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(72) Inventors:  
• **HEFER, Brandon Thomas**  
St. Louis, 63104 (US)  
• **TROSTRUD, Brandon Karl**  
St. Louis, 63103 (US)

(74) Representative: **Banzer, Hans-Jörg**  
**Kraus & Weisert**  
**Patentanwälte PartGmbB**  
**Thomas-Wimmer-Ring 15**  
**80539 München (DE)**

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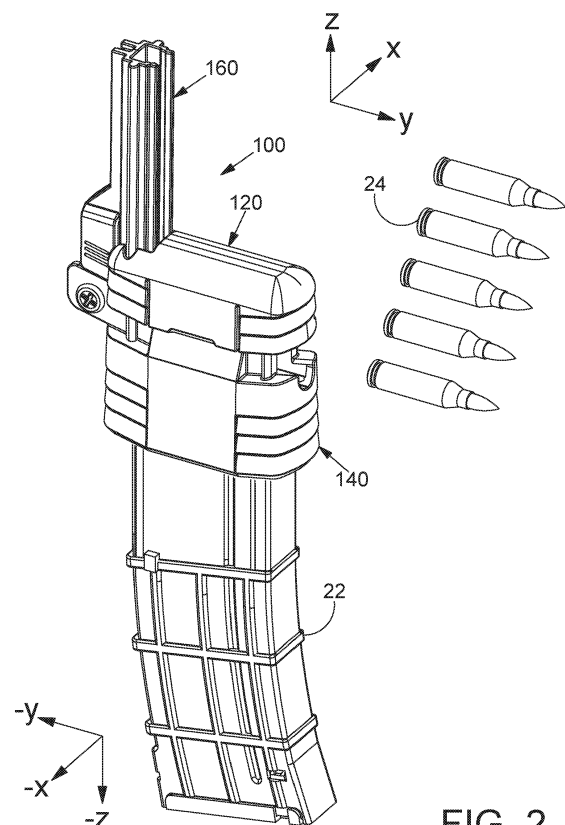
(71) Applicant: **Vista Outdoor Operations LLC**  
**Farmington, UT 84025 (US)**

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### (54) RIFLE MAGAZINE LOADER

(57) A magazine loader (100) for loading cartridges (24) in a rifle magazine (22) comprises a body (140) having a body interior and an open bottom sized to receive an upper end of the rifle magazine (22), wherein a slot is sized for receiving individual cartridges into the body interior. The magazine loader (100) further comprises a cap (120) which has a cap interior, is configured to be slidably attached to the body (140), and has a projection for pushing a cartridge (24) inserted into the body interior into the rifle magazine (22) when the rifle magazine (22) is inserted into the open bottom of the body (140). One of the cap (120) and body (140) has two slide guides and the other one of the cap (120) and body (140) has two spring members to bias the cap (120) to an upward position with respect to the body (140). A latch holds the rifle magazine (22) in position relative to the body (140).



**FIG. 2**

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## Description

### BACKGROUND OF THE DISCLOSURE

**[0001]** In order to maintain their proficiency with various types of firearms, military personnel, law enforcement officers, and hunters frequently engage in target practice. Target practice is often performed at a shooting range with 300 or more cartridges being fired at each practice session. In the sport of hunting, marksmanship is practiced so that a shot can be carefully placed to ensure a quick, clean and humane kill. For military personnel, good marksmanship may make the difference between victory and defeat in battlefield situations.

**[0002]** Many firearms, including pistols and rifles, are designed to utilize a removable magazine that holds ammunition cartridges. The use of a magazine allows a plurality of cartridges to be easily loaded into the firearm by inserting a single magazine into the firearm. After each cartridge is fired, a manually or automatically operated mechanism moves the bolt of the firearm backward and then forward again. The upper most cartridge in the magazine is pulled off of a stack of cartridges each time the mechanism cycles so that cartridges are fed one-by-one into the firing chamber of the firearm. Each magazine typically has an elongate housing defining a chamber with a spring loaded follower slidably disposed therein. The force of the spring loaded follower urges each cartridge in the magazine toward the upper most position in the where the bolt can push it into the firing chamber. When all of the cartridges have been fired, the empty magazine is removed from the firearm and a new magazine is inserted in its place. The empty magazine may then be refilled with cartridges.

### SUMMARY

**[0003]** According to the invention, a magazine loader as defined in the independent claims is provided. The dependent claims define preferred and or advantageous embodiments of the invention.

**[0004]** An example magazine loader comprises a body for receiving an upper portion of the magazine and a cap slidably engaged with the body for loading cartridges in to the magazine received by the body. The body comprises a plurality of wall portions defining a body cavity with a lower opening proximate a bottom end thereof. The body cavity may be configured to receive an upper portion of a magazine to be loaded with cartridges. The body cavity may extend along a magazine insertion axis extending in upward and downward directions. In some embodiments, the plurality of body wall portions comprise a starboard body wall and an opposing port body wall. In some embodiments, the starboard body comprises a starboard ramp and the port body wall comprises a port ramp. The cap comprises a plurality of cap wall portions defining an interior volume. The plurality of cap wall portions comprise a starboard cap wall portion and an op-

posing port cap wall portion. An upper portion of the body is slidably received in the interior volume defined by the cap so that the body and the cap slide relative to one another along a sliding axis. The sliding axis may extend in the upward and downward directions and the cap may translate between an upper position and a lower position along the sliding axis.

**[0005]** In some embodiments, the starboard cap wall portion defines a first starboard slot and a second starboard slot. Each starboard slot may extend in the upward and downward directions. In some embodiments, the starboard cap wall portion includes a starboard leaf spring portion disposed between the first starboard slot and the second starboard slot. The starboard leaf spring portion may have a fixed end and a free end. In some embodiments, the starboard leaf spring portion comprises a starboard ramp engaging portion proximate the free end thereof and the starboard ramp engaging portion contacts the starboard ramp of the body. In some embodiments, the port cap wall portion defines a first port slot and a second port slot. Each port slot may extend in the upward and downward directions. In some embodiments, the port cap wall portion includes a port leaf spring portion disposed between the first port slot and the second port slot. The port leaf spring portion may have a fixed end and a free end. In some embodiments, the port leaf spring portion comprises a port ramp engaging portion proximate the free end thereof and the port ramp engaging portion contacts the port ramp of the body. In some embodiments, when the cap is urged to translate downward along the sliding axis each ramp applies a reaction force to each ramp engaging portion. The orientation of each ramp relative to the sliding axis may be such that each reaction force has an outwardly directed component that acts to deflect each leaf spring portion in a cantilevered fashion and an upwardly directed component. The upwardly directed components may urge the cap to translate in the upward direction along the sliding axis toward the upper position.

**[0006]** In some embodiments, the magazine loader further includes a latch member adapted and configured to hold the magazine in position relative to the body of the magazine loader. In some embodiments, the starboard body wall defines a first slit and a second slit. The first slit and the second slit may each extend in the upward and downward directions. The starboard body wall may comprise a cantilevered beam of the latch member disposed between the first slit and the second slit. The cantilevered beam may have a fixed end and a free end. In some embodiments, a blocking member is fixed to the cantilevered beam proximate the free end thereof. In some embodiments, the blocking member comprises a projection extending in a portward direction beyond a portward facing surface of the cantilevered beam.

**[0007]** In some embodiments, the magazine loader further includes a latch member adapted and configured to hold the magazine in position relative to the body of the magazine loader. In some embodiments, the rear body

wall of the body defines a first slit and a second slit. Each slit may extend in the upward and downward directions. In some embodiments, a rear body wall of the body comprises a cantilevered beam of the latch member disposed between the first slit and the second slit. The cantilevered beam may have a fixed end and a free end. In some embodiments, a blocking member is fixed to the cantilevered beam proximate the free end thereof. In some embodiments, the blocking member comprises a projection extending in a forward direction beyond a forward facing surface of the cantilevered beam.

**[0008]** In some embodiments, the body comprises a starboard flange extending in the upward direction beyond the starboard body wall and a port flange extending in the upward direction beyond the port body wall. In some embodiments, a throat is defined between the starboard flange and the port flange. The throat may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into the body cavity. The throat may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into a magazine having an upper portion extending into the body cavity. In some embodiments, the cap comprises a plunger supported by a top panel of the cap. In some embodiments, the plunger extends downward from the top panel into the interior volume defined by the cap.

**[0009]** In some embodiments, the body comprises a first starboard rail and the first starboard rail extending in the upward direction along a first starboard rail axis. In some embodiments, the first starboard rail projects in the starboard direction beyond a starboard facing surface of the starboard flange. In some embodiments, the first starboard rail extends into a first starboard channel defined by the starboard cap wall portion. In some embodiments, the body comprises a second starboard rail and the second starboard rail extending in the upward direction along a second starboard rail axis. In some embodiments, the second starboard rail extends in the upward direction away from the starboard body wall. In some embodiments, the second starboard rail projects in the starboard direction beyond a starboard facing surface of the starboard flange. In some embodiments, the second starboard rail extends into the second starboard channel defined by the starboard cap wall portion. In some embodiments, the body comprises a first port rail and the first port rail extends in the upward direction along a first port rail axis. In some embodiments, the first port rail extends in the upward direction away from the port body wall. In some embodiments, the first port rail projects in the port direction beyond a port facing surface of the port flange. In some embodiments, the first port rail extends into the first port channel defined by the port cap wall portion. In some embodiments, the body comprises a second port rail and the second port rail extends in the upward direction along a second port rail axis. In some embodiments, the second port rail extends in the upward direction away from the port body wall. In some embodiments, the second port rail projects in the port direction

beyond a port facing surface of the port flange. In some embodiments, the second port rail extends into the second port channel defined by the port cap wall portion.

**[0010]** In one or more embodiments, a magazine loader for loading cartridges into a magazine may comprise a cap including a starboard shell and a port shell. The shells of the cap cooperating to define an entrance and an interior volume fluidly communicating with the entrance. In one or more embodiments, the entrance faces the downward direction. The cap comprises a starboard shell wall of the starboard shell and a port shell wall of the port shell disposed on opposite sides of the interior volume.

**[0011]** The cap also comprises a top panel extending in a port direction from the starboard shell wall to the port shell wall and extending in a starboard direction from the port shell wall to the starboard shell wall. The top panel comprises a top panel portion of the starboard shell and a top panel part of the port shell. The top panel defines an aperture. The top panel portion of the starboard shell defines a starboard aperture portion and the top panel part of the port shell defines a port aperture portion.

**[0012]** The cap also comprises a front wall extending in the port direction from the starboard shell wall to the port shell wall and extending in the starboard direction from the port shell wall to the starboard shell wall. In one or more embodiments, the front wall may extend in the upward direction from the entrance to the top panel and extends in the downward direction from the top panel to the entrance. The front wall comprises a front wall portion of the starboard shell and a front wall part of the port shell.

**[0013]** In one or more embodiments, the cap may also comprise a rear wall extending in the port direction from the starboard shell wall to the port shell wall and extending in the starboard direction from the port shell wall to the starboard shell wall. In one or more embodiments, the rear wall may extend in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance. The rear wall comprises a rear wall portion of the starboard shell and a rear wall part of the port shell.

**[0014]** The starboard shell wall of the starboard shell extends in the forward direction from the rear wall to the front wall and extends in the rearward direction from the front wall to the rear wall. In one or more embodiments, the starboard shell wall may extend in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance. The port shell wall of the port shell extends in the forward direction from the rear wall to the front wall and extends in the rearward direction from the front wall to the rear wall. In one or more embodiments, the port shell wall extends in the upward direction from the entrance to the top panel and extends in the downward direction from the top panel to the entrance.

**[0015]** The starboard shell comprises a plurality of starboard ribs. Each starboard rib protrudes in the port direction beyond a port facing inner surface of the starboard

shell wall. The starboard ribs define a first starboard channel and a second starboard channel. The port shell comprises a plurality of port ribs. Each port rib protrudes in the starboard direction beyond a starboard facing inner surface of the port shell wall. The port ribs defining a first port channel and a second port channel.

**[0016]** A body of the magazine loader comprises a starboard body wall and a port body wall disposed on opposite sides of a cavity. In one or more embodiments, the cavity extends in upward and downward directions along a magazine insertion and removal axis. The cavity fluidly communicating with a bottom opening and a top opening defined by the body. In one or more embodiments, the top opening faces the upward direction and the bottom opening faces the downward direction. In one or more embodiments, the cavity is dimensioned and adapted to receive an upper portion of the magazine. The body comprises a front body wall extending in the port direction from the starboard body wall to the port body wall and extending in the starboard direction from the port body wall to the starboard body wall. In one or more embodiments, the front body wall extends in the upward direction from the bottom opening to the top opening and extends in the downward direction from the top opening to the bottom opening.

**[0017]** The body comprises a rear body wall extending in the port direction from the starboard body wall to the port body wall and extending in the starboard direction from the port body wall to the starboard body wall. In one or more embodiments, the rear body wall extends in the upward direction from the bottom opening to the top opening and extends in the downward direction from the top opening to the bottom opening. The starboard body wall extends in the forward direction from the rear body wall to the front body wall and extends in the rearward direction from the front body wall to the rear body wall. The port body wall extends in the forward direction from the rear body wall to the front body wall and extends in the rearward direction from the front body wall to the rear body wall.

**[0018]** The body comprises a starboard flange extending in the upward direction beyond the starboard body wall. The body also comprises a first starboard rail. The first starboard rail extending in the upward direction away from the starboard body wall. The first starboard rail also projecting in the starboard direction beyond a starboard facing surface of the starboard flange. The first starboard rail extends into the first starboard channel defined by the starboard ribs. In one or more embodiments, the body also comprises a second starboard rail. The second starboard rail extending in the upward direction away from the starboard body wall. The second starboard rail projecting in the starboard direction beyond a starboard facing surface of the starboard flange. The second starboard rail extends into the second starboard channel defined by the starboard ribs.

**[0019]** The body of the magazine loader comprises a first port rail. The first port rail extends in the upward

direction away from the port body wall. The first port rail projecting in the port direction beyond a port facing surface of the port flange. The first port rail extends into the first port channel defined by the port ribs. The body also comprises a second port rail. The second port rail extending in the upward direction away from the port body wall. The second port rail also projecting in the port direction beyond a port facing surface of the port flange. The second port rail extends into the second port channel defined by the port ribs.

**[0020]** The body of the magazine loader also comprises a starboard ramp located upward of the starboard body wall. The starboard ramp has a starboard ramp surface extending in a portward, upward direction beyond an upper end of the starboard body wall. The body includes at least one starboard stop fixed to an upper end of the starboard ramp. The at least one starboard stop comprises a downward facing surface. The body also comprises a port ramp located upward of the port body wall. The port ramp has a port ramp surface extending in a starboard, upward direction beyond an upper end of the port body wall. The body includes at least one port stop fixed to an upper end of the port ramp. The port stop comprises a downward facing side.

**[0021]** The starboard shell wall defines a first starboard slot and a second starboard slot, each of the slots extending in the upward and downward directions. The starboard shell wall includes a starboard leaf spring portion disposed between the first starboard slot and the second starboard slot. The starboard leaf spring portion comprising a ramp engaging portion having a ramp engaging surface. The ramp engaging portion comprises a starboard protrusion. The starboard protrusion extends in a port direction beyond a port facing inner surface of the starboard leaf spring portion. The ramp engaging surface of the ramp engaging portion contacts the starboard ramp surface of the starboard ramp.

**[0022]** The port shell wall defines a first port slot and a second port slot, each slot extending in the upward and downward directions. The port shell wall includes a port leaf spring part disposed between the first port slot and the second port slot. The port leaf spring part comprises a ramp engaging part having a ramp engaging edge. The ramp engaging part comprises a port protrusion. The port protrusion extending in a starboard direction beyond a starboard facing inner surface of the port leaf spring part. The ramp engaging edge of the ramp engaging part contacts the port ramp surface of the port ramp.

**[0023]** In one or more embodiments, the magazine loader comprises a latch member adapted and configured to hold a magazine in position relative to the body of the magazine loader. In one or more embodiments, a selected one of the body walls defines a first slit and a second slit, each slit extending in the upward and downward directions. The selected one of the body walls also comprises a cantilevered beam disposed between the first slit and the second slit. The cantilevered beam has a fixed end and a free end. A blocking member is fixed

to the cantilevered beam proximate the free end thereof. In one or more embodiments, a portion of the blocking member is positioned, dimensioned, and adapted to be received in a depression defined by the magazine.

**[0024]** In embodiments, a magazine loader for loading cartridges in a magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into a firearm, the magazine loader comprising a body for receiving the magazine and a cap slidably engaged with the body for loading cartridges into the magazine received by the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the rifle magazine, an upward slot sized for receiving individual cartridges into the interior of the body; wherein the cap is movably attached to the body, the cap having a downwardly extending plunger that is received in the upward slot and that is configured for pushing a cartridge into the open interior of the magazine received by the body; one of the cap and body having a slide guide tapered in a direction away from said one with respect to a vertical axis of said one and the other of the cap and body having a spring member for engaging the slide guide of said one, whereby the cap and body are urged away from each other by the spring member. In such embodiments, one of the cap and body has two slide guides and the other of the cap and body has two spring members. In embodiments, the spring members are a leaf springs. In embodiments, the leaf springs are each defined by two upright slits in a respective lateral wall portion of said one.

**[0025]** In embodiments, of such magazine loaders, the body has an arm extending upwardly from the body, the cap having sliding surfaces for engaging the arm, the arm having a slot for receiving a loading clip with a plurality of cartridges, the cap raiseable on the arm permitting the loading clip with the plurality of cartridges to be inserted on the arm wherein when the cap is pushed downwardly the plunger engages an uppermost cartridge of the plurality of cartridges of the loading clip and there is a magazine in the open bottom of the loader, the plurality of cartridges of the loading clip are urged into the magazine by the plunger.

**[0026]** In embodiments, a magazine loader for loading cartridges in a magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into a firearm, the magazine loader comprising a body with an arm pivotally attached to the body, and a cap slidably engaged with the arm. In embodiments, the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior

and an open bottom conformingly sized to receive the upper end of the magazine, an upward slot for sequentially receiving a plurality of cartridges into the interior of the body and into the magazine therein, the arm having an upward position and defining a slot for receiving a loading clip having a plurality of cartridges. In embodiments, the cap has an upper portion, the upper portion having an aperture conforming to the arm, the cap slidable upwardly and downwardly on the arm, the cap further having a plunger extending downwardly from the upper portion, the plunger positioned for pushing the plurality of cartridges of the loading clip downwardly into the upper end of the magazine when the magazine is received by the body. In such embodiments the arm may have an integral locking portion that releasably secures the arm in the upward position.

**[0027]** An example magazine loader comprises a body for receiving an upper portion of the magazine and a cap slidably engaged with the body for loading cartridges in to the magazine received by the body. The body comprises a plurality of wall portions defining a body cavity with a lower opening proximate a bottom end thereof. The body cavity may be configured to receive an upper portion of a magazine to be loaded with cartridges. The body cavity may extend along a magazine insertion axis extending in upward and downward directions. In some embodiments, the plurality of body wall portions comprise a starboard body wall and an opposing port body wall. In some embodiments, the starboard body comprises a starboard ramp and the port body wall comprises a port ramp. The cap comprises a plurality of cap wall portions defining an interior volume. The plurality of cap wall portions comprise a starboard cap wall portion and an opposing port cap wall portion. An upper portion of the body is slidably received in the interior volume defined by the cap so that the body and the cap slide relative to one another along a sliding axis. The sliding axis may extend in the upward and downward directions and the cap may translate between an upper position and a lower position along the sliding axis.

**[0028]** In some embodiments, the starboard cap wall portion defines a first starboard slot and a second starboard slot. Each starboard slot may extend in the upward and downward directions. In some embodiments, the starboard cap wall portion includes a starboard leaf spring portion disposed between the first starboard slot and the second starboard slot. The starboard leaf spring portion may have a fixed end and a free end. In some embodiments, the starboard leaf spring portion comprises a starboard ramp engaging portion proximate the free end thereof and the starboard ramp engaging portion contacts the starboard ramp of the body. In some embodiments, the port cap wall portion defines a first port slot and a second port slot. Each port slot may extend in the upward and downward directions. In some embodiments, the port cap wall portion includes a port leaf spring portion disposed between the first port slot and the second port slot. The port leaf spring portion may have a

fixed end and a free end. In some embodiments, the port leaf spring portion comprises a port ramp engaging portion proximate the free end thereof and the port ramp engaging portion contacts the port ramp of the body. In some embodiments, when the cap is urged to translate downward along the sliding axis each ramp applies a reaction force to each ramp engaging portion. The orientation of each ramp relative to the sliding axis may be such that each reaction force has an outwardly directed component that acts to deflect each leaf spring portion in a cantilevered fashion and an upwardly directed component. The upwardly directed components may urge the cap to translate in the upward direction along the sliding axis toward the upper position.

**[0029]** In some embodiments, the magazine loader further includes a latch member adapted and configured to hold the magazine in position relative to the body of the magazine loader. In some embodiments, the starboard body wall defines a first slit and a second slit. The first slit and the second slit may each extend in the upward and downward directions. The starboard body wall may comprise a cantilevered beam of the latch member disposed between the first slit and the second slit. The cantilevered beam may have a fixed end and a free end. In some embodiments, a blocking member is fixed to the cantilevered beam proximate the free end thereof. In some embodiments, the blocking member comprises a projection extending in a portward direction beyond a portward facing surface of the cantilevered beam.

**[0030]** In some embodiments, the magazine loader further includes a latch member adapted and configured to hold the magazine in position relative to the body of the magazine loader. In some embodiments, the rear body wall of the body defines a first slit and a second slit. Each slit may extend in the upward and downward directions. In some embodiments, a rear body wall of the body comprises a cantilevered beam of the latch member disposed between the first slit and the second slit. The cantilevered beam may have a fixed end and a free end. In some embodiments, a blocking member is fixed to the cantilevered beam proximate the free end thereof. In some embodiments, the blocking member comprises a projection extending in a forward direction beyond a forward facing surface of the cantilevered beam.

**[0031]** In some embodiments, the body comprises a starboard flange extending in the upward direction beyond the starboard body wall and a port flange extending in the upward direction beyond the port body wall. In some embodiments, a throat is defined between the starboard flange and the port flange. The throat may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into the body cavity. The throat may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into a magazine having an upper portion extending into the body cavity. In some embodiments, the cap comprises a plunger supported by a top panel of the cap. In some embodiments, the plunger extends downward from the

top panel into the interior volume defined by the cap.

**[0032]** In some embodiments, the body comprises a first starboard rail and the first starboard rail extending in the upward direction along a first starboard rail axis. In some embodiments, the first starboard rail projects in the starboard direction beyond a starboard facing surface of the starboard flange. In some embodiments, the first starboard rail extends into a first starboard channel defined by the starboard cap wall portion. In some embodiments, the body comprises a second starboard rail and the second starboard rail extending in the upward direction along a second starboard rail axis. In some embodiments, the second starboard rail extends in the upward direction away from the starboard body wall. In some embodiments, the second starboard rail projects in the starboard direction beyond a starboard facing surface of the starboard flange. In some embodiments, the second starboard rail extends into the second starboard channel defined by the starboard cap wall portion. In some embodiments, the body comprises a first port rail and the first port rail extends in the upward direction along a first port rail axis. In some embodiments, the first port rail extends in the upward direction away from the port body wall. In some embodiments, the first port rail projects in the port direction beyond a port facing surface of the port flange. In some embodiments, the first port rail extends into the first port channel defined by the port cap wall portion. In some embodiments, the body comprises a second port rail and the second port rail extends in the upward direction along a second port rail axis. In some embodiments, the second port rail extends in the upward direction away from the port body wall. In some embodiments, the second port rail projects in the port direction beyond a port facing surface of the port flange. In some embodiments, the second port rail extends into the second port channel defined by the port cap wall portion.

**[0033]** In one or more embodiments, a magazine loader for loading cartridges into a magazine may comprise a cap including a starboard shell and a port shell. The shells of the cap cooperating to define an entrance and an interior volume fluidly communicating with the entrance. In one or more embodiments, the entrance faces the downward direction. The cap comprises a starboard shell wall of the starboard shell and a port shell wall of the port shell disposed on opposite sides of the interior volume.

**[0034]** The cap also comprises a top panel extending in a port direction from the starboard shell wall to the port shell wall and extending in a starboard direction from the port shell wall to the starboard shell wall. The top panel comprises a top panel portion of the starboard shell and a top panel part of the port shell. The top panel defines an aperture. The top panel portion of the starboard shell defines a starboard aperture portion, and the top panel part of the port shell defines a port aperture portion.

**[0035]** The cap also comprises a front wall extending in the port direction from the starboard shell wall to the port shell wall and extending in the starboard direction

from the port shell wall to the starboard shell wall. In one or more embodiments, the front wall may extend in the upward direction from the entrance to the top panel and extends in the downward direction from the top panel to the entrance. The front wall comprises a front wall portion of the starboard shell and a front wall part of the port shell.

**[0036]** In one or more embodiments, the cap may also comprise a rear wall extending in the port direction from the starboard shell wall to the port shell wall and extending in the starboard direction from the port shell wall to the starboard shell wall. In one or more embodiments, the rear wall may extend in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance. The rear wall comprises a rear wall portion of the starboard shell and a rear wall part of the port shell.

**[0037]** The starboard shell wall of the starboard shell extends in the forward direction from the rear wall to the front wall and extends in the rearward direction from the front wall to the rear wall. In one or more embodiments, the starboard shell wall may extend in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance. The port shell wall of the port shell extends in the forward direction from the rear wall to the front wall and extends in the rearward direction from the front wall to the rear wall. In one or more embodiments, the port shell wall extends in the upward direction from the entrance to the top panel and extends in the downward direction from the top panel to the entrance.

**[0038]** The starboard shell comprises a plurality of starboard ribs. Each starboard rib protrudes in the port direction beyond a port facing inner surface of the starboard shell wall. The starboard ribs define a first starboard channel and a second starboard channel. The port shell comprises a plurality of port ribs. Each port rib protrudes in the starboard direction beyond a starboard facing inner surface of the port shell wall. The port ribs defining a first port channel and a second port channel.

**[0039]** A body of the magazine loader comprises a starboard body wall and a port body wall disposed on opposite sides of a cavity. In one or more embodiments, the cavity extends in upward and downward directions along a magazine insertion and removal axis. The cavity fluidly communicating with a bottom opening and a top opening defined by the body. In one or more embodiments, the top opening faces the upward direction, and the bottom opening faces the downward direction. In one or more embodiments, the cavity is dimensioned and adapted to receive an upper portion of the magazine. The body comprises a front body wall extending in the port direction from the starboard body wall to the port body wall and extending in the starboard direction from the port body wall to the starboard body wall. In one or more embodiments, the front body wall extends in the upward direction from the bottom opening to the top opening and extends in the downward direction from the top opening to the bottom opening.

**[0040]** The body comprises a rear body wall extending in the port direction from the starboard body wall to the port body wall and extending in the starboard direction from the port body wall to the starboard body wall. In one or more embodiments, the rear body wall extends in the upward direction from the bottom opening to the top opening and extends in the downward direction from the top opening to the bottom opening. The starboard body wall extends in the forward direction from the rear body wall to the front body wall and extends in the rearward direction from the front body wall to the rear body wall. The port body wall extends in the forward direction from the rear body wall to the front body wall and extends in the rearward direction from the front body wall to the rear body wall.

**[0041]** The body comprises a starboard flange extending in the upward direction beyond the starboard body wall. The body also comprises a first starboard rail. The first starboard rail extending in the upward direction away from the starboard body wall. The first starboard rail also projecting in the starboard direction beyond a starboard facing surface of the starboard flange. The first starboard rail extends into the first starboard channel defined by the starboard ribs. In one or more embodiments, the body also comprises a second starboard rail. The second starboard rail extending in the upward direction away from the starboard body wall. The second starboard rail projecting in the starboard direction beyond a starboard facing surface of the starboard flange. The second starboard rail extends into the second starboard channel defined by the starboard ribs.

**[0042]** The body of the magazine loader comprises a first port rail. The first port rail extends in the upward direction away from the port body wall. The first port rail projecting in the port direction beyond a port facing surface of the port flange. The first port rail extends into the first port channel defined by the port ribs. The body also comprises a second port rail. The second port rail extending in the upward direction away from the port body wall. The second port rail also projecting in the port direction beyond a port facing surface of the port flange. The second port rail extends into the second port channel defined by the port ribs.

**[0043]** The body of the magazine loader also comprises a starboard ramp located upward of the starboard body wall. The starboard ramp has a starboard ramp surface extending in a portward, upward direction beyond an upper end of the starboard body wall. The body includes at least one starboard stop fixed to an upper end of the starboard ramp. The at least one starboard stop comprises a downward facing surface. The body also comprises a port ramp located upward of the port body wall. The port ramp has a port ramp surface extending in a starboard, upward direction beyond an upper end of the port body wall. The body includes at least one port stop fixed to an upper end of the port ramp. The port stop comprises a downward facing side.

**[0044]** The starboard shell wall defines a first starboard

slot and a second starboard slot, each of the slots extending in the upward and downward directions. The starboard shell wall includes a starboard leaf spring portion disposed between the first starboard slot and the second starboard slot. The starboard leaf spring portion comprises a ramp engaging portion having a ramp engaging surface. The ramp engaging portion comprises a starboard protrusion. The starboard protrusion extends in a port direction beyond a port facing inner surface of the starboard leaf spring portion. The ramp engaging surface of the ramp engaging portion contacts the starboard ramp surface of the starboard ramp.

**[0045]** The port shell wall defines a first port slot and a second port slot, each slot extending in the upward and downward directions. The port shell wall includes a port leaf spring part disposed between the first port slot and the second port slot. The port leaf spring part comprises a ramp engaging part having a ramp engaging edge. The ramp engaging part comprises a port protrusion. The port protrusion extends in a starboard direction beyond a starboard facing inner surface of the port leaf spring part. The ramp engaging edge of the ramp engaging part contacts the port ramp surface of the port ramp.

**[0046]** In one or more embodiments, the magazine loader comprises a latch member adapted and configured to hold a magazine in position relative to the body of the magazine loader. In one or more embodiments, a selected one of the body walls defines a first slit and a second slit, each slit extending in the upward and downward directions. The selected one of the body walls also comprises a cantilevered beam disposed between the first slit and the second slit. The cantilevered beam has a fixed end and a free end. A blocking member is fixed to the cantilevered beam proximate to the free end thereof. In one or more embodiments, a portion of the blocking member is positioned, dimensioned, and adapted to be received in a depression defined by the magazine.

**[0047]** In embodiments, a magazine loader for loading cartridges in a rifle magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into the rifle, the magazine loader comprising a body and a cap slidably engaged with the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the rifle magazine, a forward upward slot sized for sequentially receiving a plurality of individual cartridges into the interior of the body, and a pair of upwardly extending slide guides with a forward backward slot opening within the pair of slide guides; and wherein the cap has four side wall portions defining a cap interior and the cap is slidably attached to the upwardly extending slide guides within the four side wall portions, the cap having a downward projection within the four side wall portions positioned for pushing one of

the plurality of individual cartridges inserted into the forward upper slot downward into the magazine when the magazine has been inserted into the open bottom of the body, the cap movable on the body downwardly for the cartridge loading. In embodiments, such a magazine loader has the cap is biased upwardly with respect to the body whereby when the cap is not being pushed downwardly with respect to the body, the cap is urged to a normal upward position. In embodiments such a magazine loader of above where the cap is biased upwardly by a pair of upwardly extending slide guides each having a taper upwardly and the cap has resilient slide guide engaging portions that are deflected outwardly by the slide guides as the cap is pushed downwardly with respect to the body.

**[0048]** In embodiments, a magazine loader for loading cartridges in a magazine, the magazine loader comprising a body and a cap slidably engaged with the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the rifle magazine, a forward upward slot sized for receiving individual cartridges into the interior of the body, and a pair of upwardly extending slide guides with a slot extending forwardly and rearwardly within the pair of slide guides, each of the slide guides having an outwardly facing surface that is tapered in an upwardly direction; and wherein the cap has four side wall portions defining a cap interior and the cap is slidably attached to the upwardly extending slide guides within the four side wall portions, the cap having a downward projection within the four side wall portions positioned for pushing a cartridge inserted into the forward upper slot downward into the magazine when the magazine is inserted into the open bottom of the body, the cap biased to an upward position by a pair of leaf springs engaged with the pair of slide guides. In embodiments, such a magazine loader as described above, wherein the leaf springs have a substantially undeflected position when the cap is in an upward position and the pair of leaf springs are each increasingly deflected outwardly as the cap is pushed downwardly with respect to the body whereby the deflected leaf springs urge the cap toward the upward position. In embodiments, such a magazine loader as described above, further comprising a cartridge ejection member within the cap, the cartridge ejection member having an exposed lever, the cartridge ejection member movable forwardly to force a cartridge in an uppermost position in the magazine out of the magazine and out of the forward upper slot of the body. In embodiments, the cartridge ejection member is slidably engaged with the cap.

**[0049]** In embodiments, a magazine loader comprising a body for receiving a magazine and a cap slidably engaged with the body for loading cartridges into the magazine received by the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body in-



terior and an open bottom conformingly sized to receive the upper end of the rifle magazine, an upward slot sized for receiving individual cartridges into the interior of the body, wherein the cap is movably attached to the body, the cap having a downwardly extending plunger that is received in the upward slot and that is configured for pushing a cartridge into the open interior of the magazine received by the body, and wherein one of the cap and body having a slide guide tapered in a direction away from said one with respect to a vertical axis of said one and the other of the cap and body having a spring member for engaging the slide guide of said one, whereby the cap and body are urged away from each other by the spring member. In embodiments, such as those described above, one of the cap and body has two slide guides and the other of the cap and body has two spring members. In embodiments, the spring members are a leaf springs. In embodiments, the leaf springs are each defined by two upright slits in a respective lateral wall portion of said one. **[0050]** The above summary is not intended to describe each illustrated embodiment or every implementation of the present disclosure.

#### BRIEF DESCRIPTION OF THE FIGURES

**[0051]** The drawings included in the present application are incorporated into, and form part of, the specification. They illustrate embodiments of the present disclosure and, along with the description, serve to explain the principles of the disclosure. The drawings are only illustrative of certain embodiments and do not limit the disclosure.

FIG. 1 is a perspective view showing a firearm, a plurality of cartridges, a magazine, and a magazine loader for loading cartridges into a magazine.

FIG. 2 is a perspective view showing a magazine and a magazine loader in accordance with the detailed description.

FIG. 3 is perspective views of a magazine loader in accordance with the present invention.

FIG. 4 is an exploded perspective view of a magazine loader in accordance with the detailed description.

FIG. 5 is a partially exploded perspective view further illustrating selected parts of the magazine loader shown in FIG. 4.

FIG. 6 is a partially exploded perspective view further illustrating selected parts of the magazine loader shown in FIG. 4.

FIG. 7A is a front view of a starboard shell for a magazine loader in accordance with the detailed description.

FIG. 7B is a right side view of the starboard shell shown in FIG. 7A.

FIG. 7C is a top view of the starboard shell shown in FIG. 7A.

FIG. 7D is a rear view of the starboard shell shown in FIG. 7A.

FIG. 7E is a left side view of the starboard shell shown in FIG. 7A.

FIG. 7F is a bottom view of the starboard shell shown in FIG. 7A. FIGS. 7A through 7F may be collectively referred to as FIG. 7.

FIG. 8A is a front view of a port shell for a magazine loader in accordance with the detailed description.

FIG. 8B is a right side view of the port shell shown in FIG. 8A.

FIG. 8C is a top view of the port shell shown in FIG. 8A.

FIG. 8D is a rear view of the port shell shown in FIG. 8A.

FIG. 8E is a left side view of the port shell shown in FIG. 8A.

FIG. 8F is a bottom view of the port shell shown in FIG. 8A. FIGS. 8A through 8F may be collectively referred to as FIG. 8.

FIG. 9A is a front view of a body for a magazine loader in accordance with the detailed description.

FIG. 9B is a right side view of the body shown in FIG. 9A.

FIG. 9C is a top view of the body shown in FIG. 9A.

FIG. 9D is a rear view of the body shown in FIG. 9A.

FIG. 9E is a left side view of the body shown in FIG. 9A.

FIG. 9F is a bottom view of the body shown in FIG. 9A. FIGS. 9A through 9F may be collectively referred to as FIG. 9.

FIG. 10A is a front view of a tool for a magazine loader in accordance with the detailed description.

FIG. 10B is a right side view of the tool shown in FIG. 10A.

FIG. 10C is a top view of the tool shown in FIG. 10A.

FIG. 10D is a rear view of the tool shown in FIG. 10A.

FIG. 10E is a left side view of the tool shown in FIG. 10A.

FIG. 10F is a bottom view of the tool shown in FIG. 10A. FIGS. 10A through 10F may be collectively referred to as FIG. 10.

FIGS. 11A through 11C are a series of stylized diagrams showing a magazine loader including a cap and a body. FIGS. 11A through 11C may be collectively referred to as FIG. 11.

FIG. 12A is an enlarged diagram further illustrating a portion of the body and the cap shown in FIG. 11B.

FIG. 12B is a diagram further illustrating a plurality of forces acting on the cap shown in FIG. 12A.

FIG. 13 is a diagram illustrating another embodiment.

FIG. 14A is a front view of an arm for a magazine loader in accordance with the detailed description.

FIG. 14B is a right side view of the arm shown in FIG. 14A.

FIG. 14C is a top view of the arm shown in FIG. 14A.

FIG. 14D is a rear view of the arm shown in FIG. 14A.

FIG. 14E is a left side view of the arm shown in FIG. 14A.

FIG. 14F is a bottom view of the arm shown in FIG. 14A. FIGS. 14A through 14F may be collectively referred to as FIG. 14.

FIG. 15A and FIG. 15B are perspective views showing a magazine loader including an arm. The arm is in a first, upward orientation in the embodiment of FIG. 15A. The arm is in a second, downward orientation in the embodiment of FIG. 15B.

FIG. 16 is a side view showing a magazine loader including an arm.

FIG. 17A is a side view showing a cartridge clip holding a stack of cartridges.

FIG. 17B is a side view showing a magazine loader including an arm. In the embodiment of FIG. 17B, a trough of the arm is receiving a stack of cartridges held together by a cartridge clip. The cartridge clip is disposed inside the trough of the arm and each cartridge is shown extending through the mouth of the trough.

FIG. 17C is an additional side view showing the magazine loader shown in FIG. 17B.

FIG. 17D is an additional side view showing the magazine loader shown in FIG. 17C.

FIG. 18 is a perspective view showing a firearm, a plurality of cartridges, a magazine, and a magazine loader for loading cartridges into a magazine.

FIG. 19 is a perspective view showing a magazine and a magazine loader in accordance with the detailed description.

FIG. 20 is perspective views of a magazine loader in accordance with the present invention.

FIG. 21 is an exploded perspective view of a magazine loader in accordance with the detailed description.

FIG. 22 is a partially exploded perspective view further illustrating selected parts of the magazine loader shown in FIG. 21.

FIG. 23 is a partially exploded perspective view further illustrating selected parts of the magazine loader shown in FIG. 21.

FIG. 24A is a front view of a starboard shell for a magazine loader in accordance with the detailed description.

FIG. 24B is a right side view of the starboard shell shown in FIG. 24A.

FIG. 24C is a top view of the starboard shell shown in FIG. 24A.

FIG. 24D is a rear view of the starboard shell shown in FIG. 24A.

FIG. 24E is a left side view of the starboard shell shown in FIG. 24A.

FIG. 24F is a bottom view of the starboard shell shown in FIG. 24A. FIGS. 24A through 24F may be collectively referred to as FIG. 24.

FIG. 25A is a front view of a port shell for a magazine loader in accordance with the detailed description.

FIG. 25B is a right side view of the port shell shown in FIG. 25A.

FIG. 25C is a top view of the port shell shown in FIG. 25A.

FIG. 25D is a rear view of the port shell shown in FIG. 25A.

FIG. 25E is a left side view of the port shell shown in FIG. 25A.

FIG. 25F is a bottom view of the port shell shown in FIG. 25A. FIGS. 25A through 25F may be collectively referred to as FIG. 25.

FIG. 26A is a front view of a body for a magazine loader in accordance with the detailed description.

FIG. 26B is a right side view of the body shown in FIG. 26A.

FIG. 26C is a top view of the body shown in FIG. 26A.

FIG. 26D is a rear view of the body shown in FIG. 26A.

FIG. 26E is a left side view of the body shown in FIG. 26A.

FIG. 26F is a bottom view of the body shown in FIG. 26A. FIGS. 26A through 26F may be collectively referred to as FIG. 26.

FIG. 27A is a front view of a tool for a magazine loader in accordance with the detailed description.

FIG. 27B is a right side view of the tool shown in FIG. 27A.

FIG. 27C is a top view of the tool shown in FIG. 27A.

FIG. 27D is a rear view of the tool shown in FIG. 27A.

FIG. 27E is a left side view of the tool shown in FIG. 27A.

FIG. 27F is a bottom view of the tool shown in FIG. 27A. FIGS. 27A through 27F may be collectively referred to as FIG. 27.

FIG. 28 is perspective view of a magazine loader in accordance with the present invention.

FIG. 29 is an exploded perspective view of a magazine loader in accordance with the detailed description.

FIG. 30 is a partially exploded perspective view further illustrating selected parts of the magazine loader shown in FIG. 29.

FIG. 31 is a partially exploded perspective view further illustrating selected parts of the magazine loader shown in FIG. 29.

**[0052]** While embodiments of the disclosure are amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the disclosure to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the disclosure.

## DETAILED DESCRIPTION

**[0053]** FIG. 1 is a perspective view showing a firearm 20, a plurality of cartridges 24, a magazine 22, and a

magazine loader 100 for loading cartridges into the magazine 22. FIG. 2 is a perspective view showing a plurality of cartridges 24, a magazine 22, and a magazine loader 100. The magazine loader 100 may be used to load a plurality of cartridges 24 into the magazine.

**[0054]** Referring, for example, to FIGS. 3 and 4, an example magazine loader 100 comprises a body 140 for receiving an upper portion of the magazine and a cap 120 slidably engaged with the body 140 for loading cartridges in to the magazine received by the body 140. The body 140 comprises a plurality of wall portions defining a body cavity 142 with a lower opening proximate a bottom end thereof. The body cavity 142 may be configured to receive an upper portion of a magazine to be loaded with cartridges. The body cavity 142 may extend along a magazine insertion axis 126 extending in upward and downward directions. In some embodiments, the plurality of body wall portions comprise a starboard body wall 420 and an opposing port body wall 520. In some embodiments, the starboard body 140 comprises a starboard ramp 428 and the port body wall 520 comprises a port ramp 528. The cap comprises a plurality of cap wall portions defining an interior volume 124. The plurality of cap wall portions comprise a starboard cap wall portion 222 and an opposing port cap wall portion 322. An upper portion of the body 140 is slidably received in the interior volume 124 defined by the cap 120 so that the body 140 and the cap 120 slide relative to one another along a sliding axis. The sliding axis may extend in the upward and downward directions and the cap 120 may translate between an upper position and a lower position along the sliding axis.

**[0055]** In some embodiments, the starboard cap wall portion 222 defines a first starboard slot 238 and a second starboard slot 240. Each starboard slot may extend in the upward and downward directions. In some embodiments, the starboard cap wall portion 222 includes a starboard leaf spring portion 242 disposed between the first starboard slot 238 and the second starboard slot 240. The starboard leaf spring portion 242 may have a fixed end and a free end. In some embodiments, the starboard leaf spring portion 242 comprises a starboard ramp engaging portion 244 proximate the free end thereof and the starboard ramp engaging portion 244 contacts the starboard ramp 428 of the body 140. In some embodiments, the port cap wall portion 322 defines a first port slot 338 and a second port slot 340. Each port slot may extend in the upward and downward directions. In some embodiments, the port cap wall portion 322 includes a port leaf spring portion 342 disposed between the first port slot 338 and the second port slot 340. The port leaf spring portion may have a fixed end and a free end. In some embodiments, the port leaf spring portion 342 comprises a port ramp engaging portion 344 proximate the free end thereof and the port ramp engaging portion 344 contacts the port ramp 528 of the body 140. In some embodiments, when the cap 120 is urged to translate downward along the sliding axis each ramp applies a

reaction force to each ramp engaging portion. The orientation of each ramp relative to the sliding axis may be such that each reaction force has an outwardly directed component that acts to deflect each leaf spring portion in a cantilevered fashion and an upwardly directed component. The upwardly directed components may urge the cap to translate in the upward direction along the sliding axis toward the upper position.

**[0056]** In some embodiments, the magazine loader further includes a latch member 180 adapted and configured to hold the magazine in position relative to the body 140 of the magazine loader 100. In some embodiments, the starboard body wall 420 defines a first slit 182 and a second slit 184. The first slit 182 and the second slit 184 may each extend in the upward and downward directions. The starboard body wall 420 may comprise a cantilevered beam 186 of the latch member 180 disposed between the first slit 182 and the second slit 184. The cantilevered beam 186 may have a fixed end and a free end. In some embodiments, a blocking member 188 is fixed to the cantilevered beam 186 proximate the free end thereof. In some embodiments, the blocking member 188 comprises a projection 188 extending in a portward direction beyond a portward facing surface of the cantilevered beam 186.

**[0057]** In some embodiments, the body 140 comprises a starboard flange 522 extending in the upward direction beyond the starboard body wall 420 and a port flange 522 extending in the upward direction beyond the port body wall 520. In some embodiments, a throat 144 is defined between the starboard flange 522 and the port flange 522. The throat 144 may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into the body cavity 142. The throat 144 may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into a magazine having an upper portion extending into the body cavity 142. In some embodiments, the cap 120 comprises a plunger 110 supported by a top panel 128 of the cap 120. In some embodiments, the plunger 110 extends downward from the top panel 128 into the interior volume 124 defined by the cap 120.

**[0058]** In some embodiments, the body 140 comprises a first starboard rail 424 and the first starboard rail 424 extending in the upward direction along a first starboard rail axis. In some embodiments, the first starboard rail 424 projects in the starboard direction beyond a starboard facing surface of the starboard flange 522. In some embodiments, the first starboard rail 424 extends into a first starboard channel 234 defined by the starboard cap wall portion 222. In some embodiments, the body 140 comprises a second starboard rail 426 and the second starboard rail 426 extending in the upward direction along a second starboard rail axis. In some embodiments, the second starboard rail 426 extends in the upward direction away from the starboard body wall 420. In some embodiments, the second starboard rail 426 projects in the starboard direction beyond a starboard facing surface of the

starboard flange 522. In some embodiments, the second starboard rail 426 extends into the second starboard channel 236 defined by the starboard cap wall portion 222. In some embodiments, the body 140 comprises a first port rail 524 and the first port rail 524 extends in the upward direction along a first port rail axis. In some embodiments, the first port rail 524 extends in the upward direction away from the port body wall 520. In some embodiments, the first port rail 524 projects in the port direction beyond a port facing surface of the port flange 522. In some embodiments, the first port rail 524 extends into the first port channel 334 defined by the port cap wall portion 322. In some embodiments, the body 140 comprises a second port rail and the second port rail 526 extends in the upward direction along a second port rail axis. In some embodiments, the second port rail extends in the upward direction away from the port body wall 520. In some embodiments, the second port rail 526 projects in the port direction beyond a port facing surface of the port flange 522. In some embodiments, the second port rail 526 extends into the second port channel 336 defined by the port cap wall portion 322.

**[0059]** Referring, for example, to FIGS. 7A-17D, a magazine loader 100 for loading cartridges into a magazine in accordance with this detailed description may comprise a cap 120 including a starboard shell and a port shell. The starboard shell 220 and the port shell 320 may be fastened to one another using a plurality of screws 56.

**[0060]** The shells of the cap 120 cooperating to define an entrance 122 and an interior volume 124 fluidly communicating with the entrance 122. In one or more embodiments, the entrance 122 faces the downward direction. The cap 120 comprises a starboard shell wall 222 of the starboard shell 220 and a port shell wall 322 of the port shell 320 disposed on opposite sides of the interior volume 124.

**[0061]** The cap 120 also comprises a top panel 128 extending in a port direction from the starboard shell wall to the port shell wall 322 and extending in a starboard direction from the port shell wall 322 to the starboard shell wall 222. The top panel comprises a top panel portion 224 of the starboard shell 220 and a top panel part 324 of the port shell 320. The top panel 128 defines an aperture 130. The top panel portion 224 of the starboard shell 220 defines a starboard aperture portion 226 and the top panel part 324 of the port shell 320 defines a port aperture portion 326.

**[0062]** The cap 120 also comprises a front wall 132 extending in the port direction from the starboard shell wall 222 to the port shell wall 322 and extending in the starboard direction from the port shell wall 322 to the starboard shell wall 222. In one or more embodiments, the front wall 132 may extend in the upward direction from the entrance 122 to the top panel 128 and extends in the downward direction from the top panel 128 to the entrance 122. The front wall 132 comprises a front wall portion 228 of the starboard shell 220 and a front wall part 328 of the port shell 320.

**[0063]** In one or more embodiments, the cap 120 may also comprise a rear wall 134 extending in the port direction from the starboard shell wall 222 to the port shell wall 322 and extending in the starboard direction from the port shell wall 322 to the starboard shell wall 222. In one or more embodiments, the rear wall 134 may extend in the upward direction from the entrance 122 to the top panel 128 and extending in the downward direction from the top panel 128 to the entrance 122. The rear wall 134 comprises a rear wall portion 230 of the starboard shell 220 and a rear wall part 330 of the port shell.

**[0064]** The starboard shell wall 222 of the starboard shell 220 extends in the forward direction from the rear wall 134 to the front wall 132 and extends in the rearward direction from the front wall 132 to the rear wall 134. In one or more embodiments, the starboard shell wall 222 may extend in the upward direction from the entrance 122 to the top panel 128 and extending in the downward direction from the top panel 128 to the entrance 122. The port shell wall 322 of the port shell 320 extends in the forward direction from the rear wall 134 to the front wall 132 and extends in the rearward direction from the front wall 132 to the rear wall 134. In one or more embodiments, the port shell wall 322 extends in the upward direction from the entrance 122 to the top panel 128 and extends in the downward direction from the top panel 128 to the entrance 122.

**[0065]** The starboard shell 220 comprises a plurality of starboard ribs 232. Each starboard rib 232 protrudes in the port direction beyond a port facing inner surface of the starboard shell wall 222. The starboard ribs 232 define a first starboard channel 234 and a second starboard channel 236. The port shell 320 comprises a plurality of port ribs 332. Each port rib 332 protrudes in the starboard direction beyond a starboard facing inner surface of the port shell wall 322. The port ribs 332 defining a first port channel 334 and a second port channel 336.

**[0066]** A body 140 of the magazine loader comprises a starboard body wall 420 and a port body wall 520 disposed on opposite sides of a cavity 142. In one or more embodiments, the cavity 142 extends in upward and downward directions along a magazine insertion and removal axis 126. The cavity 142 fluidly communicating with a bottom opening 144 and a top opening 146 defined by the body 140. In one or more embodiments, the top opening 146 faces the upward direction and the bottom opening 144 faces the downward direction. In one or more embodiments, the cavity 142 is dimensioned and adapted to receive an upper portion of the magazine. The body 140 comprises a front body wall 148 extending in the port direction from the starboard body wall 420 to the port body wall 520 and extending in the starboard direction from the port body wall 520 to the starboard body wall 420. In one or more embodiments, the front body wall 148 extends in the upward direction from the bottom opening 144 to the top opening 146 and extends in the downward direction from the top opening 146 to the bottom opening 144.

**[0067]** The body 140 comprises a rear body wall 150 extending in the port direction from the starboard body wall 420 to the port body wall 520 and extending in the starboard direction from the port body wall 520 to the starboard body wall 420. In one or more embodiments, the rear body wall 150 extends in the upward direction from the bottom opening 144 to the top opening 146 and extends in the downward direction from the top opening 146 to the bottom opening 144. The starboard body wall 420 extends in the forward direction from the rear body wall 150 to the front body wall 148 and extends in the rearward direction from the front body wall 148 to the rear body wall 150. The port body wall 520 extends in the forward direction from the rear body wall 150 to the front body wall 148 and extends in the rearward direction from the front body wall 148 to the rear body wall 150.

**[0068]** The body 140 comprises a starboard flange 422 extending in the upward direction beyond the starboard body wall 420. The body 140 also comprises a first starboard rail 424. The first starboard rail 424 extending in the upward direction away from the starboard body wall 420. The first starboard rail 424 also projecting in the starboard direction beyond a starboard facing surface of the starboard flange 422. The first starboard rail 424 extends into the first starboard channel 234 defined by the starboard ribs 232. In one or more embodiments, the body 140 also comprises a second starboard rail 426. The second starboard rail 426 extending in the upward direction away from the starboard body wall 420. The second starboard rail 426 projecting in the starboard direction beyond a starboard facing surface of the starboard flange 422. The second starboard rail 426 extends into the second starboard channel 236 defined by the starboard ribs 232.

**[0069]** The body 140 of the magazine loader 100 comprises a first port rail 524. The first port rail 524 extends in the upward direction away from the port body wall 520. The first port rail 524 projecting in the port direction beyond a port facing surface of the port flange 522. The first port rail 524 extends into the first port channel 334 defined by the port ribs 332. The body 140 also comprises a second port rail 526. The second port rail 526 extending in the upward direction away from the port body wall 520. The second port rail 526 also projecting in the port direction beyond a port facing surface of the port flange 522. The second port rail 526 extends into the second port channel 336 defined by the port ribs 332.

**[0070]** The body 140 of the magazine loader also comprises a starboard ramp 428 located upward of the starboard body wall 420. The starboard ramp 428 has a starboard ramp surface 430 extending in a portward, upward direction beyond an upper end of the starboard body wall 420. The body 140 includes at least one starboard stop 432 fixed to an upper end of the starboard ramp 428. The at least one starboard stop 432 comprises a downward facing surface 434. The body 140 also comprises a port ramp 528 located upward of the port body wall 520. The port ramp 528 has a port ramp surface 530 extending in

a starboard, upward direction beyond an upper end of the port body wall 520. The body 140 includes at least one port stop 532 fixed to an upper end of the port ramp 528. The port stop 532 comprises a downward facing side 536.

**[0071]** The starboard shell wall 222 defines a first starboard slot 238 and a second starboard slot 240, each of the slots extending in the upward and downward directions. The starboard shell wall 222 includes a starboard leaf spring portion 242 disposed between the first starboard slot 238 and the second starboard slot 240. The starboard leaf spring portion 242 comprising a ramp engaging portion 244 having a ramp engaging surface 248. The ramp engaging portion 244 comprises a starboard protrusion 246. The starboard protrusion 246 extends in a port direction beyond a port facing inner surface of the starboard leaf spring portion 242. The ramp engaging surface 248 of the ramp engaging portion 244 contacts the starboard ramp surface 430 of the starboard ramp 428.

**[0072]** The port shell wall 322 defines a first port slot 338 and a second port slot 340, each slot extending in the upward and downward directions. The port shell wall 322 includes a port leaf spring part 342 disposed between the first port slot 338 and the second port slot 340. The port leaf spring part 342 comprises a ramp engaging part 344 having a ramp engaging edge 348. The ramp engaging part 344 comprises a port protrusion 346. The port protrusion 346 extending in a starboard direction beyond a starboard facing inner surface of the port leaf spring part 342. The ramp engaging edge 348 of the ramp engaging part 344 contacts the port ramp surface 530 of the port ramp 528.

**[0073]** In one or more embodiments, the magazine loader 100 comprises a latch member 180 adapted and configured to hold a magazine in position relative to the body of the magazine loader 100. In one or more embodiments, a selected one of the body walls defines a first slit 182 and a second slit 184, each slit extending in the upward and downward directions. The selected one of the body walls also comprises a cantilevered beam 186 disposed between the first slit 182 and the second slit 184. The cantilevered beam 186 has a fixed end and a free end. A blocking member 188 is fixed to the cantilevered beam 186 proximate the free end thereof. In one or more embodiments, a portion of the blocking member 188 is positioned, dimensioned, and adapted to be received in a depression defined by the magazine.

**[0074]** In one or more embodiments, the magazine loader 100 also comprises an arm 160 having a proximal end 162 and a distal end 164. The arm 160 defines a trough 166 having a mouth 168. The arm 160 being pivotally coupled to the body 140 near the proximal end 162. In one or more embodiments, the arm 160 is rotatable between a first, upward orientation and second, downward orientation. In one or more embodiments, the distal end 164 of the arm 160 is above the proximal end 162 of the arm 160 when the arm is assuming the first, upward

orientation and the distal end 164 of the arm 160 is below the proximal end 162 of the arm 160 when the arm 160 is assuming the second, downward orientation.

**[0075]** The arm 160 comprises a starboard arm rail 260 protruding in the starboard direction beyond a starboard facing side surface 262 of the arm 160. The arm 160 also comprises a port arm rail 360 protruding in the port direction beyond a port facing side surface 362 of the arm 160. In one or more embodiments, the starboard arm rail 260 is disposed in alignment with the first starboard rail 424 of the body 140 when the arm 160 is assuming the first, upward orientation and the port arm rail 360 is disposed in alignment with the first port rail 524 of the body 140 when the arm 160 is assuming the first, upward orientation.

**[0076]** In one or more embodiments, the starboard arm rail 260 extends through the first starboard channel 234 defined by the starboard ribs 232 and the starboard aperture portion 226 defined by the starboard shell 220 and the port arm rail 360 extends through the first port channel 334 defined by the port ribs 332 and the port aperture portion 326 defined by the port shell 320 while the arm 160 is in the first upward orientation. In one or more embodiments, the mouth 168 of the trough 166 opens in the forward direction when the arm 160 is assuming the first, upward orientation and the mouth 168 of the trough 166 opens in the rearward direction when the arm 160 is assuming the second, downward orientation. In one or more embodiments, the trough 166 defined by the arm 160 is disposed in fluid communication with the cavity 142 defined by the body 140 when the arm 160 is assuming the first, upward orientation.

**[0077]** In one or more embodiments, the trough 166 is adapted and dimensioned to receive a cartridge clip. In one or more embodiments, the trough 166 is adapted and dimensioned to receive a stack of cartridges held together by a cartridge clip, the cartridge clip being disposed inside the trough 166 and each cartridge extending through the mouth 168 of the trough 166. In one or more embodiments, the starboard flange 422 comprises a rearward portion 460 extending in the rearward direction beyond the rear wall 134 of the body 140. The rearward portion 460 defines a first hole 462. In one or more embodiments, the port flange 522 comprises a rearward part 560 extending in the rearward direction beyond the rear wall 134 of the body 140. The rearward portion 460 defines a second hole 562. In one or more embodiments, a proximal portion 170 of the arm 160 is disposed between the rearward portion 460 of the starboard flange 422 and the rearward part 560 of the port flange 522. In one or more embodiments, the proximal portion 170 of the arm 160 defines an arm bore 172. In one or more embodiments, a fastener assembly 50 extends through the first hole 462 defined by the rearward portion 460 of the starboard flange 422, the arm bore 172, and the second hole 562 defined by the rearward part 560 of the port flange 522 so that the arm 160 and the body 140 pivot relative to one another about the fastener assembly 50.

In one or more embodiments, the fastener assembly 50 comprises a female threaded sleeve 54 and a male threaded post 52.

**[0078]** In one or more embodiments, the magazine loader 100 comprises a plunger member 110 having an upper portion and a lower portion. The lower portion of the plunger member 110 extends in the interior volume defined by the cap. A starboard side of the upper portion of the plunger member forms a mechanically interlocking connection with the starboard shell. A port side of the upper portion of the plunger member 110 forms a mechanically interlocking connection with the port shell.

**[0079]** Referring to FIGS. 2, 3 and 4, an upward direction Z and a downward or lower direction -Z are illustrated using arrows labeled "Z" and "-Z," respectively. A forward direction Y and a rearward direction -Y are illustrated using arrows labeled "Y" and "-Y," respectively. A starboard direction X and a port direction -X are illustrated using arrows labeled "X" and "-X," respectively. The directions illustrated using these arrows are applicable to the apparatus shown and discussed throughout this application. The port direction may also be referred to as the portward direction. In one or more embodiments, the upward direction is generally opposite the downward direction. In one or more embodiments, the upward direction and the downward direction are both generally orthogonal to an XY plane defined by the forward direction and the starboard direction. In one or more embodiments, the forward direction is generally opposite the rearward direction. In one or more embodiments, the forward direction and the rearward direction are both generally orthogonal to a ZY plane defined by the upward direction and the starboard direction. In one or more embodiments, the starboard direction is generally opposite the port direction. In one or more embodiments, starboard direction and the port direction are both generally orthogonal to a ZX plane defined by the upward direction and the forward direction. Various direction-indicating terms are used herein as a convenient way to discuss the objects shown in the figures. It will be appreciated that many direction indicating terms are related to the instant orientation of the object being described. It will also be appreciated that the objects described herein may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, direction-indicating terms such as "upwardly," "downwardly," "forwardly," "backwardly," "portwardly," and "starboardly," should not be interpreted to limit the scope of the invention recited in the attached claims.

**[0080]** FIG. 7A through FIG. 7F are elevation and plan views showing six sides of the starboard shell 220. Engineer graphics textbooks generally refer to the process used to create views showing six sides of a three dimensional object as multiview projection or orthographic projection. It is customary to refer to multiview projections using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 7A may be referred to as a

front view of the starboard shell 220, FIG. 7B may be referred to as a right side view of the starboard shell 220, and FIG. 7C may be referred to as a top view of the starboard shell 220. FIG. 7A through FIG. 7F may be referred to collectively as FIG. 7. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 7. It will be appreciated that the elements shown in FIG. 7 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 7D may be referred to as a rear view of the starboard shell 220, FIG. 7E may be referred to as a left side view of the starboard shell 220, and FIG. 7F may be referred to as a bottom view of the starboard shell 220.

**[0081]** Referring to FIG. 8A through FIG. 8F, views showing six sides of the port shell 320. In the field of engineer graphics, the process used to create views showing six sides of a three dimensional object may be referred to as multiview projection or orthographic projection. It is also customary to refer to multiview or orthographic projection using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 8A may be referred to as a front view of the port shell 320, FIG. 8B may be referred to as a right side view of the port shell 320, and FIG. 8C may be referred to as a top view of the port shell 320. FIG. 8A through FIG. 8F may be referred to collectively as FIG. 8. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 8. It will be appreciated that the elements shown in FIG. 8 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 8D may be referred to as a rear view of the port shell 320, FIG. 8E may be referred to as a left side view of the port shell 320, and FIG. 8F may be referred to as a bottom view of the port shell 320.

**[0082]** FIG. 9A through FIG. 9F are elevation and plan views showing six sides of the body 140. Engineer graphics textbooks generally refer to the process used to create views showing six sides of a three dimensional object as multiview projection or orthographic projection. It is customary to refer to multiview projections using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 9A may be referred to as a front view of the body 140, FIG. 9B may be referred to as a right side view of the body 140, and FIG. 9C may be referred to as a top view of the body 140. FIG. 9A through FIG. 9F may be referred to collectively as FIG. 9. Terms such as front view and right side view are used herein as a convenient

method for differentiating between the views shown in FIG. 9. It will be appreciated that the elements shown in FIG. 9 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 9D may be referred to as a rear view of the body 140, FIG. 9E may be referred to as a left side view of the body 140, and FIG. 9F may be referred to as a bottom view of the body 140.

**[0083]** Referring to FIG. 10A through FIG. 10F, views showing six sides of the plunger 110. In the field of engineer graphics, the process used to create views showing six sides of a three dimensional object may be referred to as multiview projection or orthographic projection. It is also customary to refer to multiview or orthographic projection using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 10A may be referred to as a front view of the plunger 110, FIG. 10B may be referred to as a right side view of the plunger 110, and FIG. 10C may be referred to as a top view of the plunger 110. FIG. 10A through FIG. 10F may be referred to collectively as FIG. 10. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 10. It will be appreciated that the elements shown in FIG. 10 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 10D may be referred to as a rear view of the plunger 110, FIG. 10E may be referred to as a left side view of the plunger 110, and FIG. 10F may be referred to as a bottom view of the plunger 110.

**[0084]** FIGS. 11A through 11C are a series of stylized diagrams showing a magazine loader 100 including a cap 120 and a body 140. In FIG. 11A, the cap 120 is shown in an upper, first position relative to the body 140 in FIG. 11A. The ramp engaging surface 248 of the starboard ramp engaging portion 244 can be seen contacting the starboard ramp surface 430 of the starboard ramp 428 in FIG. 11A. In one or more embodiments, the starboard leaf spring portion 242 has an un-deflected state in which no external forces are acting on it. In the embodiment of FIG. 11A, the starboard leaf spring portion 242 may be assuming a deflected shape with the starboard leaf spring portion 242 applying a spring force to the starboard ramp surface 430 of the starboard ramp 428. A starboard stop 432 is fixed to an upper end of the starboard ramp 428. The starboard stop 432 comprises a downward facing surface 434. In the embodiment of FIG. 11A, an upward facing surface of the starboard protrusion 246 is contacting the downward facing surface 434 of the starboard stop 432.

**[0085]** The ramp engaging edge 348 of the port ramp engaging portion 244 can be seen contacting the port ramp surface 530 of the port ramp 528 in FIG. 11A. In one or more embodiments, the port leaf spring part 342 has an un-deflected state in which no external forces are acting on it. In the embodiment of FIG. 11A, the port leaf spring part 342 may be assuming a deflected shape with the port leaf spring part 342 applying a spring force to the port ramp surface 530 of the port ramp 528. A port stop 532 is fixed to an upper end of the port ramp 528. The port stop 532 comprises a downward facing side 536. In the embodiment of FIG. 11A, an upward facing surface of the port protrusion 346 is contacting the downward facing side 536 of the port stop 532.

**[0086]** In the embodiment of FIG. 11B, the cap 120 has moved in the downward direction D relative to the position of the cap 120 shown in FIG. 11A. By comparing FIG. 11A and FIG. 11B, it will be appreciated that the ramp engaging surface 248 slides along the starboard ramp surface 430 of the starboard ramp 428 as the cap 120 moves in the downward direction D. It will also be appreciated that the ramp engaging edge 348 slides along the port ramp surface 530 of the port ramp 528 as the cap 120 moves in the downward direction D when comparing FIG. 11A and FIG. 11B. The starboard leaf spring portion 242 and the port leaf spring part 342 bend in a cantilevered fashion as the cap 120 is urged downward from the position shown in FIG. 11A toward the position shown in FIG. 11B. The starboard leaf spring portion 242 and the port leaf spring part 342 produce a biasing force BF. The biasing force BF acts to urge the cap 120 in the upward direction U toward the first, upper position. The cap 120 may be urged downward, for example, by pressing downward on the cap 120 with a force greater than the biasing force BF. In the embodiment of FIG. 11C, the cap 120 has been urged further in the downward direction D relative to the position of the cap 120 shown in FIG. 11B.

**[0087]** FIG. 12A is an enlarged diagram further illustrating a portion of the body 140 and the cap 120 shown in FIG. 11B. The starboard leaf spring portion 242 applies a spring force FS to the starboard ramp surface 430 of the starboard ramp 428. The starboard ramp 428 provides a reaction force RS that is generally equal and opposite the spring force FS. In other words, the reaction force RS has a magnitude that is equal to the magnitude of the spring force FS and a direction that is opposite the direction of the spring force FS. The port leaf spring part 342 applies a spring force FP to the port ramp surface 530 of the port ramp 528. The port ramp 528 provides a reaction force RP that is generally equal and opposite the spring force FP. In other words, the reaction force RP has a magnitude that is equal to the magnitude of the spring force FP and a direction that is opposite the direction of the spring force FP. The starboard leaf spring portion 242 and the port leaf spring part 342 produce a biasing force BF. The biasing force BF acts to urge the cap 120 in the upward direction U toward the first, upper position.

**[0088]** FIG. 12B is a diagram further illustrating a plurality of forces acting on the cap 120 under circumstances such as those illustrated in FIG. 12A. A number of forces acting on the cap 120 are illustrated using arrows in FIG. 12B. In operation, the ramp engaging surface of the starboard leaf spring portion acts on the starboard ramp surface of the starboard ramp with a spring force and the starboard ramp provides a reaction force RS that is equal and opposite the spring force. The reaction force RS acting on the starboard leaf spring portion is illustrated using an arrow in FIG. 12B. The reaction force RS may be resolved in a lateral force component RSL and an upward force component RSU. The upward force component RSU contributes to the biasing force BF that acts to urge the cap 120 upward toward a first, upper position.

**[0089]** The ramp engaging edge of the port leaf spring portion acts on the port ramp surface of the port ramp with a spring force and the port ramp provides a reaction force RP that is equal and opposite the spring force. The reaction force RP acting on the port leaf spring portion is illustrated using an arrow in FIG. 12B. The reaction force RP may be resolved in a lateral force component RPL and an upward force component RPU. The upward force component RPU contributes to the biasing force BF that acts to urge the cap 120 upward toward a first, upper position. In one or more embodiments, the upward force component RPU and the upward force component RSU combine to produce the biasing force BF. The biasing force BF acts to urge the cap in the upward direction toward a first, upper position.

**[0090]** Referring, for example, to FIGS. 3 and 4, an example magazine loader 100 comprises a body 140 for receiving a magazine and a cap 120 slidably engaged with the body 140 for loading cartridges into the magazine received by the body 140. In some embodiments, the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining an interior or cavity 142 and an open bottom conformingly sized to receive the upper end of the rifle magazine, an upward slot or throat 144 sized for receiving individual cartridges into the interior or cavity 142 of the body 140. In some embodiments, the cap 120 is movably attached to the body 140. In some embodiments, the cap 120 has a downwardly extending plunger 110 that is received in the upward slot or throat 144 and that is configured for pushing a cartridge into the open interior of the magazine received by the body 140. In an embodiment, one of the cap 120 and body 140 having a slide guide or ramp tapered in a direction away from said one with respect to a vertical axis of said one and the other of the cap 120 and body 140 having a spring member for engaging the slide guide or ramp of said one, whereby the cap and body are urged away from each other by the spring member. In such embodiments, one of the cap 120 and body 140 has two slide guides or ramps and the other of the cap 120 and body 140 has two spring members. In embodiments, the spring members are a leaf springs. In embodiments, the leaf springs are each de-



fined by two upright slits in a respective lateral wall portion of said one.

**[0091]** In embodiments, of such magazine loaders, the body 140 has an arm 160 extending upwardly from the body 140, the cap 120 having sliding surfaces for engaging the arm 160, the arm 160 having a slot or trough for receiving a loading clip with a plurality of cartridges, the cap 120 raiseable on the arm 160 permitting the loading clip with the plurality of cartridges to be inserted on the arm 160 wherein when the cap 120 is pushed downwardly the plunger 110 engages an uppermost cartridge of the plurality of cartridges of the loading clip and there is a magazine in the open bottom of the loader, the plurality of cartridges of the loading clip are urged into the magazine by the plunger 110.

**[0092]** In embodiments, an example magazine loader 100 comprises a body 140 with an arm 160 pivotally attached to the body 140, and a cap 120 slidably engaged with the arm 160. In embodiments, the body 140 has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior or cavity 142 and an open bottom conformingly sized to receive the upper end of the magazine, an upward slot or throat 144 for sequentially receiving a plurality of cartridges into the interior or cavity 142 of the body 140 and into the magazine therein. In some embodiments, the arm 160 has an upward position and defines a slot or trough for receiving a loading clip having a plurality of cartridges. In embodiments, the cap 120 has an upper portion, the upper portion having an aperture conforming to the arm 160, the cap 120 slidable upwardly and downwardly on the arm 160. In embodiments, the cap 120 further includes a plunger 110 extending downwardly from the upper portion, the plunger positioned for pushing the plurality of cartridges of the loading clip downwardly into the upper end of the magazine when the magazine is received by the body 140. In such embodiments the arm 160 may have an integral locking portion that releasably secures the arm 160 in the upward position.

**[0093]** FIG. 18 is a perspective view showing a firearm 1020, a plurality of cartridges 1024, a magazine 1022, and a magazine loader 1100 for loading cartridges into the magazine 1022. FIG. 19 is a perspective view showing a plurality of cartridges 1024, a magazine 1022, and a magazine loader 1100. The magazine loader 1100 may be used to load a plurality of cartridges 1024 into the magazine.

**[0094]** Referring, for example, to FIGS. 20 and 21, an example magazine loader 1100 comprises a body 1140 for receiving an upper portion of the magazine and a cap 1120 slidably engaged with the body 1140 for loading cartridges in to the magazine received by the body 1140. The body 1140 comprises a plurality of wall portions defining a body cavity 1142 with a lower opening proximate a bottom end thereof. The body cavity 1142 may be configured to receive an upper portion of a magazine to be loaded with cartridges. The body cavity 1142 may extend

along a magazine insertion axis 1126 extending in upward and downward directions. In some embodiments, the plurality of body wall portions comprise a starboard body wall 1420 and an opposing port body wall 1520. In some embodiments, the starboard body 1140 comprises a starboard ramp 1428 and the port body wall 1520 comprises a port ramp 1528. The cap comprises a plurality of cap wall portions defining an interior volume 1124. The plurality of cap wall portions comprise a starboard cap wall portion 1222 and an opposing port cap wall portion 1322. An upper portion of the body 1140 is slidably received in the interior volume 1124 defined by the cap 1120 so that the body 1140 and the cap 1120 slide relative to one another along a sliding axis. The sliding axis may extend in the upward and downward directions and the cap 1120 may translate between an upper position and a lower position along the sliding axis.

**[0095]** In some embodiments, the starboard cap wall portion 1222 defines a first starboard slot 1238 and a second starboard slot 1240. Each starboard slot may extend in the upward and downward directions. In some embodiments, the starboard cap wall portion 1222 includes a starboard leaf spring portion 1242 disposed between the first starboard slot 1238 and the second starboard slot 1240. The starboard leaf spring portion 1242 may have a fixed end and a free end. In some embodiments, the starboard leaf spring portion 1242 comprises a starboard ramp engaging portion 1244 proximate the free end thereof and the starboard ramp engaging portion 1244 contacts the starboard ramp 1428 of the body 1140. In some embodiments, the port cap wall portion 1322 defines a first port slot 1338 and a second port slot 1340. Each port slot may extend in the upward and downward directions. In some embodiments, the port cap wall portion 1322 includes a port leaf spring portion 1342 disposed between the first port slot 1338 and the second port slot 1340. The port leaf spring portion may have a fixed end and a free end. In some embodiments, the port leaf spring portion 1342 comprises a port ramp engaging portion 1344 proximate the free end thereof and the port ramp engaging portion 1344 contacts the port ramp 1528 of the body 1140. In some embodiments, when the cap 1120 is urged to translate downward along the sliding axis each ramp applies a reaction force to each ramp engaging portion. The orientation of each ramp relative to the sliding axis may be such that each reaction force has an outwardly directed component that acts to deflect each leaf spring portion in a cantilevered fashion and an upwardly directed component. The upwardly directed components may urge the cap to translate in the upward direction along the sliding axis toward the upper position.

**[0096]** In some embodiments, the magazine loader 1100 further includes a latch member 1180 adapted and configured to hold the magazine in position relative to the body 1140 of the magazine loader 1100. In some embodiments, the rear body wall 1150 of the body 1140 defines a first slit 1182 and a second slit 1184. Each slit may extend in the upward and downward directions. In

some embodiments, a rear body wall 1150 of the body 1140 comprises a cantilevered beam 1186 of the latch member 1180 disposed between the first slit 1182 and the second slit 1184. The cantilevered beam 1186 may have a fixed end and a free end. In some embodiments, a blocking member 1188 is fixed to the cantilevered beam 1186 proximate the free end thereof. In some embodiments, the blocking member 1188 comprises a projection 1188 extending in a forward direction beyond a forward facing surface of the cantilevered beam 1186.

**[0097]** In some embodiments, the body 1140 comprises a starboard flange 1522 extending in the upward direction beyond the starboard body wall 1420 and a port flange 1522 extending in the upward direction beyond the port body wall 1520. In some embodiments, a throat 1144 is defined between the starboard flange 1522 and the port flange 1522. The throat 1144 may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into the body cavity 1142. The throat 1144 may be dimensioned and configured to allow sequential passage of a plurality of individual cartridges into a magazine having an upper portion extending into the body cavity 1142. In some embodiments, the cap 1120 comprises a plunger 1110 supported by a top panel 1128 of the cap 1120. In some embodiments, the plunger 1110 extends downward from the top panel 1128 into the interior volume 1124 defined by the cap 1120.

**[0098]** In some embodiments, the body 1140 comprises a first starboard rail 1424 and the first starboard rail 1424 extending in the upward direction along a first starboard rail axis. In some embodiments, the first starboard rail 1424 projects in the starboard direction beyond a starboard facing surface of the starboard flange 1522. In some embodiments, the first starboard rail 1424 extends into a first starboard channel 1234 defined by the starboard cap wall portion 1222. In some embodiments, the body 1140 comprises a second starboard rail 1426 and the second starboard rail 1426 extending in the upward direction along a second starboard rail axis. In some embodiments, the second starboard rail 1426 extends in the upward direction away from the starboard body wall 1420. In some embodiments, the second starboard rail 1426 projects in the starboard direction beyond a starboard facing surface of the starboard flange 1522. In some embodiments, the second starboard rail 1426 extends into the second starboard channel 1236 defined by the starboard cap wall portion 1222. In some embodiments, the body 1140 comprises a first port rail 1524 and the first port rail 1524 extends in the upward direction along a first port rail axis. In some embodiments, the first port rail 1524 extends in the upward direction away from the port body wall 1520. In some embodiments, the first port rail 1524 projects in the port direction beyond a port facing surface of the port flange 1522. In some embodiments, the first port rail 1524 extends into the first port channel 1334 defined by the port cap wall portion 1322. In some embodiments, the body 1140 comprises a second port rail and the second port rail 1526 extends in the

upward direction along a second port rail axis. In some embodiments, the second port rail extends in the upward direction away from the port body wall 1520. In some embodiments, the second port rail 1526 projects in the port direction beyond a port facing surface of the port flange 1522. In some embodiments, the second port rail 1526 extends into the second port channel 1336 defined by the port cap wall portion 1322.

**[0099]** Referring, for example, to FIGS. 26-31, a magazine loader 1100 for loading cartridges into a magazine in accordance with this detailed description may comprise a cap 1120 including a starboard shell and a port shell. The starboard shell 1220 and the port shell 1320 may be fastened to one another using a plurality of screws 156.

**[0100]** The shells of the cap 1120 cooperating to define an entrance 1122 and an interior volume 1124 fluidly communicating with the entrance 1122. In one or more embodiments, the entrance 1122 faces the downward direction. The cap 1120 comprises a starboard shell wall 1222 of the starboard shell 1220 and a port shell wall 1322 of the port shell 1320 disposed on opposite sides of the interior volume 1124.

**[0101]** The cap 1120 also comprises a top panel 1128 extending in a port direction from the starboard shell wall 1222 to the port shell wall 1322 and extending in a starboard direction from the port shell wall 1322 to the starboard shell wall 1222. The top panel comprises a top panel portion 1224 of the starboard shell 1220 and a top panel part 1324 of the port shell 1320. The top panel 1128 defines an aperture 1130. The top panel portion 1224 of the starboard shell 1220 defines a starboard aperture portion 1226 and the top panel part 1324 of the port shell 1320 defines a port aperture portion 1326.

**[0102]** The cap 1120 also comprises a front wall 1132 extending in the port direction from the starboard shell wall 1222 to the port shell wall 1322 and extending in the starboard direction from the port shell wall 1322 to the starboard shell wall 1222. In one or more embodiments, the front wall 1132 may extend in the upward direction from the entrance 1122 to the top panel 1128 and extends in the downward direction from the top panel 1128 to the entrance 1122. The front wall 1132 comprises a front wall portion 1228 of the starboard shell 1220 and a front wall part 1328 of the port shell 1320.

**[0103]** In one or more embodiments, the cap 1120 may also comprise a rear wall 1134 extending in the port direction from the starboard shell wall 1222 to the port shell wall 1322 and extending in the starboard direction from the port shell wall 1322 to the starboard shell wall 1222. In one or more embodiments, the rear wall 1134 may extend in the upward direction from the entrance 1122 to the top panel 1128 and extending in the downward direction from the top panel 1128 to the entrance 1122. The rear wall 1134 comprises a rear wall portion 1230 of the starboard shell 1220 and a rear wall part 1330 of the port shell.

**[0104]** The starboard shell wall 1222 of the starboard

shell 1220 extends in the forward direction from the rear wall 1134 to the front wall 1132 and extends in the rearward direction from the front wall 1132 to the rear wall 1134. In one or more embodiments, the starboard shell wall 1222 may extend in the upward direction from the entrance 1122 to the top panel 1128 and extending in the downward direction from the top panel 1128 to the entrance 1122. The port shell wall 1322 of the port shell 1320 extends in the forward direction from the rear wall 1134 to the front wall 1132 and extends in the rearward direction from the front wall 1132 to the rear wall 1134. In one or more embodiments, the port shell wall 1322 extends in the upward direction from the entrance 1122 to the top panel 1128 and extends in the downward direction from the top panel 1128 to the entrance 1122.

**[0105]** The starboard shell 1220 comprises a plurality of starboard ribs 1232. Each starboard rib 1232 protrudes in the port direction beyond a port facing inner surface of the starboard shell wall 1222. The starboard ribs 1232 define a first starboard channel 1234 and a second starboard channel 1236. The port shell 1320 comprises a plurality of port ribs 1332. Each port rib 1332 protrudes in the starboard direction beyond a starboard facing inner surface of the port shell wall 1322. The port ribs 1332 defining a first port channel 1334 and a second port channel 1336.

**[0106]** A body 1140 of the magazine loader comprises a starboard body wall 1420 and a port body wall 1520 disposed on opposite sides of a cavity 1142. In one or more embodiments, the cavity 1142 extends in upward and downward directions along a magazine insertion and removal axis 1126. The cavity 1142 fluidly communicating with a bottom opening 1144 and a top opening 1146 defined by the body 1140. In one or more embodiments, the top opening 1146 faces the upward direction and the bottom opening 1144 faces the downward direction. In one or more embodiments, the cavity 1142 is dimensioned and adapted to receive an upper portion of the magazine. The body 1140 comprises a front body wall 1148 extending in the port direction from the starboard body wall 1420 to the port body wall 1520 and extending in the starboard direction from the port body wall 1520 to the starboard body wall 1420. In one or more embodiments, the front body wall 1148 extends in the upward direction from the bottom opening 1144 to the top opening 1146 and extends in the downward direction from the top opening 1146 to the bottom opening 1144.

**[0107]** The body 1140 comprises a rear body wall 1150 extending in the port direction from the starboard body wall 1420 to the port body wall 1520 and extending in the starboard direction from the port body wall 1520 to the starboard body wall 1420. In one or more embodiments, the rear body wall 1150 extends in the upward direction from the bottom opening 1144 to the top opening 1146 and extends in the downward direction from the top opening 1146 to the bottom opening 1144. The starboard body wall 1420 extends in the forward direction from the rear body wall 1150 to the front body wall 1148 and extends

in the rearward direction from the front body wall 1148 to the rear body wall 1150. The port body wall 1520 extends in the forward direction from the rear body wall 1150 to the front body wall 1148 and extends in the rearward direction from the front body wall 1148 to the rear body wall 1150.

**[0108]** The body 1140 comprises a starboard flange 1422 extending in the upward direction beyond the starboard body wall 1420. The body 1140 also comprises a first starboard rail 1424. The first starboard rail 1424 extending in the upward direction away from the starboard body wall 1420. The first starboard rail 1424 also projecting in the starboard direction beyond a starboard facing surface of the starboard flange 1422. The first starboard rail 1424 extends into the first starboard channel 1234 defined by the starboard ribs 1232. In one or more embodiments, the body 1140 also comprises a second starboard rail 1426. The second starboard rail 1426 extending in the upward direction away from the starboard body wall 1420. The second starboard rail 1426 projecting in the starboard direction beyond a starboard facing surface of the starboard flange 1422. The second starboard rail 1426 extends into the second starboard channel 1236 defined by the starboard ribs 1232.

**[0109]** The body 1140 of the magazine loader 1100 comprises a first port rail 1524. The first port rail 1524 extends in the upward direction away from the port body wall 1520. The first port rail 1524 projecting in the port direction beyond a port facing surface of the port flange 1522. The first port rail 1524 extends into the first port channel 1334 defined by the port ribs 1332. The body 1140 also comprises a second port rail 1526. The second port rail 1526 extending in the upward direction away from the port body wall 1520. The second port rail 1526 also projecting in the port direction beyond a port facing surface of the port flange 1522. The second port rail 1526 extends into the second port channel 1336 defined by the port ribs 1332.

**[0110]** The body 1140 of the magazine loader also comprises a starboard ramp 1428 located upward of the starboard body wall 1420. The starboard ramp 1428 has a starboard ramp surface 1430 extending in a portward, upward direction beyond an upper end of the starboard body wall 1420. The body 1140 includes at least one starboard stop 1432 fixed to an upper end of the starboard ramp 1428. The at least one starboard stop 1432 comprises a downward facing surface 1434. The body 1140 also comprises a port ramp 1528 located upward of the port body wall 1520. The port ramp 1528 has a port ramp surface 1530 extending in a starboard, upward direction beyond an upper end of the port body wall 1520. The body 1140 includes at least one port stop 1532 fixed to an upper end of the port ramp 1528. The port stop 1532 comprises a downward facing side 1536.

**[0111]** The starboard shell wall 1222 defines a first starboard slot 1238 and a second starboard slot 1240, each of the slots extending in the upward and downward directions. The starboard shell wall 1222 includes a star-

board leaf spring portion 1242 disposed between the first starboard slot 1238 and the second starboard slot 1240. The starboard leaf spring portion 1242 comprising a ramp engaging portion 1244 having a ramp engaging surface 1248. The ramp engaging portion 1244 comprises a starboard protrusion 1246. The starboard protrusion 1246 extends in a port direction beyond a port facing inner surface of the starboard leaf spring portion 1242. The ramp engaging surface 1248 of the ramp engaging portion 1244 contacts the starboard ramp surface 1430 of the starboard ramp 1428.

**[0112]** The port shell wall 1322 defines a first port slot 1338 and a second port slot 1340, each slot extending in the upward and downward directions. The port shell wall 1322 includes a port leaf spring part 1342 disposed between the first port slot 1338 and the second port slot 1340. The port leaf spring part 1342 comprises a ramp engaging part 1344 having a ramp engaging edge 1348. The ramp engaging part 1344 comprises a port protrusion 1346. The port protrusion 1346 extending in a starboard direction beyond a starboard facing inner surface of the port leaf spring part 1342. The ramp engaging edge 1348 of the ramp engaging part 1344 contacts the port ramp surface 1530 of the port ramp 1528.

**[0113]** In one or more embodiments, the magazine loader 1100 comprises a latch member 1180 adapted and configured to hold a magazine in position relative to the body of the magazine loader 1100. In one or more embodiments, a selected one of the body walls defines a first slit 1182 and a second slit 1184, each slit extending in the upward and downward directions. The selected one of the body walls also comprises a cantilevered beam 1186 disposed between the first slit 1182 and the second slit 1184. The cantilevered beam 1186 has a fixed end and a free end. A blocking member 1188 is fixed to the cantilevered beam 1186 proximate the free end thereof. In one or more embodiments, a portion of the blocking member 1188 is positioned, dimensioned, and adapted to be received in a depression defined by the magazine.

**[0114]** In one or more embodiments, the magazine loader 1100 includes a guide pin 1620 disposed inside the interior volume 1124 defined by the cap 1120. The guide pin 1620 has a forward end 1622 and a rearward end 1624 and the guide pin 1620 is positioned and oriented to extend in the forward and rearward directions between the forward end and the rearward end 1624 thereof. The forward end 1622 of the guide pin 1620 is disposed between the starboard shell 1220 and the port shell 1320. In one or more embodiments, the forward end 1622 of the guide pin 1620 is received in a forward starboard notch 1250 defined by the starboard shell 1220 and a forward port notch 1350 defined by the port shell 1320. In one or more embodiments, the rearward end 1624 of the guide pin 1620 is disposed between the starboard shell 1220 and the port shell 1320. The rearward end 1624 of the guide pin being received in a rearward starboard notch 1252 defined by the starboard shell 1220 and a rearward port notch 1352 defined by the port shell

1320.

**[0115]** In one or more embodiments, the magazine loader 1100 comprises a plunger 1630 slidably supported by the guide pin 1620 and a spring 1632 disposed about the guide pin 1620. The plunger 1630 defines a bore 1674 and the guide pin 1620 extends through the bore 1674 so that the plunger 1630 is slidable along the guide pin 1620. The spring 1632 comprises a length of wire 1634 forming a plurality of turns 1636. The plurality of turns 1636 form a coil 1638. The coil 1638 defines a lumen 1670. The plurality of turns 1636 are disposed about the guide pin 1620 and the guide pin 1620 extends through the lumen 1670 defined by the spring 1632. The spring 1632 is seating against the plunger 1630 and acts to bias the plunger 1630 for movement in the forward direction. The plunger 1630 includes a knob portion 1672. In one or more embodiments, the knob portion 1672 extends in the upward direction through the aperture 1130 defined by the cap 1120. A user of the magazine loader 1100 may selectively move the plunger 1630 in the rearward direction against a biasing force of the spring 1632 by applying appropriate force to the knob portion 1672.

**[0116]** Referring, for example, to FIGS. 19, 20 and 21, an upward direction Z and a downward or lower direction -Z are illustrated using arrows labeled "Z" and "-Z," respectively. A forward direction Y and a rearward direction -Y are illustrated using arrows labeled "Y" and "-Y," respectively. A starboard direction X and a port direction -X are illustrated using arrows labeled "X" and "-X," respectively. The directions illustrated using these arrows are applicable to the apparatus shown and discussed throughout this application. The port direction may also be referred to as the portward direction. In one or more embodiments, the upward direction is generally opposite the downward direction. In one or more embodiments, the upward direction and the downward direction are both generally orthogonal to an XY plane defined by the forward direction and the starboard direction. In one or more embodiments, the forward direction is generally opposite the rearward direction. In one or more embodiments, the forward direction and the rearward direction are both generally orthogonal to a ZY plane defined by the upward direction and the starboard direction. In one or more embodiments, the starboard direction is generally opposite the port direction. In one or more embodiments, starboard direction and the port direction are both generally orthogonal to a ZX plane defined by the upward direction and the forward direction. Various direction-indicating terms are used herein as a convenient way to discuss the objects shown in the figures. It will be appreciated that many direction indicating terms are related to the instant orientation of the object being described. It will also be appreciated that the objects described herein may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, direction-indicating terms such as "upwardly," "downwardly," "forwardly," "backwardly," "portwardly," and "starboardly," should not be interpreted to limit the

scope of the invention recited in the attached claims.

**[0117]** FIG. 24A through FIG. 24F are elevation and plan views showing six sides of the starboard shell 1220. Engineer graphics textbooks generally refer to the process used to create views showing six sides of a three dimensional object as multiview projection or orthographic projection. It is customary to refer to multiview projections using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 24A may be referred to as a front view of the starboard shell 1220, FIG. 24B may be referred to as a right side view of the starboard shell 1220, and FIG. 24C may be referred to as a top view of the starboard shell 1220. FIG. 24A through FIG. 24F may be referred to collectively as FIG. 24. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 24. It will be appreciated that the elements shown in FIG. 24 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 24D may be referred to as a rear view of the starboard shell 1220, FIG. 24E may be referred to as a left side view of the starboard shell 1220, and FIG. 24F may be referred to as a bottom view of the starboard shell 1220.

**[0118]** Referring to FIG. 25A through FIG. 25F, views showing six sides of the port shell 1320. In the field of engineer graphics, the process used to create views showing six sides of a three dimensional object may be referred to as multiview projection or orthographic projection. It is also customary to refer to multiview or orthographic projection using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 25A may be referred to as a front view of the port shell 1320, FIG. 25B may be referred to as a right side view of the port shell 1320, and FIG. 25C may be referred to as a top view of the port shell 1320. FIG. 25A through FIG. 25F may be referred to collectively as FIG. 25. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 25. It will be appreciated that the elements shown in FIG. 25 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 25D may be referred to as a rear view of the port shell 1320, FIG. 25E may be referred to as a left side view of the port shell 1320, and FIG. 25F may be referred to as a bottom view of the port shell 1320.

**[0119]** FIG. 26A through FIG. 26F are elevation and plan views showing six sides of the body 1140. Engineer graphics textbooks generally refer to the process used

to create views showing six sides of a three dimensional object as multiview projection or orthographic projection. It is customary to refer to multiview projections using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 26A may be referred to as a front view of the body 1140, FIG. 26B may be referred to as a right side view of the body 1140, and FIG. 26C may be referred to as a top view of the body 1140. FIG. 26A through FIG. 26F may be referred to collectively as FIG. 26. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 26. It will be appreciated that the elements shown in FIG. 26 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 26D may be referred to as a rear view of the body 1140, FIG. 26E may be referred to as a left side view of the body 1140, and FIG. 26F may be referred to as a bottom view of the body 1140.

**[0120]** Referring to FIG. 27A through FIG. 27F, views showing six sides of the plunger 1630. In the field of engineer graphics, the process used to create views showing six sides of a three dimensional object may be referred to as multiview projection or orthographic projection. It is also customary to refer to multiview or orthographic projection using terms such as front view, right side view, top view, rear view, left side view, and bottom view. In accordance with this convention, FIG. 27A may be referred to as a front view of the plunger 1630, FIG. 27B may be referred to as a right side view of the plunger 1630, and FIG. 27C may be referred to as a top view of the plunger 1630. FIG. 27A through FIG. 27F may be referred to collectively as FIG. 27. Terms such as front view and right side view are used herein as a convenient method for differentiating between the views shown in FIG. 27. It will be appreciated that the elements shown in FIG. 27 may assume various orientations without deviating from the spirit and scope of this detailed description. Accordingly, the terms front view, right side view, top view, rear view, left side view, bottom view, and the like should not be interpreted to limit the scope of the invention recited in the attached claims. FIG. 27D may be referred to as a rear view of the plunger 1630, FIG. 27E may be referred to as a left side view of the plunger 1630, and FIG. 27F may be referred to as a bottom view of the plunger 1630.

**[0121]** Referring, for example, to FIGS. 20 and 21, an example magazine loader 1100 comprises a body 1140 and a cap 1120 slidably engaged with the body 1140. The body 1140 may have, for example, a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior or cavity 1142 and an open bottom conformingly sized to receive the upper end of the rifle magazine. In embodiments, the

body 1140 also has a forward upward slot or throat 1144 sized for sequentially receiving a plurality of individual cartridges into the interior or cavity 1142 of the body 1140 and a pair of upwardly extending slide guides or ramps with a forward backward slot or throat 1144 positioned between the pair of slide guides or ramps. In embodiments, the cap 1120 has four side wall portions defining a cap interior volume 1124 and the cap 1120 is slidably attached to the upwardly extending slide guides or ramps within the four side wall portions. In embodiments, the cap 1120 includes a downward projection or plunger 1110 within the four side wall portions positioned for pushing one of the plurality of individual cartridges inserted into the forward upper slot downward into the magazine when the magazine has been inserted into the open bottom of the body. In embodiments, the cap 1120 is movable on the body 1140 downwardly for the cartridge loading. In embodiments, such a magazine loader 1100 has the cap 1120 that is biased upwardly with respect to the body 1140 whereby when the cap 1120 is not being pushed downwardly with respect to the body 1140, the cap 1120 is urged to a normal upward position. In embodiments of the magazine loader 1100 above the cap 1120 is biased upwardly by a pair of upwardly extending slide guides or ramps each having a taper upwardly and the cap 1120 has resilient slide guide engaging portions that are deflected outwardly by the slide guides or ramps as the cap 1120 is pushed downwardly with respect to the body 1140.

**[0122]** In embodiments, an example magazine loader comprises a body 1140 and a cap 1120 slidably engaged with the body 1140. The body 1140 may have a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior or cavity 1142 and an open bottom conformingly sized to receive the upper end of the rifle magazine. The body may also include a forward upward slot or throat 1144 sized for receiving individual cartridges into the interior of the body 1140, and a pair of upwardly extending slide guides or ramps with the slot or throat positioned between the pair of slide guides or ramps. In embodiments, each of the slide guides or ramps have an outwardly facing surface that is tapered in an upwardly direction. In embodiments, the cap 1120 has four side wall portions defining a cap interior volume 1124 and the cap 1120 is slidably attached to the upwardly extending slide guides or ramps within the four side wall portions. In embodiments, the cap 1120 includes a downward projection or plunger 1110 within the four side wall portions positioned for pushing a cartridge inserted into the forward upper slot downward into the magazine when the magazine is inserted into the open bottom of the body. In embodiments, the cap is biased to an upward position by a pair of leaf springs engaged with the pair of slide guides or ramps. In embodiments, in the magazine loader 1100 described above, the leaf springs have a substantially undeflected position when the cap is in an upward position and the pair of leaf springs are each increasingly

deflected outwardly as the cap 1120 is pushed downwardly with respect to the body 1140 whereby the deflected leaf springs urge the cap 1120 toward the upward position. In embodiments, such a magazine loader as described above, further comprises a cartridge ejection member within the cap, the cartridge ejection member having an exposed lever, the cartridge ejection member movable forwardly to force a cartridge in an uppermost position in the magazine out of the magazine and out of the forward upper slot of the body. In embodiments, the cartridge ejection member is slidably engaged with the cap.

**[0123]** In embodiments, a magazine loader 1100 comprises a body 1140 for receiving a magazine and a cap 1120 slidably engaged with the body 1140 for loading cartridges into the magazine received by the body 1140. The body 1140 may have a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior or cavity 1142 and an open bottom conformingly sized to receive the upper end of the rifle magazine. The body 1140 may also have an upward slot or throat 1144 sized for receiving individual cartridges into the interior or cavity 1142 of the body 1140. In embodiments, the cap 1120 is movably attached to the body 1140. In embodiments, the cap 1120 has a downwardly extending plunger 1110 that is received in the upward slot or throat 1144 and that is configured for pushing a cartridge into the open interior of the magazine received by the body 1140. In embodiments, one of the cap 1120 and body 1140 has a slide guide or ramp tapered in a direction away from said one with respect to a vertical axis of said one and the other of the cap 1120 and body 1140 has a spring member for engaging the slide guide or ramp of said one, whereby the cap 1120 and body 1140 are urged away from each other by the spring member. In embodiments, such as above, one of the cap 1120 and body 1140 has two slide guides or ramps and the other of the cap 1120 and body 1140 has two spring members. In embodiments, the spring members are a leaf springs. In embodiments, the leaf springs are each defined by two upright slits in a respective lateral wall portion of said one.

**[0124]** The following United States patents are hereby incorporated by reference herein: US4464855, US4689909, US4719715, US4827651, US4829693, US4888902, US4993180, US5249386, US5355606, US5377436, US6810616, US6178683, US6817134, US7059077, US7257919, US7383657, US7487613, US7503138, US7637048, US7805874, US9212859, US9239198, US9347722 and US9273917.

**[0125]** The above references in all sections of this application are herein incorporated by references in their entirety for all purposes. Components illustrated in such patents may be utilized with embodiments herein. Incorporation by reference is discussed, for example, in MPEP section 2163.07(B).

**[0126]** All of the features disclosed in this specification (including the references incorporated by reference, in-

cluding any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

**[0127]** Each feature disclosed in this specification (including references incorporated by reference, any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

**[0128]** The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any incorporated by reference references, any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed. The above references in all sections of this application are herein incorporated by references in their entirety for all purposes.

**[0129]** Although specific examples have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement calculated to achieve the same purpose could be substituted for the specific examples shown. This application is intended to cover adaptations or variations of the present subject matter. Therefore, it is intended that the invention be defined by the attached claims and their legal equivalents, as well as the following illustrative aspects. The above described aspects embodiments of the invention are merely descriptive of its principles and are not to be considered limiting. Further modifications of the invention herein disclosed will occur to those skilled in the respective arts and all such modifications are deemed to be within the scope of the invention. The inventors of the magazine loaders described herein are associated with Fred Sparks Design of St. Louis, Missouri.

**[0130]** The present disclosure also comprises the following aspects:

Aspect 1: An apparatus for loading cartridges into a magazine, comprising: a body having a top end and a bottom end, the body comprising a plurality of wall portions defining a body cavity with a lower opening proximate the bottom end, the body cavity configured to receive an upper portion of the magazine, the body cavity extending along a magazine insertion axis, the magazine insertion axis extending in upward and downward directions, the plurality of body wall portions comprising a starboard body wall portion and an opposing port body wall portion, the body further including a starboard ramp supported by the starboard wall portion and a port ramp supported by the port wall portion; a cap comprising a plurality of cap wall portions defining an interior volume, the plurality

of cap wall portions comprising a starboard cap wall portion and an opposing port cap wall portion; an upper portion of the body being slidably received in the interior volume defined by the cap wall portions so that the body and the cap slide relative to one another along a sliding axis, the sliding axis extending in the upward and downward directions, the cap translating between an upper position and a lower position along the sliding axis; the starboard cap wall defining a first starboard slot and a second starboard slot, each starboard slot extending in the upward and downward directions, the starboard cap wall including a starboard leaf spring portion disposed between the first starboard slot and the second starboard slot, the starboard leaf spring portion having a fixed end and a free end, the starboard leaf spring portion comprising a starboard ramp engaging portion proximate the free end thereof, the starboard ramp engaging portion contacting the starboard ramp; the port cap wall defining a first port slot and a second port slot, each port slot extending in the upward and downward directions, the port cap wall including a port leaf spring portion disposed between the first port slot and the second port slot, the port leaf spring portion having a fixed end and a free end, the port leaf spring portion comprising a port ramp engaging portion proximate the free end thereof, the port ramp engaging portion contacting the port ramp; when the cap is urged to translate downward along the sliding axis each ramp applies a reaction force to each ramp engaging portion, the orientation of each ramp relative to the sliding axis being such that each reaction force has an outwardly directed component that acts to deflect each leaf spring portion in a cantilevered fashion and an upwardly directed component, the upwardly directed components urging the cap to translate in the upward direction along the sliding axis toward the upper position.

Aspect 2: The apparatus of aspect 1, further comprising an arm having a proximal end and a distal end, the arm being pivotally coupled to the body near the proximal end, the arm being rotatable between a first, upward orientation and second, downward orientation, the arm defining a trough having a mouth.

Aspect 3: The apparatus of aspect 2, wherein the distal end of the arm is above the proximal end of the arm when the arm is assuming the first, upward orientation and the distal end of the arm is below the proximal end of the arm when the arm is assuming the second, downward orientation.

Aspect 4: The apparatus of aspect 2, wherein the arm comprises a starboard arm rail protruding in the starboard direction beyond a starboard facing side surface of the arm and the arm comprises a port arm rail protruding in the port direction beyond a port facing side surface of the arm.

Aspect 5: The apparatus of aspect 4, wherein: the

starboard arm rail is disposed in alignment with a first starboard rail of the body when the arm is assuming the first, upward orientation; and the port arm rail is disposed in alignment with a first port rail of the body when the arm is assuming the first, upward orientation.

Aspect 6: The apparatus of aspect 5, wherein the starboard arm rail extends through a first starboard channel defined by starboard ribs of the body and a starboard aperture portion defined by the cap; and the port arm rail extends through a first port channel defined by port ribs of the body and the port aperture portion defined by the cap while the arm is in the first upward orientation.

Aspect 7: The apparatus of aspect 2, wherein the mouth of the trough opens in the forward direction when the arm is assuming the first, upward orientation and the mouth of the trough opens in the rearward direction when the arm is assuming the second, downward orientation.

Aspect 8: The apparatus of aspect 2, wherein the trough defined by the arm is disposed in communication with the cavity defined by the body when the arm is assuming the first, upward orientation.

Aspect 9: The apparatus of aspect 2, wherein the trough is adapted and dimensioned to receive a cartridge clip.

Aspect 10: The apparatus of aspect 2, wherein the trough is adapted and dimensioned to receive a stack of cartridges held together by a cartridge clip, the cartridge clip being disposed inside the trough and each cartridge extending through the mouth of the trough.

Aspect 11: The apparatus of aspect 2, wherein: the body comprises a starboard flange having rearward portion extending in the rearward direction beyond the rear wall of the body, the rearward portion defining a first hole; the body comprises a port flange having a rearward part extending in the rearward direction beyond the rear wall of the body, the rearward portion defining a second hole; a proximal portion of the arm is disposed between the rearward portion of the starboard flange and the rearward part of the port flange, the proximal portion of the arm defining an arm bore; and a fastener assembly extends through the first hole defined by the rearward portion of the starboard flange, the arm bore, and the second hole defined by the rearward part of the port flange so that the arm and the body pivot relative to one another about the fastener assembly.

Aspect 12: The apparatus of aspect 1 wherein: the body comprises a starboard flange extending in the upward direction beyond the starboard body wall; the body comprises a starboard flange extending in the upward direction beyond the starboard body wall; and a throat is defined between the starboard flange and the port flange, the throat being dimensioned and configured to allow sequential passage of a plu-

ality of individual cartridges into the body cavity.

Aspect 13: The apparatus of aspect 12 wherein the body comprises a first starboard rail, the first starboard rail extending in the upward direction along a first starboard rail axis, the first starboard rail projecting in the starboard direction beyond a starboard facing surface of the starboard flange, the first starboard rail extending into a first starboard channel defined by the starboard cap wall.

Aspect 14: The apparatus of aspect 13 wherein the body comprises a second starboard rail, the second starboard rail extending in the upward direction along a second starboard rail axis, the second starboard rail projecting in the starboard direction beyond a starboard facing surface of the starboard flange, the second starboard rail extending into the second starboard channel defined by the starboard cap wall.

Aspect 15: The apparatus of aspect 14 wherein the body comprises a first port rail, the first port rail extending in the upward direction along a first port rail axis, the first port rail projecting in the port direction beyond a port facing surface of the port flange, the first port rail extending into the first port channel defined by the port cap wall.

Aspect 16: The apparatus of aspect 15 wherein the body comprises a second port rail, the second port rail extending in the upward direction along a second port rail axis, the second port rail projecting in the port direction beyond a port facing surface of the port flange, the second port rail extending into the second port channel defined by the port cap wall.

Aspect 17: The apparatus of aspect 1 wherein: the cap comprises a starboard shell and a port shell, the shells cooperating to define the entrance and the interior volume fluidly communicating with the entrance, the cap comprising a starboard shell wall of the starboard shell and a port shell wall of the port shell disposed on opposite sides of the interior volume; and the cap comprises a top panel extending in a port direction from the starboard shell wall to the port shell wall and extending in a starboard direction from the port shell wall to the starboard shell wall, the top panel comprising a top panel portion of the starboard shell and a top panel part of the port shell, the top panel defining an aperture, the top panel portion of the starboard shell defining a starboard aperture portion and the top panel part of the port shell defining a port aperture portion.

Aspect 18: The apparatus of aspect 17 wherein the cap comprises a front wall extending in the port direction from the starboard shell wall to the port shell wall and extending in the starboard direction from the port shell wall to the starboard shell wall, the front wall extending in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance, the front wall comprising a front wall portion of the starboard shell and a front wall part of the port shell.



Aspect 19: The apparatus of aspect 18 wherein the starboard shell wall of the starboard shell extends in the forward direction from the rear wall to the front wall and extending in the rearward direction from the front wall to the rear wall, the starboard shell wall extending in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance.

Aspect 20: The apparatus of aspect 19 wherein the port shell wall of the port shell extends in the forward direction from the rear wall to the front wall and extending in the rearward direction from the front wall to the rear wall, the port shell wall extending in the upward direction from the entrance to the top panel and extending in the downward direction from the top panel to the entrance.

Aspect 21: The apparatus of aspect 20 wherein the starboard shell comprising a plurality of starboard ribs, each starboard rib protruding in the port direction beyond a port facing inner surface of the starboard shell wall, the starboard ribs defining a first starboard channel and a second starboard channel, wherein the first starboard channel defined by the starboard ribs extends through the starboard aperture portion defined by the starboard shell.

Aspect 22: The apparatus of aspect 21 wherein the port shell comprising a plurality of port ribs, each port rib protruding in the starboard direction beyond a starboard facing inner surface of the port shell wall, the port ribs defining a first port channel and a second port channel, wherein the first port channel defined by the port ribs extends through the port aperture portion defined by the port shell.

Aspect 23: The apparatus of aspect 22 wherein the body comprises a front body wall extending in the port direction from the starboard body wall to the port body wall and extending in the starboard direction from the port body wall to the starboard body wall, the front body wall extending in the upward direction from the bottom opening to the top opening and extending in the downward direction from the top opening to the bottom opening;

Aspect 24: The apparatus of aspect 23 wherein the body comprises a rear body wall extending in the port direction from the starboard body wall to the port body wall and extending in the starboard direction from the port body wall to the starboard body wall, the rear body wall extending in the upward direction from the bottom opening to the top opening and extending in the downward direction from the top opening to the bottom opening; the starboard body wall extending in the forward direction from the rear body wall to the front body wall and extending in the rearward direction from the front body wall to the rear body wall; the port body wall extending in the forward direction from the rear body wall to the front body wall and extending in the rearward direction from the front body wall to the rear body wall.

Aspect 25: The apparatus of aspect 1 wherein the cap comprises a plunger supported by a top panel of the cap, the plunger extending downward from the top panel into the interior volume defined by the cap.

Aspect 26: The apparatus of aspect 1 further including a latch member adapted and configured to hold the magazine in position relative to the body of the magazine loader, the starboard body wall defining a first slit and a second slit, each slit extending in the upward and downward directions, the starboard body wall comprising a cantilevered beam of the latch member disposed between the first slit and the second slit, the cantilevered beam having a fixed end and a free end, a blocking member being fixed to the cantilevered beam proximate the free end thereof, the blocking member comprising a projection extending in a portward direction beyond a portward facing surface of the cantilevered beam.

Aspect 27: A magazine loader for loading cartridges in a rifle magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into the rifle, the magazine loader comprising a body and a cap slidably engaged with the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the rifle magazine, a forward upward slot sized for sequentially receiving a plurality of individual cartridges into the interior of the body, and a pair of upwardly extending slide guides with a forward backward slot opening within the pair of slide guides; and wherein the cap has four side wall portions defining a cap interior and the cap is slidably attached to the upwardly extending slide guides within the four side wall portions, the cap having a downward projection within the four side wall portions positioned for pushing one of the plurality of individual cartridges inserted into the forward upper slot downward into the magazine when the magazine has been inserted into the open bottom of the body, the cap movable on the body downwardly for the cartridge loading.

Aspect 28: The magazine loader of aspect 1 wherein the cap is biased upwardly with respect to the body whereby when the cap is not being pushed downwardly with respect to the body, the cap is urged to a normal upward position.

Aspect 29: The magazine loader of aspect 28 where the cap is biased upwardly by a pair of upwardly extending slide guides each having a taper upwardly and the cap has resilient slide guide engaging portions that are deflected outwardly by the slide guides as the cap is pushed downwardly with respect to the body.

Aspect 30: The magazine loader of aspect 1 further

comprising an arm extending upwardly from the body, the cap having sliding surfaces for engaging the arm, the arm having a slot for receiving a loading clip with a plurality of cartridges, the cap raiseable on the arm permitting the loading clip with the plurality of cartridges to be inserted on the arm wherein when the cap is pushed downwardly the plunger engages an uppermost cartridge of the plurality of cartridges of the loading clip and there is a magazine in the open bottom of the loader, the plurality of cartridges of the loading clip are urged into the magazine by the plunger.

Aspect 31: The magazine loader of aspect 30 wherein the arm is pivotal from an upright position to a downward position, the upright position associated with loading the plurality of cartridges on the loading clip into the magazine, the downward position associated with loading individual cartridges sequentially into the magazine through the forward upward slot.

Aspect 32: The magazine loader of aspect 31 wherein the arm has locking structure associated with maintaining the arm in each of the upright position and the downward position.

Aspect 33: The magazine loader of any of aspects 27-32 in combination with the loading clip with the plurality of cartridges.

Aspect 34: The magazine loader of any of aspect 27-33 in combination with the magazine.

Aspect 35: A magazine loader for loading cartridges in a rifle magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into the rifle, the magazine loader comprising a body and a cap slidably engaged with the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the rifle magazine, a forward upward slot sized for receiving individual cartridges into the interior of the body, and a pair of upwardly extending slide guides with a slot extending forwardly and rearwardly within the pair of slide guides, each of the slide guides having an outwardly facing surface that is tapered in an upwardly direction; and wherein the cap has four side wall portions defining a cap interior and the cap is slidably attached to the upwardly extending slide guides within the four side wall portions, the cap having a downward projection within the four side wall portions positioned for pushing a cartridge inserted into the forward upper slot downward into the magazine when the magazine is inserted into the open bottom of the body, the cap biased to an upward position by a pair of leaf springs engaged with the pair of slide guides.

Aspect 36: The magazine loader of aspect 35 where-

in the leaf springs have a substantially undeflected position when the cap is in an upward position and the pair of leaf springs are each increasingly deflected outwardly as the cap is pushed downwardly with respect to the body whereby the deflected leaf springs urge the cap toward the upward position.

Aspect 37: The magazine loader of aspect 36 further comprising a cartridge ejection member within the cap, the cartridge ejection member having an exposed lever, the cartridge ejection member movable forwardly to force a cartridge in an uppermost position in the magazine out of the magazine and out of the forward upper slot of the body.

Aspect 38: The magazine loader of aspect 37 wherein the cartridge ejection member is slidably engaged with the cap.

Aspect 39: A magazine loader for loading cartridges in a magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into a firearm, the magazine loader comprising a body for receiving the magazine and a cap slidably engaged with the body for loading cartridges into the magazine received by the body; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the rifle magazine, an upward slot sized for receiving individual cartridges into the interior of the body, wherein the cap is movably attached to the body, the cap having a downwardly extending plunger that is received in the upward slot and that is configured for pushing a cartridge into the open interior of the magazine received by the body, one of the cap and body having a slide guide tapered in a direction away from said one with respect to a vertical axis of said one and the other of the cap and body having a spring member for engaging the slide guide of said one, whereby the cap and body are urged away from each other by the spring member.

Aspect 40: The magazine loader of aspect 39 wherein the one of the cap and body has two slide guides and the other of the cap and body has two spring members.

Aspect 41: The magazine loader of aspect 40 wherein the spring members are a leaf springs.

Aspect 42: The magazine loader of aspect 41 wherein the leaf springs are each defined by two upright slits in a respective lateral wall portion of said one.

Aspect 43: The magazine loader of aspect 42 wherein the body has an arm extending upwardly from the body, the cap having sliding surfaces for engaging the arm, the arm having a slot for receiving a loading clip with a plurality of cartridges, the cap raiseable on the arm permitting the loading clip with the plu-

ality of cartridges to be inserted on the arm wherein when the cap is pushed downwardly the plunger engages an uppermost cartridge of the plurality of cartridges of the loading clip and there is a magazine in the open bottom of the loader, the plurality of cartridges of the loading clip are urged into the magazine by the plunger.

Aspect 44: A magazine loader for loading cartridges in a magazine, the magazine being an elongate four sided enclosure with an open interior, an upper end, with an open top, a spring loaded platform movably constrained in the open interior for pushing cartridges in the magazine to the open top for feeding into a firearm, the magazine loader comprising a body with an arm pivotally attached to the body, and a cap slidably engaged with the arm; wherein the body has a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom conformingly sized to receive the upper end of the magazine, an upward slot for sequentially receiving a plurality of cartridges into the interior of the body and into the magazine therein, the arm having an upward position and defining a slot for receiving a loading clip having a plurality of cartridges, wherein the cap has an upper portion, the upper portion having an aperture conforming to the arm, the cap slidable upwardly and downwardly on the arm, the cap further having a plunger extending downwardly from the upper portion, the plunger positioned for pushing the plurality of cartridges of the loading clip downwardly into the upper end of the magazine when the magazine is received by the body.

Aspect 45: The magazine loader of aspect 44 wherein the arm has an integral locking portion that releasably secures the arm in the upward position.

Aspect 46: The magazine loader of aspect 44 or 45 wherein one of the cap and body having a slide guide tapered in a direction away from said one with respect to a vertical axis of said one and the other of the cap and body having a spring member for engaging the slide guide of said one, whereby when the cap is pushed downwardly toward the body, the cap and body are urged away from each other by the spring member.

## Claims

1. A magazine loader for loading cartridges in a rifle magazine, the magazine loader comprising

a body having a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom sized to receive an upper end of the rifle magazine, a slot sized for receiving individual cartridges into the body interior;

a cap having four side wall portions defining a cap interior, the cap configured to be slidably attached to the body, the cap having a projection within the four side wall portions positioned for pushing a cartridge inserted into the body interior into the rifle magazine when the rifle magazine is inserted into the open bottom of the body, wherein one of the cap and body has two slide guides and the other one of the cap and body has two spring members to bias the cap to an upward position with respect to the body; and a latch to hold the rifle magazine in position relative to the body of the magazine loader.

2. The magazine loader of claim 1, wherein the slide guides are disposed on the body and the two spring members are disposed on the cap.

3. The magazine loader of claim 1 or claim 2, wherein the spring members are leaf springs.

4. The magazine loader of any one of claims 1-3, wherein the slide guides comprise a starboard ramp and a port ramp supported by the lateral wall portions; and wherein the spring members comprise a starboard leaf spring portion and a port leaf spring portion disposed on the opposing wall portions, the starboard leaf spring contacting the starboard ramp and the port leaf portion contacting the port ramp.

5. A magazine loader for loading cartridges in a rifle magazine, the magazine loader comprising:

a body having a pair of opposing forward and rearward wall portions and a pair of lateral wall portions, together defining a body interior and an open bottom sized to receive an upper end of the rifle magazine, a slot sized for receiving individual cartridges into the body interior;

a cap having four side wall portions defining a cap interior, the cap configured to be slidably attached to the body, the cap having a projection within the four side wall portions positioned for pushing a cartridge inserted into the body interior into the rifle magazine when the rifle magazine is inserted into the open bottom of the body, wherein one of the cap and body has a slide guide and the other one of the cap and body has a leaf spring member to bias the cap to an upward position with respect to the body; and a latch to hold the rifle magazine in position relative to the body of the magazine loader.

6. The magazine loader of claim 5, wherein the slide guide is disposed on the body and the leaf spring member is disposed on the cap.

7. The magazine loader of claim 5 or claim 6, wherein

the slide guide comprises a starboard ramp and a port ramp supported by the lateral wall portions; and wherein the leaf spring member comprises a starboard leaf spring portion and a port leaf spring portion disposed on the opposing wall portions, the starboard leaf spring contacting the starboard ramp and the port leaf portion contacting the port ramp. 5

8. The magazine loader of any one of the preceding claims, wherein the body further comprises 10

a starboard flange and a port flange extending beyond the lateral wall portions; and a throat defined between the starboard flange and the port flange, the throat being dimensioned and configured to allow sequential passage of a plurality of individual cartridges into the body cavity. 15

9. The magazine loader of claim 8, wherein the body further comprises a first starboard rail, the first starboard rail extending in a direction along a first starboard rail axis, the first starboard rail projecting in the starboard direction beyond a starboard facing surface of the starboard flange, the first starboard rail extending into a first starboard channel defined by a starboard cap wall. 20 25

10. The magazine loader of claim 9, wherein the body further comprises a second starboard rail, the second starboard rail extending in a direction along a second starboard rail axis, the second starboard rail projecting in the starboard direction beyond a starboard facing surface of the starboard flange, the second starboard rail extending into a second starboard channel defined by the starboard cap wall. 30 35

11. The magazine loader of any one of claims 8-10, wherein the body further comprises a first port rail, the first port rail extending in a direction along a first port rail axis, the first port rail projecting in a port direction beyond a port facing surface of the port flange, the first port rail extending into a first port channel defined by a port cap wall. 40 45

12. The magazine loader of claim 11, wherein the body comprises a second port rail, the second port rail extending in a direction along a second port rail axis, the second port rail projecting in the port direction beyond a port facing surface of the port flange, the second port rail extending into a second port channel defined by the port cap wall. 50 55

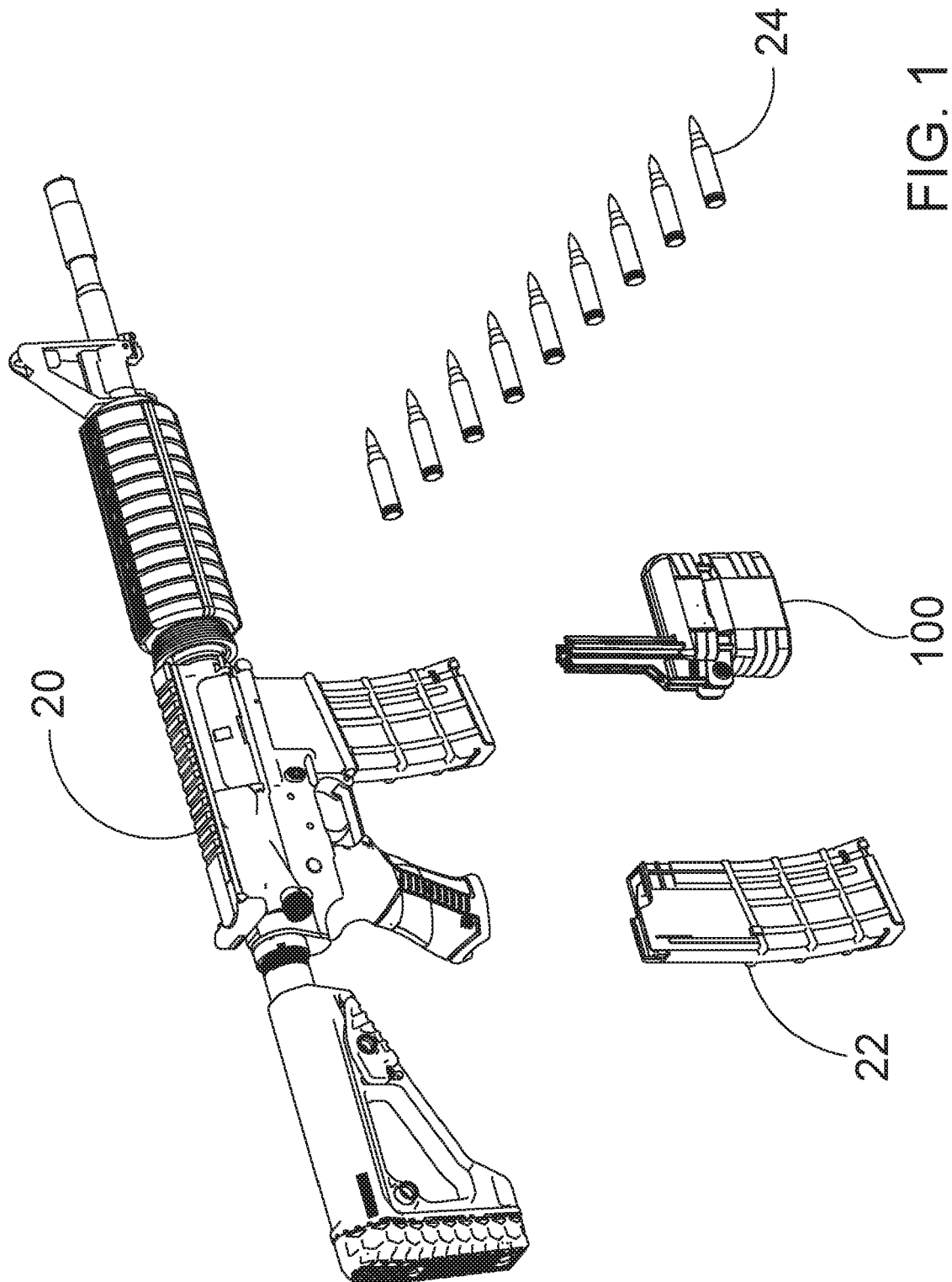


FIG. 1

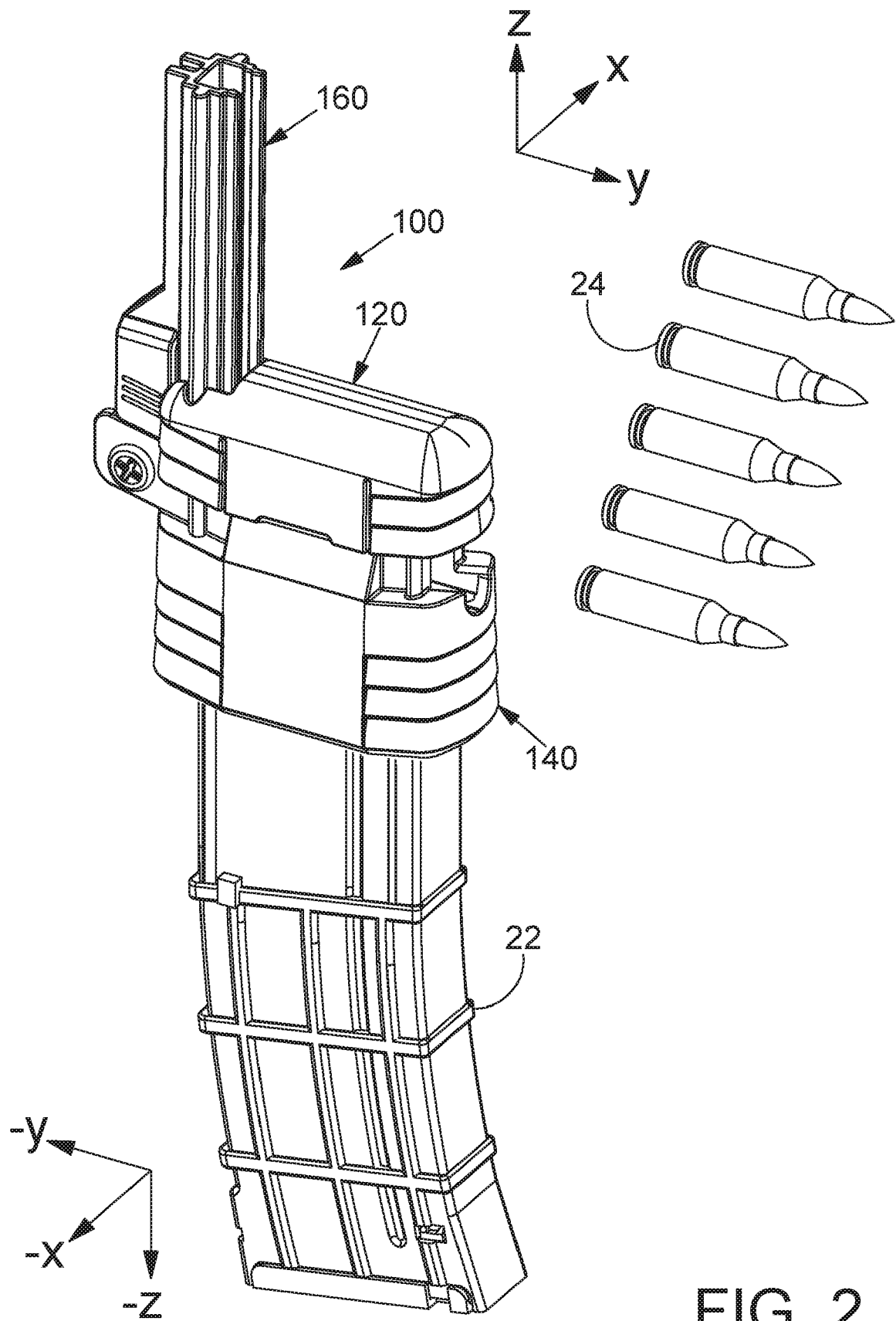


FIG. 2

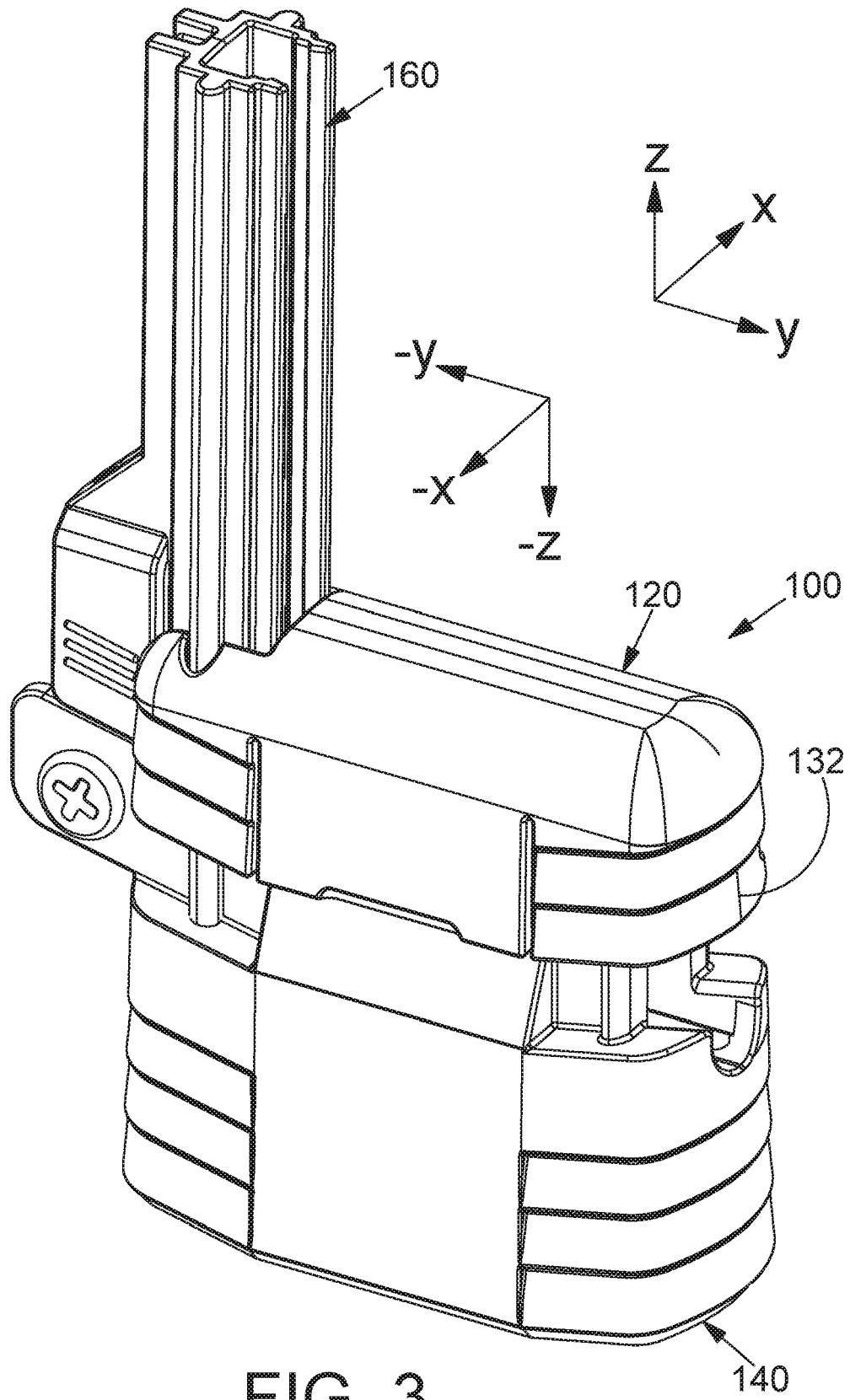


FIG. 3

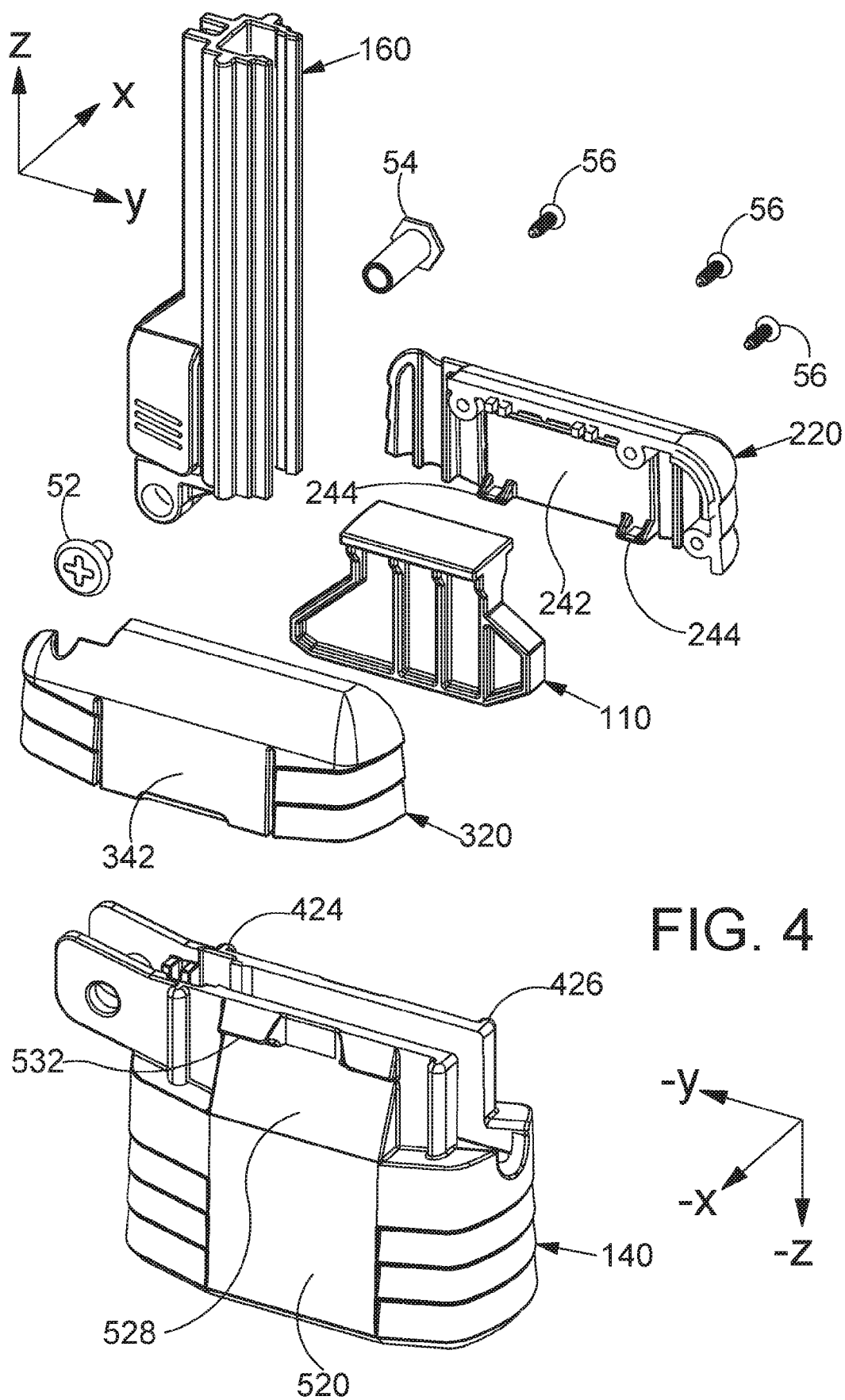


FIG. 4



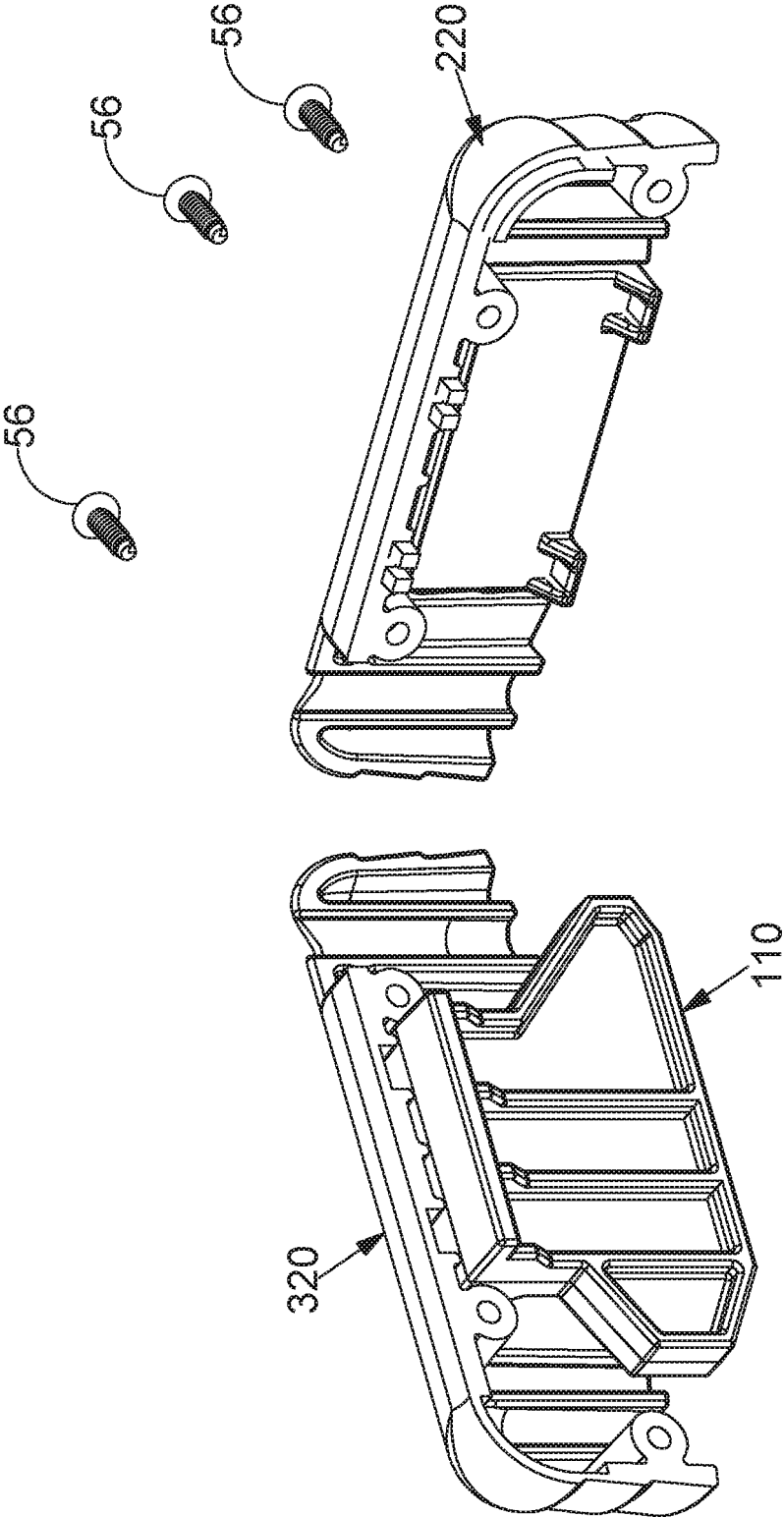


FIG. 5

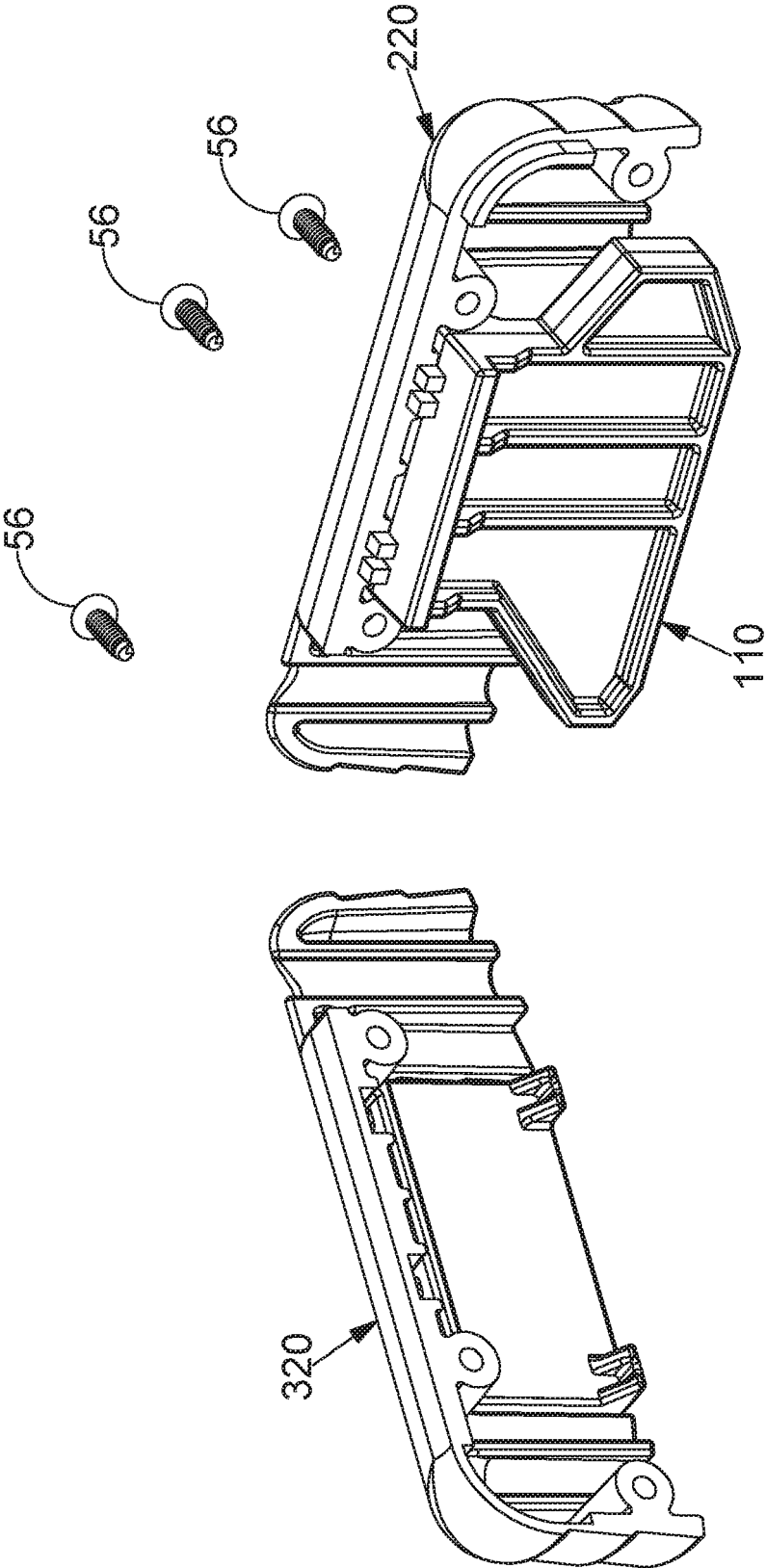
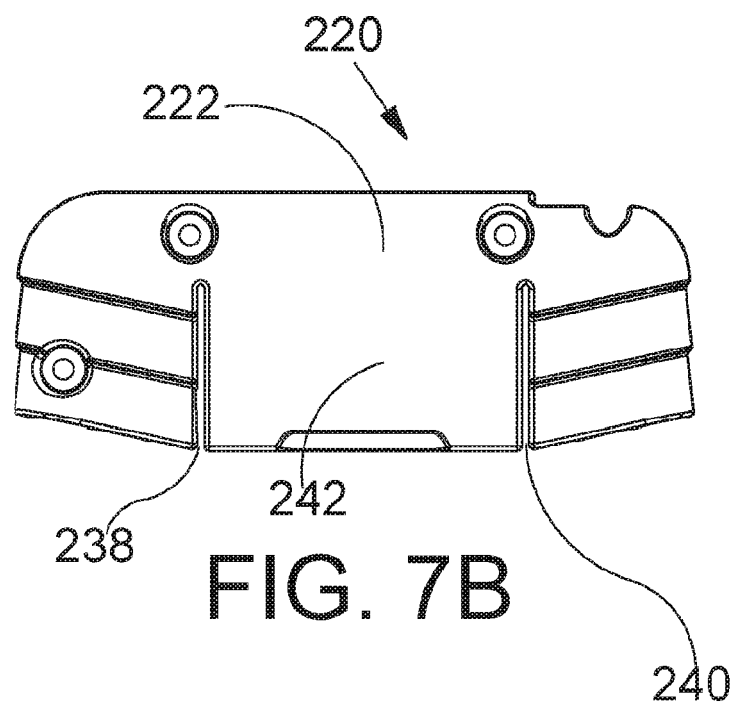
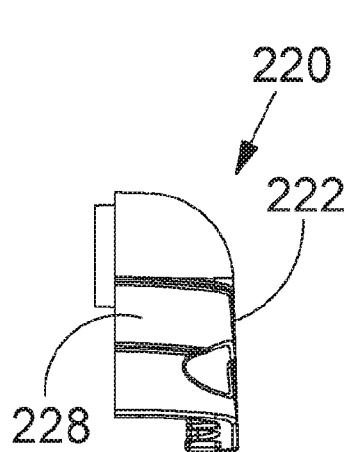
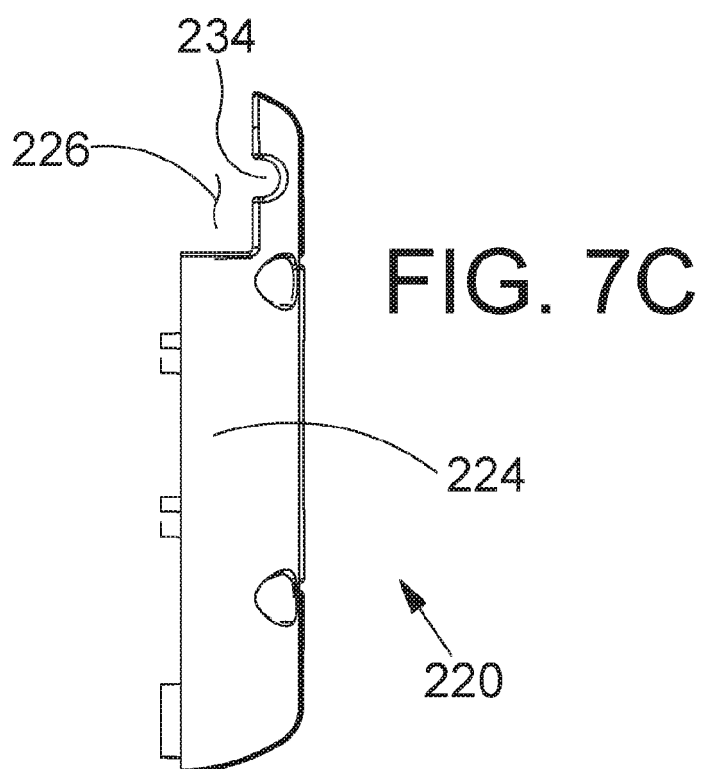


FIG. 6



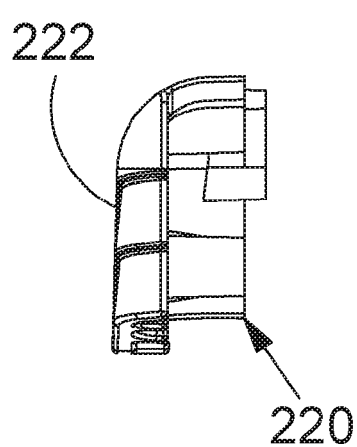


FIG. 7D

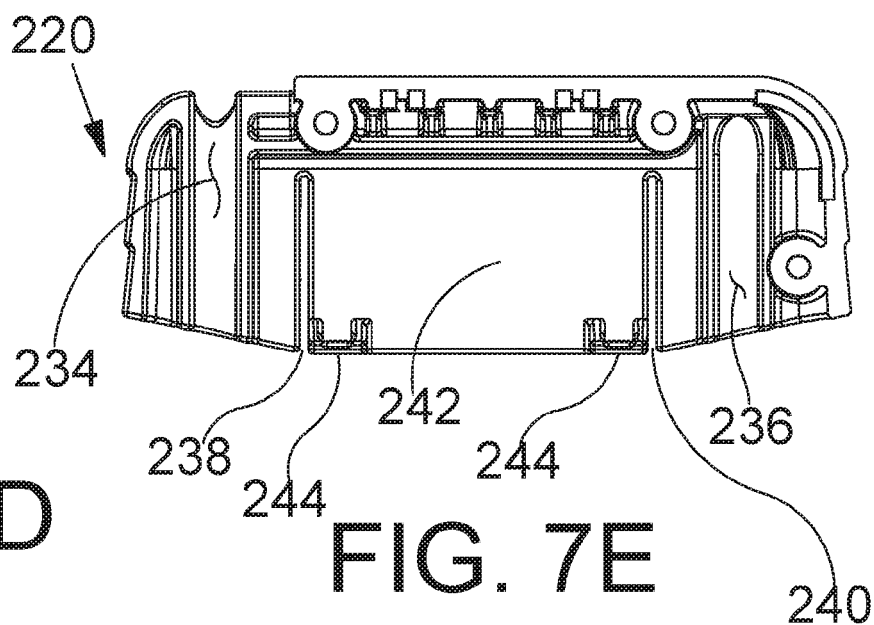


FIG. 7E

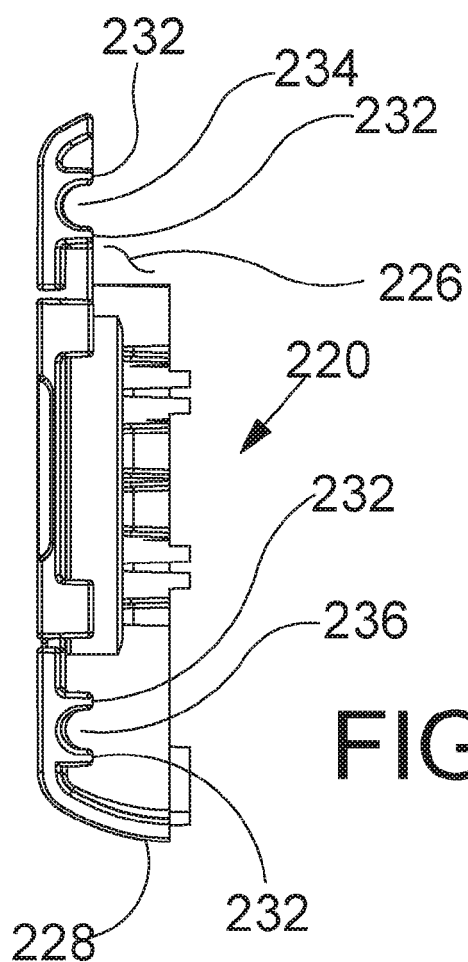
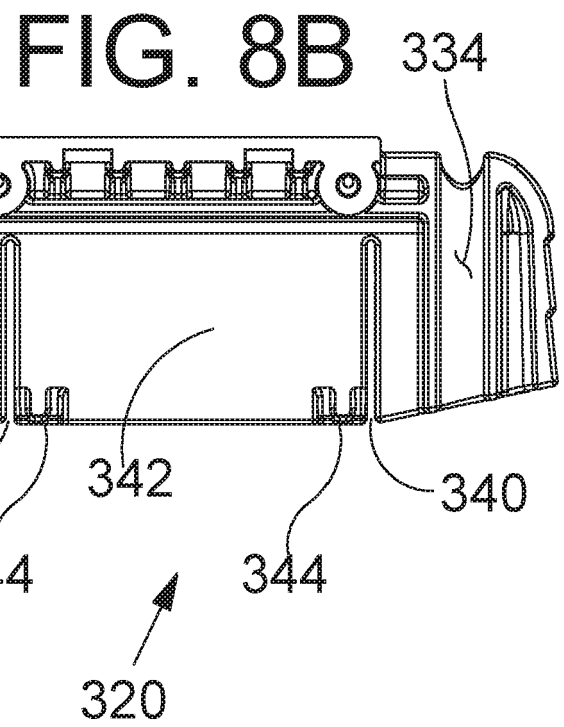
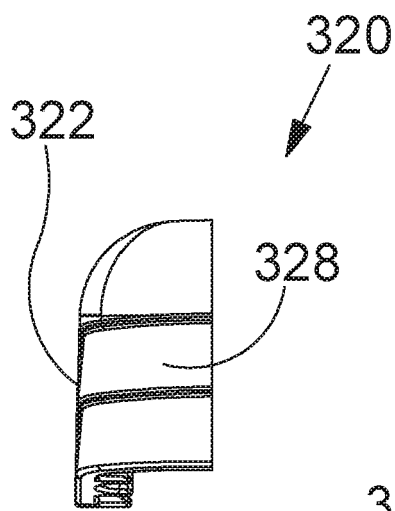
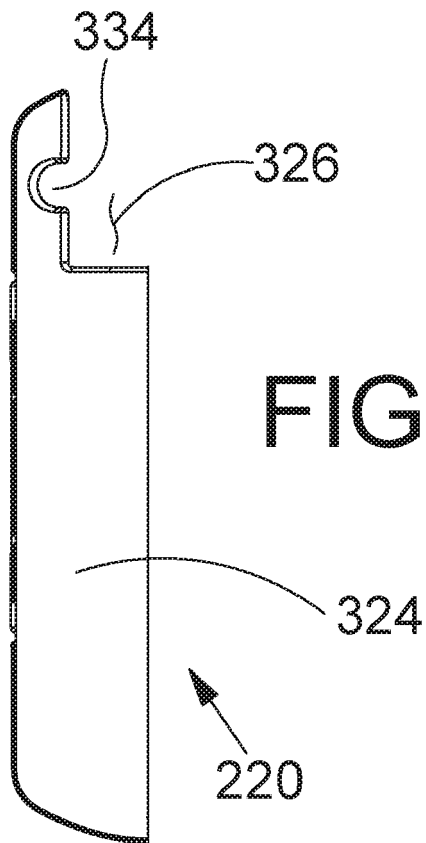
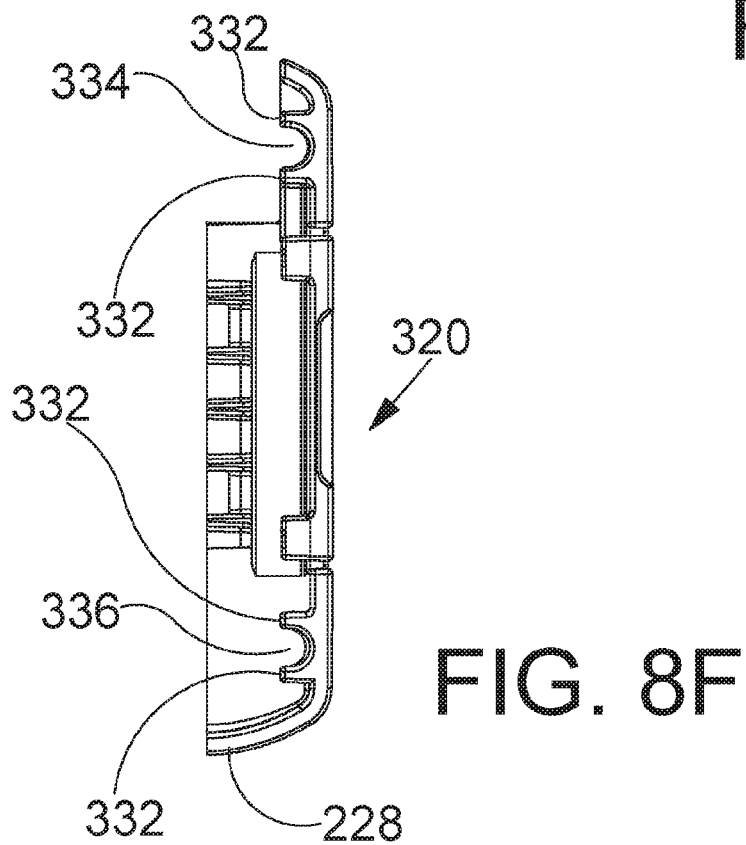
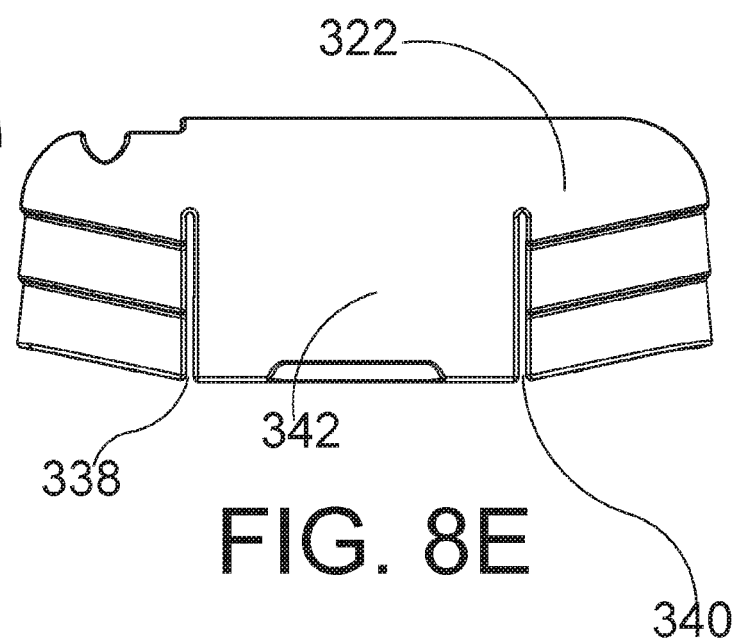
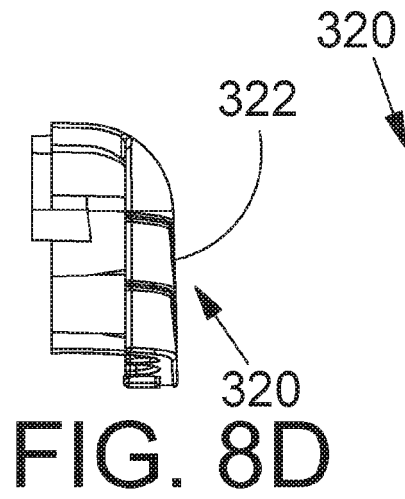
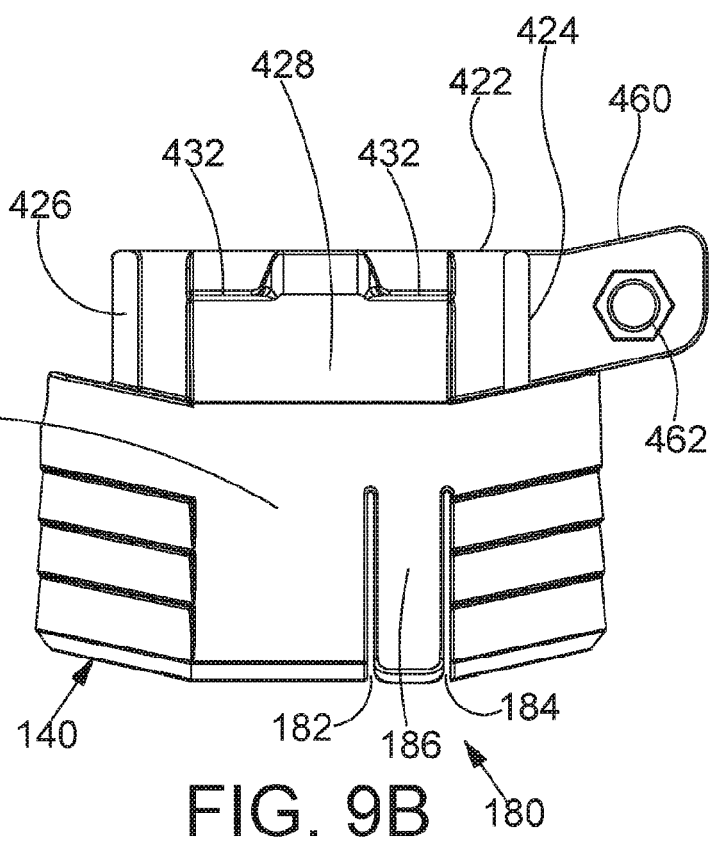
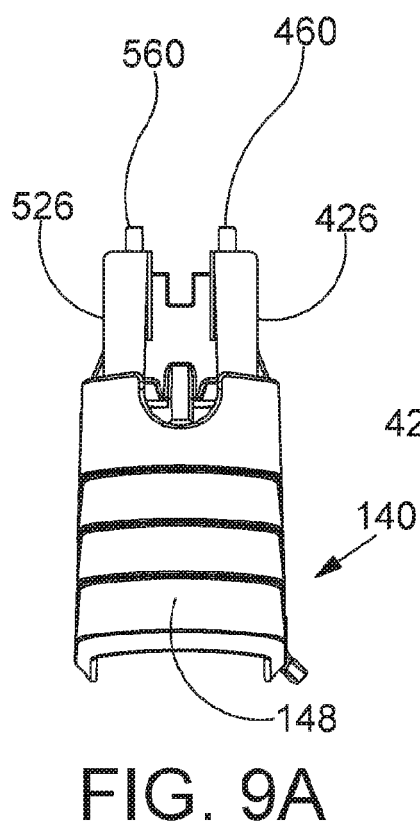
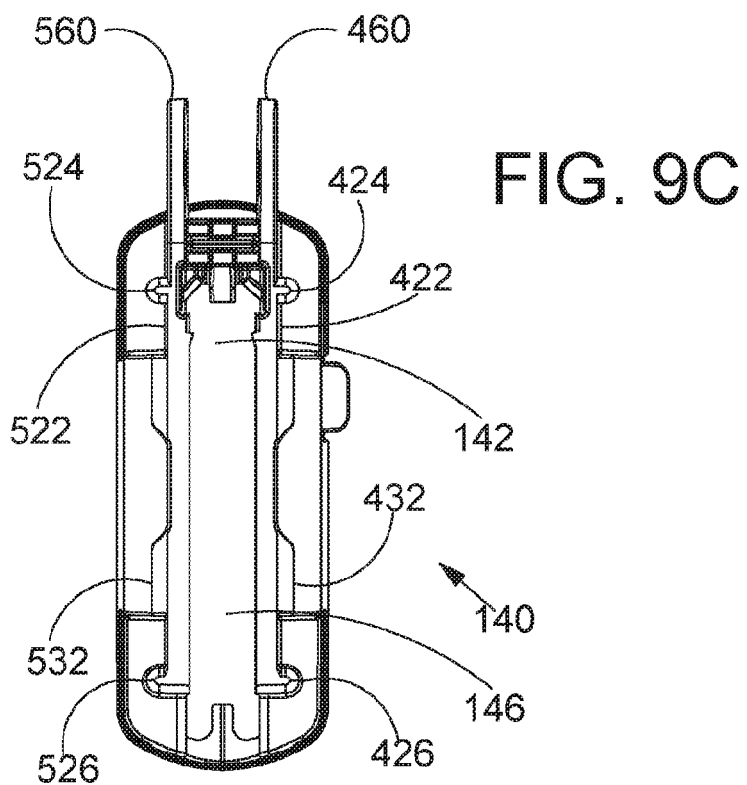


FIG. 7F







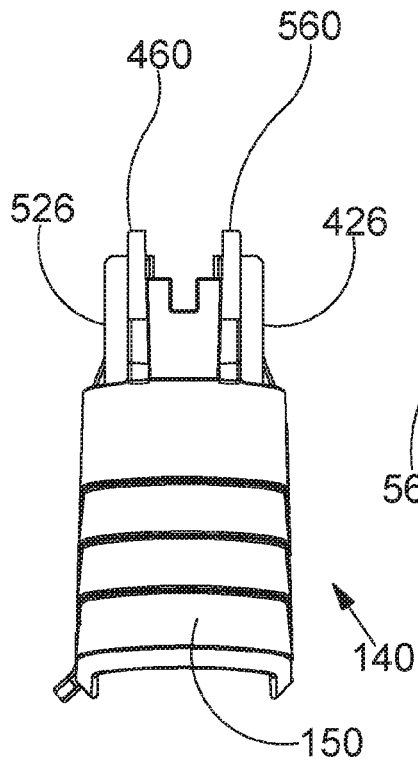


FIG. 9D

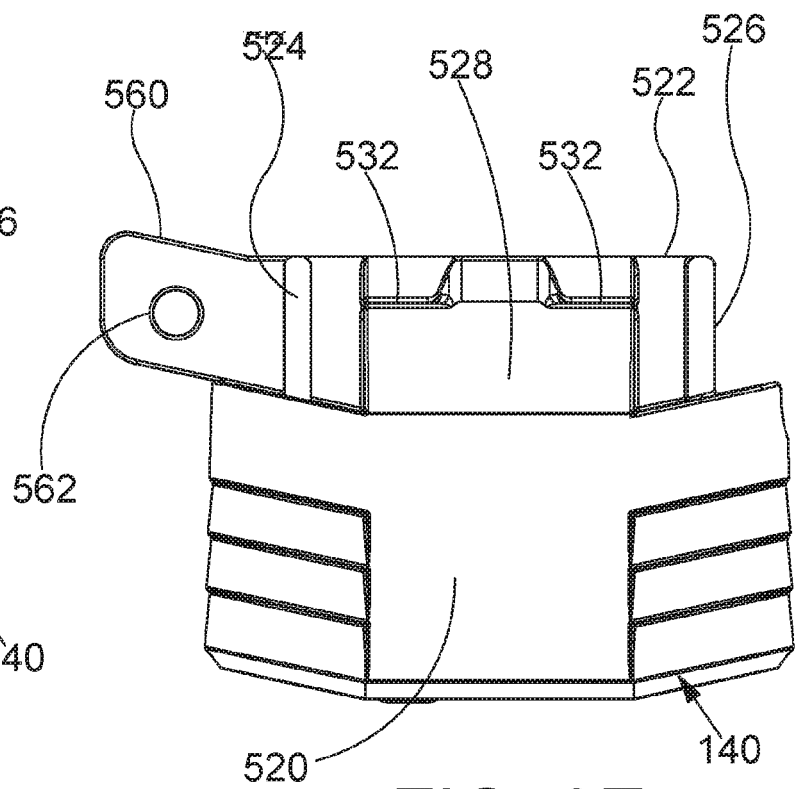


FIG. 9E

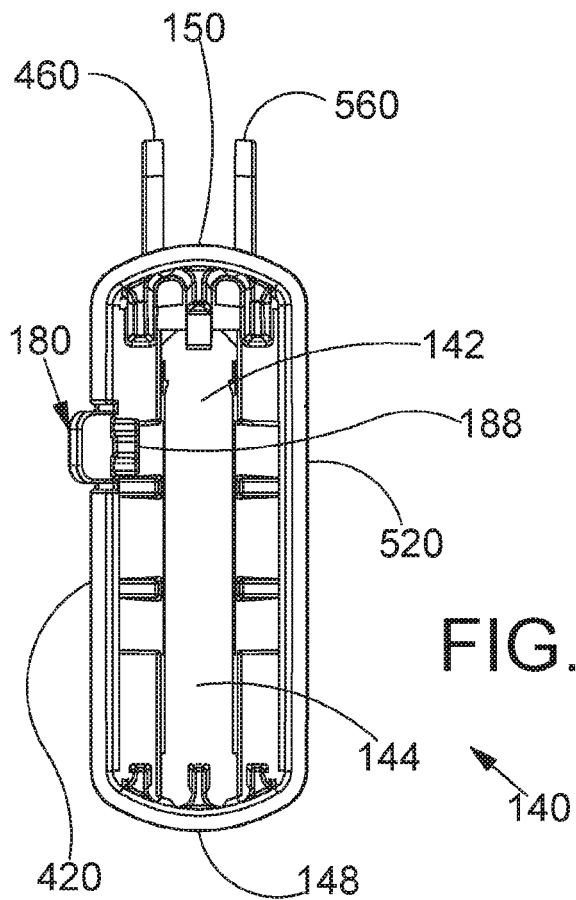


FIG. 9F



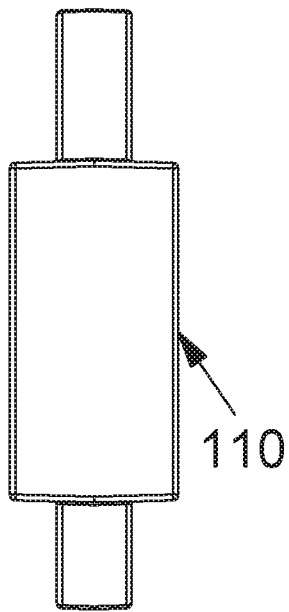


FIG. 10C

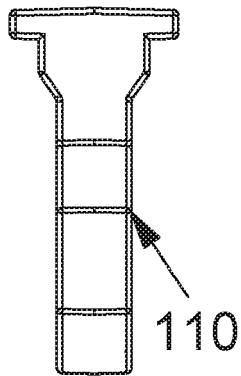


FIG. 10A

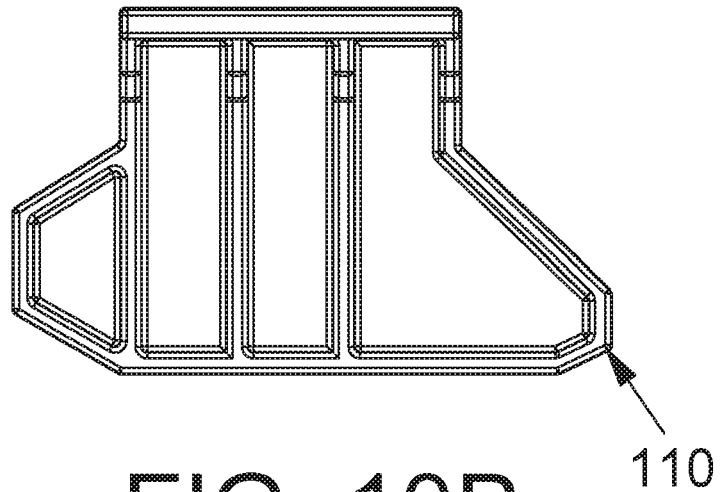


FIG. 10B

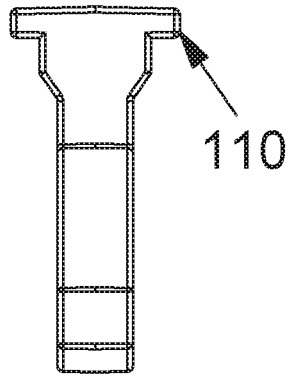


FIG. 10D

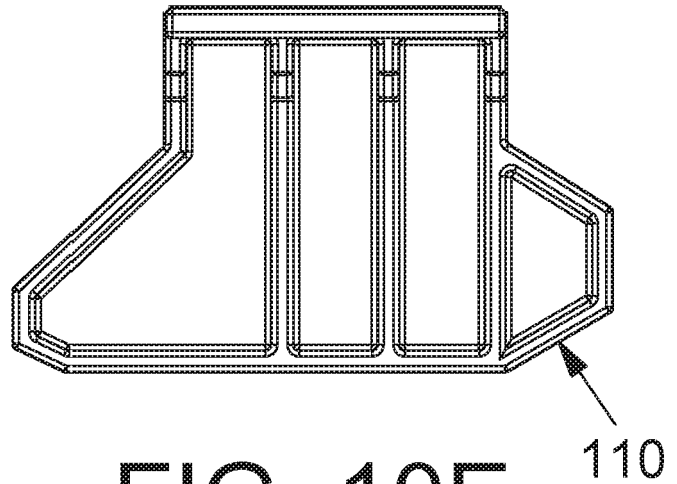


FIG. 10E

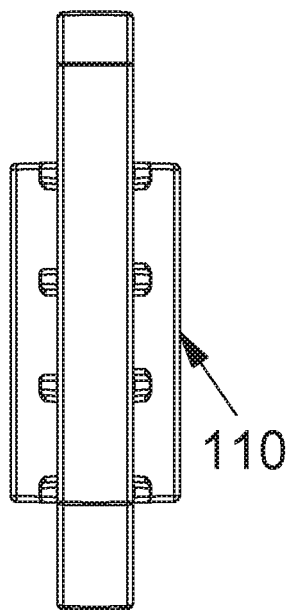


FIG. 10D

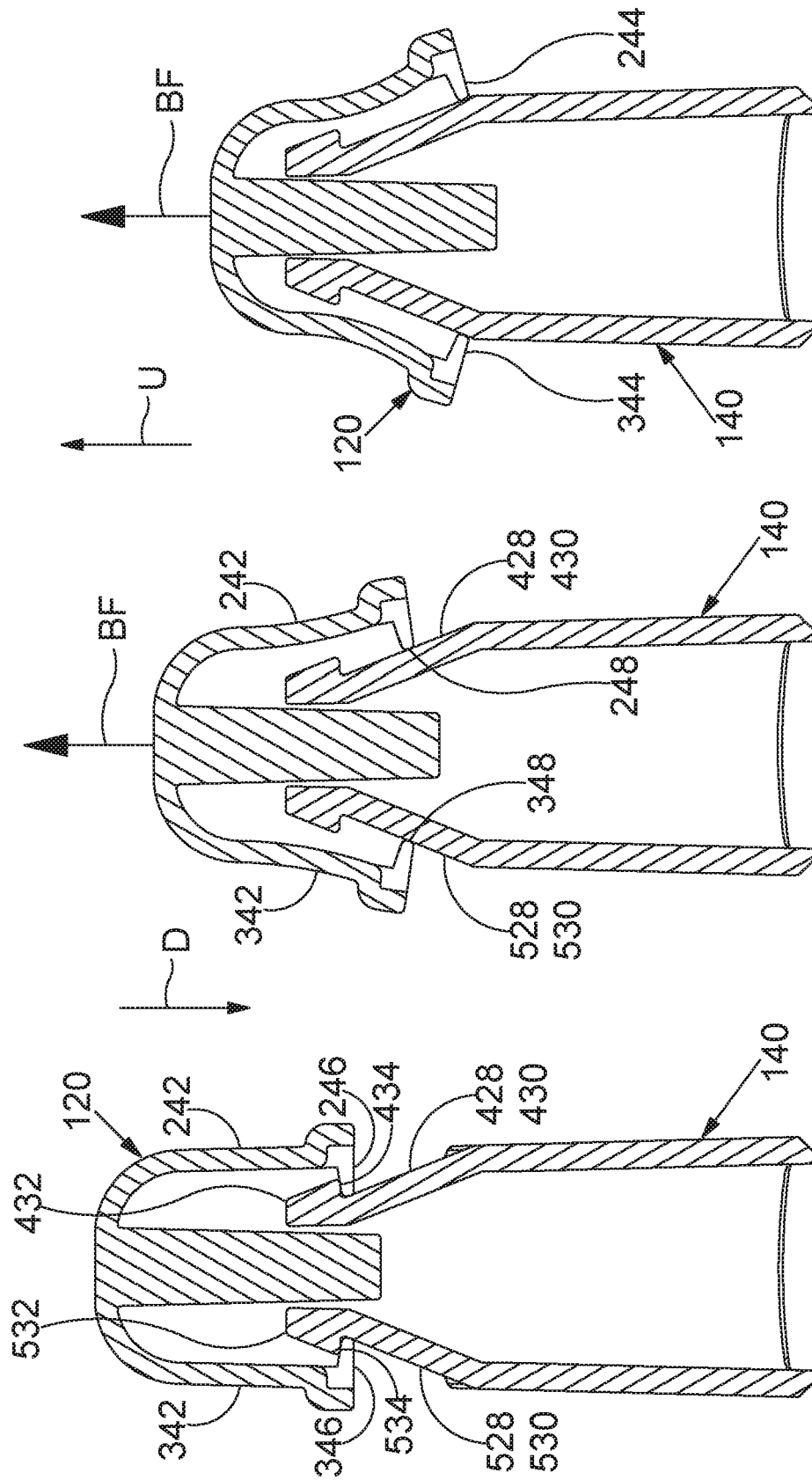


FIG. 11C

FIG. 11B

FIG. 11A

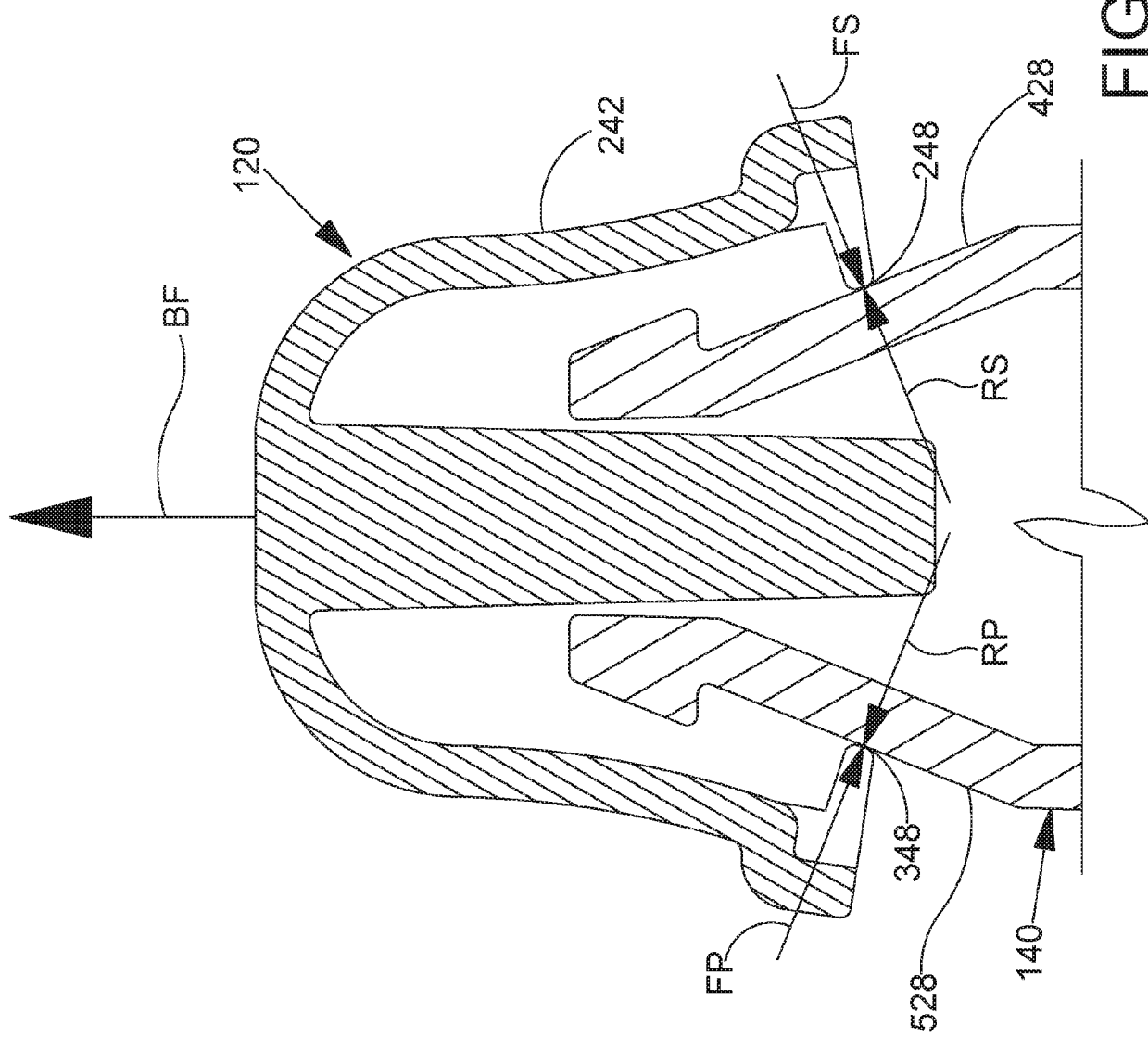


FIG. 12A

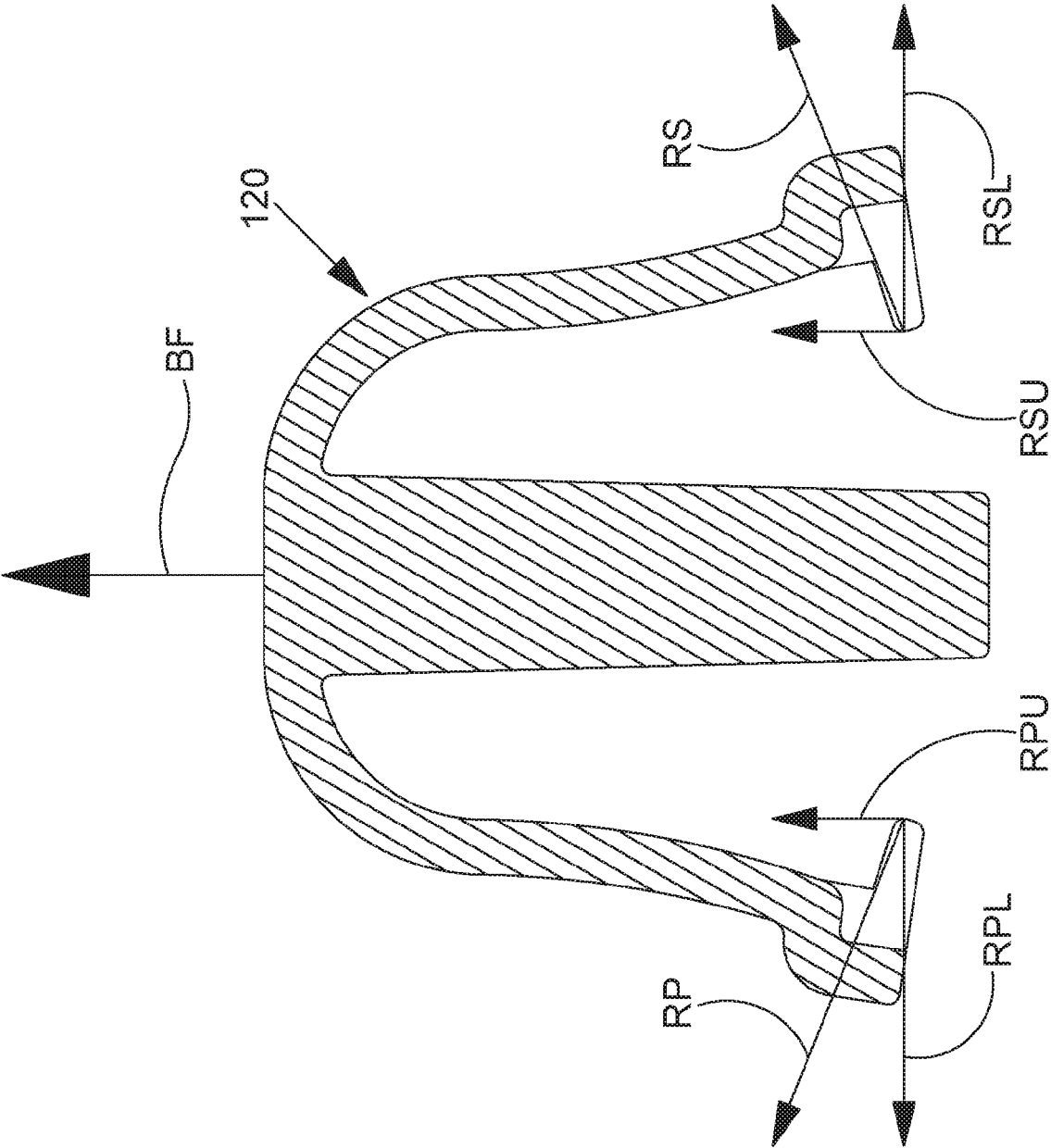


FIG. 12B

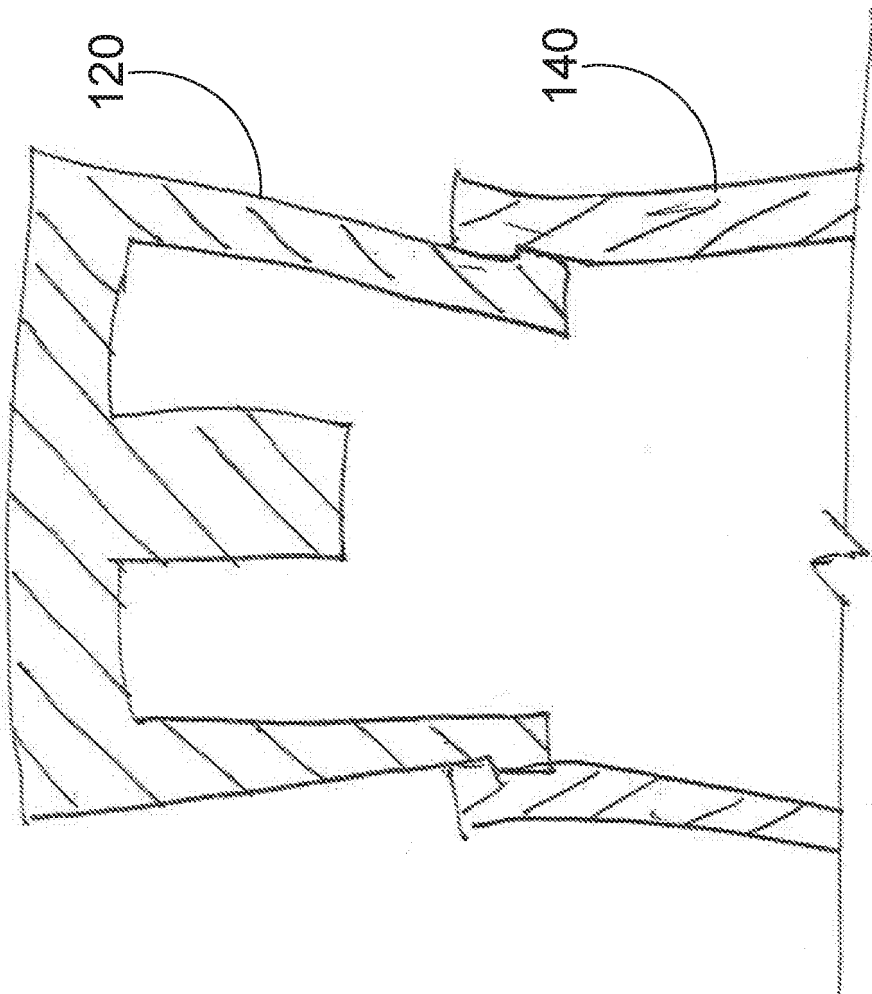
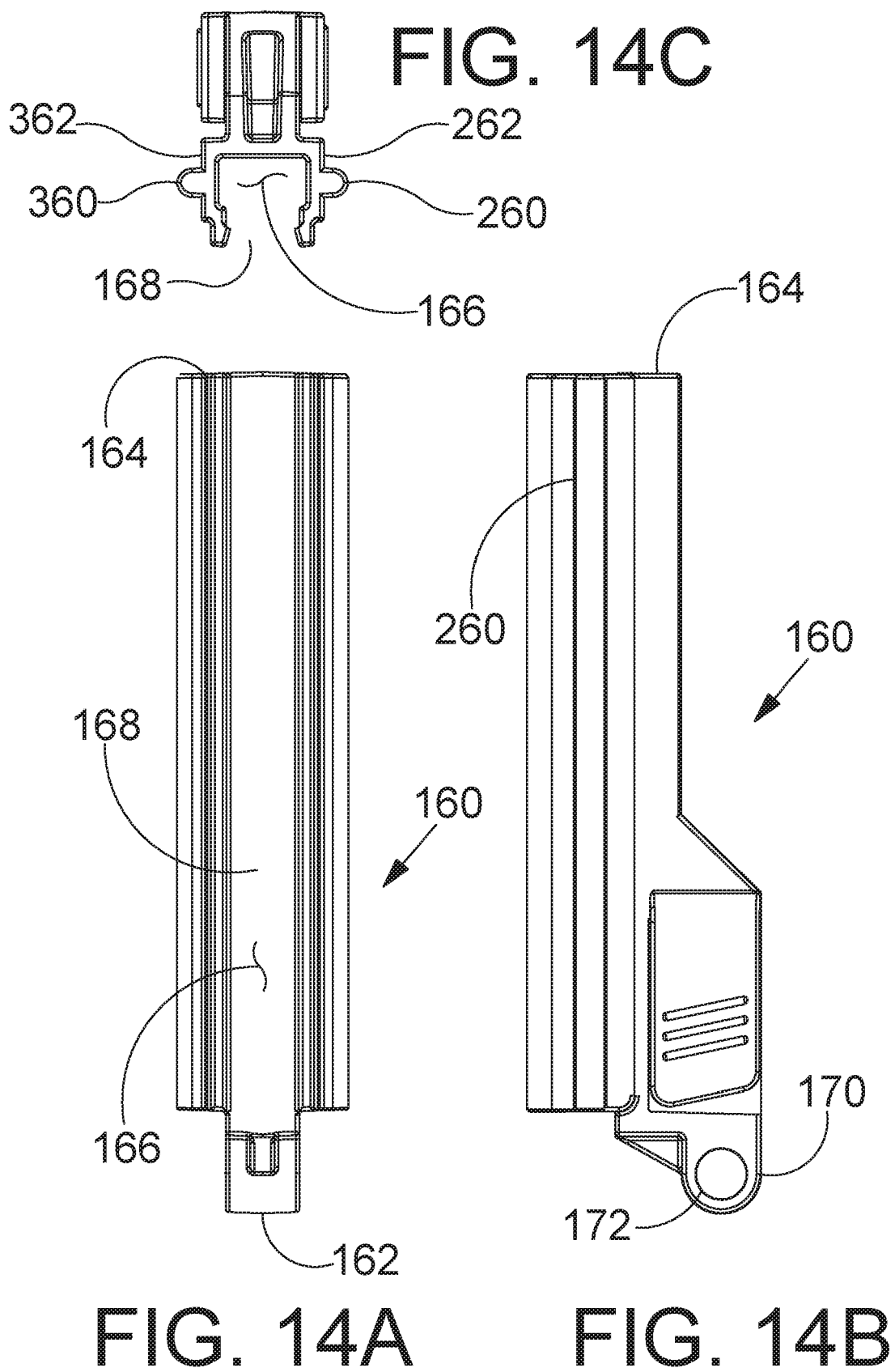


FIG. 13



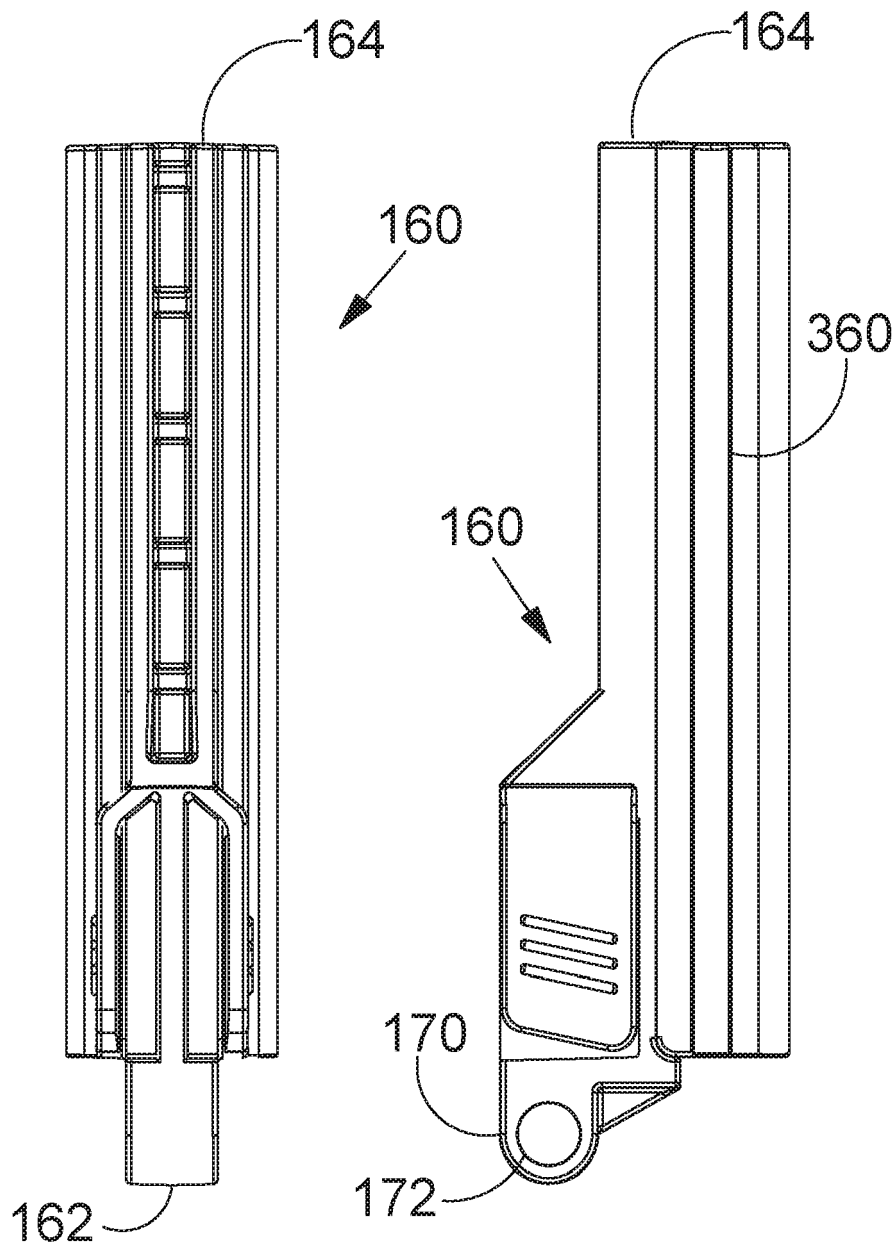


FIG. 14D

FIG. 14E

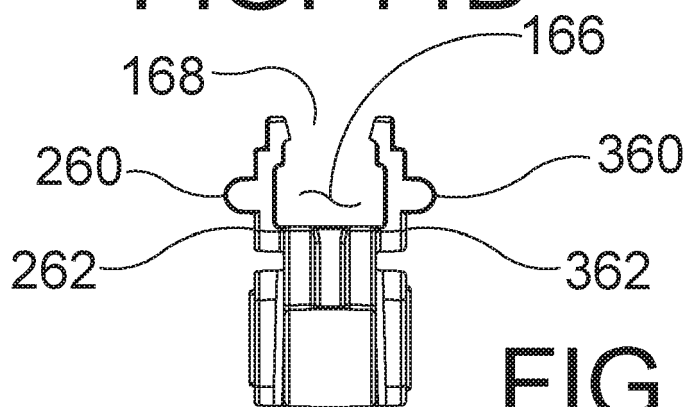


FIG. 14F



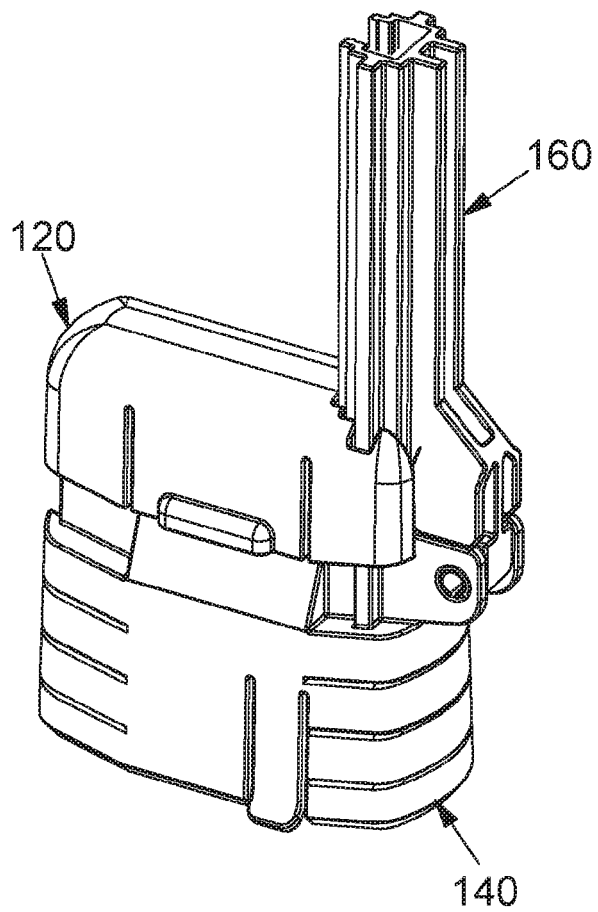


FIG. 15A

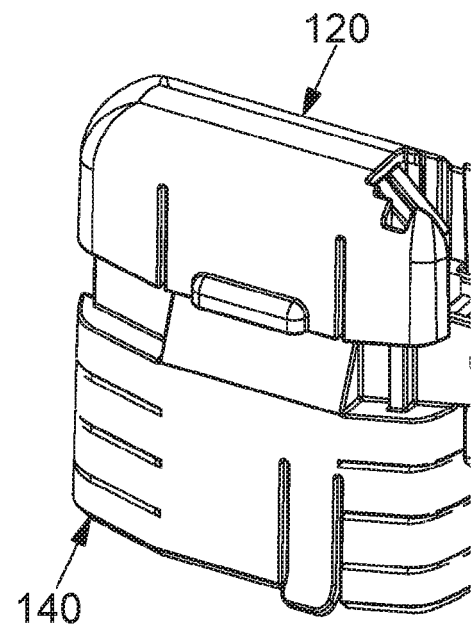


FIG. 15B

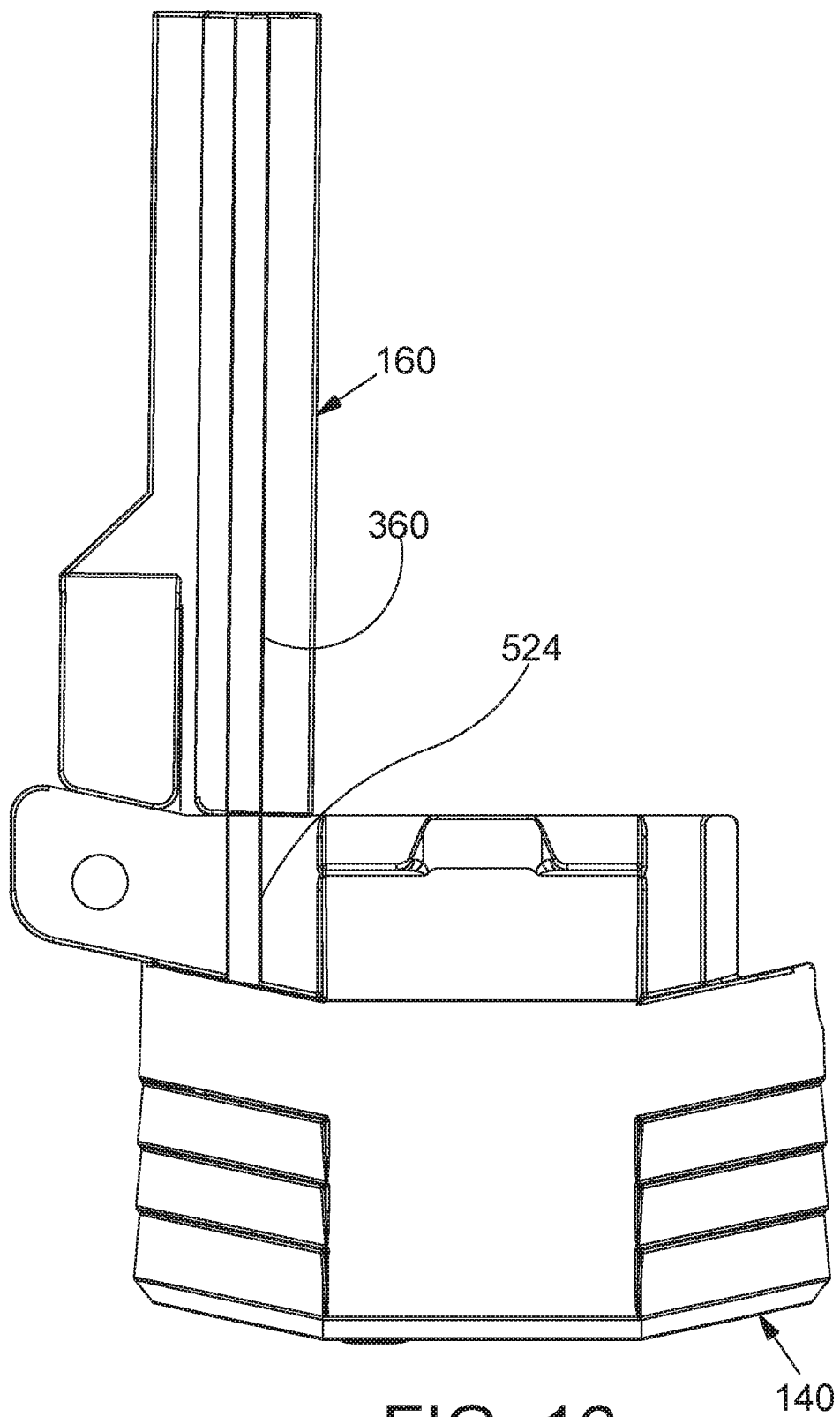
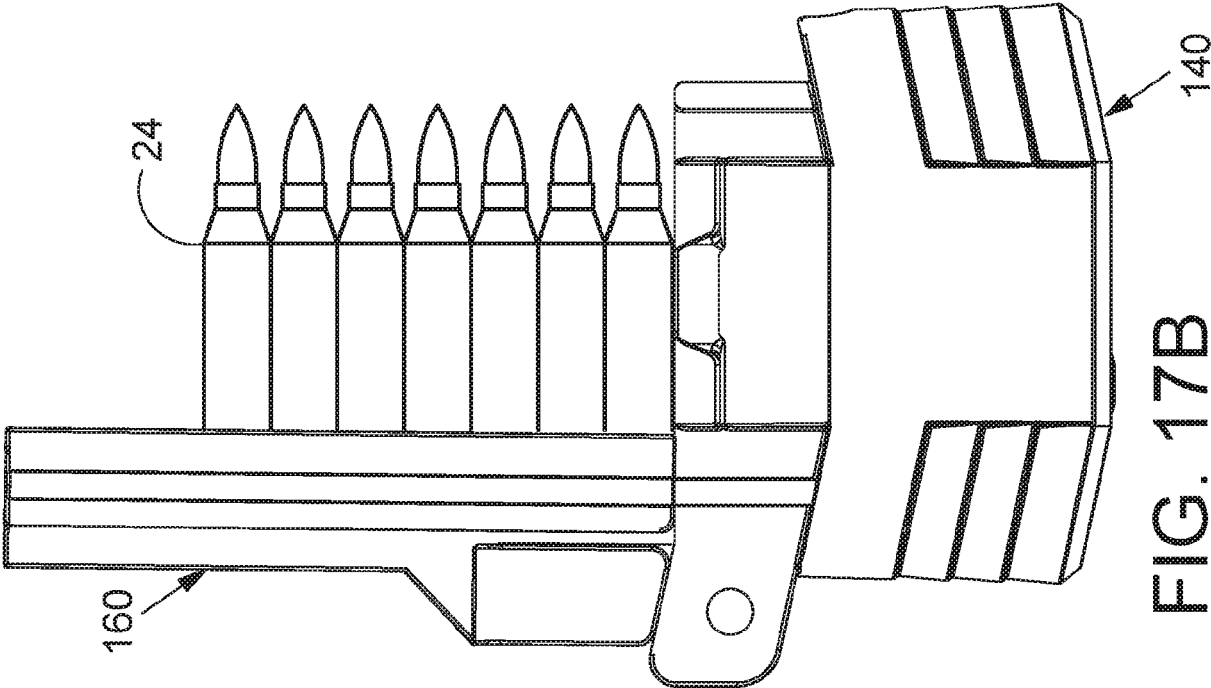
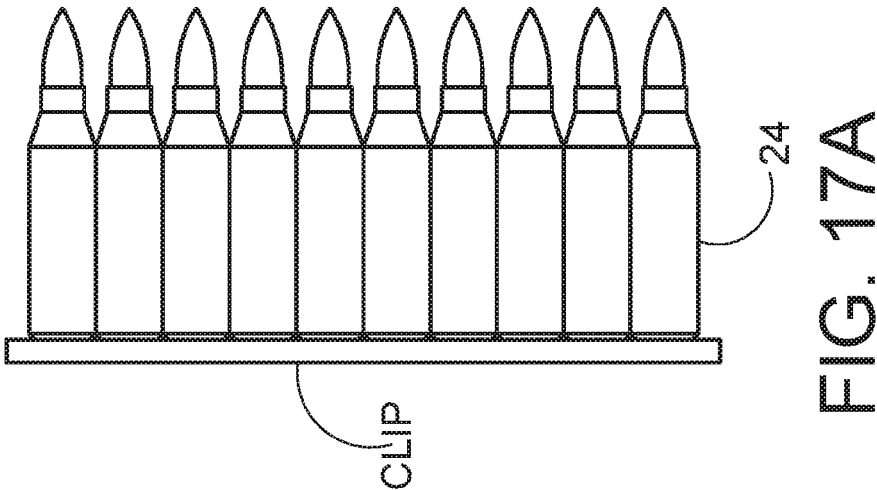


FIG. 16



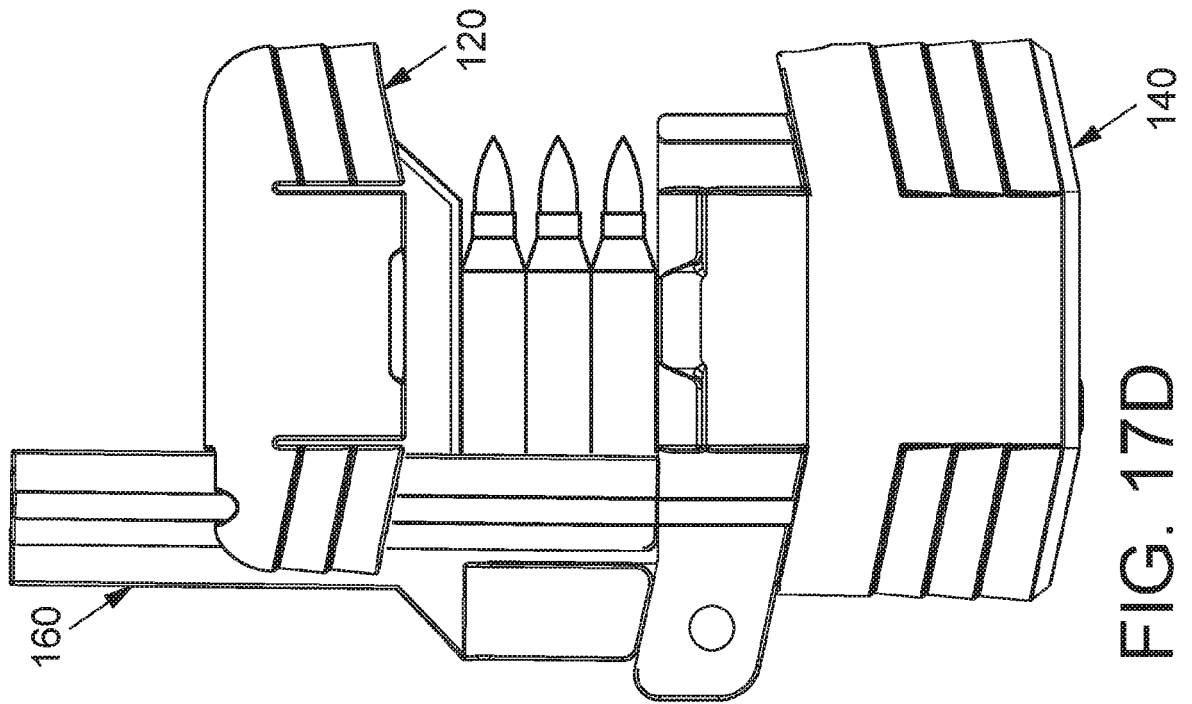


FIG. 17D

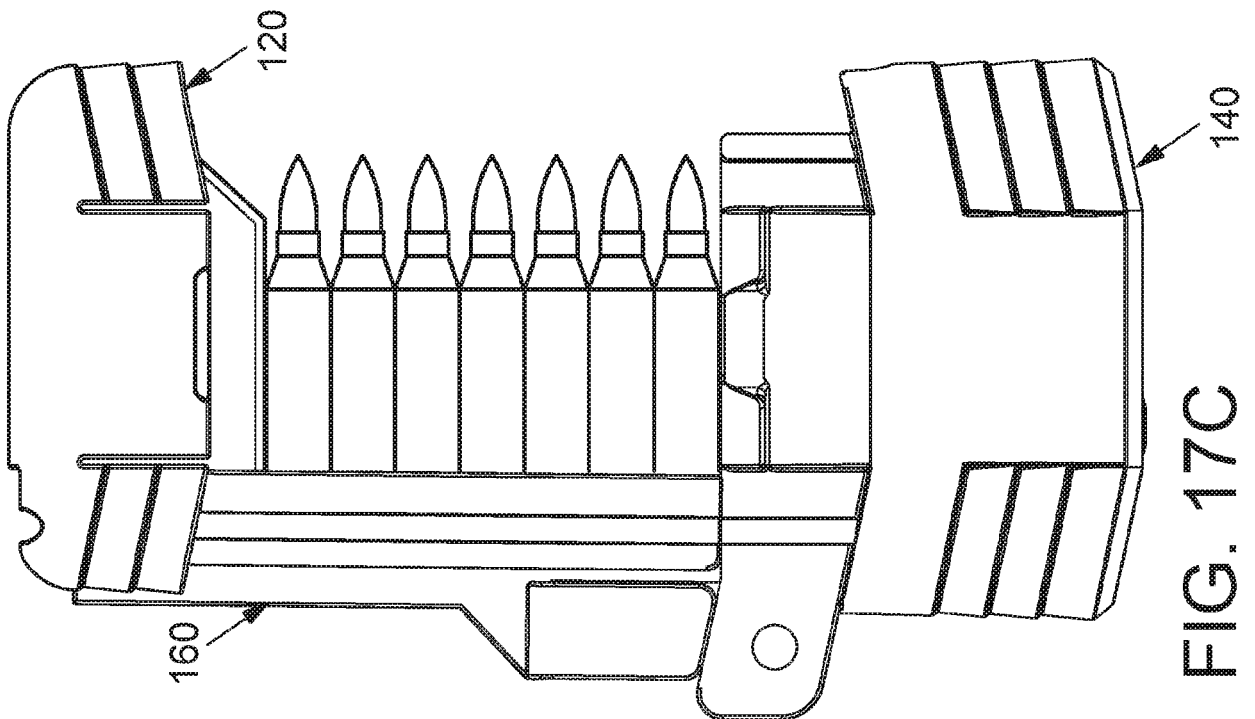
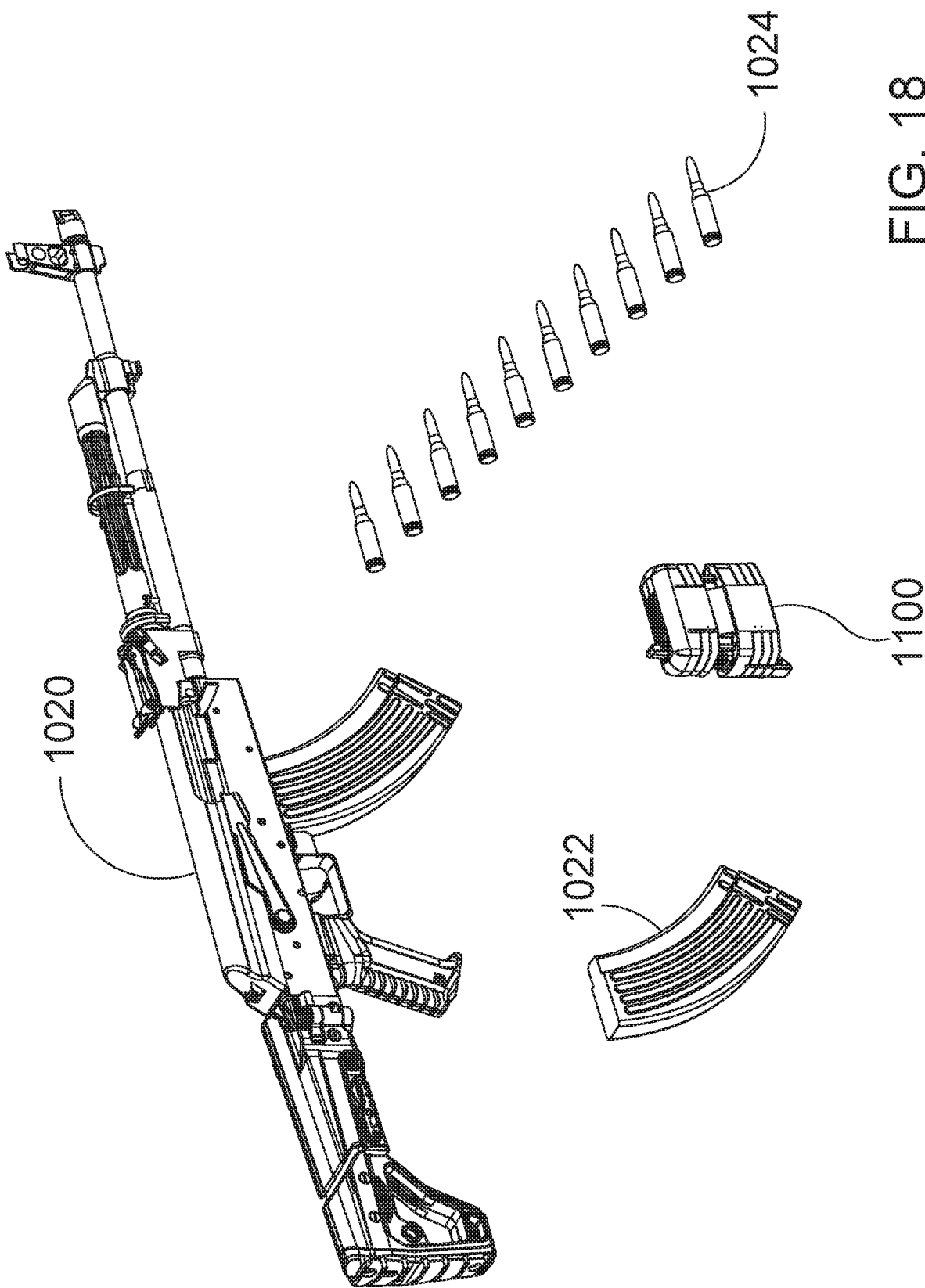


FIG. 17C



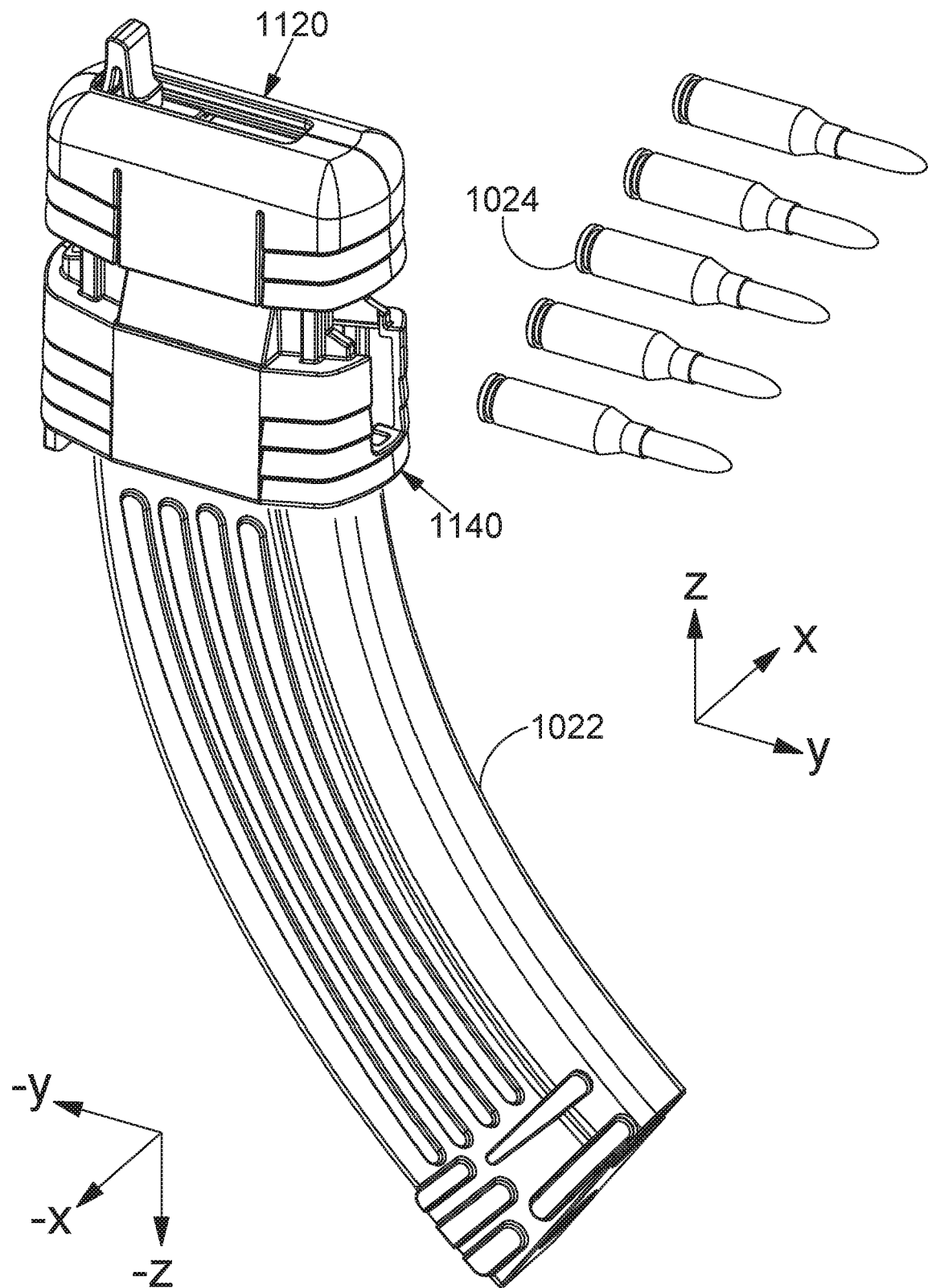
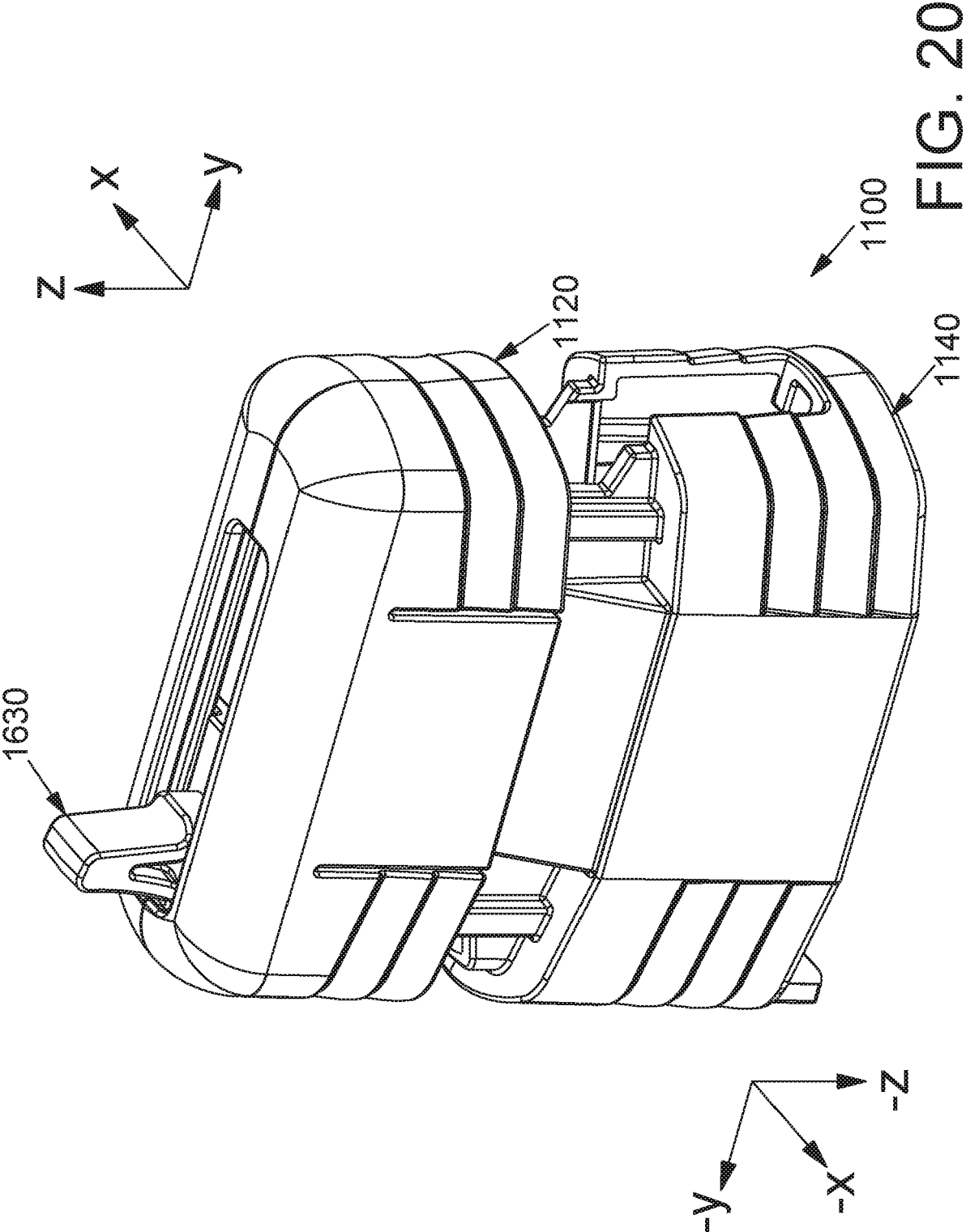


FIG. 19



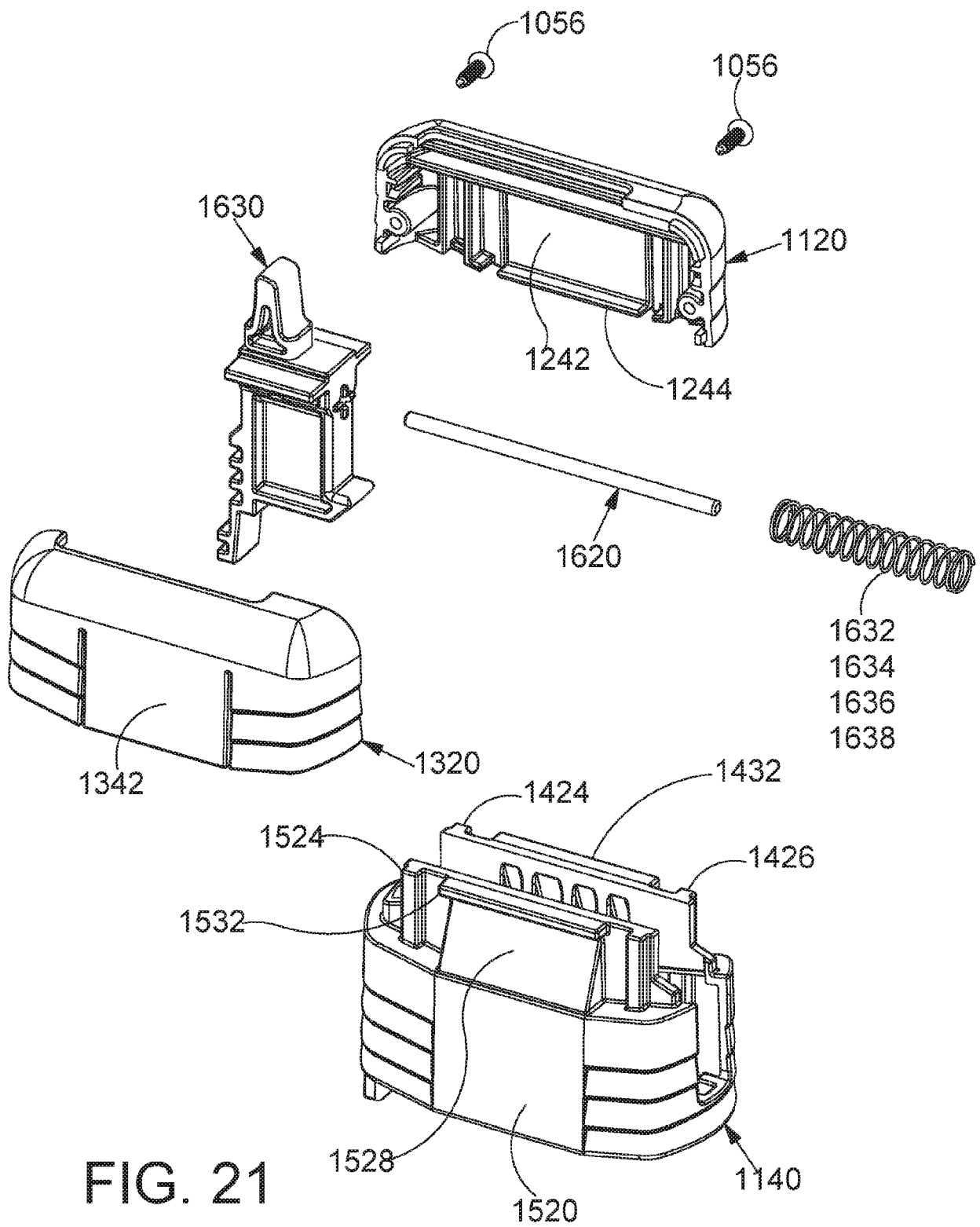


FIG. 21



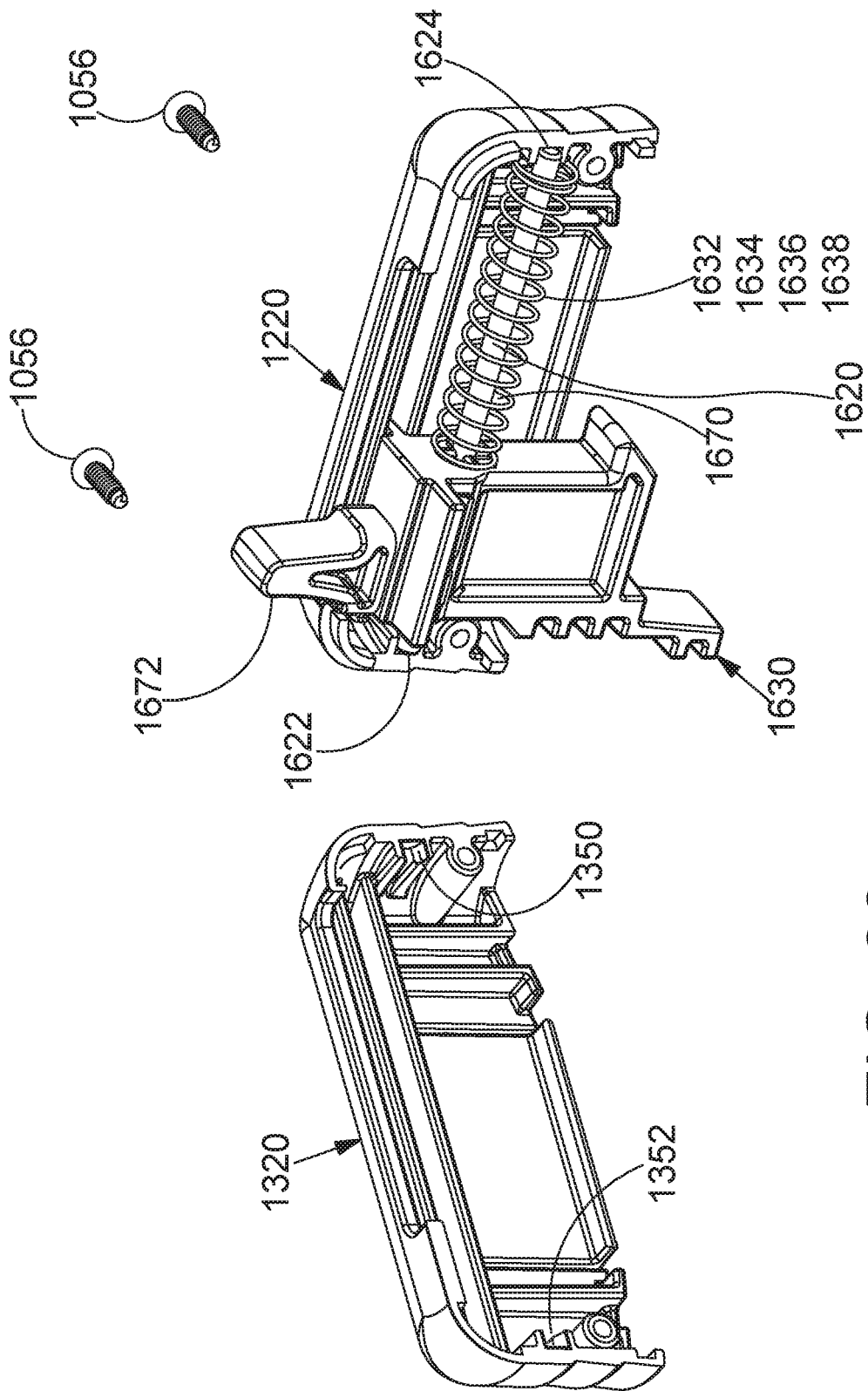


FIG. 22

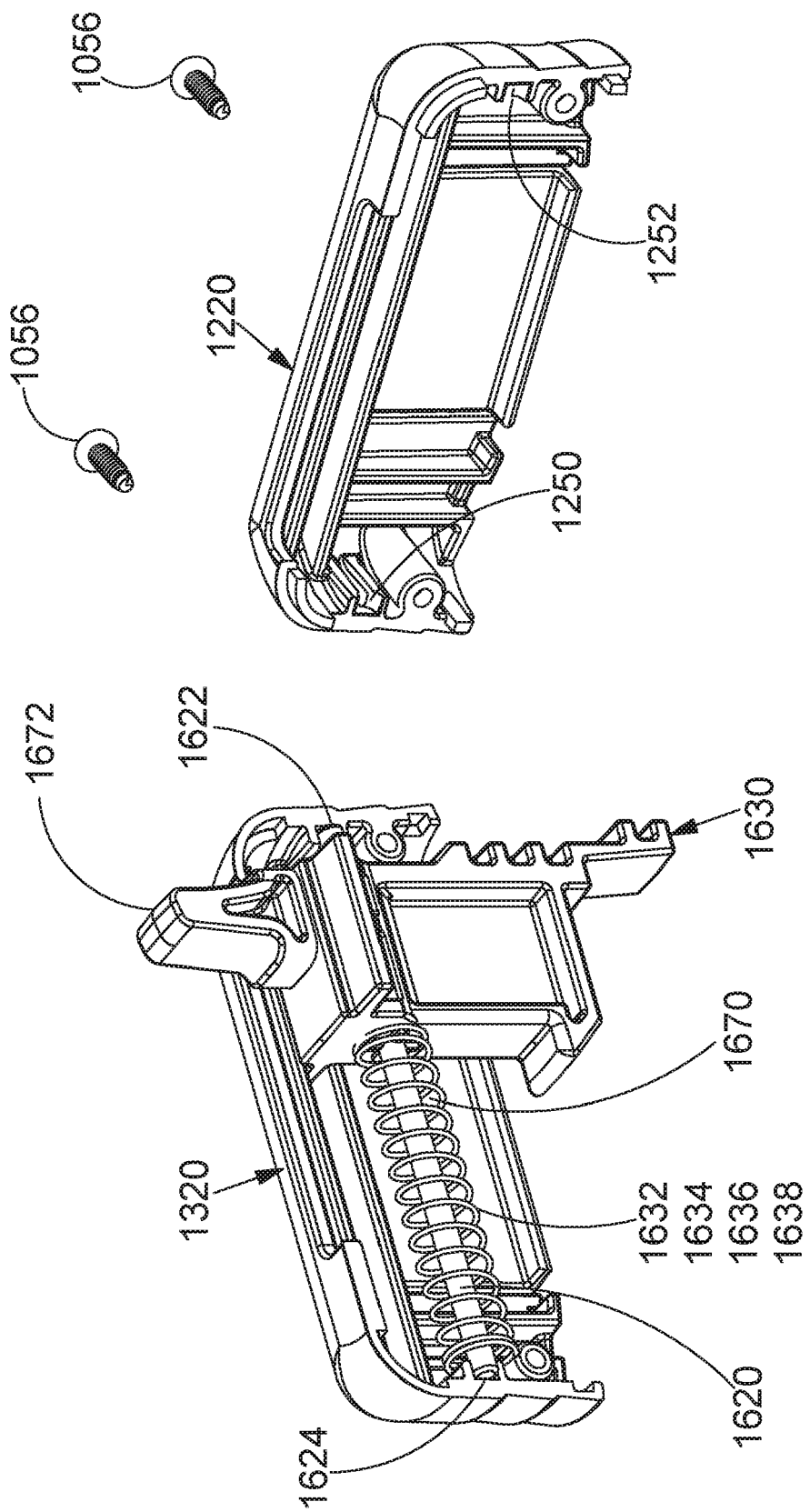
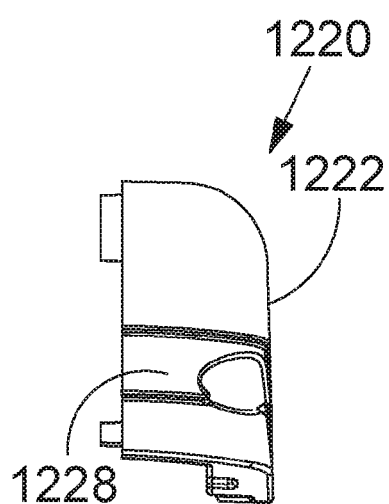
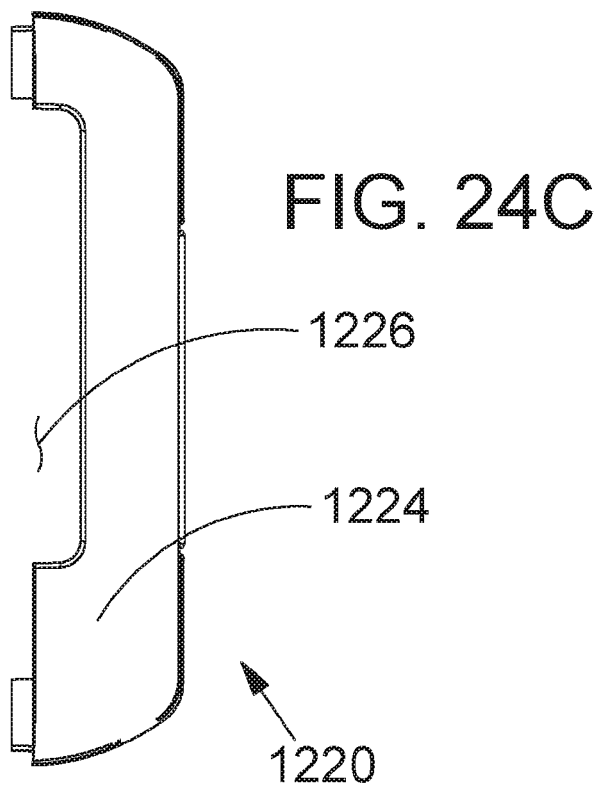
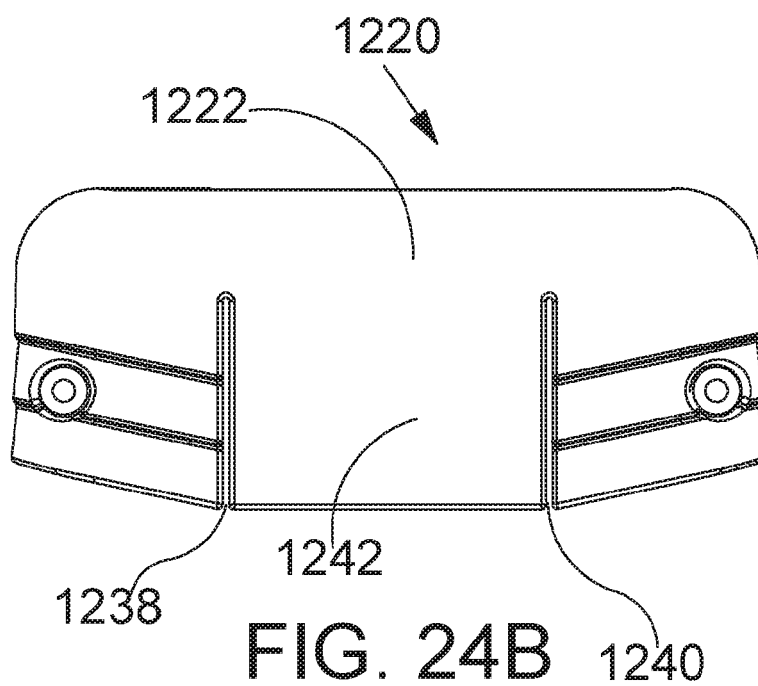


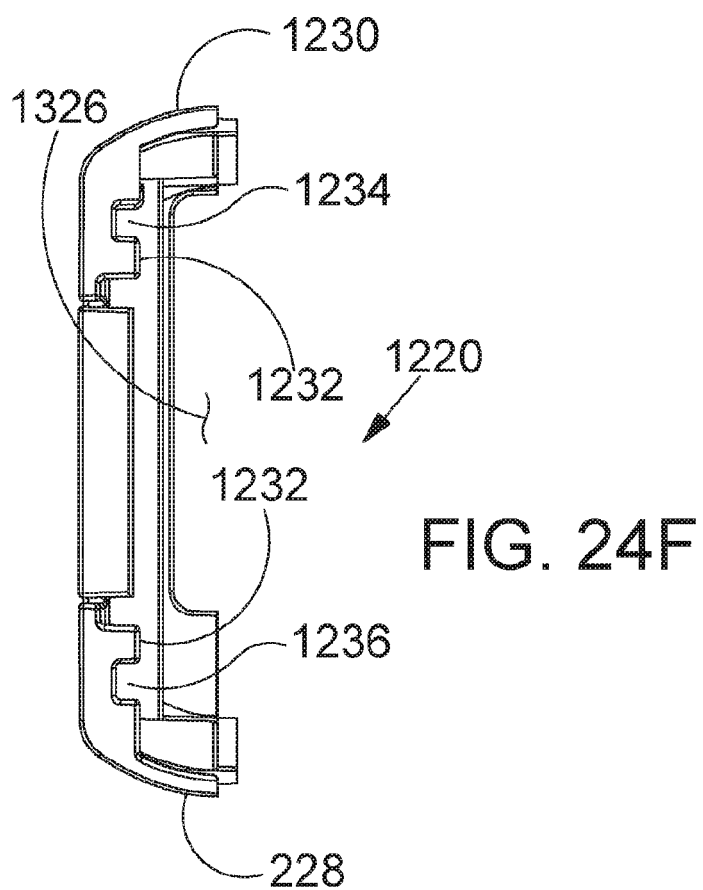
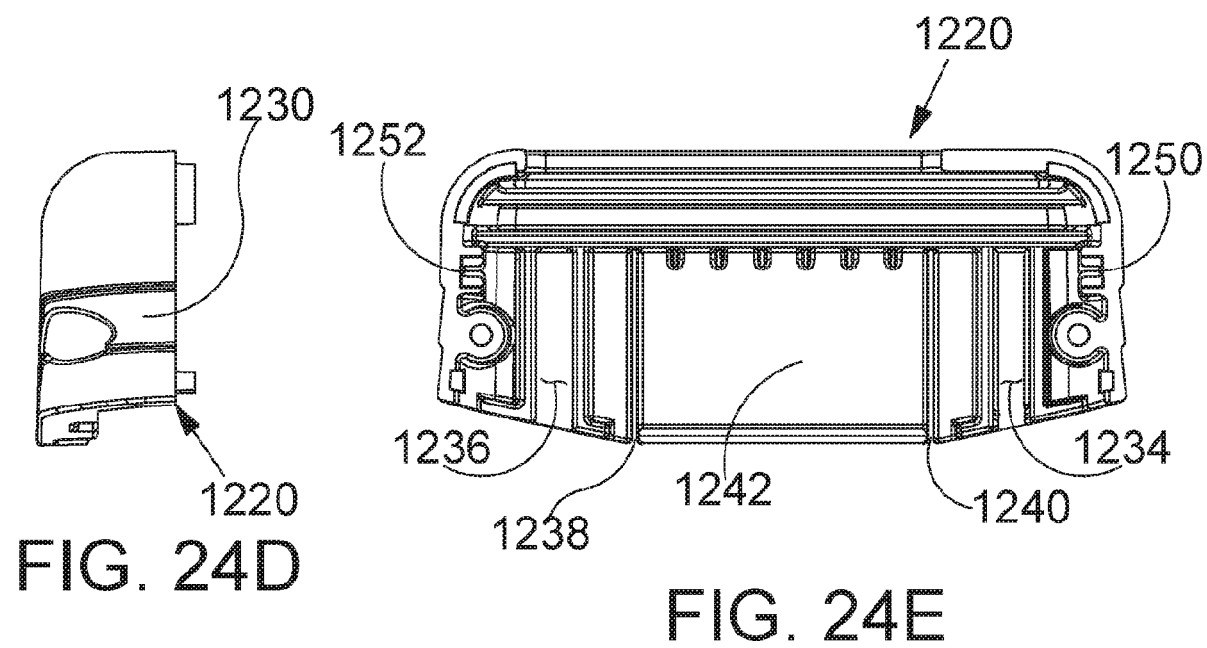
FIG. 23

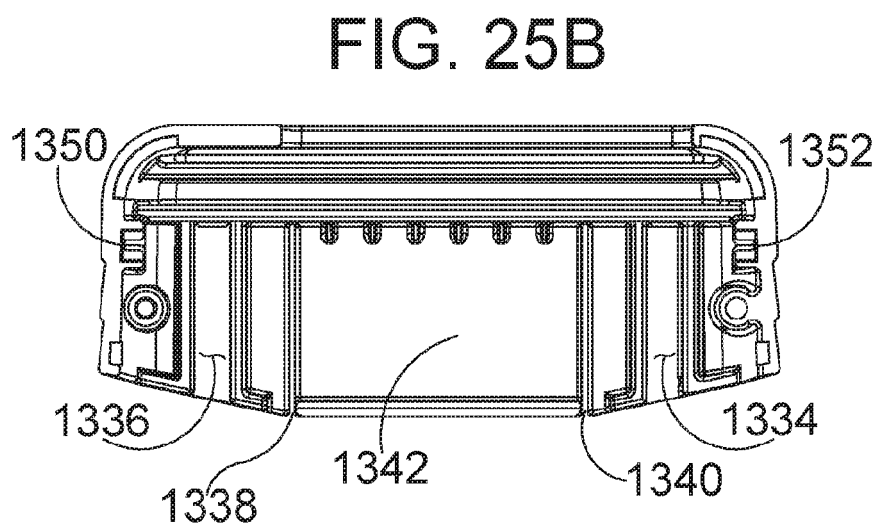
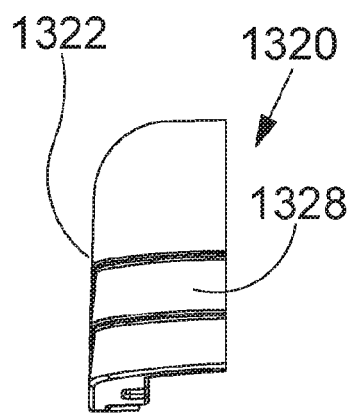
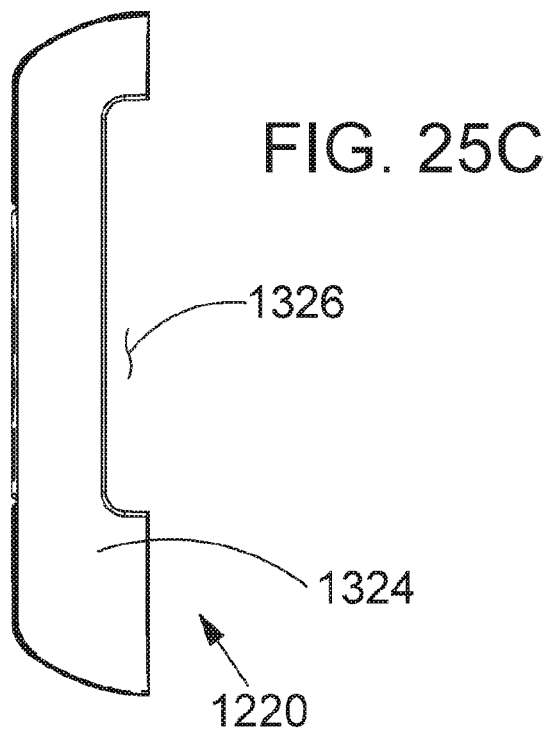


**FIG. 24A**



**FIG. 24B**





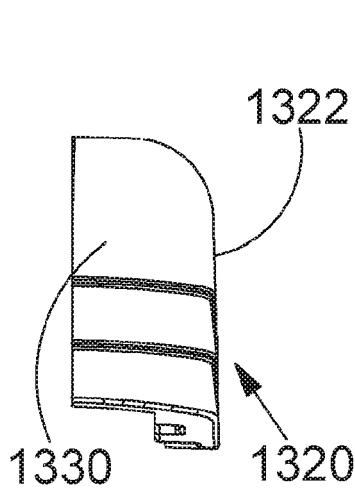


FIG. 25D

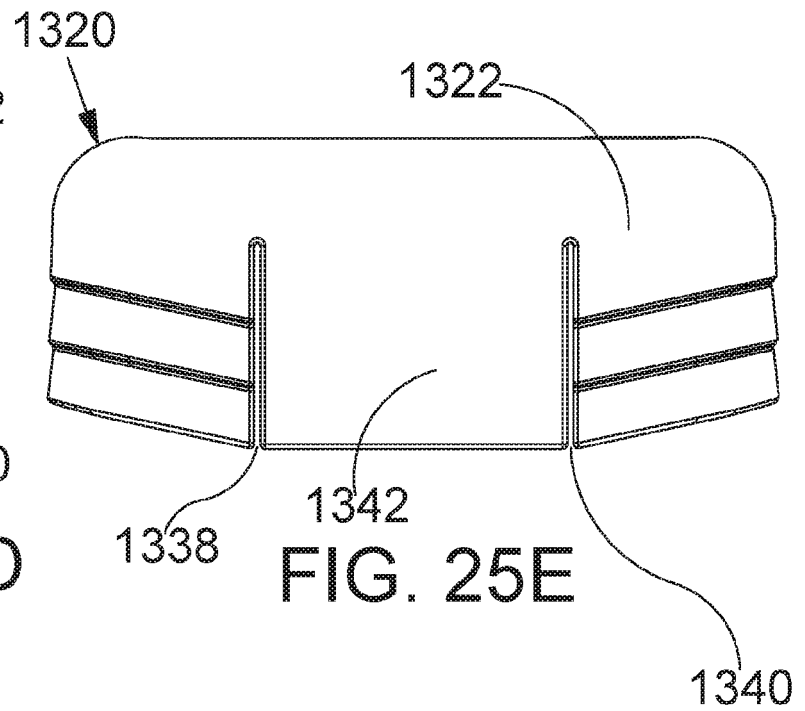


FIG. 25E

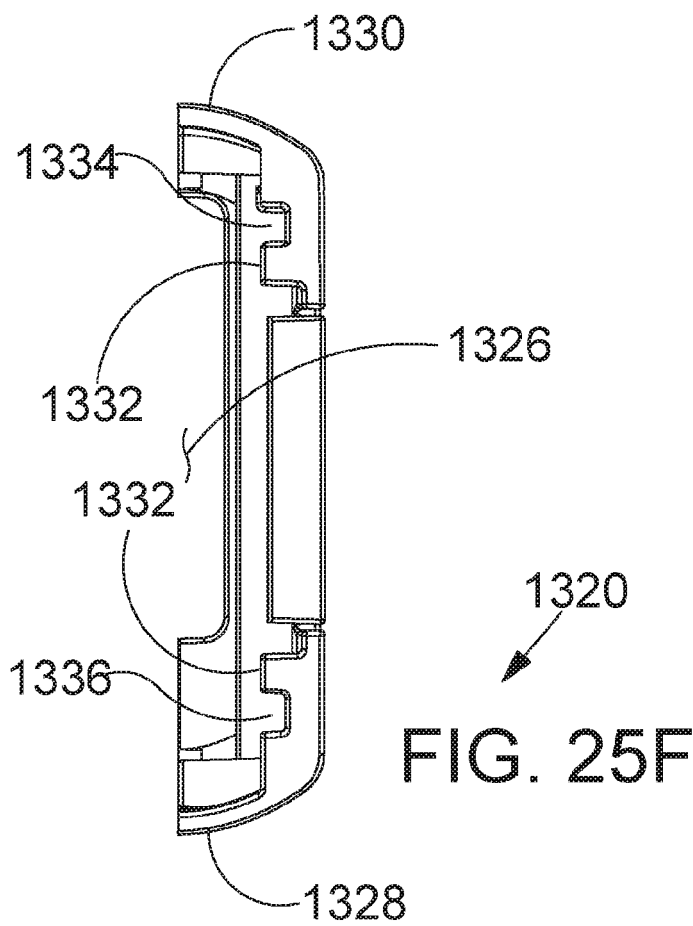
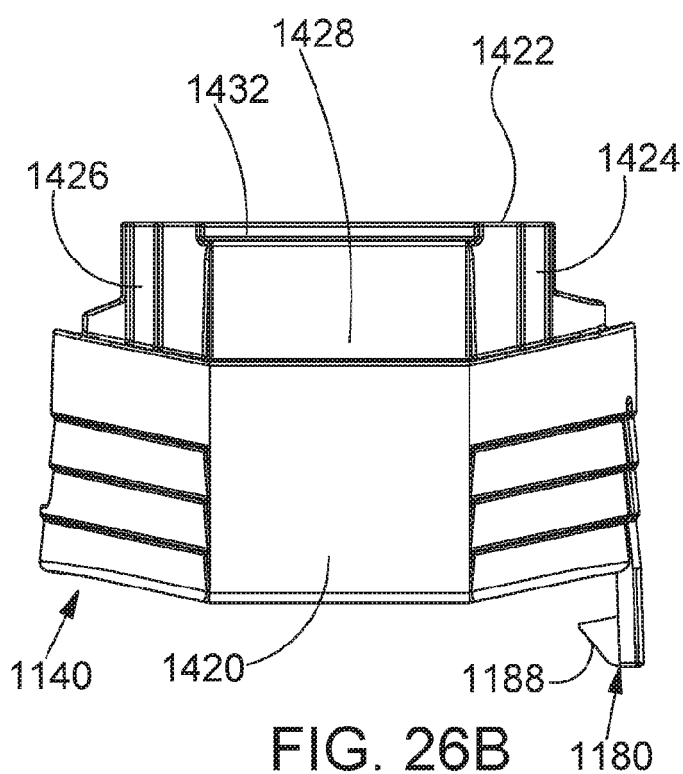
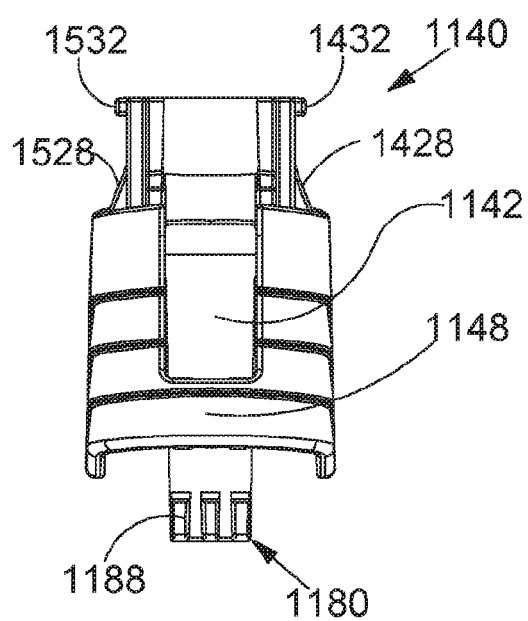
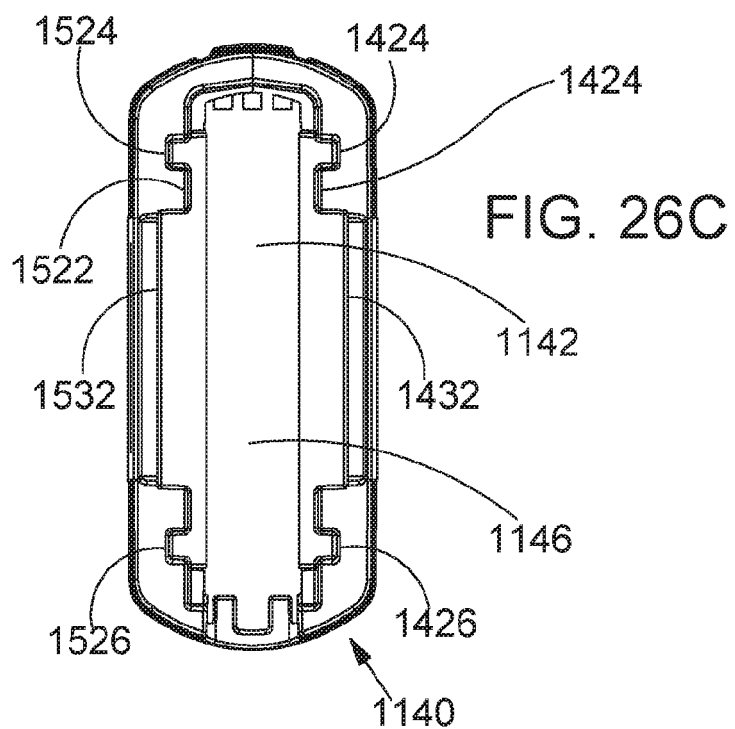
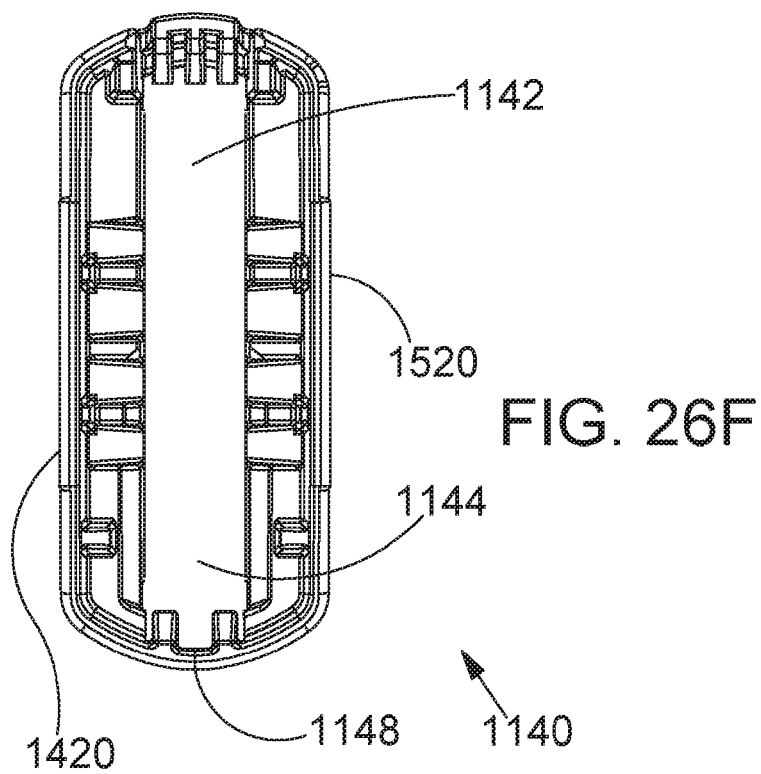
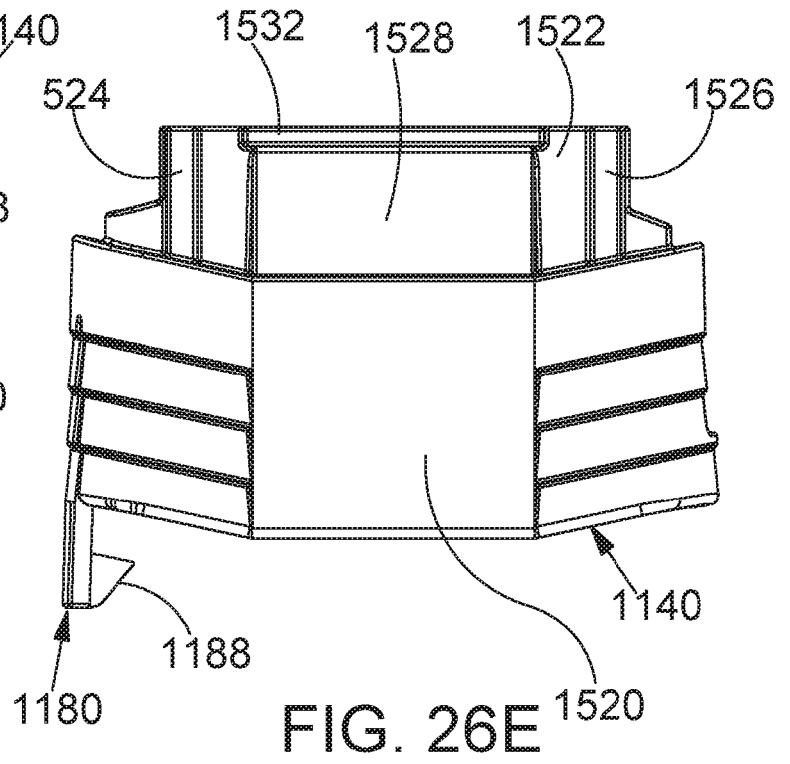
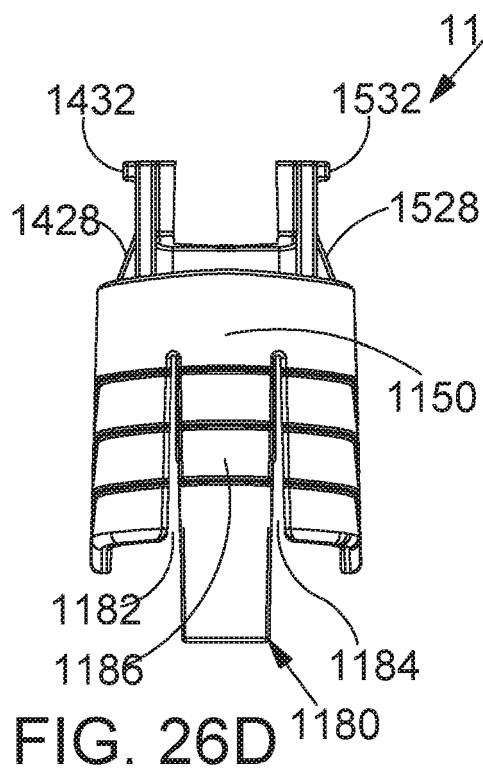


FIG. 25F







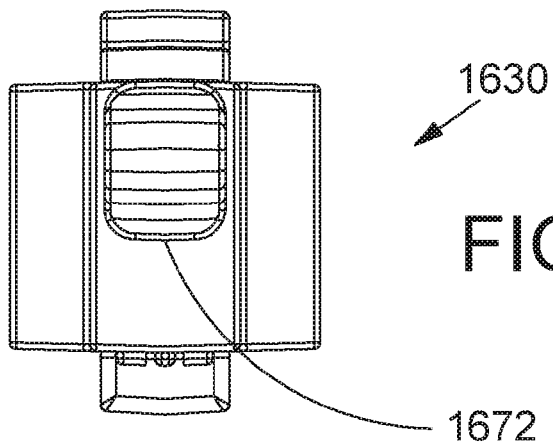


FIG. 27C

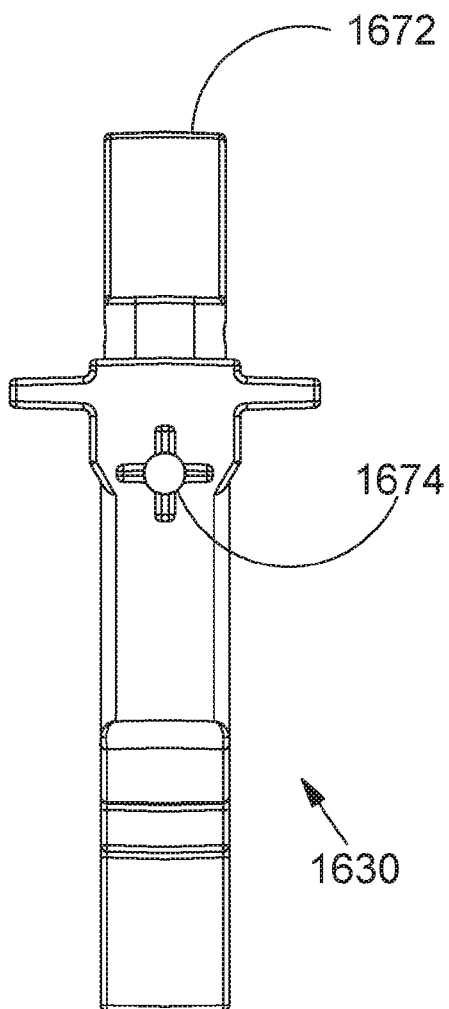


FIG. 27A

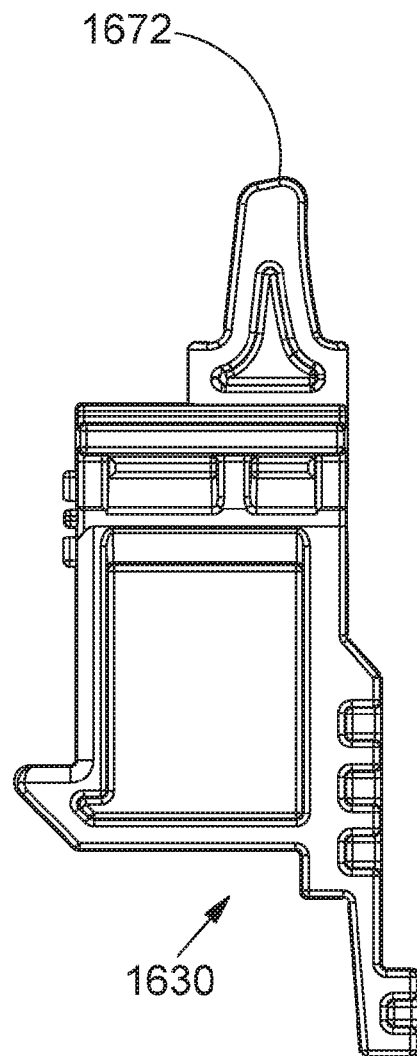


FIG. 27B

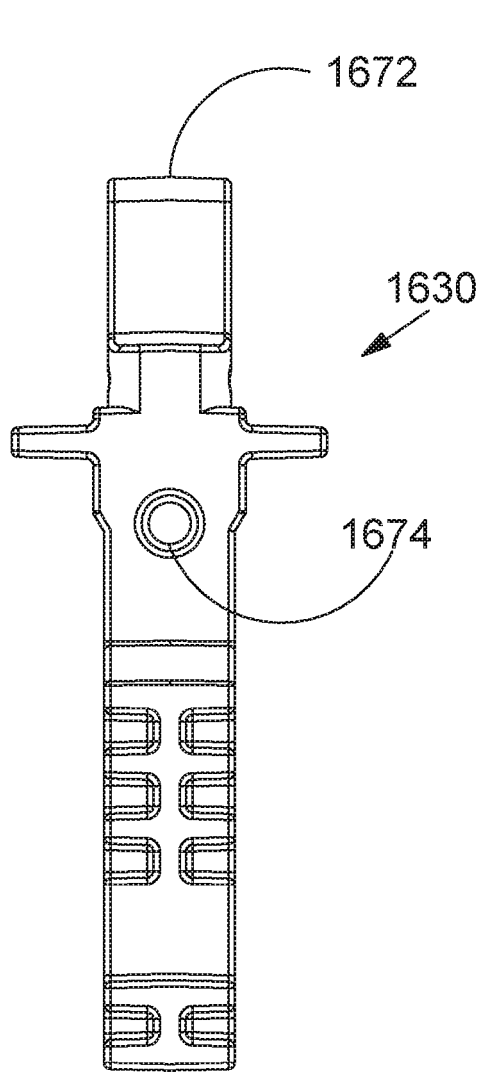


FIG. 27D

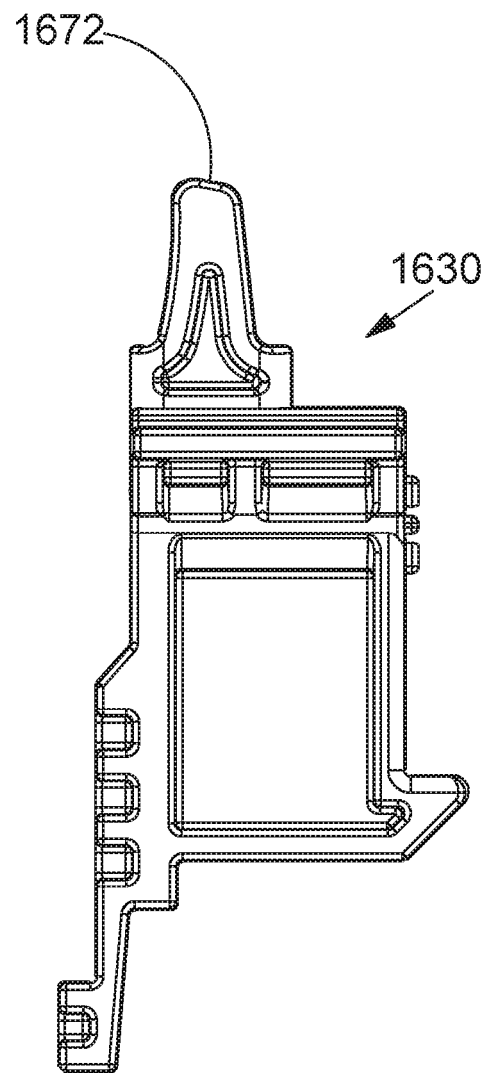


FIG. 27E

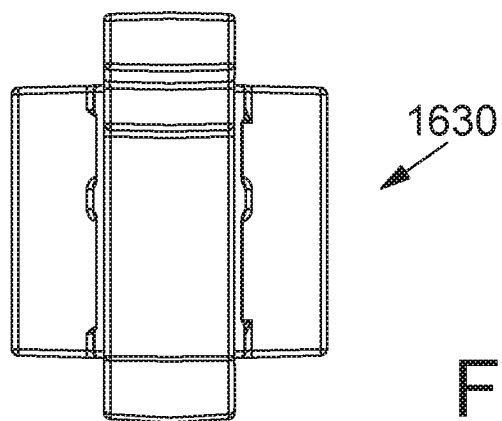
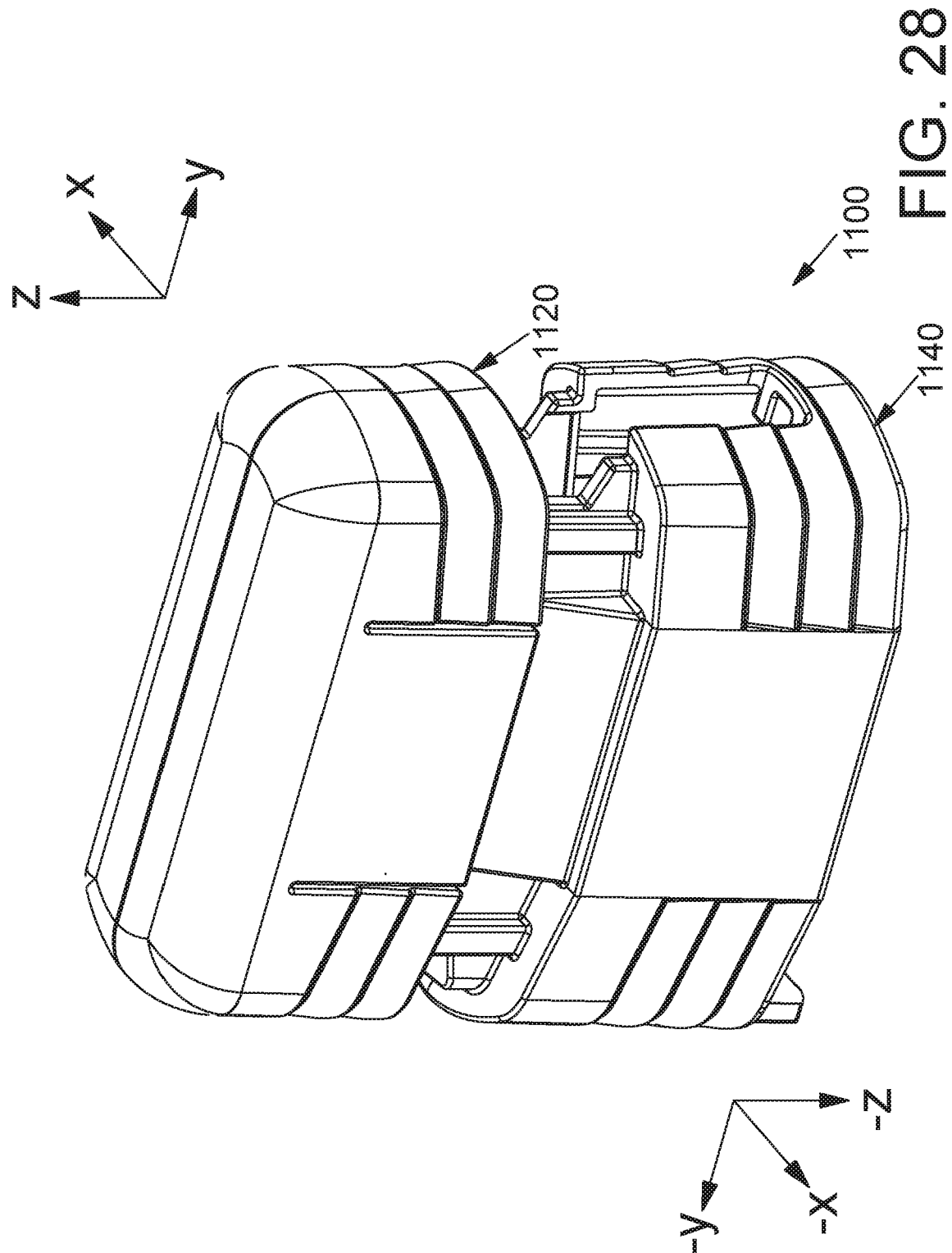
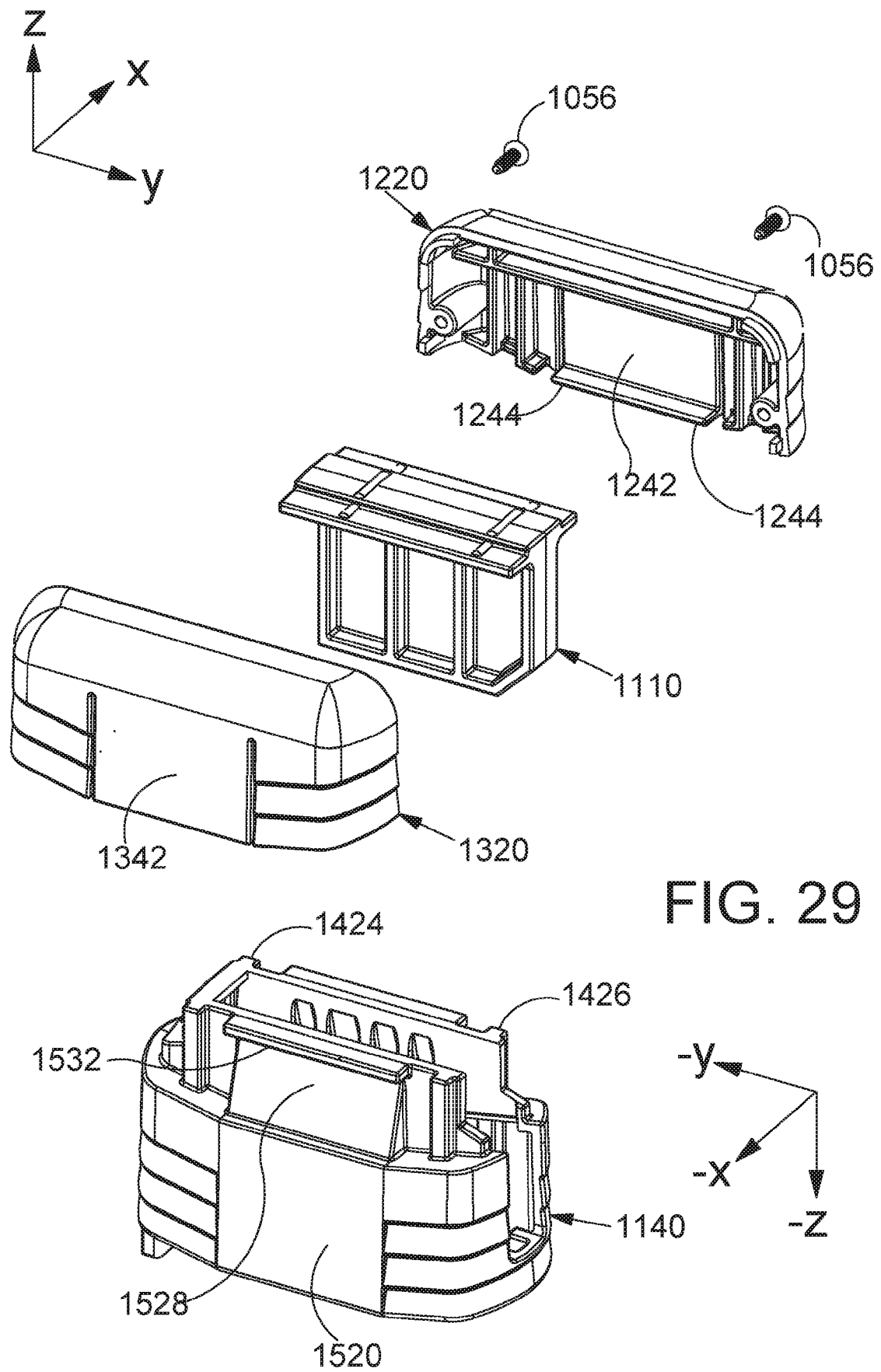


FIG. 27F





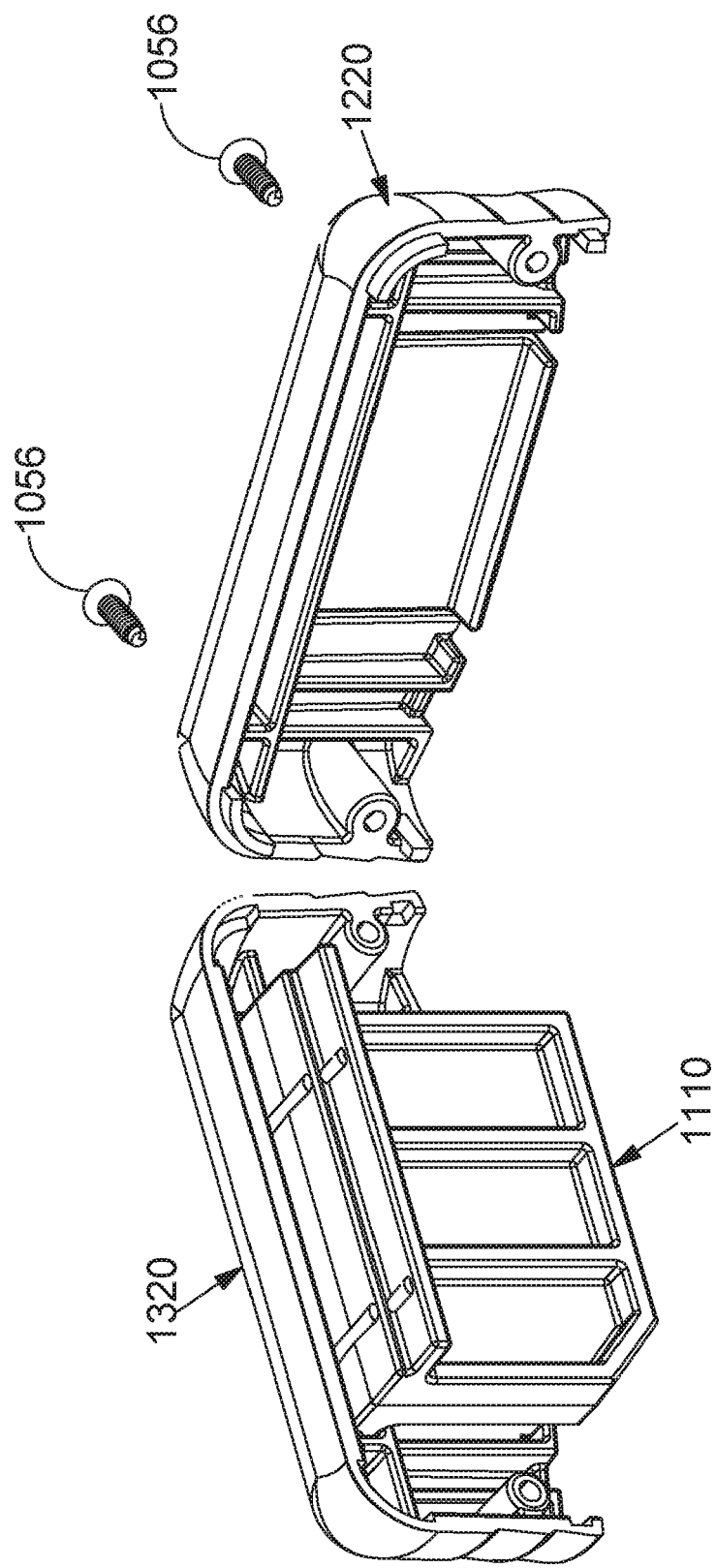


FIG. 30

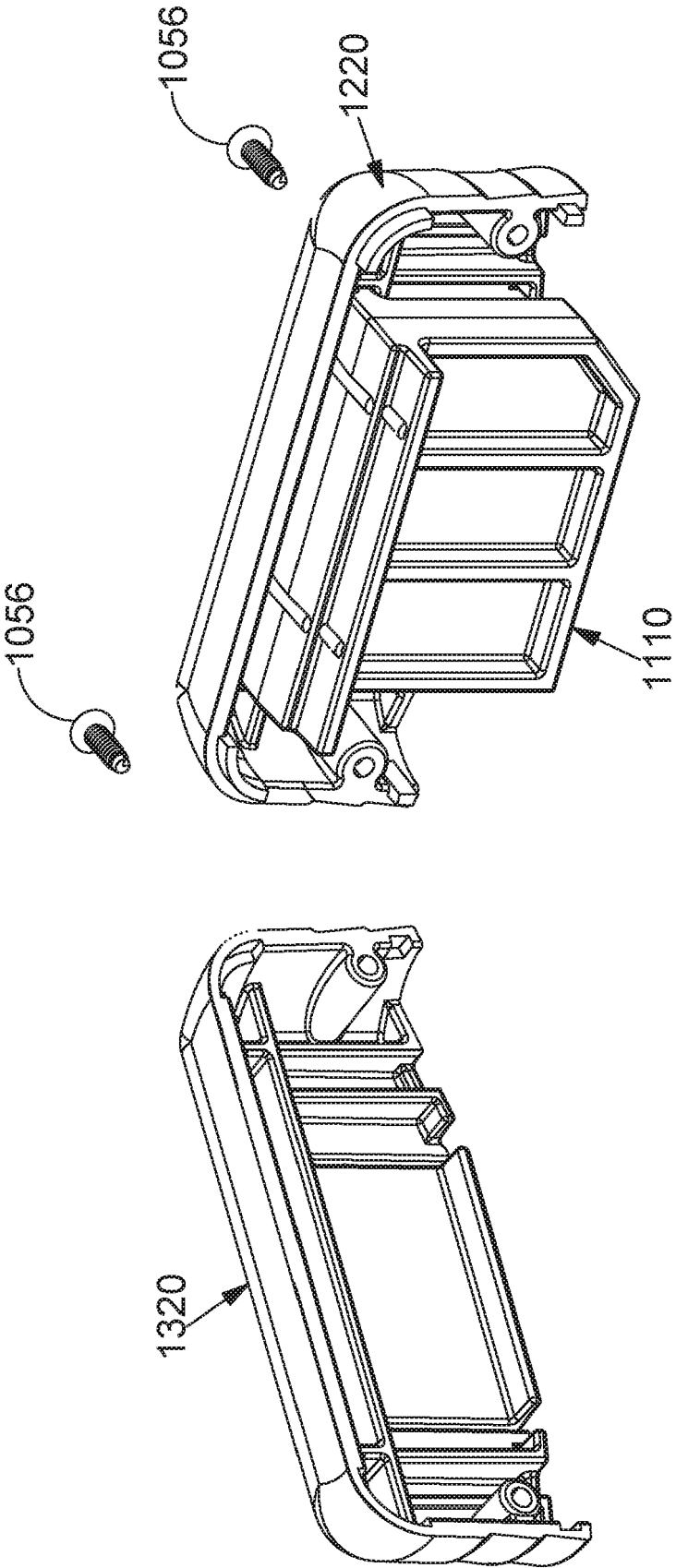


FIG. 31



## EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

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A	US 2009/044440 A1 (TAL GUY [IL] ET AL) 19 February 2009 (2009-02-19) * abstract; figures 1A-2D, 3C * * paragraphs [0085] - [0102] * * paragraphs [0118] - [0120] * -----	1-12	INV. F41A9/84 F41A9/83
A	US 6 754 987 B1 (CHENG CARSON [US] ET AL) 29 June 2004 (2004-06-29) * abstract; figures 1-3 * * column 2, line 66 - column 3, line 23 * -----	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			F41A
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>26 April 2022</b>	Examiner <b>Schwingel, Dirk</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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26-04-2022

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		<b>US 2009044440 A1</b>	<b>19-02-2009</b>
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