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(54) Title: PROJECTILE LOADING DEVICE

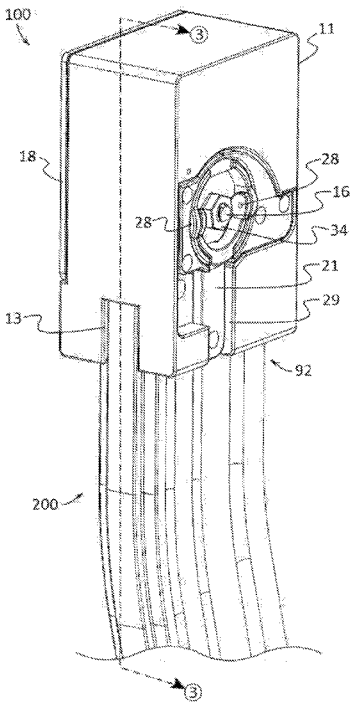

FIG. 1

(57) Abstract: A projectile loading device for inserting projectiles into a magazine which in some embodiments may comprise a housing defining a projectile reservoir configured to contain a plurality of spherical projectiles. The housing may also define a magazine well configured to be removably coupled to a magazine. The device may also comprise a rotatable loading wheel comprising a plurality of conducting protrusions. The conducting protrusions may be configured to engage with projectiles within the projectile reservoir so that upon rotating the loading wheel the conducting protrusions may contact and direct one or more projectiles from the projectile reservoir to the magazine.

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PROJECTILE LOADING DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority to and the benefit of the filing date of U.S. Provisional Application No. 61/983,995, filed on April 24, 2014, entitled "Projectile loading device", which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

This patent specification relates to the field of projectile magazine reloading devices. More specifically, this patent specification relates to devices configured to load projectiles such as spherical bullets into a magazine.

BACKGROUND

In the game of airsoft, players may fire thousands of spherical projectiles, sometimes referred to as BBs, in a matter of minutes. At that rate of fire, there will be a frequent need to reload both on and off the field. The spherical projectiles used are loaded into a magazine which will be inserted into an airsoft gun to supply the gun with ammunition. In utilizing the pre-filled magazines, the depleted magazines must be refilled with additional spherical projectiles. This process may be repeated numerous times throughout the course of a game. If one game consists of several rounds, the magazines may be refilled in between rounds for continued use. Whether in game or between games at is advantageous to be able to reload your magazines as quickly, efficiently and reliably as possible allowing more time for other tasks such as playing, prepping

other gear, planning your next move etc. Existing reloading devices (Speed Loaders) are insufficient for this task. Several have a limited capacity, and are very slow and flimsy. Others have more capacity and are faster but are too large to carry into the field for in-game use significantly limiting their benefit. Variations have been made to several designs but none have been able to overcome all of the existing speed loaders shortcomings.

Therefore, a need exists for novel projectile loading devices. There is a further need for novel projectile loading devices that is able to accept and dispense a large capacity of spherical projectiles. A further need exists for novel projectile loading devices that are sturdy enough for frequent magazine reloading while not being too cumbersome to carry and use during game play. Finally, there exists a need for novel projectile loading devices that are able to rapidly load magazines with spherical projectiles to capacity while preventing damage to the magazine due to overfilling.

BRIEF SUMMARY OF THE INVENTION

A projectile loading device for inserting projectiles into a magazine is provided. The device may be removably coupled to a projectile magazine and be configured to insert projectiles contained in the device into the magazine. In some embodiments, the projectile loading device may comprise a housing defining a projectile reservoir configured to contain a plurality of spherical projectiles. The housing may also define a magazine well configured to be removably coupled to a magazine. The device may also comprise a rotatable loading wheel comprising a plurality of conducting protrusions. The conducting protrusions may be configured to engage with projectiles within the projectile reservoir so that upon rotating the loading wheel the conducting protrusions may contact and direct one or more projectiles from the projectile

reservoir to the magazine. The device may further comprise a drive shaft which may secure the loading wheel and a loader feed channel configured to conduct projectiles engaged by the loading wheel from the projectile reservoir into a magazine.

In further embodiments, the projectile loading device may comprise a housing defining a projectile reservoir configured to contain a plurality of spherical projectiles. The housing may also define a magazine well configured to be removably coupled to a magazine. The device may also comprise a rotatable loading wheel comprising a plurality of conducting protrusions. The conducting protrusions may be configured to engage with projectiles within the projectile reservoir so that upon rotating the loading wheel the conducting protrusions may contact and direct one or more projectiles from the projectile reservoir to the magazine. The device may further comprise a drive shaft rotatably securing the loading wheel with a clutch and a loader feed channel configured to conduct projectiles engaged by the loading wheel from the projectile reservoir into a magazine.

In still further embodiments, the device may comprise a hand crank which may be coupled to the drive shaft allowing rotational motion from the hand crank to be transferred to the loading wheel.

In still further embodiments, the device may comprise a motor which may be coupled to the drive shaft allowing rotational motion from the motor to be transferred to the loading wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the present invention are illustrated as an example and are not limited by the figures of the accompanying drawings, in which like references may indicate similar elements and in which:

FIG. 1 - Figure 1 depicts a perspective view of an example of a projectile loading device removably coupled to a magazine according to various embodiments described herein.

FIG. 2 - Figure 2 illustrates a perspective view of an example of a projectile loading device removably coupled to a magazine according to various embodiments described herein.

FIG. 3 - Figure 3 shows a sectional, through line 3-3 shown in FIG. 1, view of an example of a projectile loading device according to various embodiments described herein.

FIG. 4 - Figure 4 depicts a sectional, through line 4-4 shown in FIG. 2, view of an example of a projectile loading device removably coupled to a magazine according to various embodiments described herein.

FIG. 5 – Figure 5 illustrates a perspective view of an example of a hand crank rotationally coupled to a loading wheel according to various embodiments described herein.

FIG. 6 – Figure 6 shows a sectional, through line 6-6 shown in FIG. 5, view of an example of a hand crank rotationally coupled to a loading wheel according to various embodiments described herein.

FIG. 7 – Figure 7 depicts a perspective view of an example of a ramp configured to direct projectiles towards the loading wheel according to various embodiments described herein.

FIG. 8 – Figure 8 illustrates an elevation exploded view of an alternative example of a hand crank rotationally coupled to a loading wheel according to various embodiments described herein.

FIG. 9 - Figure 9 shows an elevation view of an alternative example of a hand crank rotationally coupled to a loading wheel according to various embodiments described herein.

FIG. 10 - Figure 10 depicts a perspective view of an example of a motor rotationally coupled to a loading wheel to various embodiments described herein.

FIG. 11 - Figure 11 illustrates an elevation view of an example of a motor rotationally coupled to a loading wheel according to various embodiments described herein.

DETAILED DESCRIPTION OF THE INVENTION

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well as the singular forms, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof. Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one having ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and the present disclosure and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

In describing the invention, it will be understood that a number of techniques and steps are disclosed. Each of these has individual benefit and each can also be used in conjunction with one or more, or in some cases all, of the other disclosed techniques. Accordingly, for the sake of clarity, this description will refrain from repeating every possible combination of the individual steps in an unnecessary fashion. Nevertheless, the specification and claims should be read with

the understanding that such combinations are entirely within the scope of the invention and the claims.

For purposes of description herein, the terms "upper", "lower", "left", "rear", "right", "front", "vertical", "horizontal", and derivatives thereof shall relate to the invention as oriented in FIG. 1. However, one will understand that the invention may assume various alternative orientations and step sequences, except where expressly specified to the contrary. Therefore, the specific devices and processes illustrated in the attached drawings, and described in the following specification, are simply exemplary embodiments of the inventive concepts defined in the appended claims. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

New projectile magazine reloading devices are discussed herein. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

The present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to the specific embodiments illustrated by the figures or description below.

The present invention will now be described by example and through referencing the appended figures representing preferred and alternative embodiments. FIGS. 1 - 4 illustrate an example of a projectile loading device ("the device") 100 according to various embodiments. The device 100 may be removably coupled to a projectile magazine ("the magazine") 200 and configured to insert projectiles 300 (FIGS. 4 and 7), such as spherically shaped projectiles, from the device 100 into the magazine 200. In this example, the device 100 comprises a housing 11 defining a

projectile reservoir 12 configured to contain a plurality of spherical projectiles 300. The housing 11 may be made from of rigid plastic, metal or metal alloys, or any other durable rigid material, and may also define a magazine well 13 configured to be removably coupled to a magazine 200. The device 100 may also comprise a rotatable loading wheel 14 comprising a plurality of conducting protrusions 15. The conducting protrusions 15 may be configured to engage with projectiles 300 within the projectile reservoir 12 so that upon rotating the loading wheel 14 the conducting protrusions 15 may contact and direct one or more projectiles 300 from the projectile reservoir 12 to the magazine 200. The device 100 may further comprise a drive shaft 16 which may secure the loading wheel 14 and a loader feed channel 17 configured to conduct projectiles 300 engaged by the loading wheel 14 from the projectile reservoir 12 into a magazine 200. The device 100 may comprise a magazine well 13 which may be configured to removably couple a magazine 200. Generally, a magazine 200 may comprise an inlet/outlet port 201 in communication with a magazine channel 202. Projectiles 300 may be inserted through the inlet/outlet port 201 and into the magazine channel 202 which may further comprise a spring 203. The spring 203 may exert pressure on the projectiles within the magazine channel 202 to facilitate ejection of the projectiles 300 from the inlet/outlet port 201. A magazine 200 may be configured to contain a maximum number of projectiles 300 in the magazine channel 202 with further projectiles 300 resulting in damage to the spring 203 or other component of the magazine 200. The magazine well 13 may be complementarily shaped to a portion, such as the top portion, of a magazine 200 allowing a portion of the magazine to be inserted into the magazine well 200. The magazine well 13 may be configured to receive a portion of a M4 pattern magazine, AK47 pattern, or any other pattern, size, or style of magazine. In further embodiments, the device 100 may comprise a magazine catch 19 which may be configured to temporarily engage with a

portion of a magazine 200 which has been inserted within the magazine well 13, thereby removably coupling the magazine 200 to the magazine well 13.

In some embodiments, the device 100 may be configured to insert projectiles into a magazine 200 that has been inserted or removably coupled to the magazine well 13. The loading wheel 14 may be rotated on the drive shaft 16 allowing the conducting protrusions 15 to contact and engage with the conducting protrusions 15 which may then push one or more projectiles 300 into the loader feed channel 17. Once in the loader feed channel 17, the projectiles may be conducted through the loader feed channel 17 by the addition of more projectiles into the loader feed channel 17 engaged by the conducting protrusions 15 of the rotating loading wheel 14. The loader feed channel 17 may be generally helical in shape so that when projectiles 300 are engaged by the conducting protrusions 15 and pushed into the loader feed channel 17, the conducting protrusions 15 may protrude into the loader feed channel 17. As the projectiles 300 advance in the loader feed channel 17, the loader feed channel 17 may curve away from the loading wheel 14 so that the conducting protrusions 15 do not protrude into the loader feed channel 17 thereby allowing the projectiles 300 to disengage from the conducting protrusions 15 and continue through the loader feed channel 17. The projectiles 300 may be conducted out of a discharge port 20 formed by the terminus of the loader feed channel 17, into the inlet/outlet port 201 of the magazine 200, and into the magazine channel 202 where a spring 203 may be compressed until the magazine channel 202 is filled to a desired level.

The projectile reservoir 12 may comprise a hollow cavity within the housing 11 configured to contain a plurality of spherical projectiles 300. Access to the projectile reservoir 12 may be governed by a fill door 18 allowing projectiles 300 to be added or removed from the projectile reservoir 12. In some embodiments, a fill door 18 may be hingedly coupled to the housing 11

such as with a hinge 12 may comprise a butt hinge, butterfly hinge, flush hinge, barrel hinge, concealed hinge, continuous hinge, T-hinge, strap hinge, double-acting hinge, Soss hinge, a flexible material hinge, a so-called "living" hinge, which typically comprises a linear, relatively flexible area between two relatively more rigid components, such as a line of thin plastic between thicker plastic portions, as is well known in the art, or any other type or style of hinge or pivotal joining method that allows portions of a fill door 18 and housing 11 to be pivoted away from each other. In other embodiments, a fill door 18 may comprise a spring or other tension providing device that is able to mechanically assist with the opening or closing of the fill door 18. In still other embodiments, a fill door 18 and housing 11 may be slidably joined together with a tongue and groove engagement allowing portions of a fill door 18 to be slid open and closed from the housing 11. In further embodiments, a fill door 18 and housing 11 may be joined with any other type of engagement that allows a portion of a fill door 18 to be moved relative to the housing 11 thereby restricting and granting access to the projectile reservoir 12 of the device 100.

Referring now to FIG. 5 and FIG. 6, an example of a hand crank 21 rotationally coupled to a loading wheel 14 according to various embodiments described herein. In some embodiments, the loading wheel 14 may comprise a generally circular shape with one or more conducting protrusions 15 radially disposed thereon. In the example shown in FIGS. 4 and 5, the loading wheel 14 may comprise six conducting protrusions 15 which may be spaced from each other to allow two projectiles to be fit or positioned between two adjacent conducting protrusions 15. In other embodiments, the loading wheel 14 may comprise six conducting protrusions 15 which may be spaced from each other to allow three projectiles to be fit or positioned between two adjacent conducting protrusions 15. In still other embodiments, the loading wheel 14 may

comprise nine conducting protrusions 15 which may be spaced from each other to allow one projectile to be fit or positioned between two adjacent conducting protrusions 15. One of skill in the art will immediately recognize that a loading wheel may comprise one, two, three, four, five, six, seven, eight, nine, ten, or more conducting protrusions 15 and that the conducting protrusions 15 may be spaced from each other to allow one, two, three, four, five, six, seven, eight, nine, ten, or more projectiles to be fit or positioned between two adjacent conducting protrusions 15. In still further embodiments, the loading wheel 14 may comprise a worm or screw type gear with the conducting protrusions 15 formed by the worm or screw type gear teeth. A conducting protrusion 15 may be configured to extend away from the loading wheel 14 a distance which allows a projectile 300 in contact with the conducting protrusion 15 to be moved by the conducting protrusion 15 as the loading wheel 14 rotates. Also shown in the example of FIGS. 5 and 6, in some embodiments, a conducting protrusion 15 may comprise a generally rounded paddle shape that may extend away from the loading wheel 14. In other embodiments, a conducting protrusion 15 may comprise a generally cylindrical shape that may extend away from the loading wheel 14. In alternative embodiments, a conducting protrusion 15 may comprise a generally fin shape, post shape, cuboid shape, spherical shape, triangular prism shape, or any other geometric or non-geometric shape, including combinations of shapes that may extend away from the loading wheel 14. It is not intended herein to mention all the possible alternatives, equivalent forms or ramifications of the invention. It is understood that the terms and proposed shapes used herein are merely descriptive, rather than limiting, and that various changes may be made without departing from the spirit or scope of the invention.

In some embodiments, a first end 22 of the drive shaft 16 may rotatably secure the loading wheel 14 and second end 23 of the drive shaft 16 may optionally be coupled to a hand crank 21. The

hand crank 21 may comprise a crank lever 25 with a grip 24 which may be coupled to a first end 26 of the crank lever 25, such as with a screw 41 or pin, while the second end 27 of the crank lever 25 may be coupled to the drive shaft 16. By rotating the hand crank 21, the drive shaft 16 and therefore the loading wheel 14 may be rotated. In further embodiments, the second end 27 of the crank lever 25 may be pivotally coupled to the drive shaft 16 with one or more pins 28 (FIGS. 1, 2, 8, and 9), rivets, or other coupling method which may allow the hand crank 21 to be moved between a work position 91 (FIGS. 2, 3, 5 – 9) and a stowed position 92 (FIG. 1). The housing 11 may comprise a hand crank depression 29 which may be complementarily shaped to a portion of the grip 24 and/or crank lever 25 so that a portion of the grip 24 and/or crank lever 25 may be received in the hand crank depression 29 when the hand crank 21 is in a stowed position 92.

Turning now to FIGS. 3 and 5, in some embodiments, the device 100 may comprise one or more bearings 30, such as ball bearings, roller bearings or any other type of friction reducing bearing, which may rotatably secure the drive shaft 16 to the housing 11. A bearing 30 may facilitate or allow the drive shaft 16 to form an axis of rotation allowing the drive shaft 16 and the loading wheel 14 to rotate relative to the housing 11 while the drive shaft 16 remains coupled to the housing 11.

As shown in FIGS. 3, 5, and 6, in some embodiments, a drive shaft 16 may be rotatably secured to the loading wheel 14 with a clutch 31 which may be configured to rotationally couple and rotationally uncouple the loading wheel 14 from the drive shaft16. When the drive shaft 16 and loading wheel 14 are rotationally coupled, the loading wheel 14 may rotate as the drive shaft 16 is rotated. When the drive shaft 16 and loading wheel 14 are rotationally uncoupled, the loading wheel 14 may not rotate as the drive shaft 16 is rotated. In further embodiments, a clutch 31 may

be a type of friction clutch and may generally rely on frictional forces in order to rotationally couple and rotationally uncouple the loading wheel 14 from the drive shaft 16. In other embodiments, a clutch 31 may comprise any type of clutch suitable for rotationally coupling and rotationally uncoupling the loading wheel 14 from the drive shaft 16.

In some embodiments, a clutch 31 may comprise a drive washer 32 which may be coupled to the drive shaft 16 and a friction washer 33 which may be coupled to the loading wheel 14. The loading wheel 14 and the friction washer 33 may be rotatably secured by the drive shaft while being able to freely rotate around the rotational axis provided by the drive shaft 16. The drive washer 32 and the friction washer 33 may each comprise any type of friction washer and may be made from durable plastic, metals and metal alloys, ceramic, or any other material suitable for use as a friction washer. When the drive washer 32 and the friction washer 33 are pressed or frictionally engaged together, friction between the two may rotationally couple the washers 32, 33, and therefore the drive shaft 16 and the loading wheel 14 together. In further embodiments, the drive shaft 16 may comprise a friction nut 34, such as a threaded nut type fastener, which may be configured to modulate the amount of friction between the drive washer 32 and the friction washer 33. The friction nut 34 may be threadedly coupled to the drive shaft 16 so that by tightening the friction nut 34, the drive washer 32 and the friction washer 33 may be pressed together thereby increasing the frictionally engagement between the washers 32, 33. Conversely, by loosening the friction nut 34, the pressure and therefore friction between the drive washer 32 and the friction washer 33 may be lessened thereby decreasing the frictionally engagement between the washers 32, 33. In this manner, the amount of friction between the drive washer 32 and the friction washer 33 may be modulated allowing the washers 32, 33, to be rotationally coupled together to overcome the resistance of the spring 203 (FIG. 4) to insertion of

projectiles 300 (FIGS. 4 and 7) into the magazine channel 202 (FIG. 4) and then to be rotationally uncoupled once the magazine 200 (FIGS. 1, 2, and 4) is filled to capacity thereby preventing damage from overfilling.

FIG. 7 shows a perspective view of an example of a ramp 35 configured to direct projectiles 300 towards the loading wheel 14 according to various embodiments described herein. In some embodiments, a ramp may 35 comprise a generally sloped surface which may funnel or direct the projectiles 300 within the projectile reservoir 12 (FIGS. 3 and 4) towards the loading wheel 14 thereby facilitating the engagement of the projectiles 300 with the conducting protrusions 15. Generally, the ramp 35 may be positioned within the projectile reservoir 12 so that as the loading wheel 14 is rotated, optionally by a hand crank 21, the projectiles 300 may be funneled or directed from the projectile reservoir 12 to the loading wheel 14 and moved into the loader feed channel 17 (FIGS. 3 and 4) by engagement with the conducting protrusions 15.

Turning now to FIG. 8 and FIG. 9, an elevation exploded view of an alternative example of a hand crank 21 rotationally coupled to a loading wheel 14 and an elevation view of an alternative example of a hand crank 21 rotationally coupled to a loading wheel 14 according to various embodiments described herein is depicted. In this and some alternative embodiments, the device 100 may comprise a clutch 31 in which a friction washer 33 may be coupled to the drive shaft 16. An optional hand crank 21 or an optional motor 36 (FIGS. 10 and 11) and drive gear 37 (FIGS. 10 and 11) may also be coupled to the drive shaft 16 and/or to the friction washer 33. The loading wheel 14 may be rotatably secured by the drive shaft 16 while being able to freely rotate around the rotational axis provided by the drive shaft 16.

The loading wheel and the friction washer 33 may each comprise any type of friction washer material and may be made from durable plastic, metals and metal alloys, ceramic, or any other

material suitable for use as a friction washer. When the loading wheel 14 and the friction washer 33 are pressed or frictionally engaged together, friction between the two may rotationally couple the loading wheel 14 to the friction washer 33, and therefore the drive shaft 16 and the loading wheel 14 together. In further embodiments, the drive shaft 16 may comprise a friction nut 34 (FIGS. 1 and 2), such as a threaded nut type fastener, which may be configured to modulate the amount of friction between the drive washer 16 and the friction washer 33.

The friction nut 34 may be threadedly coupled to the second end 23 of the drive shaft 16 so that by tightening the friction nut 34, the loading wheel 14 and the friction washer 33 may be pressed together thereby increasing the frictionally engagement between the loading wheel 14 and the friction washer 33. Conversely, by loosening the friction nut 34, the pressure and therefore friction between the loading wheel 14 and the friction washer 33 may be lessened thereby decreasing the frictionally engagement between the loading wheel 14 and the friction washer 33. In this manner, the amount of friction between the loading wheel 14 and the friction washer 33 may be modulated allowing the washers loading wheel 14 and the friction washer 33 to be rotationally coupled together to overcome the resistance of the spring 203 (FIG. 4) to insertion of projectiles 300 (FIGS. 4 and 7) into the magazine channel 202 (FIG. 4) and then to be rotationally uncoupled once the magazine 200 (FIGS. 1, 2, and 4) is filled to capacity thereby preventing damage from overfilling.

FIG. 8 and FIG. 9 also illustrates an alternative example of a hand crank rotationally coupled to a loading wheel in which the drive shaft 16 may be rotationally coupled to the housing with bearing surfaces on the drive shaft 16 and the portion of the housing 11 configured to contact the drive shaft 16. A bearing surface may comprise a simple bearing which may be cut or formed

into a part with varying degrees of control over the form, size, roughness and location of the surface, thereby decreasing friction between the two contacting surfaces.

As shown in FIGS. 10 and 11 in some embodiments, the device 100 may comprise a motor 36 which may be coupled to the drive shaft 16. In further embodiments, the device 100 may comprise a drive gear 37 which may be configured to transfer rotational motion from the motor 36 to the drive shaft 16. The drive gear 37 may be coupled to the drive shaft 16 and comprise a plurality of drive teeth 38 which may engage with a plurality of motor gear teeth 39 on a motor gear 40 which may be rotated by the motor 36. The drive gear 37 and the motor gear 40 may be configured in a variety of sizes and shapes to provide suitable gear ratios for transferring circumferential velocity or rotational motion from the motor 36 to the drive shaft 16 including round type gears as shown, worm or screw type gears, or any other suitable gear. In some embodiments, the drive gear 37 may comprise a greater number of drive teeth 38 than the number of motor gear teeth 39 on the motor gear 40 allowing the drive gear 37 to decrease the circumferential velocity of the drive shaft 16 relative to the circumferential velocity of the motor 37. In alternative embodiments, the drive gear 37 may comprise a lesser number of drive teeth 38 than the number of motor gear teeth 39 on the motor gear 40 allowing the drive gear 37 to increase the circumferential velocity of the drive shaft 16 relative to the circumferential velocity of the motor 37.

While some materials have been provided, in other embodiments, the elements that comprise the device 100 and other optional elements, such as the hand crank 21, clutch 31, drive washer 32, friction washer 33, friction nut 34, motor 36, and/or drive gear 37 may be made from durable materials such as aluminum, steel, other metals and metal alloys, wood, hard rubbers, hard plastics, fiber reinforced plastics, carbon fiber, fiber glass, resins, polymers or any other suitable

materials including combinations of materials. Additionally, one or more elements may be made from or comprise durable and slightly flexible materials such as soft plastics, silicone, soft rubbers, or any other suitable materials including combinations of materials. In some embodiments, one or more of the elements that comprise the device 100 may be coupled or connected together with heat bonding, chemical bonding, adhesives, clasp type fasteners, clip type fasteners, rivet type fasteners, threaded type fasteners, other types of fasteners, or any other suitable joining method. In other embodiments, one or more of the elements that comprise the device 100 may be coupled or removably connected by being press fit or snap fit together, by one or more fasteners such as hook and loop type or Velcro® fasteners, magnetic type fasteners, threaded type fasteners, sealable tongue and groove fasteners, snap fasteners, clip type fasteners, clasp type fasteners, ratchet type fasteners, a push-to-lock type connection method, a turn-to-lock type connection method, slide-to-lock type connection method or any other suitable temporary connection method as one reasonably skilled in the art could envision to serve the same function. In further embodiments, one or more of the elements that comprise the device 100 may be coupled by being one of connected to and integrally formed with another element of the device 100.

Although the present invention has been illustrated and described herein with reference to preferred embodiments and specific examples thereof, it will be readily apparent to those of ordinary skill in the art that other embodiments and examples may perform similar functions and/or achieve like results. All such equivalent embodiments and examples are within the spirit and scope of the present invention, are contemplated thereby, and are intended to be covered by the following claims.

CLAIMS

What is claimed is:

1. A projectile loading device for inserting projectiles into a magazine, the device comprising:
    a. a housing defining a; projectile reservoir configured to contain a plurality of projectiles and a magazine well configured to be removably coupled to a projectile magazine;
    b. a rotatable loading wheel comprising a plurality of conducting protrusions, wherein the conducting protrusions are configured to engage with projectiles within the projectile reservoir;
    c. a drive shaft rotatably securing the loading wheel; and
    d. a loader feed channel, wherein rotation of the loading wheel is configured to conduct projectiles from the projectile reservoir, through the loader feed channel, and into a projectile magazine.
2. The device of claim 1, further comprising a bearing configured to rotatably secure the drive shaft to the housing.
3. The device of claim 2, further comprising a ramp configured to direct projectiles within the projectile reservoir towards the loading wheel.
4. The device of claim 3, further comprising a hand crank coupled to the drive shaft.
5. The device of claim 4, wherein the hand crank is pivotally coupled to the drive shaft.
6. The device of claim 5, wherein the hand crank may be moved between a work position and a stowed position.
7. The device of claim 6, further comprising a handle depression configured to receive a portion of the hand crank when the hand crank is moved to a stowed position.
8. The device of claim 3, further comprising a motor coupled to the drive shaft.

9. A projectile loading device for inserting projectiles into a magazine, the device comprising:
    a. a housing defining a projectile reservoir configured to contain a plurality of projectiles and a magazine well configured to be removably coupled to a projectile magazine;
    b. a rotatable loading wheel comprising a plurality of conducting protrusions, wherein the conducting protrusions are configured to engage with projectiles within the projectile reservoir;
    c. a drive shaft rotatably securing the loading wheel with a clutch; and
    d. a loader feed channel, wherein rotation of the loading wheel is configured to conduct projectiles from the projectile reservoir, through the loader feed channel, and into a projectile magazine.
10. The device of claim 9, wherein the clutch comprises a drive washer coupled to the drive shaft and a friction washer coupled to the loading wheel.
11. The device of claim 9, wherein the drive washer and friction washer are frictionally engaged together.
12. The device of claim 9, wherein the drive shaft comprises a friction nut configured to modulate the amount of friction between the drive washer and friction washer.
13. The device of claim 11, further comprising a bearing configured to rotatably secure the drive shaft to the housing.
14. The device of claim 13, further comprising a ramp configured to direct spherical projectiles within the projectile reservoir towards the loading wheel.
15. The device of claim 13, further comprising a hand crank coupled to the drive shaft.
16. The device of claim 15, wherein the hand crank is pivotally coupled to the drive shaft.

17. The device of claim 16, wherein the hand crank may be moved between a work position and a stowed position.

18. The device of claim 17, further comprising a handle depression configured to receive a portion of the hand crank when the hand crank is moved to a stowed position.

19. The device of claim 13, further comprising a motor coupled to the drive shaft.

20. The device of claim 19, further comprising a drive gear wherein the drive gear is able to decrease the circumferential velocity of the drive shaft relative to the circumferential velocity of the motor.

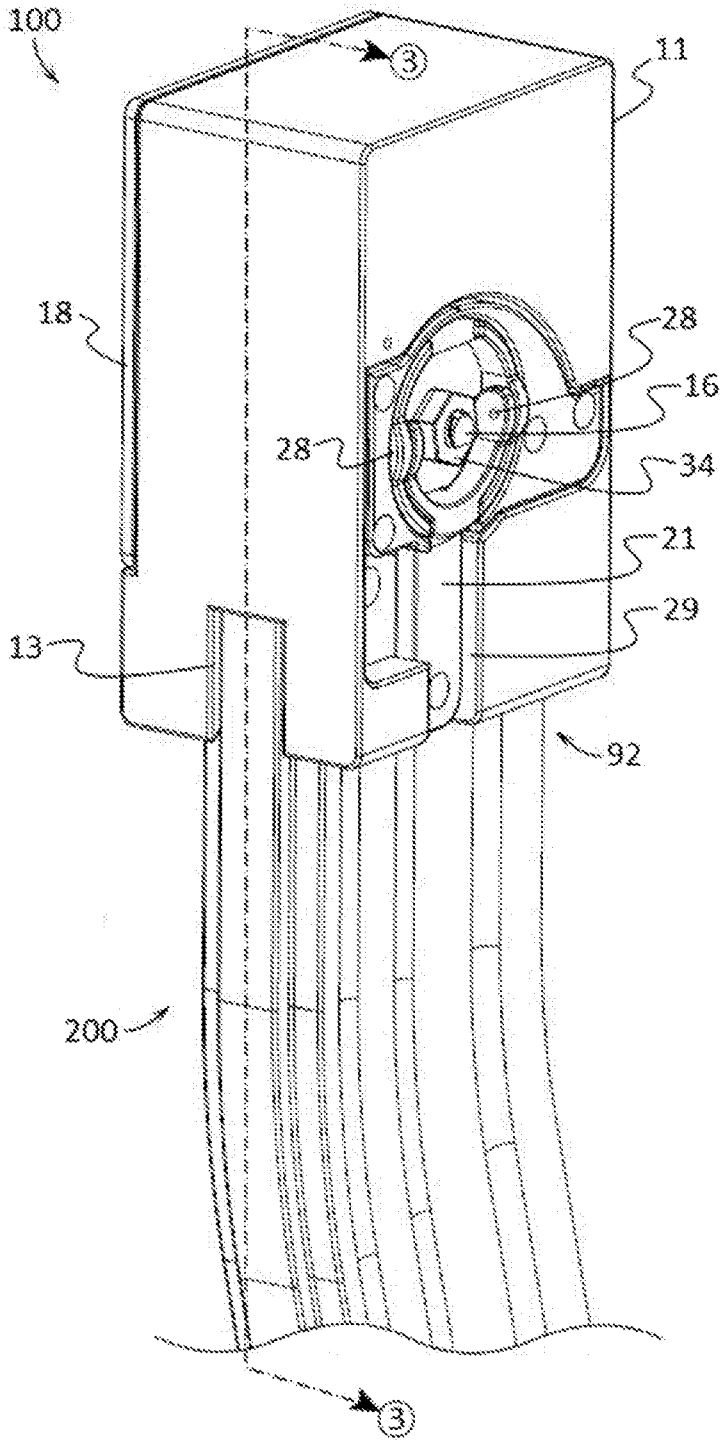

FIG. 1

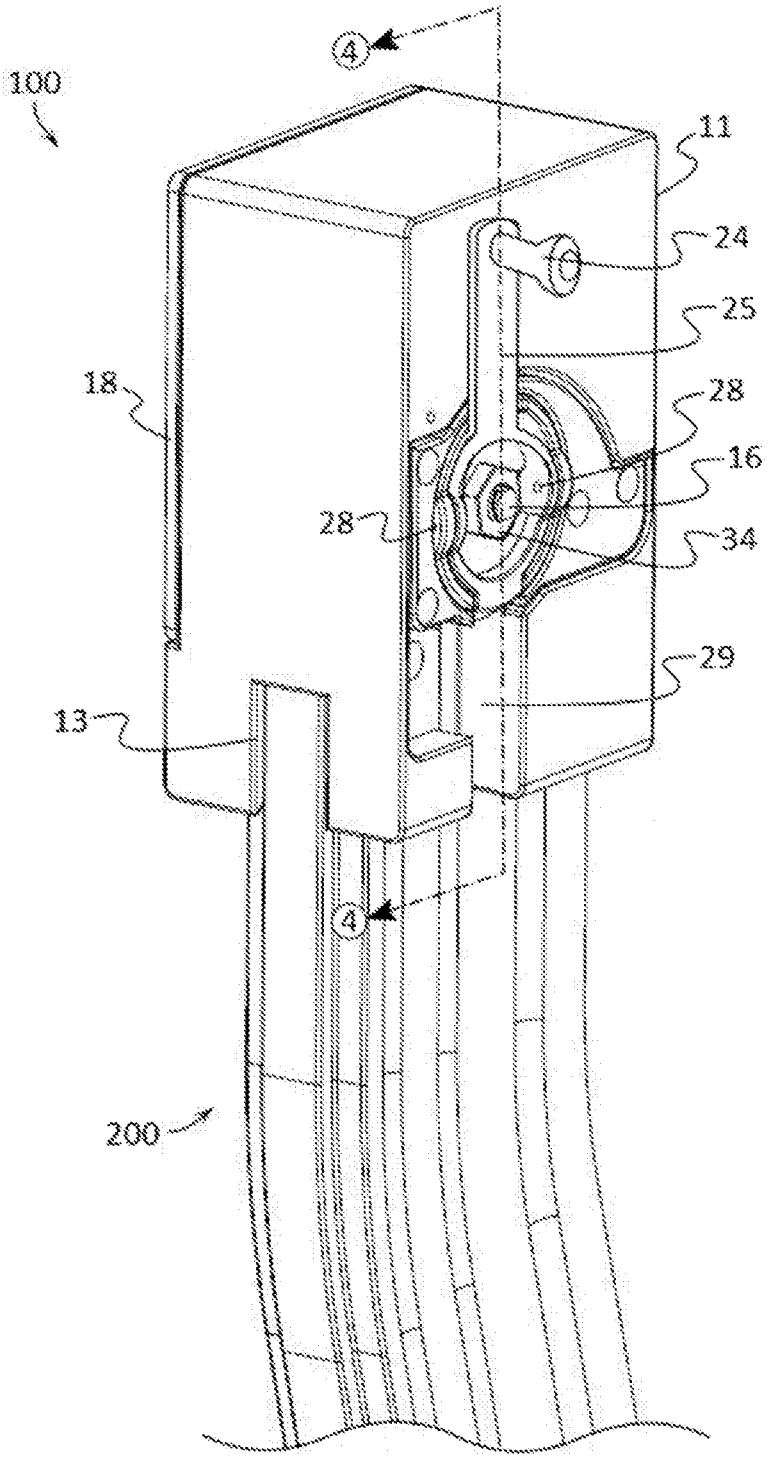

FIG. 2

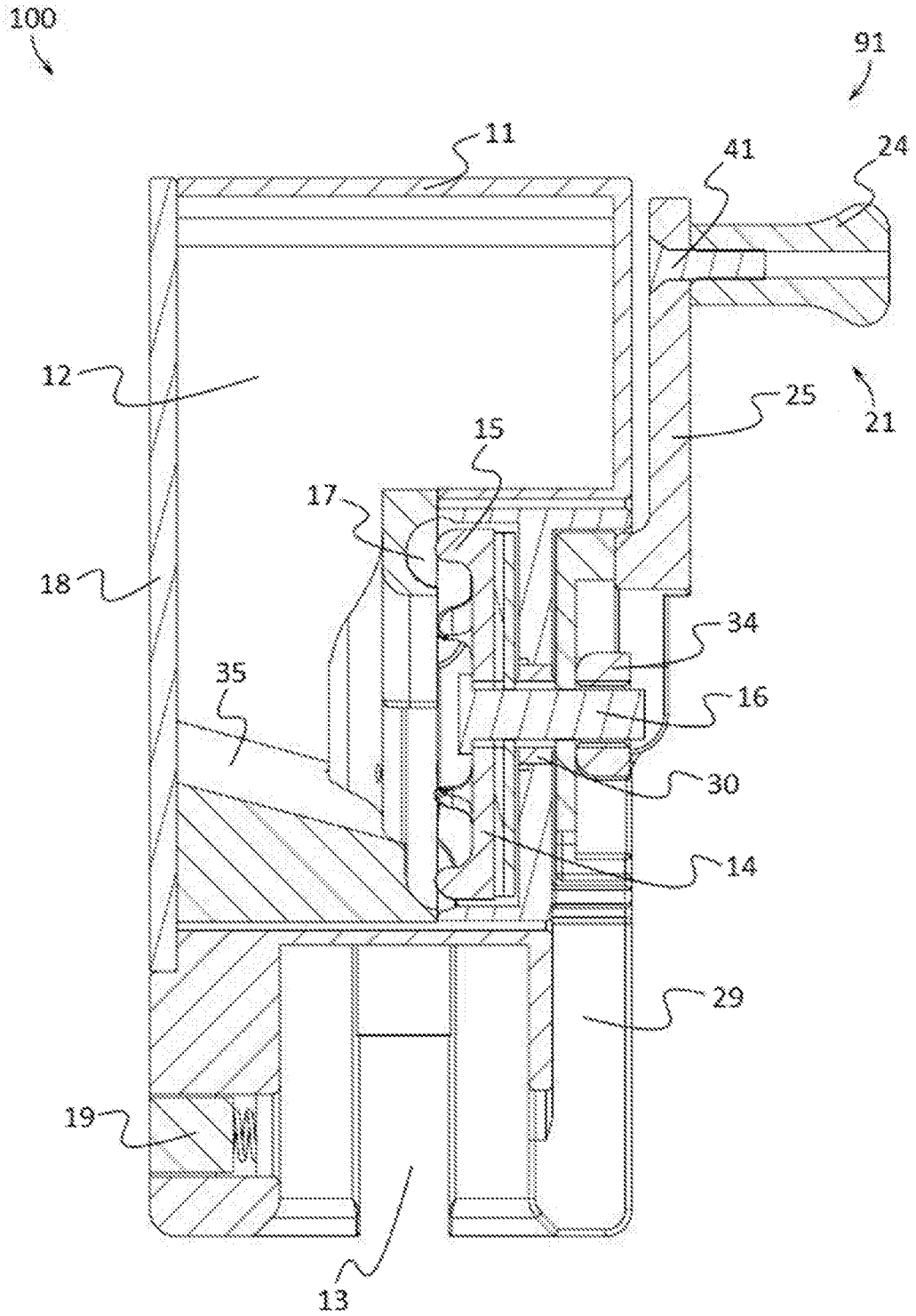

FIG. 3

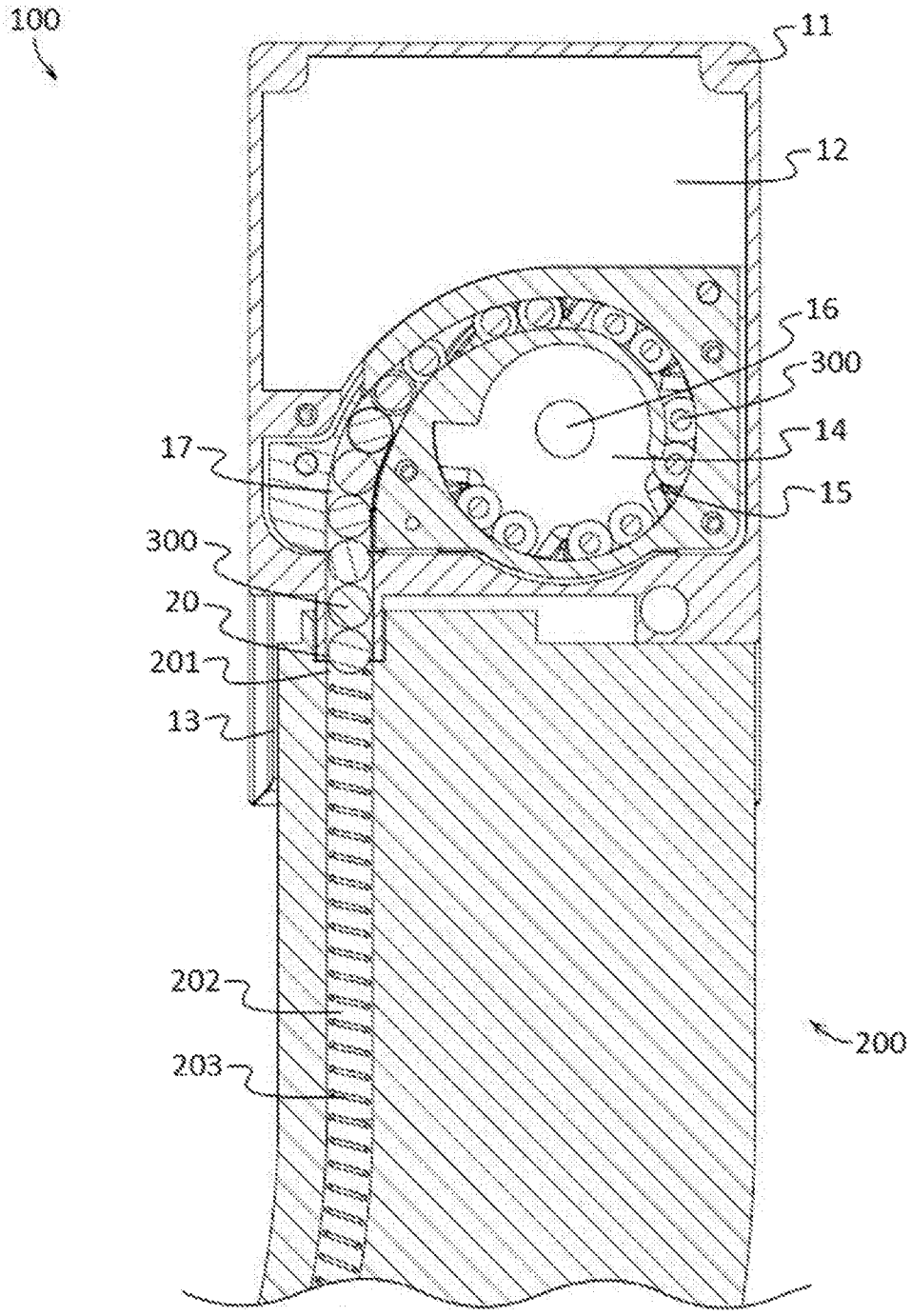

FIG. 4

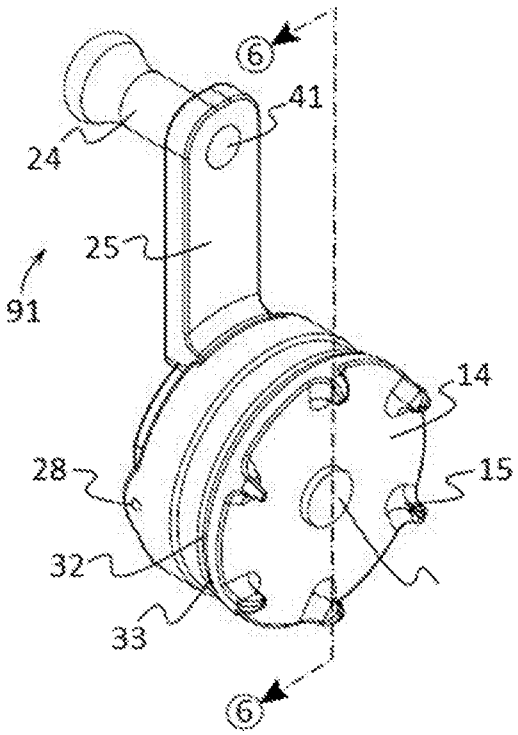
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FIG. 5

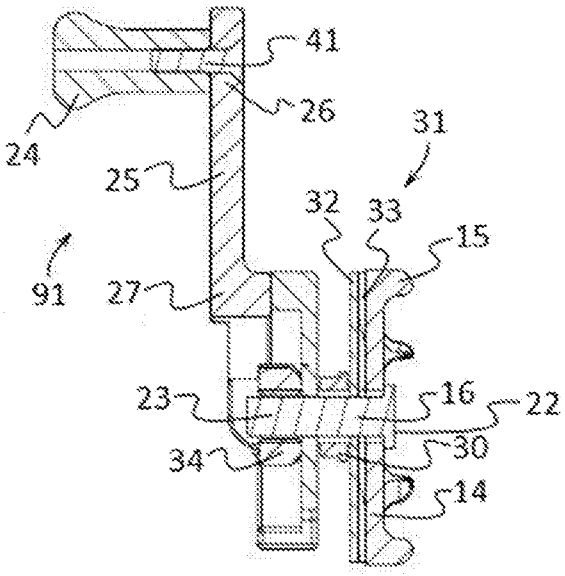
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FIG. 6

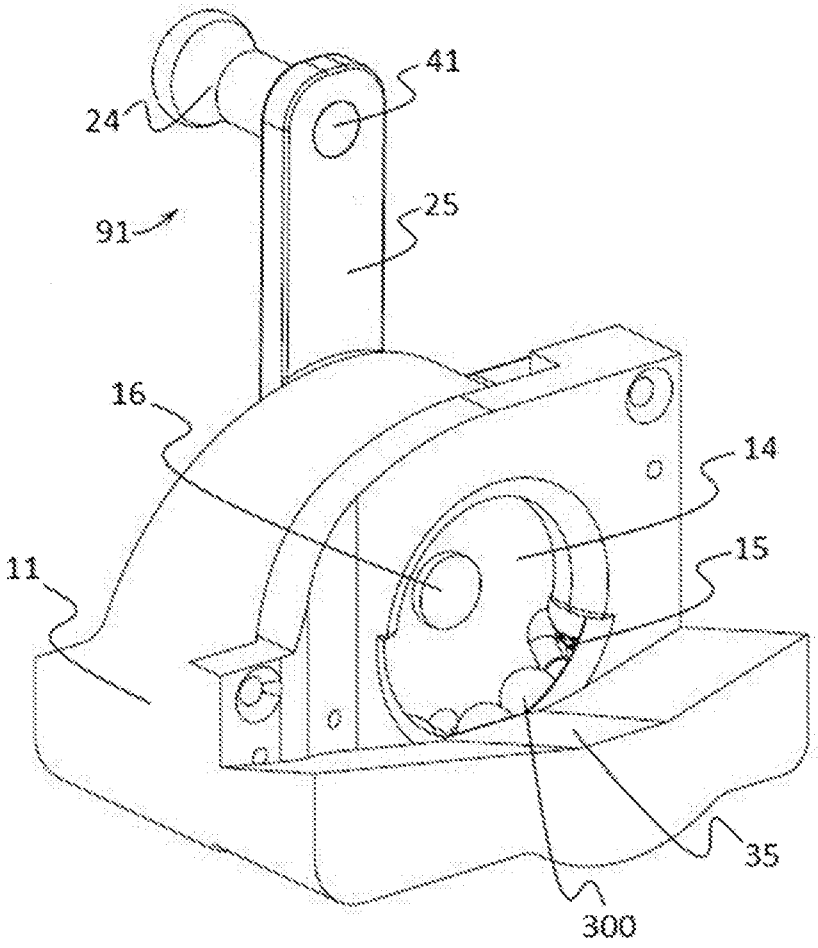

FIG. 7

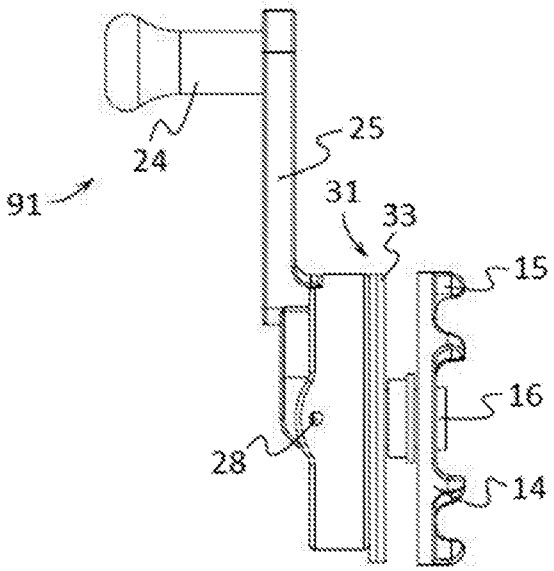

FIG. 8

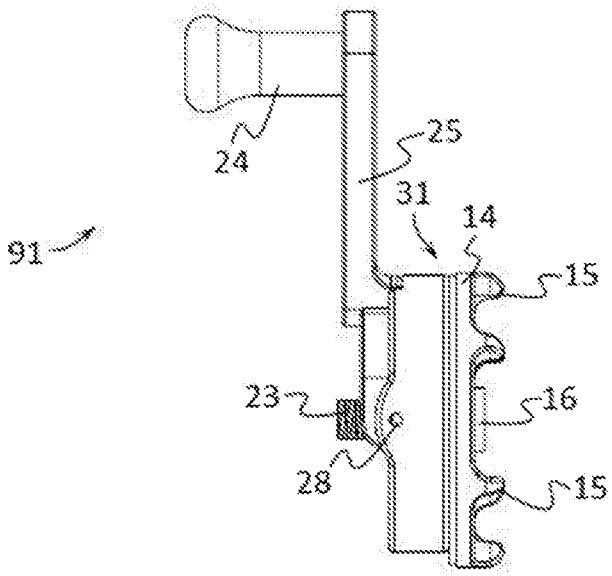

FIG. 9

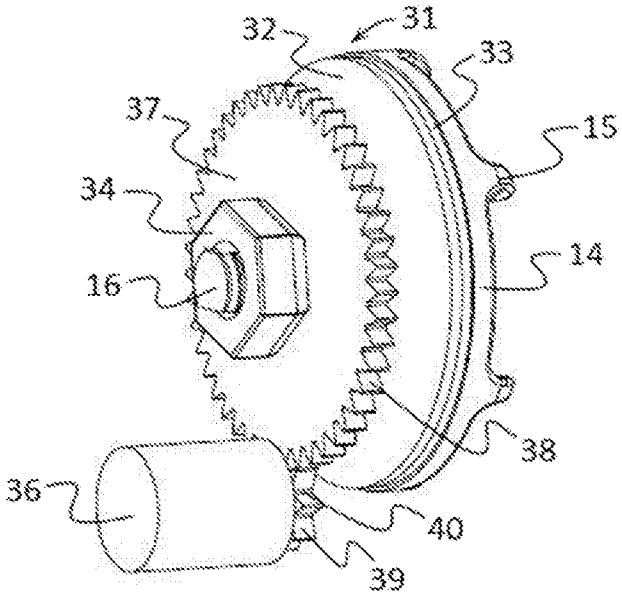

FIG. 10

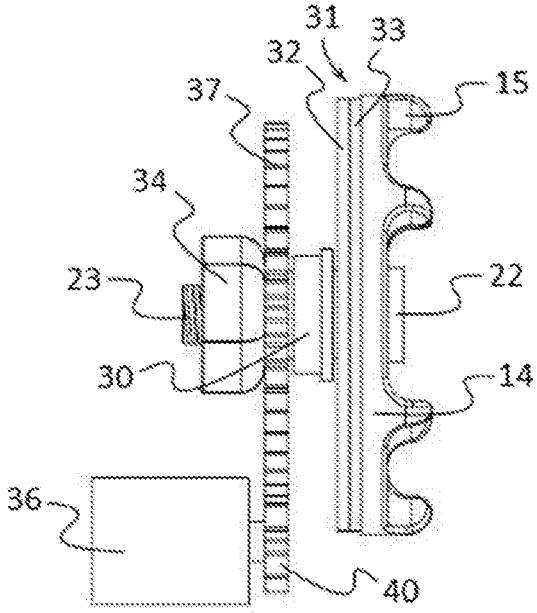

FIG. 11