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(54) **FIREARM HANDGRIP WITH A HORIZONTAL ANGLE TRACKING BIPOD**

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(57) **ABSTRACT**

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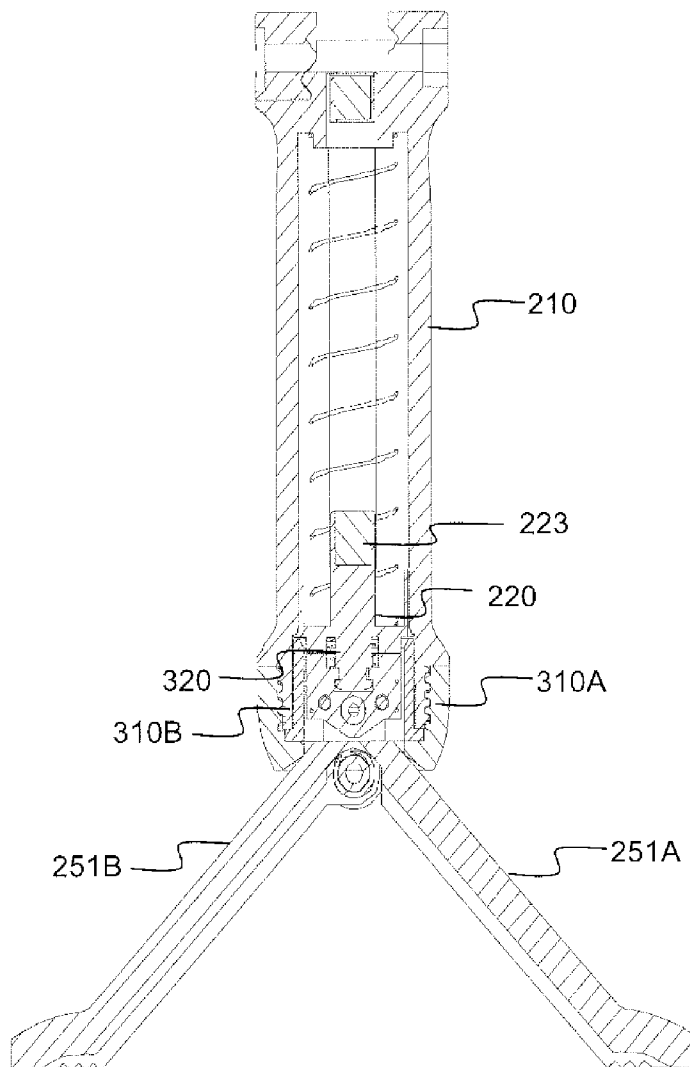
A firearm handgrip with a collapsible and concealable bipod positioned within the handgrip. The bipod enables tracking of the horizontal angle of the firearm. Specifically, the bipod is quickly deployable by pressing a button that activates a highly reliable release mechanism. Upon bipod deployment, the shooter is free to place the bipod on any surface, including uneven surfaces wherein the bipod legs are positioned on different heights so that the bipod maintains stability. The bipod enables panning (horizontal rotation), tilting (up-down) and canting (right-left) of the firearm. Additionally, after panning the firearm and subsequently lifting the bipod from the surface it lies on, the bipod's legs automatically realign to a plane perpendicular to the firearm, thus tracking and adjusting to the new horizontal angle of the firearm.

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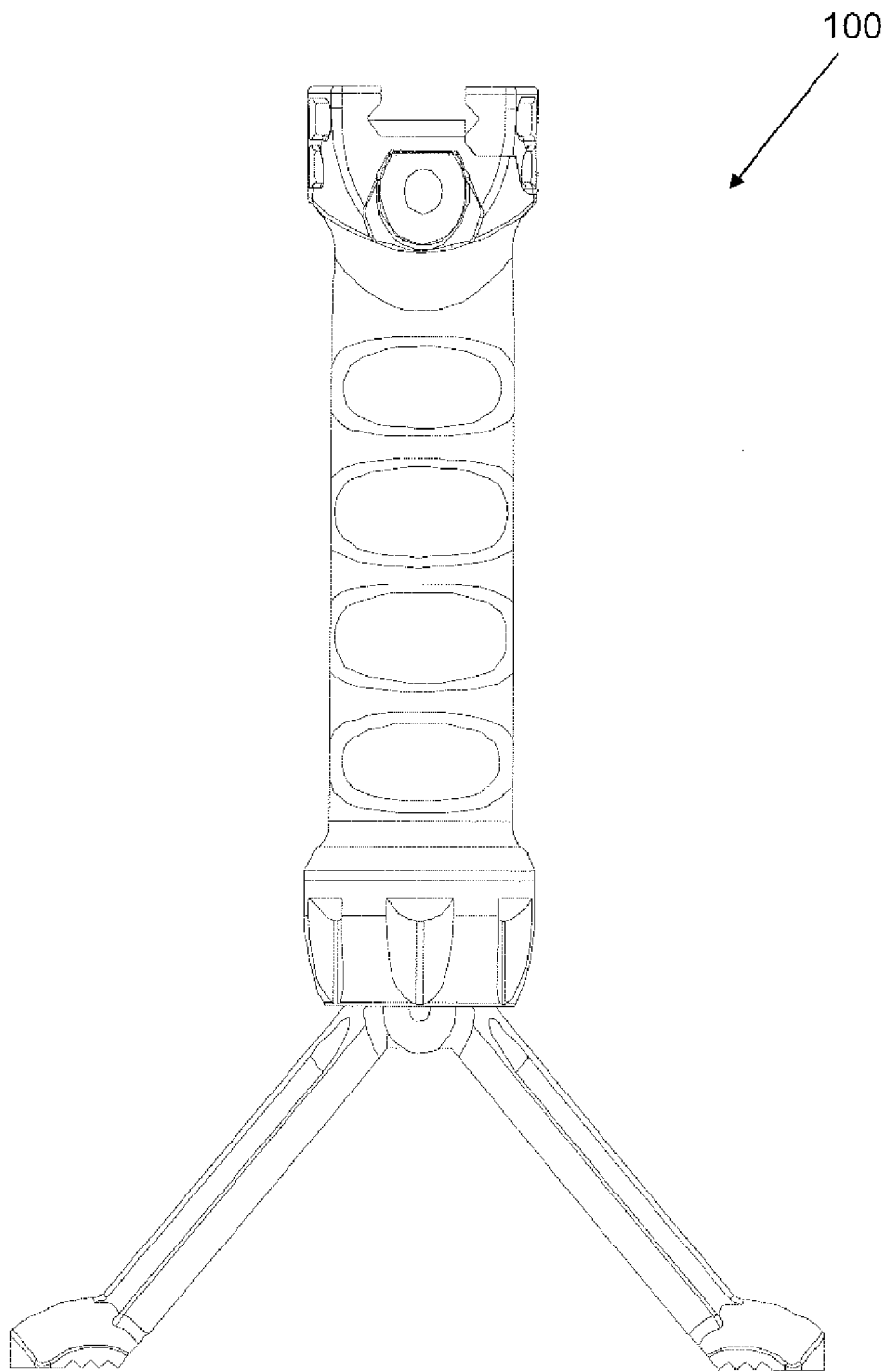


FIG. 1

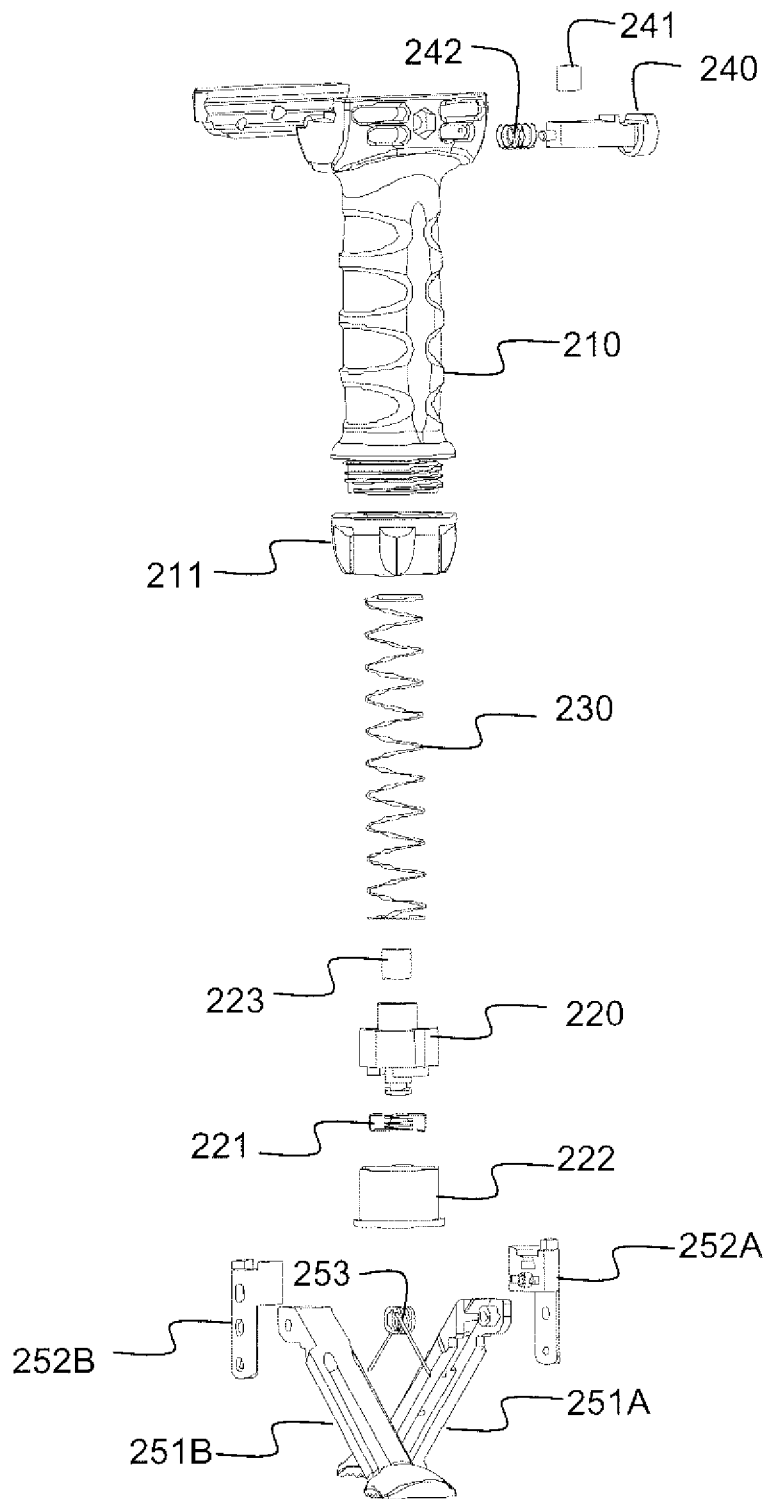


FIG. 2

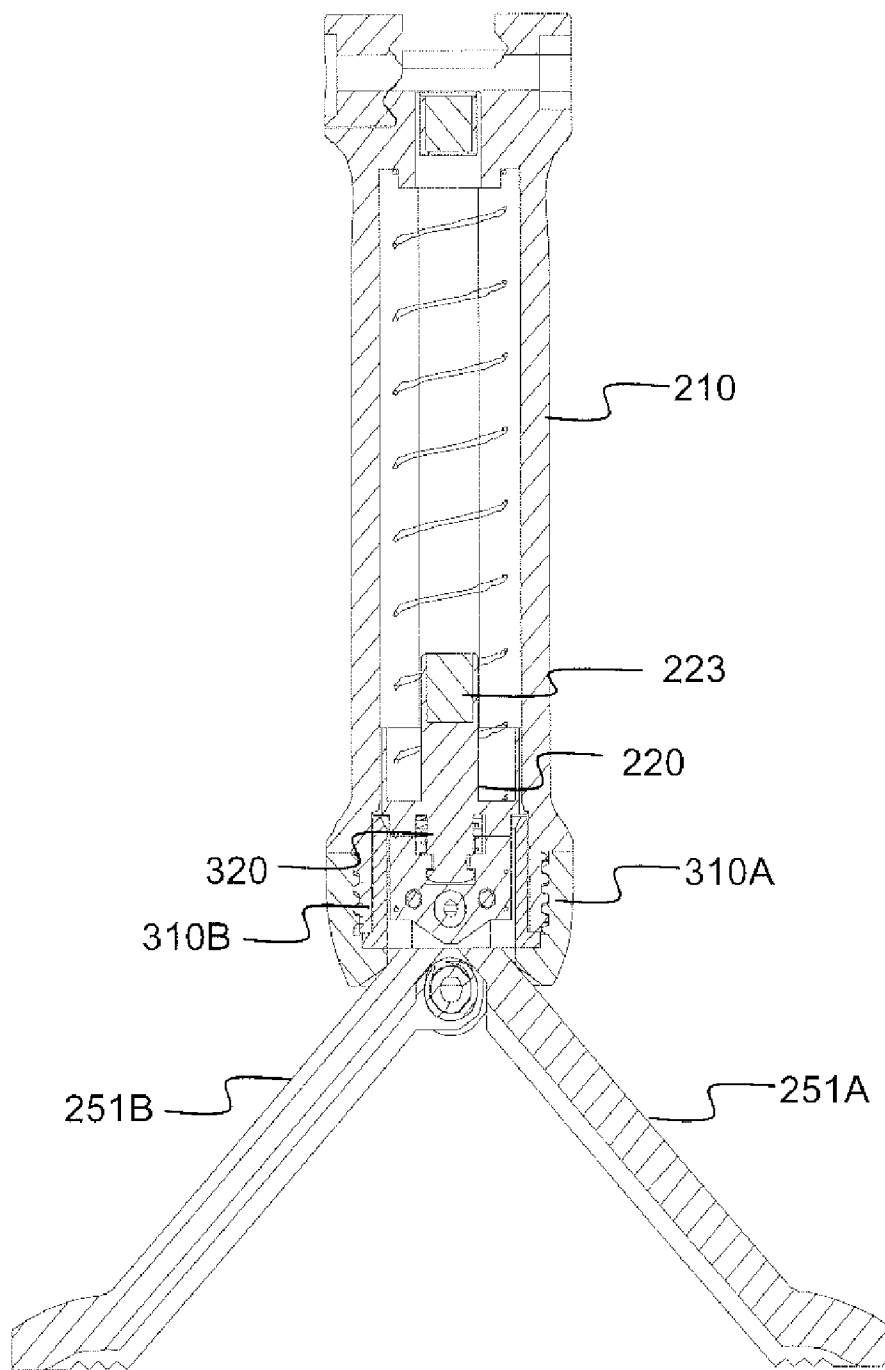


FIG. 3

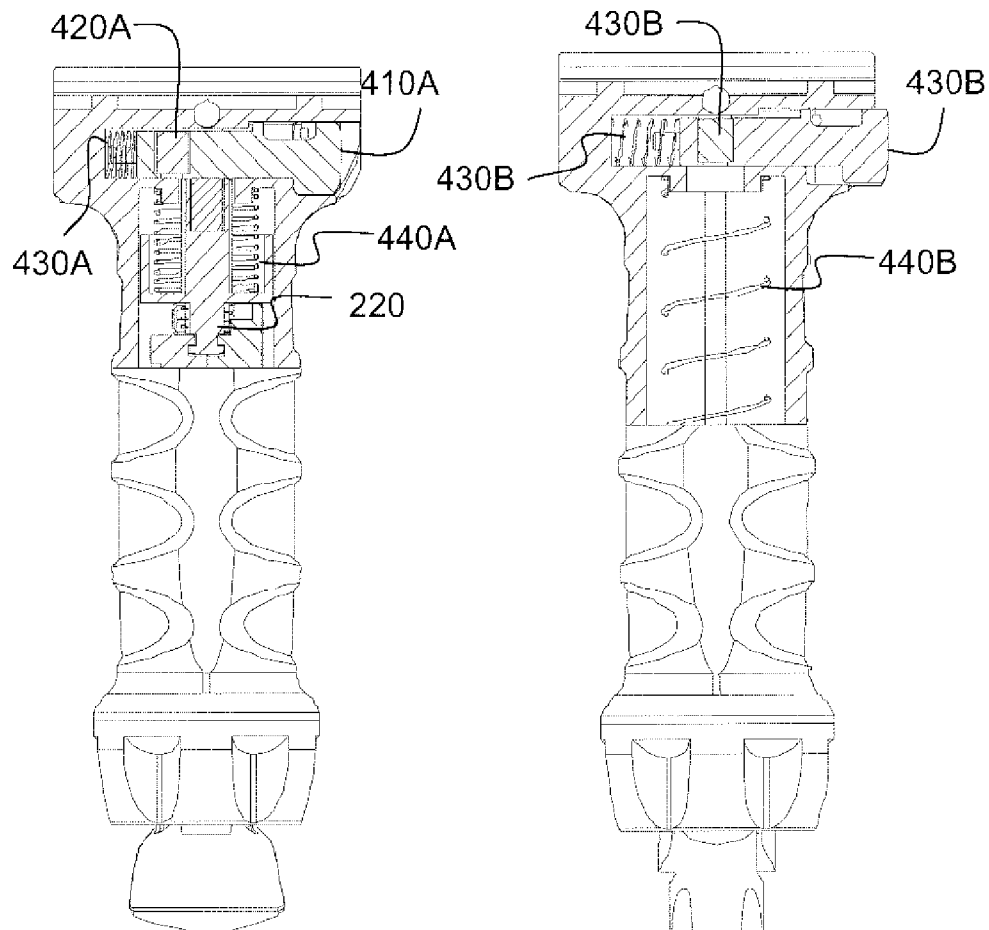


FIG. 4A

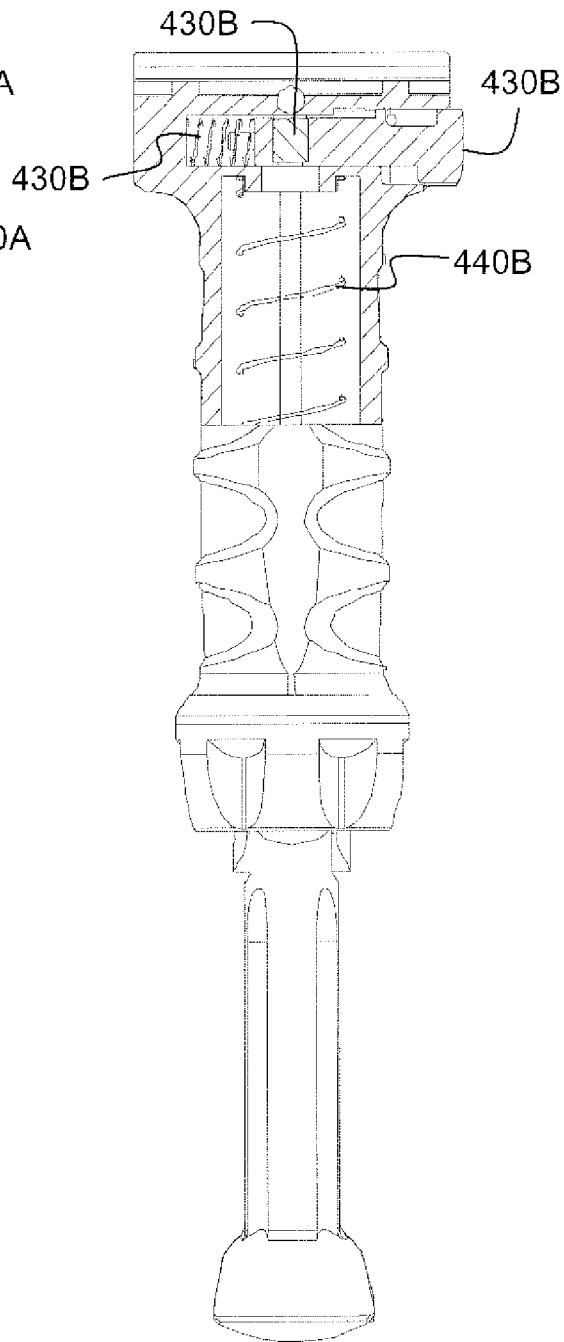


FIG. 4B

FIREARM HANDGRIP WITH A HORIZONTAL ANGLE TRACKING BIPOD

FIELD OF THE INVENTION

[0001] The present invention relates generally to firearm accessories and more specifically to a firearm handgrip with a bipod.

BACKGROUND OF THE INVENTION

[0002] Shooting firearms, specifically during combat requires maintaining a steady and stable position to insure accuracy of aim. Stabilizing the firearm manually, simply by holding it tight is usually impractical due to the size and weight of the firearm. Therefore, peripheral support devices have been developed during the years for use in conjunction with firearms as a means for stabilizing and improving accuracy.

[0003] Early stabilizing means were large stationary objects such as rocks and tree branches to forked sticks, shooting slings, bipods and tripods. In more recent times, compact collapsible bipod supports have been developed. These collapsible bipods are relatively lightweight and are mountable to the forearm stock of a firearm. Most conventional bipod supports include a pair of legs that can be pivoted from an up position adjacent the firearm stock, to a down position engaging a support surface.

[0004] Tracking moving targets requires several different motions of the firearm in the hand of the shooter. The first motion is horizontal or lateral rotation, also referred to as "panning". Another motion is sometimes required when the shooter places the bipod on an uneven support surface. In this case, the firearm has to be rotated around the axis of the bore. This motion is also referred to as "canting."

[0005] Several attempts have been made in designing compact, ergonomic bipods that are both collapsible and concealable within a handgrip of a firearm. Some references focus on the quick deployment of the bipods whereas other references focus on lock mechanisms that lock the bipod upon deployment.

[0006] U.S. Pat. No. 7,111,424, which is incorporated by reference in its entirety herein, discloses a fore grip or a gun handle with a concealable and collapsible bipod that requires only one action to deploy and lock the bipod. Specifically, locking the bipod prevents the abovementioned motions (panning, tilting canting) and therefore the suggested bipod is limited to shooting activities where these motions are not required.

[0007] U.S. Patent Application No. 2005/0241206, which is incorporated by reference in its entirety herein, discloses a hollow grip handle with a bipod for quick deployment. When the legs are extended, and placed on a support surface, the weight of the weapon causes the feet to pivot against the bias springs to align the feet with the support surface. In addition, stop members allow a desired degree of horizontal rotation of the leg assembly relative to the housing. The relative rotation permits the weapon to be horizontally pivoted to engage the target without the need to move or shift the feet relative to the underlying support surface.

[0008] Sometimes during combat it is required to perform panning of a target (horizontal tracking) for a while prior to shooting. In the case that the angle of rotation is substantial, the accuracy of the shooting is decreased. It would be advantageous therefore to have a quick deployment bipod that

tracks the horizontal rotation angle of the firearm and enables a quick realignment of the bipod, for an accurate shooting.

SUMMARY OF THE INVENTION

[0009] The present invention discloses a firearm handgrip with a collapsible and concealable bipod positioned within the handgrip. The bipod enables tracking of the horizontal angle of the firearm. Specifically, the bipod is quickly deployable by pressing a button that activates a highly reliable release mechanism. Upon bipod deployment, the shooter is free to place the bipod on any surface, including uneven surfaces wherein the bipod legs are positioned on different heights so that the bipod maintains stability. The bipod enables panning (horizontal rotation) and canting (right-left) of the firearm. Additionally, after panning the firearm and subsequently lifting the bipod from the surface it lies on, the bipod's legs automatically realign to a plane perpendicular to the firearm, thus tracking and adjusting to the new horizontal angle of the firearm.

[0010] The handgrip comprises four main elements: The first element is a hollow housing that may be mountable to a firearm. The housing may be composed of aluminum, hardened polymer, composite material and the like. The second element is a bipod that enables panning and canting and further enables tracking a horizontal angle for quick realignment of the bipod legs. The third element is a compression spring for forcing deployment of the bipod and the third element is a release mechanism for releasing the spring and deploying the bipod.

[0011] The steps of the method according to the present invention are: (a) releasing the bipod from the handgrip resulting in bipod deployment upon a support surface; (b) horizontally rotating the firearm in accordance with a moving target and finally (c) lifting the bipod from the support surface, causing the legs of the bipod to realign so that the plane of the legs becomes substantially perpendicular to the firearm.

BRIEF DESCRIPTION OF DRAWINGS

[0012] The subject matter regarded as the invention will become more clearly understood in light of the ensuing description of embodiments herein, given by way of example and for purposes of illustrative discussion of the present invention only, with reference to the accompanying drawings (Figures, or simply "FIGS."), wherein:

[0013] FIG. 1 is an elevational view of an embodiment of the invention showing the firearm handgrip with the bipod in a deployment position;

[0014] FIG. 2 is an exploded view of an embodiment of the invention showing the firearm handgrip;

[0015] FIG. 3 is a cross-sectional view of an embodiment of the invention showing the firearm handgrip with the bipod in a deployment position; and

[0016] FIG. 4A and FIG. 4B are cross-sectional views of an embodiment of the invention showing the firearm handgrip with the bipod in a stored and deploy positions respectively;

[0017] Further, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements.

DETAILED DESCRIPTION OF THE INVENTION

[0018] FIG. 1 shows an elevational view of an embodiment of the invention showing the firearm handgrip **100** with the

bipod in after deployment 101. The handgrip 100 enables the shooter to practice all the motions required in combat. Specifically, the handgrip 100 may be horizontally rotated around its axis in a panning motion 1102. Finally, the handgrip 100 may be canted to the right 103B and to the left 103A in order to fit the bipod to an uneven support surface.

[0019] FIG. 2 shows an exploded view of an embodiment of the invention showing the firearm handgrip 100. The handgrip 100 comprises a hollow housing 210 mountable to a firearm. The housing 210 has a top end with a horizontal channel and an open bottom end. The handgrip 100 further comprises a bipod comprising a vertically sliding piston 220 located within the housing 210. The piston 220 has a top end and a bottom end. The handgrip 100 further comprises two legs 252A, 252B hingedly connected to the bottom end of said piston 220, wherein a first torsion spring 253 positioned between the legs 252A, 252B causes the legs 252A, 252B to expand outwardly whenever the legs 252A, 252B are released from the housing 210. The bipod further comprises a tracking mechanism comprising a horizontally positioned second torsion spring 221 having a first end and a second end, wherein the first end is connected to the legs 252A, 252B and the second end is connected to the bottom end of the piston 220. The deployment of the bipod is achieved by a first compression spring 231 positioned within the housing 210 between the top end of the housing 210 and the top end of the piston 220. At the top end of the housing a release mechanism for releasing the first compression spring 230 and pushing the piston 220 down causing the deployment of the bipod.

[0020] Upon the deployment of the bipod and stabilizing the bipod on a support surface, the handgrip 100 enables panning the firearm horizontally. The tracking mechanism is configured so that upon lifting the firearm from the support surface, the legs 252A, 252B track the new horizontal angle of the firearm and the plane including the legs 252A, 252B aligns substantially perpendicularly to the firearm.

[0021] FIG. 3 shows a cross-sectional view of an embodiment of the invention showing the firearm handgrip with the bipod in a deployment position. The horizontal tracking mechanism is depicted in details. The piston 220 is positioned at the bottom end of the housing 210. The horizontal torsion spring 320 is connected to the bottom end of the piston 220 in one end and to the legs 252A, 252B on the other end. The inner side of the bottom end of the housing may be threaded, 310A, 310B so that it may serve as outline for panning movements.

[0022] FIG. 4A and FIG. 4A show cross-sectional views of an embodiment of the invention showing the firearm handgrip with the bipod in a stored and deploy positions respectively; These figures illustrates the operation of the release mechanism: Whenever the bipod is in the stored positioned, the first compression spring 440A is compressed between the piston and the bottom side of you bottom. The ram 410A is fitted within the channel and both magnet pieces 420A and 450A are aligned so that they attract each other. The magnetic attraction power is selected so that it overcomes the expansion power of the first compression spring 440A. Then, pushing the ram 430B inside realigns the magnets so that the magnetic attraction force decreases and so the compression spring 440B is release, pushing down the piston and the legs. The magnetic release mechanism is more reliable than mechanical mechanism, as there is practically no contact between the first compression spring and the ram.

[0023] According to some embodiments of the invention, the invention may also be practices as a method. The method is a method for tracking the horizontal angle of a firearm using a handgrip with a deployable bipod. The steps of the method are: (a) releasing the bipod from the handgrip resulting in bipod deployment upon a support surface; (b) horizontally rotating the firearm in accordance with a moving target and finally (c) lifting the bipod from the support surface, causing the legs of the bipod to realign so that the plane of the legs becomes substantially perpendicular to the firearm.

[0024] According to other embodiments of the invention, lifting the bipod from the support surface is followed by repositioning the bipod on said support surface and finally shooting the target.

[0025] According to other embodiments of the invention, the method enables canting of the firearm as well as horizontally rotating the firearm in accordance with a moving target.

[0026] In the above description an embodiment is an example or implementation of the inventions. The various appearances of “one embodiment,” “an embodiment” or “some embodiments” do not necessarily all refer to the same embodiments.

[0027] Although various features of the invention may be described in the context of a single embodiment, the features may also be provided separately or in any suitable combination. Conversely, although the invention may be described herein in the context of separate embodiments for clarity, the invention may also be implemented in a single embodiment.

[0028] Reference in the specification to “some embodiments”, “an embodiment”, “one embodiment” or “other embodiments” means that a particular feature, structure, or characteristic described in connection with the embodiments is included in at least some embodiments, but not necessarily all embodiments, of the inventions.

[0029] It is understood that the phraseology and terminology employed herein is not to be construed as limiting and are for descriptive purpose only.

[0030] The principles and uses of the teachings of the present invention may be better understood with reference to the accompanying description, figures and examples.

[0031] It is to be understood that the details set forth herein do not construe a limitation to an application of the invention.

[0032] Furthermore, it is to be understood that the invention can be carried out or practiced in various ways and that the invention can be implemented in embodiments other than the ones outlined in the description below.

[0033] It is to be understood that the terms “including”, “comprising”, “consisting” and grammatical variants thereof do not preclude the addition of one or more components, features, steps, or integers or groups thereof and that the terms are to be construed as specifying components, features, steps or integers.

[0034] If the specification or claims refer to “an additional” element, that does not preclude there being more than one of the additional element.

[0035] It is to be understood that where the claims or specification refer to “a” or “an” element, such reference is not to be construed that there is only one of that element.

[0036] It is to be understood that where the specification states that a component, feature, structure, or characteristic “may”, “might” “can” or “could” be included, that particular component, feature, structure, or characteristic is not required to be included.

[0037] Where applicable, although state diagrams, flow diagrams or both may be used to describe embodiments, the invention is not limited to those diagrams or to the corresponding descriptions. For example, flow need not move through each illustrated box or state, or in exactly the same order as illustrated and described.

[0038] Methods of the present invention may be implemented by performing or completing manually, automatically, or a combination thereof, selected steps or tasks.

[0039] The term “method” may refer to manners, means, techniques and procedures for accomplishing a given task including, but not limited to, those manners, means, techniques and procedures either known to, or readily developed from known manners, means, techniques and procedures by practitioners of the art to which the invention belongs.

[0040] The descriptions, examples, methods and materials presented in the claims and the specification are not to be construed as limiting but rather as illustrative only.

[0041] Meanings of technical and scientific terms used herein are to be commonly understood as by one of ordinary skill in the art to which the invention belongs, unless otherwise defined.

[0042] The present invention can be implemented in the testing or practice with methods and materials equivalent or similar to those described herein.

[0043] Any publications, including patents, patent applications and articles, referenced or mentioned in this specification are herein incorporated in their entirety into the specification, to the same extent as if each individual publication was specifically and individually indicated to be incorporated herein. In addition, citation or identification of any reference in the description of some embodiments of the invention shall not be construed as an admission that such reference is available as prior art to the present invention.

[0044] While the invention has been described with respect to a limited number of embodiments, these should not be construed as limitations on the scope of the invention, but rather as exemplifications of some of the embodiments. Those skilled in the art will envision other possible variations, modifications, and applications that are also within the scope of the invention. Accordingly, the scope of the invention should not be limited by what has thus far been described, but by the appended claims and their legal equivalents. Therefore, it is to be understood that alternatives, modifications, and variations of the present invention are to be construed as being within the scope and spirit of the appended claims.

What is claimed is:

1. A firearm handgrip with a horizontal angle tracking bipod, said handgrip comprising:
 - a hollow housing mountable to a firearm;
 - a bipod that enables panning and canting and further comprises a first torsion spring that enables tracking a horizontal angle for quick realignment of the bipod legs;
 - a first compression spring for forcing deployment of the bipod;
 - a release mechanism for releasing the spring and deploying the bipod;
2. The handgrip according to claim 1, wherein the hollow housing comprises a top end with a horizontal channel going through and an open bottom end;
 - and wherein the bipod comprises
 - a vertically sliding piston located within the housing, said piston having a top end and a bottom end;

- two legs hingedly connected to the bottom end of said piston;
 - a first torsion spring positioned between the legs causing the legs to expand outward whenever the legs are released from the housing;
 - a tracking mechanism comprising a horizontally positioned second torsion spring having a first end and a second end, wherein the first end is connected to the legs and the second end is connected to the bottom end of the piston;
- wherein upon bipod deployment and stabilizing the bipod on a surface, the handgrip enables panning a firearm horizontally;
- and wherein upon lifting the firearm from said surface, the legs track the new horizontal angle of the firearm and align in a substantially perpendicular manner to the firearm.
3. The handgrip according to claim 2, wherein the first compression spring is positioned within the housing between the top end of the housing and the top end of the piston.
 4. The handgrip according to claim 1, wherein the release mechanism for releasing the first compression spring, causes pushing the piston down enabling the deployment of the bipod.
 5. The handgrip according to claim 2, wherein upon bipod deployment, the handgrip enables panning the firearm in a horizontal rotational motion.
 6. The handgrip according to claim 2, wherein upon bipod deployment, the handgrip enables canting the firearm in a rotational motion around the bore of the firearm.
 7. The handgrip according to claim 2, wherein upon bipod deployment, the legs adjust to an uneven surface, wherein one leg is positioned higher than the other leg and wherein stabilized panning is achieved.
 8. The handgrip according to claim 2, wherein the piston further comprises a first magnet piece positioned at the top end of said piston and wherein the release mechanism comprises:
 - a ram that is fitted into the channel in the top end of the housing; and
 - a second magnet piece positioned within said ram; and
 - a second compression spring positioned between one end of the ram and the housing;
 wherein the polarity of the first magnet piece and the second magnet piece is opposite and wherein the magnetic attraction between the pieces overcomes the counter compression power of the first compression spring in the compressed position;
 - and wherein sliding the ram along the channel decreases the overlap between the magnetic pieces and the magnetic attraction between them until the first compression spring is released, which causes the deployment of the bipod.
 9. The handgrip according to claim 1, wherein the housing is made from at least one of the following materials: aluminum, hardened polymer, composite material.
 10. A method for tracking the horizontal angle of a firearm using a handgrip with a deployable bipod, said method comprising the steps of:
 - releasing the bipod from the handgrip resulting in bipod deployment upon a support surface;
 - horizontally rotating the firearm in accordance with a moving target;

lifting the bipod from the support surface, causing the legs of the bipod to realign so that the plane of the legs becomes substantially perpendicular to the firearm.

11. The method according to claim **10**, wherein lifting the bipod from the support surface is followed by repositioning the bipod on said support surface.

12. The method according to claim **10**, wherein horizontally rotating the firearm in accordance with a moving target is performed while canting the firearm to adjust the bipod to an uneven support surface.

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