



(12) **DEMANDE DE BREVET CANADIEN**
CANADIAN PATENT APPLICATION

(13) **A1**

(22) Date de dépôt/Filing Date: 2013/03/07

(41) Mise à la disp. pub./Open to Public Insp.: 2013/09/12

(62) Demande originale/Original Application: 3 003 110

(30) Priorité/Priority: 2012/03/08 (US61/608,195)

(51) Cl.Int./Int.Cl. *A61M 5/32* (2006.01),
A61B 5/15 (2006.01), *A61M 5/158* (2006.01)

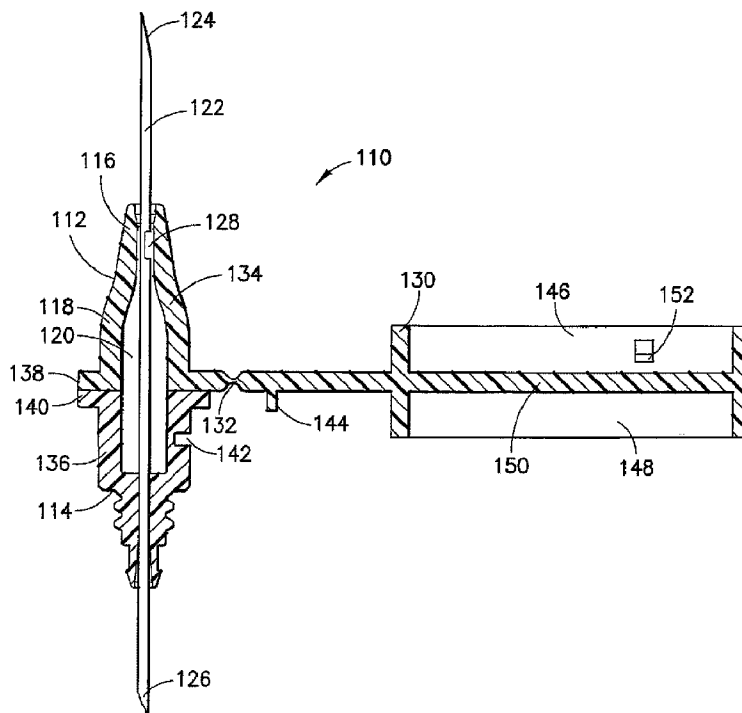
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(54) Titre : ENSEMBLE POUR PRELEVEMENT SANGUIN AYANT UNE PROTECTION MULTIFONCTION

(54) Title: BLOOD COLLECTION ASSEMBLY HAVING A MULTI-FUNCTION SHIELD



(57) Abrégé/Abstract:

A needle assembly comprising: a housing having proximal and distal ends; a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally therefrom; an IV shield comprising a pair of spaced sidewalls defining a space

(57) **Abrégé(suite)/Abstract(continued):**

for receiving a portion of the IV end of the cannula, the IV shield pivotally secured to the housing and having a pre-use position, with the IV shield covering a portion of the IV end, and a use position, with the IV shield adapted to move between a non-shielded and shielded position, wherein at least one of the sidewalls comprises a first projection to temporarily engage the housing when the IV shield is in the pre-use position, and at least one of the sidewalls comprises another projection to permanently engage the housing with the IV shield in the shielded position.

Abstract

A needle assembly comprising: a housing having proximal and distal ends; a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally therefrom; an IV shield comprising a pair of spaced sidewalls defining a space for receiving a portion of the IV end of the cannula, the IV shield pivotally secured to the housing and having a pre-use position, with the IV shield covering a portion of the IV end, and a use position, with the IV shield adapted to move between a non-shielded and shielded position, wherein at least one of the sidewalls comprises a first projection to temporarily engage the housing when the IV shield is in the pre-use position, and at least one of the sidewalls comprises another projection to permanently engage the housing with the IV shield in the shielded position.

BLOOD COLLECTION ASSEMBLY HAVING A MULTI-FUNCTION SHIELD**BACKGROUND OF THE INVENTION**Field of the Invention

[0002] The present invention relates to a needle assembly and, more particularly, to a shieldable blood collection needle assembly.

Description of Related Art

[0003] Needle assemblies are used for collecting specimens of fluid, such as blood, from a patient. Some such needle assemblies are intended for use with an evacuated tube and include a housing with a proximal end, a distal end, and a passage extending between the ends. Such needle assemblies further include at least one needle cannula mounted to the housing. The needle cannula includes a sharply pointed distal end that projects distally beyond the housing, a proximal end that projects proximally beyond the housing, and a lumen that provides communication between the opposed ends of the needle cannula. Some needle assemblies include separate proximal and distal cannulas and rely upon a portion of the housing to provide communication between the lumens of the respective cannulas. The distal end of the needle cannula typically is beveled to a tip that is sufficiently sharp for piercing the skin of the patient and accessing the vein or other source of fluid that is to be collected. The proximal end of the needle cannula is configured for piercing the rubber stopper on an evacuated tube. The proximal end of the needle cannula typically is covered by a needle pierceable rescalable multi-sample sleeve. The sleeve is compressed by the rubber stopper of the evacuated tube and punctured by the proximal end of the needle cannula as the proximal end of the needle cannula is urged into communication with the evacuated tube. The evacuated tube is typically received by a needle holder secured to the proximal end of the housing.

[0004] Prior to use, the needle assembly also typically includes an IV shield and a non-patient shield mounted respectively over the distal end of the needle cannula and the proximal end of the needle cannula. The IV shield and the non-patient shield are frictionally retained

on the housing and can be separated through axial movement of the shields away from the housing. The combined needle assembly and evacuated tube is employed by initially urging the pointed distal end of the needle cannula into a blood vessel of a patient. Once the targeted blood vessel has been accessed, the evacuated tube is urged into the needle holder such that the proximal point of the needle cannula pierces the septum of the tube. Low pressure conditions within the evacuated tube, as well as the patient's own vasculature pressure, generate a flow of blood from the patient through the needle cannula and into the evacuated tube. The evacuated tube may be removed from the needle holder after a sufficient quantity of blood has been collected. One or more additional evacuated tubes may similarly be urged into the open end of the needle holder for drawing one or more additional samples of blood to be analyzed. The needle cannula is then withdrawn from the patient after a sufficient volume of blood has been collected for the required analytical procedure.

[0005] Many fluid collection needle assemblies are provided with a flashback chamber that communicates with the needle cannula. The flashback chamber typically is formed at least partly from a transparent or translucent material and is intended to receive a portion of the blood flow shortly after a vein has been accessed properly. The flashback chamber gives a positive indication of venous entry after a vein is entered with the distal end of the needle cannula.

[0006] In order to reduce the risk of an accidental needle stick, or contact that could transmit pathogens from the patient to the medical practitioner, the needle cannula is shielded after contact with the patient. Shields have taken many different forms. For example, some shields telescope over the needle cannula and frictionally engage the housing. Other shields are telescoped over the housing and can be moved distally over the needle cannula to effect shielding. Other shields are hingedly mounted to or near the housing and can be rotated from an open position, where the needle cannula is exposed, to a closed position, where the needle cannula is shielded.

SUMMARY OF THE INVENTION

[0007] In one embodiment, a needle assembly includes a housing having proximal and distal ends, an IV cannula projecting distally from the housing, and an IV shield having an engagement. The housing has a shield seat and the IV cannula has a distal tip. The IV shield has a pre-use position where the IV shield covers the distal tip of the IV cannula and the engagement is disengaged from the shield seat, and a use position where the engagement is engaged with the shield seat and the IV shield is adapted to move between a non-shielded

position, in which the distal tip is exposed, and a shielded position, in which the distal tip is shielded by the IV shield.

[0008] The IV shield may include a body that defines a longitudinal slot adapted to receive the IV cannula and a needle catch adapted to engage the IV cannula when the IV shield is in the shielded position. The body of the IV shield may engage the distal end of the housing when the IV shield is in the pre-use position and the IV shield may be pivotable relative to the housing when the IV shield is in the use position. The engagement may comprise a locking pin and the IV shield may be pivotable about the locking pin in the use position. The needle assembly may further include a non-patient cannula projecting from the housing, and a non-patient shield for removably shielding the non-patient cannula adapted to engage the proximal end of the housing. The shield seat may include a projection that defines an opening to receive the engagement of the IV shield. The opening of the shield seat may be tapered to lock the engagement to the shield seat after insertion of the engagement into the opening. The engagement may comprise a locking pin with the shield seat substantially c-shaped about the locking pin.

[0009] In a further embodiment, a needle assembly includes a housing having proximal and distal ends and a shield seat, a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally from the housing, and a shield secured to the housing. The shield has a pre-use position where the shield covers the non-patient end of the cannula, and a use position where the shield is capable of covering the IV end of the cannula.

[0010] The housing may have a chamber wall extending between the proximal and distal ends for defining a chamber in the housing. The cannula may define an opening in fluid communication with the chamber. The housing may have a first portion and a second portion with the first portion secured to the second portion, and where the shield and the first portion of the housing are formed integrally. The shield may be secured to the first portion of the housing via a living hinge, and the shield may be pivotable between a non-shielded position and a shielded position. The shield may include a non-patient portion adapted to cover a portion of the non-patient end of the cannula and an IV portion adapted to cover a portion of the IV end of the cannula. The IV portion of the shield may include a needle catch adapted to engage the IV end of the cannula when the shield is in the use position. The shield may include a non-patient portion adapted to cover a portion of the non-patient end of the cannula, and an IV portion adapted to cover a portion of the IV end of the cannula, where the IV

portion of the shield includes a needle catch adapted to engage the IV end of the cannula when the shield is in the use position. The housing may include a projection with the shield secured to the housing about the projection and with the shield being pivotable relative to the housing between the pre-use position and the use position. The cannula may include two distinct cannulae. The shield may be engaged with the shield seat in the use position and capable of rotating from a non-shielded position, in which a tip of the IV end is exposed, to a shielded position, in which the tip of the IV end is shielded.

[0011] In another embodiment, a needle assembly includes a housing having proximal and distal ends, a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally from the housing, and an IV shield pivotally secured to the housing. The IV shield has a pre-use position, where the IV shield covers a portion of the IV end of the cannula, and a use position, where the IV shield is adapted to move between a non-shielded position and a shielded position. At least one of the sidewalls includes a first projection adapted to temporarily engage the housing when the IV shield is in the pre-use position, and at least one of the sidewalls includes a second projection adapted to permanently engage the housing when the IV shield is in the shielded position.

[0012] In certain configurations, the sidewalls are spaced via an end wall extending between the pair of sidewalls. In other configurations, the IV shield includes a needle catch adapted to engage the IV end of the cannula when the IV shield is in the shielded position. Each of the sidewalls may include a pair of semi-spherical projections adapted to temporarily engage the housing when the IV shield is in the pre-use position.

[0013] Further details and advantages of the invention will become clear upon reading the following detailed description in conjunction with the accompanying drawing figures, wherein like parts are designated with like reference numerals throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] **FIG. 1** is a perspective view of a needle assembly according to an embodiment of the present invention.

[0015] **FIG. 2** is a front view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0016] **FIG. 3** is a right side view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0017] **FIG. 4** is a top view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0018] **FIG. 5** is a left side view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0019] **FIG. 6** is a bottom view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0020] **FIG. 7** is an exploded perspective view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0021] **FIG. 8** is cross-sectional view of the needle assembly of **FIG. 1** in accordance with an embodiment of the present invention.

[0022] **FIG. 9** is a front view of the needle assembly of **FIG. 1** showing the assembly with a non-patient shield removed in accordance with an embodiment of the present invention.

[0023] **FIG. 10** is a front view of the needle assembly of **FIG. 1** showing the assembly with a needle holder secured thereto in accordance with an embodiment of the present invention.

[0024] **FIG. 11** is a front view of the needle assembly of **FIG. 1** showing the assembly with a needle holder secured thereto and the removal of a needle shield in accordance with an embodiment of the present invention.

[0025] **FIG. 12** is a front perspective view of the needle assembly of **FIG. 1** showing the attachment of the needle shield in accordance with an embodiment of the present invention.

[0026] **FIG. 13** is a front perspective view of the needle assembly of **FIG. 1** showing the needle shield in a non-shielded position in accordance with an embodiment of the present invention.

[0027] **FIG. 14** is a cross-sectional view of the needle assembly shown in **FIG. 1** showing the needle shield in a non-shielded position in accordance with an embodiment of the present invention.

[0028] **FIG. 15** is a front view of the needle assembly of **FIG. 1** showing the needle shield in a non-shielded position and with an evacuated tube received by the needle holder in accordance with an embodiment of the present invention.

[0029] **FIG. 16** is a front view of the needle assembly of **FIG. 1** showing the needle shield in a shielded position in accordance with an embodiment of the present invention.

[0030] **FIG. 17** is a cross-sectional view of the needle assembly shown in **FIG. 1** showing the needle shield in a shielded position in accordance with an embodiment of the present invention.

[0031] **FIG. 18** is a bottom view of the needle assembly of **FIG. 1** showing the needle shield in a shielded position in accordance with an embodiment of the present invention.

[0032] **FIG. 19** is a cross-sectional view of a needle assembly according to an embodiment of the present invention.

[0033] **FIG. 20** is a cross-sectional view of a needle assembly according to an embodiment of the present invention.

[0034] **FIG. 21** is a front view of the needle assembly of **FIG. 20** showing a shield in a non-shielded position in accordance with an embodiment of the present invention.

[0035] **FIG. 22** is a perspective view of the shield shown in **FIG. 20** in accordance with an embodiment of the present invention.

[0036] **FIG. 23** is a front view of a needle assembly showing a shield in a pre-use position according to an embodiment of the present invention.

[0037] **FIG. 24** is a partial cross-sectional view of the needle assembly of **FIG. 23** showing the shield in a use position and in a non-shielded position in accordance with an embodiment of the present invention.

[0038] **FIG. 25** is a front view of the needle assembly of **FIG. 23** showing the shield in a use position and in a shielded position in accordance with an embodiment of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0039] For purposes of the description hereinafter, spatial orientation terms, if used, shall relate to the referenced embodiment as it is oriented in the accompanying drawing figures or otherwise described in the following detailed description. However, it is to be understood that the embodiments described hereinafter may assume many alternative variations and embodiments. It is also to be understood that the specific devices illustrated in the accompanying drawing figures and described herein are simply exemplary and should not be considered as limiting.

[0040] Referring to **FIGS. 1-18**, one embodiment of a needle assembly **10** includes a housing **12** with a proximal end **14**, a distal end **16**, and a generally cylindrical-shaped outer

sidewall 18 extending between the ends 14, 16. Outer sidewall 18 is formed from a transparent or translucent plastic material and defines a chamber 20 within the housing between the proximal and distal ends 14, 16. The housing 12 also includes a generally cylindrical-shaped inner sidewall 22 that extends from the distal end 16 toward the proximal end 14. The inner sidewall 22 is substantially concentrically disposed within the outer sidewall 18 and is also formed from a transparent or translucent plastic material. The inner sidewall 22 defines a flashback chamber 24 such that fluid collected in the flashback chamber 24 can be observed from locations externally of the needle assembly 10. The flashback chamber 24 is in fluid communication with the chamber 20 such that the chamber 20 may also contribute to an indication of flashback.

[0041] The needle assembly 10 further includes an IV cannula 26 with a proximal end 28, a distal end 30, and a lumen 32 extending between the ends 28, 30. The distal end 30 of the IV cannula 26 is disposed externally of the housing 12 and includes a distal tip 34 that is beveled to a sufficiently sharp tip for piercing skin and tissue of a patient. The IV cannula 26 is secured to the housing 12 with the proximal end 28 of the IV cannula 26 positioned substantially adjacent to the distal end 16 of the housing 12. The lumen 32 of the IV cannula 26 is in fluid communication with the flashback chamber 24. The needle assembly 10 also includes a non-patient cannula 36 secured to the proximal end 14 of the housing 12. The non-patient cannula 36 includes a proximal end 38 disposed externally of the housing 12, a distal end 40 disposed adjacent to the flashback chamber 24, and a lumen 42 extending between the ends 38, 40. The proximal end 38 is adapted to pierce a rubber stopper of an evacuated tube, which is discussed in more detail below. The lumen 42 of the non-patient cannula 36 is substantially axially aligned with the lumen 32 of the IV cannula 26. A sleeve 44 is mounted over a portion of the non-patient cannula 36 that is disposed externally of the housing 12. The sleeve 44 is mounted to the proximal end 14 of the housing 12 and is formed from a material that is substantially impervious to liquid, readily pierceable by the proximal end 38 of the non-patient cannula 36, and resiliently resealable. The sleeve 44 is adapted to collapse distally upon being engaged by the rubber stopper of an evacuated tube. The IV cannula 26, the non-patient cannula 36, and the housing 12 cooperate to provide an early indication of venous entry due to the flashback of blood in the flashback chamber 24 and/or the chamber 20 of the housing 12. Other suitable flashback arrangements, however, may be utilized such as arrangements using vented plugs.

[0042] Referring still to **FIGS. 1-18**, the needle assembly **10** includes a collar **46** that extends circumferentially around the housing **12** at the proximal end **14** thereof. The collar **46** is formed integrally with the housing **12**, but also may be formed separately and mechanically secured to the housing **12**. The collar **46** has a proximal end **48** axially spaced from a distal end **50**. The collar **46** is provided with a shield seat **52** that includes a C-shaped projection **54** extending radially outward from the collar **46** and defining a tapered opening **56**.

[0043] The needle assembly **10** further includes an IV shield **58** with a proximal end **60** and a distal end **62**. The IV shield **58** includes an elongate body **64** that defines an opening **66** adjacent to the proximal end **60** of the IV shield **58** and an interior space **68** that is adapted to receive the IV cannula **26**. The elongate body **64** also defines a longitudinal slot **70** that extends from the proximal end **60** to a position adjacent to the distal end **62** of the IV shield **58**. In particular, the longitudinal slot **70** extends from the opening **66** of the elongate body **64** in a direction extending along a longitudinal axis of the elongate body **64** toward the proximal end **60** of the IV shield **58**. Further, the elongate body **64** of the IV shield **58** includes an engagement **72** that is adapted to be secured to the shield seat **52** of the housing **12**. The engagement **72** includes a pair of L-shaped extensions **74** extending from the elongate body **64** of the IV shield **58** with a back plate **75** extending between the L-shaped extensions **74**. A pin **76** extends laterally between the L-shaped extensions **74**. The pin **76** is shaped and configured to be received by the tapered opening **56** of the shield seat **52**, which is discussed in more detail below. The pin **76** is cylindrically-shaped, although other suitably shaped pins may be utilized. The IV shield **58** also includes a needle catch **78** positioned within the interior space **68** that is adapted to be secured and locked to the IV cannula **26**. The needle assembly **10** also includes a non-patient shield **80** with a proximal end **82** and a distal end **84**. The non-patient shield **80** includes an elongate body **86** that defines an opening **88** adjacent to the proximal end **82** of the non-patient shield **80** and an interior space **90** that is adapted to receive the non-patient cannula **36**.

[0044] Referring to **FIGS. 9-18**, the IV shield **58** has a pre-use position (shown in **FIGS. 9 and 10**) and a use position (shown in **FIGS. 13-18**). When the IV shield **58** is in the pre-use position, the IV shield **58** covers the distal tip **34** of the IV cannula **26**. More specifically, in the pre-use position, the interior space **68** of the IV shield **58** receives the IV cannula **26** and the proximal end **60** of the IV shield **58** frictionally engages the housing **12** and abuts the collar **46** of the housing **12**. Further, in the pre-use position, the engagement **72** of the IV

shield 58 is disengaged from the shield seat 52 and circumferentially spaced from the shield seat 52 on the housing 12. As shown in FIG. 9, for example, the engagement 72 of the IV shield 58 is positioned opposite or 180 degrees from the shield seat 52. As shown in FIG. 11, the IV shield 58 is transitioned from the pre-use position to the use position by moving the IV shield 58 in a distal direction away from the housing 12 to remove the frictional engagement with the housing 12. As shown in FIG. 12, the IV shield 58 is rotated and the engagement 72 of the IV shield 58 is secured to the shield seat 52 of the housing 12 such that the pin 76 is circumferentially surrounded by the C-shaped projection 54. The tapered opening 56 of the C-shaped projection 54 allows the pin 76 to be pushed through the tapered opening 56, but substantially restricts subsequent removal of the pin 76 from the tapered opening 56.

[0045] When in the use position, the IV shield 58 has a non-shielded position (shown in FIGS. 12-15) and a shielded position (shown in FIGS. 16-18). In particular, the IV shield 58 is pivotable between the non-shielded position and the shielded position via the connection between the engagement 72 and the shield seat 52. In the non-shielded position, the IV shield 58 is spaced from the IV cannula 26 and is aligned to the IV cannula 26 at an obtuse angle of, for example, about 120 degrees such that the IV shield 58 does not interfere with the IV cannula 26 during use by a health care technician. The IV shield 58 is transitioned to the shielded position by rotating the IV shield 58 towards the IV cannula 26 such that the longitudinal slot 70 of the elongate body 64 accommodates the IV cannula 26 and allows the IV shield 58 to cover the distal tip 34 of the IV cannula 26. When the IV shield 58 is in the shielded position, the IV cannula 26 is positioned in the interior space 68 of the IV shield 58 with the needle catch 78 engaging the IV cannula 26. The needle catch 78 limits further rotation of the IV shield 58 relative to the housing 12 and IV cannula 26 to prevent exposure of the distal tip 34 after use. The needle catch 78 is a resiliently deflectable member that will yield in response to contact with the IV cannula 26 as the IV shield 58 is rotated toward the IV cannula 26, but returns to an undeflected position and locks the IV cannula 26 within the shield 58.

[0046] Referring to FIGS. 9-11, the needle assembly 10 is used by separating the non-patient shield 80 from the collar 46 and threading a needle holder 92 onto the housing 12. Referring to FIGS. 11 and 12, the IV shield 58 is then removed from the housing 12 and secured to the shield seat 52 of the housing 12 as discussed above. With the IV shield 58 in the non-shielded position and rotated away from the IV cannula 26, a phlebotomist guides the

distal tip **34** of the IV cannula **26** into a targeted blood vessel (not shown). A pressure differential between the blood in the vein and the pressure within the housing **12** will cause blood to flow through the lumen **32** of the IV cannula **26**. Blood will typically appear in the flashback chamber **24** quickly after access to the blood vessel has been attained. Referring to **FIG. 15**, the phlebotomist then inserts an evacuated tube **94** into the needle holder **92**. The evacuated tube **94** includes a rubber stopper that collapses the sleeve **44**. The proximal end **38** of the non-patient cannula **36** pierces the sleeve **44** and then pierces the stopper of the evacuated tube **94**. The phlebotomist may accumulate one or more samples of blood in this manner.

[0047] After collecting the last sample of blood, the phlebotomist urges the needle assembly **10** and needle holder **92** from the patient and rotates the IV shield **58** from the non-shielded position to the shielded position. As a result, the IV cannula **26** is positioned within the interior space **68** of the IV shield **58** with the IV shield **58** surrounding the IV cannula **26**. Sufficient rotation of the IV shield **58** causes the needle catch **78** to engage the IV cannula **26** and lock the IV shield **58** to the IV cannula **26**. The needle assembly **10** can then be disposed of in a suitable sharps receptacle.

[0048] Referring to **FIG. 19**, a second embodiment of a needle assembly **110** includes a housing **112** having a proximal end **114** and a distal end **116** with a generally cylindrical-shaped outer sidewall **118** extending between the ends to define a chamber **120** within the housing **112**. The needle assembly **110** further includes a cannula **122** extending through the housing **112** and having an IV end **124** projecting distally from the housing **112** and a non-patient end **126** projecting proximally from the housing **112**. The cannula **122** defines a notch **128** that is in fluid communication with the chamber **120** of the housing **112**. The needle assembly **110** also includes a shield **130** secured to the housing **112** via a living hinge **132**, although other suitable arrangements for securing the shield **130** to the housing **112** may be utilized. The housing **112** includes a first portion **134** and a second portion **136** with the first portion **134** secured to the second portion **136** at respective flanges **138**, **140** of the first and second portions **134**, **136**. The first portion **134** and the shield **130** are formed integrally as a single component. The second portion **136** of the housing **112** defines a recess **142** for receiving a catch **144** provided on the shield **130**.

[0049] Referring still to **FIG. 19**, the shield **130** includes an IV portion **146** adapted to surround a portion of the IV end **124** of the cannula **122** and a non-patient portion **148** adapted to surround a portion of the non-patient end **126** of the cannula **122**. The IV portion

146 and the non-patient portion **148** of the housing are positioned opposite from each other and separated via a central wall **150**. The IV portion **146** of the shield **130** includes a needle catch **152** adapted to engage the IV end **124** of the cannula **122**. The shield **130** has a pre-use position where the non-patient portion **148** of the shield **130** covers a portion of the non-patient end **126** of the cannula **122** and a use position where the IV portion **146** of the shield **130** covers a portion of the IV end **124** of the cannula **122**. The shield **130** is pivotable relative to the housing **112** between the non-patient position and the IV position via the living hinge **132**. When the shield **130** is in the pre-use position, the catch **144** on the shield **130** frictionally engages the recess **142** provided on the second portion **136** of the housing **112** to temporarily secure the shield **130** to the housing **112**. During use of the needle assembly **110**, the shield **130** is pivoted away from the housing **112** to the use position shown in **FIG. 19** where the shield **130** is capable of covering the IV end **124** of the cannula **122**. A holder (not shown) may then be secured to the second portion **136** of the housing **112** in a similar manner as described above and shown in **FIGS. 1-18**. After completing a blood sample collection, the shield **130** is pivoted forward towards the housing **112** to cover the IV end **124** of the cannula **122**. Upon sufficient movement and/or force, the needle catch **152** engages the cannula **122** and prevents further movement of the shield **130** relative to the housing **112** such that re-exposure of the IV end **124** of the cannula **122** is prevented. Thus, the shield **130** is utilized to shield and protect the non-patient end **126** of the cannula **122** prior to use and also as a safety shield to shield the IV end **124** of the cannula **122** after use.

[0050] Referring to **FIGS. 20-22**, a third embodiment of a needle assembly **170** includes a housing **172** having a proximal end **174** and a distal end **176** with a generally cylindrical-shaped outer sidewall **178** extending between the ends **174**, **176** to define a chamber **180** within the housing **172**. The needle assembly **170** also includes a cannula **182** extending through the housing **172** and having an IV end **184** projecting distally from the housing **172** and a non-patient end **186** projecting proximally from the housing **172**. The cannula **182** defines a notch **188** that is in fluid communication with the chamber **180** of the housing **172**. The needle assembly **170** further includes a shield **190** having a body **192** with a first end **194** and a second end **196**. The body **192** of the shield **190** includes an IV portion **198** adapted to surround a portion of the IV end **184** of the cannula **182** and a non-patient portion **200** adapted to surround a portion of the non-patient end **186** of the cannula **182**. The IV portion **198** and the non-patient portion **200** of the housing **172** are positioned opposite from each other and may be separated via a central wall (not shown) in a similar manner as shown in

FIG. 19 and described above. The housing **172** includes a shield seat **202** for securing the shield **190** to the housing **172**. The shield seat **202** includes a pair of protrusions **204** extending radially outward from the housing **172** and positioned opposite each other. The shield **190** further includes a mounting portion **206** for engaging the shield seat **202** on the housing **172** to secure the shield **190** to the housing **172**. The mounting portion **206** of the shield **190** is formed by one or more inwardly extending projections **208**. The shield **190** also includes a needle catch **210** adapted to engage the IV end **184** of the cannula **182**.

[0051] Referring still to **FIGS. 20-22**, the shield **190** has a pre-use position where the non-patient portion **200** of the shield **190** covers a portion of the non-patient end **186** of the cannula **182** and a use position where the IV portion **198** of the shield covers a portion of the IV end **184** of the cannula **182**. The shield **190** is pivotable relative to the housing **172** between the pre-use position and the use position via the connection between the mounting portion **206** of the shield **190** and the shield seat **202** on the housing **172**. In particular, the connection between the shield **190** and the housing **172** allows the shield **190** to rotate 360 degrees. The needle assembly **170** is used in a similar manner as the needle assembly **110** described above and shown in **FIG. 11**.

[0052] Referring to **FIGS. 23-25**, a fourth embodiment of a needle assembly **230** includes a housing **232** with a proximal end **234**, a distal end **236**, and a generally cylindrical-shaped outer sidewall **238** extending between the ends **234**, **236**. Outer sidewall **238** defines a chamber **240** within the housing **232** between the proximal and distal ends **234**, **236**. The needle assembly **230** further includes a cannula **242** having an IV end **244** projecting distally from the housing **232** and a non-patient end **246** projecting proximally from the housing **232**. The cannula **242** defines a notch **248** that is in fluid communication with the chamber **240** of the housing **232**. As shown in **FIG. 24**, a sleeve **250** is mounted over a portion of the non-patient end **246** of the cannula **242**. The housing **232** further includes a collar **252** that extends circumferentially around the housing **232**. The collar **252** is formed integrally with the housing **232**, but also may be formed separately and mechanically secured to the housing **232**.

[0053] Referring still to **FIGS. 23-25**, the needle assembly **230** further includes an IV shield **254** with a first end **256** and a second end **258**. The IV shield **254** includes an elongate body **260** having an end wall **262** and a pair of sidewalls **264** extending from the end wall **262** to define an interior space **266** for receiving the IV end **244** of the cannula **242**. The IV shield **254** is secured to the housing **232** via a living hinge **268**. In particular, the first end

256 of the IV shield 254 is secured to the collar 252 of the housing 232. One or both of the sidewalls 264 of the IV shield 254 includes a pair of semi-spherical shaped projections 270 that are adapted to temporarily engage the housing 232. The IV shield 254 also includes a needle catch 272 adapted to engage the IV end 244 of the cannula 242. As shown in FIG. 24, the needle assembly 230 also includes a non-patient shield 274 with a proximal end 276 and a distal end 278. The non-patient shield 274 includes a cylindrical shaped body 280 that defines a pair of openings 282 adjacent to the respective proximal and distal ends 276, 278 of the non-patient shield 274.

[0054] The IV shield 254 has a pre-use position (shown in FIG. 23) and a use position (shown in FIGS. 24 and 25). When the IV shield 254 is in the pre-use position, the IV shield 254 covers the IV end 244 of the cannula 242. More specifically, in the pre-use position, the interior space 266 of the IV shield 254 receives the IV end 244 of the cannula 242 and the distal end 236 of the housing is positioned between the semi-spherical shaped projections 270 of the IV shield 254. The IV shield 254 is temporarily held in the pre-use position via the semi-spherical shaped projections 270 of the IV shield 254. The IV shield 254 is transitioned from the pre-use position to the use position by moving the IV shield 254 in a proximal direction away from the housing 232. Upon application of sufficient force to the IV shield 254, the semi-spherical shaped projections 270 will disengage from the housing 232 thereby allowing further rotation of the IV shield 254 to the position shown in FIG. 24.

[0055] When in the use position, the IV shield 254 has a non-shielded position (shown in FIG. 24) and a shielded position (shown in FIG. 25). The IV shield 254 is pivotable between the non-shielded position and the shielded position via the living hinge 268. In the non-shielded position, the IV shield 254 is spaced from the IV end 244 of the cannula 242 and is transitioned to the shielded position by rotating the IV shield 254 towards the IV end 244 of the cannula 242 such that the interior space 266 of the IV shield 254 receives the IV end 244 of the cannula 242. As the IV shield 254 is rotated toward the IV end 244 of the cannula 242, the distal end 236 of the housing 232 engages the spherical shaped projections 270 with further rotation of the IV shield 254 causing disengagement of the housing 232 from the spherical shaped projections 270. The IV shield 254 is rotated until the needle catch 272 of the IV shield 254 engages the IV end 244 of the cannula 242, which prevents exposure of the IV end 244 of the cannula 242 after use.

Claims

1. A needle assembly comprising:
 - a housing having proximal and distal ends;
 - a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally from the housing; and
 - an IV shield comprising a pair of spaced-apart sidewalls that define a space for receiving a portion of the IV end of the cannula, the IV shield pivotally secured to the housing and having a pre-use position, in which the IV shield covers a portion of the IV end of the cannula, and a use position, in which the IV shield is adapted to move between a non-shielded position and a shielded position,wherein at least one of the sidewalls comprises a first projection adapted to temporarily engage the housing when the IV shield is in the pre-use position, and at least one of the sidewalls comprises a second projection adapted to permanently engage the housing when the IV shield is in the shielded position.
2. The needle assembly of claim 1, wherein the sidewalls are spaced via an end wall extending between the pair of sidewalls.
3. The needle assembly of claim 1, wherein the IV shield includes a needle catch adapted to engage the IV end of the cannula when the IV shield is in the shielded position.
4. The needle assembly of claim 1, wherein each of the sidewalls includes a pair of semi-spherical projections adapted to temporarily engage the housing when the IV shield is in the pre-use position.
5. A needle assembly comprising:
 - a housing having proximal and distal ends;
 - a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally from the housing; and
 - a single IV shield comprising a pair of spaced-apart sidewalls that define a space for receiving a portion of the IV end of the cannula, the IV shield pivotally secured to the housing

and having a pre-use position, in which the IV shield covers a portion of the IV end of the cannula, and a use position, in which the IV shield is adapted to move between a non-shielded position and a shielded position,

wherein each of the sidewalls includes a pair of projections adapted to temporarily engage the housing when the IV shield is in the pre-use position.

6. The needle assembly of claim 5, wherein the sidewalls are spaced via an end wall extending between the pair of sidewalls.

7. The needle assembly of claim 5, wherein the IV shield includes a needle catch adapted to engage the IV end of the cannula when the IV shield is in the shielded position.

8. The needle assembly of claim 5, wherein the housing is positioned between the pair of projections extending from each of the sidewalls when the IV shield is in the pre-use position.

9. The needle assembly of claim 5, wherein the pair of projections directly engage the housing.

10. The needle assembly of claim 5, wherein the housing includes a collar and the IV shield is attached to the collar.

11. The needle assembly of claim 10, wherein the IV shield is attached to the collar via a living hinge.

12. The needle assembly of claim 5, wherein the pair of projections comprise semi-spherical shaped projections.

13. The needle assembly of claim 5, including a non-patient shield for shielding the non-patient end of the cannula.

14. A needle assembly comprising:
a housing having proximal and distal ends;
a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally from the housing; and
a single IV shield comprising a pair of spaced-apart sidewalls that define a space for receiving a portion of the IV end of the cannula, the IV shield pivotally secured to the housing and having a pre-use position, in which the IV shield covers a portion of the IV end of the cannula, and a use position, in which the IV shield is adapted to move between a non-shielded position and a shielded position,
wherein at least one of the sidewalls includes a pair of projections adapted to temporarily engage the housing when the IV shield is in the pre-use position.
15. The needle assembly of claim 14, wherein the pair of projections extend from the at least one sidewall in an inward direction toward the housing.
16. The needle assembly of claim 15, wherein the pair of projections directly engage the housing.
17. The needle assembly of claim 14, wherein the housing is positioned between the pair of projections extending from the at least one sidewall when the IV shield is in the pre-use position.
18. The needle assembly of claim 14, wherein the housing includes a collar and the IV shield is attached to the collar.
19. The needle assembly of claim 18, wherein the IV shield is attached to the collar via a living hinge.
20. The needle assembly of claim 14, wherein the pair of projections comprise semi-spherical shaped projections.

21. The needle assembly of claim 14, including a non-patient shield for shielding the non-patient end of the cannula.

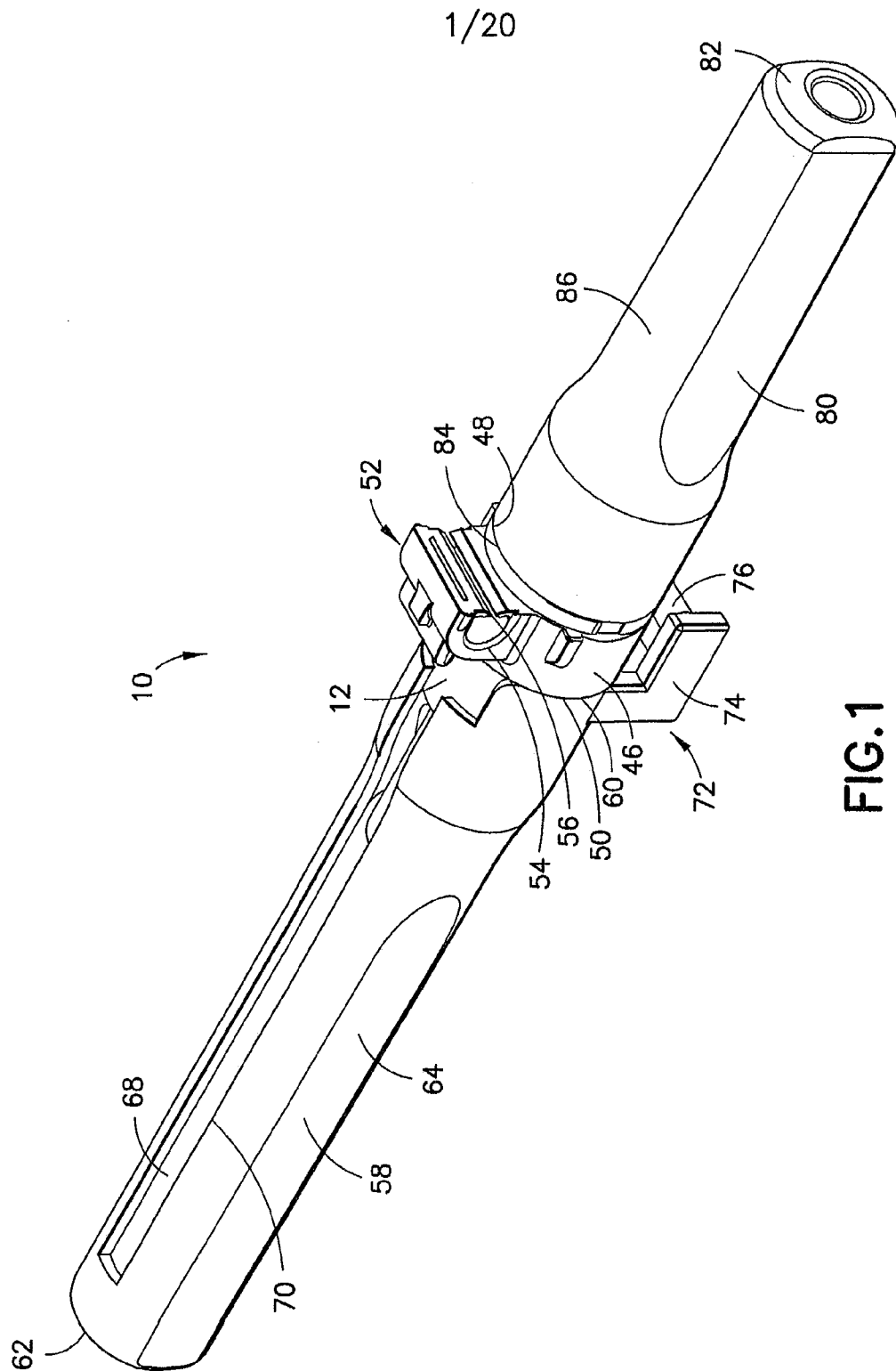
22. A needle assembly comprising:
a housing having proximal and distal ends;
a cannula having an IV end projecting distally from the housing and a non-patient end projecting proximally from the housing; and

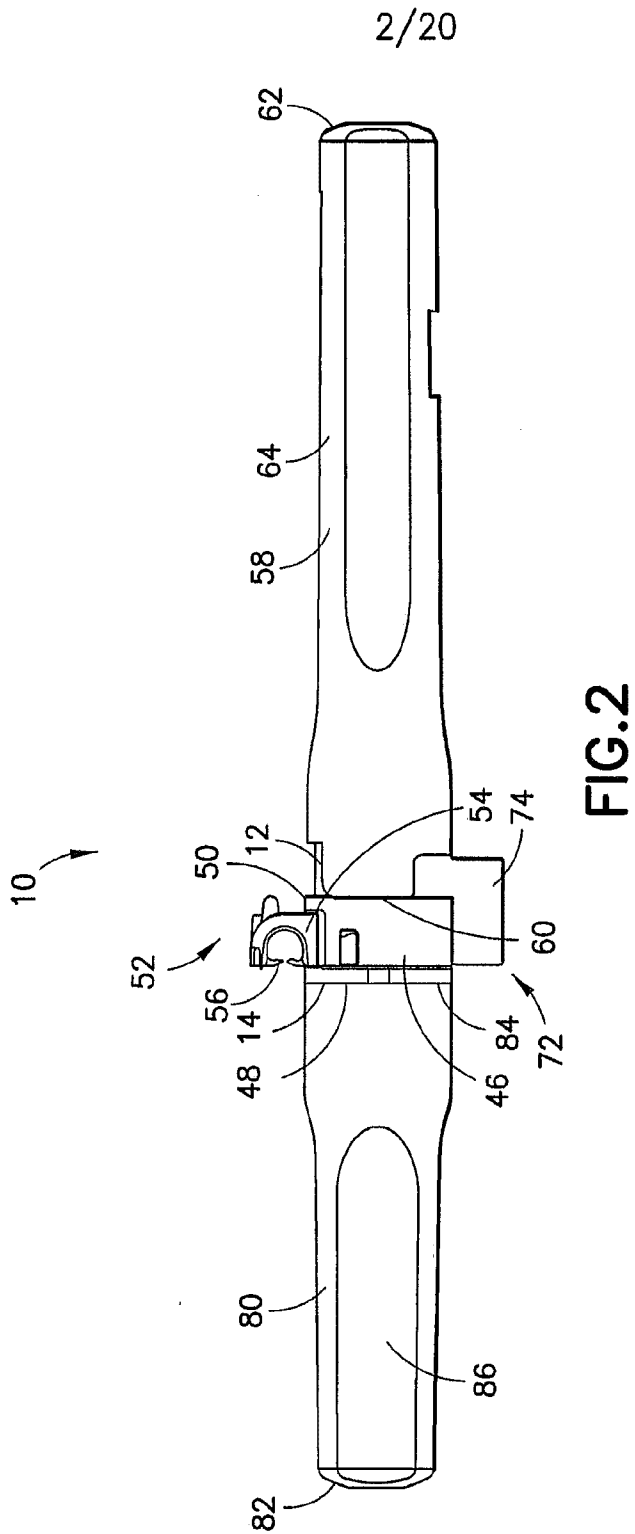
a single IV shield comprising a pair of spaced-apart sidewalls that define a space for receiving a portion of the IV end of the cannula, the IV shield pivotally secured to the housing and having a pre-use position, in which the IV shield covers a portion of the IV end of the cannula, and a use position, in which the IV shield is adapted to move between a non-shielded position and a shielded position,

wherein at least one of the sidewalls includes a pair of projections adapted to directly contact and temporarily engage the housing when the IV shield is in the pre-use position and at least one of the sidewalls includes a needle catch adapted to engage the IV end of the cannula when the IV shield is in the shielded position preventing exposure of the IV end of the cannula after use.

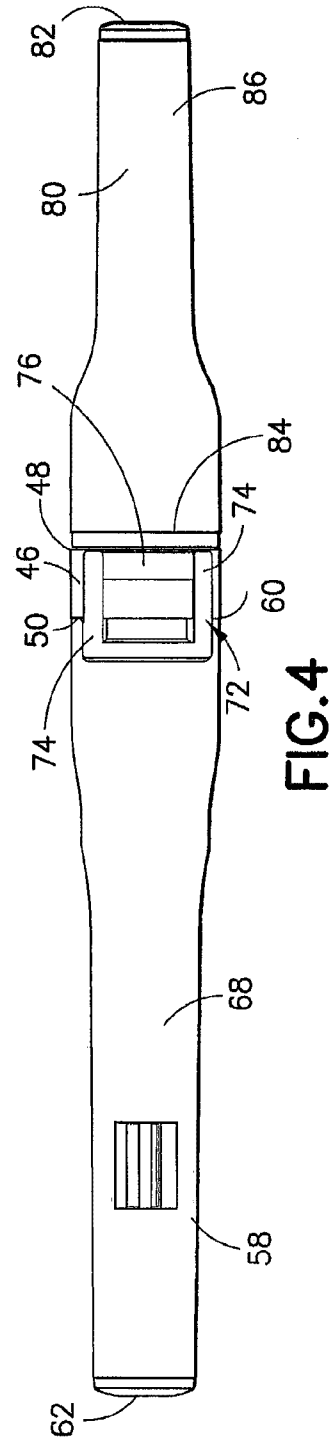
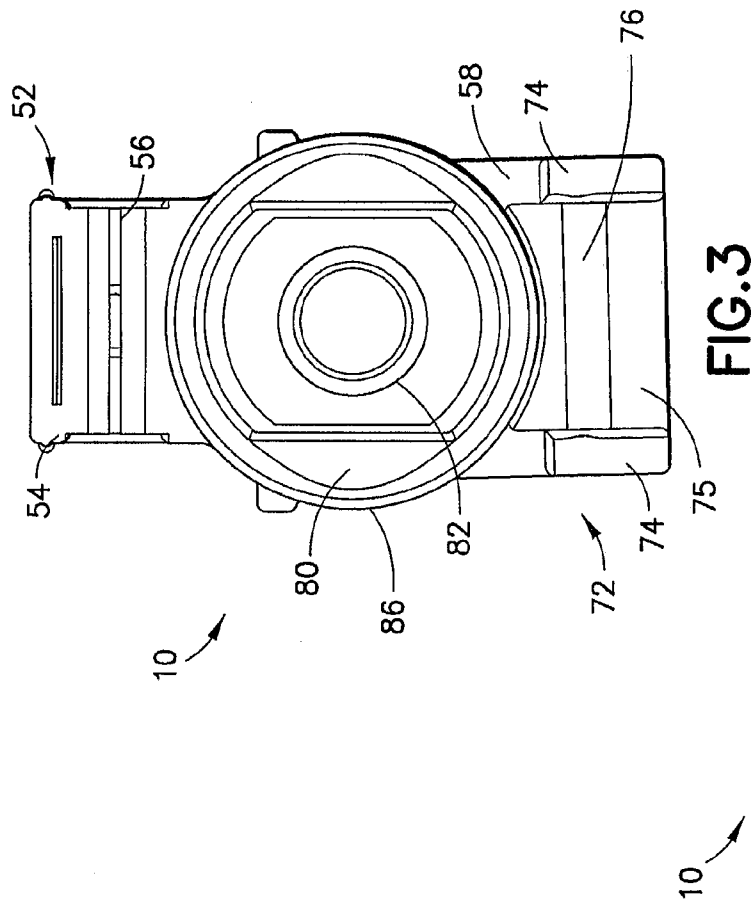
23. The needle assembly of claim 22, wherein each of the spaced-apart sidewalls includes the pair of projections.

24. The needle assembly of claim 23, wherein the housing is positioned between the pair of projections extending from each of the sidewalls when the IV shield is in the pre-use position.

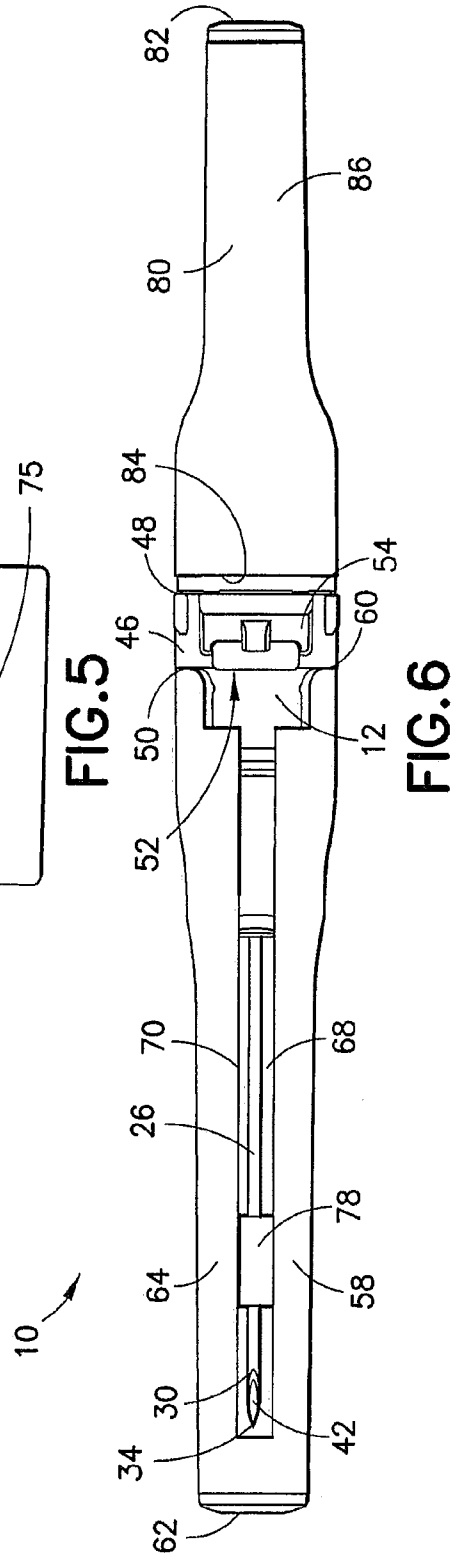
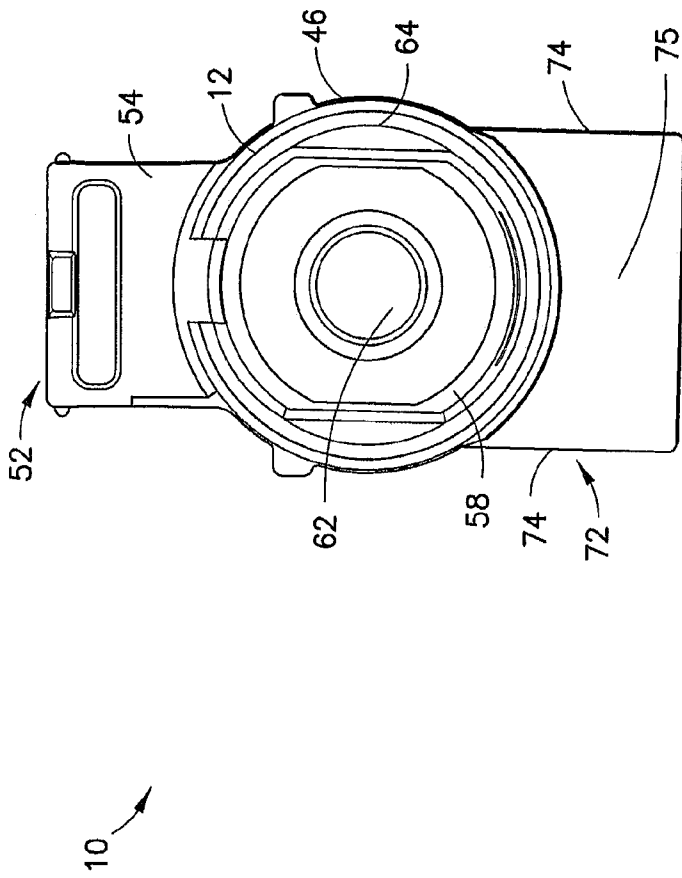


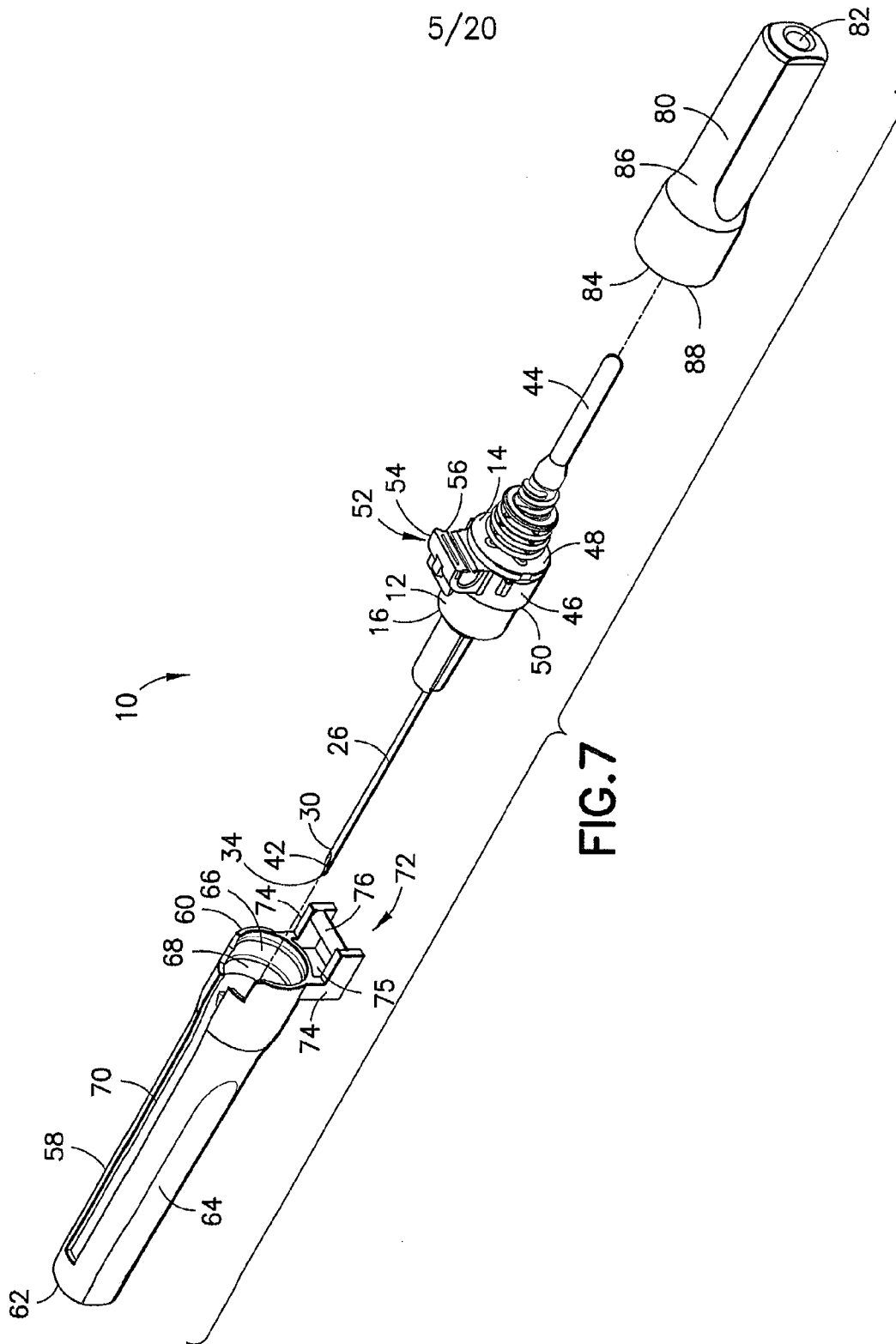


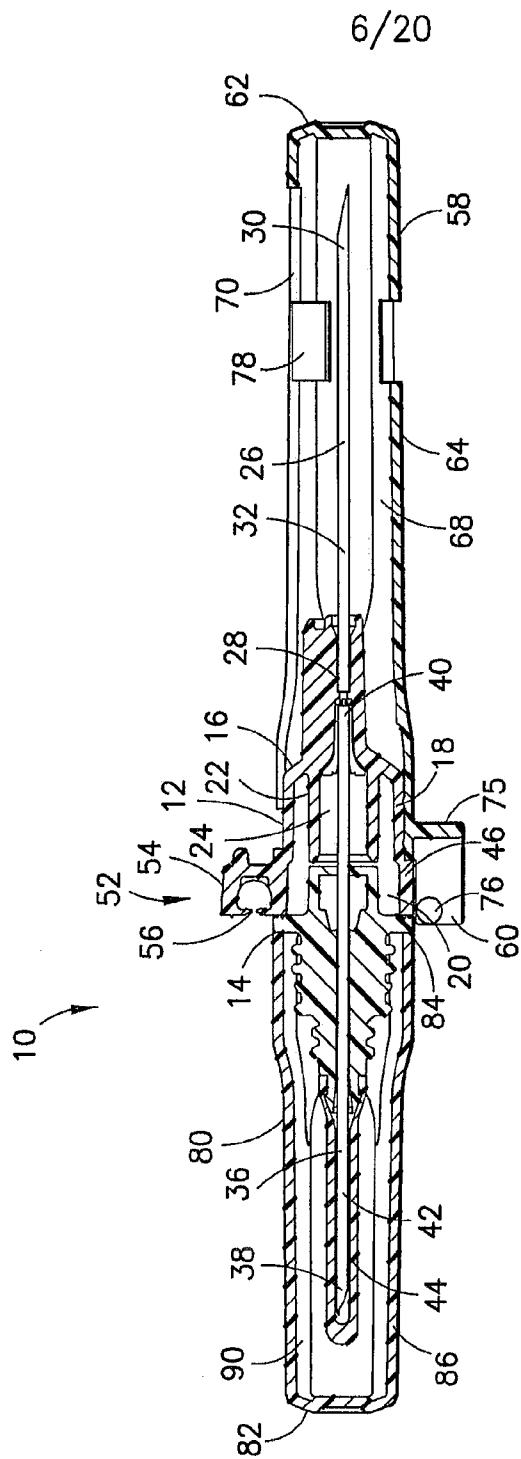
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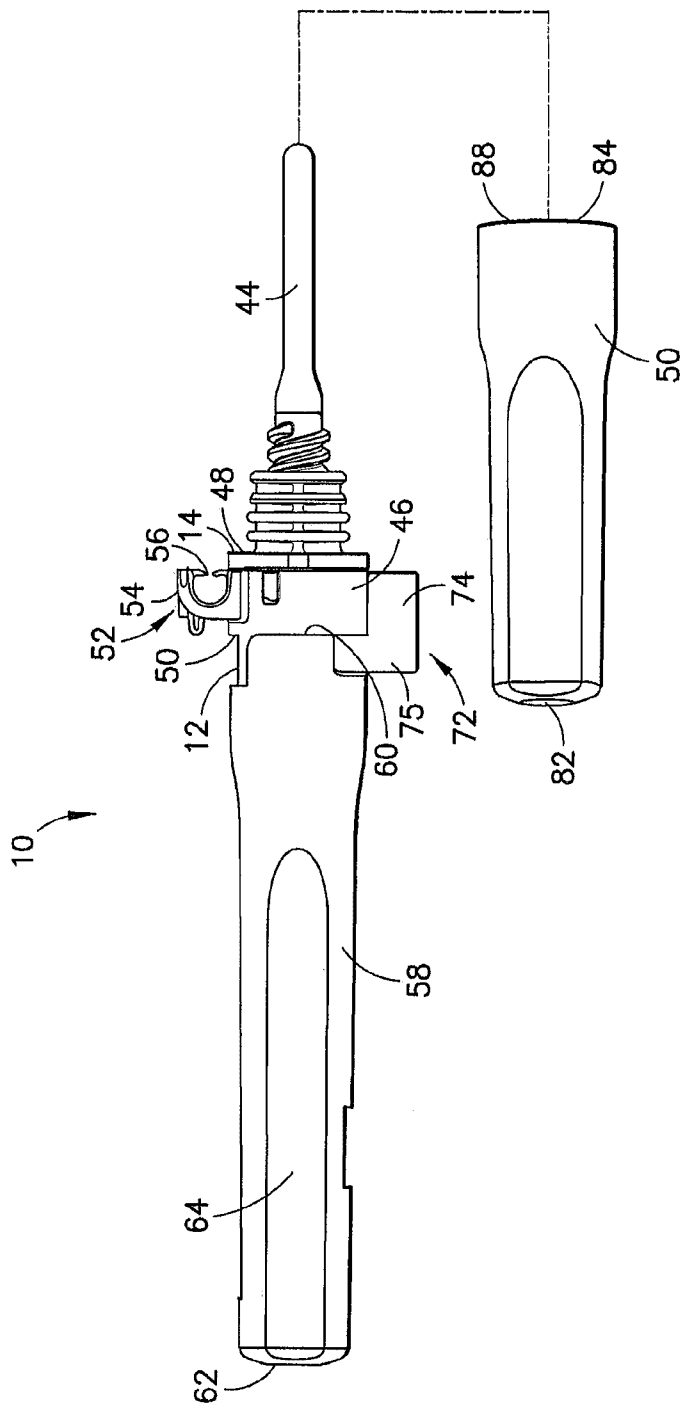


FIG. 9

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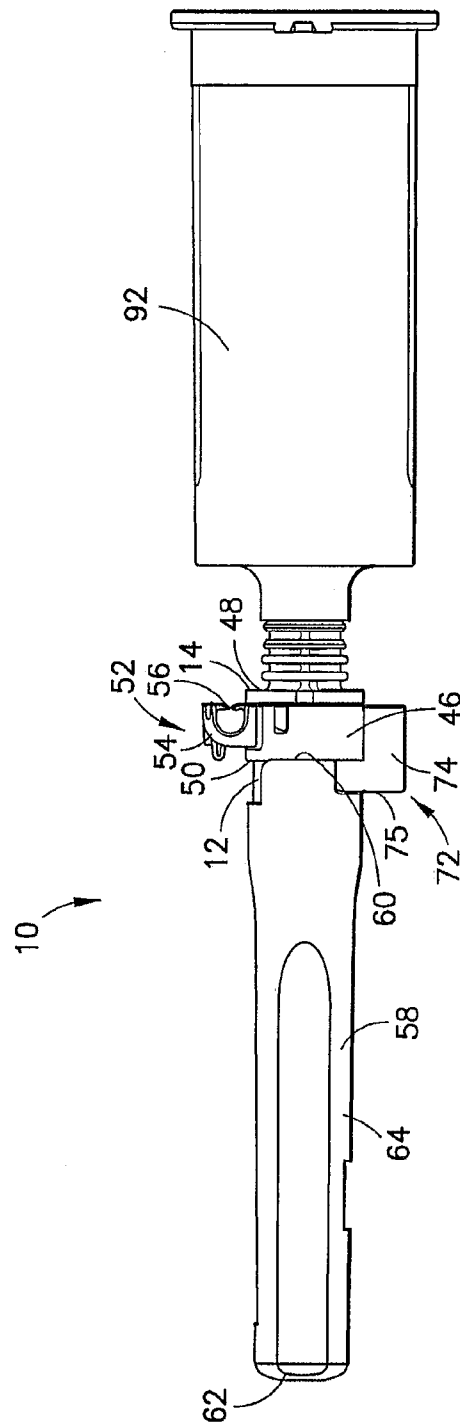


FIG. 10

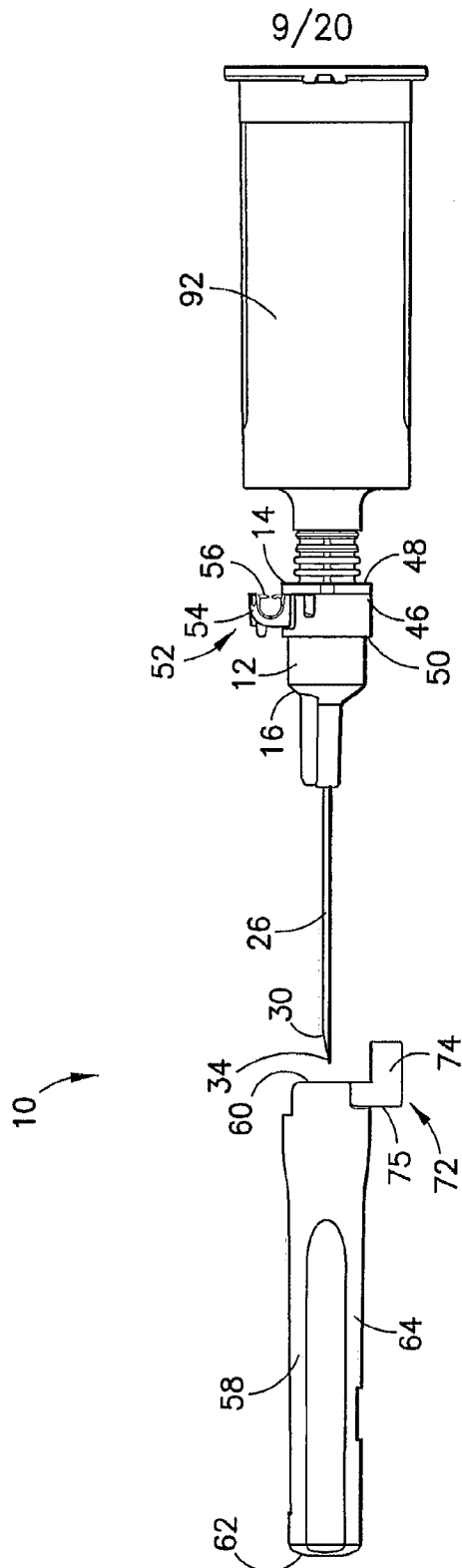


FIG. 11

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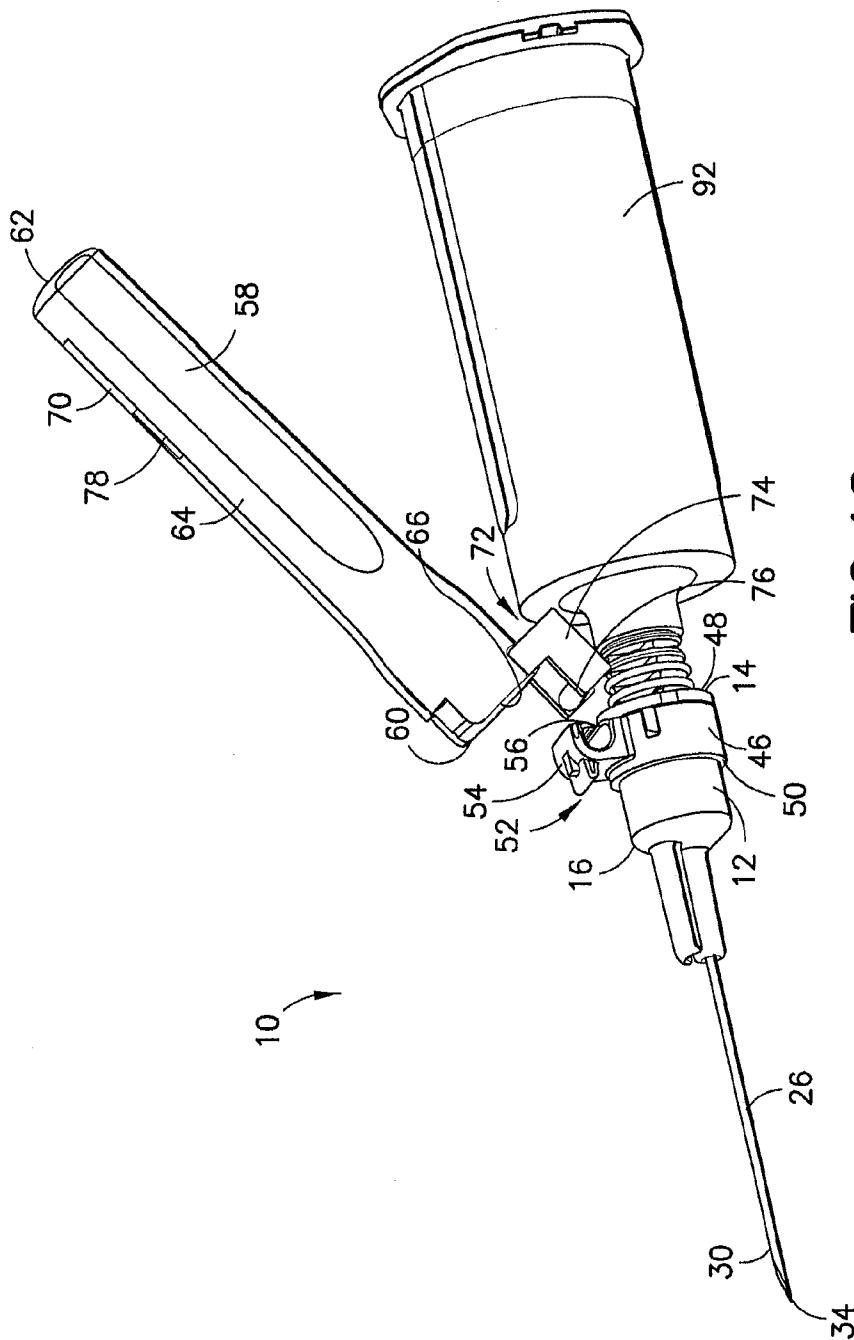
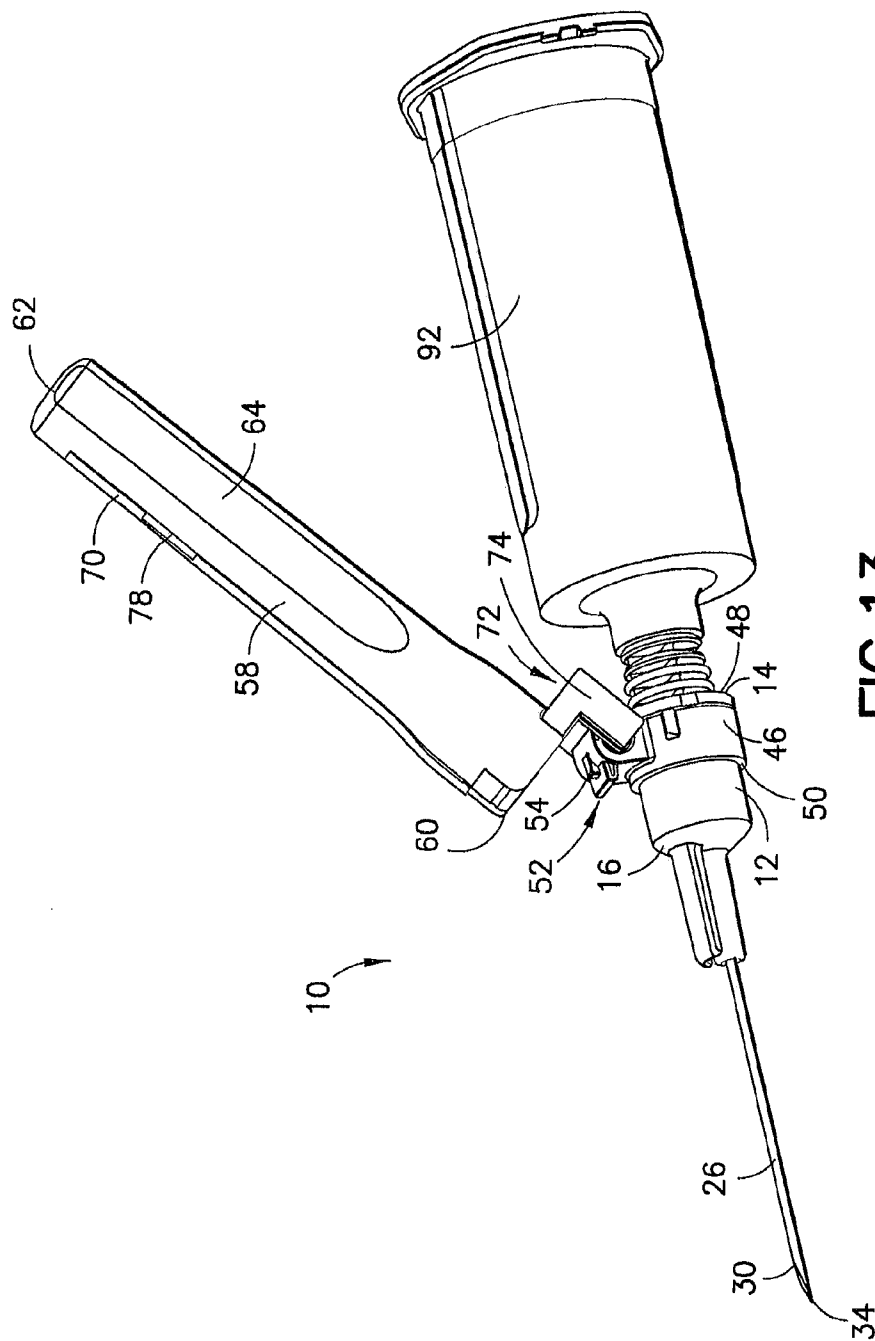


FIG. 12

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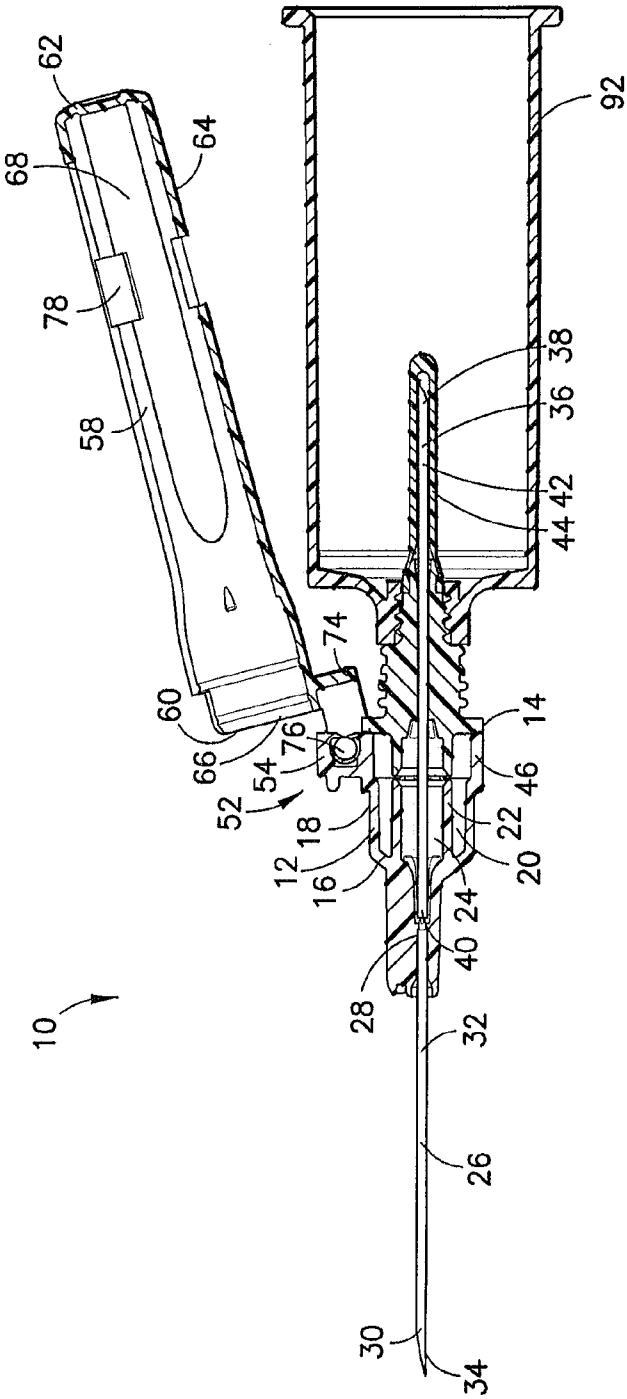


FIG.14

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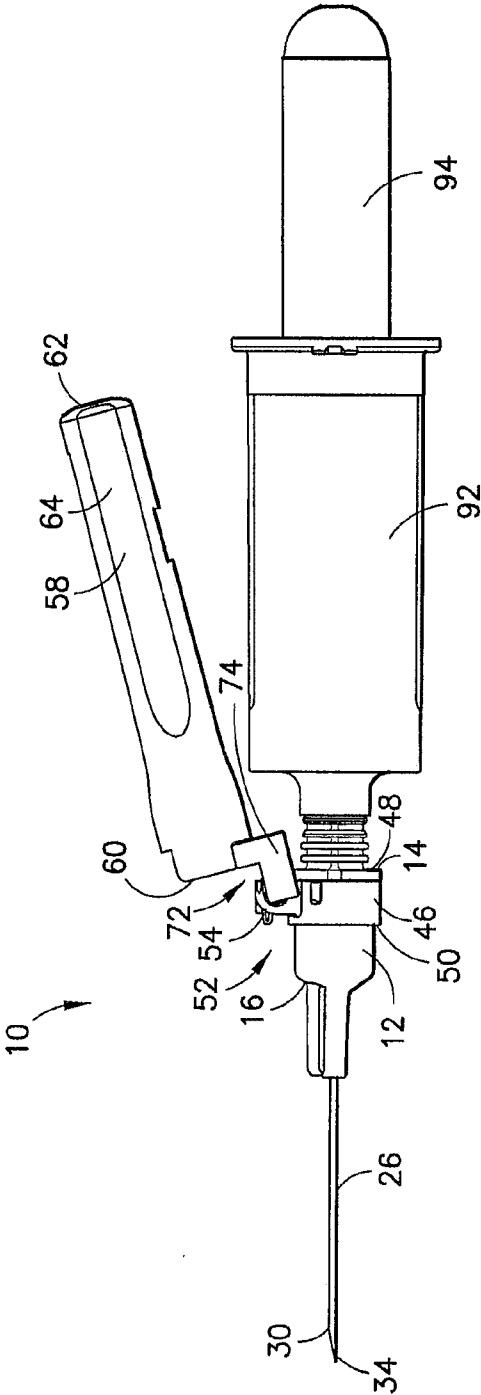


FIG.15

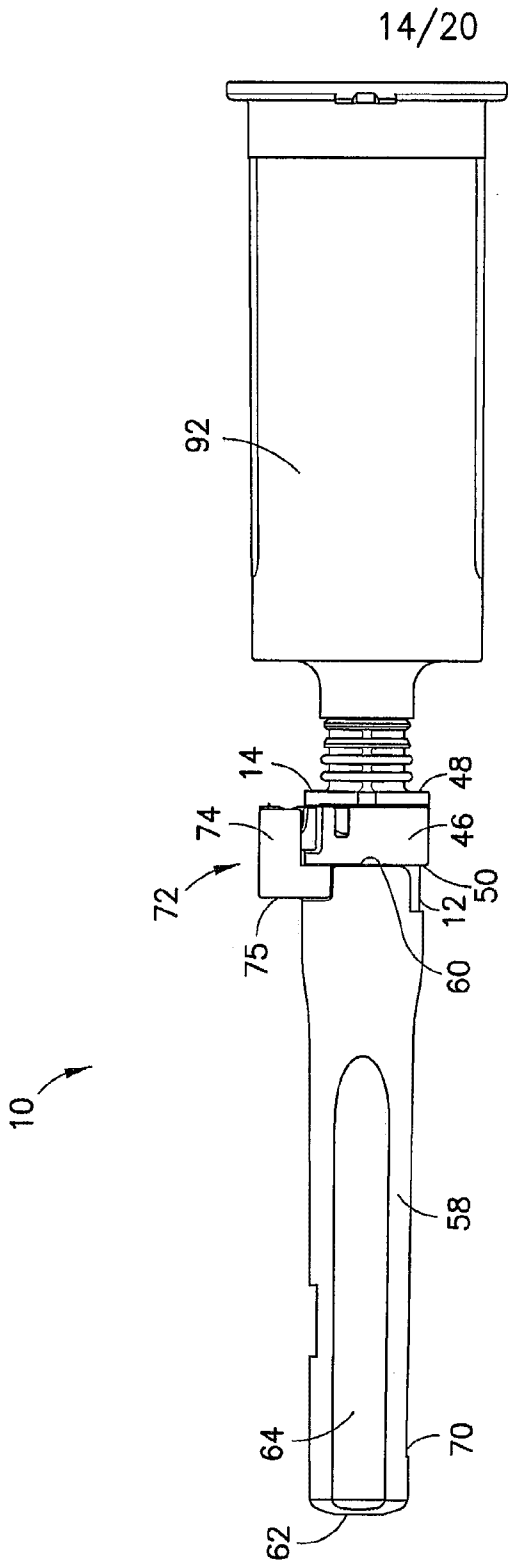


FIG.16

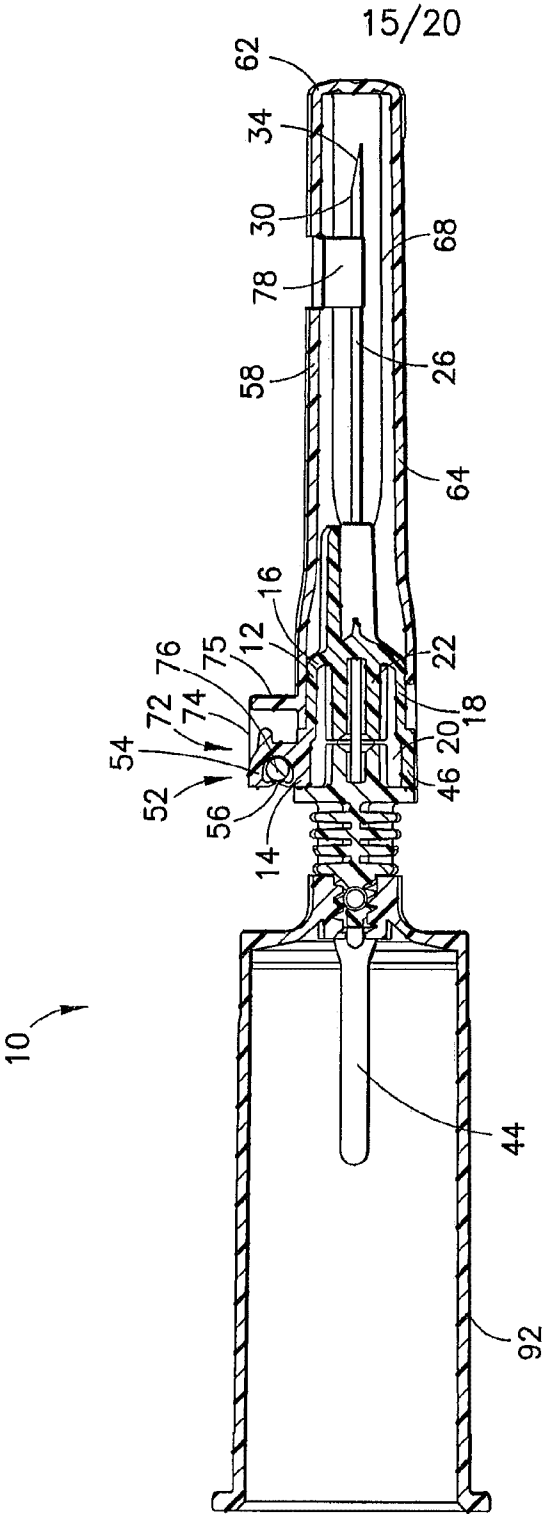


FIG.17

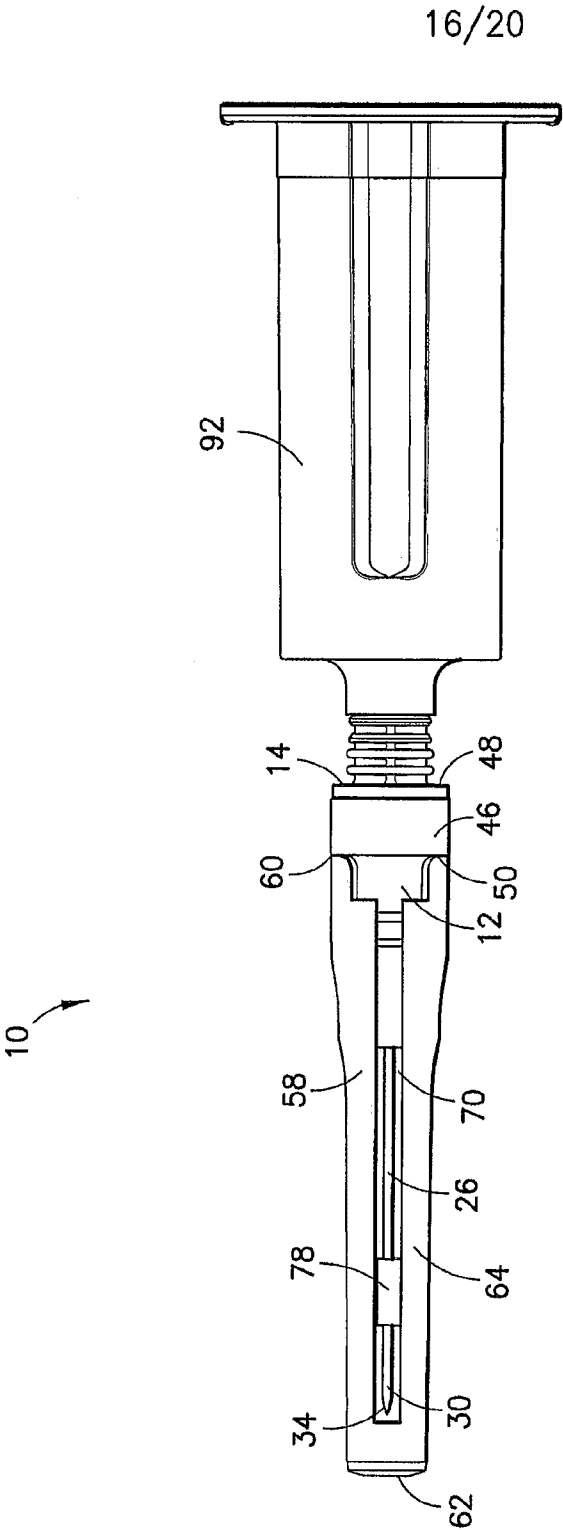


FIG.18

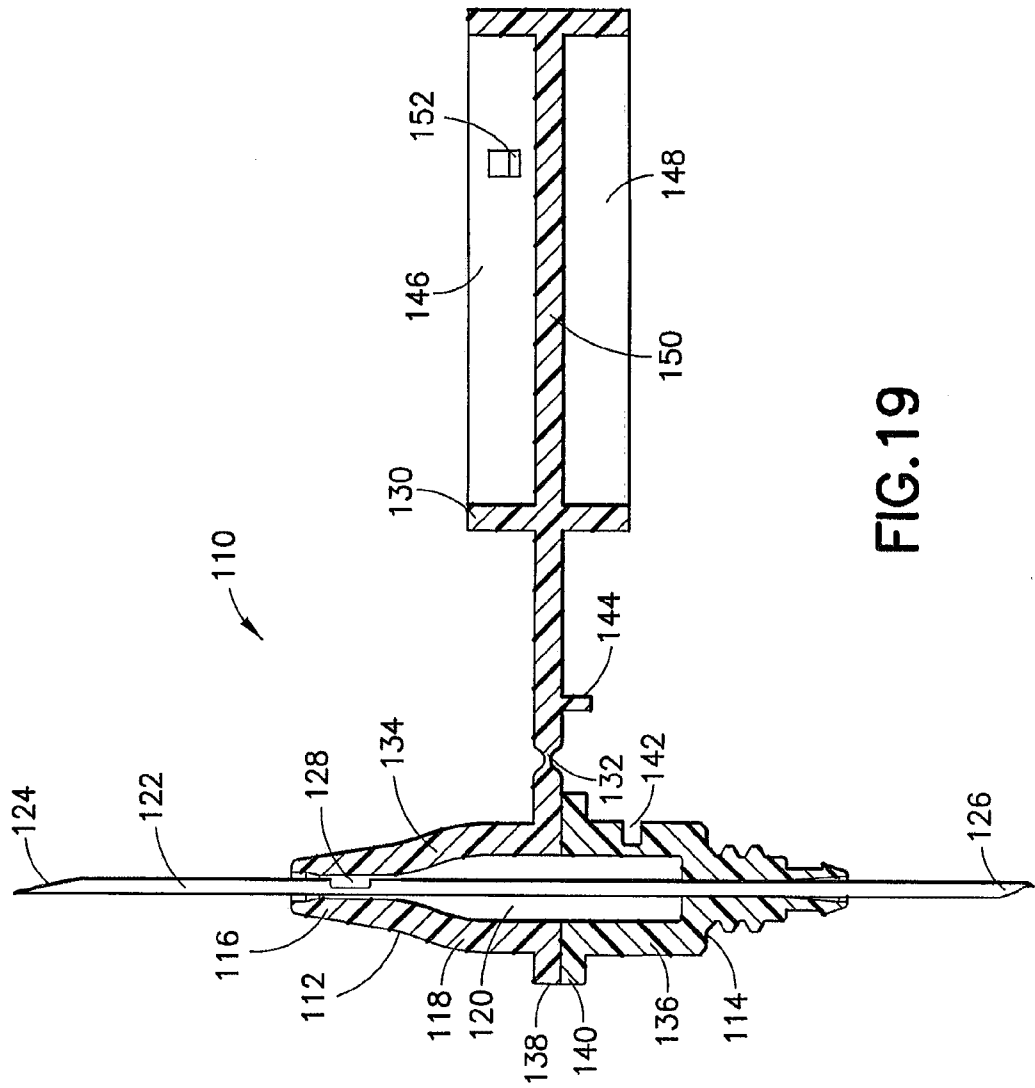
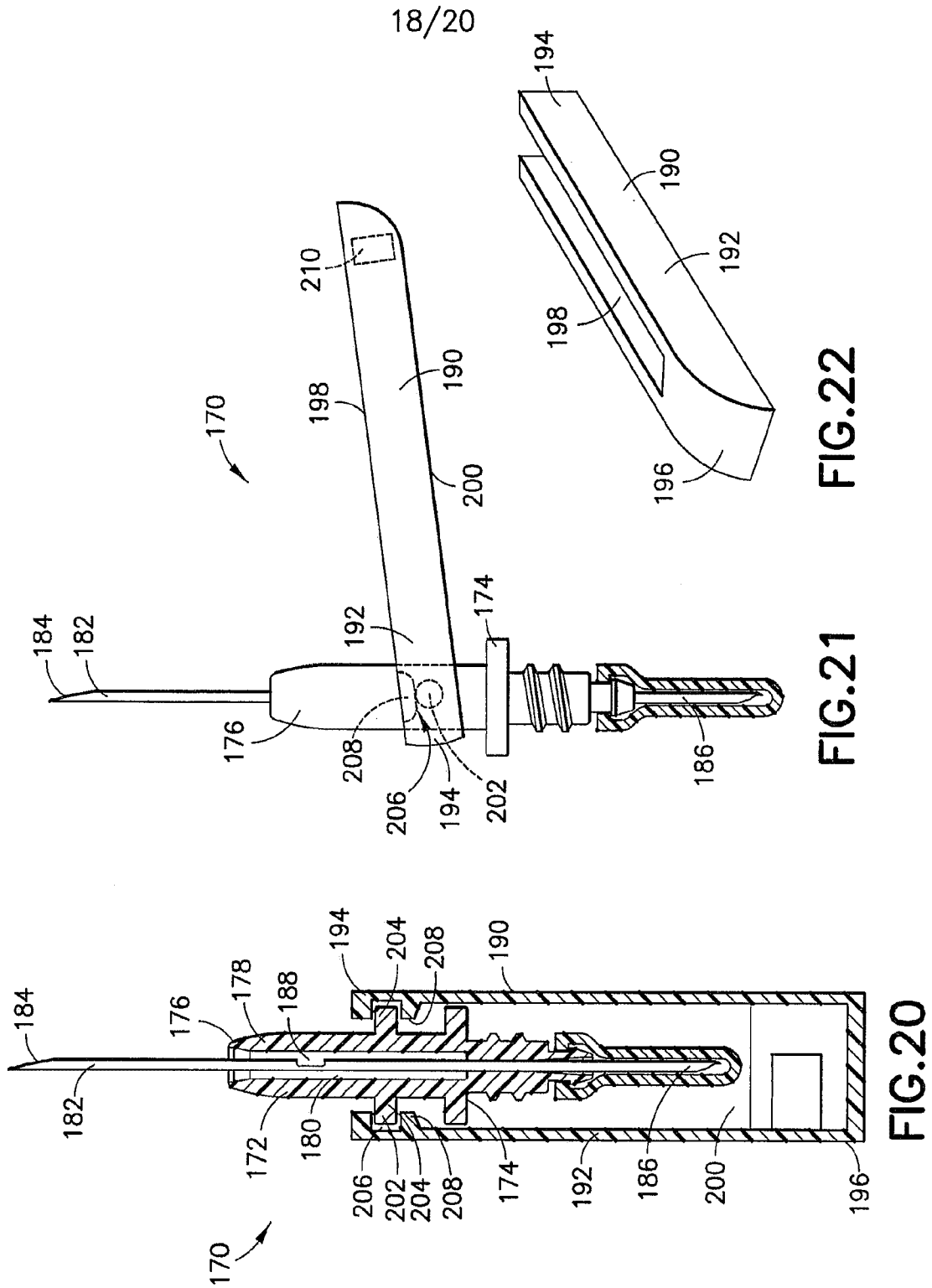


FIG.19



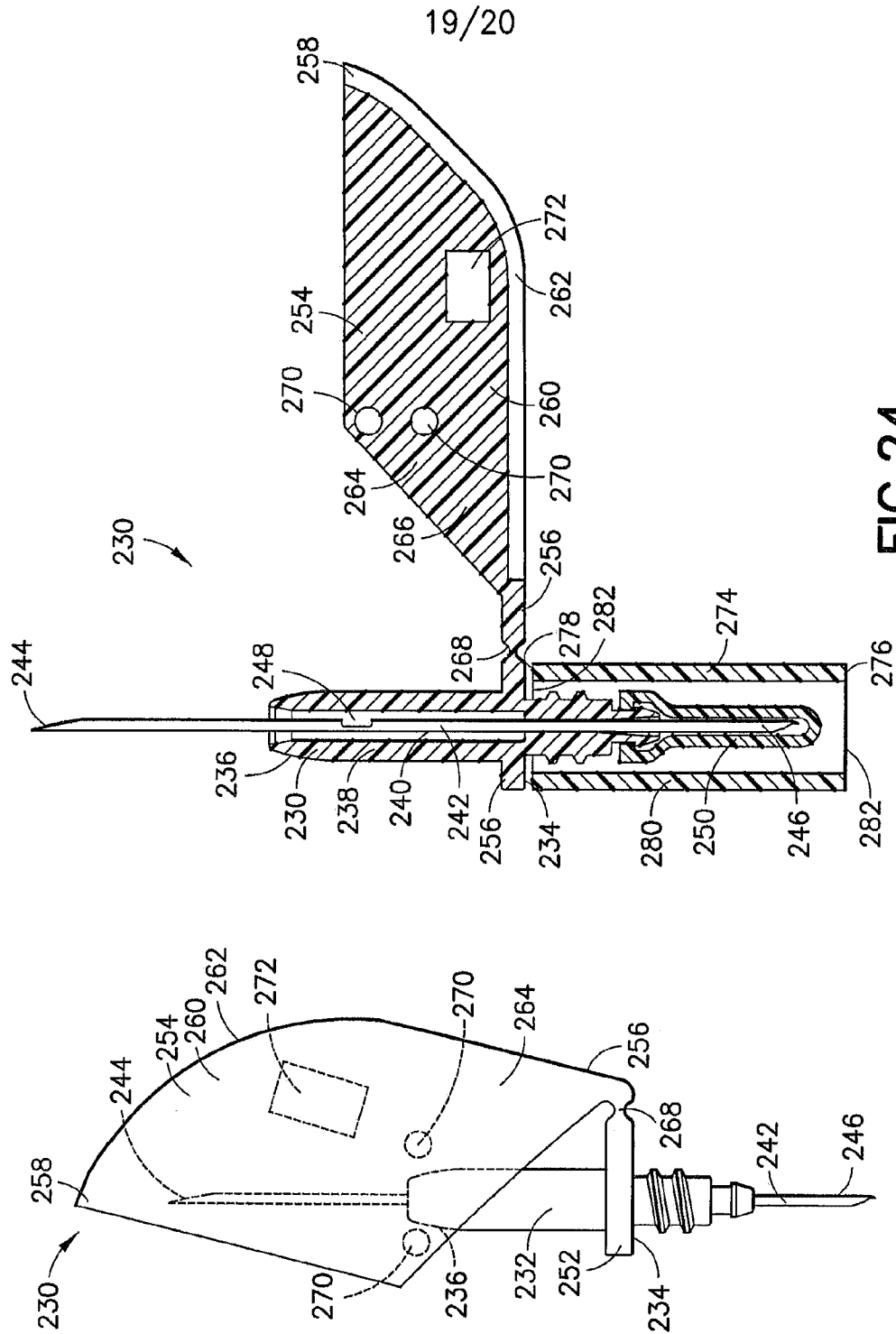


FIG. 24

FIG. 23

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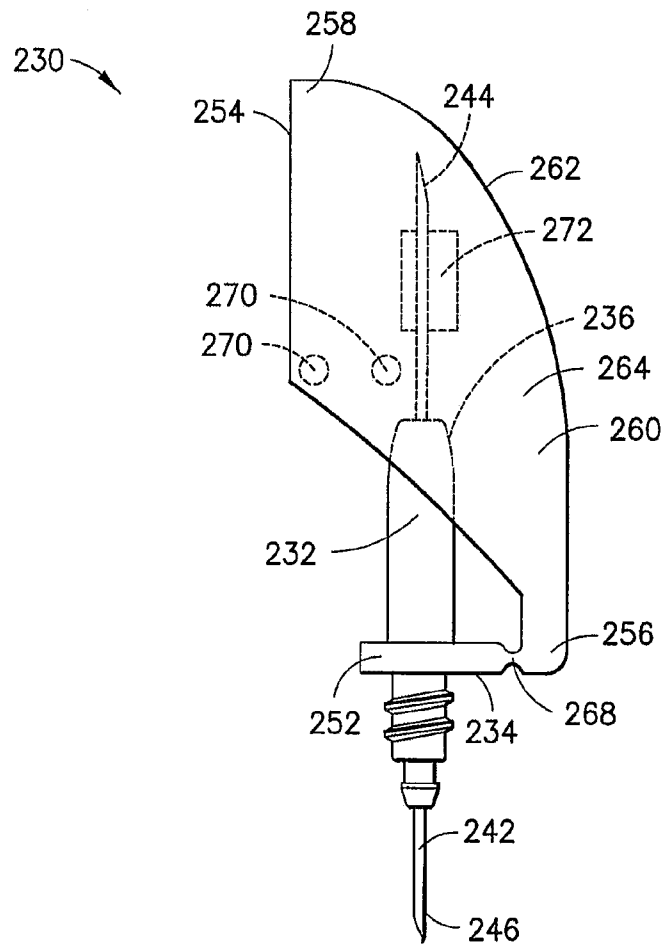


FIG.25