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Hayden et al.

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(54) **ROTATABLE TARGETING ASSEMBLY HAVING WEAPONS INTEGRATED DIRECTION AND RATE CONTROL**

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F41A 27/00 (2006.01)

(52) **U.S. Cl.**
USPC **89/41.02**; 89/41.01; 89/37.03

(58) **Field of Classification Search**
USPC 89/41.01, 41.02, 36.03, 36.08, 37.03, 89/41.17; 42/94
See application file for complete search history.

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(57) **ABSTRACT**

A weapons system includes a frame having an axis. A targeting assembly is arranged and operational to move rotationally the frame axis. The targeting assembly includes a weapon. A user interface is attached to the weapon and is operable actuate movement of the targeting assembly about the axis.

28 Claims, 8 Drawing Sheets

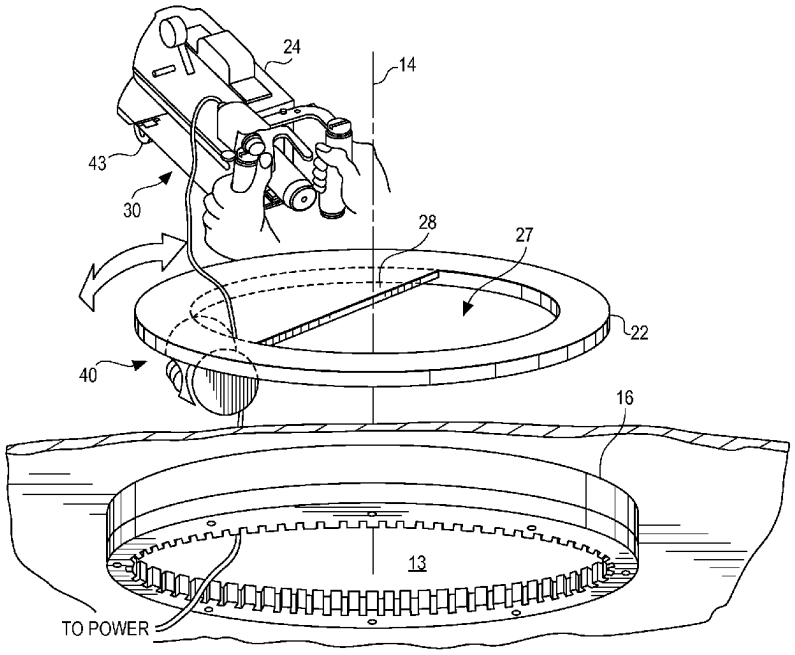
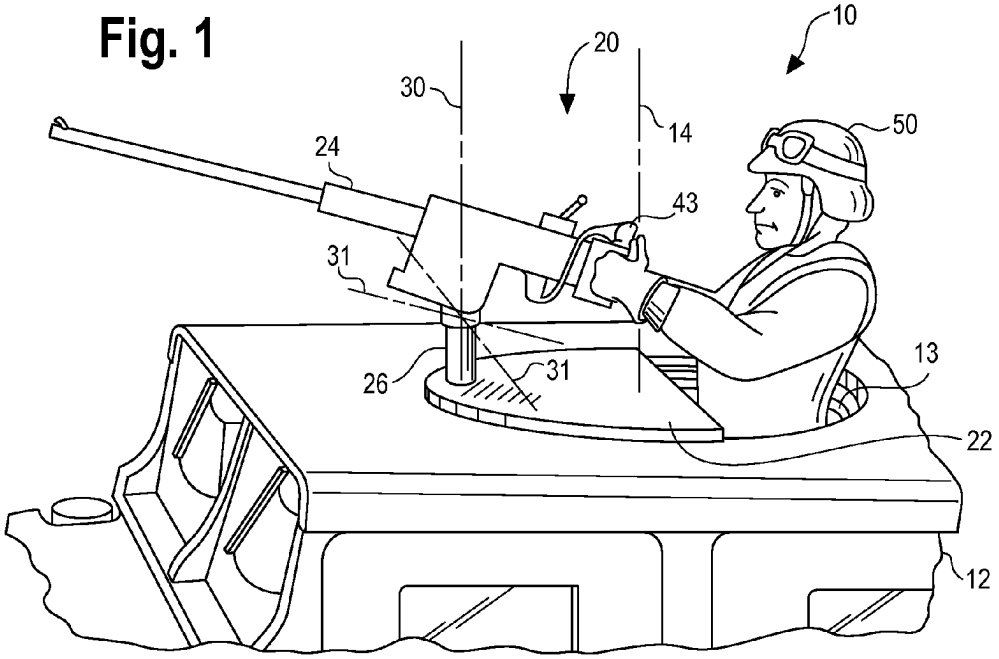


Fig. 1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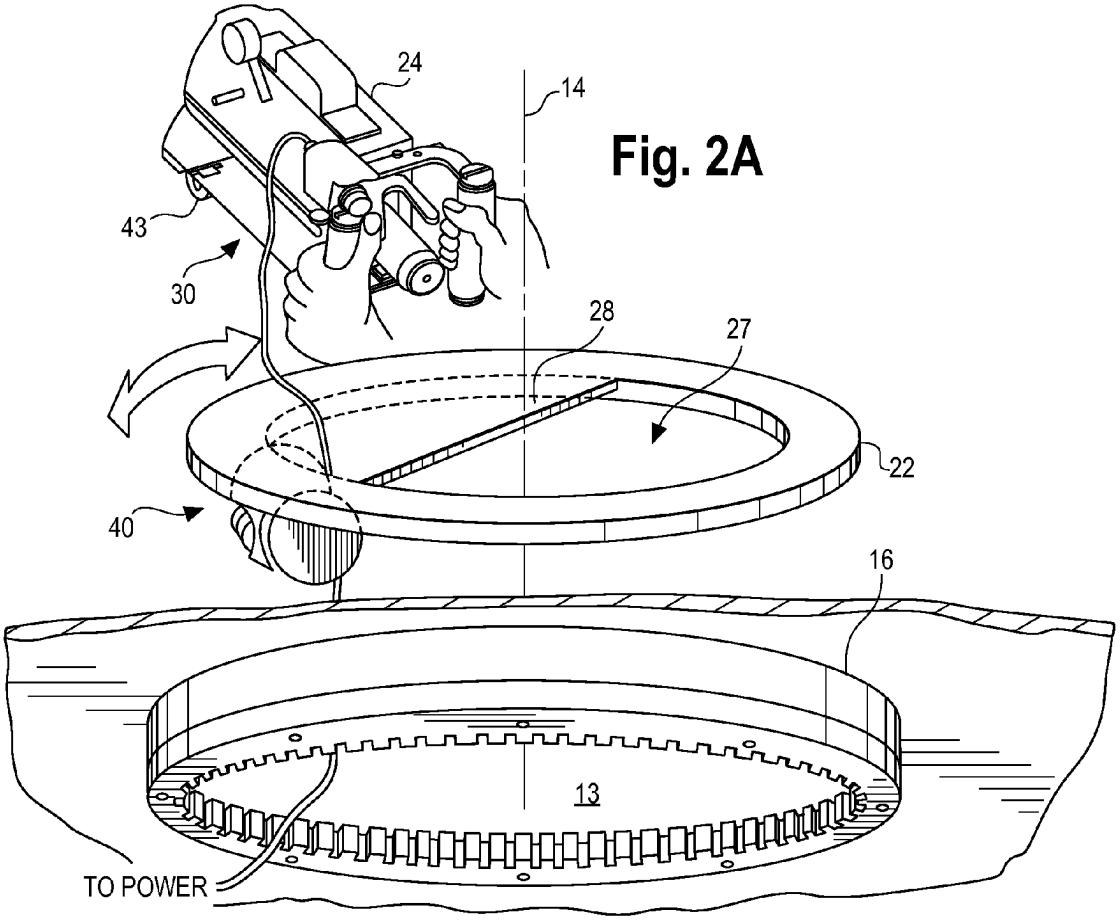
24
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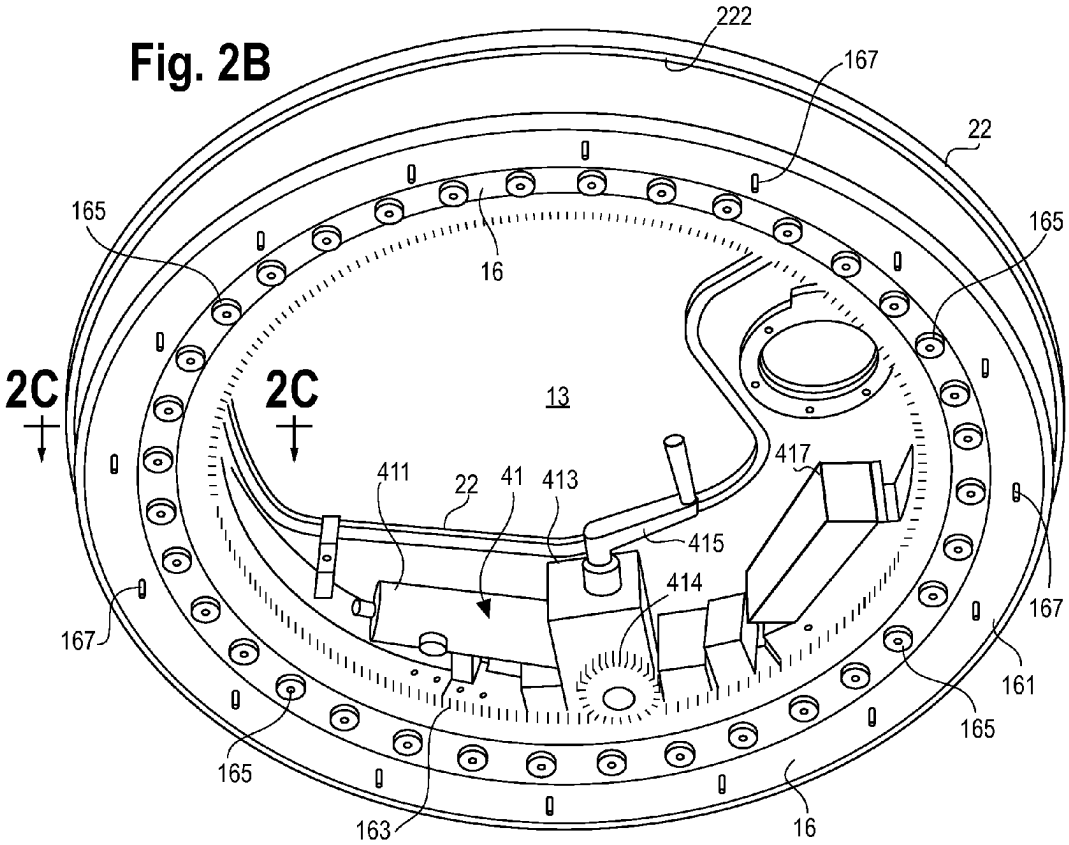
TO POWER

Fig. 2A

Fig. 2B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167
22
165
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165
2C
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13
411
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163
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Fig. 2C

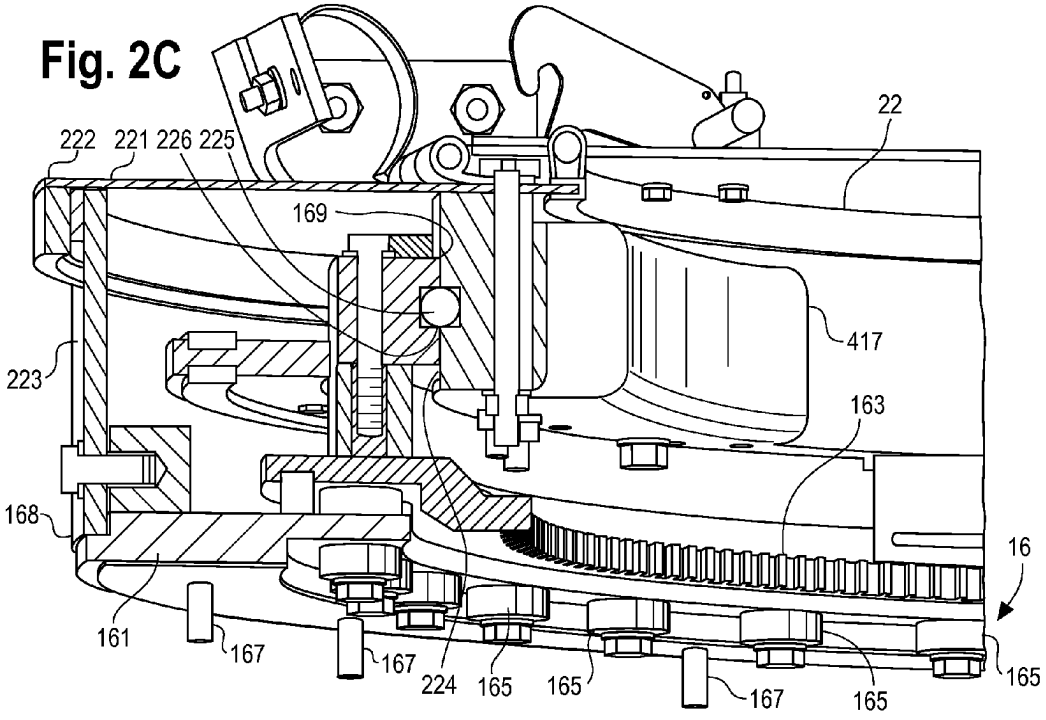
22
222
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Fig. 3

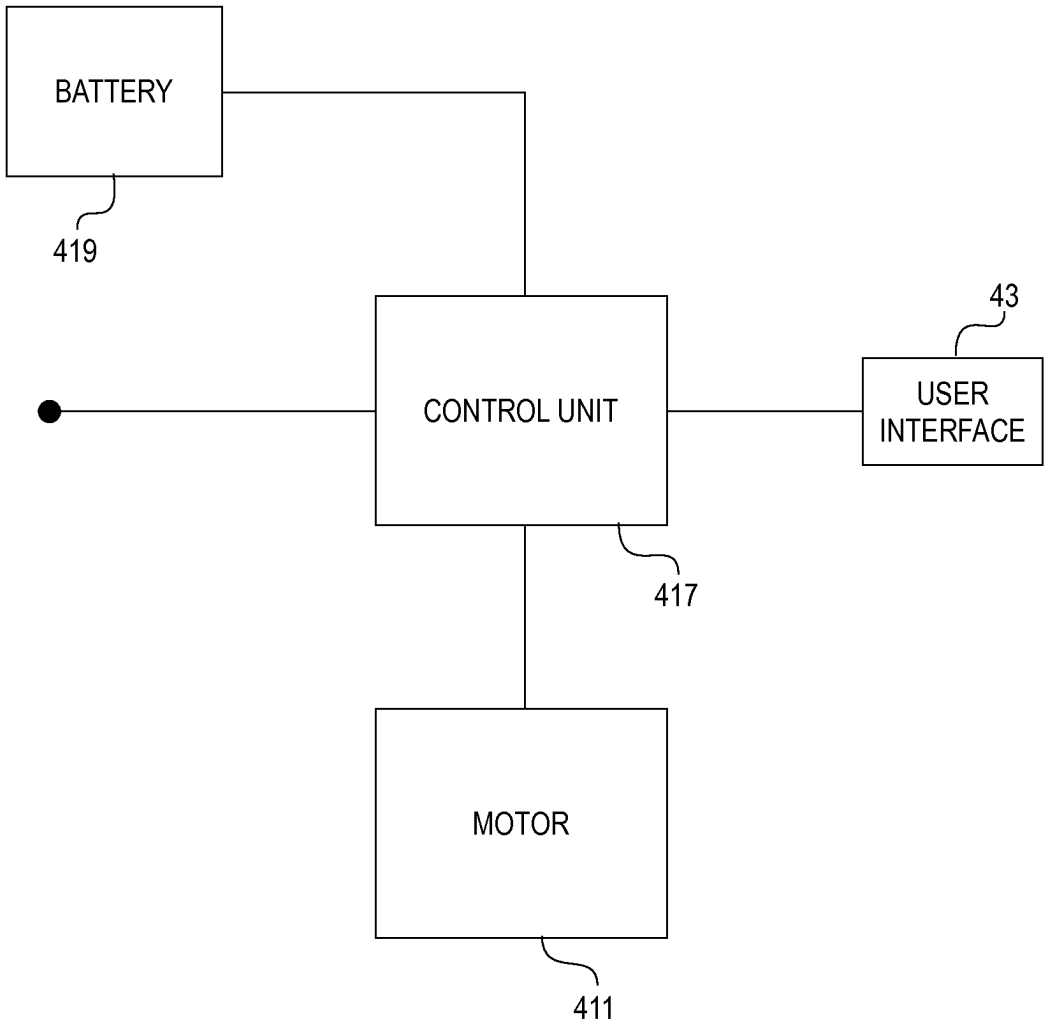

Fig. 4

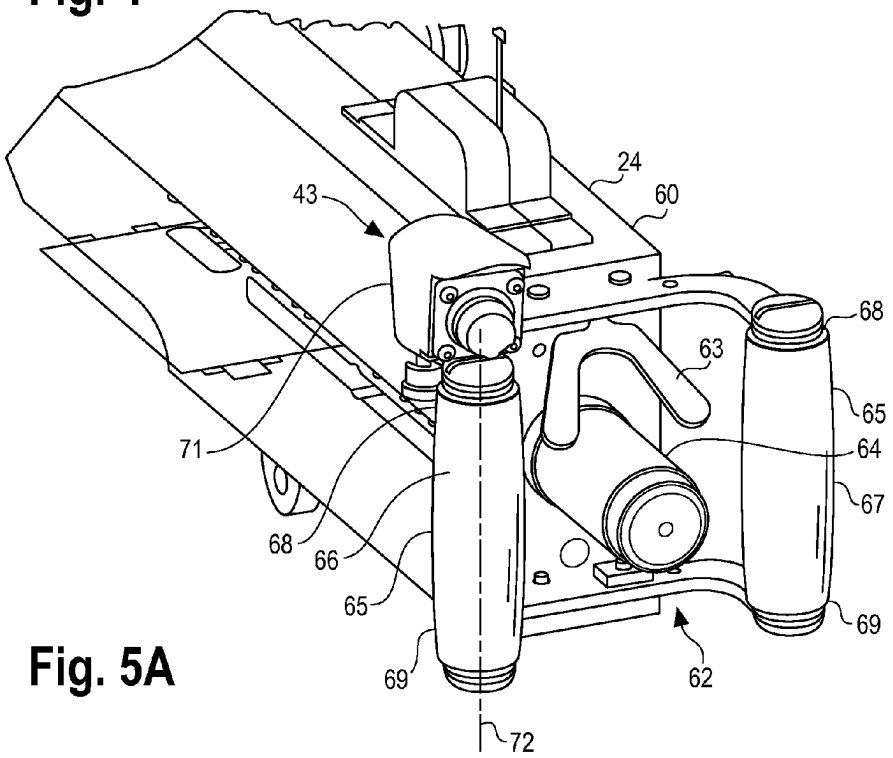

Fig. 5A

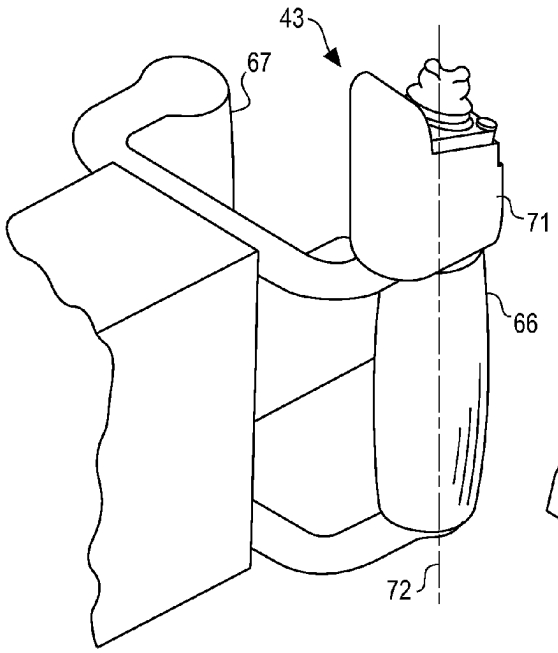

Fig. 5B

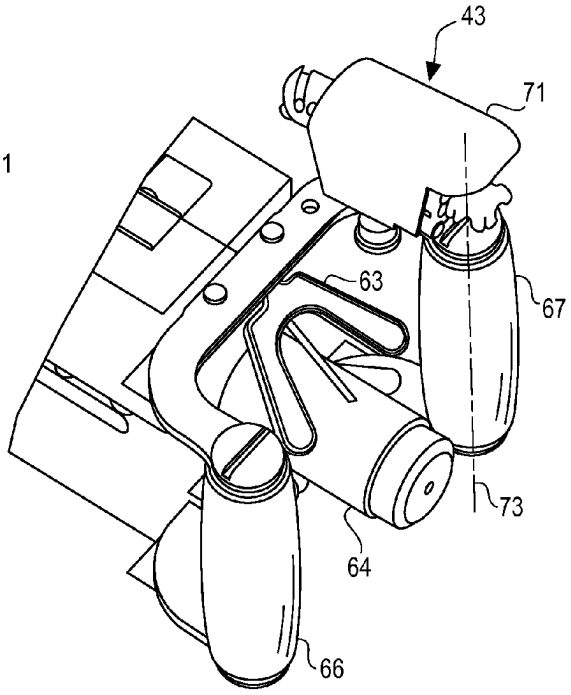

Fig. 6

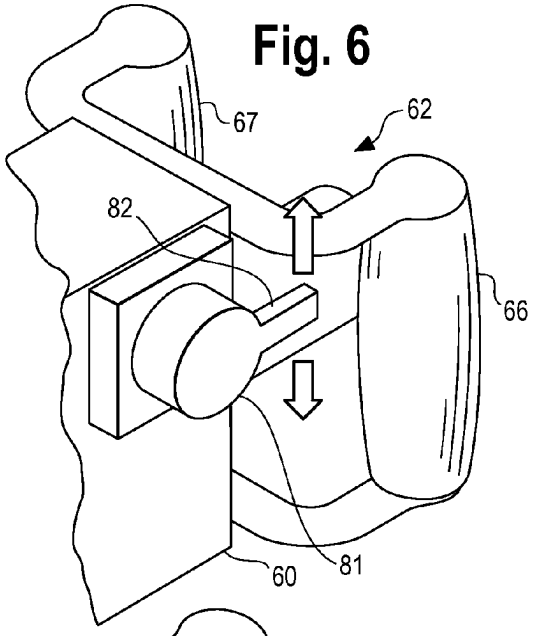

Fig. 7

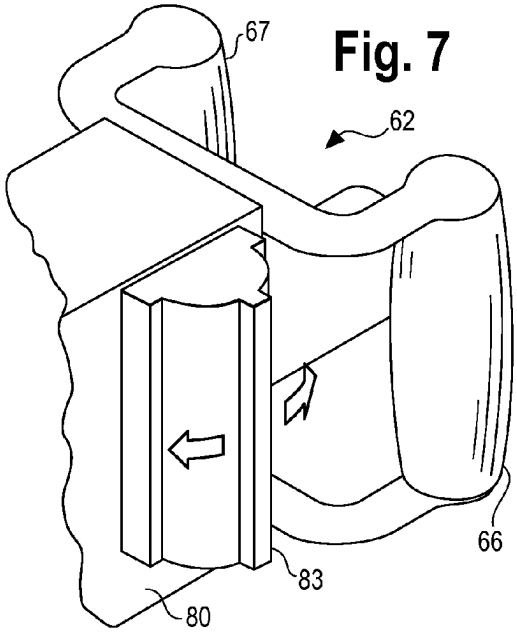

Fig. 8

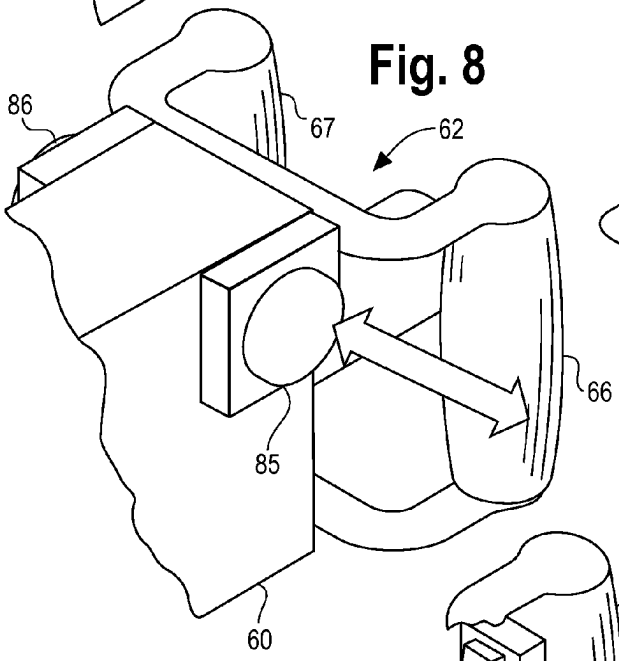

Fig. 9

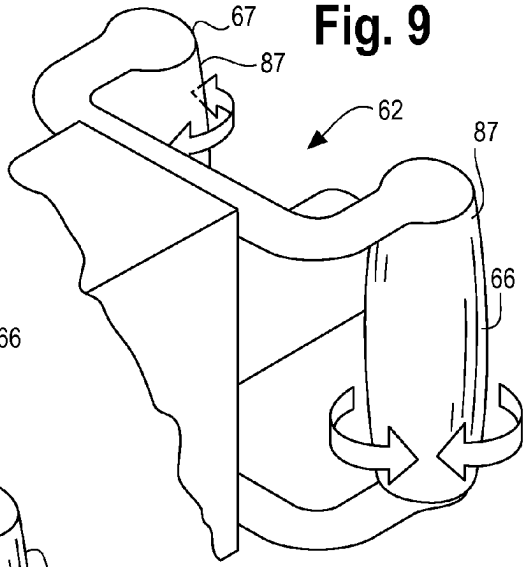

Fig. 10

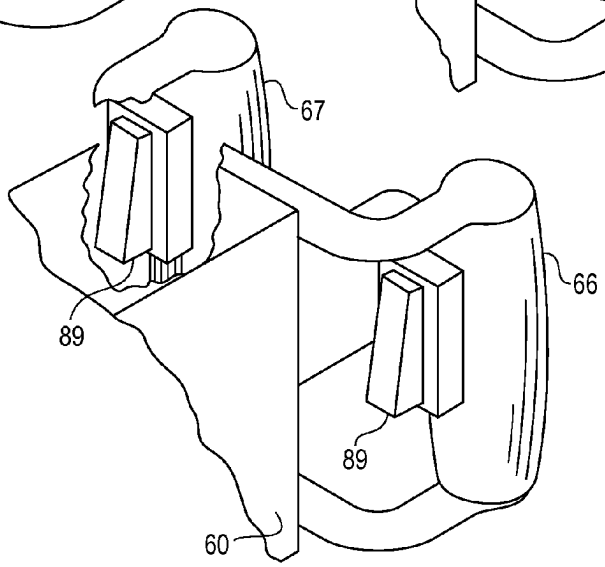

Fig. 11

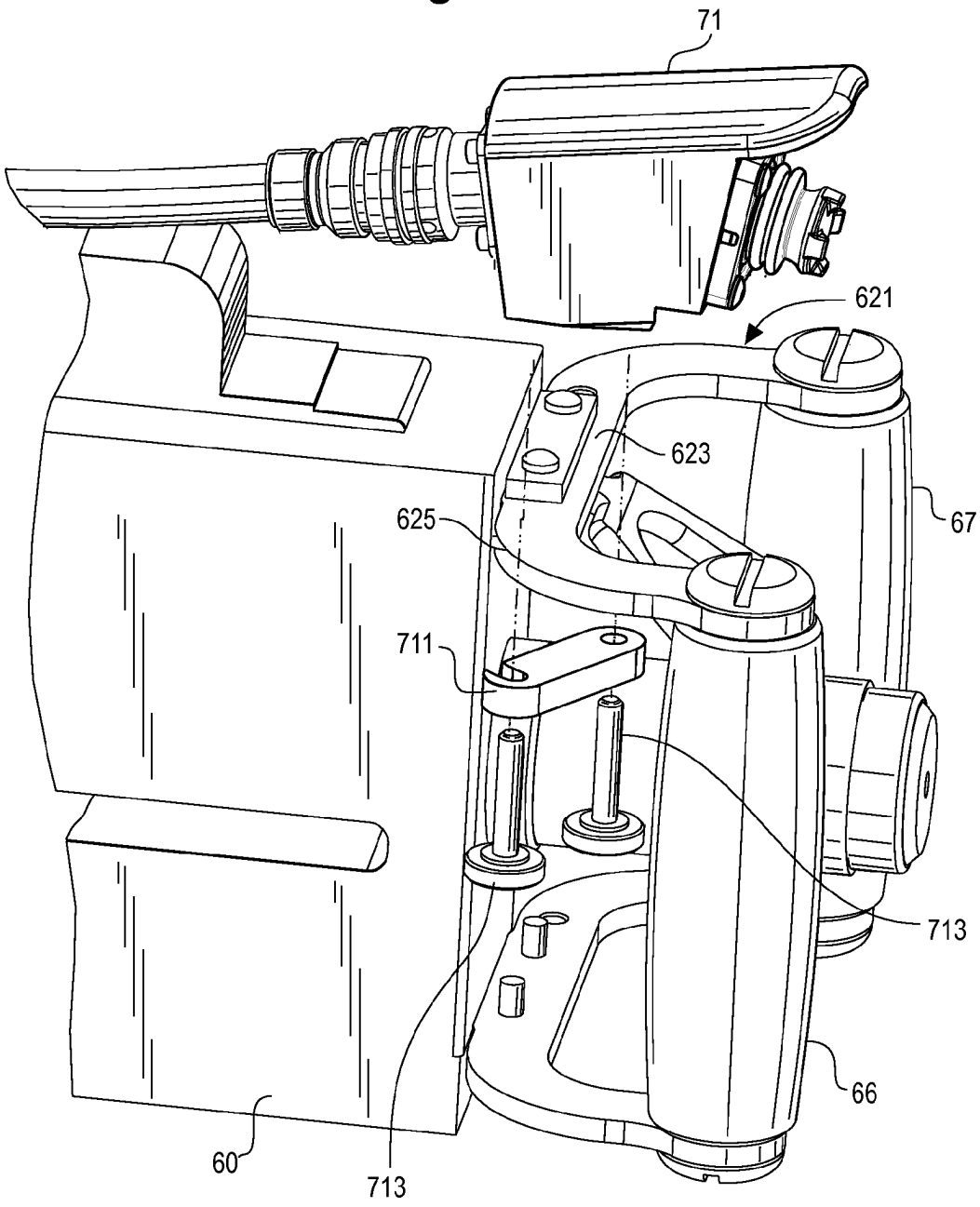

Fig. 11A

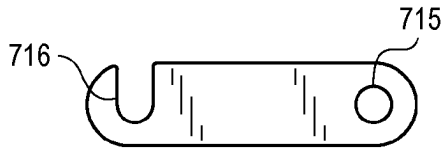

Fig. 12

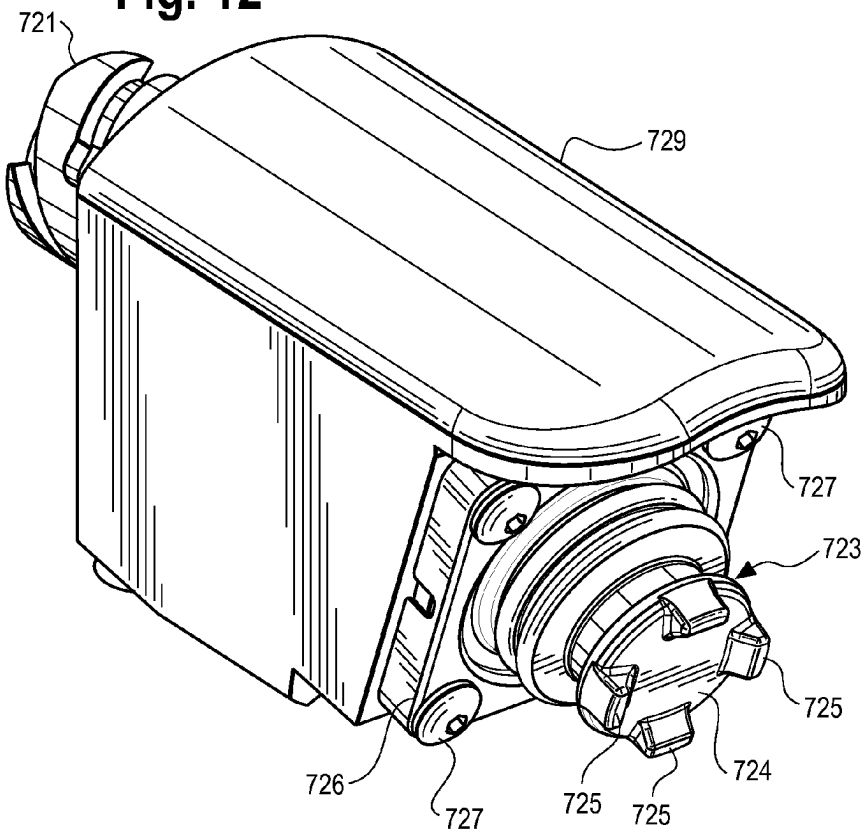
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Fig. 13

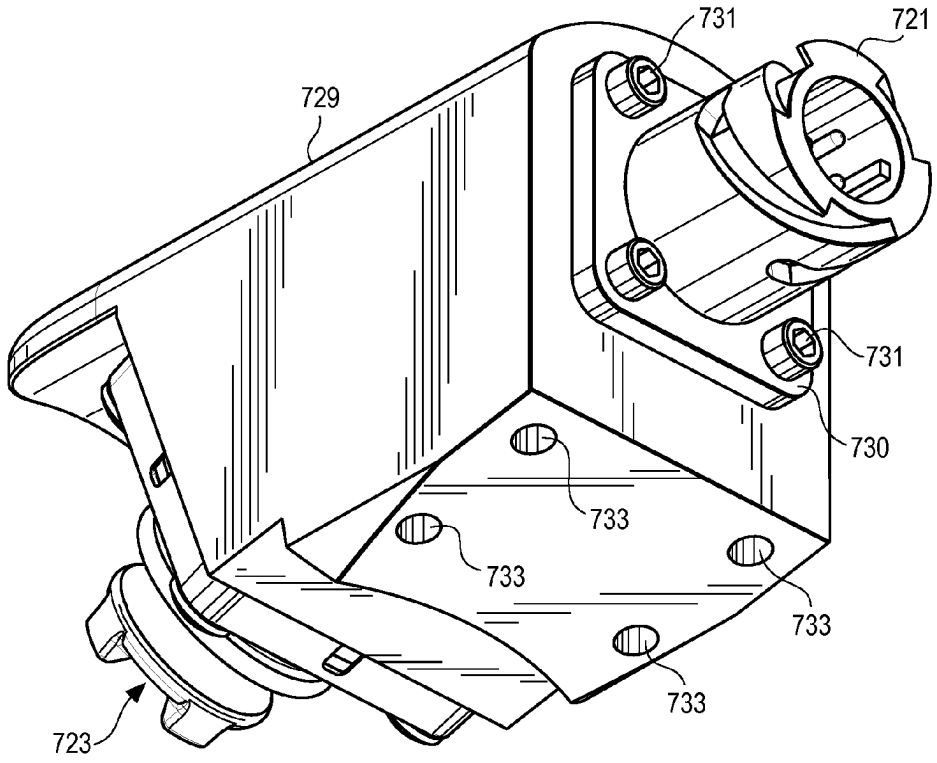
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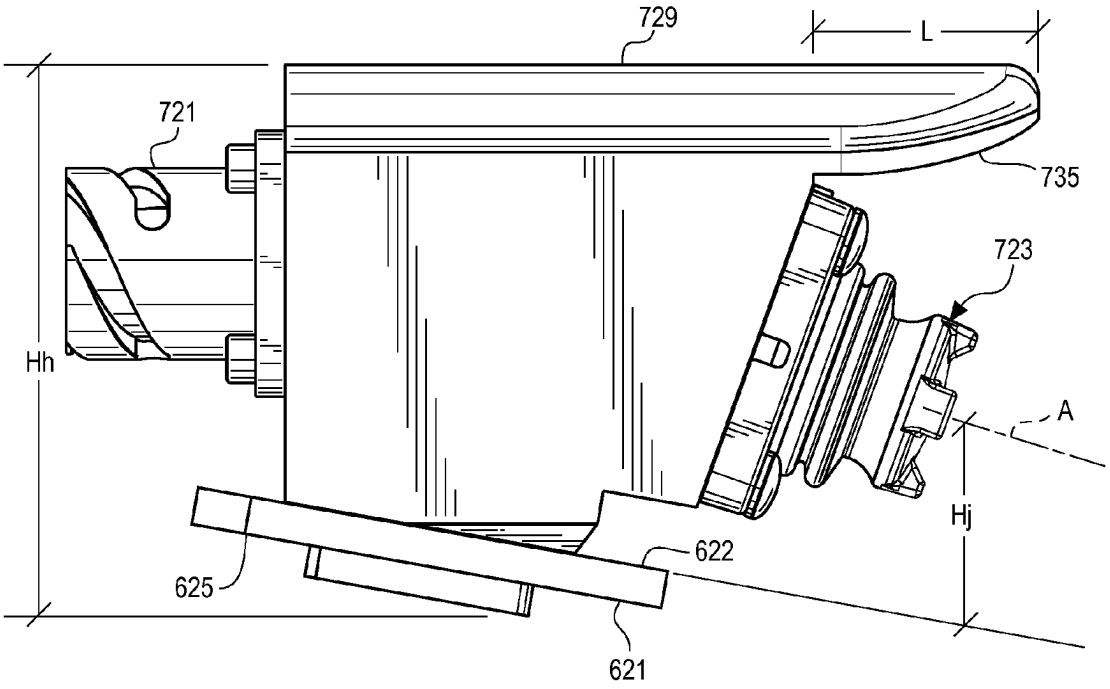
Fig. 14



ROTATABLE TARGETING ASSEMBLY HAVING WEAPONS INTEGRATED DIRECTION AND RATE CONTROL

BACKGROUND

Many weapons systems include rotatable weapons turrets. Often these are attached to either a stationary or a mobile frame (e.g. a vehicle). If a turret is heavily armored, it will likely include a motor to rotate the turret in response to operator input. Typically, a turret operator uses a hand controller to adjust the turret to a desired position. A problem exists, however, in that the operator needs a free hand to move the controller. This forces the operator either (1) to fire a weapon with one hand while operating the controller with the other hand (contrary to generally recognized and accepted training principles) or (2) to move the turret into position before achieving a proper firing position. Thus, the operator either loses accuracy, by using only one hand to fire, or encounters delay by having to position the turret before firing.

Accordingly, what is needed is controller that will allow the operator to maintain a sure grip on a weapon, while simultaneously being able to rotate the turret. Further, it would be desirable for such a controller to be retrofittable to existing weapons systems.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side perspective view of a portion of a vehicle with a motorized targeting assembly;

FIG. **2**A is an exploded view of the motorized targeting assembly of FIG. **1**;

FIG. **2**B is an underside perspective view of a prime mover system shown in FIG. **2**A;

FIG. **2**C is a cross-sectional view taken along line **2**C-**2**C in FIG. **2**B with a control unit attached thereto;

FIG. **3** is functional block diagram of the prime mover system shown in FIG. **2**B.

FIG. **4** is a partial perspective view of the weapon shown attached to the targeting assembly in FIG. **1**;

FIG. **5**A-FIG. **5**B are perspective views of the handle assembly of the weapon shown in FIG. **4**;

FIGS. **6**-**10** are alternate embodiments of the handle assembly shown in FIGS. **5**A-**5**B.

FIG. **11** is an elevated side view of the handle assembly shown in FIG. **4** with the controller and mounting bracket used thereon shown in an exploded orientation;

FIG. **11**A is an enlarged cut out top view of the clip shown in FIG. **11**;

FIG. **12** is a front perspective view of the controller shown in FIG. **11**;

FIG. **13** is a back underside perspective view of the controller shown in FIG. **11**.

FIG. **14** is an elevated side view of the controller shown in FIG. **11**.

It should be understood that the invention is not limited in its application to the details of the construction and the arrangement of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is understood that the phraseology and terminology used herein is to describe and should not be regarded as limiting.

DETAILED DESCRIPTION

Referring to FIGS. **1** and **2**A, a system **10** and operator **50** are shown. In one example, system **10** is a weapons system comprising a frame **12**, targeting assembly **20**, and control assembly **40** (FIG. **2**A).

Frame **12** in the example shown is a vehicle. Frame **12**, however, could be a vehicle body, a vehicle frame, or another appropriate structure. In one example, frame **12** is a land based motor vehicle, such as an M-1114 High Mobility Multipurpose Wheeled Vehicle (HMMWV). In another example, frame **12** could be a water based vehicle. Essentially, frame **12** comprises any structure capable of serving as a platform for targeting assembly **20**.

Referring further to FIGS. **1** and **2**A, frame **12** includes an opening **13** with an axis **14**. Targeting assembly **20** is positioned within opening **13** and is arranged for rotation about axis **14**. Operator **50** stands or sits within opening **13** and operates targeting assembly **20** in a manner that will be discussed further herein.

Referring further to FIGS. **1** and **2**A, targeting assembly **20** in one embodiment comprises body member **22**, targeting equipment **24**, and mount **26**. Body member **22** in one example includes a substantially circular frame capable of fitting within opening **13** and into registration with a drive ring **16** attached to frame **12**. Body member **22** includes an opening **27** (for operator **50**) and a support surface **28**. Targeting equipment **24** is mounted on support surface **28** through employment of mount **26**.

Targeting equipment **24** in one example comprises a weapon, such as a .50 caliber machine gun. In another example, targeting equipment **24** comprises another type of weaponry, such as a missile launcher or a rocket propelled grenade launcher. In a further example, targeting equipment **24** comprises non-lethal equipment, such as a fire hose, a light emitting weapon, a sound emitting weapon, and audio and/or visual reproduction equipment. In one example, mount **26** is configured such that targeting equipment **24** is capable of rotating horizontally around axis **30** and rotating vertically around horizontal axes **31**.

Referring to FIGS. **2**B and **2**C, targeting assembly **20** in one example rotates relative to frame **12** through employment of drive ring **16** and body member **22**. Drive ring **16** is positioned within opening **13** and secured to frame **12**. Alternatively, drive ring **16** could be integrally molded to frame **12** or secured to frame **12** through other connecting means. Drive ring **16** includes a base member **161** and a gear track **163**. Gear track **163** is attached to base member **161** through bolts **165** and base member **161** is attached to frame **12** through bolts **167**.

Referring primarily to FIG. **2**C, body member **22** includes a top surface **221**, a ledge **222**, and a sidewall **223**. Sidewall **223** is positioned in registration with a shelf **168** located on base member **161**. Sidewall **222** is adapted to slide with respect to shelf **168**, thereby allowing body member **22** to move with respect to drive ring **16**.

Continuing to refer primarily to FIG. **2**C, drive ring **16** includes an interior bearing surface **169** projecting upward from and attached to gear track **163**. Body member **22** also includes an interior bearing surface **224**. A recess is formed in each of interior bearing surface **169** and interior bearing surface **224** such that a channel **225** is formed therebetween. Ball bearings **226** are positioned within channel **225** such that the two bearing surfaces **169**, **224** can efficiently move with respect to each other.

Referring now to FIG. **2**B, electromechanical rotation of targeting assembly **20** will now be described for illustrative purposes. Control assembly **40** in one example comprises a prime mover system **41**, attached to body member **22**. Prime mover system **41** interacts with drive ring **16** and causes body member **22** to rotate relative to axis **14**.

Referring to FIG. **2**B, prime mover system **41** is mounted to body member **22** through means, such as bolts, and in one

example includes a motor **411**, gearbox **413** (including drive gear **414**), hand crank **415**, and control unit **417**. In one example, prime mover system **41** includes a proportional motor control device, such as a battery powered motorized traversing unit ("BPMTU") controller manufactured by Control Solutions LLC of Aurora, Ill.

Motor **411** is utilized to turn drive gear **414** thereby applying a force against gear track **163** and moving body member **22** relative to axis **14**. Gearbox **413** holds the gear configuration that translates the movement of motor **411** (and hand crank **415**) into rotational movement of drive gear **414**. Hand crank **415** is used to manually move drive gear **414** in the event that power is cut or some other electrical malfunction occurs such that prime mover system **41** is no longer capable of being driven by motor **411**. Control unit **417** in one example provides proportional control to motor **411**. For instance, control unit **417** receives electrical signals from a hand controller, as will now be described herein, and translates those signals into a command to motor **411** to turn in one direction or the other.

Detailed interconnection of components is not shown in FIGS. **2**A-**2**C to aid in illustration of the major components shown therein. Accordingly, FIG. **3** provides a functional block diagram depicting the electrical connection of the components shown in FIGS. **2**A-**2**C. Referring to FIG. **3**, control unit **417** is coupled to motor **411**, battery **419**, and to user interface **43**. In one example, control unit **417** is also electrically coupled to a main power source on frame **12**. For instance, if frame **12** is a vehicle, such as a HMMWV, then control unit **417** will be coupled to the main HMMWV power through a wiring harness, such as one that can be coupled to wiring harness with a connector that will separate if targeting assembly **20** rotates more than about 25 degrees from center. Battery **419** allows targeting assembly **20** to continue to rotate if the connector is disconnected. It should be noted that the components of FIG. **3** can be coupled together through wired means, such as cabling, or through wireless means (e.g., WiFi, IrDA, wireless power, etc.)

Referring to FIG. **2**A, prime mover system **41** is actuated by user interface **43**. User interface **43** in one example is a proportional control input device. User interface **43** is positioned on targeting equipment **24**, and is electromechanically coupled, through cable to prime mover system **41**. In one example, user interface **43** is attached to prime mover system **41** through electromechanically coupling through a BPMTU interface. By actuating user interface **43**, operator **50** can rotate targeting assembly **20** in a clockwise direction or counterclockwise direction about axis **14**.

Referring further to FIG. **1**, as body member **22** rotates about axis **14**, a platform or sling (not shown) can be attached to body member **22** to support operator **50**. In this manner, drive ring **16**, body member **22**, and prime mover system **41** form a motorized turret assembly. U.S. Pat. No. 7,030,579 to Schmitz et al., issued Apr. 18, 2006, entitled "System and method for retrofit mechanism for motorizing a manual turret," is hereby incorporated by reference and describes a motorized turret employing a gear track and body member in a similar manner as to that set forth herein.

Referring further to FIGS. **1** and **2**, operator **50** according to one aspect of the present invention actuates user interface **43** to rotate targeting assembly **20** about axis **14** to train targeting equipment **24** in a desired direction. Attaching user interface **43** to targeting equipment **24**, allows operator **50** to rotate targeting assembly **20** about axis **14** without having to remove his hands from targeting equipment **24**.

Referring to FIG. **4**, an exemplary embodiment of targeting equipment **24** is now described for illustrative purposes. Targeting equipment **24** in one example comprises a **50** caliber machine gun **60**. Gun **60** includes a handle assembly **62**, including a trigger **63**, a buffer tube sleeve **64**, and at least one grip member **65**. In the example shown, gun **60** includes a first generally cylindrical grip member **66** and a second generally cylindrical grip member **67**. The first grip member **66** and the second grip member **67** each have a top portion **68** and a bottom portion **69**. The first grip member **66** and the second grip member **67** are positioned in a substantially parallel relationship. When using gun **60**, the operator **50** grips the first grip member **66** with one hand and grips the second grip member **67** with another hand. User interface **43** is positioned on gun **60** such that operator **50** can rotate targeting assembly **20** without removing a hand from either first grip member **66** or second grip member **67**. Operator **50** can fire gun **60** by depressing trigger **63** while rotating targeting assembly **20**. Thus, control assembly **40** has two operable conditions: By utilizing user interface **43**, system **10** is entered into a first operational mode, in which the targeting assembly **20** is movable about the axis **14** to a secondary firing azimuth, wherein the secondary firing azimuth runs to the general direction at which the operator **50** wants to fire. Then, when the targeting assembly **20** is pointed along the secondary firing azimuth, the operator can utilize the handle assembly **62**, in a second operational mode, to move the gun **60** to a primary firing azimuth, wherein the primary firing azimuth runs to the precise target or location at which the operator wants to fire. The operator then fires at the target or location.

Referring further to FIG. **4**, user interface **43** in one example comprises a switch mechanism that is capable of proportional control over the slew rate of the targeting assembly **20**. The switch mechanism employed in FIG. **4** is a joystick controller **71**. FIGS. **6**-**10** depict alternate embodiments for the switch mechanism, as will be discussed herein. Referring back to FIG. **4**, joystick controller **71** is positioned such that it overhangs the top portion **68** of first grip member **66** and extends substantially perpendicular to the axis **72** running through first grip member **66**. In one example, joystick controller **71** operates in single axis. The direction the joystick controller **71** is pushed corresponds to the direction of desired travel. The operator **50** can hold first grip member **66** while manipulating joystick with a thumb or finger of the same hand to control the direction of rotation and slew rate of targeting assembly **20** while depressing trigger **63**.

FIGS. **5**A and **5**B depict additional configurations of joystick controller **71** and gun **60** are now provided for illustrative purposes. In FIG. **5**A, joystick controller **71** is again positioned on first grip member **66**. The joystick controller **71** extends in a direction parallel to the axis **72** of first grip member **66**. In FIG. **5**B, joystick controller **71** is positioned on second grip member **67** and extends in a direction perpendicular to the axis **73** of second grip member **67**. Joystick controller **71** could also be positioned to extend parallel to the axis **73** of second grip member **67**. It should be noted that the embodiments shown in FIGS. **5**A and **5**B are shown for illustrative purposes and are not meant to be limiting. Joystick controller **71** could be positioned on weapon in various other configurations without departing from the scope defined herein. Further, a multiple axis joystick could be used and various permutations of joystick pushes could be used to select the direction of targeting assembly **20** rotation. For instance, if there were elevation control on gun **60**, a joystick push in an x direction could initiate rotation of targeting assembly **20** about a vertical axis and a push in the y direction could cause the targeting assembly **20** and/or the gun **60** to move vertically about the same vertical axis.

Referring to FIG. **6** through FIG. **10**, additional embodiments of user interface **43** are now provided for illustrative purposes.

FIG. **6** illustrates user interface **43** as a thumb or finger activated proportional control switch **81** on the left side of the gun **60**. The operator **50** would be able to use the index or some other convenient finger to push the lever **82** on the control up or down resulting in respective clockwise or counterclockwise rotation of the targeting assembly **20** or vice versa.

FIG. **7** illustrates an example in which user interface **43** comprises a center biased spring loaded roller bar **83** (up/down rotation) to control the direction and rate of travel of the targeting assembly **20**. The roller bar **83** in one example could be mounted proximate to the first grip member **66** on a side of weapon **50**.

FIG. **8** illustrates an example utilizing a button switch **85** mounted proximate first grip member **66** and another button switch **86** mounted proximate second grip member **67**. In one example, by pushing button **85**, targeting assembly **20** would rotate clockwise about axis **14** and by pushing button **86**, targeting assembly **20** would rotate counter clockwise about axis **14**.

FIG. **9** illustrates yet another embodiment in which user interface **43** comprises twist grips **87** formed by adapting grips **66**, **67** for rotational movement around the axes **72**, **73** of grip member **66**, **67**—i.e., in a manner similar to the throttle of a motorcycle. In one example, the twist grips **87** are bi-directional, center spring twist grip, in which the normal position is centered calibrated to zero input. Control assembly **40** responds to twisting movement of grips **87**. For instance, by rotating one of the twist grips **87** in a first direction, operator **50** can move targeting assembly **20** clockwise. By rotating the same twist grip **87** in a second direction operator **50** can move targeting assembly **20** counterclockwise. Alternatively, in a manner similar to the embodiment shown in FIG. **6**, actuation of one twist grip **87** could be used to rotate the targeting assembly **20** in a first direction, and the other twist grip **87** could be used to rotate the targeting assembly **20** in a second direction.

FIG. **10** illustrates a further embodiment in a rocker switch **89** is positioned on each grip **65** and act as user interface **43**. By actuating first rocker switch **89**, the operator **50** can rotate the targeting assembly **20** in a first direction. By actuating the second rocker switch **89**, the operator **50** can rotate the targeting assembly in a second direction. Alternatively, each rocker switch **89** could be used to rotate the targeting assembly in both directions. For instance, each rocker switch **89** would be center sprung. A push of the top portion **89***a* of the switch **89** would rotate targeting assembly **20** in one direction and a push of the bottom portion **89***b* of the switch **89** would rotate the targeting assembly **20** in the other direction. In another instance, a single center sprung rocker switch **89** could be positioned on a single grip and act as a single controller for rotation of targeting assembly **20**.

Referring to FIG. **11**, joystick controller **71** in one example attaches to gun **60** through employment of bracket **711**. Bracket **711** is positioned under the U-shaped bracket **621** by which grip members **66**, **67** are attached to the body of gun **60**. In one example, bracket **711** is positioned vertically beneath U bracket **621** and attached to joystick controller **71** through employment of screws **713**. Screws **713** cause bracket **711** to bear against U-shaped bracket **621** and hold joystick controller **71** in place against handle assembly **62**. In one embodiment, bracket **711** is positioned at a diagonal relative to base **623** of U bracket **621** and at location **625** where the arms of U-shaped bracket **621** meet base **623**. Screws **713** are attached to joystick controller **71** in a diagonal configuration. It should be noted that the preceding arrangement has been described for illustrative purposes only. User interface **43** could also be attached to gun **60** through a number of alternative means, such as magnets, adhesives, molding, screws, hook and loop fasteners (e.g. Velcro®), etc.

Referring to FIG. **11**A, bracket **711** in one embodiment comprises a solid oval shaped frame made of a material, such aluminum, steel, a steel alloy, or a composite material. Bracket **711** includes recesses **715**, **716**. Recess **715** in one example is a substantially round screw hole and recess **716** is a substantially U-shaped cutout. Such a configuration allows operator **50** to quickly remove joystick controller **71** from handle assembly **62** and reposition it. For instance, if joystick controller **71** were mounted near grip member **66**, operator **50** could loosen screw **713** extending through recess **715**, rotate bracket **711**, and slide the other screw **713** from recess **716**. Operator **50** could then reposition joystick controller **71** elsewhere, e.g. on or proximate to grip member **67**. The embodiment shown in FIG. **11** is a joystick controller **71**. It should be noted, however, that bracket **711** can also be used to attach other embodiments of user interface **43** to handle assembly **62**.

Referring to FIG. **12**, joystick controller **71** in one embodiment comprises port **721**, joystick member **723**, and housing **729**.

Port **721** in one example is an output port which is attached to control unit **417** through a BPMTU interface connector.

Joystick member **723** in one embodiment is covered with a sheath **724** made of a material, such as rubber, plastic, cloth, etc. Sheath includes at least one instance of projection **725**. Projections **725** in one example are shaped like truncated pyramids. Projections **725** provide user with an effective surface against which to bear a thumb or finger to actuate joystick member **723**.

Referring to FIGS. **11-13**, joystick controller **71** is attached to housing **729** through plate **726** and screws **727** (FIG. **11**). Port **721** is attached to housing **729** through plate **730** and screws **731**. Threaded holes **733** are located on the underside of housing **729** (FIG. **13**). Threaded holes **733** receive screws **713** which are employed to attach joystick controller **71** to handle assembly **62**.

Referring to FIG. **14**, housing **729** in one embodiment is made of a ruggedized material (e.g. aluminum, steel, steel alloy, a composite material, etc.) and is at least partially hollow such that it can receive at least a portion of joystick member **723** and controller electronics. Housing **729** includes a hood **735** which extends over joystick member **723** and prevents joystick member **723** from being actuated due to inadvertent movement from operator **50**.

Referring to FIG. **14**, an exemplary orientation for joystick controller **71** to provide operator **50** with an effective reach to joystick member **723** will now be provided for illustrative purposes. In one example, joystick member **723** (FIG. **12**) is oriented such that the axis A of the joystick member **723** is oriented downward angle 10 degrees relative to a plane parallel to the top horizontal plane **622** of U-shaped bracket **621** at location **625** (FIG. **11**). The height H_j of joystick member **723** (FIG. **12**) (to the centroid of that surface) in one example is from −0.25" to 1.0" and optimally at 0.75" from the top horizontal plane **622** of the U-shaped bracket **621** at location **625** (FIG. **11**). The height of housing H_h of joystick controller has an exemplary value of 1.5". Finally, a length L of hood **735** has an exemplary value of 0.75". The angle of rotation R of the joystick has an exemplary value of +/−25 degrees from center.

While particular embodiments have been shown and described, it will be apparent to those skilled in the art that changes and modifications may be made without departing from the broader aspects of applicants' contribution. The actual scope of the protection sought is intended to be defined in the following claims when viewed in their proper perspective based on the prior art.

The invention claimed is:

1. A weapons system, comprising:
a frame having an axis;
a targeting assembly including a body member, attached to the frame and arranged for rotational movement relative to the axis, and a weapon; and
a control assembly including a user interface mounted on the weapon and operable to rotate the body member about the axis.

2. The weapons system of claim **1**, wherein the user interface is a proportional control input device.

3. The weapons system of claim **2**, wherein the proportional control input device comprises at least one of a joystick, a twist grip, a rocker switch, a roller bar, and a button switch.

4. The weapons system of claim **1**, wherein the weapon comprises a handle assembly, the handle assembly including at least one grip member.

5. The weapons system of claim **4**, wherein the at least one grip member comprises a first generally cylindrical grip member and a second generally cylindrical grip member, each having a top portion and a bottom portion, wherein the first generally cylindrical grip member and the second generally cylindrical grip member are positioned in a substantially parallel relationship.

6. The weapons system of claim **5**, wherein the user interface comprises a joystick member positioned on the top portion of at least one of the first generally cylindrical grip member and the second generally cylindrical grip member.

7. The weapons system of claim **5**, wherein at least one of the first generally cylindrical grip member and the second generally cylindrical grip member is adapted for twisting movement about a vertical axis, and further wherein the user interface is activated by twisting movement of at least one of the first generally cylindrical grip member and the second generally cylindrical grip member.

8. The weapons system of claim **7**, wherein the targeting assembly responds to twisting movement of the first generally cylindrical grip member by rotating in a first direction and responds to twisting movement of the second generally cylindrical grip member by rotating in a second direction.

9. The weapons system of claim **5**, wherein the user interface comprises a first rocker switch positioned on the first generally cylindrical grip member and a second rocker switch positioned on the second generally cylindrical grip member, wherein the targeting assembly responds to actuation of the first rocker switch by rotating in a first direction and responds to actuation of the second rocker switch by rotating in a second direction.

10. A weapons system, comprising:
a frame having an axis;
a targeting assembly, including a weapon, attached to the frame and arranged for rotational movement relative to the axis;
a control assembly mounted on the frame and the targeting assembly and operable to provide the rotational movement of the targeting assembly about the axis, wherein the control assembly includes a user interface, positioned on the weapon, and operable to move the weapon to a secondary firing azimuth.

11. The weapons system of claim **10**, wherein the user interface is a proportional control input device.

12. The weapons system of claim **11**, wherein the proportional control input device comprises at least one of a joystick, a twist grip, a rocker switch, a roller bar, and a button switch.

13. The weapons system of claim **10**, wherein the weapon comprises a handle assembly, the handle assembly including at least one grip member.

14. The weapons system of claim **13**, wherein the at least one grip member comprises a first generally cylindrical grip member and second generally cylindrical grip member, each having a top portion and a bottom portion, wherein the first generally cylindrical grip member and the second generally cylindrical grip member are positioned in a substantially parallel relationship.

15. The weapons system of claim **14**, wherein the user interface comprises a joystick member positioned on the top portion of the first generally cylindrical grip member.

16. A weapons system,
comprising:
a frame having an axis;
a targeting assembly, including a weapon, attached to the frame and arranged for rotational movement relative to the axis;
a control assembly, including a user interface positioned on the weapon, mounted on the frame and the targeting assembly and operable to provide the rotational movement of the targeting assembly around the axis, wherein the control assembly has two operable conditions, including a first operational mode in which the weapon is movable to a secondary firing azimuth and a second operational mode in which the weapon is movable to a primary firing azimuth, wherein the first operational mode is entered by actuating the user interface.

17. The weapons system of claim **16**, wherein the user interface is a proportional control input device.

18. The weapons system of claim **17**, wherein the proportional control input device comprises at least one of a joystick, a twist grip, a rocker switch, a roller bar, and a button switch.

19. The weapons system of claim **16**, wherein the weapon comprises a handle assembly, the handle assembly including at least one grip member.

20. The weapons system of claim **19**, wherein the at least one grip member comprises a first generally cylindrical grip member and second generally cylindrical grip member, each having a top portion and a bottom portion, wherein the first generally cylindrical grip member and the second generally cylindrical grip member are positioned in a substantially parallel relationship.

21. The weapons system of claim **20**, wherein the user interface comprises a joystick member positioned on the top portion of the first generally cylindrical grip member.

22. A method of providing a weapons system with weapons mounted rotational control, the weapons system comprising a targeting assembly, including a weapon, and a control unit operable to provide rotational movement of the targeting assembly relative to a frame, the method comprising:
providing a user interface configured to be electromechanically coupled to the control unit;
mounting the user interface on the weapon, and
electromechanically coupling the user interface to the control unit.

23. The method of claim **22**, wherein the step of providing comprises:
providing a proportional control input device.

24. The weapons system of claim **23**, wherein the step of providing the proportional control input device comprises

providing at least one of a joystick, a twist grip, a rocker switch, a roller bar, and a button switch.

25. The method of claim **22**, wherein the step of providing comprises:

providing the user interface such that it includes a battery powered motorized traversing unit ("BPMTU") interface.

26. The method of claim **22**, wherein the weapon includes a handle assembly comprising a first generally cylindrical grip member and a second generally cylindrical grip member, each having a top portion and a bottom portion, wherein the first generally cylindrical grip member and the second generally cylindrical grip member are positioned in a substantially parallel relationship, and wherein the step of attaching the user interface comprises:

attaching the user interface to at least one of the first generally cylindrical grip member and the second generally cylindrical grip member.

27. The method of claim of claim **26**, wherein the step of attaching the user interface comprises:

attaching a joystick member to one of the first generally cylindrical grip member and the second generally cylindrical grip member at the top portion thereof.

28. The method of claim **26**, wherein the step of attaching the user interface comprises:

adapting at least one of the first generally cylindrical grip member and the second generally cylindrical grip member for twisting movement about an axis.

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