quelconque des revendications 1 ou 2, dans laquelle le support (3) d'arme est également conçu pour être commandé afin de tourner autour du premier axe transversal (X1) en fonction du mouvement de rotation de l'unité de visée (17) autour du troisième axe transversal (X3).

4. Base d'arme éloignée selon l'une quelconque des revendications précédentes, dans le premier axe transversal (X1) coïncide avec le troisième axe (X3).

5. Base d'arme éloignée selon l'une quelconque des revendications précédentes, dans laquelle l'unité de visée (17) comprend un premier corps creux essentiellement sphérique (23) qui interagit avec un deuxième corps essentiellement symétrique en rotation (35), les deux corps pouvant tourner l'un par rapport à l'autre par rapport au troisième axe transversal (X3), le corps sphérique (23) accueillant au moins un capteur électro-optique (19), le capteur (19) pouvant tourner autour du quatrième axe d'élévation (X4).

6. Base d'arme éloignée selon la revendication 5, dans laquelle le support (3) d'arme comprend un agencement de pattes inclinables (41) supportant le dispositif de fixation (5) d'arme, l'agencement de pattes (41) tant inclinable sur le premier corps creux essentiellement sphérique (23).

7. Base d'arme éloignée selon l'une quelconque des revendications 1-4, dans laquelle l'unité de visée (17) comprend un premier corps creux essentiellement cylindrique (33) accueillant au moins un capteur électro-optique (19).

8. Base d'arme éloignée selon l'une quelconque des revendications précédentes, dans laquelle un corps creux essentiellement transparent (23, 33) renferme toutes les pièces intérieures mobiles, telles que les capteurs électro-optiques, de l'unité de visée (17) pour protéger et cacher lesdites pièces.

9. Base d'arme éloignée selon l'une quelconque des revendications précédentes, dans laquelle le support (3) d'arme est compris dans un système de commande de pistolet.

10. Base d'arme éloignée selon l'une quelconque des revendications précédentes, dans laquelle l'unité de visée (17) est adaptée pour commander ou guider au moins une arme (60) disposée à une distance de la base d'arme éloignée (1).

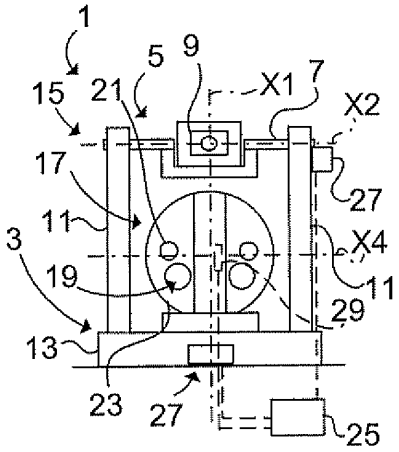


Fig. 1a

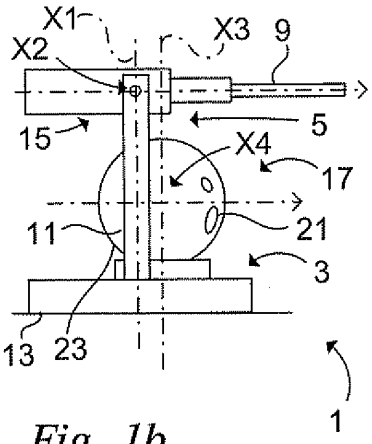


Fig. 1b

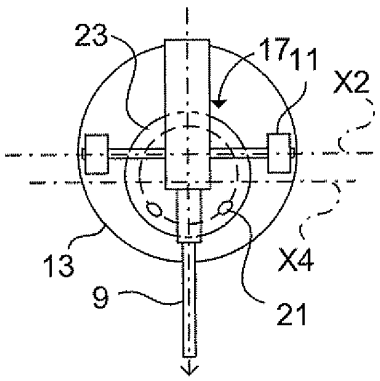


Fig. 1c

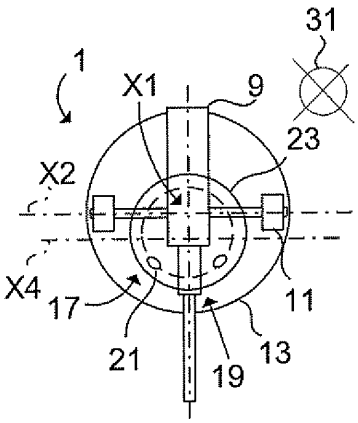


Fig. 2a

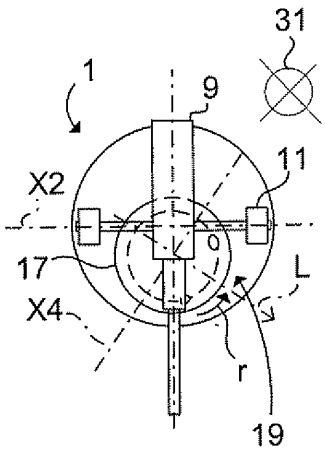


Fig. 2b

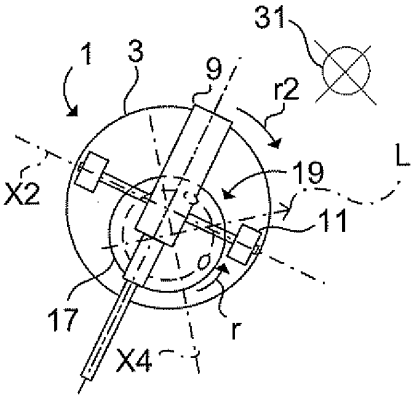


Fig. 2c

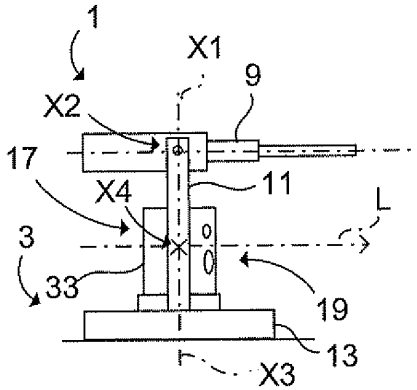


Fig. 3a

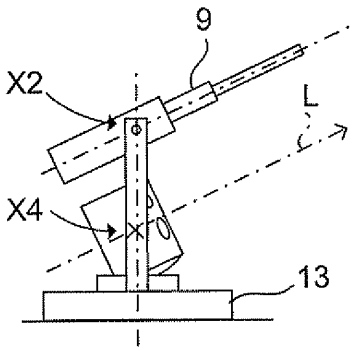


Fig. 3b

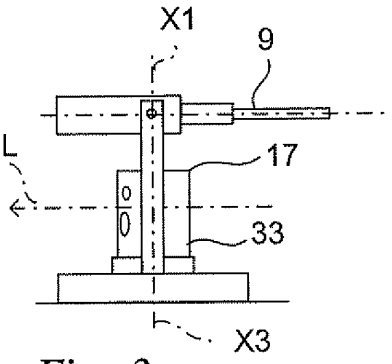


Fig. 3c

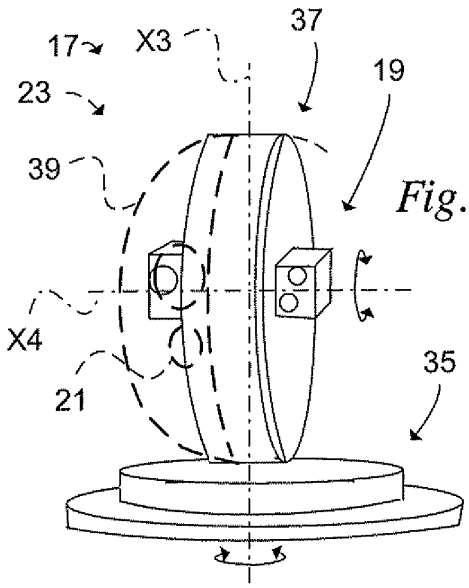


Fig. 4

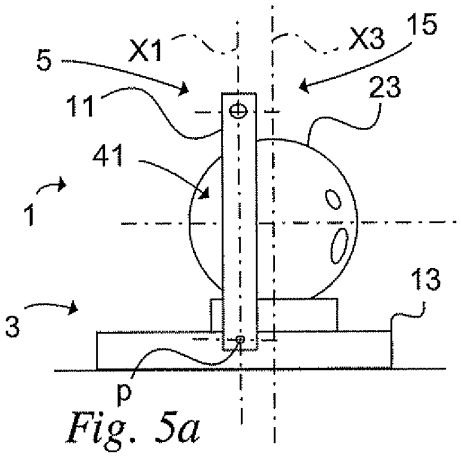


Fig. 5a

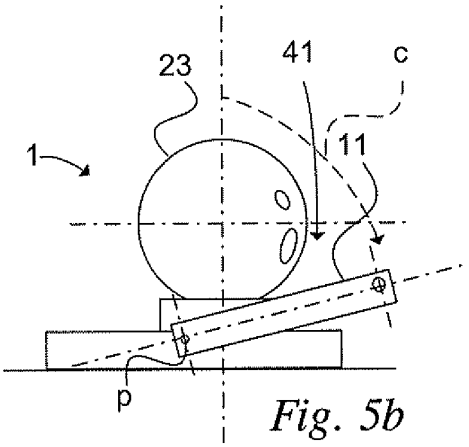


Fig. 5b

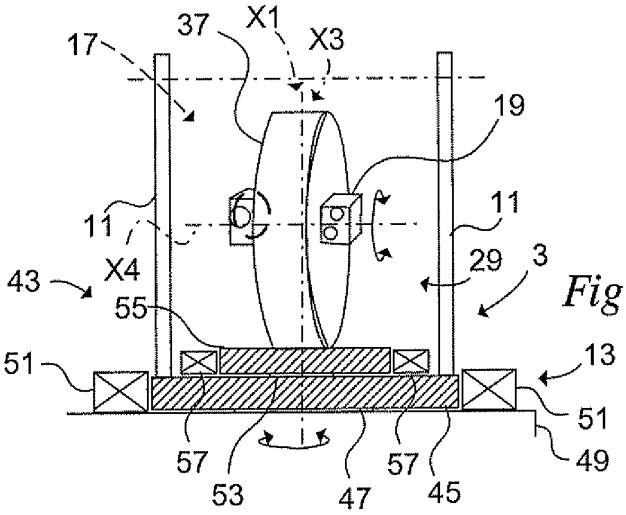
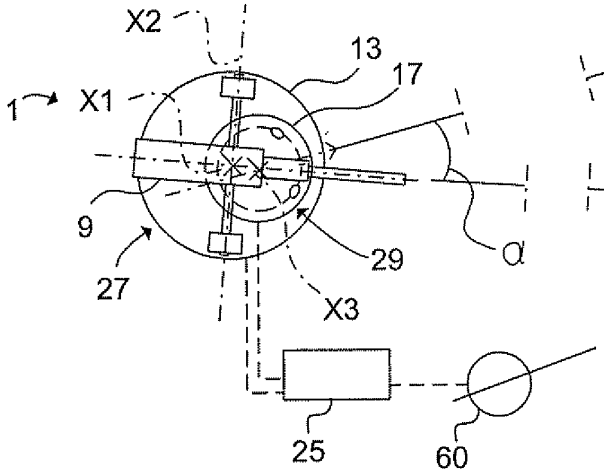


Fig. 6



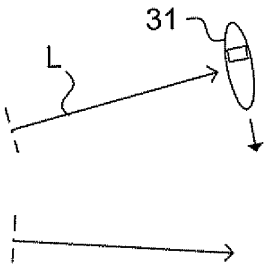


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5273236 A **[0005]**
- US 4576346 A **[0005]**
- EP 111192 A **[0006]**