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(54) **M240 MACHINE GUN BARREL ASSEMBLY**

LAUFBAUGRUPPE FÜR M240 MASCHINENGEWEHR

ENSEMBLE CANON POUR MITRAILLEUSE M240

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Description

TECHNICAL FIELD

[0001] The present invention relates to an M240 machine gun barrel assembly.

BACKGROUND ART

[0002] The M240 machine gun has generally been used by the United States military since at least about the late 1970's. Currently, the firearm has multiple applications being used by both infantry as well as with vehicles, both on land and on water. In use, the M240 machine gun is often fired from an integrated bipod or from a mount that may be attached to a vehicle or a fixed location. While not the lightest machine gun in use, the firearm is very reliable and relatively standardized among the NATO countries.

[0003] Historically, the M240 machine gun was modeled after features of the Browning machine gun of 1919 and the Browning automatic rifle of 1918.

[0004] US2015/0020429 discloses an M240 machine gun barrel assembly comprising: a barrel with a distal end and a proximal end and a bore; the barrel having a barrel axis spanning through the distal end and proximal end of the barrel and parallel with the bore; and a handle assembly with a handle and a handle connector, the handle connector for connecting the handle assembly to the barrel, the handle having a free end and a connected end, the connected end operably connected to the handle connector and the free end not connected to the handle connector and the handle further having a linear axis beginning at the connected end and spanning through the handle and out a centre of the free end of the handle.

[0005] US2131716 discloses an automatic rifle having a barrel and a foldable handle connected to the barrel.

DISCLOSURE OF THE INVENTION

[0006] As used herein, "proximal" refers to a longitudinal direction closer to the butt stock of the firearm than the muzzle of the firearm, and "distal" refers to a longitudinal direction closer to the muzzle of the firearm than the butt stock of the firearm. When "proximally" is used herein to describe the relationship between parts, the term denotes that the part located proximally is closer to the butt stock than the other part. When "distally" is used herein to describe the relationship between parts, the term denotes that the part located distally is closer to the muzzle than the other part.

[0007] Also as used herein, M240 refers to the family of belt-fed, gas operated machine guns which generally fire the 7.62x51mm NATO cartridge. Further as used herein, the term "M240" is generally synonymous with the Belgian FN MAG58 machine gun and is used to include variants. Variants of the M240 machine gun may include but are not limited to the M240B, M240C, M240D, M240G, M240H, M240L, M240E1 and E5, M240L, and M240LW. While discussions of various optional embodiments may describe specific variants of the M240 machine gun, the use of "M240" is intended to include all variants so long as feasible, including when also present in the claims. Also, to the extent semiautomatic versions and/or single shot variants of the M240 machine gun exist, the use of "M240" is intended to include these variants so long as feasible.

[0008] The invention provides an M240 machine gun barrel assembly that includes a barrel with a distal end and a proximal end and a bore; the barrel having a barrel axis spanning through the distal end and proximal end of the barrel and parallel with the bore; and a handle assembly with a handle and a handle connector, the handle connector for connecting the handle assembly to the barrel, the handle having a free end and a connected end, the connected end operably connected to the handle connector and the free end not connected to the handle connector and the handle further having a linear axis beginning at the connected end and spanning through the handle and out a centre of the free end of the handle, characterised in that the handle is operable between a first position with the free end of the handle pointing proximally and a second position with the free end of the handle assembly pointing distally.

[0009] Optionally, the handle of the handle assembly points proximally with the linear axis of the handle oriented about parallel to the barrel axis. In another aspect, the free end of the handle points distally with the linear axis of the handle oriented about parallel to the barrel axis. In yet a further optional aspect, the free end of the handle assembly points distally with the linear axis of the handle oriented away from the barrel axis. In other aspects, the free end of the handle assembly points distally with the linear axis of the handle oriented to intersect the barrel axis.

[0010] Optionally, the M240 machine gun barrel assembly further comprises a release button to operably select between the first position and the second position of the handle. The handle may also include a first notch to engage the release button to orient the handle in the first position with the free end of the handle pointing proximally and a second notch to engage the release button to orient the handle in the second position with the free end of the handle pointing distally.

[0011] As used herein, the term "engage" means to interact with, interlock with, associate with or communicate with.

[0012] The term "providing," and forms thereof, are used in a broad sense, and are referred to, but are not limited to making available for use, enabling usage, giving, supplying, obtaining, getting hold of, acquiring, making ready for use, and/or placing into position ready for use.

[0013] Aside from the structural and procedural arrangements set forth above, the invention could include a number of other arrangements, such as those ex-

plained hereinafter. It is to be understood, that both the foregoing description and the following description are exemplary.

[0014] The accompanying drawings are incorporated in and constitute a part of the specification. The drawings illustrate optional embodiments of the invention and together with the description serve to explain some principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 is an illustration of a prior art M240 machine gun with optic.

Fig. 2 is an illustration of a prior art M240 machine gun with optic.

Fig. 3 is an illustration of an embodiment of a handle oriented with mounted optic.

Fig. 4 is an illustration of an embodiment of a handle oriented with mounted optic.

Fig. 5 is an illustration of an embodiment of a handle with the handle oriented distally.

Fig. 6 is an illustration of an embodiment of a carry handle oriented with the handle oriented proximally.

Fig. 7 is an illustration of an embodiment of a cutaway view of a handle.

Fig. 8 is an illustration of an embodiment of an exploded view of a handle.

DETAILED INVENTION

[0016] While the making and using of various embodiments are discussed in detail below, it should be appreciated that the present invention provides many applicable inventive concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed herein are merely illustrative of specific ways to make and use the invention and do not delimit the scope of the invention.

[0017] Where the various figures may describe embodiments sharing various common elements and features with other embodiments, similar elements and features are given the same reference numerals and redundant description thereof may be omitted below. Generally, different, but similar reference numbers (e.g. 42 and 142) will be used to show that some parts are replaced. Numerals that indicate proximal and distal will generally stay the same even though they might be for different locations on different elements.

[0018] Conditional language used herein, such as, among others, "can," "might," "may," "e.g.," and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or states. Thus, such conditional language is not generally intended to imply that features, elements and/or states are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or states are included or are to be performed in any particular embodiment.

[0019] To the extent that the term "includes" or "including" is used in the specification or the claims, it is intended to be inclusive in a manner similar to the term "comprising" as that term is interpreted when employed as a transitional word in a claim. Furthermore, to the extent that the term "or" is employed (e.g., A or B) it is intended to mean "A or B or both." Furthermore, to the extent the term "connect" is used in the specification or claims, it is intended to mean not only "directly connected to," but also "indirectly connected to" such as connected through another component or multiple components.

[0020] To facilitate the understanding of the embodiments described herein, a number of terms are defined below. The terms defined herein have meanings as commonly understood by a person of ordinary skill in the areas relevant to the embodiments described herein. The terminology herein is used to describe specific embodiments of the invention, but their usage does not delimit the invention, except as set forth in the claims.

[0021] Referring now to Figs. 1 and 2, there are prior art illustrations of an M240 machine gun. Specifically, this includes receiver 218, and its prior art top cover with optic 474. Also illustrated is handle assembly 79 which includes handle 80 and handle connector 82 with handle lift catch 84. Handle 80 is in a fixed position relative to handle connector 82. Generally, handle 80 is oriented in the vicinity of the right side of the M240 machine gun's receiver when the machine gun is intended to be fired. The handle assembly can be rotated upward relative to the receiver when the barrel assembly is to be removed. Additionally, the handle in the upward position, can also be considered a carry position for some embodiments of the M240 machine gun. With optics mounted to an attachment interface in prior art M240 machine guns, the optic may interfere with the rotational movement of the handle. This may be disadvantageous as one might have to remove the optic first, prior to removing the barrel assembly if such optic was in the necessary rotational path of the handle. Even if there was not a direct mechanical interference between the handle assembly, such close proximity of the handle and optic could complicate the removal of the barrel assembly from the machine gun. Alternatively, the handle would force the optic to be mounted more proximally so that necessary space would be available for the handle to rotate.

[0022] Referring now to Figs. 3-9, a handle assembly 479 includes handle 480 and handle connector 482. Furthermore, handle 480 includes both connected end 481 and free end 483. Connected end 481 of handle 480 is the end of handle 480 in connection with handle connector 482 whereas free end 483 of handle 480 is not connected to handle connector 482. Advantageously, handle

480 may rotate at connected end 481. In doing so, handle 480 may be optionally oriented so as to minimize interference with optic 474 as mounted to an attachment interface of the top cover. Furthermore, handle assembly 479 allows for accessories, such as optic 474, to be mounted farther distally forward on the top cover as handle 480 can rotate out of the way of optic 474 in comparison to prior art handle 80.

[0023] Handle 480 may be operable between a variety of positions. Handle 480 may be positioned in a first position with free end 483 of handle 480 pointing proximally. Handle 480 may also be positioned in a second position with free end 483 of handle 480 pointing distally. To assist in clarifying the direction free end 483 of handle 480 points, one can consider the direction linear axis 480LA of handle 480 extends. Linear axis 480LA runs lengthwise, beginning at the centre of connected end 481 and through handle 480, and out through the centre of free end 483. Fig. 5 illustrates free end 483 of handle 480 pointing distally with linear axis 480LA and Fig. 6 illustrates free end 483 of handle 480 pointing proximally with linear axis 480LA.

[0024] As illustrated in Fig. 5, in optional embodiments, with handle 480 pointing distally, free end 483 and linear axis 480LA can be oriented to point toward barrel axis 414BA of barrel 414. As used herein, a barrel axis is the axis running though and parallel with the bore of the barrel, and can be used interchangeably with the axis of the bore. Otherwise stated, one optional embodiment is handle assembly 479 with handle 480 positioned with free end 483 pointing distally with linear axis 480LA oriented to intersect barrel axis 414BA. Alternatively, free end 483 and linear axis 480LA can be oriented to point away from barrel axis 414BA while still pointing distally. Such would occur if handle 480 was pointed slightly upward relative to barrel 414 and barrel axis 414BA so that free end 483 and linear axis 480LA pointed slightly upward, but still in a proximal direction. In yet further optional embodiments, free end 483 and linear axis 480LA can be oriented to be parallel with barrel 414 and barrel axis 414BA.

[0025] Similar orientations of free end 483 of handle 480 and linear axis 480LA can occur with free end 483 pointing proximally. Another optional embodiment is handle assembly 479 with a handle 480 positioned with free end 483 pointing proximally with linear axis 480LA intersecting barrel axis 414BA extending out of the proximal end of the barrel. Alternatively, free end 483 and linear axis 480LA can be oriented to point away from barrel axis 414BA while still pointing proximally. Such would occur if handle 480 was pointed slightly upward relative to an attached receiver so that free end 483 and linear axis 480LA pointed slightly upward, but still in a proximal direction. In yet a further optional embodiment, free end 483 and linear axis 480LA can be oriented to be parallel with barrel axis 414BA. This is illustrated in Fig. 6. In referencing the various orientations of handle 480, linear axis 480LA, barrel 414 and barrel axis 414BA, the described orientations are as one of skill in the art would understand such arrangements in visually observing the various components.

[0026] Referring back to Figs. 3 and 4, handle 480 is positioned so that free end 483 points distally and toward barrel 414. In such configurations where free end 483 of handle 480 points distally where linear axis 480LA would intersect barrel axis 414BA (axes are not shown in Figs. 3 and 4), such orientation of handle 483 can be advantageous for the user. In situations where a user carries an M240 machine gun with handle assembly 479 having handle 480 oriented as in Figs. 3 and 4, the muzzle of the barrel would point more upward than parallel to the ground. This is quite useful in helping to avoid barrel 414 from getting tangled in brush, debris or other impediments that would more likely contact the barrel if it was carried about parallel to the ground. Advantageously, it can allow a user to move more swiftly while carrying or climbing with an M240 machine gun with such orientation.

[0027] Referring back to Figs. 5 and 6, there are illustrations of handle assembly 479 affixed to a barrel. As mentioned previously, Fig. 5 illustrates handle assembly 479 with handle 480 having its free end 483 pointing distally and Fig. 6 illustrates handle assembly 479 with handle 480 having its free end 483 pointing proximally. The receiver and other components have been removed to more clearly illustrate handle assembly 479 and different positions of handle 480. Additionally, these two figures also illustrate handle connector 482, lift catch 484 and push button 486. Push button 486 can be used to rotate handle 480 of handle assembly 479 from pointing distally as illustrated in Fig. 5 to Fig. 6 wherein free end 483 of handle 480 points proximally. Otherwise stated, handle 480 of handle assembly 479 can fold forward or rearward. To allow for handle 480 to alternate between a forward (distally pointing) and rearward (proximally pointing) position, push button 486 is engaged by the user. Lift catch 484 is used to unlock and rotate handle assembly 479 from a carry position to a position wherein handle 480 is in the vicinity of the right side of the receiver.

[0028] Referring now to Figs. 7 and 8, there are illustrations of a cut-away view of handle assembly 479 and an exploded view of handle assembly 479. In such illustrations, spring 487 is visible which applies tension to push button 486 to engage notches 485P and 485D on handle 480. More specifically and in the optional embodiment as illustrated, handle 480 includes two notches 485P and 485D, each notch corresponding to a position of handle 480. For example, Fig. 7 illustrates push button 486 engaging notch 485D corresponding to handle 480 having free end 483 pointing distally if handle assembly 479 was configured on a barrel. Engaging notch 485P with push button 486 would result in handle 480 having its free end 483 pointing proximally. Fig. 8, with the exploded view, provides for further visuals as to how handle assembly 479 is assembled. As is illustrated, handle 480 rotates at connected end 481 about handle connector 482 so long as push button 486 is engaged to withdraw

it from either of notches 485D and 485P of handle 480. In further optional embodiments, lesser or greater numbers of notches may be present which would correspond to different orientations of handle 480.

[0029] This written description uses examples to disclose the invention and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims.

[0030] It will be understood that the particular embodiments described herein are shown by way of illustration and not as limitations of the invention. The principal features of this invention may be employed in various embodiments without departing from the scope of the claims.

Claims

1. An M240 machine gun barrel assembly comprising:

   a barrel (414) with a distal end and a proximal end and a bore; the barrel having a barrel axis spanning through the distal end and proximal end of the barrel and parallel with the bore; and a handle assembly (479) with a handle (480) and a handle connector (482),
   the handle connector (482) for connecting the handle assembly (479) to the barrel (414), the handle (480) having a free end (483) and a connected end (481), the connected end (481) operably connected to the handle connector (482) and the free end (483) not connected to the handle connector (482) and the handle further having a linear axis (480LA) beginning at the connected end (481) and spanning through the handle (480) and out a centre of the free end (483) of the handle (480),
   characterised in that the handle (480) is operable between a first position with the free end (483) of the handle (480) pointing proximally and a second position with the free end (483) of the handle assembly (480) pointing distally.

2. The M240 machine gun barrel assembly of claim 1, wherein: i) in the first position, the free end (483) of the handle (480) points proximally with the linear axis (480LA) of the handle (480) oriented about parallel to the barrel axis (414BA); or
   ii) in the second position, the free end (483) of the handle (480) points distally with the linear axis (480LA) of the handle (480) oriented about parallel to the barrel axis (414BA).

3. The M240 machine gun barrel assembly of claim 1, wherein i) in the second position, the free end (483) of the handle (480) points distally with the linear axis (480LA) of the handle (480) oriented away from the barrel axis (414BA); or
   ii) in the second position, the free end (483) of the handle (480) points distally with the linear axis (480LA) of the handle (480) oriented to intersect the barrel axis (414BA).

4. The M240 machinegun barrel assembly of claim 1, 2 or 3, further comprising a push button (486) to operably select between the first position and the second position of the handle (480).

5. The M240 machinegun barrel assembly of claim 4, wherein the handle assembly (479) further comprises a first notch (485P) to engage the push button (486) to orient the handle (480) in said first position and a second notch (485D) to engage the push button (486) to orient the handle (480) in said second position.

Patentansprüche

1. Laufbaugruppe für M240-Maschinengewehr, umfassend:

   einen Lauf (414) mit einem distalen Ende und einem proximalen Ende und einer Seele; wobei der Lauf eine Laufachse aufweist, die sich durch das distale Ende und das proximale Ende des Laufs und parallel mit der Seele erstreckt; und eine Griffbaugruppe (479) mit einem Griff (480) und einem Griffverbinder (482),
   wobei der Griffverbinder (482) zum Verbinden der Griffbaugruppe (479) mit dem Lauf (414) ist, wobei der Griff (480) ein freies Ende (483) und ein verbundenes Ende (481) aufweist, wobei das verbundene Ende (481) bedienbar mit dem Griffverbinder (482) verbunden ist und das freie Ende (483) nicht mit dem Griffverbinder (482) verbunden ist, und der Griff weiterhin eine lineare Achse (480LA) aufweist, die an dem verbundenen Ende (481) beginnt und sich durch den Griff (480) und aus einer Mitte des freien Endes (483) des Griffs (480) erstreckt,
   dadurch gekennzeichnet, dass der Griff (480) zwischen einer ersten Position, wobei das freie Ende (483) des Griffs (480) proximal weist, und einer zweiten Position, wobei das freie Ende (483) der Griffbaugruppe (480) distal weist, bedienbar ist.

2. Laufbaugruppe für M240-Maschinengewehr nach Anspruch 1, wobei: (i) in der ersten Position das freie Ende (483) des Griffs (480) proximal weist, wobei die lineare Achse (480LA) des Griffs (480) etwa parallel zu der Laufachse (414BA) ausgerichtet ist; oder

ii) in der zweiten Position das freie Ende (483) des Griffs (480) distal weist, wobei die lineare Achse (480LA) des Griffs (480) etwa parallel zu der Laufachse (414BA) ausgerichtet ist.

3. Laufbaugruppe für M240-Maschinengewehr nach Anspruch 1, wobei i) in der zweiten Position das freie Ende (483) des Griffs (480) distal weist, wobei die lineare Achse (480LA) des Griffs (480) von der Laufachse (414BA) weg ausgerichtet ist; oder
ii) in der zweiten Position das freie Ende (483) des Griffs (480) distal weist, wobei die lineare Achse (480LA) des Griffs (480) ausgerichtet ist, um sich mit der Laufachse (414BA) zu überschneiden.

4. Laufbaugruppe für M240-Maschinengewehr nach Anspruch 1, 2 oder 3, weiterhin umfassend einen Druckknopf (486), um zwischen der ersten Position und der zweiten Position des Griffs (480) bedienbar auszuwählen.

5. Laufbaugruppe für M240-Maschinengewehr nach Anspruch 4, wobei die Griffbaugruppe (479) weiterhin eine erste Kerbe (485P), um den Druckknopf (486) in Eingriff zu nehmen, um den Griff (480) in der ersten Position auszurichten, und eine zweite Kerbe (485D), um den Druckknopf (486) in Eingriff zu nehmen, um den Griff (480) in der zweiten Position auszurichten, umfasst.

Revendications

1. Ensemble formant canon de mitrailleuse M240 comportant :

un canon (414) ayant une extrémité distale et une extrémité proximale et une âme ; le canon ayant un axe de canon s'étendant au travers de l'extrémité distale et de l'extrémité proximale du canon et étant parallèle par rapport à l'âme ; et un ensemble formant poignée (479) ayant une poignée (480) et un raccord de poignée (482), le raccord de poignée (482) servant à raccorder l'ensemble formant poignée (479) au canon (414), la poignée (480) ayant une extrémité libre (483) et une extrémité raccordée (481), l'extrémité raccordée (481) étant fonctionnellement raccordée au raccord de poignée (482) et l'extrémité libre (483) n'étant pas raccordée au raccord de poignée (482) et la poignée ayant par ailleurs un axe linéaire (480LA) commençant au niveau de l'extrémité raccordée (481) et s'étendant au travers de la poignée (480) et hors d'un centre de l'extrémité libre (483) de la poignée (480),
caractérisé en ce que la poignée (480) fonctionne entre une première position avec l'extrémité libre (483) de la poignée (480) pointant de manière proximale et une deuxième position avec l'extrémité libre (483) de l'ensemble de poignée (480) pointant de manière distale.

2. Ensemble formant canon de mitrailleuse M240 selon la revendication 1, dans lequel : i) dans la première position, l'extrémité libre (483) de la poignée (480) pointe de manière proximale avec l'axe linéaire (480LA) de la poignée (480) orienté de manière approximativement parallèle par rapport à l'axe de canon (414BA) ; ou
ii) dans la deuxième position, l'extrémité libre (483) de la poignée (480) pointe de manière distale avec l'axe linéaire (480LA) de la poignée (480) orienté de manière approximativement parallèle par rapport à l'axe de canon (414BA).

3. Ensemble formant canon de mitrailleuse M240 selon la revendication 1, dans lequel i) dans la deuxième position, l'extrémité libre (483) de la poignée (480) pointe de manière distale avec l'axe linéaire (480LA) de la poignée (480) orienté à l'opposé de l'axe de canon (414BA) ; ou
ii) dans la deuxième position, l'extrémité libre (483) de la poignée (480) pointe de manière distale avec l'axe linéaire (480LA) de la poignée (480) orienté de manière à croiser l'axe de canon (414BA).

4. Ensemble formant canon de mitrailleuse M240 selon la revendication 1, la revendication 2 ou la revendication 3, comportant par ailleurs un bouton poussoir (486) servant à sélectionner fonctionnellement entre la première position et la deuxième position de la poignée (480).

5. Ensemble formant canon de mitrailleuse M240 selon la revendication 4, dans lequel l'ensemble formant poignée (479) comporte par ailleurs une première entaille (485P) servant à des fins de mise en prise du bouton poussoir (486) pour orienter la poignée (480) dans ladite première position et une deuxième entaille (485D) servant à des fins de mise en prise du bouton poussoir (486) pour orienter la poignée (480) dans ladite deuxième position.

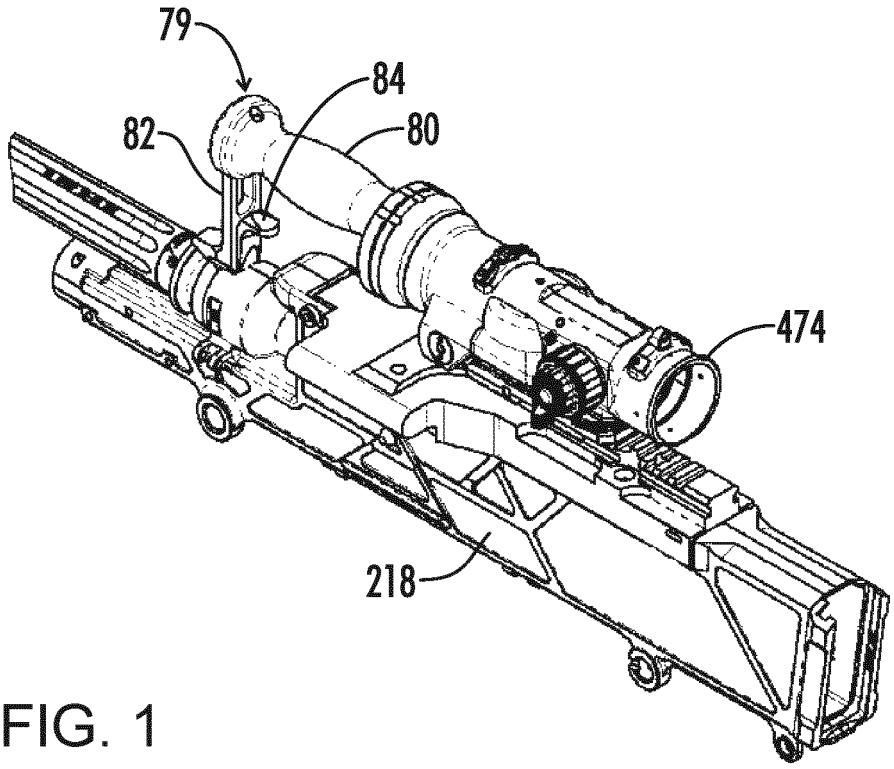


FIG. 1
(Prior Art)

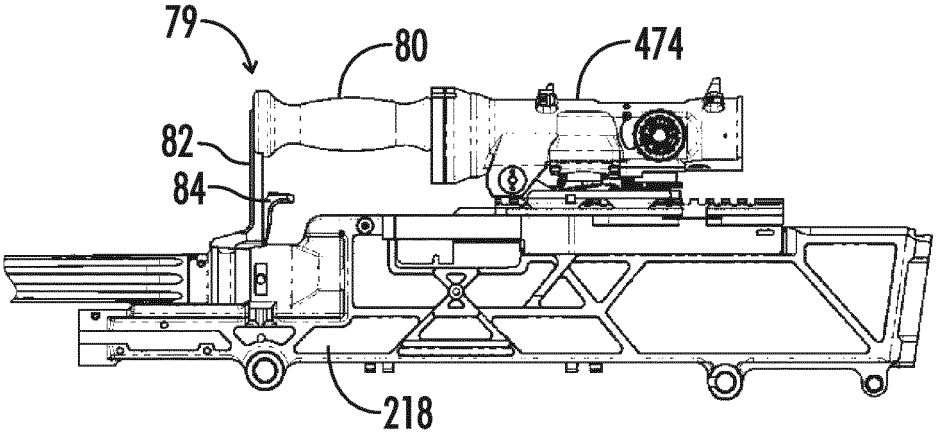


FIG. 2
(Prior Art)

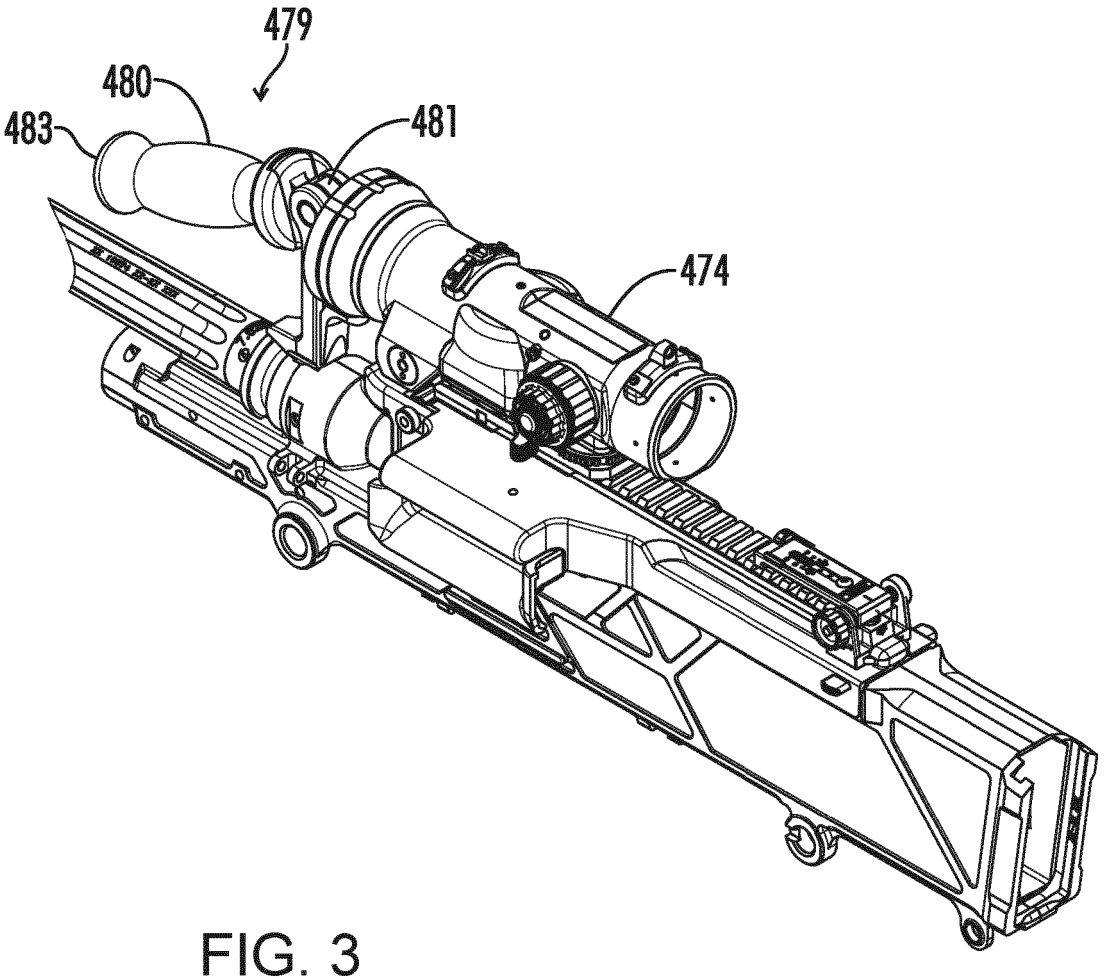


FIG. 3

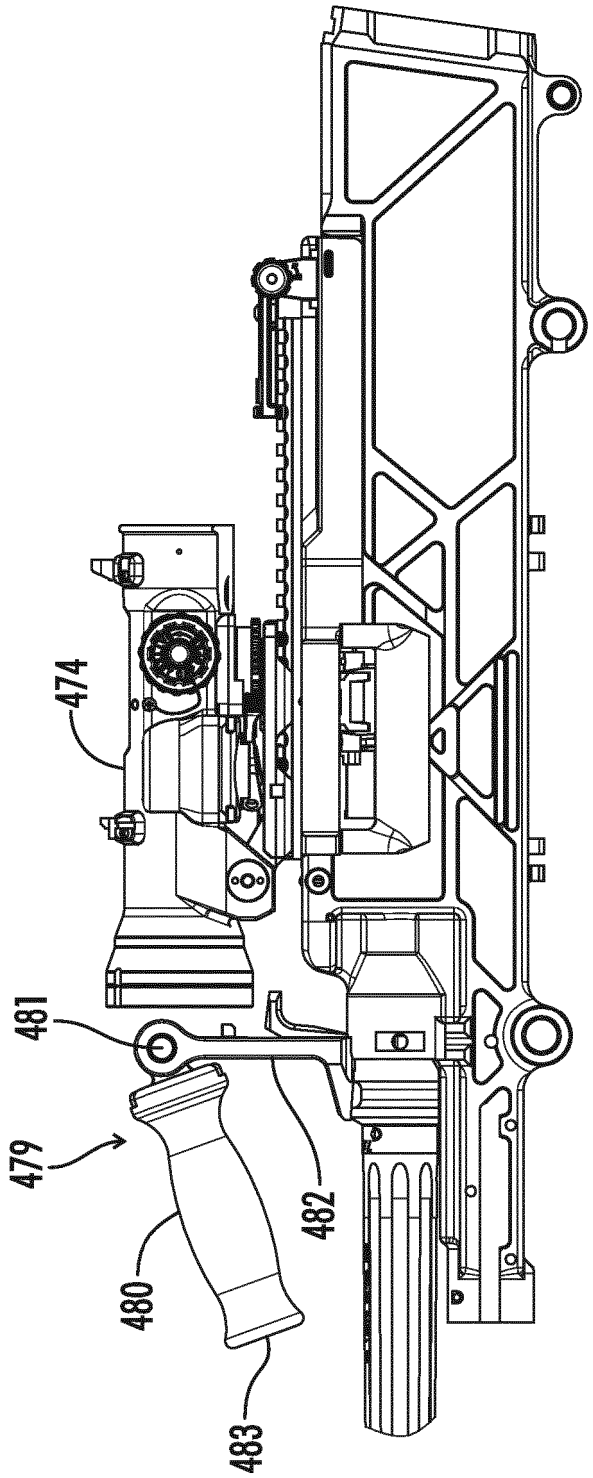


FIG. 4

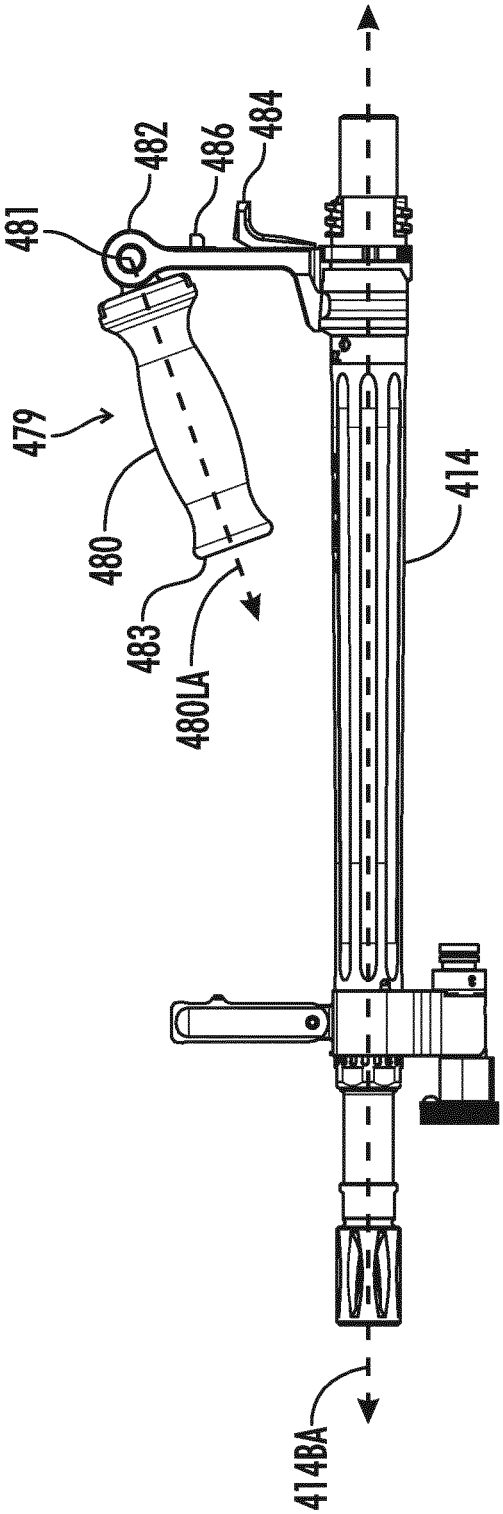

481
482
486
484
479
480
483
480LA
414
414BA

FIG. 5

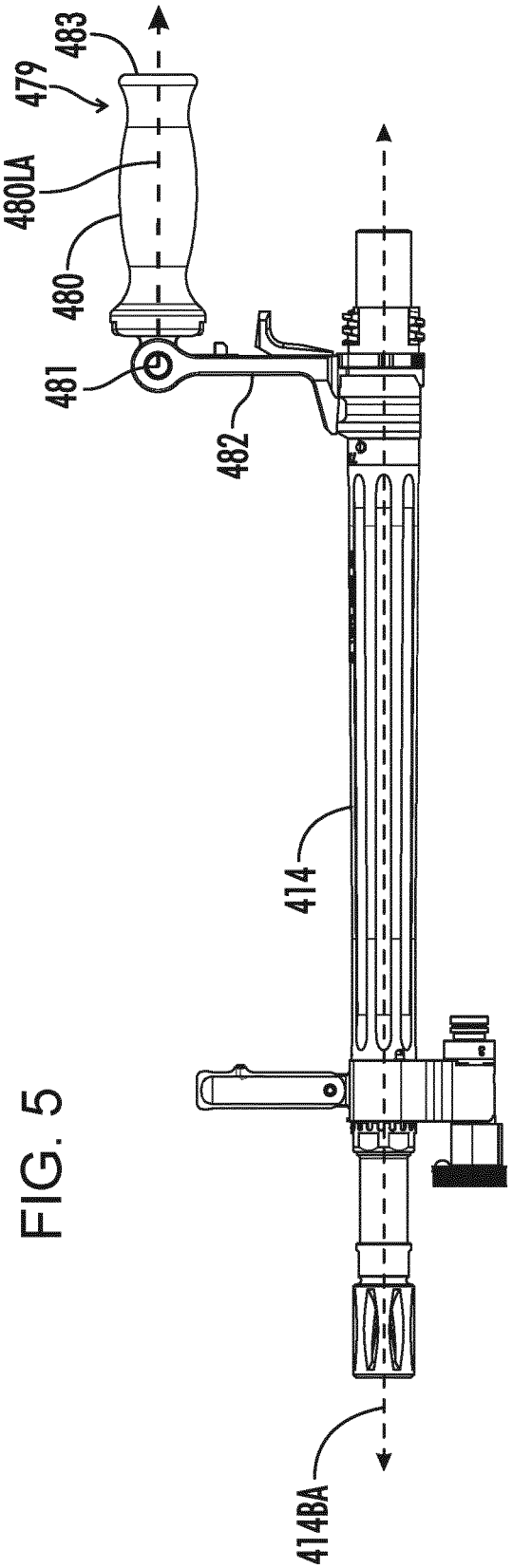

483
479
480LA
480
481
482
414
414BA

FIG. 6

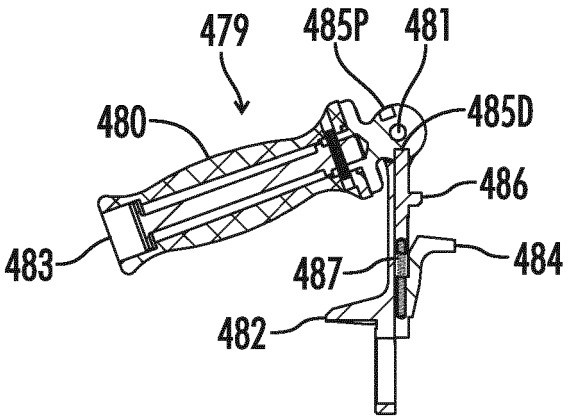
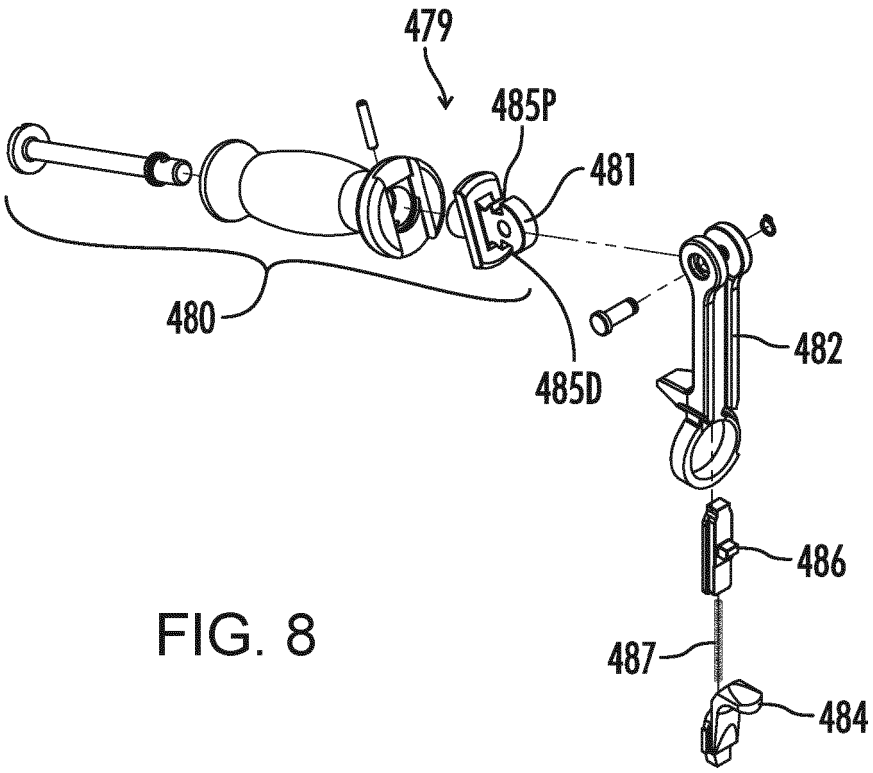

479
485P
481
480
485D
486
483
487
484
482

FIG. 7


479
485P
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485D
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484

FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20150020429 A **[0004]**
- US 2131716 A **[0005]**