



US008069767B2

(12) **United States Patent**
Deckard et al.

(10) **Patent No.:** **US 8,069,767 B2**
(45) **Date of Patent:** **Dec. 6, 2011**

(54) **GUN MOUNT AND EJECTION SYSTEM**

(75) Inventors: **Aaron Deckard**, Wheatland, IN (US);
Michael Holzmeyer, Bloomfield, IN
(US); **James Buechler**, Jasper, IN (US)

(73) Assignee: **The United States of America as
represented by the Secretary of the
Navy**, Washington, DC (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 280 days.

(21) Appl. No.: **12/571,405**

(22) Filed: **Sep. 30, 2009**

(65) **Prior Publication Data**

US 2010/0294120 A1 Nov. 25, 2010

Related U.S. Application Data

(60) Provisional application No. 61/179,615, filed on May
19, 2009.

(51) **Int. Cl.**
F41A 23/00 (2006.01)

(52) **U.S. Cl.** **89/33.4**; 89/37.03; 89/37.16; 42/98

(58) **Field of Classification Search** 89/37.03,
89/37.16, 33.4; 42/98
See application file for complete search history.

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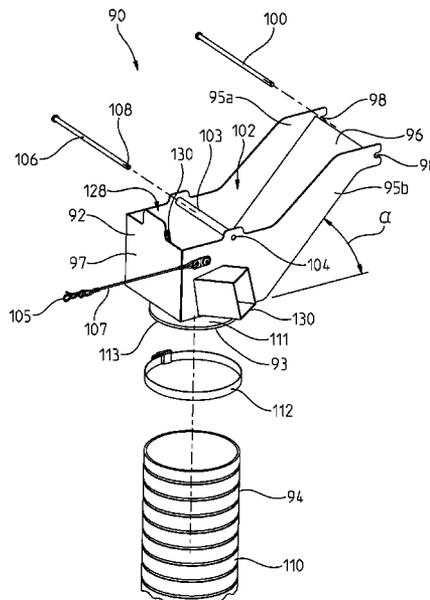
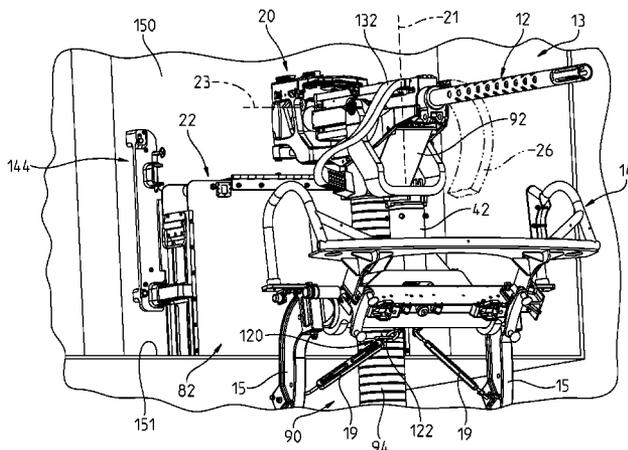
Primary Examiner — Michael David

(74) *Attorney, Agent, or Firm* — Christopher A. Monsey

(57) **ABSTRACT**

An armament system for aircraft includes gun mount and
ejection system for a machine gun. The gun mount and ejection
system includes an ejection chute assembly including a
hopper positioned intermediate the uprights of a carriage
supporting the machine gun.

4 Claims, 25 Drawing Sheets



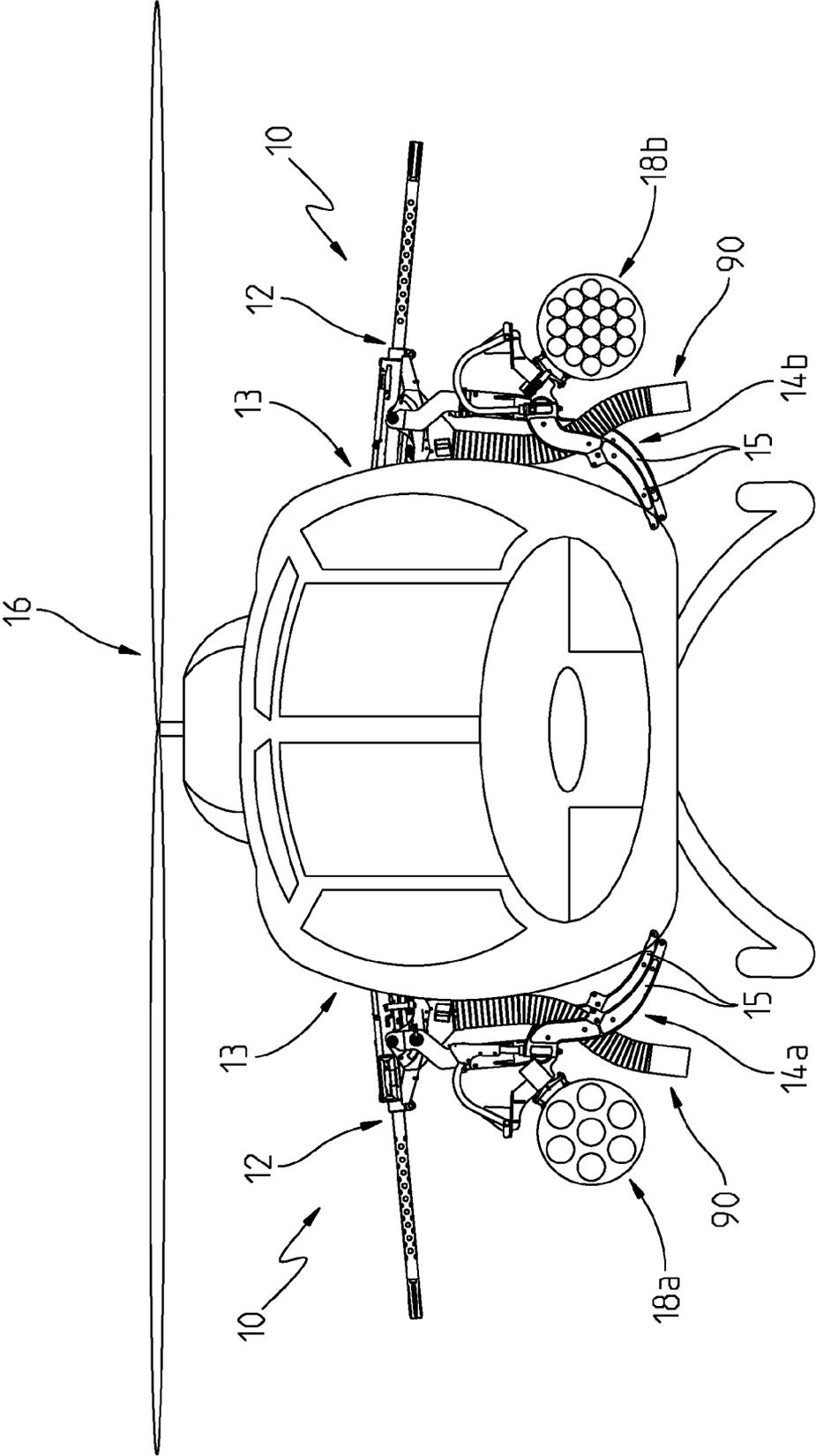


FIG. 1

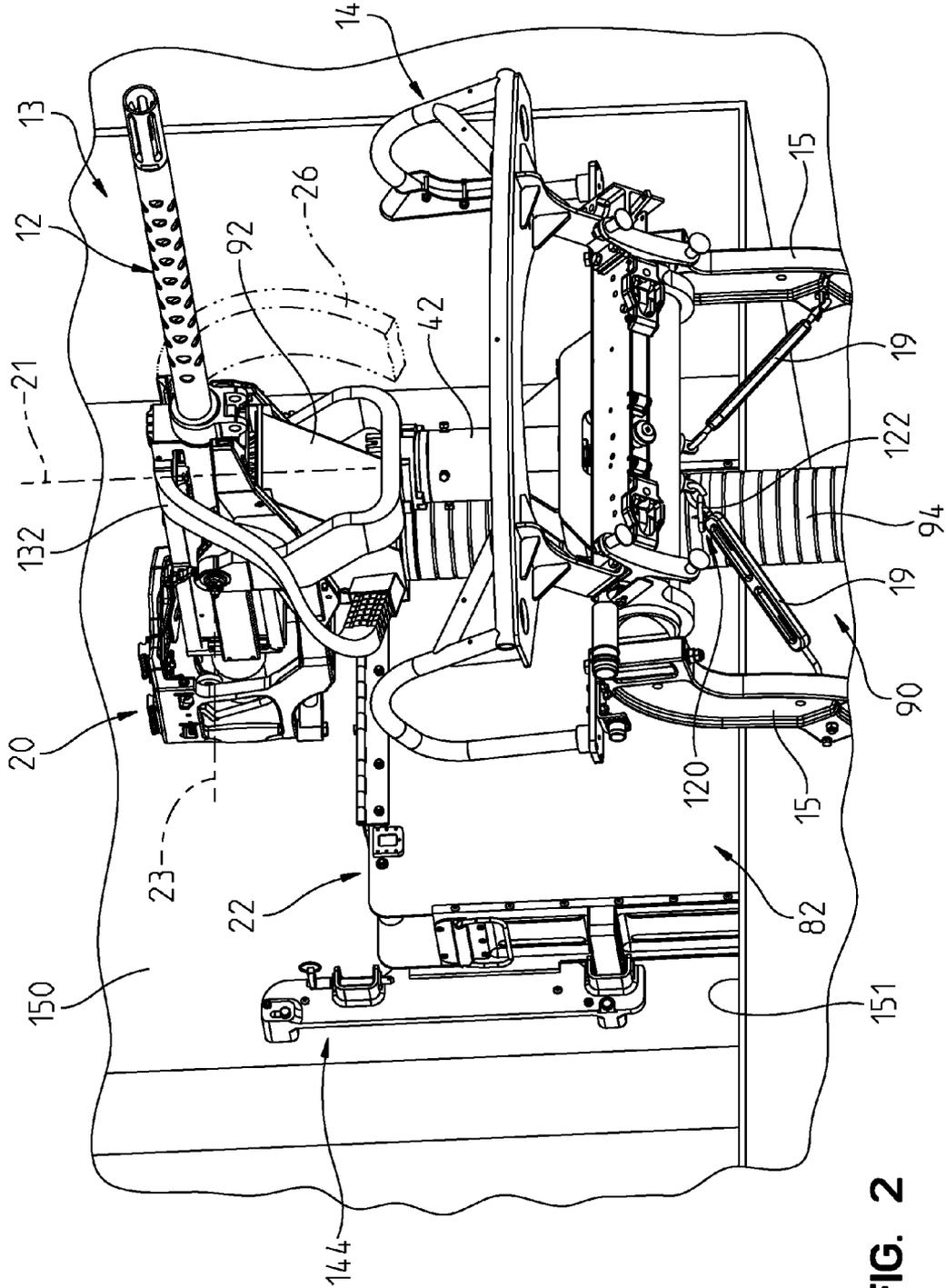


FIG. 2

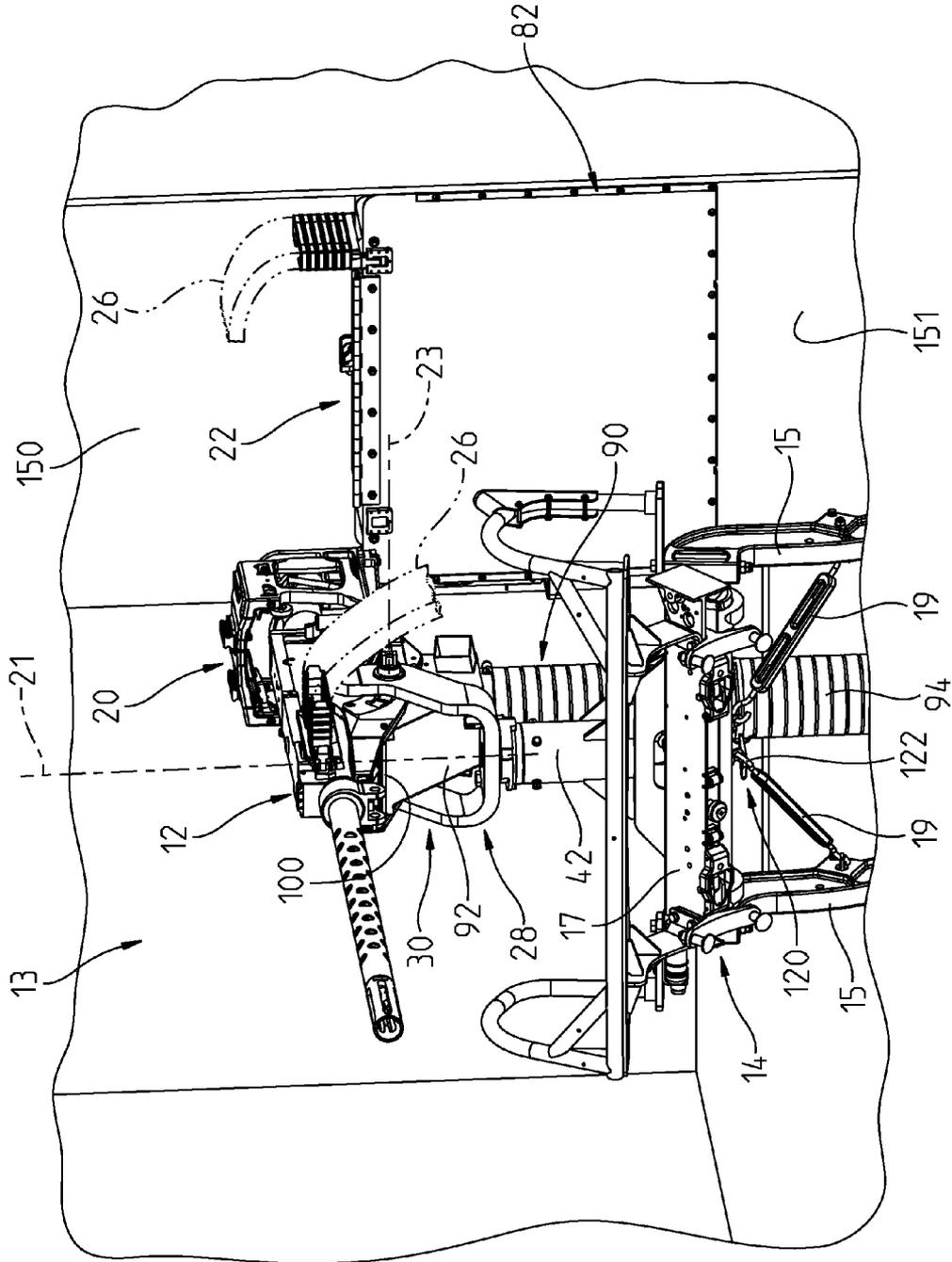


FIG. 3

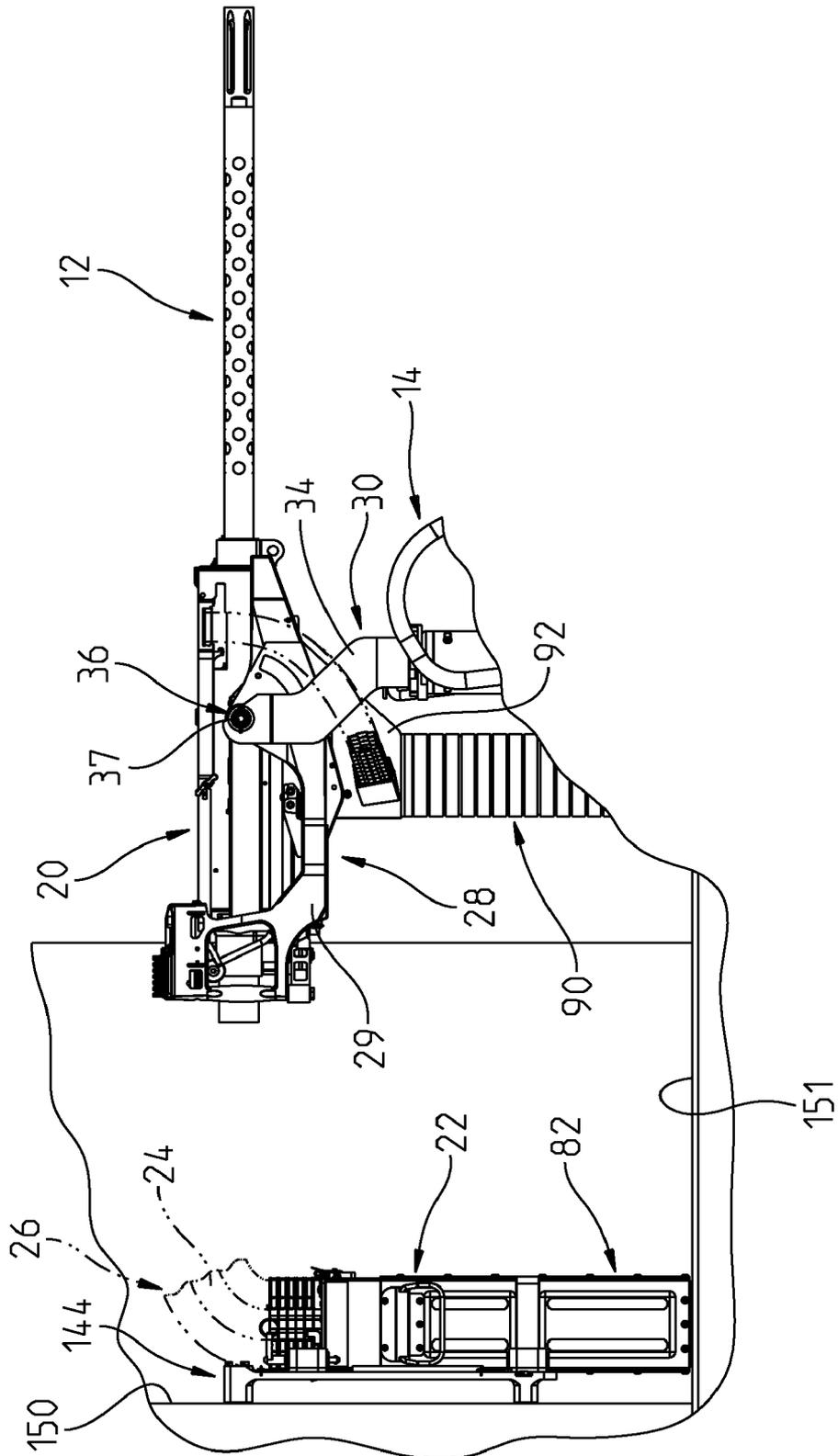


FIG. 4

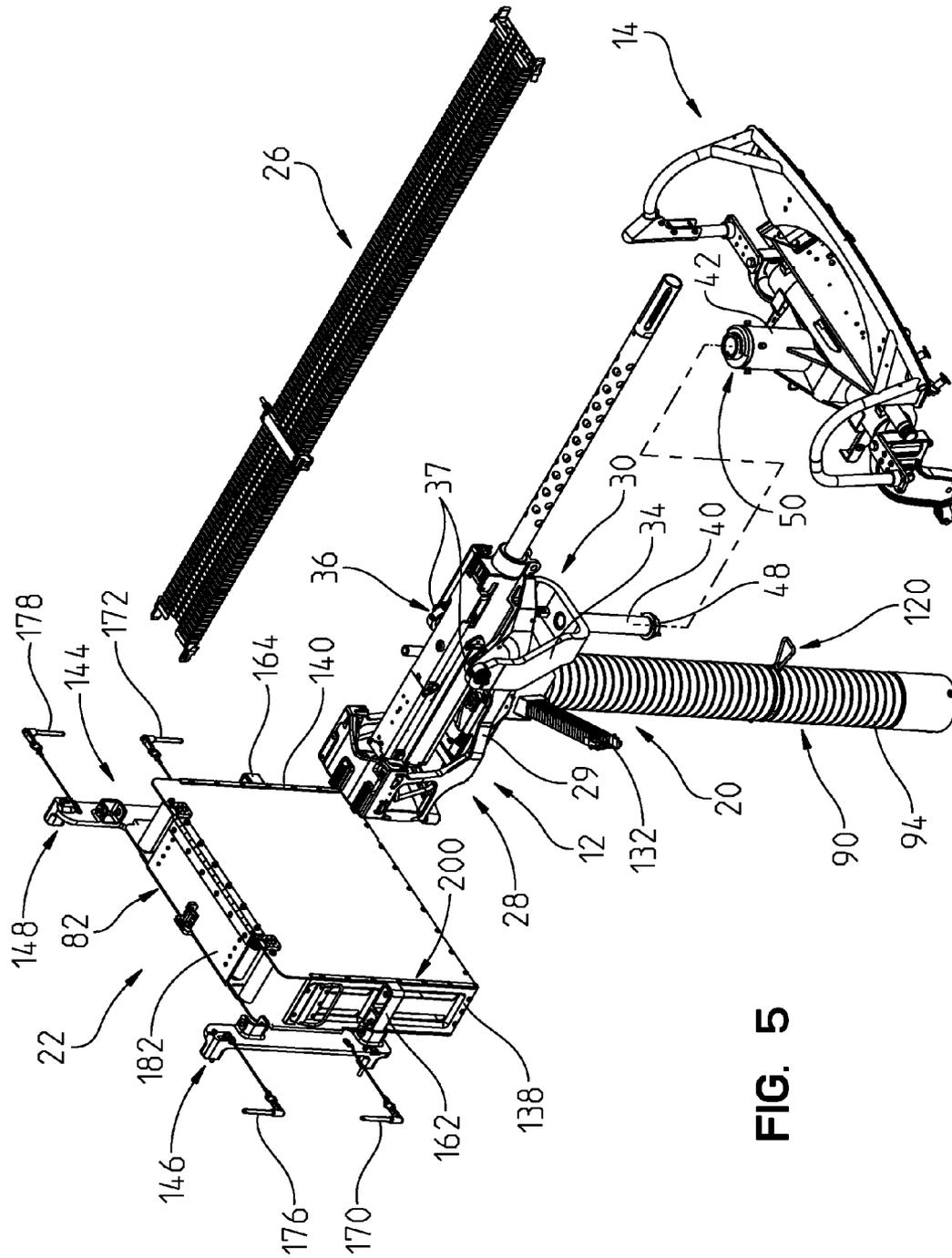


FIG. 5

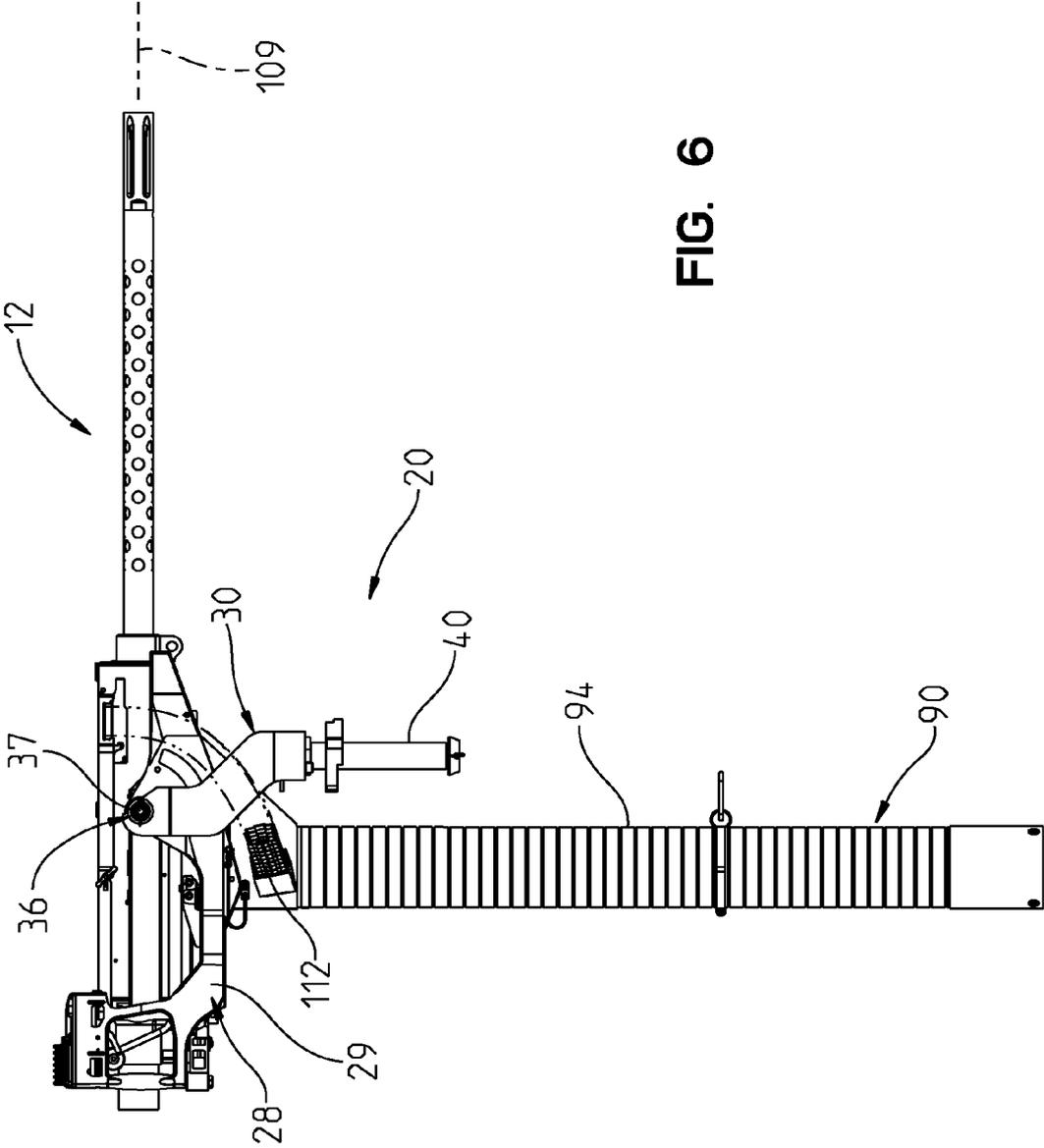


FIG. 6

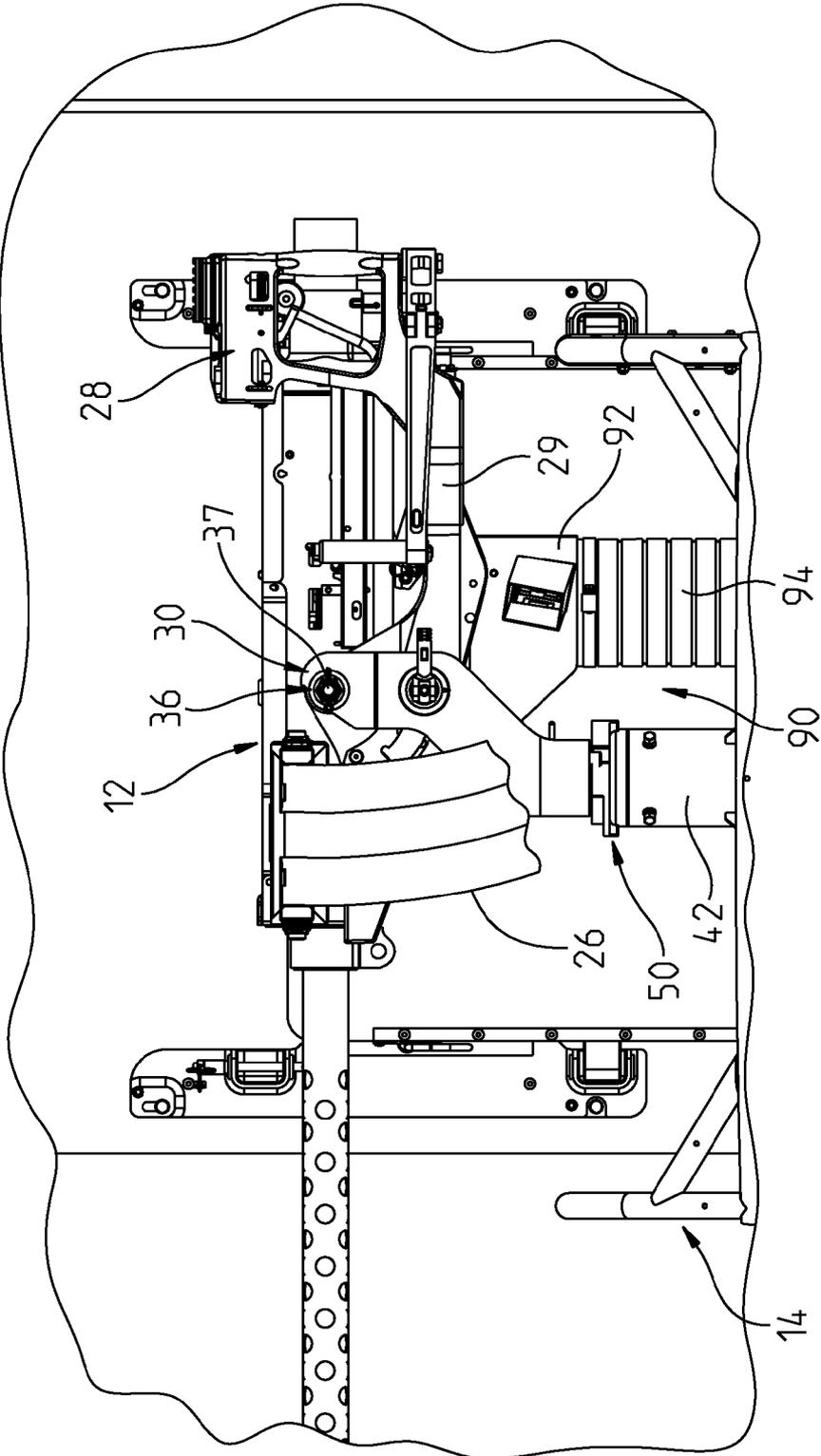


FIG. 7

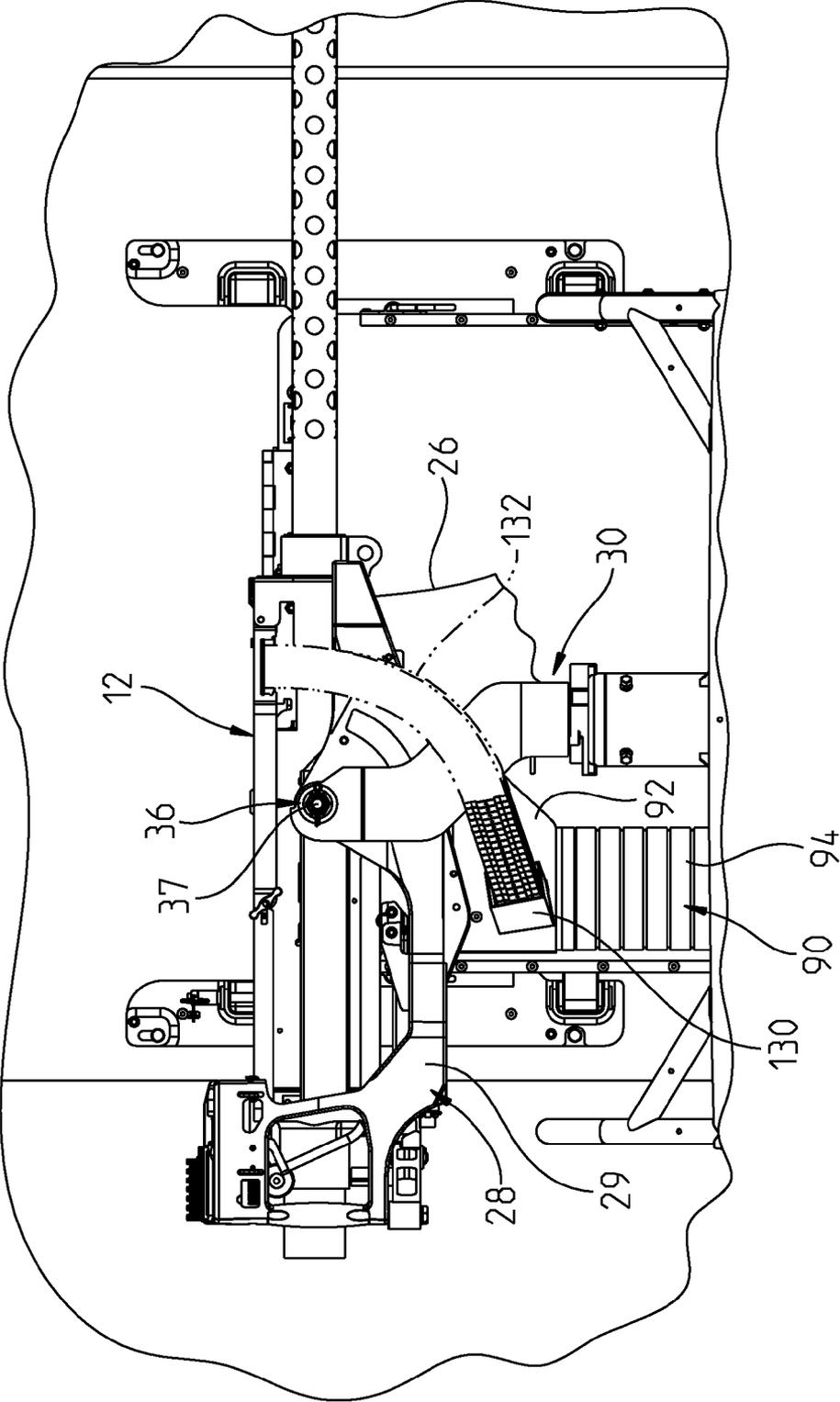


FIG. 8

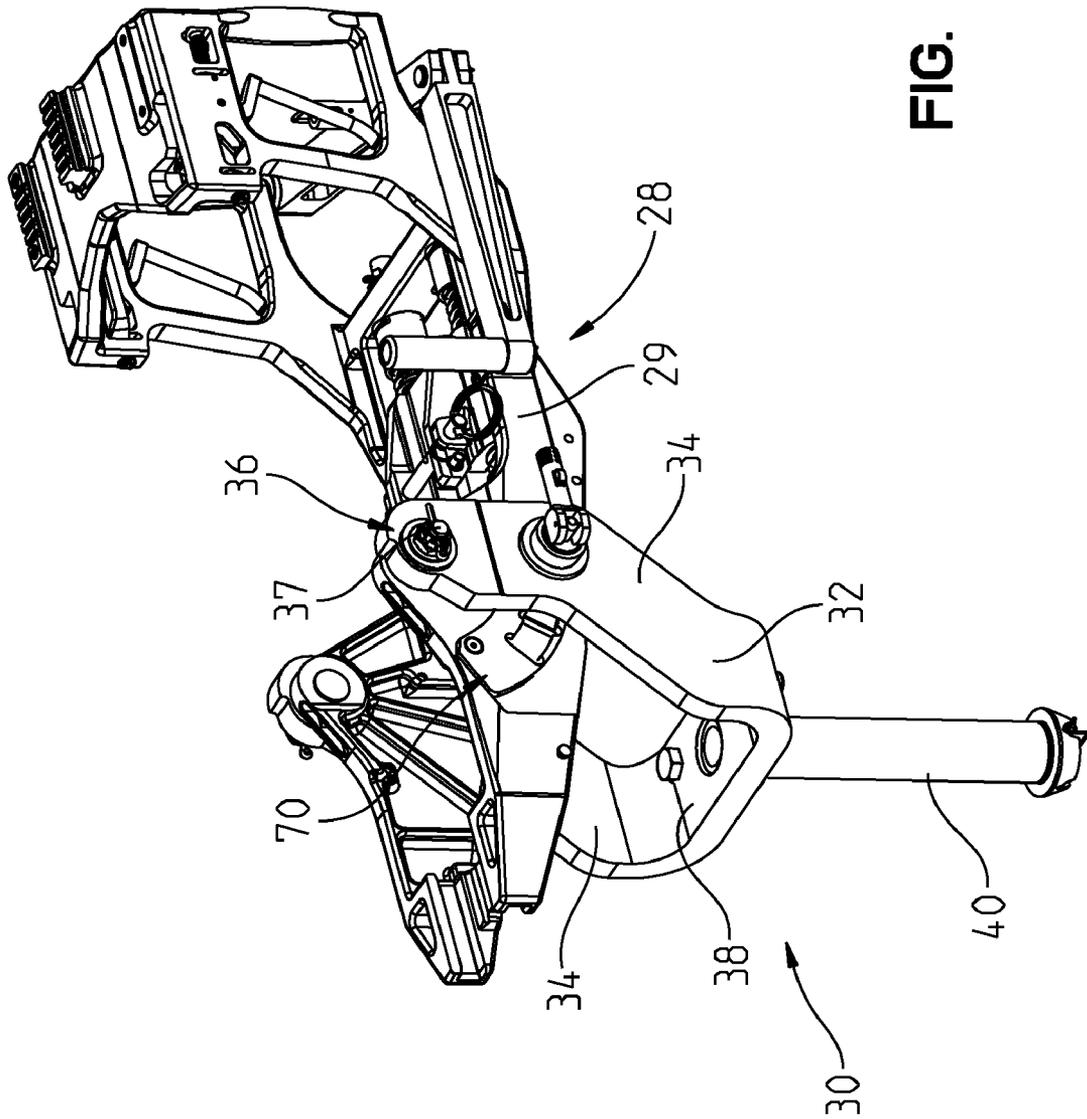


FIG. 9

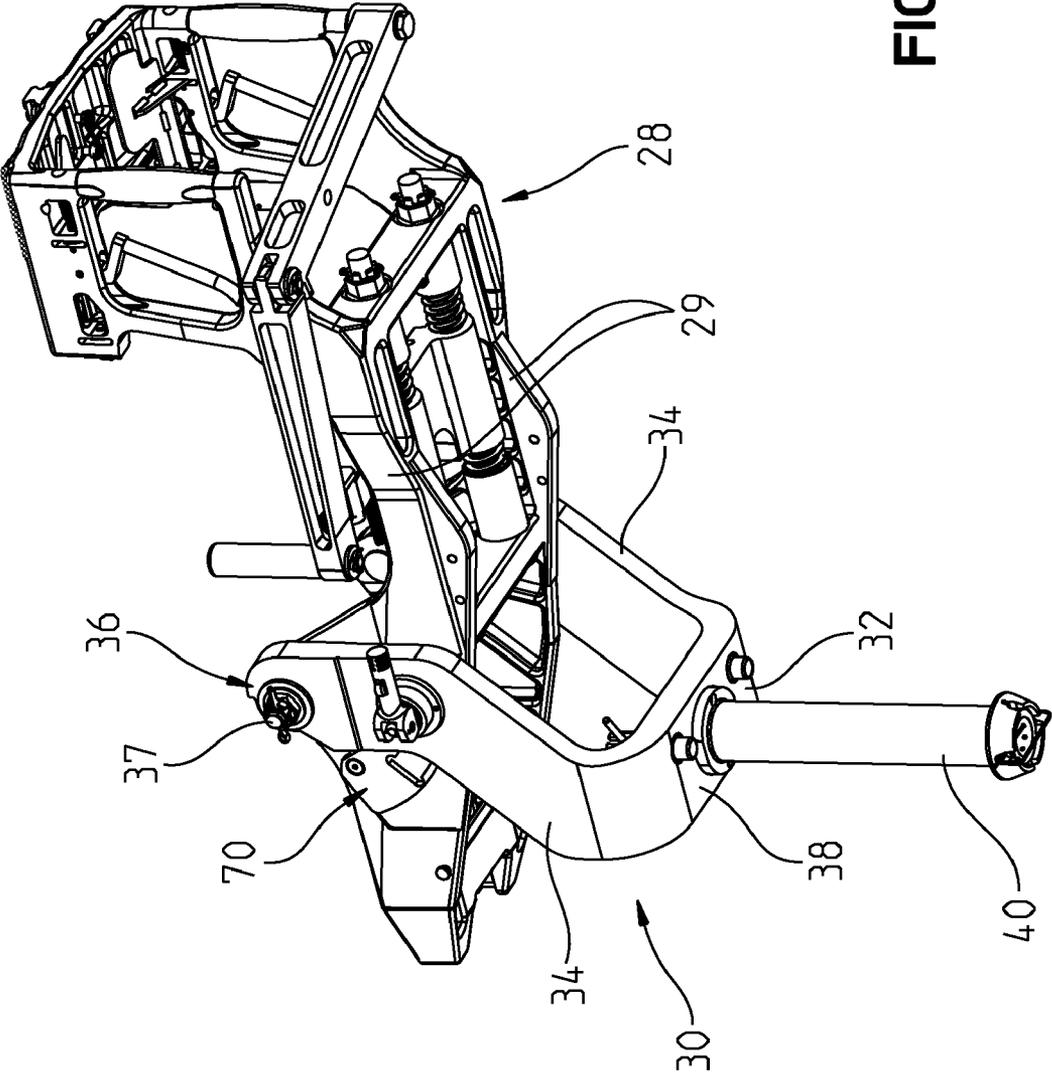


FIG. 10

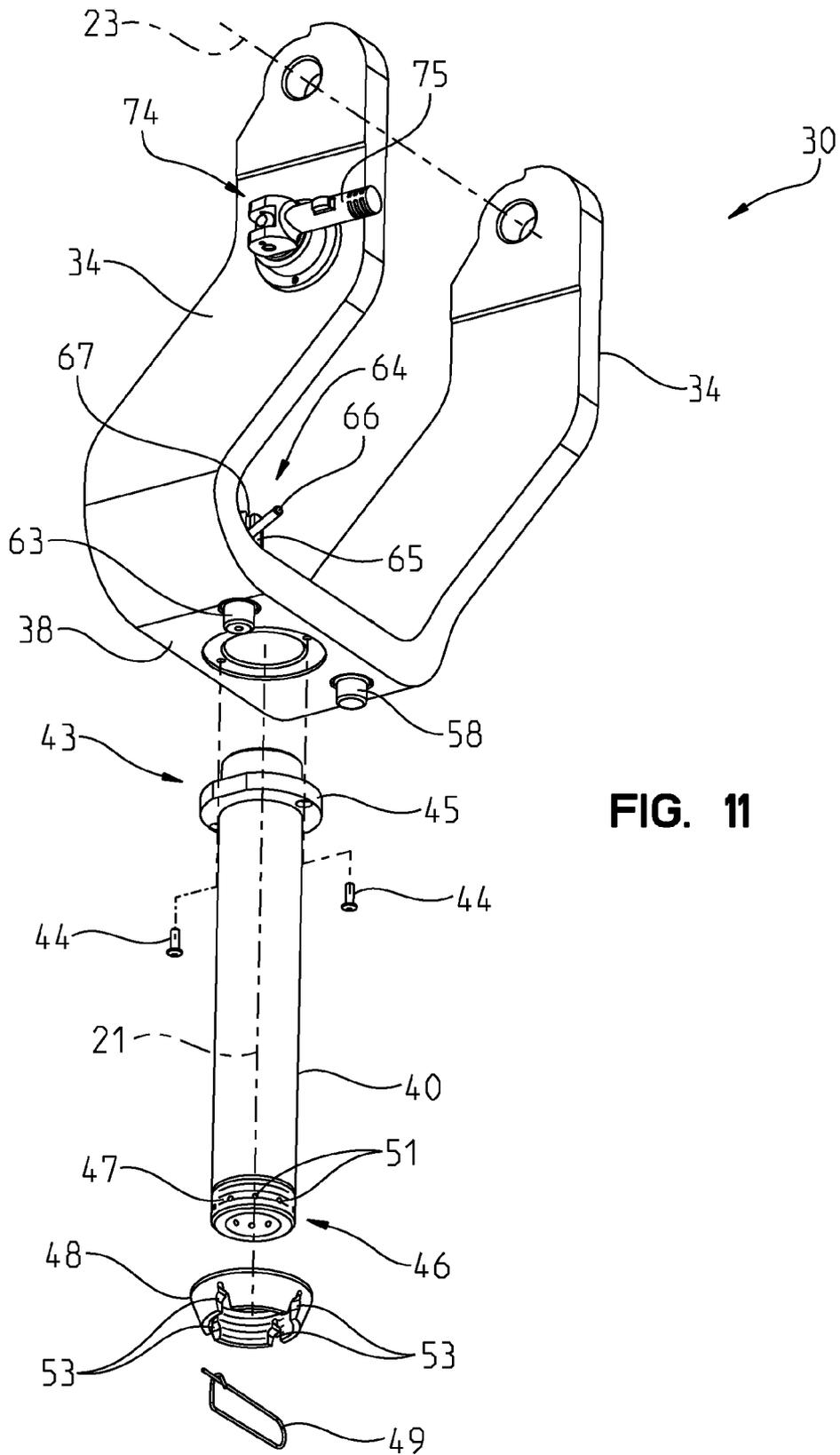


FIG. 11

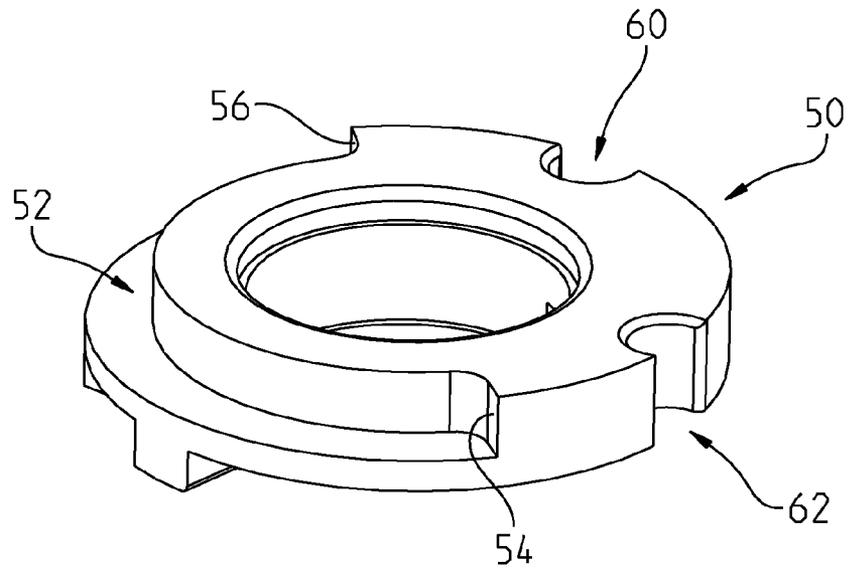


FIG. 13

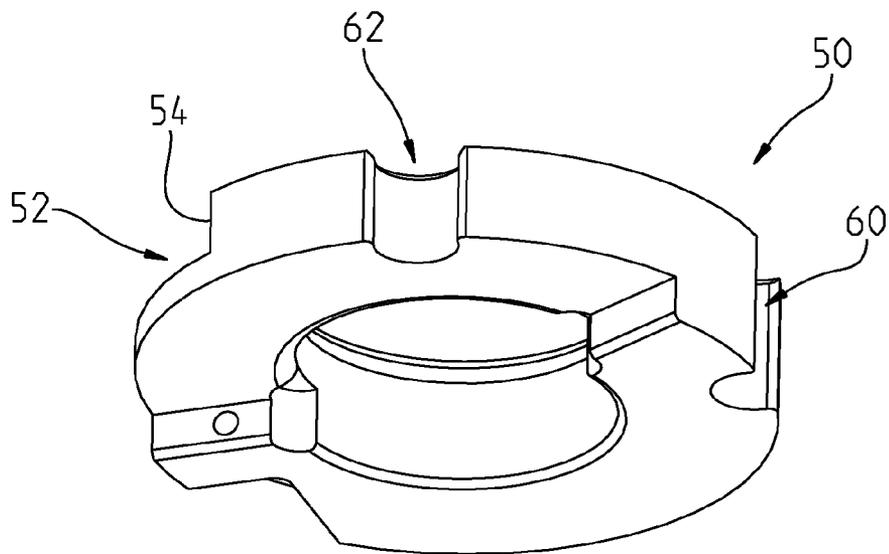
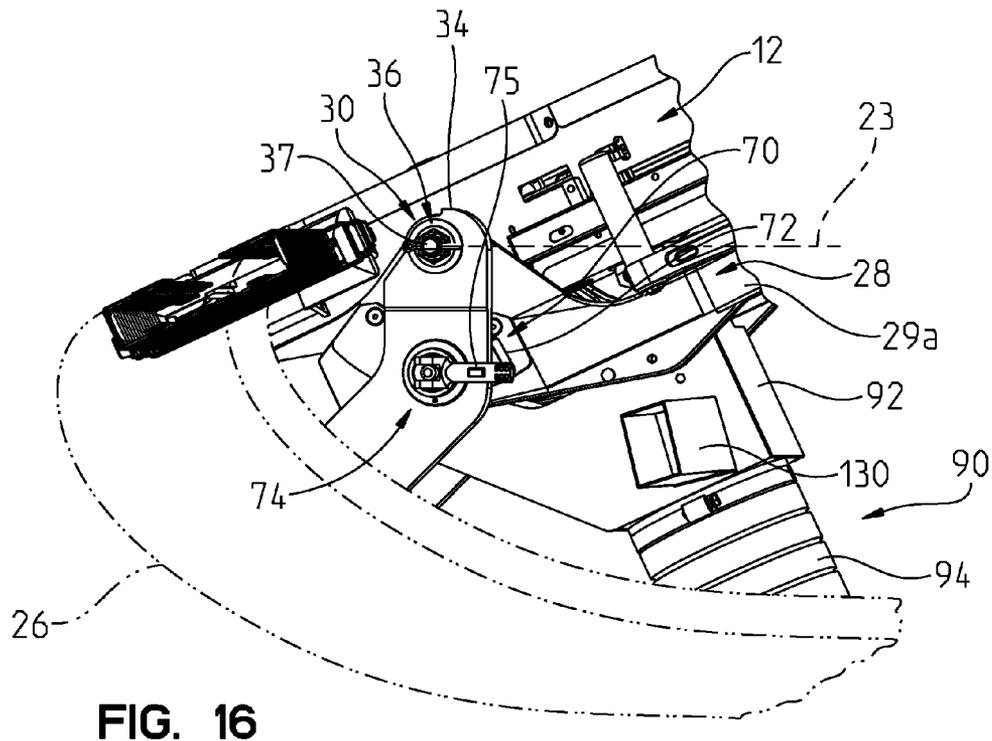
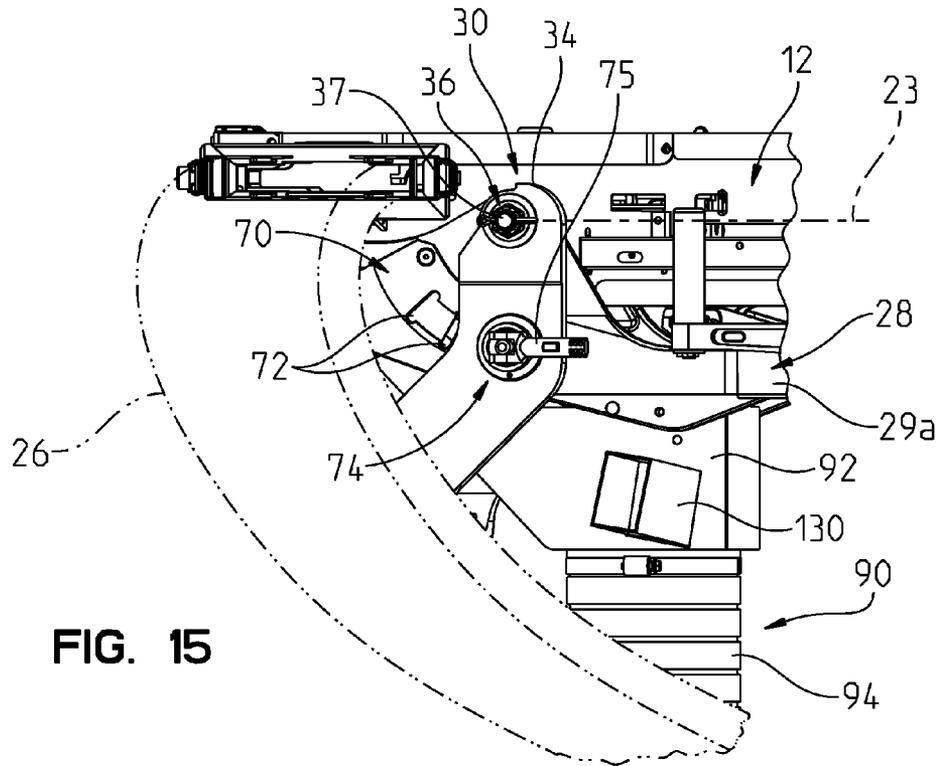


FIG. 14



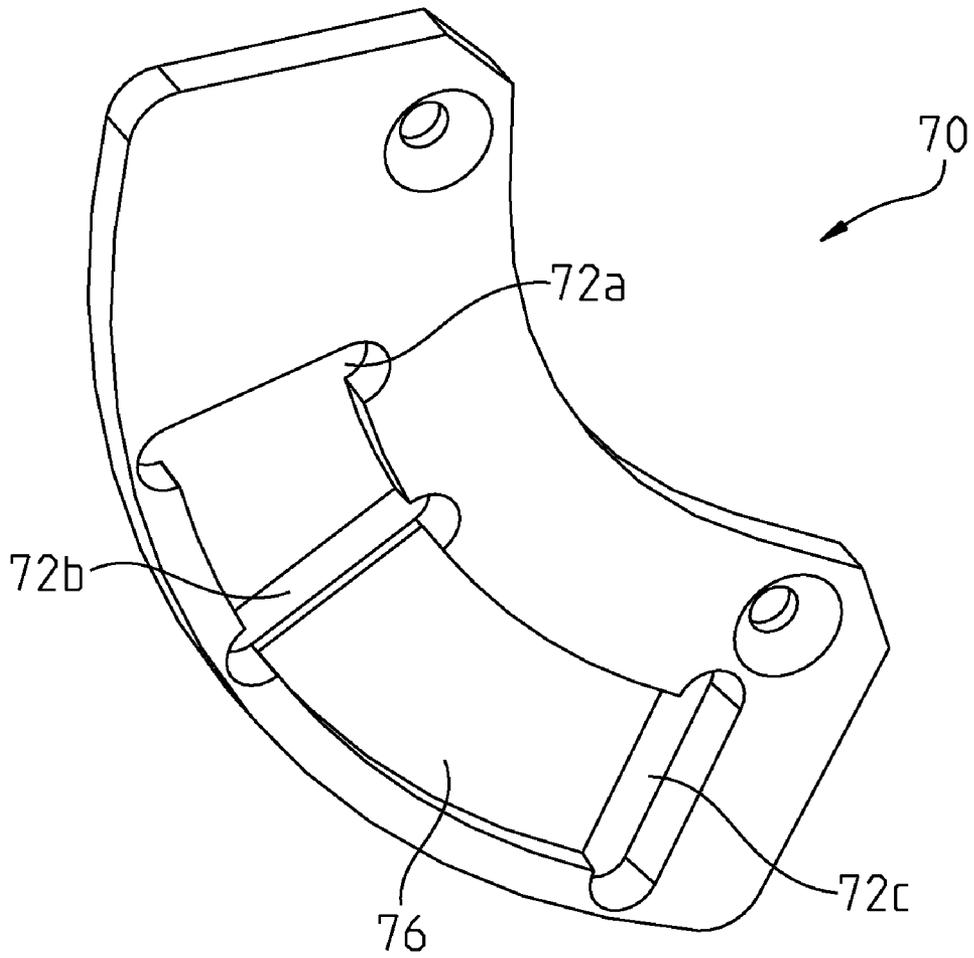


FIG. 17

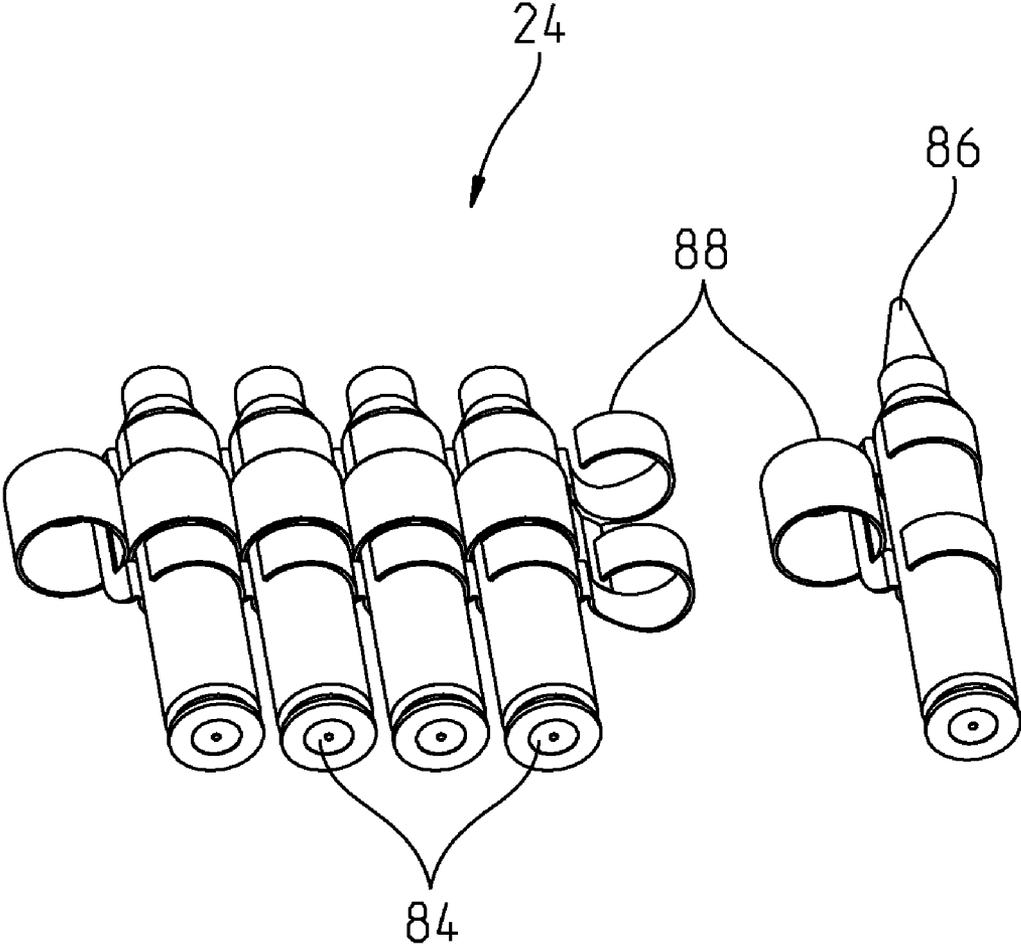


FIG. 18

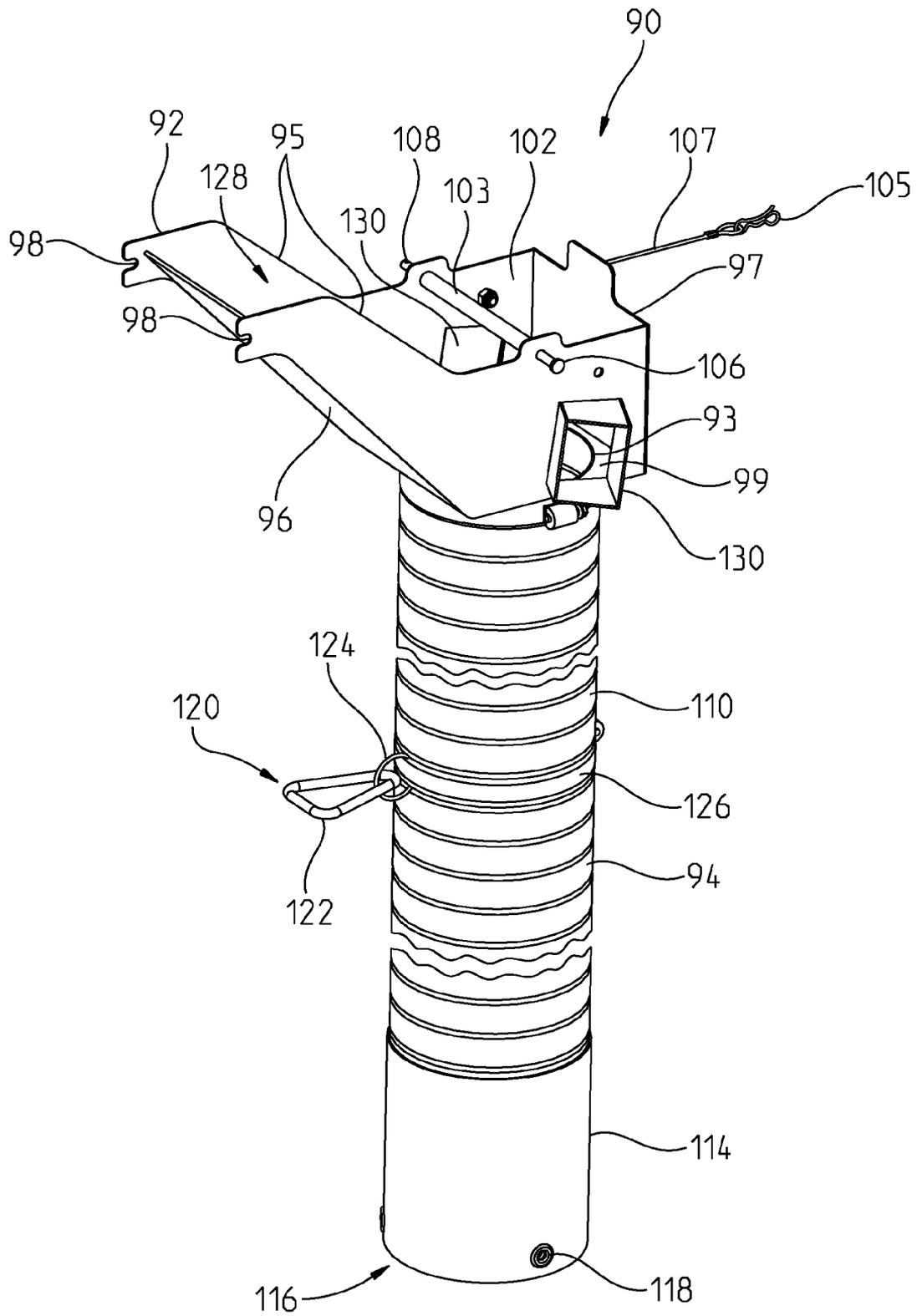


FIG. 19

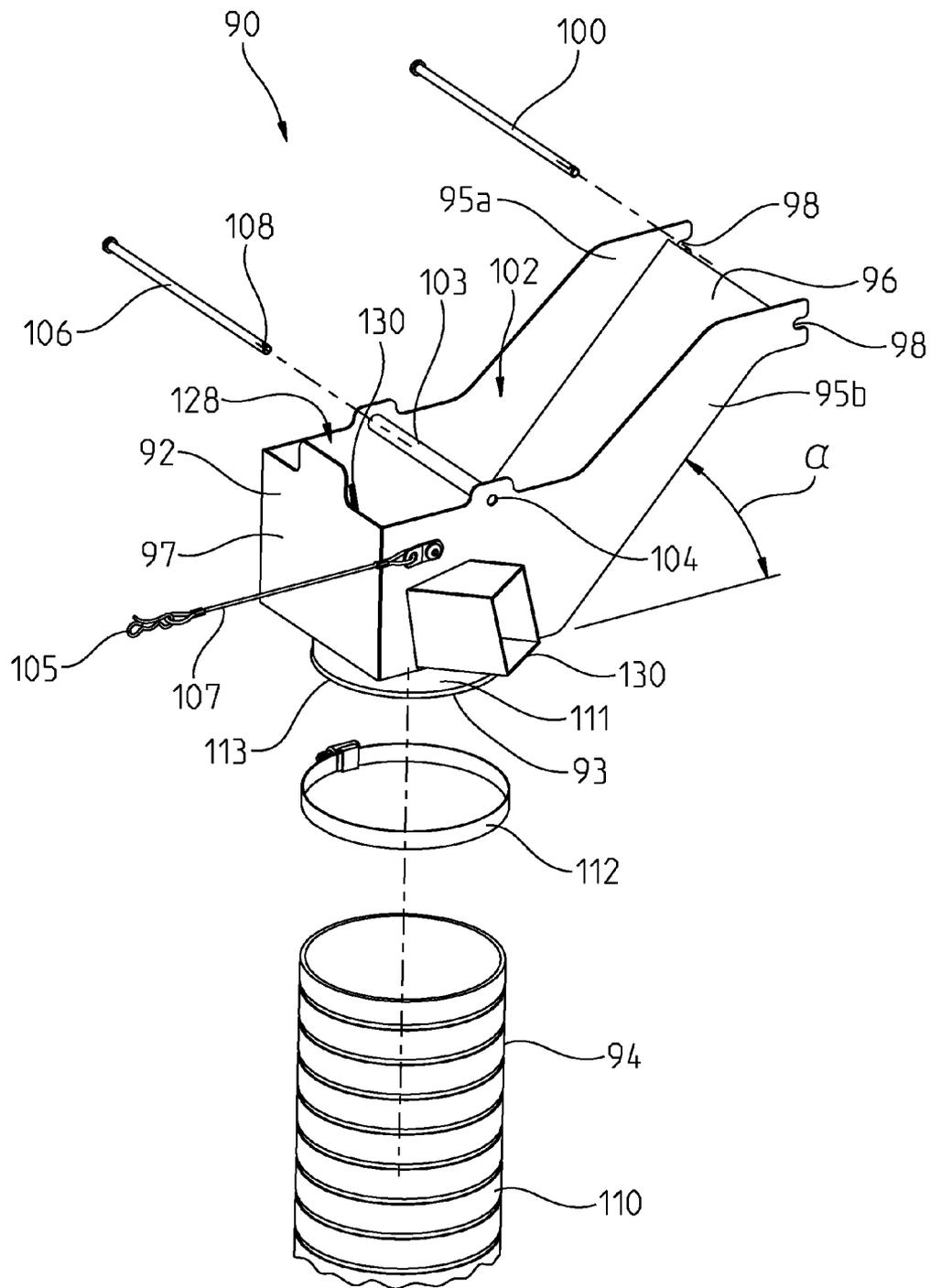


FIG. 20

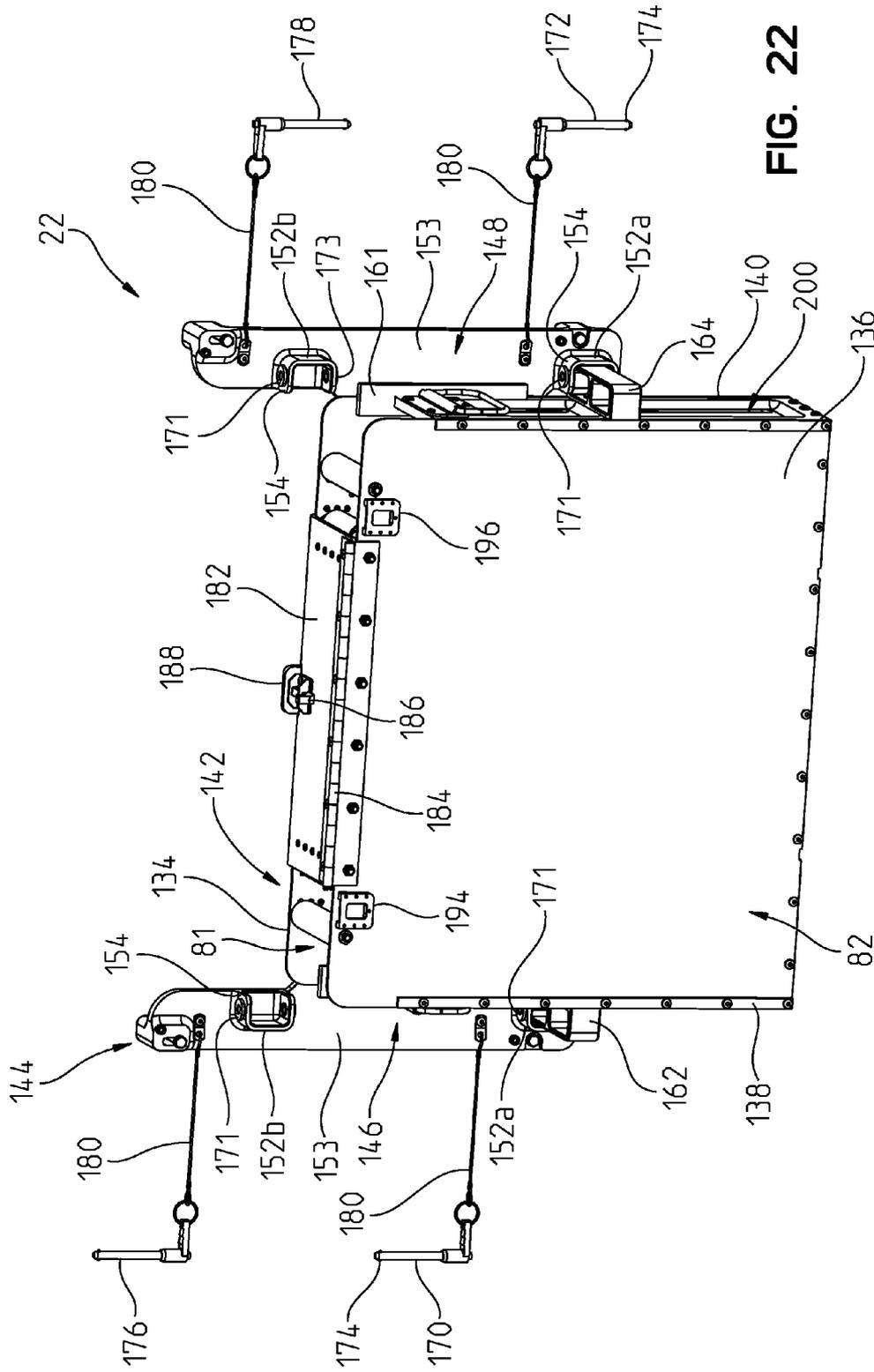


FIG. 22

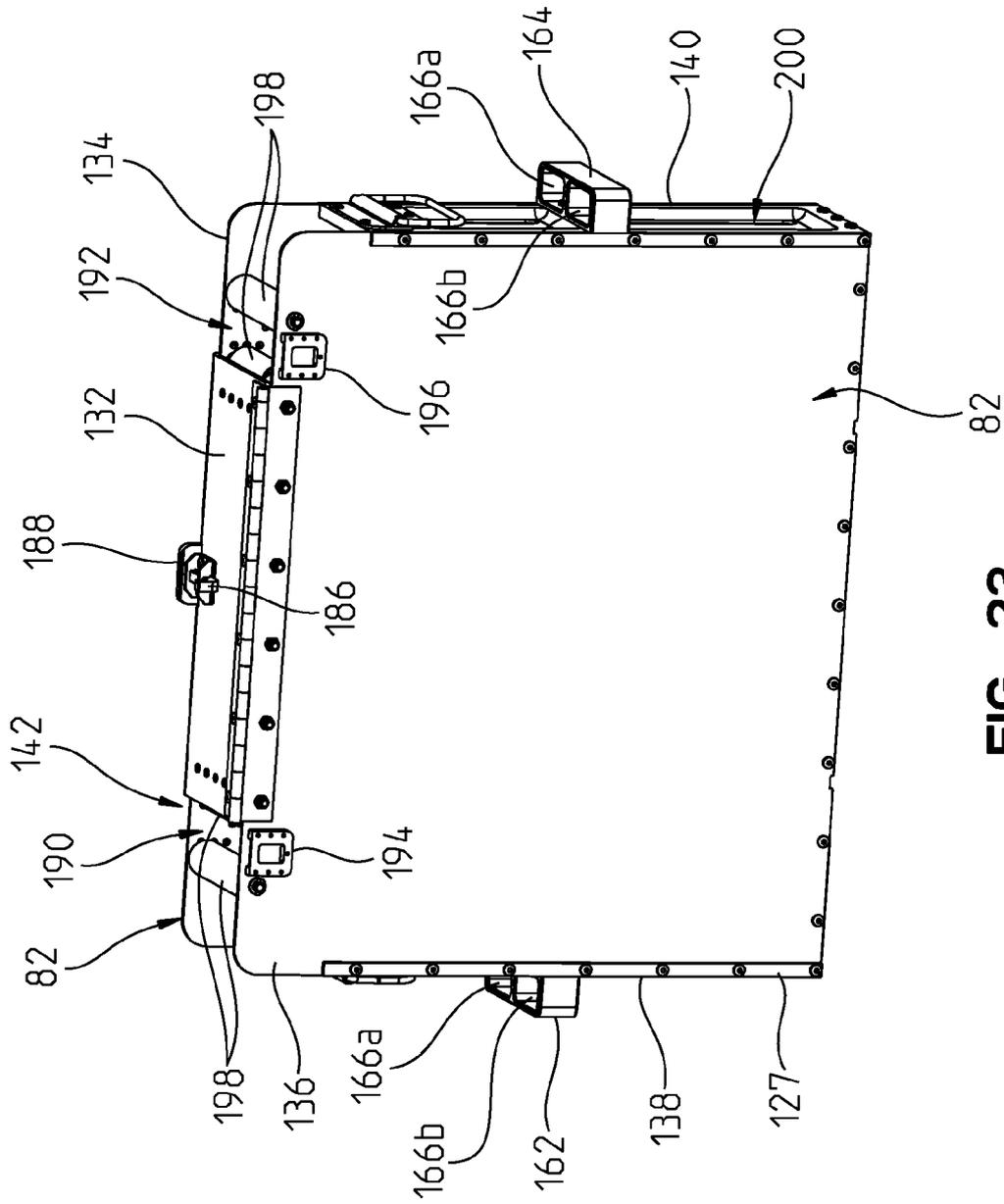


FIG. 23

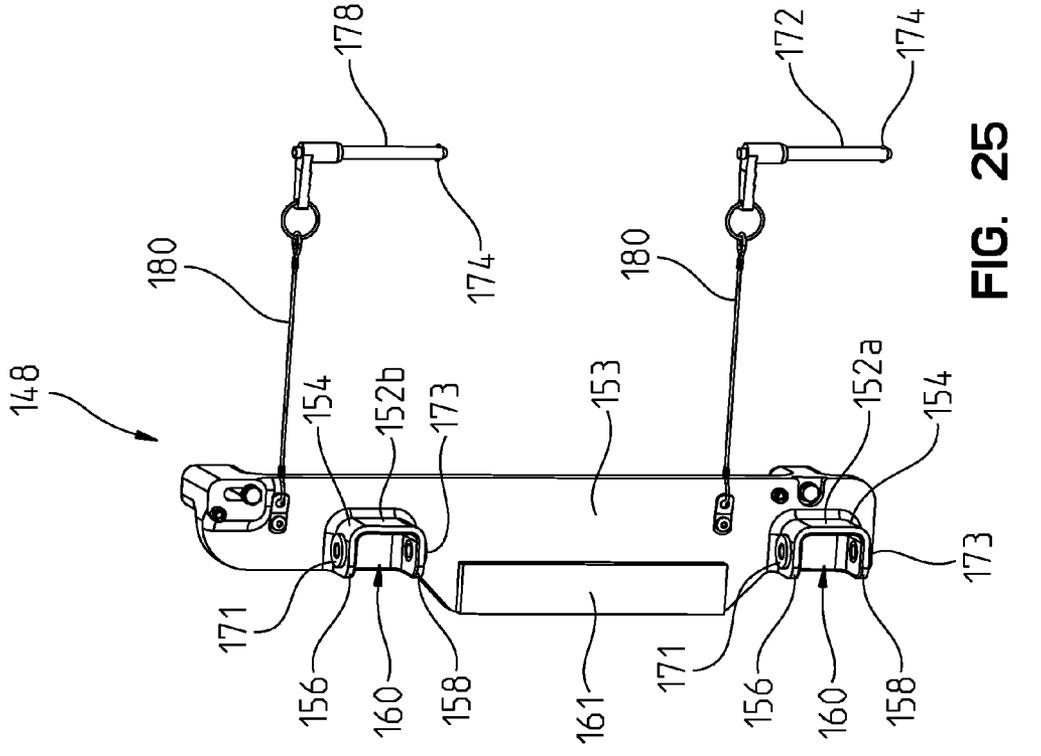


FIG. 25

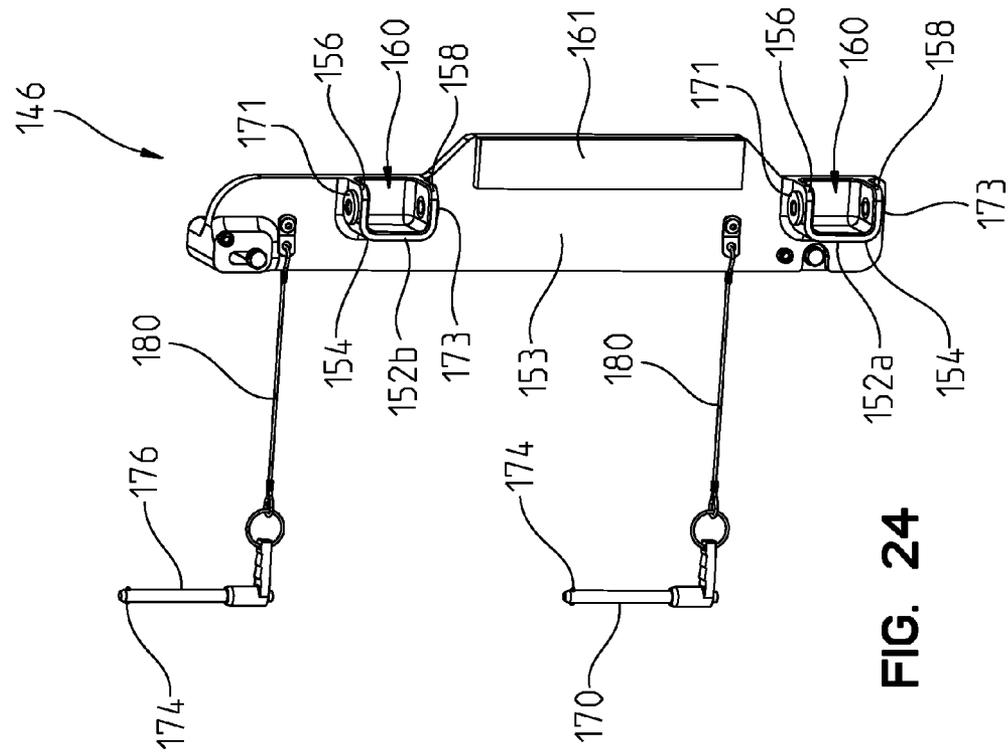


FIG. 24

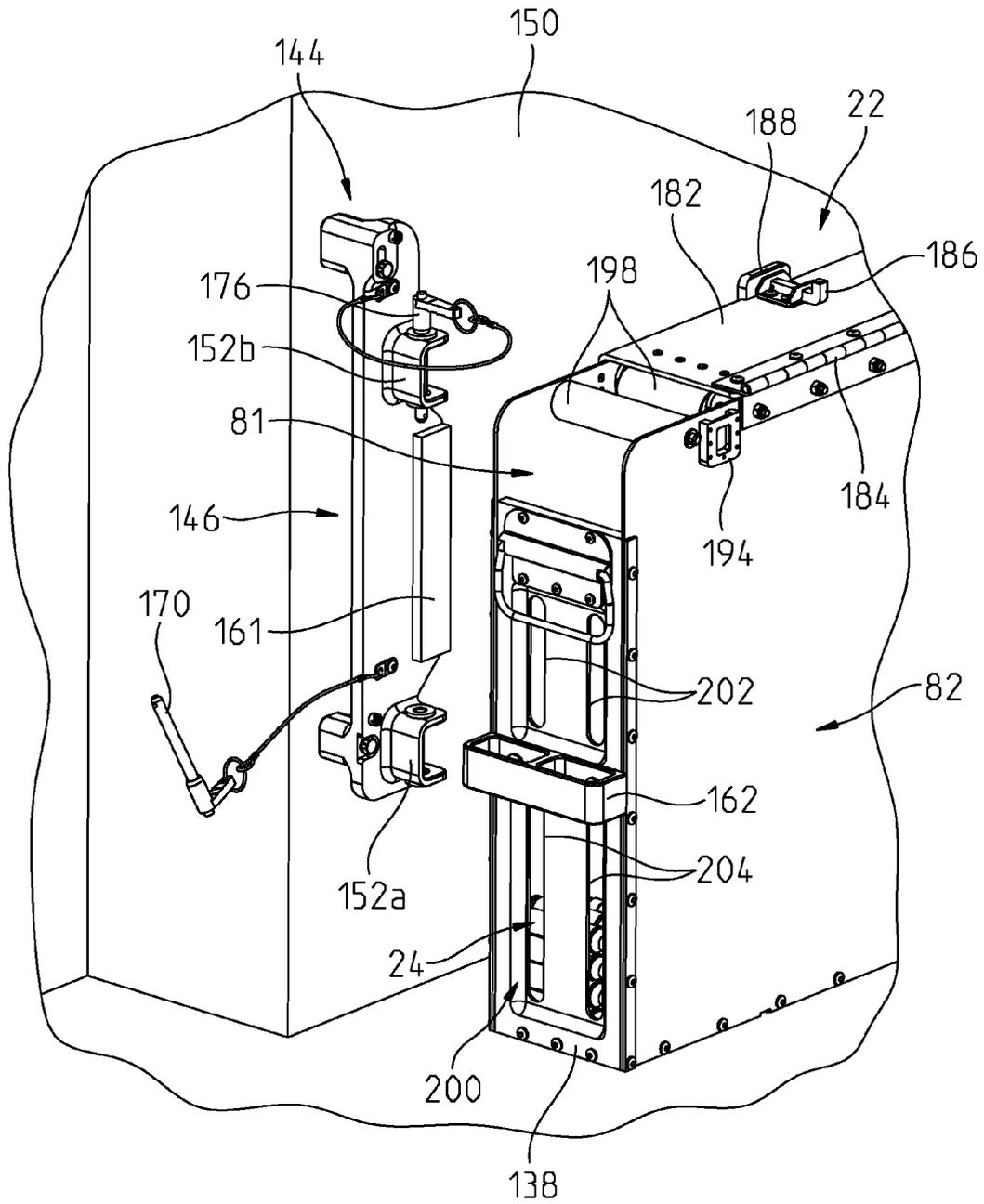


FIG. 26

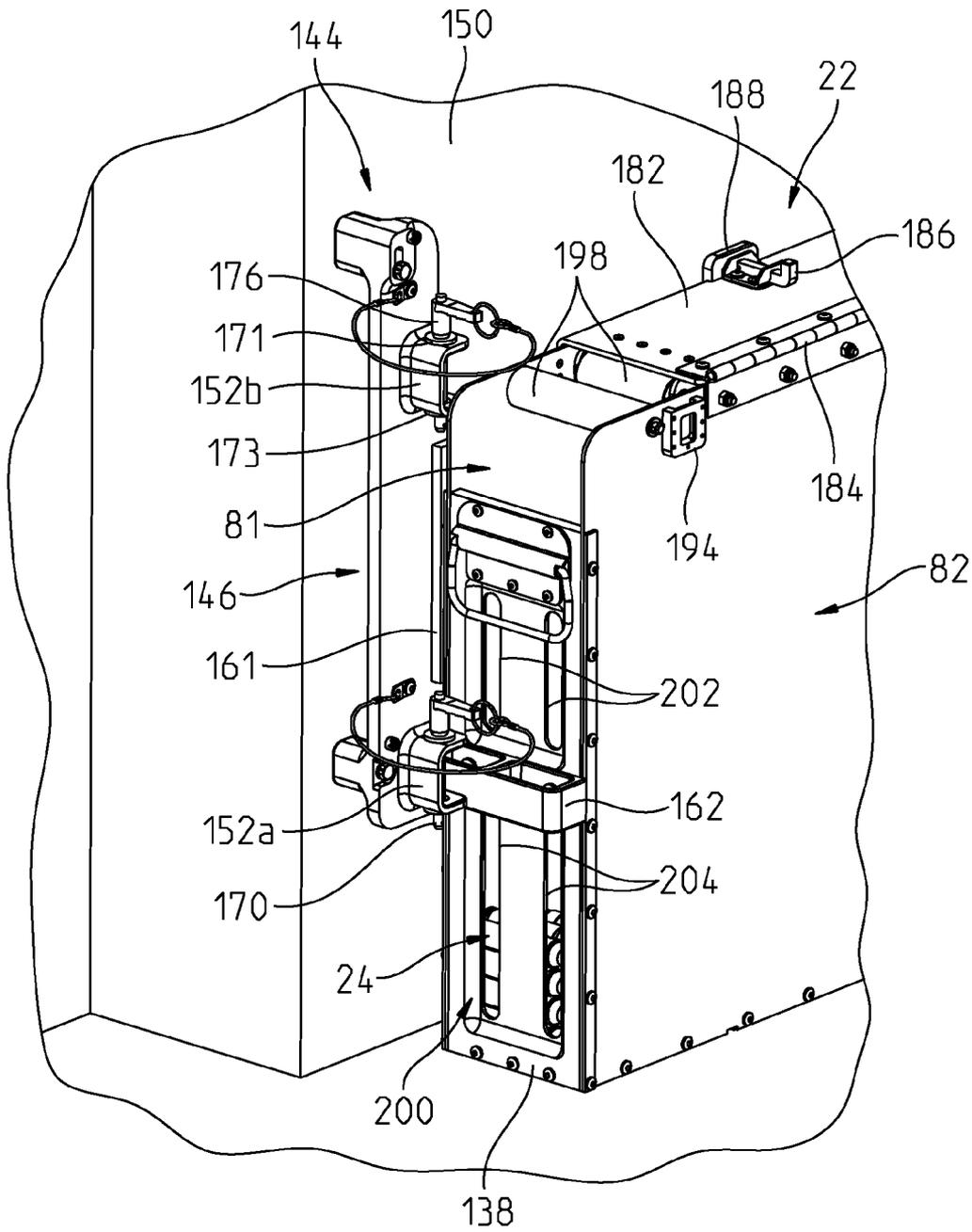


FIG. 27

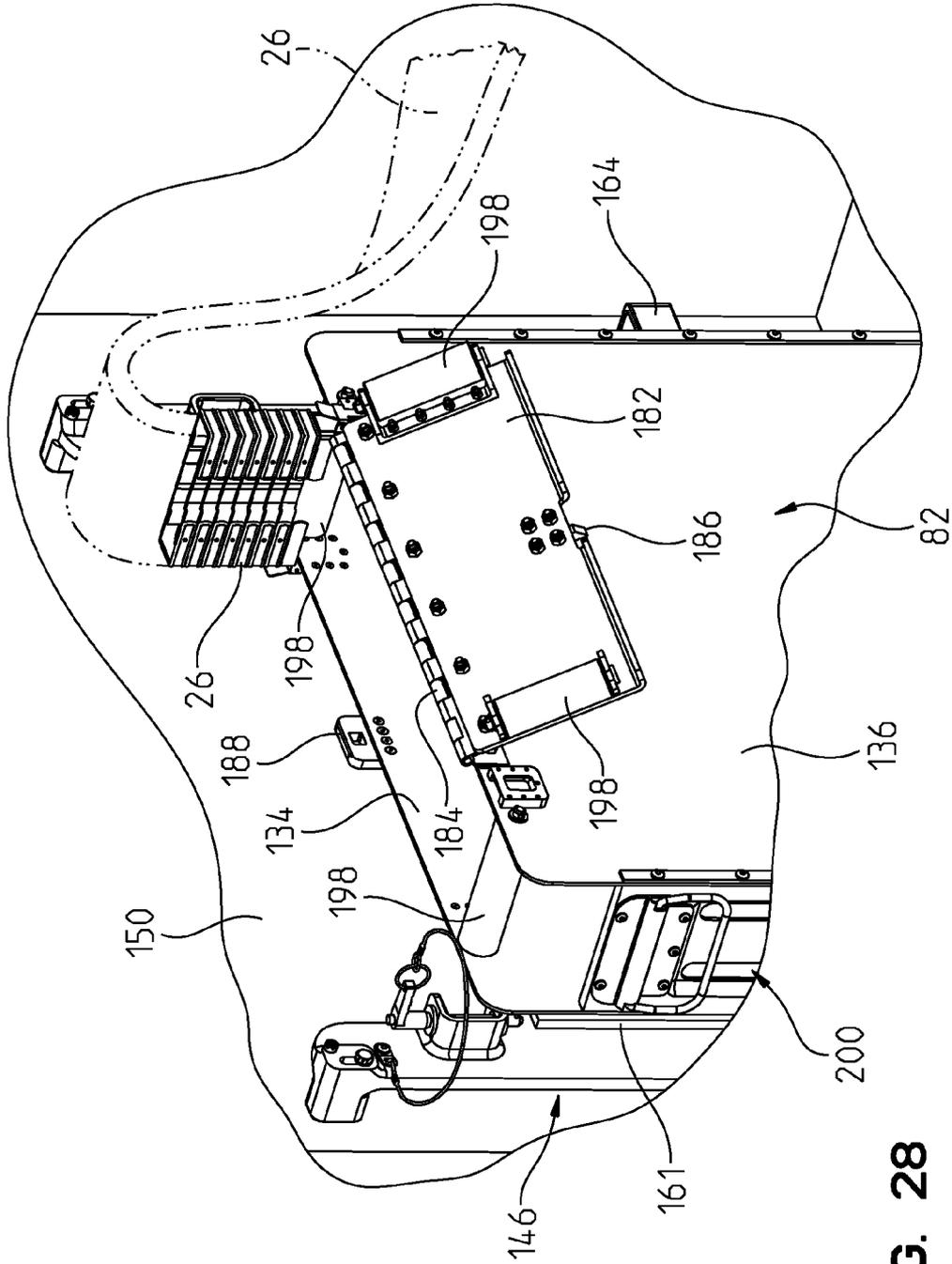


FIG. 28

GUN MOUNT AND EJECTION SYSTEM**CROSS-REFERENCE TO RELATED APPLICATION**

This application claims priority to U.S. Provisional Patent Application Ser. No. 61/179,615, filed May 19, 2009, the disclosure of which is expressly incorporated by reference herein. This application is related to U.S. patent application Ser. No. 12/571,396, filed Sep. 30, 2009, titled "Ammunition Canister and Feed System", the disclosure of which is expressly incorporated by reference herein.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

The invention described herein includes contributions by one or more employees of the Department of the Navy made in performance of official duties and may be manufactured, used and licensed by or for the United States Government for any governmental purpose without payment of any royalties thereon.

BACKGROUND AND SUMMARY OF THE DISCLOSURE

The present disclosure relates to weapon systems and, more particularly, to helicopter armament systems.

It is known to provide weapon systems on aircraft, including helicopters. For example, 50 caliber machine guns have been mounted on helicopters using an external store support assemblies. However, there remains a need for a system to integrate updated weapons, including the GAU-21 50 caliber machine gun, onto helicopters, including the UH-1Y. Additionally, there is a need for an effective ammunition feed system, and casing and link ejection system.

According to an illustrative embodiment of the present disclosure, a gun mount assembly for a machine gun includes a gun cradle including spaced apart side members and configured to releasably couple to a machine gun, a carriage supporting the gun cradle and including a pair of spaced apart uprights and a downwardly extending pintle, and an ejection chute assembly including a hopper having an outlet opening. The hopper is positioned intermediate the spaced apart uprights of the carriage and is supported for movement with the cradle. An ejection tube includes an upper end coupled to the outlet opening of the hopper, and an open lower end positioned below the upper end. The hopper is configured to collect spent casings and links ejected from the machine gun and convey the spent casings and links to the ejection tube through the outlet opening.

According to another illustrative embodiment of the present disclosure, a method of ejecting spent casings and links from a machine gun comprises the steps of providing an ammunition belt to a machine gun, the ammunition belt including casings interconnected by links, ejecting spent casings downwardly from the machine gun into a hopper, ejecting spent links laterally outwardly from the machine gun, passing the spent links through a link chute from the machine gun to the hopper, and passing the combined spent casings and links from the hopper downwardly through a flexible ejection tube and out through an open lower end.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated

as the same become better understood by reference to the following detailed description when taken in conjunction with the accompanying drawings.

FIG. 1 is a front view in partial schematic of an illustrative helicopter including a prior art external stores support assembly;

FIG. 2 is a rear side perspective view of an aircraft armament system of the present disclosure;

FIG. 3 is a front side perspective view of the aircraft armament system of FIG. 2;

FIG. 4 is a side perspective view of the aircraft armament system of FIG. 2;

FIG. 5 is a partially exploded perspective view of an aircraft armament system of the present disclosure, showing the external stores support assembly;

FIG. 6 is a side elevational view of the gun mount assembly of FIG. 2;

FIG. 7 is a side elevational view showing the carriage oriented in a rearward position;

FIG. 8 is a side elevational view similar to FIG. 7, showing the carriage oriented in a forward position;

FIG. 9 is a top perspective view of the carriage and the cradle of the gun mount assembly of FIG. 6;

FIG. 10 is a bottom perspective view of the carriage and the cradle of the gun mount assembly of FIG. 9;

FIG. 11 is a partially exploded perspective view of the carriage of the gun mount assembly of FIG. 9;

FIG. 12 is a partially exploded perspective view showing interaction between the carriage and the azimuth stop body;

FIG. 13 is a top perspective view of the azimuth stop body of the cradle of the gun mount assembly of FIG. 12;

FIG. 14 is a bottom perspective view of the azimuth stop body of FIG. 13;

FIG. 15 is a side perspective view showing the elevation stop body and carriage in a first position;

FIG. 16 is a side perspective view similar to FIG. 15, showing the elevation stop body and carriage in a second position;

FIG. 17 is a perspective view of the elevation stop body of the gun mount assembly of FIG. 9;

FIG. 18 is a perspective view of representative ammunition belt including casings and links;

FIG. 19 is a perspective view of the ejection chute assembly of FIG. 5;

FIG. 20 is an exploded perspective view of the ejection chute assembly of FIG. 19;

FIG. 21 is a perspective view of the ammunition canister and the feed chute for feeding the ammunition belt from an ammunition canister to the machine gun of FIG. 2;

FIG. 22 is a partially exploded perspective view of the ammunition canister and mounting assembly of the aircraft armament system of FIG. 5;

FIG. 23 is a perspective view of the ammunition canister of FIG. 22;

FIG. 24 is a perspective view of the right hand receiver of the mounting assembly of FIG. 22;

FIG. 25 is a perspective view of the left hand receiver of the mounting assembly of FIG. 22;

FIG. 26 is a left side perspective view of the ammunition canister and mounting assembly of FIG. 22, with the canister uncoupled from the receiver;

FIG. 27 is a left side perspective view similar to FIG. 26, showing the canister coupled to the receiver; and

FIG. 28 is a top perspective view of the ammunition canister of FIG. 22, showing the hinged lid in an open position.

Corresponding reference characters indicate corresponding parts throughout the several views. Although the drawings

represent embodiments of various features and components according to the present disclosure, the drawings are not necessarily to scale and certain features may be exaggerated in order to better illustrate and explain the present disclosure. The exemplification set out herein illustrates embodiments of the invention, and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION OF THE DRAWINGS

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings, which are described below. The embodiments disclosed below are not intended to be exhaustive or limit the invention to the precise form disclosed in the following detailed description. Rather, the embodiments are chosen and described so that others skilled in the art may utilize their teachings. It will be understood that no limitation of the scope of the invention is thereby intended. The invention includes any alterations and further modifications in the illustrated devices and described methods and further applications of the principles of the invention which would normally occur to one skilled in the art to which the invention relates.

Referring initially to FIGS. 1-3, a machine gun helicopter armament system 10 of the present disclosure supports a weapon 12 and is configured to be mounted to an external stores support assembly 14. The support assembly 14 may be coupled to an enclosure 13 of aircraft 16 in a known manner. Illustratively, the aircraft 16 comprises a UH-1Y helicopter including left and right support assemblies 14a and 14b mounted to the left and right sides of the helicopter 16. The enclosure 13 may be a crew compartment and illustratively includes a vertical mounting surface 150 and a horizontal floor 151. The helicopter 16 may also include additional weapons, such as rockets 18a and 18b, supported by and/or adjacent to the respective support assemblies 14a and 14b. More particularly, the support assemblies 14 may each include a pair of spaced apart downwardly extending arms 15 supporting a cross member 17 which, in turn, supports rockets 18. A pair of sway members 19, illustratively adjustable turn buckles, extend at an angle between the arms 15 and the cross member 17.

In the illustrative embodiment, the weapon 12 comprises a 50 caliber machine gun, such as a GAU-21 machine gun manufactured by FNH USA of McLean, Va. While a UH-1Y helicopter and a GAU-21 machine gun are used for illustrative purposes, it should be appreciated that other aircraft and weapons may utilize the armament system 10 of the present disclosure.

With reference to FIGS. 2 and 3, the armament system 10 illustratively includes a gun mount assembly 20 configured to support the machine gun 12 for azimuth movement (about a longitudinal (e.g. vertical) axis 21) and elevational movement (about a transverse (e.g. horizontal) axis 23). An ammunition canister and mounting assembly 22 is supported within the interior of the helicopter 16 and is configured to supply an ammunition belt 24 (FIG. 18) to the machine gun 12 through a feed chute 26. The feed chute 26 couples to the firing chamber of the machine gun 12 in a conventional manner. The feed chute 26 is illustratively formed of interconnected stainless steel segments to provide flexibility and may be manufactured by Standard Armament of Glendale, Calif.

With reference to FIGS. 4-10, the gun mount assembly 20 illustratively includes a cradle 28 operably coupled to a carriage 30. The machine gun 12 is coupled to the cradle 28 in a conventional manner. The cradle 28 includes a pair of later-

ally spaced apart side members 29 which are supported by the carriage 30. More particularly, the carriage 30 illustratively includes a U-shaped body or yoke 32 having laterally spaced apart uprights 34 receiving the cradle 28. The side members 29 of the cradle 28 are supported by a pivot coupling 36, illustratively defined by opposing studs 37 supported by uprights 34, for vertical pivoting movement (i.e., elevational or about axis 23) relative to the carriage 30. A base 38 connects the uprights 34 of the carriage 30 and is rotatably supported by a pintle 40. The pintle 40 extends downwardly through a hollow support shaft or mounting tube 42 of the external stores support assembly 14.

Referring now to FIG. 11, a first or upper end 43 of the pintle 40 is secured to the base 38 of the carriage 30 through fasteners 44, such as screws extending through a collar 45. A second or lower end 46 of the pintle 40 includes a nut 48 secured thereto and configured to secure the carriage 30 to the support assembly 14. More particularly, the nut 48 is threadably received on a threaded lower portion 47 of the pintle 40. A safety pin 49 prevents unintended loosening of the nut 48 by being received within slots 51 of nut 48 and passing through diametrically opposed openings 53 of pintle 40.

With reference to FIGS. 11-14, the pintle 40 permits rotational movement about axis 21 (i.e., azimuth) of the carriage 30. A pintle adapter or azimuth stop body 50 is supported by the mounting tube 42 and includes an arcuate raceway 52 extending between stops 54 and 56. A stud 57 including a pin 58 extends downwardly from the base 38 of the carriage 30 and is configured to ride within the raceway 52 as the carriage 30 is rotated about the longitudinal axis. The stops 54 and 56 define the rotational limits of travel for the carriage 30 about axis 21.

A pair of notches 60 and 62 are formed in the peripheral edge of the stop body 50 and are configured to alternately cooperate with a spring biased stow pin assembly 64 extending downwardly from the base 38 of the carriage 30. The stow pin assembly 64 illustratively includes a pin 63 slidably received within a receiver 65 and spring biased downwardly in a down position (FIG. 11). A handle 66 is coupled to an upper end of the pin 63 to permit a user to raise and lower the pin 63. The handle 66 is received within a first slot 67 when in a lowered position, and is received within a second slot 69 when in a raised position. When the pin 63 is lowered and received within notch 60 of the stop body 50, the carriage 30 supports the machine gun 12 in a position substantially perpendicular to the helicopter 16 (FIG. 2). When the pin 63 is lowered and received within notch 62 of the stop body 50, the carriage 30 supports the machine gun 12 in a stowed position substantially parallel to the helicopter 16 (FIG. 8).

With reference to FIGS. 15-17, a cradle elevation stop member 70 is secured to side member 29a of the cradle 28 and is configured to provide discrete set points, as defined by depressions or recesses 72a, 72b, 72c for the elevation of the machine gun 12. As shown in FIGS. 15 and 16, a spring biased toggle pin 74 may be set and released, through operation of a lever handle 75, in position within one of the recesses 72a, 72b, 72c to provide a desired set point for the angular orientation of the cradle 28 and hence the machine gun 12 about transverse axis 23. In the illustrative embodiment, the recesses 72a, 72b, 72c are circumferentially spaced apart along an arcuate pathway 76.

The ammunition canister and mounting assembly 22 is operably coupled to the machine gun 12 and includes an ammunition receptacle or canister 82 configured to receive a predetermined number of rounds of ammunition. In one illustrative embodiment, the canister 82 is configured to receive 600 rounds of ammunition forming ammunition belt 24. The

ammunition belt 24 is stored in a serpentine pattern within a storage compartment 81 of the canister 82 to facilitate feeding to the machine gun 12 through the feed chute 26. The ammunition belt 24 may be of conventional design as including a plurality of rounds including a casing 84 receiving a bullet 86, and a plurality of links 88 interconnecting adjacent casings 84 (FIG. 18). The casings 84 and links 88 are typically made of metal, such as brass.

As is known, when bullets 86 are fired from the machine gun 12, the spent casings 84 and associated links 88 are ejected at elevated temperatures. More particularly, spent casings 84 generally fall from the bottom of the machine gun 12 while links 88 are generally ejected from the side of the machine gun 12 opposite the feed chute 26. An ejection chute assembly 90 is provided to collect and distribute casings 84 and links 88 exiting from the machine gun 12 in order to reduce the likelihood of the casings 84 and links 88 from falling onto helicopter external stores, such as rockets 18, or within the operator compartment of the helicopter 16. More particularly, hot casings 84 and links 88 coming into contact with other stores on the helicopter 16 may adversely affect their operation and/or present safety concerns.

With reference to FIGS. 2-4, 19 and 20, the ejection chute assembly 90 includes a hopper 92 including an outlet opening 93 coupled to a downwardly extending ejection tube 94. The hopper 92 is illustratively formed of a durable metal, such as stainless steel or aluminum, and is received intermediate the uprights 34 of the carriage 30 and is coupled to the cradle 28. Referring further to FIGS. 19 and 20, the front end of the hopper 92 includes an inclined deflector 96 extending between first and second side walls 95a and 95b, while an end wall 97 extends between the side walls 95a and 95b at a rear end of the hopper 92. A bottom portion 99 extends between the side walls 95a and 95b intermediate the deflector 96 and the end wall 97. The bottom portion 99 defines the outlet opening 93 for receiving spent casings 84 and links 88.

The front end of walls 95 include a pair of notches 98 configured to receive a pin 100 extending laterally proximate a front end of the cradle 28 between side members 29 (FIG. 3). A collector 102 of the hopper 92 is defined between the side walls 95a and 95b, the deflector 96, and the end wall 97. A spacer tube 103 extends between a pair of apertures 104 formed within the side walls 95a and 95b and provides additional rigidity to the hopper 92. The spacer tube 103 is configured to slidably receive a laterally extending pin 106 for securing the ejection chute assembly 90 to the cradle 28. A cotter pin 105 is illustratively secured to the hopper 92 through a lanyard 107 and is configured to be received within an aperture 108 formed within the end of pin 106 to secure the pin 106 within the spacer tube 103.

The ejection chute assembly 90 is configured to facilitate conveyance of spent casings 84 and links 88 away from the gun 12, particularly when used in connection with a gun having a high rates of fire (for example GAU-21 with potential of 1,100 shots per minute). The deflector 96 cooperates with the outlet opening 93 (FIG. 19) to facilitate discharge of the spent casings 84 and links 88 into the ejection tube 94. More particularly, the deflector 96 is angled relative to the gun 12 such that spent casings 84 deflect or ricochet off of the deflector 96, pass through the outlet opening 93, and into the ejection tube 94, without tending to collect or jam by bridging the opening 93. The angle of deflection of the spent casings 84 is determined by the angle of discharge of the casings 84 from the gun 12 and the angle of the deflector 96 relative to the gun 12. In the illustrative embodiment shown in FIG. 6, the deflector 96 is angled from the longitudinal axis 109 of the gun barrel by about 47 degrees (+/-5 degrees). As such, the

angle α as shown in FIG. 20 is about 47 degrees (+/-5 degrees) and the angle between the bottom portion 99 and the deflector 96 is about 133 degrees (+/-5 degrees).

As shown in FIG. 19, the ejection tube 94 illustratively includes a flexible portion 110 having an upper end coupled to a cylindrical connector 111 of the hopper 92 through a band clamp 112. A bottom portion of the connector 111 has an enlarged, illustratively flared, portion 113 having an increased diameter to prevent the clamp 112, and hence the tube 94, from slipping off of the hopper 92. An end sleeve 114 defines a lower open end 116 of the ejection tube 94 and is coupled to the flexible portion 110 through fasteners, such as grommets 118. The flexible portion 110 is illustratively formed of a heat and flame resistant material. In one illustrative embodiment, the flexible portion 110 is formed of CEET ducting, including a support formed of a copper coated or bronze plated spring steel wire helix, a liner and a cover formed of woven fiberglass fabric impregnated and coated with neoprene rubber, and a fiberglass cord impregnated with neoprene rubber supported outside of the cover. The end sleeve 114 may comprise a heat shrinkable insulation sleeving that is configured to prevent damaging contact with the lower end of the flexible portion 110 and fraying thereof.

A securing device 120 illustratively secures the ejection tube 94 to the support 18. The securing device 120 may comprise a releasable clip 122 coupled to a ring 124 which, in turn, is secured to the flexible portion 110 of the ejection tube 94 by a band clamp 126. The clip 122 coupled to one of the sway members 19 of the support 18 to restrict movement of the ejection tube 94 (FIG. 2).

An upper opening 128 of the hopper 92 collects the ejected casings 84 and directs them to the tube 94. Similarly, first and second ports or receivers 130 are supported by opposing side walls 95 of the hopper 92 and collect the ejected links 88 and direct them to the tube 94. As noted above, the links 88 are generally ejected from the side of machine gun 12 opposite the feed chute 26. As such, a link chute 132 is coupled to the receiver 130 opposite the feed chute 26 (FIG. 2). The opposing receivers 130 provides flexibility for coupling link chute 132 to opposing sides of the machine gun 12 depending upon the orientation thereof (for example, left or right side of the helicopter 16). In other words, the link chute 132 may be positioned on either side of the machine gun 12, opposite the feed chute 26. The link chute 132 is illustratively formed of interconnected stainless steel segments to provide flexibility and may be manufactured by Standard Armament of Glendale, Calif.

In operation, ejected casings 84 drop through the upper opening 128 of the hopper 92, while links 88 pass through the link chute 132 and through the receiver 130 of the hopper 92. The casings 84 and links 88 pass through the collector 102 and down through the ejection tube 94. The ejection tube 94 directs the ejected casings 84 and links 88 away from the helicopter 16. Combining the casings 84 and links 88 in the hopper 92 reduces space requirements and reduces operational issues with the machine gun 12. More particularly, the ejection chute assembly 90 facilitates ejection of casings 84 and links 88 associate with weapons operating at high rates of speed (for example, at the GAU-21 machine gun).

With reference to FIGS. 2-5 and 21, the ammunition canister 82 is configured to be releasably coupled to the interior of the helicopter 16 through a mounting assembly 144. As shown in FIGS. 22 and 23, the canister 82 illustratively includes a first side wall 134, and a second side wall 136 extending parallel to the first side wall 134. A first end wall 138 extends between the first side wall 134 and the second side wall 136. A second end wall 140 extends between the first

side wall **134** and the second side wall **136** in spaced relation to the first end wall **138**. The storage compartment **81** is defined by the walls **134**, **136**, **138**, and **140** and is accessible through an open upper end **142**.

Referring now to FIGS. **22**, **24**, and **25**, the mounting assembly **144** includes a pair of first mounting members, illustratively a first or left receiver **146** and a second or right receiver **148** supported by a vertical mounting surface **150**. The mounting surface **150** may comprise the longitudinally extending transmission wall of the helicopter **16**. The receivers **146** and **148** each illustratively include a first or lower coupler **152a** and a second or upper coupler **152b** supported by a base **153** secured to mounting surface **150**. With reference to FIGS. **24** and **25**, each coupler **152a** and **152b** illustratively includes a C-shaped bracket **154** having an upper arm **156** and a lower arm **158** defining an end bracket receiving opening **160**. A resilient pad **161**, illustratively a polyurethane foam, may be supported by the base **153** and provides a cushion between the canister **82** and the mounting surface **150**.

Referring further to FIGS. **22** and **23**, a pair of second mounting members, illustratively a first or left end bracket **162** and a second or right end bracket **164** are secured to opposing first and second end walls **138** and **140**, respectively, of the canister **82**. Each bracket **162**, **164** includes laterally spaced apart openings **166a** and **166b** (FIG. **23**). The first end bracket **162** is configured to be releasably coupled to the first receiver **146**, and the second end bracket **164** is configured to be releasably coupled to the second receiver **148**. More particularly, a first pin **170** is illustratively slidably received by the first end bracket **162** and the lower coupler **152a** of first receiver **146**, while a second pin **172** is illustratively slidably received by the second end bracket **164** and the lower coupler **152a** of the second receiver **148**.

As shown in FIG. **22**, the arms **156** and **158** of the brackets **154** each include upper and lower bushings **171** and **173**, respectively, configured to slidably receive one of the pins **170** and **172**. Each pin includes a spring biased ball **174** configured to engage respective bushing **171**, **173** as the pin **170**, **172** is moved axially therethrough.

A third pin **176** is illustratively slidably received by the upper coupler **152b** of the first receiver **146**, while a fourth pin **178** is illustratively slidably received by the upper coupler **152b** of the second receiver **148**. The pins **170**, **172**, **176**, **178** are secured to the respective bases **153** by lanyards **180**.

The combination of lower coupler **152a** and upper coupler **152b** for each receiver **146** and **148** facilitates mounting of different size ammunition canisters to the mounting surface **120**. In the illustrative embodiment, the receiver **146** and **148** may be utilized to mount either GAU-21 or GAU-17 ammunition canisters. The upper couplers **152b** provide additional flexibility in mounting canisters **82** of varying sizes (for example, to accommodate different types, sizes, and amounts of ammunition). For example, canister **82** of FIG. **22** includes only single brackets **162** and **164** on each end wall **138** and **140**, while larger canisters **82** may be taller and have a second set of brackets (not shown) above the brackets **162** and **164** for coupling with couplers **152b**.

The left and right end brackets **162** and **164** are mirror images of each other to facilitate mounting of the canister **82** on either side of the helicopter **16**. In other words, the canister may be coupled with the first side wall **134** facing the mounting surface **150** in a first orientation, and may be coupled with the second side wall **134** facing the mounting surface **150** in a second orientation (i.e., rotated 180 degrees about a vertical axis).

With reference to FIGS. **26-28**, the ammunition canister **82** also includes a lid **182** coupled to second side wall **136** by a hinge **184** to cover at least a portion of open upper end **142**. A latch **186** is supported opposite the hinge **184** and is configured to engage a catch **188** supported by the first side wall **134**.

As shown in FIG. **22**, a first outlet opening **190** is defined between the lid **182** and the first end wall **138**, while a second outlet opening **192** is defined between the lid **182** and the second end wall **140**. The ammunition feed chute **26** may be operably coupled to the canister **82** above the first outlet opening **190** in the first orientation of the canister **82** (FIG. **21**), and may be operably coupled to the canister **82** above the second outlet opening **192** in the second orientation of the canister **82**. A first pair of feed chute catches **194** are supported by the first and second side walls **134** and **136** adjacent the first outlet opening **190**, and a second pair of feed chute catches **196** are supported by the first and second side walls **134** and **136** adjacent the second outlet opening **192**. Rollers **198** are provided on opposing sides of the lid **182** to facilitate feeding of the ammunition belt **24** from the canister **82** through the feed chute **26**.

The ammunition feed chute **26** extends from the outlet opening **190,192** of the ammunition canister **82** to a receiver chamber **199** of the gun **12**. The canister **82** is mounted adjacent the vertical mounting surface **150** and the floor **151** to minimize the consumption of usable space within the enclosure **13**, and to ensure sufficient positioning of the feed chute **26** so it limits restrictions on movement of the ammunition belt **24** through the feed chute **26** over the full range of movement of the gun **12**. The outlet opening **190, 192** of the ammunition canister **82** is illustratively positioned below the receiver chamber **199** of the gun **12** to reduce the bending of the feed chute **26** therebetween and limit the drag on the ammunition belt **24** traveling through the feed chute **26**.

With reference to FIGS. **26** and **27**, end walls **138** and **140** of the canister **82** include sights **200** such that ammunition belt **24** remaining in the storage compartment **81** of canister **82** is visible. As such, the operator can view how much ammunition is remaining or needs to be added. Illustratively, the sight **200** comprises a pair of upper vertical slots **202** formed in the first and second end walls **138** and **140** above the respective end brackets **162** and **164**, and a pair of lower vertical slots **204** formed in the first and second end walls **138** and **140** below the respective end brackets **162** and **164**.

While this invention has been described as having an exemplary design, the present invention may be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains.

The invention claimed is:

1. A weapon system comprising:

a machine gun;

a gun cradle supporting the machine gun;

an ejection chute assembly including a hopper having a first side wall, a second side wall, a bottom portion defining an opening and coupled between the first side wall and the second side wall, and a deflector coupled between the first side wall and the second side wall and extending at an obtuse angle to the bottom portion, the ejection chute assembly further including an ejection tube having an upper end coupled to the opening of the bottom portion of the hopper and an open lower end, the

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deflector of the hopper configured to deflect spent casings from the machine gun toward the opening and the ejection tube;
a link chute, wherein the hopper further includes a receiver supported by each side wall and configured to couple to the link chute;
wherein the hopper further includes an open upper end and a downwardly extending cylindrical connector, and a band clamp coupling the ejection tube to the connector of the hopper.
2. The weapon system of claim **1**, wherein the obtuse angle between the deflector and the bottom portion is between 128 degrees and 138 degrees.

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3. The weapon system of claim **1**, further comprising a first pin coupling a front end of the hopper to the gun cradle, and a second pin coupling a rear portion of the hopper to the gun cradle.
4. The gun mount assembly of claim **3**, further comprising a spacer tube extending between the first and second side walls of the hopper, the second pin extending through the spacer tube and through laterally spaced side members of the gun cradle.

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