US 20060120009A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2006/0120009 A1

Chudy, II (43) Pub. Date: Jun. 8, 2006

(54) NON-LETHAL ELECTRICAL DISCHARGE WEAPON HAVING A SLIM PROFILE

(76) Inventor: John F. Chudy II, Yucaipa, CA (US)

Correspondence Address:
LEONARD TACHNER, A PROFESSIONAL LAW
CORPORATION
17961 SKY PARK CIRCLE, SUITE 38-E
IRVINE, CA 92614

(21) Appl. No.: 11/003,276

(22) Filed: Dec. 3, 2004

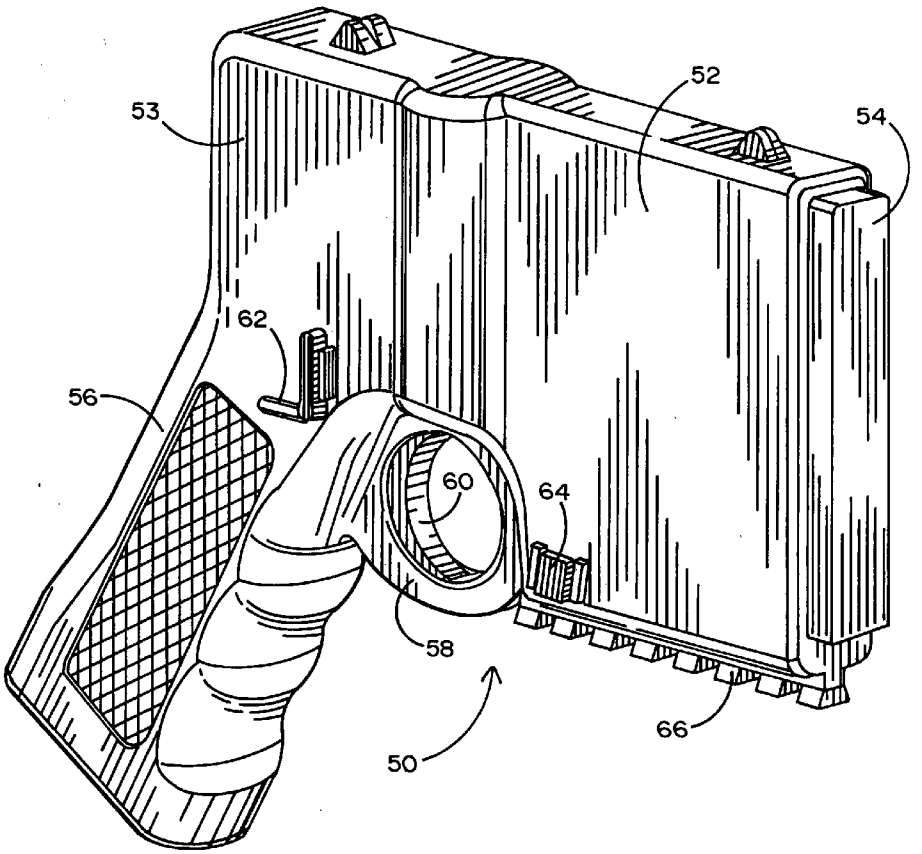
Publication Classification

(51) Int. Cl.
F41B 15/04 (2006.01)
F41C 9/00 (2006.01)

(52) U.S. Cl. 361/232; 42/1.08; 89/1.11

(57) ABSTRACT

An electrical discharge weapon configured as a lightweight, slim profile gun-shaped weapon which is less than one inch thick along the cartridge receiving chamber so that it can be readily placed in a police officer's uniform pocket or in a slim-line holster for easy deployment. All of the major internal components, including battery and transformer, are positioned above or behind the trigger aperture so that even with the dart cartridge in the chamber, the weapon's center of gravity is through the hand so that it is balanced and easily aimed at the target. The invention employs a specially configured chamber to receive a unique cartridge with widely separated darts. As a result, the electrodes may be also widely separated so that current will not jump the electrode gap even when the impacted darts leave a substantial gap to a suspect's skin. Thus, the present invention is more likely to be effective against suspect's wearing thick outerwear. The spent cartridge may be expelled by a spring-activated release for quick ejection and rapid reload. A bottom rail permits connection of another non-lethal device such as a mace canister for use as a secondary weapon or the attachment of tactical lighting or laser aiming devices. A push-on/push-off trigger switch is combined with a mechanical safety device to assure weapon effectiveness and safety for the police officer. Quick disconnect battery clip allows for rapid battery replacement.



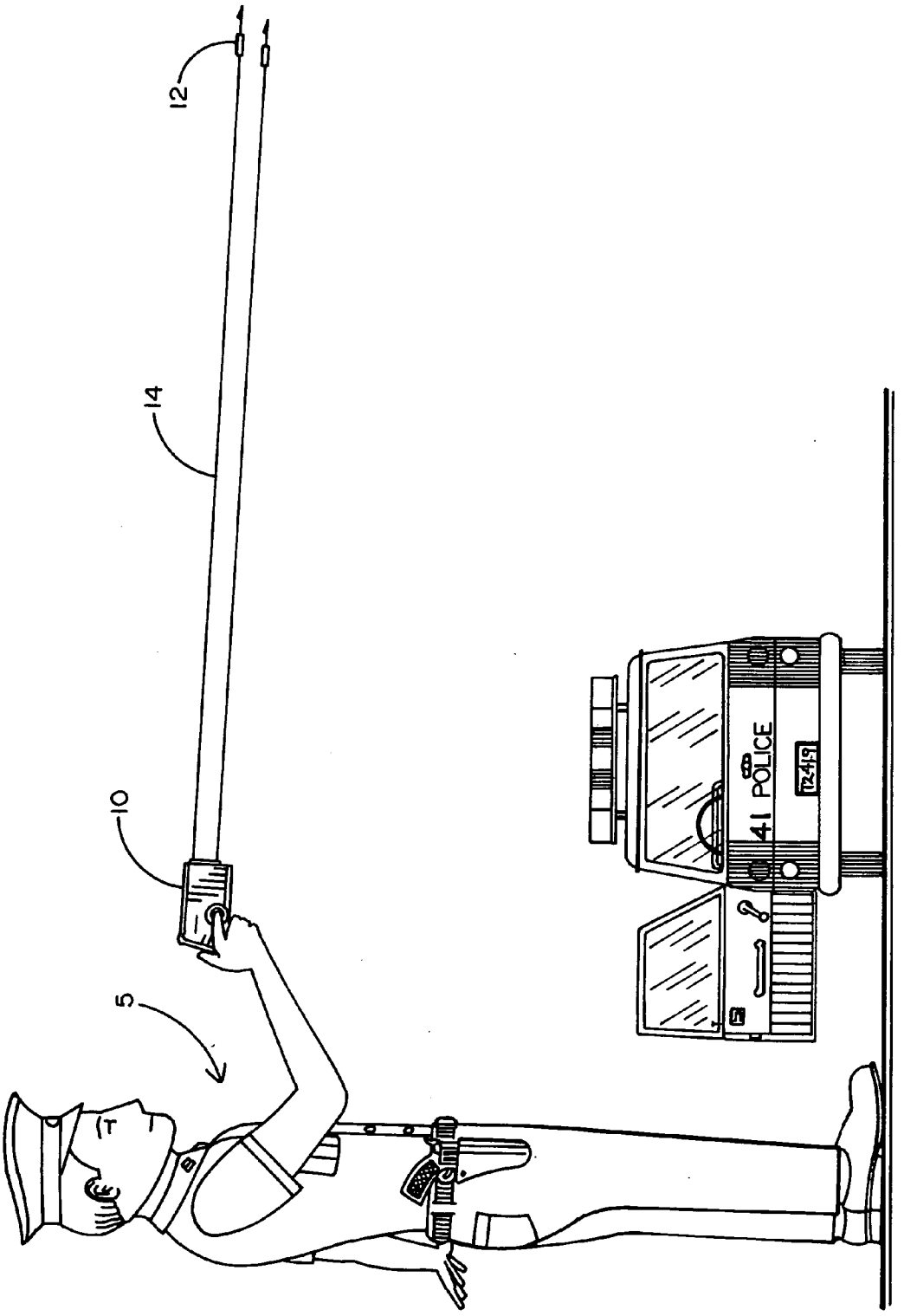


FIG. 1

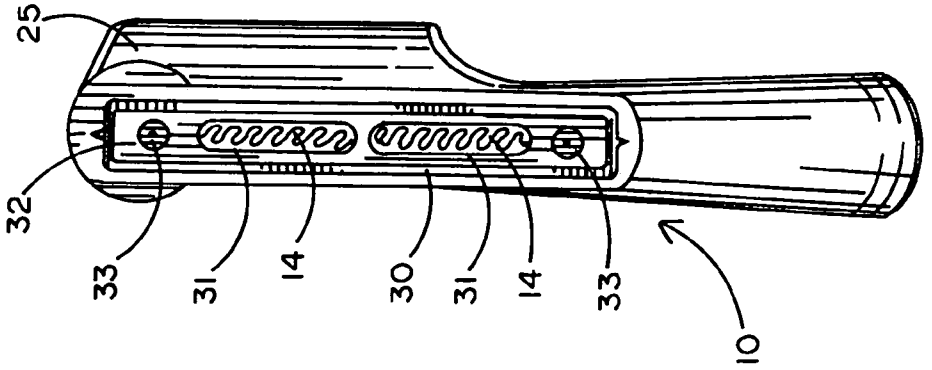


FIG. 3

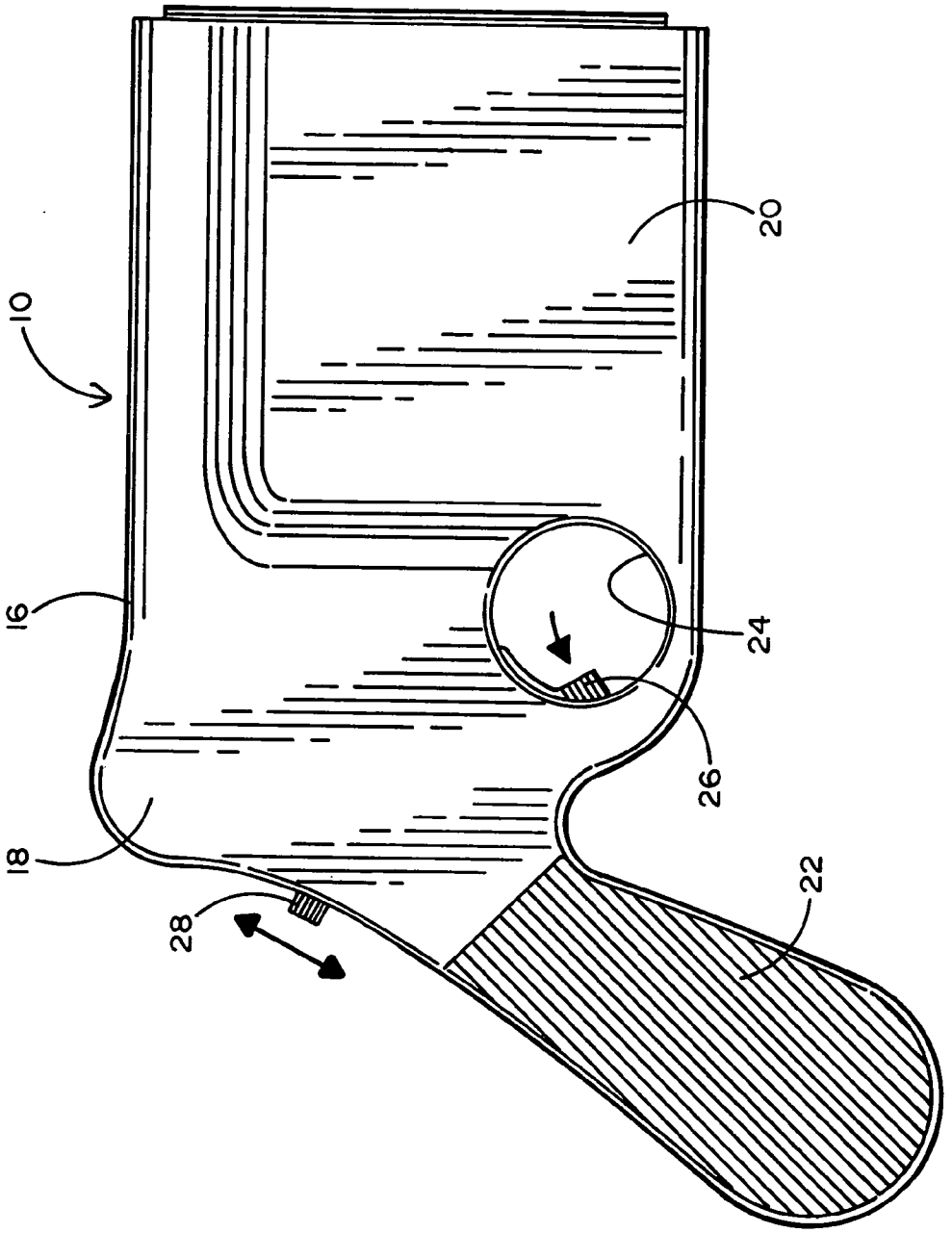


FIG. 2

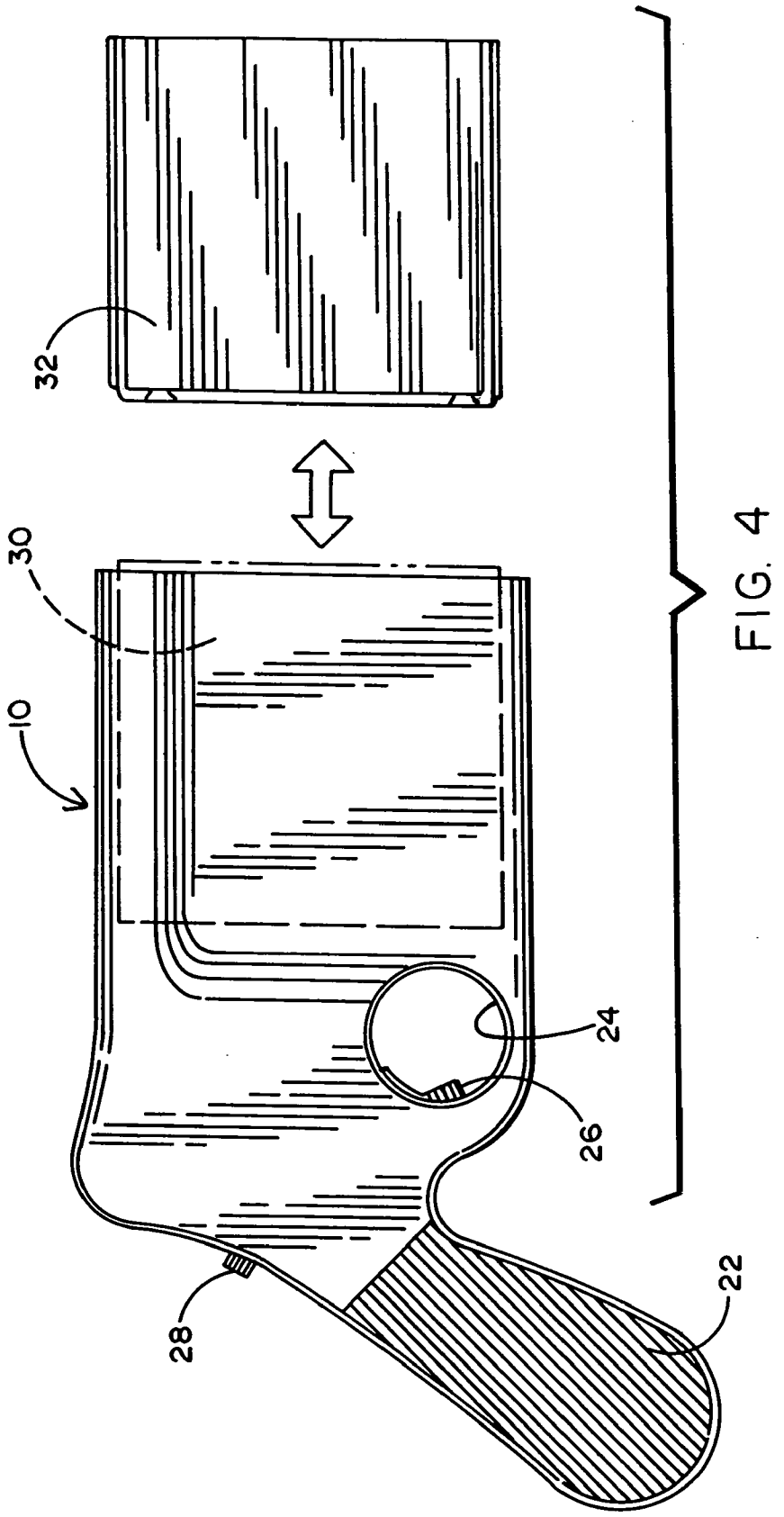


FIG. 4

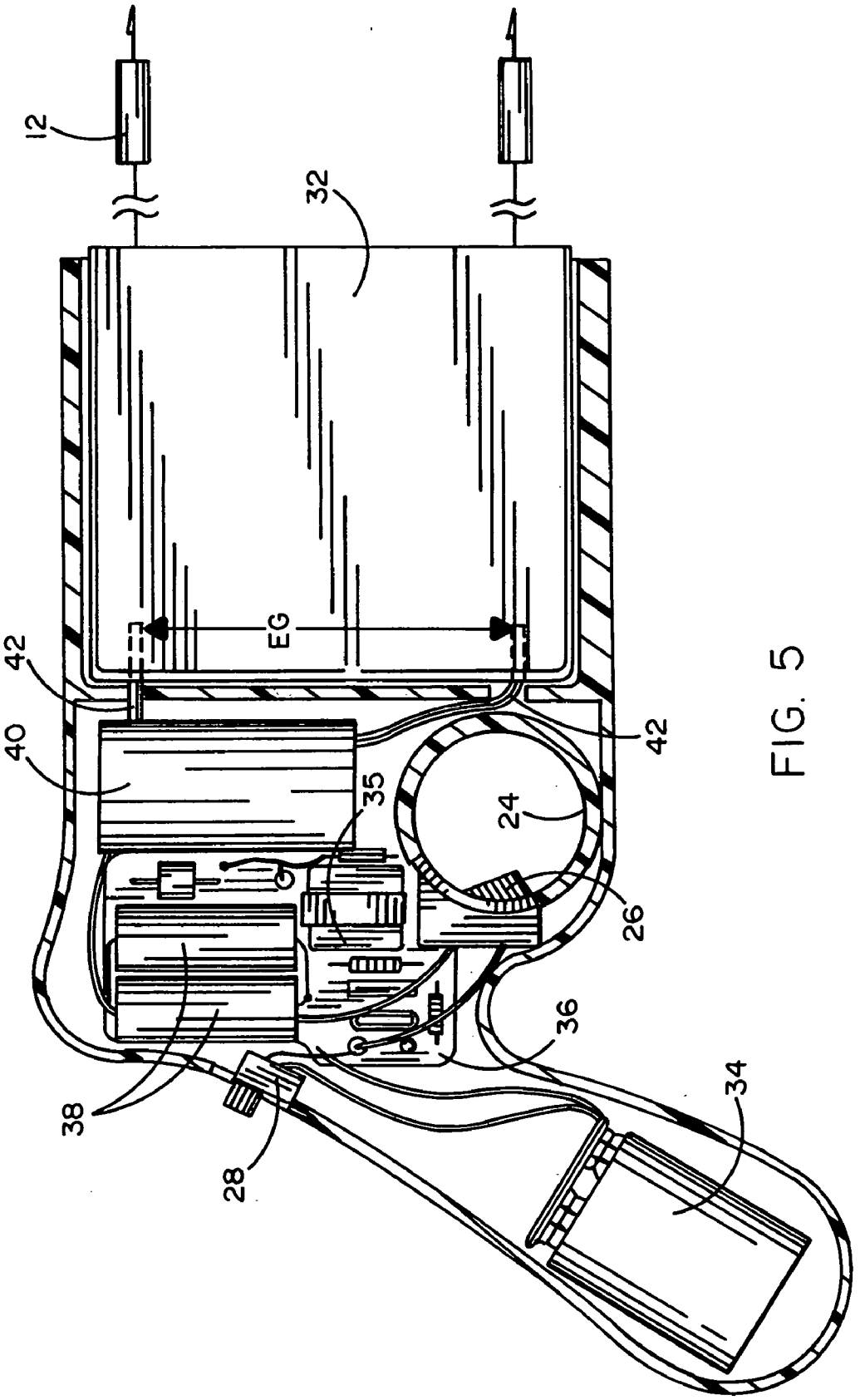


FIG. 5

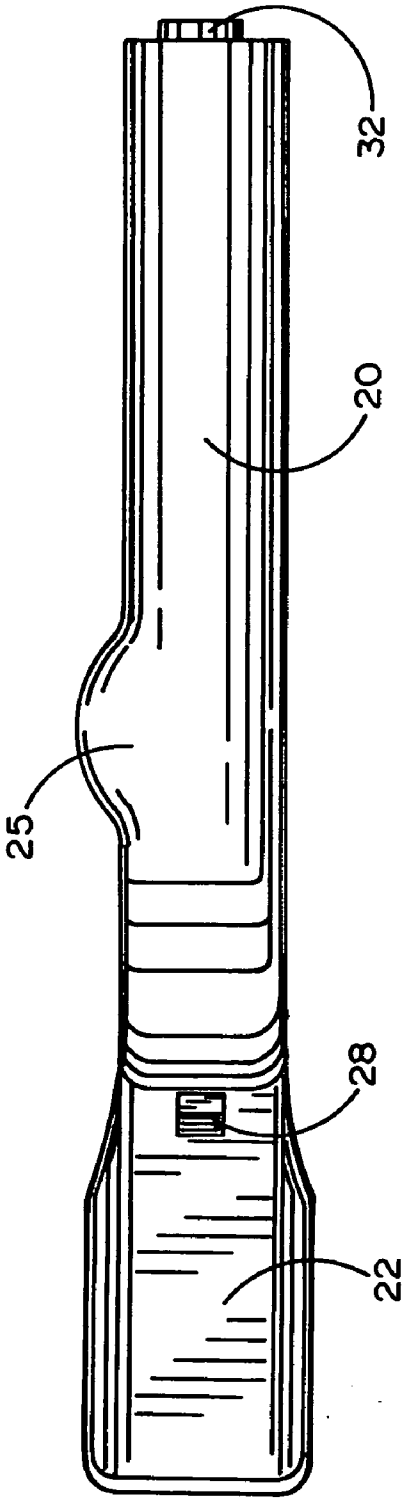


FIG. 6

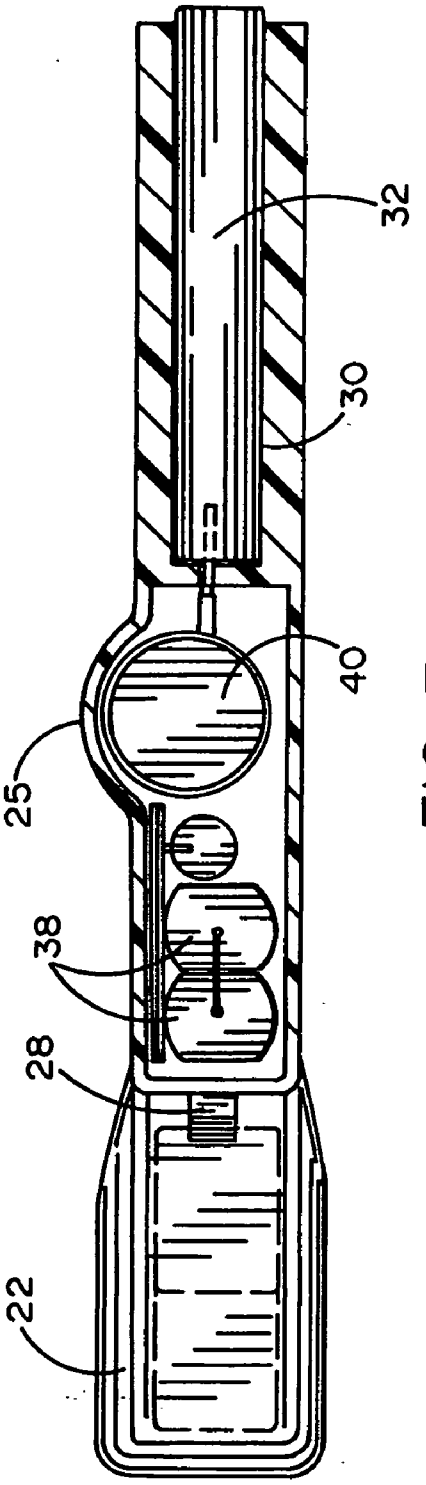


FIG. 7

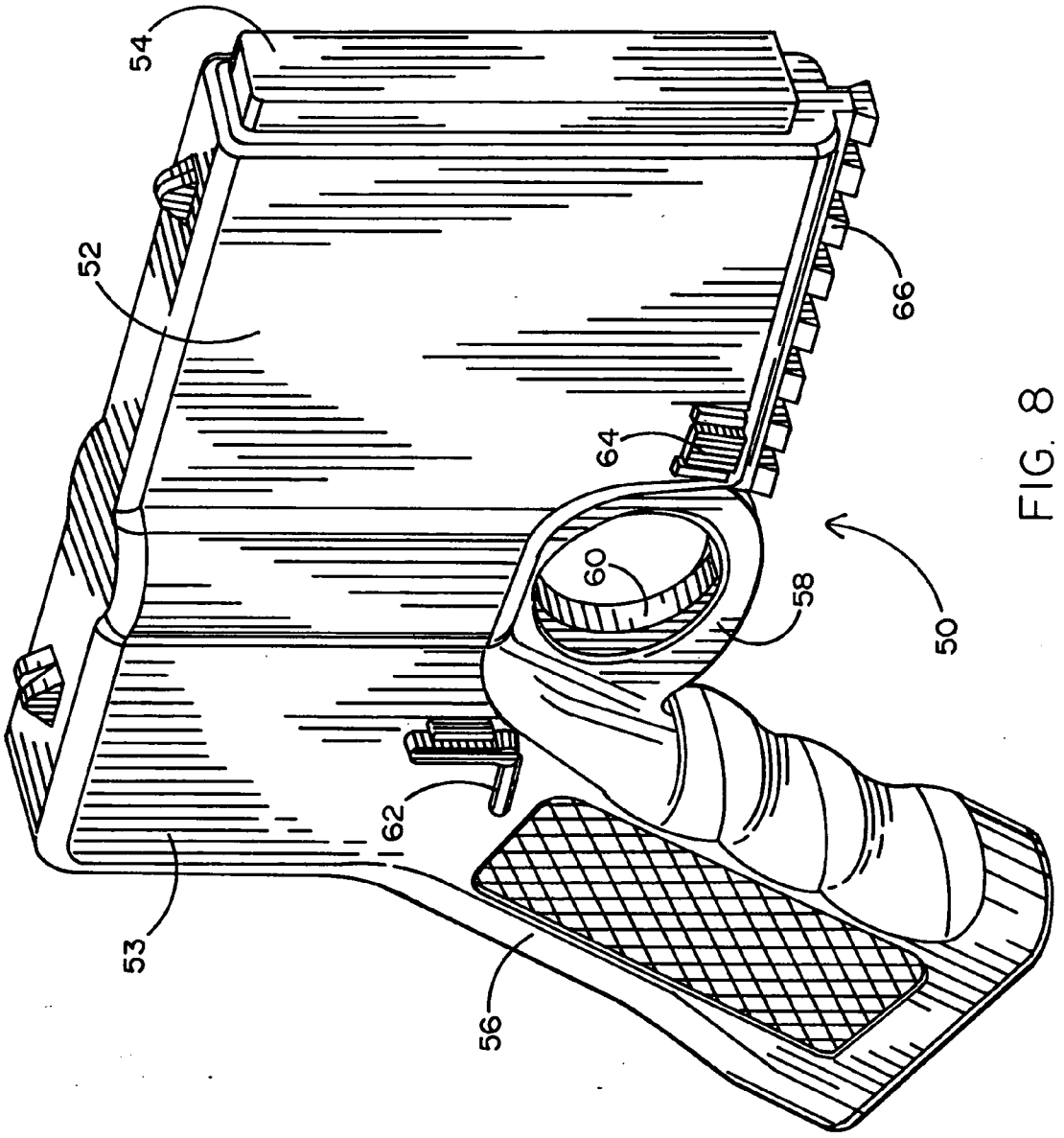


FIG. 8

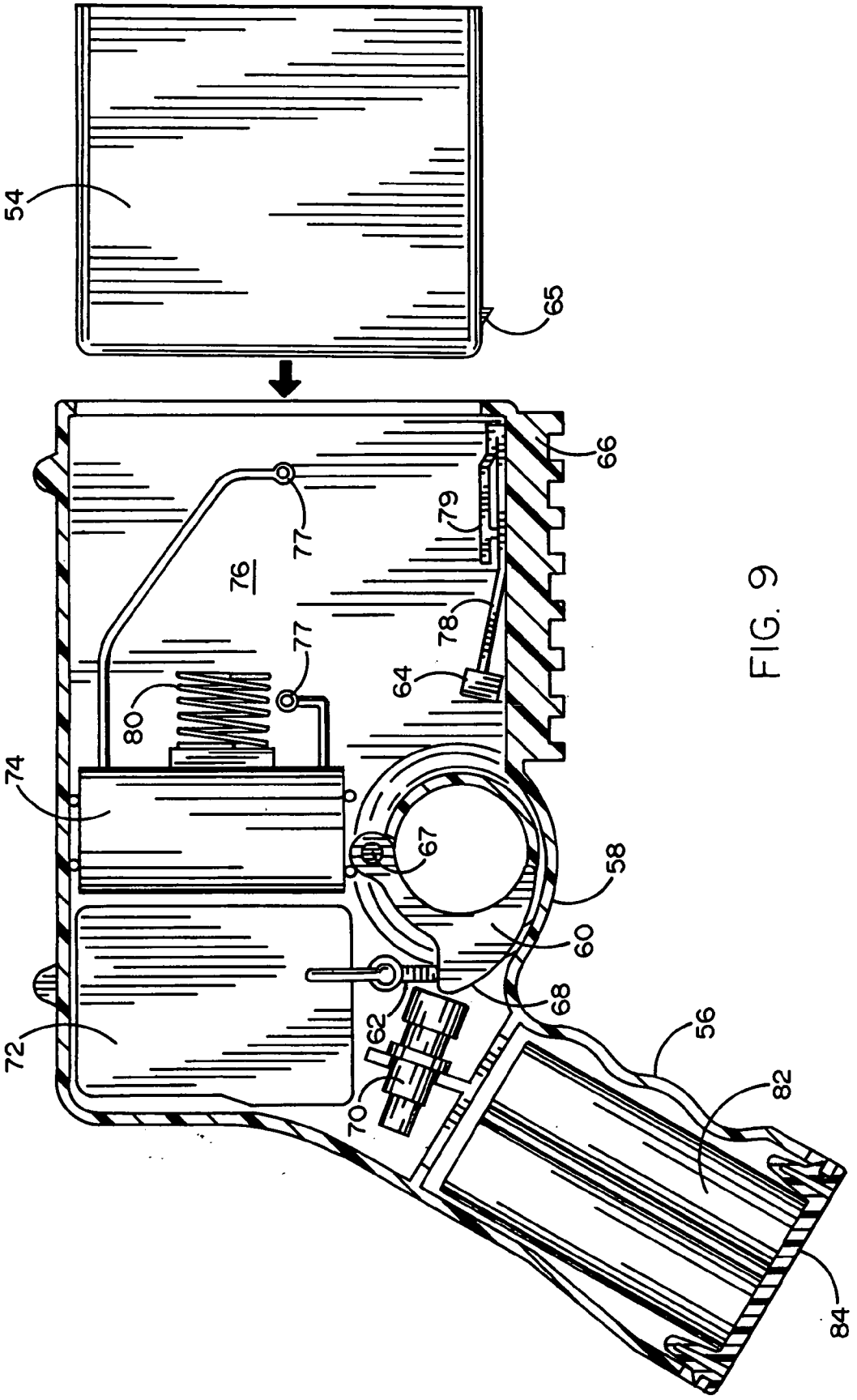


FIG. 9

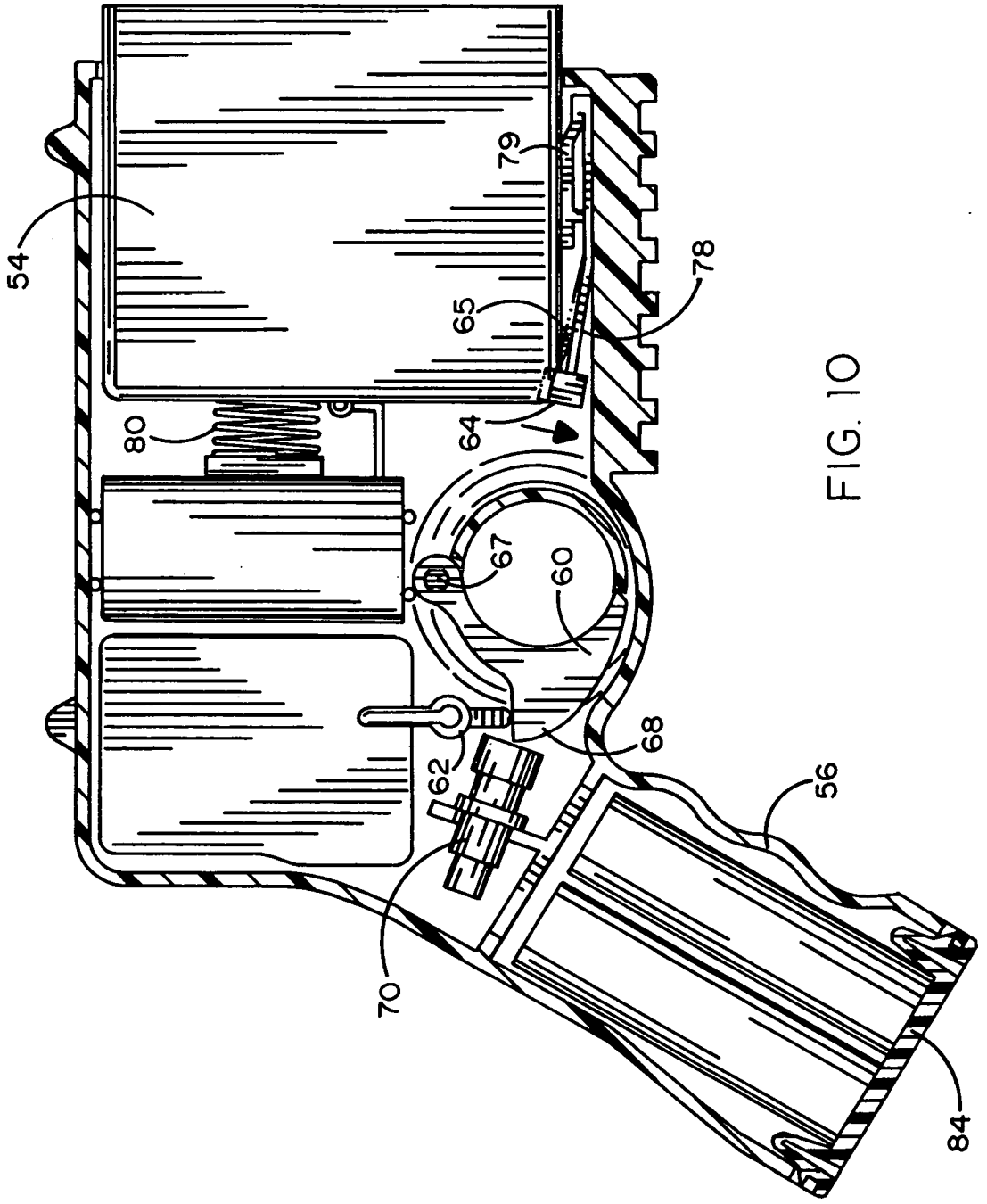


FIG. 10

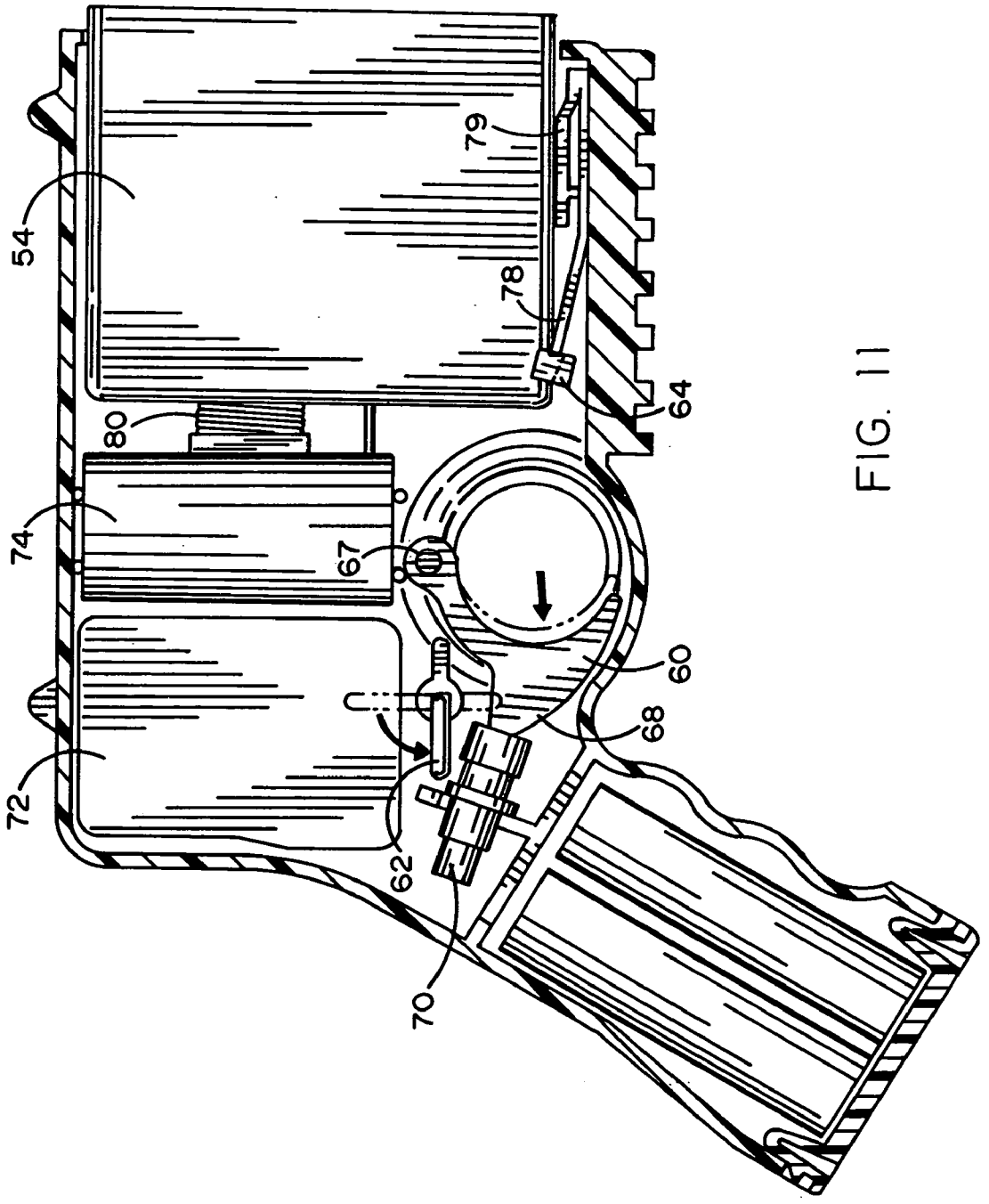


FIG. 11

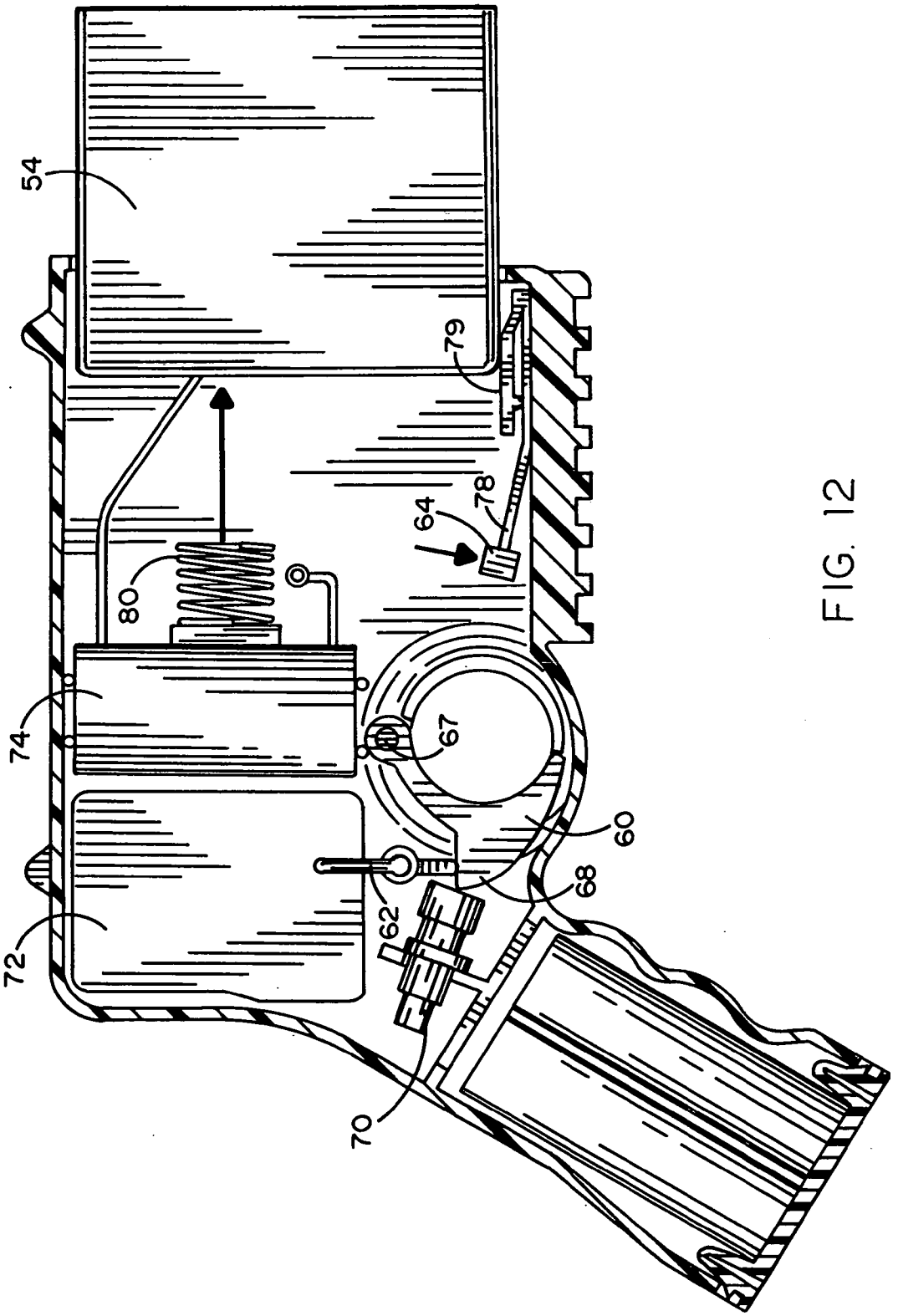


FIG. 12

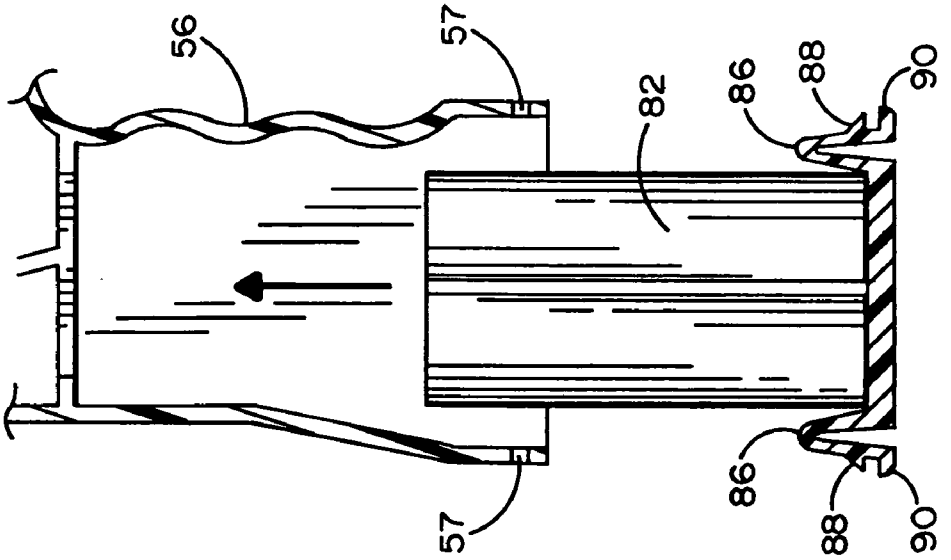


FIG. 14

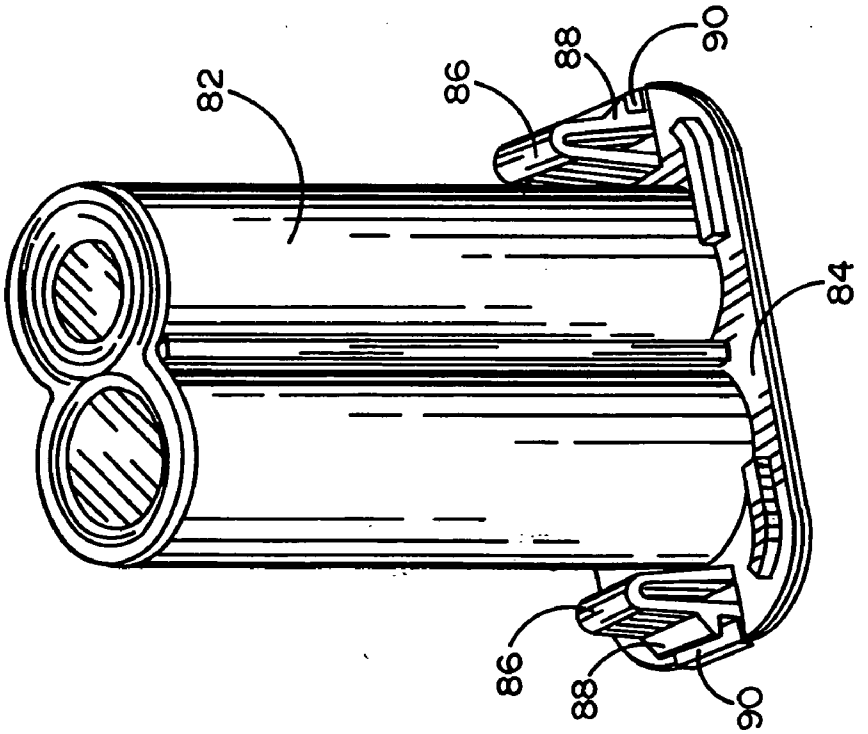


FIG. 13

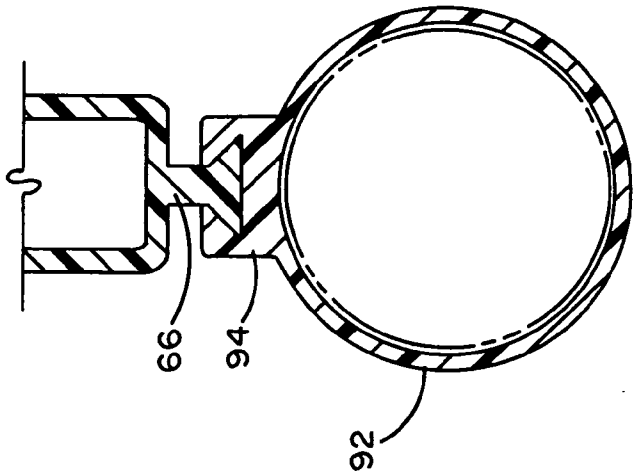


FIG. 17

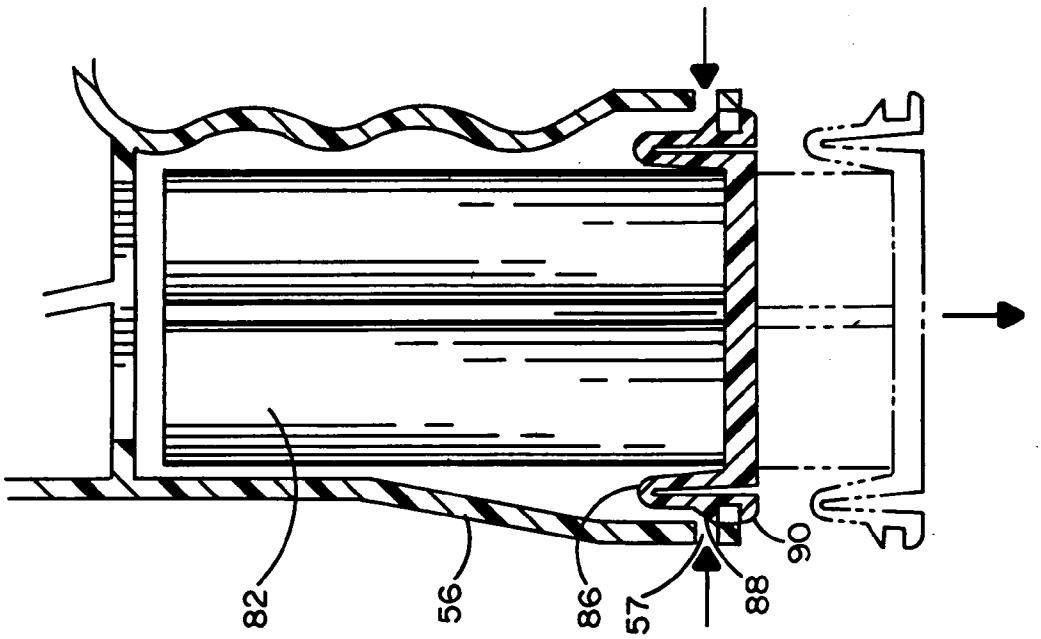


FIG. 15

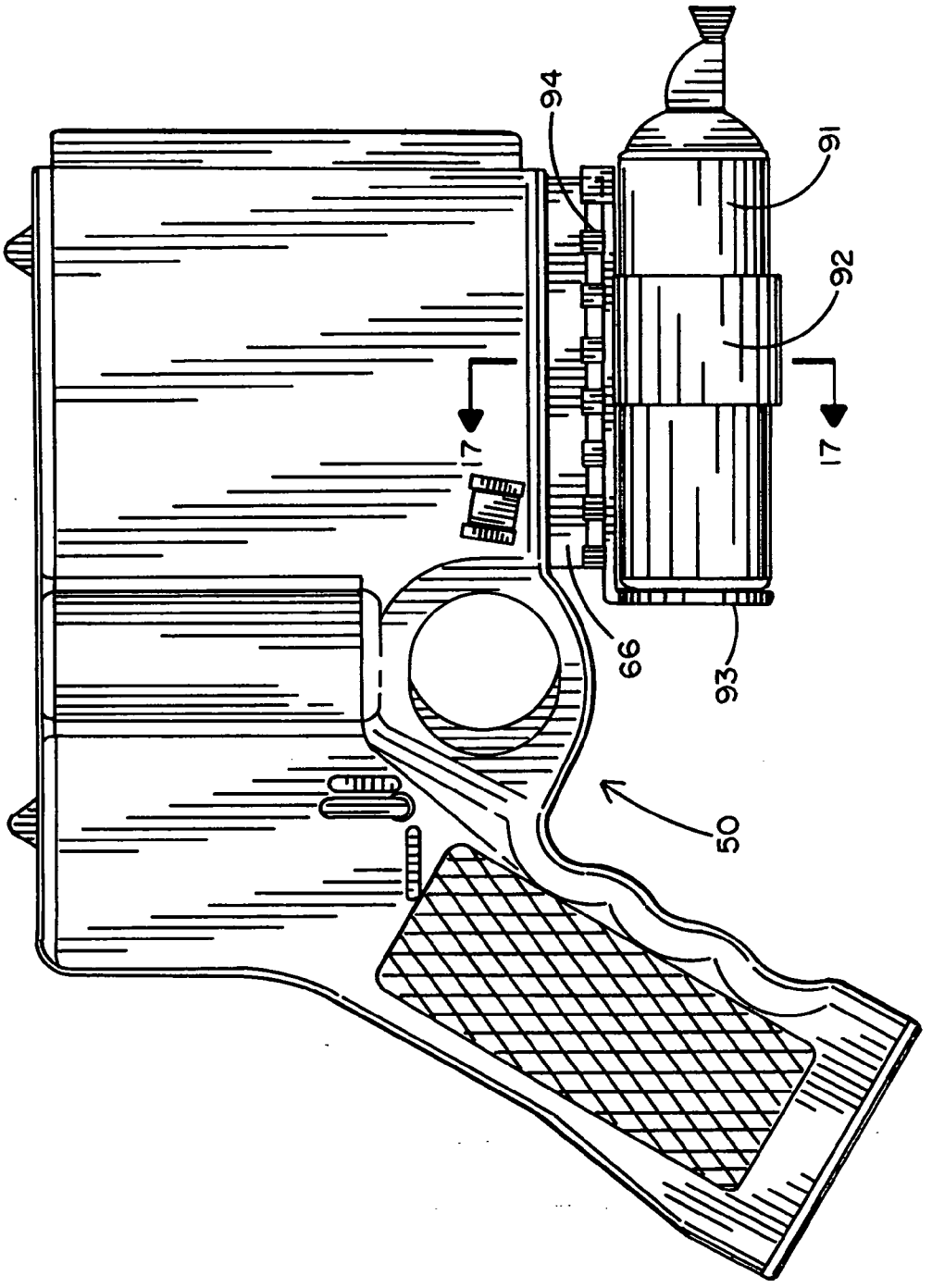


FIG. 16

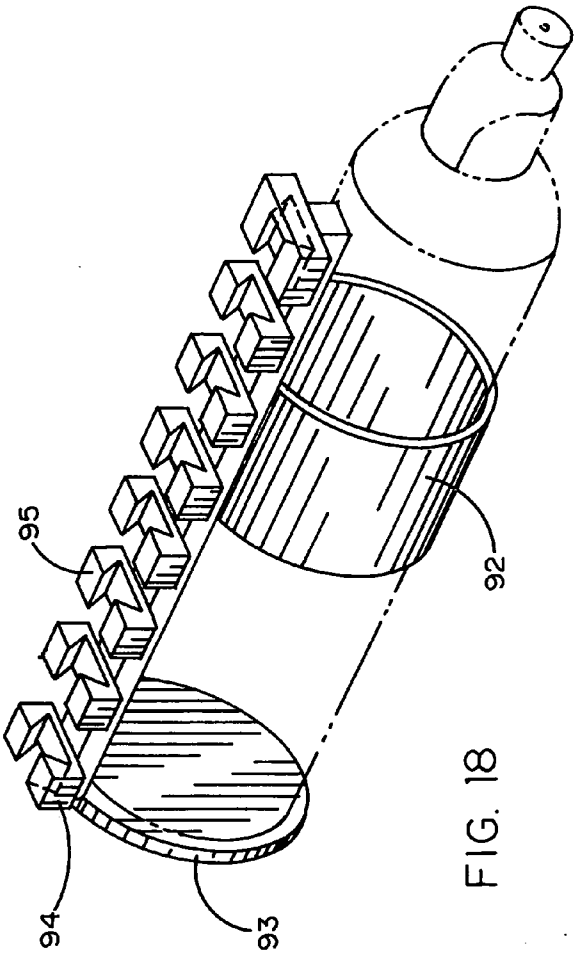


FIG. 18

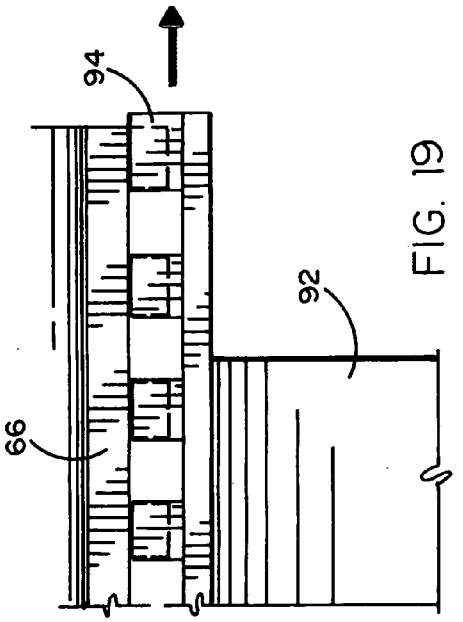


FIG. 19

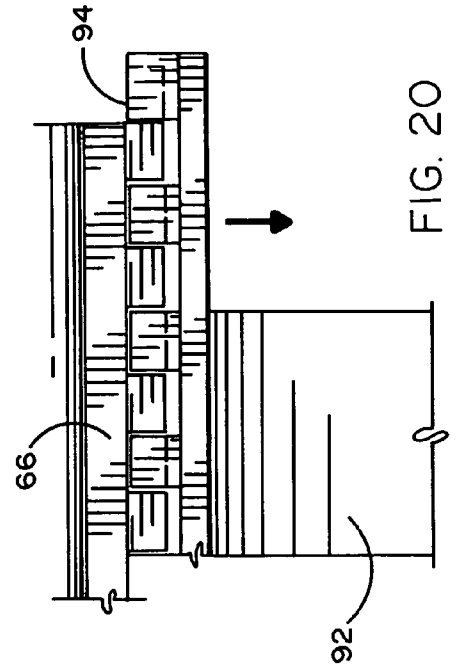


FIG. 20

NON-LETHAL ELECTRICAL DISCHARGE WEAPON HAVING A SLIM PROFILE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates generally to the field of non-lethal electrical discharge weapons for subduing a remote target using a pair of propelled wire-tethered darts. The invention relates more specifically to a slim profile electrical discharge hand gun configured for more convenient deployment from a pocket or holster by a police officer and for better balance in a police officer's hand which promotes increased accuracy.

[0003] 2. Background Art

[0004] Non-lethal electrical discharge hand guns which are also referred to as stun guns, have over the past twenty-five years or so, become an immobilization weapon of choice for many police agencies and other law enforcement bodies. Such weapons impart a temporarily debilitating electrical charge immobilizing a suspect, but without causing permanent injury or harm. They give a law enforcement officer sufficient time to handcuff or otherwise subdue and secure a suspect with little or no risk of injury to the officer or to the suspect. Typically, such weapons employ an electrically actuatable cartridge containing a pair of wire-tethered darts which are propelled from the cartridge by an explosive charge. The darts travel along a generally ballistic path where they contact the suspect at two spaced-apart locations. An electrical current (typically a high voltage pulsed discharge) is then imparted through the wires and darts with some portion of the suspect's body completing the electrical circuit. Most often, the darts become embedded in the suspect's outer garments which may or may not (depending on the thickness of the garment's material) prevent direct contact of a dart with the suspect's underlying skin surface. Direct skin contact is not always necessary to complete the electrical circuit because the higher voltages employed (i.e., 50,000 volts) permit the electrical current to "jump" across the gap remaining between the dart and the skin. A typical electrical discharge weapon of the prior art is disclosed for example in issued U.S. Pat. No. 5,654,867 issued Aug. 5, 1997 to inventor John Murray, the content of which is incorporated herein by reference. One of the most significant characteristics of this prior art weapon, readily apparent by simply looking at the drawings therein, is the physical size and shape of the disclosed embodiment. More specifically, one will readily observe that the weapon is relatively big and bulky and therefore requires an especially large holster to carry the weapon when it is not deployed. Police officers already carry a significant number of heavy and bulky items on their person. They carry a standard handgun in a holster. They also often carry a night stick, a mace container, extra ammunition, handcuffs, a communication device and various other accessories that they may need out in the field. The addition of a relatively large electrical discharge weapon adds significantly to their burden and is inconvenient at best and often an impractical impediment to an officer's mobility. The large size and bulkiness of an electrical discharge weapon often results in their being left in a patrol car or their being treated as equipment for use only by special request which limits their access and often results in delay in deploying them to an officer who needs one in an emergency situation.

[0005] Once in the hand of an officer, the effectiveness of an electrical discharge weapon depends on the accuracy with which the wire-tethered darts can be fired at a remotely positioned target. If one or both darts fail to reach the suspect, or hit the target at an extremity instead of the torso, the weapon will be ineffective and may leave the officer with no choice but to deploy his or her lethal weapon at a now irritated and close suspect. Unfortunately, a large, heavy and bulky electrical discharge weapon, particularly one which is not well-balanced, but is heavily front-loaded, is difficult to aim and fire accurately at a target up to 15 or 20 feet from the officer, particularly if the suspect is agitated and uncooperative as is often the case in circumstances where an electrical discharge weapon is to be used. Moreover, if the suspect is wearing thick outerwear such as a bulky down jacket or heavy sweater, the gap between each dart and the suspect's body surface may be too large to permit a spark to jump across the gap to complete an electrical circuit between the darts. This problem is especially likely to occur when the distance between the electrodes at the fired gun is less than the gap between either dart and the suspect's skin. Thus, if a dart remains say more than one inch from a suspect's skin after impact and there is only one inch or less between electrodes at the fired weapon, electrical current will seek the least resistant path at the shorter electrode gap and not jump the longer gap between the dart and the suspect.

[0006] Therefore, it will be understood that it would be highly advantageous if there were an electrical discharge weapon which had one or more of the following novel attributes:

[0007] (a) a lightweight configuration including a slim profile for easy storage;

[0008] (b) a well-balanced weight distribution that promotes easy aiming for increased accuracy; and

[0009] (c) increased electrode separation to permit effective operation against suspects having thick outerwear.

SUMMARY OF THE INVENTION

[0010] The present invention is an electrical discharge weapon having the aforementioned attributes. The preferred embodiment disclosed herein is configured as a lightweight, slim profile gun-shaped weapon which is less than one inch thick along the cartridge receiving chamber so that it can be readily placed in a police officer's uniform pocket or in a slim-line holster for easy deployment. All of the major internal components, including battery and transformer, are positioned above or behind the trigger aperture so that even with the dart cartridge in the chamber, the weapon's center of gravity is through the hand so that it is balanced and easily aimed at the target. The invention employs a specially configured chamber to receive a unique cartridge with widely separated darts. As a result, the electrodes may be also widely separated so that current will not jump the electrode gap even when the impacted darts leave a substantial gap to a suspect's skin. Thus, the present invention is more likely to be effective against suspect's wearing thick outerwear. The spent cartridge may be expelled by a spring-activated release for quick ejection and rapid reload. A bottom rail permits connection of another non-lethal device such as a mace canister for use as a secondary weapon or the attachment of tactical lighting or laser aiming devices. A

push-on/push-off trigger switch is combined with a mechanical safety device to assure weapon effectiveness and safety for the police officer. Quick disconnect battery clip allows for rapid battery replacement.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The various embodiments, features and advances of the present invention will be understood more completely hereinafter as a result of a detailed description thereof in which reference will be made to the following drawings:

[0012] **FIG. 1** is a view of a first embodiment of the present invention shown being deployed and fired by a police officer;

[0013] **FIG. 2** is a side view of the first embodiment;

[0014] **FIG. 3** is a front view thereof;

[0015] **FIG. 4** is a view similar to that of **FIG. 2**; but showing the cartridge removed from the chamber of the weapon;

[0016] **FIG. 5** is a view similar to that of **FIG. 2**, but showing the interior components;

[0017] **FIG. 6** is a top view of the first embodiment;

[0018] **FIG. 7** is a view similar to that of **FIG. 6**, but shown in cross-section;

[0019] **FIG. 8** is a three-dimensional view of a second embodiment of the invention;

[0020] **FIG. 9** is a side cross-sectional view of the second embodiment of the invention with a cartridge shown outside of the weapon's chamber;

[0021] **FIG. 10** is a view similar to that of **FIG. 9** but with the cartridge positioned almost fully inside the chamber;

[0022] **FIG. 11** is a view similar to that of **FIG. 9** but with the cartridge positioned fully inside the chamber;

[0023] **FIG. 12** is a view similar to that of **FIG. 9** but with the cartridge shown being ejected from the chamber;

[0024] **FIGS. 13, 14** and **15** are three-dimensional, first insertion and second insertion views, respectively, of a quick-disconnect handle battery pack of the second embodiment;

[0025] **FIG. 16** is an exterior side view of the second embodiment shown with a backup weapon mace can attached to a bottom rail thereof;

[0026] **FIG. 17** is a cross-sectional end view of the rail and backup weapon holder of **FIG. 16**;

[0027] **FIG. 18** is a three-dimensional view of the backup weapon holder; and

[0028] **FIGS. 19 and 20** are sequential side view illustrations of steps in removal of the backup weapon holder from the weapon of the second embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0029] Referring to the accompanying drawings and initially to **FIG. 1**, it will be seen that a police officer **5** is shown bearing a first embodiment **10** of the present invention in the firing position. In **FIG. 1**, weapon **10** has just been fired at a remote target (not shown) and a pair of darts **12** are in their ballistic path tethered to respective conductive wires **14**. As seen best in FIGS. **2** to **4**, electrical discharge weapon **10** comprises a housing **16** having an electronics compartment **18**, a chamber section **20** and a handle **22**. At the lower end of the housing **16** there is a trigger aperture **24** into which a trigger switch **26** extends. A safety switch **28** extends externally from electronics compartment **18**. As seen in **FIG. 3**, the front of chamber section **20** is open to expose the interior chamber **30** which is configured to receive a cartridge **32** as depicted in **FIG. 4**. Cartridge **32** has a pair of dart passages **33** and wire compartments **31** for receiving bundled tether wires **14**.

[0030] The interior of weapon **10** is shown best in **FIG. 5**. As shown therein, contained inside housing **16** are a battery **34**, housings of switches **26** and **28**, printed circuit board **36** having low voltage electronics **35** mounted thereon, including capacitors **38**, and a high voltage transformer **40** providing high voltage output electrodes **42**. Electrodes **42** are configured for engaging corresponding electrodes of cartridge **32** and are widely separated by a distance "EG" (electrode gap). In the preferred embodiments hereof the distance EG is greater than 1.65 inches. This large electrode gap length assures that the weapon **10** will operate effectively even when the darts **12** are up to 2.0 inches from the suspect's skin while embedded in thick outerwear. The electronics **35** of the weapon **10** are of a standard configuration for electrical discharge devices and are well-known components in the art of "TASER™" guns. It will be observed that the battery **34** and electronics **38** including transformer **40** are all located above or behind trigger switch **26**.

[0031] As seen best in **FIGS. 3, 6** and **7**, housing **16** has a cylindrical rise or bulge **25** to accommodate transformer **40**. Despite bulge **25**, gun **10** is still relatively slim in profile, being less than about 1.5 inches thick at its thickest portions and being less than about 1.25 inches thick over most of its 8 inch length and 4 inch width in the preferred embodiment. Chamber interior **30** is less than 1.0 inches thick. The cartridge **32** of the preferred embodiment is less than about 0.5 inches thick. Details of the cartridge structure and interior layout may be better understood by referring to co-pending patent application Ser. No. 10/719,131 filed on Nov. 21, 2003 which is assigned to the assignee hereof.

[0032] A second embodiment **50** of the weapon of the present invention is shown in **FIGS. 8-20**. Embodiment **50** is generally similar to that of embodiment **10**, but has a number of additional inventive features. One such feature is a spring-activated release mechanism for expelling spent cartridges from the chamber. Another such feature is the combination of a mechanical safety and a push-on/push-off activation switch. A third added feature is a cartridge which extends outside the chamber when loaded to alert a police officer that the weapon is loaded. A fourth added feature is a quick disconnect battery clip which permits rapid battery replacement. A fifth added feature is an integral accessory rail which receives a backup non-lethal weapon such as a mace canister.

[0033] Each of these additional features of the second embodiment **50** will be described herein in conjunction with **FIGS. 8-20**. Referring to those figures and **FIG. 8** in particular, it will be seen that electrical discharge weapon **50**

comprises a chamber **52**, an electronics compartment **53**, a wire-tethered dart propulsion cartridge **54** and a handle **56**. Also provided is a trigger guard **58** within which extends a trigger switch **60**. Above guard **58** is a mechanical safety **62**. At the bottom of chamber **52** there is a cartridge release **64** and below that and integral with the bottom edge of chamber **52** is an accessory rail **66**.

[**0034**] Referring to **FIGS. 9-12**, it will be seen that within the chamber interior **76** there is positioned a helical spring **80** which is compressed by cartridge **54** when the cartridge is installed into the chamber. It will also be seen that cartridge release **64** is at an end of a release arm **78** which is positioned beneath a cartridge ledge **79** and that cartridge **54** has a retainer tab **65**. As shown sequentially in **FIGS. 9-11**, cartridge **54** is inserted into chamber **52** along interior **76** thereby compressing spring **80** until cartridge release **64** catches retainer tab **65**. As shown in **FIG. 12**, after the cartridge is spent, it may be released from the chamber interior **76** by manually depressing release **64** which disengages from retainer tab **65** thereby allowing spring **80** to propel the cartridge **54** out of the chamber **52**.

[**0035**] The second added feature of push-on/push-off activation switch and mechanical safety, is also illustrated in **FIGS. 9-12**. A push-on/push-off activation switch **70** is positioned adjacent trigger switch **60** so that a cam surface **68** will depress the activation switch **70** when the trigger switch is rotated about its fulcrum axis **67**. Switch **70** is connected electrically to electronics **72** to cause a pulsed signal to be generated and sent to high voltage transformer **74** which applies a high voltage pulsed output to electrodes **77** in chamber interior **76**. De-activation is achieved by again depressing switch **70** using trigger switch **60**. This push-on/push-off operation obviates use of an unreliable timer device to otherwise overcome the tendency of a police officer to squeeze and immediately release the trigger switch as he or she normally does with a conventional pistol. Immediate release of the trigger would otherwise prevent effective operation of the discharge weapon which requires continued activation until the darts reach the target and debilitating discharge current is caused to flow through the target for at least a short period of time. Prior art electrical discharge weapons employ electronic timers to overcome this tendency, but such timers are notoriously unreliable and inconsistent, sometimes initiating inadvertently. A push-on/push-off activation switch **70** requires the police officer to squeeze the trigger switch **60** a second time after initial activation in order to deactivate the weapon. Mechanical safety **62** provides a clearly visual indication of weapon status and prevents inadvertent depression of switch **70** because it physically blocks cam surface **68** and stops rotation of switch **60** about fulcrum axis **67** as depicted in FIGS. **9**, **10** and **12**. Prior art weapons employ electric switch safety mechanisms which can be confusing and can present a hazard, particularly when used with timer circuits.

[**0036**] Another feature of the second embodiment **50** is that cartridge **54** extends well beyond the chamber interior **76** so that an officer can plainly see that the weapon has a cartridge in place (see **FIGS. 8 and 11**).

[**0037**] The quick release battery clip feature of the invention may be understood best by referring to **FIGS. 13-15**. A pair of batteries **82** is mounted to a battery clip member **84**, the latter adapted for installation into handle **56** as shown in **FIGS. 9-12**. Installation is achieved by using a pair of clip retainers **86** each having a retainer ridge **88** and a retainer release **90**. As seen best in **FIGS. 14 and 15**, retainers **86** are laterally compressed during installation so that ridges **88** are captured in respective apertures **57** at the lowermost portion of handle **56**. Retainer releases **90** permit the battery clip to be quickly released by squeezing retainers **86** and thus withdrawing ridges **88** from apertures **57**.

[**0038**] Still another feature of the second embodiment is shown in **FIGS. 16-20**. More specifically, a backup non-lethal weapon may be attached using the accessory rail **66**. Thus, for example, by employing a holder **92** shown best in **FIG. 18**, one may attach a mace canister **91**. Holder **92** employs a rail attachment **94** having a plurality of attachment members **95** to slideably engage the accessory rail **66**. An end piece **93** prevents the canister from sliding out of holder **92**. **FIGS. 19 and 20** show sequentially the manner in which the holder **92** may be released from the rail **66**.

[**0039**] Having thus disclosed a preferred embodiments of the present invention, it will be understood that various modifications are contemplated. By way of example, the precise shape of the weapon as well as the precise location of components contained in the housing, may be readily altered without deviating from the inventive features of the invention. Accordingly, the scope hereof is not to be deemed limited by the disclosed embodiments, but only by the appended claims and their equivalents.

I claim:

1. An electrical discharge weapon for propelling a pair of wire-tethered electrode darts at a remote target to be subdued by an electrical current through the target; the weapon comprising:

a housing having the shape of a pistol with a broadened end forming a chamber for receiving a dart cartridge having said wire-tethered electrode darts;

electronic components mounted within said housing for generating a high voltage output to be applied to said cartridge between two spaced-apart electrodes; and

wherein said spaced-apart electrodes are greater than 1.65 inches apart from one another when the electrical discharge weapon is not loaded with a dart cartridge.

2. The electrical discharge weapon recited in claim 1 wherein said housing comprises a trigger guard enclosing an aperture and having a trigger switch extending therein for selectively activating said electronic components and a handle for grasping said weapon, all said electronic components being located within the housing aft of the forward-most portion of the trigger guard.

3. The electrical discharge weapon recited in claim 1 wherein said chamber is less than one inch in thickness.

4. The electrical discharge weapon recited in claim 3 wherein said housing is about 8 inches in length and about 4 inches in width.

5. A low profile, handgun-shaped electrical discharge weapon receiving a cartridge having wire-tethered darts to be propelled at a remote target; the weapon comprising:

an electronic components compartment integrally interconnecting a handle and a cartridge-receiving chamber, the weapon also having a trigger aperture with a trigger switch extending into said aperture for activating said

cartridge; said weapon having a center of gravity positioned between said trigger aperture and said handle.

6. The electrical discharge weapon recited in claim 5 further comprising a first pair of electrodes in said chamber and in contact with a second pair of electrodes on said cartridge, each said pair of electrodes having an electrode gap that is greater than 1.65 inches when the chamber is unloaded.

7. The electrical discharge weapon recited in claim 5 wherein said chamber has a maximum thickness of about one inch.

8. The electrical discharge weapon recited in claim 5 wherein said cartridge-receiving chamber comprises a spring that is compressed by said cartridge, said weapon having a lever for securing said cartridge within said chamber and for releasing said cartridge to permit said spring to propel said cartridge out of said chamber.

9. The electrical discharge weapon recited in claim 5 further comprising a push-on/push-off switch and wherein said trigger switch engages said push-on/push-off switch.

10. The electrical discharge weapon recited in claim 9 further comprising a mechanical safety selectively engageable with said trigger switch for alternatively preventing and permitting said trigger switch engagement with said push-on/push-off switch.

11. The electrical discharge weapon recited in claim 5 wherein said cartridge extends partially outside of said chamber when said cartridge is ready for activation.

12. The electrical discharge weapon recited in claim 5 further comprising a quick-disconnect battery assembly mounted in said handle for powering said weapon.

13. The electrical discharge weapon recited in claim 5 further comprising an integral accessory rail for receiving a backup non-lethal weapon selectively attached to said rail.

14. A hand-gun-shaped electrical discharge weapon receiving a cartridge having wire-tethered darts to be propelled toward a remote target; the weapon comprising:

a spring compressed by said cartridge within said weapon for ejecting said cartridge after said darts have been propelled.

15. A hand-gun-shaped electrical discharge weapon receiving a cartridge having wire-tethered darts to be propelled toward a remote target; the weapon comprising:

a push-on/push-off activation switch for activating said weapon; and

a mechanical safety device for preventing inadvertent depression of said activation switch.

16. A hand-gun-shaped electrical discharge weapon receiving a cartridge having wire-tethered darts to be propelled toward a remote target; the weapon comprising:

an integral accessory rail receiving a backup weapon mounted to said electrical discharge weapon.

17. The electrical discharge weapon recited in claim 16 wherein said backup weapon is a non-lethal weapon.

* * * * *