



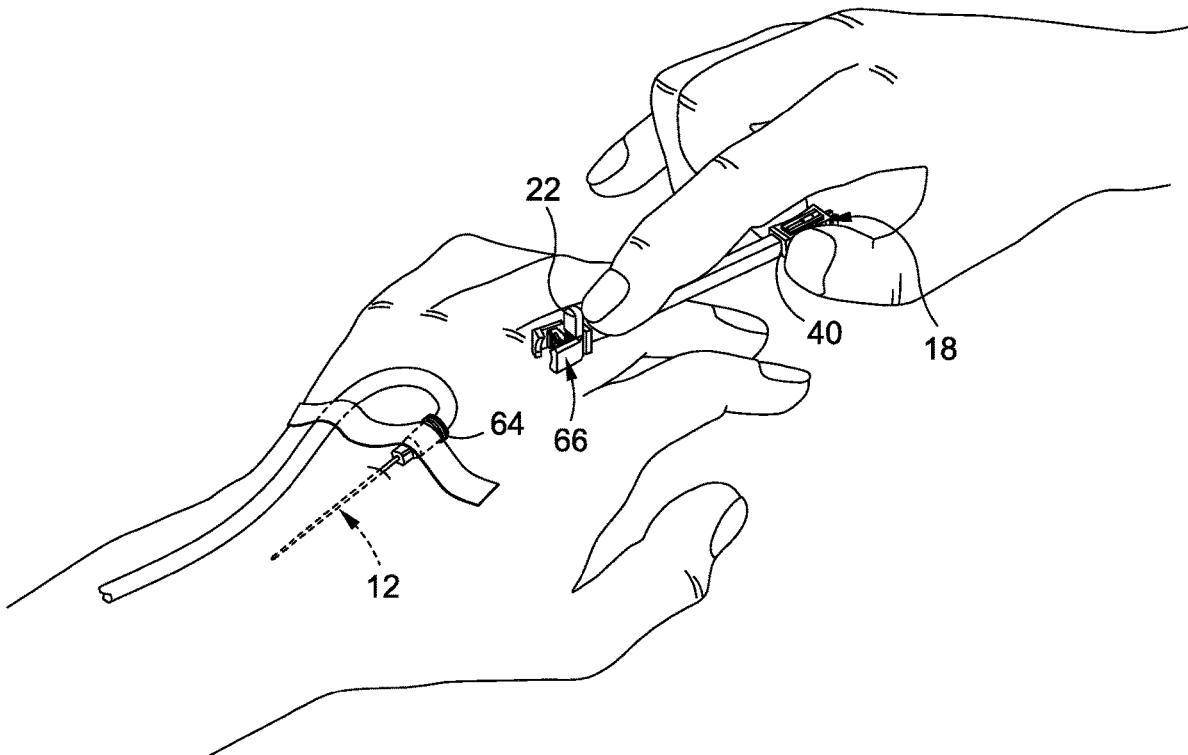
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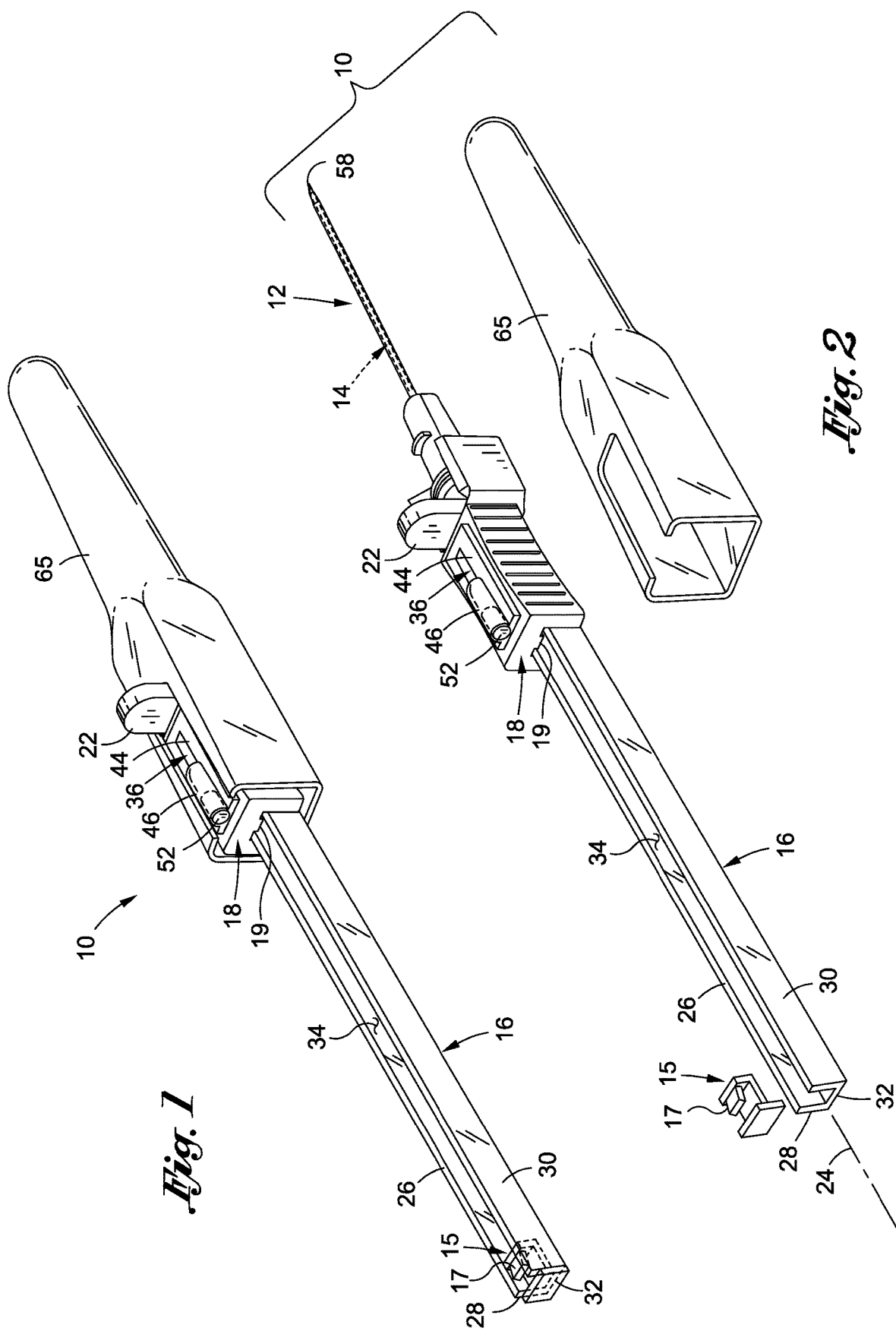
(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0275782 A1**
Antonucci (43) **Pub. Date: Sep. 9, 2021**(54) **LOW PROFILE PASSIVE PROTECTOR FOR AN I.V. CATHETER**(71) Applicant: **Luther Needlesafe Products, LLC**,
Mission Viejo, CA (US)(72) Inventor: **Joseph Antonucci**, Mission Viejo, CA
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5/1535 (2013.01); *A61M 25/0606* (2013.01);
A61B 5/150641 (2013.01)(57) **ABSTRACT**

A low-profile universal passive protector is provided for an IV catheter comprising a hypodermic needle and a catheter. An elongate sheath defines a sheath cavity and a longitudinal axis. A slider is connected to the hypodermic needle and is movable along the sheath between first and second positions for withdrawing the needle into the sheath. A finger-press plate is coupled to the sheath and extends beyond the slider in a direction perpendicular to the longitudinal axis to define a plate height. A flashback body is coupled to the slider in a manner such that the flashback body and slider collectively define a cavity in fluid communication with the hypodermic needle. The flashback body is sized and configured to extend from the slider in a direction perpendicular to the longitudinal axis to define a flashback body height that is less than the plate height.





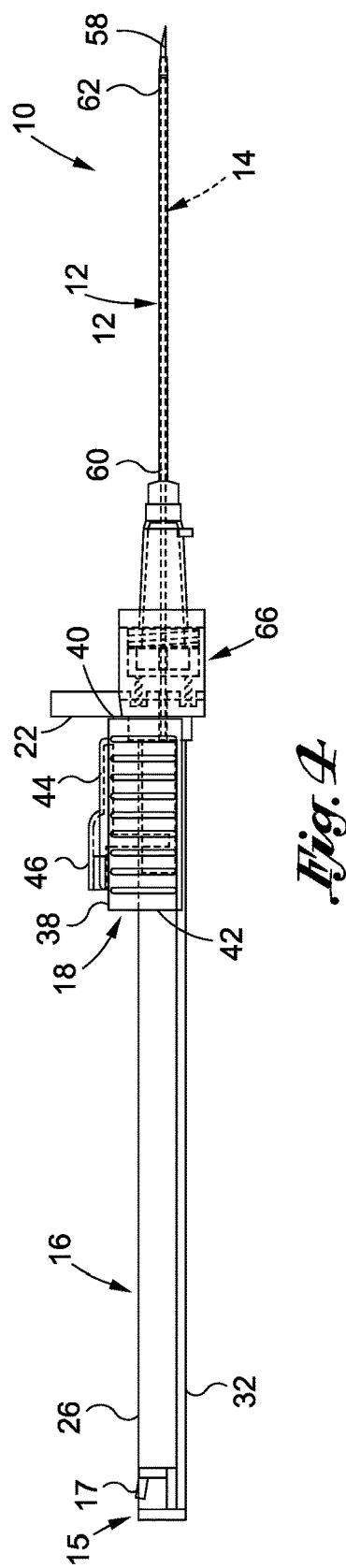
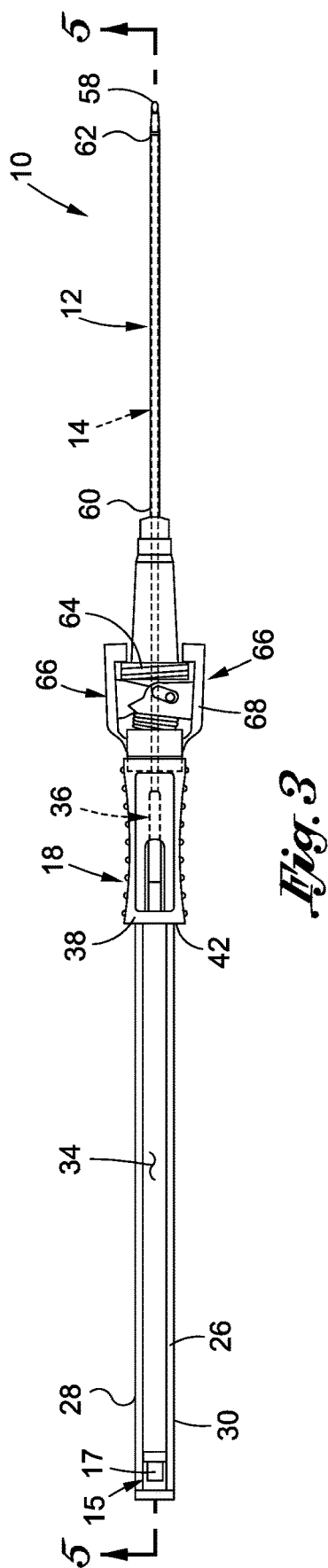
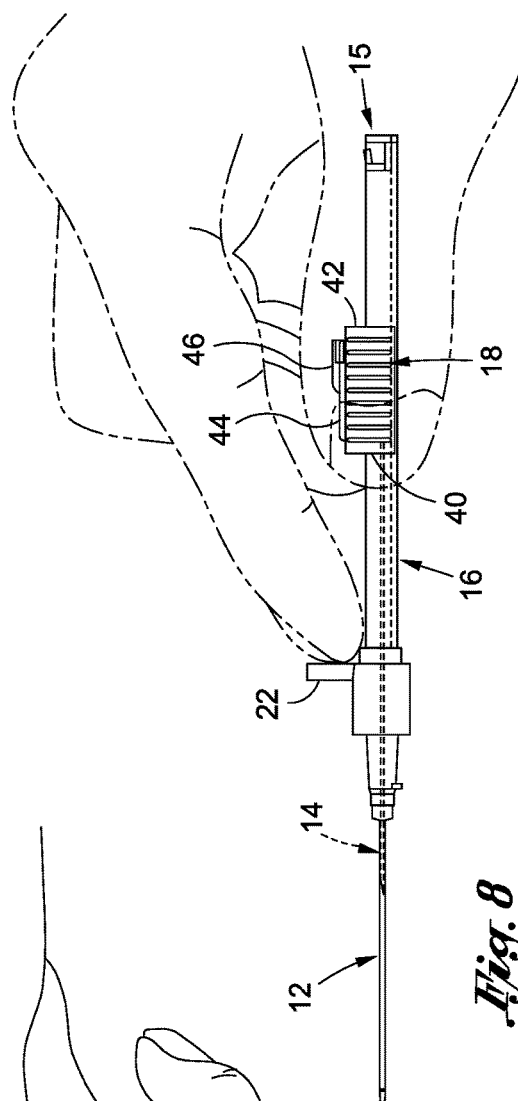
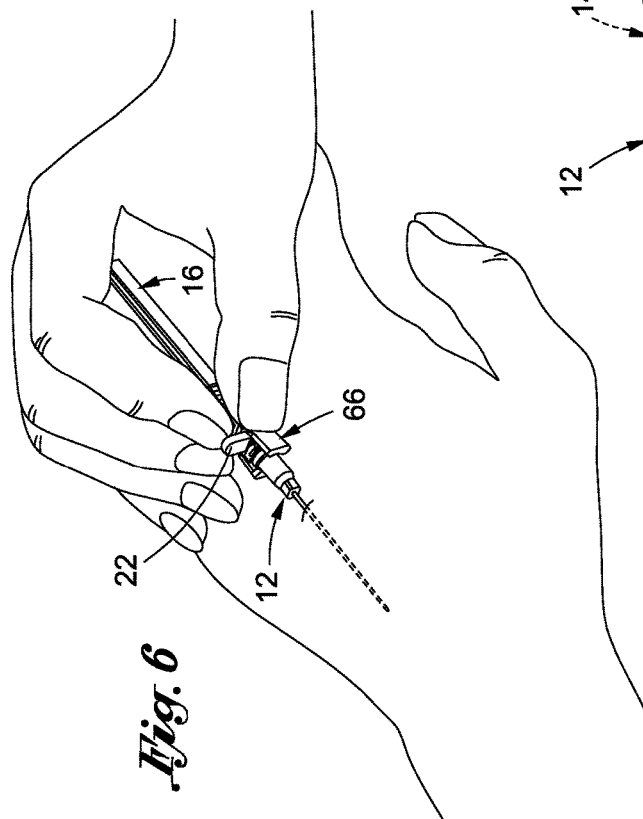
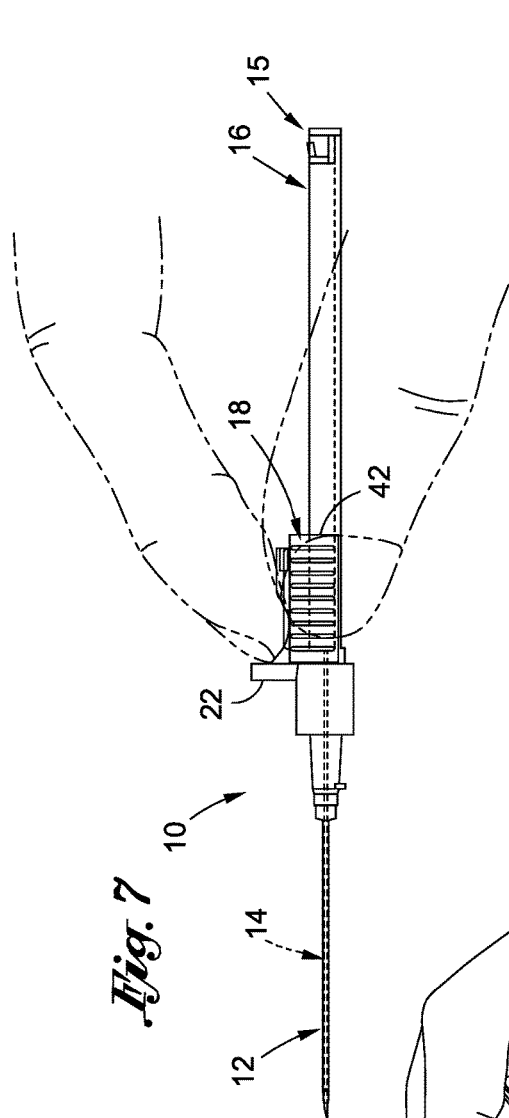
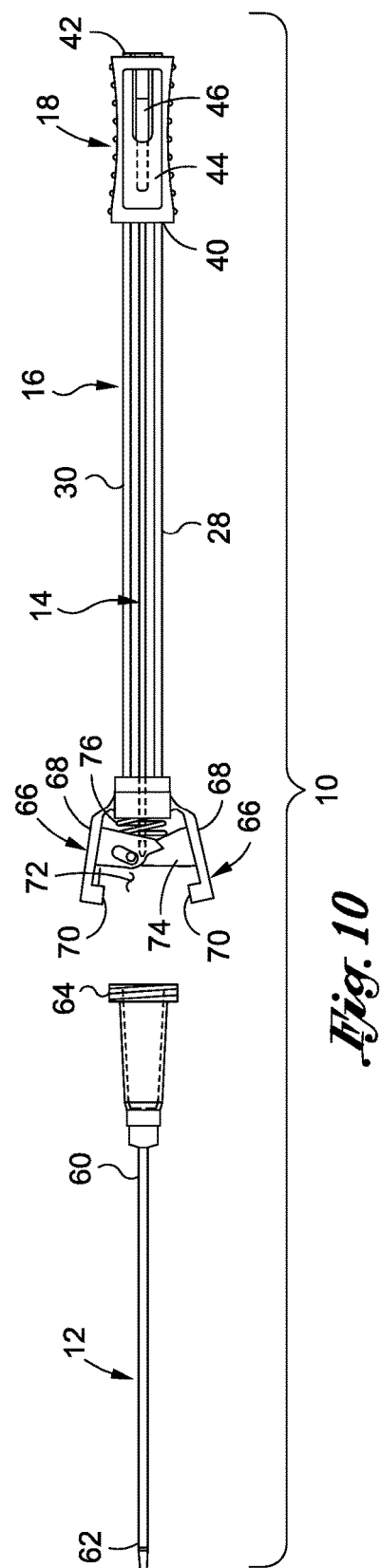
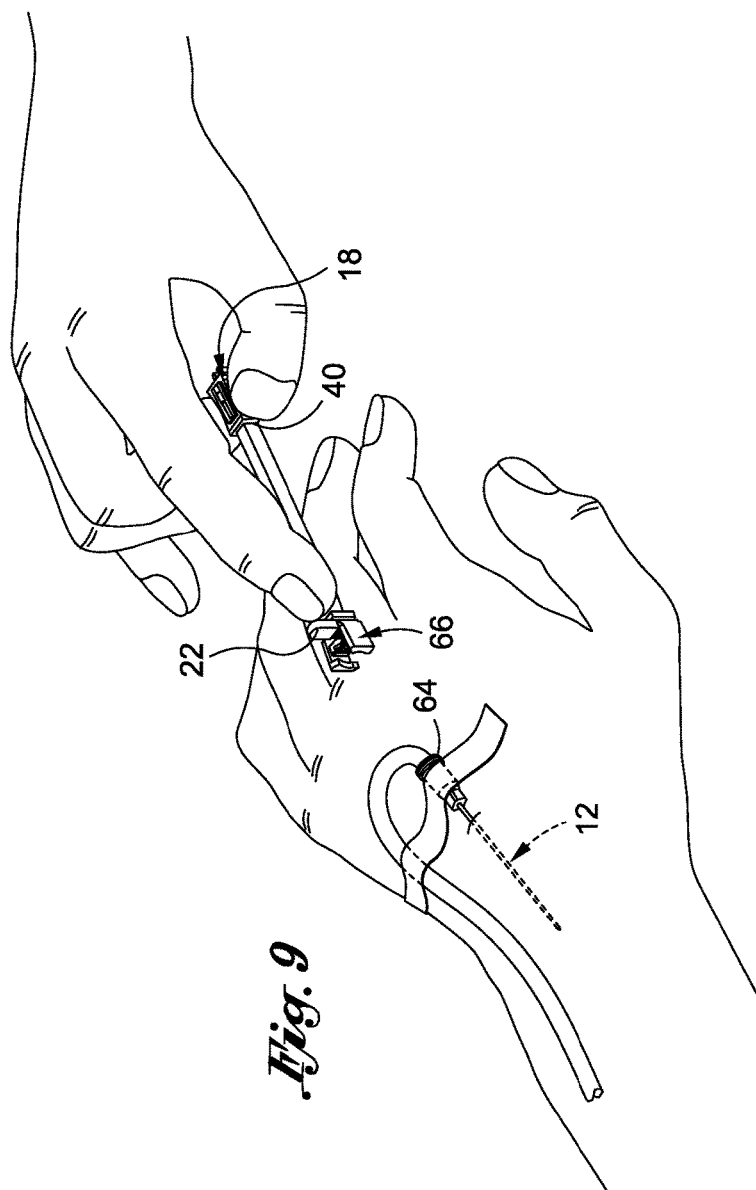


Fig. 5A





LOW PROFILE PASSIVE PROTECTOR FOR AN I.V. CATHETER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT

[0002] Not Applicable

BACKGROUND

1. Technical Field

[0003] The present disclosure relates generally to a universal passive protector for an IV catheter, and more specifically to a universal passive protector having a low-profile flashback chamber relative to a finger-press plate to define a more ergonomically friendly configuration, which in turn, simplifies withdrawal of a hypodermic needle after placement of the catheter within the patient's vein.

2. Related Art

[0004] It is well known in the medical profession that various medical treatments and procedures oftentimes require the insertion or withdrawal of fluid from a patient. Intravenous needles are commonly employed to achieve such insertion or withdrawal of fluid. However, in some instances, the needle may be required to remain in the patient for an extended period of time, such as when introducing or withdrawing large amounts of fluid. Under these circumstances, metal needles are typically unfavorable due to their rigid structure and sharp distal tip which can cause trauma to the patient's vein. In view of the disadvantages associated with metal needles, medical professionals commonly use a catheter for such applications.

[0005] A conventional catheter typically includes a generally flexible tube having a hard/rigid distal tip. The catheter is typically inserted into a patient's vein using a catheter introduction device. Various catheter introduction devices have been developed and include through-the-needle catheters, as well as over-the-needle catheters. A through-the-needle catheter is inserted into an anatomical passage of the patient through the use of a cannula, which typically includes an elongate, metal needle which punctures the skin, tissue and vein wall to provide a path for placement of the catheter in the vein. When the needle pierces the vein, blood will "flashback" through the needle and into a flashback chamber typically located at the proximal end of the needle. Thus, the "flashback" is an indication to the medical technician that the needle has been properly inserted into the vein. At this point, the catheter is maintained stationary within the vein and the needle is withdrawn and removed from the catheter. The needle may have score lines formed therein to allow a medical technician to tear or pull the needle apart to remove the needle from the catheter once the catheter is removed from the patient.

[0006] Over-the-needle catheters are also commonly used by medical technicians, and typically include a thin catheter having a hub attached to its proximal end. The catheter is advanced over a rigid cannula, such as a needle, with the cannula and catheter being simultaneously advanced into a desired anatomical passage of a patient. Once the catheter

has been inserted into the anatomical passage of the patient, the cannula is typically removed from the catheter by retracting the cannula through the catheter. The action of retracting the cannula can undesirably expose the medical technician as well as the patient to accidental contact with the cannula, particularly the piercing tip of the needle. Such accidental needle sticks are a serious concern in view of such diseases as Acquired Immune Deficiency Syndrome ("AIDS"), which can be transmitted through the exchange of bodily fluids with an infected person. In particular, a needle that has been used to place a catheter in the vein of an AIDS infected person may be a vehicle for transmission of the disease to the medical technician.

[0007] A number of protective devices have been developed recently to help reduce the incidence of disease and transmission through needle sticks. Many of the protective devices employ a protective, elongate sheath into which the needle is retracted as the needle is withdrawn from the patient. Along these lines, when the needle is withdrawn, its sharp distal tip is safely enclosed within the sheath, which is typically formed from a rigid material.

[0008] Operation of the protective devices generally includes an actuation mechanism connected to the needle, which is operated by the fingers of the medical technician. The technician uses various structures on the protective device to push against or pull on for retracting the needle within the sheath. However, in many protective devices, the flashback chamber is positioned in a manner which makes it difficult for the medical technician to easily grasp and manipulate the protective device in its intended manner. Such difficulty may lead to improper operation of the protective device, which may lengthen the process of inserting the catheter, or compromise the protective nature of the device.

[0009] Accordingly, there is a need in the medical field for an improved protective device that is sized and configured to facilitate withdrawal of the needle within a protective element. The present invention addresses this need, as will be discussed in more detail below.

BRIEF SUMMARY

[0010] According to an aspect of the invention, there is provided a universal passive protector having a low-profile flashback chamber which forms a more ergonomically compatible configuration relative to prior art passive protectors. The ergonomically friendly configuration allows the medical technician's fingers to easily interface with a finger-press plate for properly operating the protector when withdrawing the needle therein after insertion of the catheter into the patient. Despite the reduced profile of the flashback chamber, the flashback chamber is configured to perform its conventional function of providing a visual indication that the catheter has been properly inserted into the patient's vein. However, the low-profile of the flashback chamber minimizes interference with the fingers of the medical technician to allow the medical technician to easily operate the device.

[0011] According to one embodiment, there is provided a low-profile universal passive protector for an IV catheter comprising a hypodermic needle and an over-the-needle catheter removably disposed about the hypodermic needle. An elongate sheath is detachably engaged with the over-the-needle catheter and defines a sheath cavity and a longitudinal axis. A slider is connected to the hypodermic needle

and is movable along the sheath between a first position and a second position, such that the hypodermic needle is drawn into the sheath cavity as the slider moves from the first position toward the second position. A finger-press plate is coupled to the sheath and extends beyond the slider in a direction perpendicular to the longitudinal axis to define a plate height. A flashback body is coupled to the slider in a manner such that the flashback body and slider collectively define a cavity in fluid communication with the hypodermic needle. The flashback body is sized and configured to extend from the slider in a direction perpendicular to the longitudinal axis to define a flashback body height that is less than the plate height.

[0012] The slider may include a first end and an opposing second end, wherein the first end faces the finger-press plate. The flashback body may be coupled to the slider such that no portion of the flashback body extends from the slider beyond the second end.

[0013] The flashback body height may be less than $\frac{1}{3}$ of the plate height. The flashback body may include a flashback plate and a flashback cylinder coupled to the flashback plate, wherein the flashback plate defines a plane that is substantially parallel to the longitudinal axis, and the flashback cylinder defines a cylinder axis substantially parallel to the longitudinal axis. The flashback cylinder may define an opening which extends into the flashback plate. The flashback cylinder may be integrally formed with the flashback plate. The flashback cylinder may include a curved end portion and an open end portion opposite the curved end portion, wherein the flashback cylinder is arranged such that the curved end portion faces the finger-press plate. The curved end portion may intersect with the flashback plate at the approximate midpoint of the slider in a longitudinal cross section generally perpendicular to the flashback plate.

[0014] The protector may include a locking element coupled to the sheath and extending into the sheath cavity. The slider may be configured to engage with the locking element when the slider is in the second position so as to lock the slider in place. The locking element may include a locking tab which engages with a corresponding locking tab on the slider when the slider is in the second position.

[0015] The presently contemplated embodiments will be best understood by reference to the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which:

[0017] FIG. 1 is an upper perspective view of a low-profile universal passive protector constructed in accordance with an embodiment of the present invention, the universal passive protector having a cover coupled thereto and extending over a hypodermic needle and an over-the-needle catheter;

[0018] FIG. 2 is an upper perspective view of the universal passive protector and cover, with the cover removed from the universal passive protector to expose the hypodermic needle and the over-the-needle catheter;

[0019] FIG. 3 is a top plan view of the universal passive protector;

[0020] FIG. 4 is a side view of the universal passive protector;

[0021] FIG. 5 is an enlarged, partial, side sectional view of the universal passive protector illustrating a low-profile height relative to a finger-press plate;

[0022] FIG. 5A is an enlarged side sectional view of the distal end of the catheter positioned on the needle;

[0023] FIG. 6 is an upper perspective view showing use of the universal passive protector for inserting a catheter into a patient;

[0024] FIG. 7 is a side view of the universal passive protector with the slider and needle in a deployed configuration;

[0025] FIG. 8 is a side view of the universal passive protector with the slider and needle transitioned toward a retracted configuration;

[0026] FIG. 9 is an upper perspective view of the catheter detached from the sheath and inserted in a patient; and

[0027] FIG. 10 is a top view of the catheter detached from the sheath and the hypodermic needle retracted within the sheath.

[0028] Common reference numerals are used throughout the drawings and the detailed description to indicate the same elements.

DETAILED DESCRIPTION

[0029] The detailed description set forth below in connection with the appended drawings is intended as a description of the presently preferred embodiments of the invention, and is not intended to represent the only form in which the present devices may be developed or utilized. It is to be understood, however, that the same or equivalent functions may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention. It is further understood that the use of relational terms such as first, second, and the like are used solely to distinguish one from another entity without necessarily requiring or implying any actual such relationship or order between such entities.

[0030] Referring now to the drawings, wherein the showings are for purposes of illustrating a preferred embodiment of the present invention only, and are not for purposes of limiting the same, there is depicted a low-profile, universal passive protector 10 for use in inserting an over-the-needle IV catheter 12 into a patient. The universal passive protector 10 includes a hypodermic needle 14 that is configured to be withdrawn into a sheath 16 in response to movement of a slider 18 along the sheath 16 from a deployed position to a retracted position. The slider 18 is specifically configured and adapted to include a flashback chamber 20 (see FIG. 5) which defines a low-profile in relation to a finger-press plate 22 to allow a healthcare technician to easily grasp the slider 18 with the technician's thumb and middle finger, while pressing the against the finger-press plate 22 with the technician's index finger for moving the slider 18 along the sheath 16.

[0031] The sheath 16 is an elongate member which defines a longitudinal axis 24 and includes a top surface 26, a pair of opposed side surfaces 28, 30, a bottom surface 32, and a sheath cavity 34 extending into the sheath 16 from the top surface 26 thereof along the length of the sheath 16. The exemplary embodiment of the sheath 16 defines a substantially quadrangular cross section, although those skilled in the art will appreciate that the sheath 16 may define a variety of alternative cross-sectional shapes without departing from the spirit and scope of the present invention.

[0032] The slider 18 is slidably connected to the sheath 16 and is moveable along the length of the sheath 16 between a first, extended position and a second, retracted position. The slider 18 is rigidly connected to the needle 14 such that movement of the slider 18 from the extended position toward the retracted position causes the needle 14 to retract into the sheath cavity 34, as will be described in more detail below. The slider 18 includes a slider locking tab 19 (see FIG. 5) which engages with a distal needle lock 15 for locking the slider 18 in retracted position. When the slider 18 is locked in the retracted position, the engagement between the distal needle lock 15 and the slider 18 restricts/prevents movement of the slider 18 from the retracted position toward the extended position so as to maintain the needle 14 within the sheath 16 for preventing inadvertent needle sticks.

[0033] The distal needle lock 15 (i.e., a locking element) is coupled to the sheath 16 and extends into the sheath cavity 34 such that the slider 18 engages with the distal needle lock 15 when the slider 18 is in the retracted position. The particular embodiment of the distal needle lock 15 includes a locking tab 17, which is configured to engage with a slider locking tab 19 formed on the slider 18 when the slider 18 is in the fully retracted position. In particular, the slider locking tab 19 extends over the distal needle lock tab 17 and into a locking cavity 21 formed behind the locking tab 17 to capture the slider locking tab 19 therein. By capturing the slider locking tab 19, movement of the slider 18 along the sheath 34 is prevented.

[0034] A flashback body 36 is connected to the slider 18 such that the flashback body 36 and the slider 18 collectively define the flashback chamber 20, which is in fluid communication with the fluid passageway defined by the hypodermic needle 14. The flashback chamber 20 fills with blood when the needle 14 is inserted into a patient's vein so as to provide a visual indication to the medical technician that the needle 14 and catheter 12 are properly positioned.

[0035] The finger-press plate 22 is coupled to the sheath 16 and extends upwardly therefrom. The finger-press plate 22 is specifically sized and configured to serve as a push-off point for the medical technician's index finger when transitioning the slider from the extended position toward the retracted position, as discussed in more detail below.

[0036] One aspect of the present invention pertains to the height differential between the flashback body 36 and the finger-press plate 22. In particular, the flashback body 36 is specifically sized and configured to define a low-profile relative to the finger-press plate 22 to allow the medical technician's index finger to easily interface with the finger-press plate 22. In this regard, the flashback body 36 does not interfere with the medical technician's index finger when the slider 18 is positioned adjacent the finger-press plate 22 (i.e., when the slider 16 is in the extended position).

[0037] The finger-press plate 22 extends from the sheath 16 in a direction substantially perpendicular to the longitudinal axis 24 beyond an upper surface 38 of the slider 18 to define a plate height "P." The flashback body 36 extends above the upper surface 38 of the slider 18 in a direction substantially perpendicular to the longitudinal axis 24 to define a flashback body height "F." The flashback body height F is less than the plate height P, and is preferably substantially less than the plate height P. In one embodiment, the flashback body height F is less than $\frac{1}{3}$ of the plate height P, and in other embodiments, the flashback body height F is significantly less than $\frac{1}{3}$ of the plate height P. In this regard,

the plate height P may be increased in various embodiments of the universal passive protector 10 to increase the height differential between the plate height P and the flashback body height F so as to make it easier for the medical technician to interface with the finger-press plate 22 during use of the protector 10.

[0038] According to another aspect of the present invention, the flashback body 36 is additionally configured so as not to extend beyond the slider 18 in a direction parallel to the longitudinal axis 24. Along these lines, the slider 18 includes a first end 40 and an opposing second end 42, wherein the first end faces the finger-press plate 22 and the second end 42 faces away from the finger-press plate 22. The flashback body 36 is preferably confined between the planes defined by the opposing first and second ends 40, 42.

[0039] In one embodiment, the flashback body 36 includes a flashback plate 44 and a flashback cylinder 46 coupled to the flashback plate 44. In a preferred embodiment, the flashback cylinder 46 is integrally formed with the flashback plate 44, although those skilled in the art will recognize that non-integral configurations may be employed without departing from the spirit and scope of the present invention. The flashback plate 44 defines a plane that is substantially parallel to the longitudinal axis 24, and the flashback cylinder 46 defines a cylinder axis substantially parallel to the longitudinal axis 24. According to one implementation, the flashback cylinder 46 defines an opening disposed about the cylinder axis and sized to at least partially extend into the flashback plate 44, as can be seen in FIGS. 1 and 2, wherein the lower end of the opening extends partially into the flashback plate 44.

[0040] The flashback cylinder 46 includes a curved end portion 48 and an open end portion 50 opposite the curved end portion 48. The flashback cylinder 46 is arranged such that the curved end portion 48 faces the finger-press plate 22. The curved end portion 48 intersects with the flashback plate 44 at the approximate midpoint of the slider 18 (i.e., between the first and second ends 40, 42) in a longitudinal cross section generally perpendicular to the flashback plate 44. In one implementation, the opening defined by the flashback cylinder 46 is too small to engage with conventional fluid insertion or extraction devices. In this regard, the fluid insertion or extraction devices interface directly with the catheter 12 for such procedures.

[0041] A plug 52 is inserted within the flashback cylinder opening to prevent blood from exiting the flashback cavity 34. The plug 52 is preferably configured to allow gases to pass therethrough, while restricting the passage of liquids therethrough.

[0042] As noted above, movement of the slider 18 from the extended position toward the retracted position causes the needle 14 to retract into the sheath 16. Along these lines, the sheath 16 includes an opening 54 (see FIG. 5) in communication with the sheath cavity 34 and through which the needle 14 extends. The needle 14 includes a proximal portion 56 coupled to the slider 18 and an opposing distal portion defining a sharp distal tip 58 which slightly protrudes from a distal end of the catheter 12.

[0043] The catheter 12 defines a proximal end portion 60, a distal end portion 62, and a catheter passageway extending between the proximal and distal end portions 60, 62. The catheter 12 includes a hub 64 positioned adjacent the proximal end portion 60. A catheter tube 55, formed of a soft, flexible material, is attached to the hub 64. The catheter tube

55 is configured to be inserted into a patient's vein, thereby providing a path for intravenous injection or aspiration of the patient. Along these lines, the hub **64** is configured to be engageable with injection/aspiration devices via a threaded luer lock.

[0044] FIG. 5A shows an enlarged, partial side sectional view of an embodiment of the distal end portion **62** of the catheter **12**. The catheter **12** includes a hardened distal tip **61** having an exposed segment **63** and an insertion segment **67**, wherein the insertion segment **67** is disposed within the catheter tube **55**. The insertion segment **67** is sized and configured to abut against a shoulder **71** formed on the needle **14**, wherein the outer diameter of the needle **14** transitions to a reduced diameter at the distal end thereof. The abutment between the hardened distal tip **61** and the shoulder **71** prevents the catheter **12** from gathering or bunching up as the catheter **12** is inserted into the patient. In this regard, the catheter tube **55** is typically not frictionally engaged with the needle **14** and is formed from a soft-flexible material such that if the hardened distal tip **61** did not engage with the shoulder **71**, the catheter tube **55** would likely gather and bunch up over the needle **14** as the needle **14** is advanced into the patient.

[0045] Although FIG. 5A shows the hardened distal tip **61** and the catheter tube **55** as being separate elements which are joined together, it is additionally contemplated that the hardened distal tip **61** and the catheter tube **55** may be co-molded together so as to form a unitary body.

[0046] A detachable cover **65** may be placed over the needle **14** and catheter **12** before using the protector **10** to protect the medical technician from an inadvertent needle stick. Along these lines, the cover **65** is removed before the needle **14** and catheter **12** are inserted into the patient.

[0047] The sheath **16** is connected to a pair of retractable arms **66** (i.e., jaws) specifically configured and adapted to engage with the hub **64** when the slider **18** is in the extended position, and to release the hub **64** as the slider **18** transitions to the retracted position. The arms **66** are pivotally connected to the sheath **16** and are moveable between a closed position, wherein the arms **66** engage with the hub **64**, and an open position, wherein the arms **66** release the hub **64**. According to one embodiment, the arms **66** are biased toward the open position, such that when the needle **14** is retracted within the sheath **16**, the arms **66** release the hub **64**.

[0048] In one implementation of the present invention, and referring now specifically to FIG. 10, each arm **66** includes a primary arm body **68** having a proximal segment coupled to the sheath **16**, and a distal segment **70** configured to capture the hub **64** of the catheter **12** when the arms **66** are in the closed position. The arms **66** are connected to the sheath **16** such that the primary arm bodies **68** are arranged in generally opposed relation to each other and define a hub receiving cavity **72** therebetween. Each arm **66** additionally includes a secondary arm body **74** coupled to the primary arm body **68** and extending into the hub receiving cavity **72**. The secondary arm bodies **74** are configured to interlock with each other and cover the opening **54** of the sheath **16** through which the needle **14** is retracted when the needle **14** is in the fully retracted position. According to one embodiment, one secondary arm body includes a slot while the other secondary arm body includes a pin or post which resides within the slot to interlock the secondary arm bodies **74** to each other. The secondary arm bodies **74** each include

a central aperture formed therein to accommodate passage of the needle therethrough. The central apertures are co-axially aligned with each other when the arms **66** are in the closed position, to thereby allow the needle **14** to extend through each aperture. When the needle **14** is captured within the sheath **16**, and the arms **66** transition to the open position, the apertures move into a non-aligned configuration, which effectively prevents the needle **14** from leaving the sheath **16**. A spring **76** is engaged with the arms **66** and biases the arms **66** toward their open position.

[0049] The foregoing describes an exemplary embodiment of the arms **66**. For a more detailed discussion of the arms **66**, please refer to U.S. Pat. No. 6,981,965, entitled Universal Passive Protector for an IV Catheter, the contents of which are expressly incorporated herein by reference.

[0050] With the basic structural features of the device **10** described above, the following discussion will focus on operation of the device **10**. To insert the catheter **12** into the patient's vein using the protector **10**, a medical technician grasps the protector **10** and aligns the distal, piercing end of the needle **14** with the patient's vein. The medical technician then punctures the patient's skin with the needle **14** and guides the needle **14** into the vein (see FIG. 6). When the needle **14** has penetrated the vein, the flashback chamber **20** fills with blood. The technician inserts the needle **14** into the vein deep enough so that the distal end of the catheter **12** traverses a wall of the vein.

[0051] When the catheter **12** has been safely inserted into the vein, the technician grasps the opposed sides of the slider **18** between the technician's thumb and middle finger (see FIGS. 6 and 7), while the technician's index finger resides on top of the slider **18** and against the finger-press plate **22**. The low-profile configuration of the flashback body **36** reduces interference with the technician's index finger when the slider **18** is in the extended position. In this regard, the technician has greater control over the device **10**, which minimizes shaking of the needle **14** within the patient, and allows the user to more easily push/press against the finger-press plate **22** for moving the slider **18**.

[0052] The technician then pulls the slider **18** from the extended position toward the retracted position, which in turn, causes the needle **14** to retract into the sheath **16**. When the slider **18** reaches the retracted position, the slider locking tab **19** is captured within the locking cavity **21** of the distal locking element **15** so as to lock the slider **18** in place on the sheath **16**. Furthermore, when the needle **14** is completely retracted into the sheath **16**, the arms **66** are no longer restrained by the needle **14**, and thus spring into the open position. The catheter **12** is thus released from the arms and is ready to engage with an injection or aspiration device. The needle **14** is safely stowed within the sheath **16** and the secondary arm bodies **74** block the needle **14** to prevent the needle **14** from exiting the sheath **16**. In this regard, the protector **10** employs a redundant locking/needle capturing system including the engagement between the slider **18** and distal need lock **15** (i.e., the distal lock), as well as the blockage of the needle **14** by the secondary arm bodies **74** (i.e., the proximal lock) so as to ensure the safety of the medical professional and to guard against an accidental needle stick.

[0053] The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the present invention only and are presented in the cause of providing what is believed to be the most

useful and readily understood description of the principles and conceptual aspects. In this regard, no attempt is made to show more details than is necessary for a fundamental understanding of the disclosure, the description taken with the drawings making apparent to those skilled in the art how the several forms of the presently disclosed invention may be embodied in practice.

What is claimed is:

1. A low-profile universal passive protector for an IV catheter comprising:

- a hypodermic needle;
- an over-the-needle catheter removeably disposed about the hypodermic needle;
- an elongate sheath detachably engaged with the over-the-needle catheter, the elongate sheath defining a sheath cavity and a longitudinal axis;
- a slider connected to the hypodermic needle and movable along the sheath between a first position and a second position, the hypodermic needle being drawn into the sheath cavity as the slider moves from the first position toward the second position;
- a finger-press plate coupled to the sheath and extending beyond the slider in a direction perpendicular to the longitudinal axis to define a plate height; and
- a flashback body coupled to the slider, the flashback body and slider collectively defining a cavity in fluid communication with the hypodermic needle, the flashback body extending from the slider in a direction perpendicular to the longitudinal axis to define a flashback body height;

the flashback body height being less than the plate height.

2. The protector as recited in claim 1, wherein the flashback body height is less than $\frac{1}{3}$ of the plate height.

3. The protector as recited in claim 1, wherein:

the slider includes a first end and an opposing second end, the first end facing the finger-press plate;

the flashback body is coupled to the slider such that no portion of the flashback body extends from the slider beyond the second end.

4. The protector as recited in claim 1, wherein the flashback body includes a flashback plate and a flashback cylinder coupled to the flashback plate, the flashback plate defining a plane that is substantially parallel to the longitudinal axis, and the flashback cylinder defining a cylinder axis substantially parallel to the longitudinal axis.

5. The protector as recited in claim 4, wherein the flashback cylinder defines an opening which extends into the flashback plate.

6. The protector as recited in claim 4, wherein the flashback cylinder is integrally formed with the flashback plate.

7. The protector as recited in claim 6, wherein the flashback cylinder includes a curved end portion and an open end portion opposite the curved end portion, the flashback cylinder being arranged such that the curved end portion faces the finger-press plate.

8. The protector as recited in claim 7, wherein the curved end portion intersects with the flashback plate at the approximate midpoint of the slider in a longitudinal cross section generally perpendicular to the flashback plate.

9. The protector as recited in claim 1, further comprising a locking element coupled to the sheath and extending into

the sheath cavity, the slider engaging with the locking element when the slider is in the second position to lock the slider in the second position.

10. The protector as recited in claim 9, wherein:

the locking element includes a locking element locking tab; and

the slider includes a slider locking tab configured to engage with the locking element locking tab when the slider is in the second position, the engagement between the locking element locking tab and slider locking tab restricting movement of the slider from the second position toward the first position.

11. The protector as recited in claim 1, wherein:

the needle includes a stepped shoulder; and

the catheter includes a hardened distal tip configured to abut against the stepped shoulder during insertion of the catheter into a patient.

12. A low-profile universal passive protector for an IV catheter comprising:

- a hypodermic needle;
- an over-the-needle catheter removeably disposed about the hypodermic needle;
- an elongate sheath detachably engaged with the over-the-needle catheter, the elongate sheath defining a sheath cavity and a longitudinal axis;
- a slider having a first end and an opposing second end, the first end facing the hypodermic needle, the slider being connected to the hypodermic needle and movable along the sheath between a first position and a second position, the hypodermic needle being drawn into the sheath cavity as the slider moves from the first position toward the second position;
- a finger-press plate coupled to the sheath and extending beyond the slider in a direction perpendicular to the longitudinal axis to define a plate height; and
- a flashback body coupled to the slider, the flashback body and slider collectively defining a cavity in fluid communication with the hypodermic needle, the entirety of the flashback body residing between the first and second ends of the slider.

13. The protector as recited in claim 11, wherein the flashback body includes a flashback plate and a flashback cylinder coupled to the flashback plate, the flashback plate defining a plane that is substantially parallel to the longitudinal axis, and the flashback cylinder defining a cylinder axis substantially parallel to the longitudinal axis.

14. The protector as recited in claim 12, wherein the flashback cylinder defines an opening which extends into the flashback plate.

15. The protector as recited in claim 12, wherein the flashback cylinder is integrally formed with the flashback plate.

16. The protector as recited in claim 14, wherein the flashback cylinder includes a curved end portion and an open end portion opposite the curved end portion, the flashback cylinder being arranged such that the curved end portion faces the finger-press plate.

17. The protector as recited in claim 15, wherein the curved end portion intersects with the flashback plate at the approximate midpoint of the slider in a longitudinal cross section generally perpendicular to the flashback plate.

18. The protector as recited in claim 12, further comprising a locking element coupled to the sheath and extending

into the sheath cavity, the slider engaging with the locking element when the slider is in the second position to lock the slider in the second position.

19. A low-profile universal passive protector for use with an over-the-needle catheter, the universal passive protector comprising:

a hypodermic needle insertable through the over-the-needle catheter;

an elongate sheath detachably engaged with the over-the-needle catheter, the elongate sheath defining a sheath cavity and a longitudinal axis;

a slider connected to the hypodermic needle and movable along the sheath between a first position and a second position, the hypodermic needle being drawn into the sheath cavity as the slider moves from the first position toward the second position;

a finger-press plate coupled to the sheath and extending beyond the slider in a direction perpendicular to the longitudinal axis to define a plate height; and

a flashback body coupled to the slider, the flashback body and slider collectively defining a cavity in fluid communication with the hypodermic needle, the flashback body extending from the slider in a direction perpendicular to the longitudinal axis to define a flashback body height;

the flashback body height being less than the plate height.

20. The protector as recited in claim **19**, wherein:

the slider includes a first end and an opposing second end, the first end facing the finger-press plate;

the flashback body is coupled to the slider such that no portion of the flashback body extends from the slider beyond the second end.

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