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(54) **Spring clip as needle tip protection for a safety IV catheter**

Federklemme als Schutz der Nadelspitze für einen Sicherheits-IV-Katheter

Pince à ressort en tant que protection d'extrémité d'aiguille pour cathéter IV de sécurité

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Description

[0001] The invention relates to an intravenous catheter according to claim 1.

[0002] Such an intravenous catheter (IV catheter) is known from US-A-5 135 504 (McLees) wherein the needle guard is a hollow cylinder with a split end and slanted overlapping end caps. The needle tip at the distal end of the needle is flared out and is slightly larger in diameter than the needle shaft and the inside diameter of the needle guard. A retaining ring is held tightly by a friction fit with the catheter hub wherein the outside diameter of the needle guard is less than the inside diameter of this retaining ring so that normally the needle guard can easily slide through the ring. When the needle is withdrawn and the flared out needle tip goes inside the needle guard, the needle guard end caps are free to close and the needle tip shoulder pulls the needle guard through the retaining ring thus forcing the flared end of the needle guard closed.

[0003] The McLees protective device requires an irksome, extra pulling action or tug on the needle guard through a retention ring to remove the protected needle from the catheter hub. The McLees device also requires the assembly of two separate components and is thus relatively costly to manufacture. In addition, the needle in the McLees device includes a larger diameter portion near and at the needle tip. This feature of the McLees device would require that the remainder of the needle be of a lesser diameter which would have the adverse effect of slowing the blood flashback through the needle.

[0004] Additionally this flared out needle tip is impractical for a number of reasons. The device can not be assembled in the usual manner by inserting the needle tip first through the catheter, without damaging the catheter. Further, when the user wants to withdraw the needle, the flared out needle tip must expand the catheter material to allow it to pass.

[0005] I.V. catheters are primarily used to administer fluids, sometimes containing medications, directly into a patient's vascular system. The catheter is inserted into a patient's vein by a health care worker by using a handheld placement device that includes a sharp tip needle. The needle is positioned in the interior hollow portion of the catheter with its tip extended slightly beyond the edge of the catheter. The end of the apparatus opposite the needle tip is made up of the needle connected to a needle hub which is capable of being held by the health care worker during the insertion procedure.

[0006] The insertion procedure contains four basic steps: (1) the health care worker inserts the needle and catheter together into the patient's vein; (2) after insertion into the vein with the needle point, the catheter is forwarded into the vein of the patient by the health care worker pushing the catheter with his or her finger; (3) the health care worker withdraws the needle by grasping the hub end (opposite the point end) while at the same time applying pressure to the patient's skin at the insertion site with his or her free hand; and (4) the health care worker then tapes the now inserted catheter to the patient's skin and connects the exposed end of the catheter, the catheter hub, to the source of the fluid to be administered into the patient's vein.

[0007] The problem is that immediately after the withdrawal of the needle from the patient's vein, the health care worker who is, at this time, involved in at least two urgent procedures must place the exposed needle tip at a nearby location and address the tasks required to accomplish the needle withdrawal. It is at this juncture that the exposed needle tip creates a danger of an accidental needle stick occurring, which under the circumstances, leaves the health care worker vulnerable to the transmission of various, dangerous blood-borne pathogens, including AIDS and hepatitis.

[0008] This danger to the health care worker from accidental needle sticks has caused an impetus for the development of a safer IV catheter in which the occurrence of such accidental needle sticks is prevented. Safety catheters that have been developed to achieve this result are disclosed, for example, in Lemieux Reissue Patent No. Re. 34,416, Crawford U.S. Patent No. 5,558,651, McLees U.S. Patent No. 5,135,504, Gaba U.S. Patent No. 5,697,907, and Dombrowski U.S. Patent No. 4,978,344. Kulli U.S. Patent No. 4,929,241 and Chamuel U.S. Patent No. 5,053,017 disclose a protective needle guard for use with a hypodermic needle.

[0009] The prior art safety catheters all exhibit one or more drawbacks that have thus far limited their usefulness and full acceptance by health-care workers.' For example, in the safety catheter disclosed in the Lemieux patent, the force required to engage the needle slot within the guard flange is relatively great and would interfere with the removal of the needle. Reducing this force to a more acceptable level would create the possibility of the needle guard remaining in the catheter hub after the needle is removed from the catheter. As a result, the safety catheter disclosed in the Lemieux patent would not consistently function in a reliable manner.

[0010] Similarly, the user of the safety catheter disclosed in the Dombrowski patent would have to exert a considerable force to remove the protective cap from the catheter hub, when the cap engages a needle. The safety catheter disclosed in the Dombrowski patent would also be relatively expensive to fabricate because of its inclusion of a flexible flange and a tether.

[0011] It is accordingly an object of the present invention to provide a safety IV catheter, which reliably and automatically prevents accidental, inadvertent contact with the needle tip after use.

[0012] It is a further object of the invention to provide a safety catheter which provides reliable protection to the health care practitioner against needle sticks without requiring any change in the manner of use of the safety catheter by the practitioner.

[0013] It is another object of the present invention to provide a safety IV catheter of the type described which

is relatively simple and inexpensive to manufacture.

[0014] It is yet a further object of the present invention to provide a safety catheter of the type described in which removal of the needle from the needle guard after use is prevented.

[0015] These objects are achieved by the features in the characterizing part of claim 1.

[0016] To these ends, the safety IV catheter of the invention includes a resilient spring clip needle guard that includes a distal or front end and a proximal or rear wall. The spring clip is inserted into the catheter hub and is urged by the needle shaft into contact with the inner walls of the catheter hub so that the needle guard is reliably retained therein. When the needle is withdrawn from the catheter, the force it had previously exerted on the needle guard is released causing the needle guard to pivot within the catheter hub until it clamps onto the needle shaft. At this time, the distal end wall of the needle guard blocks the distal pointed end tip of the needle. In addition, the spring clip and protected needle onto which it is clamped can be readily and safely removed from the catheter hub. The needle may be provided with a slot or a bulge which cooperates with the needle guard to prevent the inadvertent removal of the needle from the needle guard after their removal from the catheter hub.

[0017] In another embodiment of the spring clip safety catheter of the invention, a retaining groove or bump is formed in the inner wall of the catheter hub, which, in the ready position, engages a lower arm of the spring clip to add in the retention of the spring clip in the catheter hub.

[0018] In yet a further embodiment of the spring clip safety catheter of the invention, a slot is formed in the needle. After the spring clip has pivoted to its retracted position and the needle is clamped by the spring clip, further movement of the needle in the proximal direction will cause the rear or proximal arm of the spring clip to seat in the slot, thereby to more securely clamp the needle shaft to the spring clip.

[0019] In a further embodiment of the spring clip catheter guard of the invention, a tether is connected to the needle hub and the spring clip guard to prevent the spring clip guard from being pulled off the protected needle without requiring an excessive clamping force therebetween.

[0020] To the accomplishment of the above and to such further objects as may hereinabove appear, the present invention relates to a safety IV catheter as described with respect to presently preferred embodiments in the following specification, as considered with the accompanying drawings, in which:

Figs. 1A and 1B are views in partial cross-section of a safety IV catheter in accordance with a first embodiment of the invention in the ready and retracted positions, respectively;

Figs. 2A and 2B are views in partial cross-section of a safety IV catheter in accordance with a second embodiment of the invention in the ready and retracted positions, respectively;

Figs. 3A and 3B are views in partial cross-section of a safety IV catheter in accordance with a third embodiment of the invention in the ready and retracted positions, respectively;

Figs. 4A and 4B are views in partial cross-section of a safety IV catheter in accordance with a fourth embodiment of the invention in the ready and retracted positions, respectively;

Figs. 5A and 5B are views in partial cross-section of a safety IV catheter in accordance with a fifth embodiment of the invention in the ready and retracted positions;

Figs. 6A and 6B are views in partial cross-section of a safety IV catheter in accordance with a sixth embodiment of the invention in the ready and retracted positions, respectively;

Fig. 7 is a perspective view of a safety IV catheter in accordance with another embodiment of the invention; and

Figs. 8A and 8B are cross-sectional views of the embodiment of the invention of Fig. 7 in the ready and protected positions, respectively.

[0021] The safety IV catheter of the invention, generally designated 10, in the embodiment illustrated in Figs. A and 1B, includes a needle hub 12 that includes an axial opening 14 which securely receives the proximal end of a needle 16 having a sharpened tip 18. The needle hub 12, as is conventional, is hollow and includes a flash chamber 22. As is also conventional, the needle 16 is received within a hollow tubular catheter 24, the proximal end of which is concentrically affixed within the distal end of a catheter hub 26 having a distal section 28 and a contiguous, larger diameter proximal section 30.

[0022] The catheter hub 26 terminates at its proximal end in a luer fitting 32 adapted to receive a tubing set, which in a known manner, administers intravenous fluid into the patient. The catheter 24 is secured within an axial passageway 34 in distal hub section 28 by means of a sleeve 20 received within passageway 34, which engages the proximal end of the catheter. Passageway 34 communicates at its proximal end with a flash chamber 36 formed in hub section 30.

[0023] In the ready position of the catheter shown in Fig. 1A, the distal end of the needle hub 12 is snugly received in the proximal end of the interior of chamber 36 such that the needle 16 extends through the chamber 36, the passageway 34 and distally beyond the catheter hub 26 and catheter 24 so that its tip extends beyond the tapered distal end of the catheter.

[0024] In use, the distal tip of the needle and the catheter are inserted into a patient's vein. Thereafter, the health care practitioner manually places the catheter further into the vein and then withdraws the needle by grasping and moving by hand the proximal end of the needle hub 12. The luer of the catheter hub 26 is then fitted with a source of the fluid that is to be administered into the

patient's vein.

[0025] In accordance with the present invention, as the needle 16 is being withdrawn from the patient, a protective needle guard 40 located within hub chamber 36 automatically snaps into a retracted position in which it blocks access to the distal needle tip and prevents further distal movement of the needle tip, thereby to prevent accidental contact by the health care practitioner with the needle tip.

[0026] As shown in Figs. 1A and 1B, the needle guard 40 is in the form of a unitary spring clip that is preferably made of a resilient metal such as stainless steel. The spring clip includes a distal arm 42 terminating at its upper end in a curved lip 44, and at its lower end in a pointed end 46, which, in the embodiment of Fig. 1, is received within a mating groove 48 formed in the lower interior wall of catheter hub section 30.

[0027] The spring clip needle guard 40 further includes a transverse segment 50 that extends upward and proximally from lower pointed end 46 and terminates at a U-shaped upper end 52. In the ready position of the spring clip shown in Fig. 1A, upper end 52 abuts against the upper interior wall of the catheter hub section 30. The spring clip guard 40 further includes a vertical arm 54 that extends downward from the U-shaped upper end 52 and terminates above the lower wall of catheter hub section 30. Transverse segment 50 and proximal vertical arm 54 respectively include axially aligned openings 56, 58 through which the shaft of needle 16 is free to pass and axially move. The diameter of opening 58 is slightly greater than that of the needle shaft, whereas the diameter of the opening 56 is greater than that of opening 58.

[0028] In the ready position of the catheter prior to needle withdrawal, the shaft of needle 16 engages the curved lip 44 of the spring clip needle guard 40, thereby to exert an essentially downward force on the resilient spring clip. That force causes the lower end 46 of the spring clip to seat securely in groove 48 at point a. That contact, in addition to the abutment of the upper end 52 of the spring clip with the upper interior wall at the catheter hub at point b, securely maintains the spring clip needle guard 40 in the ready position within the catheter hub.

[0029] As the needle 16 is retracted to the left, as viewed in Fig. 1A, to its fully retracted position shown in Fig. 1B, after catheter insertion into the patient's vein, the distal tip of the needle moves proximally past the curved lip 44 of the spring clip needle guard 40 at point c, at which time the downward force previously exerted by the needle shaft on the spring clip is released.

[0030] As a result of the needle 16 moving proximally past point c, the retention force on spring clip needle guard 40 in the catheter hub is released causing the spring clip needle guard 40 to pivot or snap in a clockwise direction to the retracted position shown in Fig. 1B. As therein shown, distal arm 42 of the needle guard 40 blocks the distal path of the needle 16. Simultaneously with the blocking and releasing actions, the spring clip guard 40 becomes securely clamped onto the needle shaft at points d and e, thereby to securely lock the needle guard 40 onto the needle shaft. At this time, the needle 16 and needle guard 40 can be removed together from the catheter hub 26, and the tip of the needle cannot be pushed past the needle guard because it is blocked by the distal arm 42 and lip 44 of the needle guard.

[0031] If desired, a slot 60 may be formed in the needle shaft slightly proximal to the needle tip. When the needle and needle guard are in their retracted and clamped positions (Fig. 1B), slot 60 is positioned slightly distal to the clamping point e of the transverse segment of the needle guard 40 such that if a subsequent attempt is made to move the needle further in a rearward or proximal direction, the transverse segment 50 at point e will seat into slot 60, thereby to provide an additional force to retain the needle guard 40 on the needle 16 in the protected position in which access to the needle tip is prevented.

[0032] The embodiment of the invention illustrated in Fig. 2 is similar to that of Fig. 1 except that instead of the groove formed in the lower wall of the catheter hub that engages the lower end of the spring clip, a retaining bump 62 is formed in that wall against which the lower end 46 of the needle guard 42 seats when the needle guard 40 is in the ready position in Fig. 2A.

[0033] The embodiment of the invention illustrated in Figs. 3A and 3B is essentially the same as that of Fig. 2 with the addition of a tether 64 secured at one end to the needle hub 12 and at its other end to proximal arm 54 of the spring clip needle guard 40. As shown in Fig. 3B, the tether 64 is extended to its full length when the needle hub is retracted to achieve needle removal so as to more securely retain the needle hub 12 and the spring clip needle guard 40 when the latter is clamped onto the needle when in the retracted position, in which, as described above, the distal arm 42 of the spring clip prevents access to the needle tip, and the needle guard 40 and needle are released from the catheter hub.

[0034] Figs. 4A and 4B illustrate a spring clip needle guard embodying the principles of the invention in an alternative configuration. As therein shown, the spring clip needle guard 40a includes a distal arm 65 terminating at its upper end in a curved lip 66, and at its lower end in a U-shaped portion 67 which, in the ready position illustrated in Fig. 4A, contacts a bump 68 formed in the lower inner wall of the catheter hub.

[0035] A transverse segment 69 having a central opening 70 extends proximally and upwardly and terminates at an upper U-shaped portion 72. A proximal end wall 74 having an opening 76 depends vertically from portion 72 and then extends distally in a horizontal lower segment 78, which has an opening 80 through which the lower halves of distal arm 65 and transverse segment 69 extend in the ready position of the needle guard. Segment 78 at its distal end extends upwardly at a front wall 82, which has a central opening 84 axially aligned with openings 70, 76. At its upper end, distal front wall 82 extends in the proximal direction in an upper segment 86 which, as shown in Fig. 4A, contacts the upper inner wall of the

catheter hub along substantially its entire.length.

[0036] As shown in Fig. 4A, when the catheter is in the ready position, the needle shaft passes through openings 70, 76 and 84 and rests on curved lip 66, urging arm 65 against bump 68 in the lower wall of the catheter hub. That engagement along with the resilient engagement of upper segment 86 with the upper interior wall of the catheter hub retains the spring clip 40a in its ready position within the catheter hub.

[0037] When the needle hub and needle are retracted to the right, as viewed in Fig. 4A, by a sufficient amount, the needle tip passes below lip 66 and then releases its downward force on arm 65. As described above, with reference to the first-described embodiment, this release of engagement of the needle shaft and spring clip arm 65 causes arm 65 to snap upwards to the retracted position illustrated in Fig. 4B, in which arm 65 and lip 66 extend over the needle tip and thereby prevent accidental contact with the needle tip as desired. In this condition, the needle guard is clamped onto the needle shaft in essentially the same manner described above with respect to the first-described embodiment, and the needle and needle guard clamped thereto can be readily removed from the catheter hub, also as described above, and as shown in Fig. 4B.

[0038] The embodiment of the needle guard illustrated in Figs. 5A and 5B is essentially the same as that shown in Figs. 4A and 4B with the addition of a slot 90 near the distal tip end of the needle. When the needle and needle guard are in their retracted and clamped position (Fig. 5B), slot 90 is positioned slightly distal to the clamping point of the transverse segment 69 such that if a subsequent attempt is made to move the needle further in a rearward or proximal direction, the transverse segment 69 will seat into slot 90, thereby to provide an additional force to retain the needle guard in the needle in the protected position in which access to the needle tip is prevented.

[0039] The embodiment of the invention illustrated in Figs. 6A and 6B is the same as that illustrated in Figs. 4A and 4B except for the inclusion of a tether 92 secured at one end to the needle hub and at its other end to the proximal wall of the spring clip needle guard. As shown in Fig. 6A, in the ready position, the tether is wound around the distal end of the needle hub. As shown in Fig. 6B, when the needle and needle guard are in their retracted position, the tether is extended to its full length and adds in the retention of the needle guard to the needle hub. If desired, the embodiment of the invention embodiment illustrated in Figs. 6A and 6B could also include a needle slot as in the embodiment of the invention illustrated in Figs. 5A and 5B.

[0040] The spring clip guard of the invention, in the embodiment illustrated in Figs. 7, 8A and 8B, includes a transverse arm 150 terminating at its distal end at a distal end wall 152, which includes at its upper end a curved lip 154, and at its lower end a curved end 156. An elongated rectangular opening or slot 158 is provided in transverse arm 150. The proximal ends of transfer arm 150 and opening 158 terminate at an extension 160 extending upwardly at an angle from arm 150 and having a finger or flap 162 that extends toward opening 158.

[0041] The proximal end of extension 160 terminates at a curved end 166 from which a proximal end wall 168 extends downwardly. Wall 168, which includes an opening 170, terminates at its lower end at a curved section 172, from which extends an upwardly sloping arm 174 that terminates at a clamping edge 176. As can be seen in Figs. 8A and 8B, a 360° circular groove 178 is formed about the circumferential wall of needle 16 slightly inwardly from the tip 18 of the needle.

[0042] In the ready position of the spring clip guard of Fig. 7, as illustrated in Fig. 8A, the shaft of the needle passes through aligned opening 170 in the rear wall 168 and opening 158 in transverse arm 150, and extends distally beyond the catheter hub. As in the prior embodiments described hereinabove, the needle shaft in this position exerts a downward radial force on arm 150 by means of its engagement with curved lip 154. This downward force urges the curved end 156 of the spring clip to seat firmly within a groove 164 formed in the inner wall of the catheter hub at point a.

[0043] At the same time, the upper curved end 166 of end wall 168 engages the inner wall of the catheter hub at point b, and the lower-curved end 172 of wall 168 engages the inner wall of the catheter hub at point f. Further engagement between the needle shaft and the spring clip is provided by the contact of finger 162 with the upper end of the needle shaft at point e, and between the clamping edge 176 and the lower surface of the needle shaft at point g. In this manner, the needle is securely but movably retained within the catheter hub in its ready position.

[0044] When the needle is retracted axially, to the right as viewed in Figs. 8A and 8B, it eventually moves past its engagement with lip 154, thereby to suddenly release the radial force it had previously exerted on arm 150 of the needle guard. This release of engagement between the needle shaft and lip 154 allows the distal curved end 156 of the distal end wall 152 of the spring clip to be released from its seat in annular groove 164, so that arm 150 and end wall 152 pivot quickly into the interior of the catheter hub, as seen in Fig. 8B, to a position at which wall 152 forms a barrier to the needle tip. This positioning of wall 152 prevents inadvertent contact with the needle tip. The engagement of finger 162 and clamping edge 176 to opposing sides of the needle prevents further axial movement of the needle in either direction.

[0045] If an attempt is thereafter made to pull the needle axially further to the right, as viewed in Fig. 8B, the finger 162 will enter the circular groove 178 formed in the needle surface, thereby to prevent further axial movement of the needle in the proximal direction out of the needle guard.

[0046] It will thus be appreciated that the spring clip needle guard of the invention as employed in an IV catheter provides automatic and reliable protection of the

needle tip upon needle retraction to prevent accidental contact with the needle tip by a health care practitioner.

Claims

1. An IV catheter comprising a tubular catheter (24); a needle (16);

- a catheter hub (26) attached to the proximal end of the tubular catheter (24);
- a needle hub (12) attached to the proximal end of the needle (16) having a needle shaft and a needle tip (18), the needle (16) being received within the tubular catheter (24) when in a ready position and being moveable from the ready position in which the needle tip (18) is outside the catheter hub (26) to a retracted blocking position in which the needle tip (18) is within the interior of the catheter hub (26); and
- a spring clip needle guard (40, 40a) retained in the ready position within the interior of the catheter hub (26) and which is adapted to cover and block the needle tip (18) and to clamp onto the needle shaft in the retracted blocking position, wherein

the needle guard (40, 40a) comprises:

- a rear wall (54, 74, 168) with a rear wall opening (58,76, 70) for the needle shaft,
- a transverse arm (50, 69, 150) which is in connection with the rear wall (54, 74, 168), and which has an arm opening (56, 70, 158) through which the needle shaft extends in the ready and the retracted blocking position, the arm opening (56, 70, 158) being coaxial with and larger than the rear wall opening (58, 76, 70)

a distal end wall (42, 65, 152) on the distal end of the arm (50, 69, 150) being positioned on the needle shaft in the ready position and being urged by the needle shaft into retaining engagement with the interior of the catheter hub (26) in the ready position and adapted to be moveable within the interior of the catheter hub (26) distal of said needle tip (18) to cover and block the needle tip (18) in the retracted blocking position in which the retaining engagement with the interior of the catheter hub (26) is released.

2. An IV catheter of any one of the preceding claims, wherein a horizontal lower segment (78) extends distally from the rear wall (74) of the needle guard (40a) and has an opening (80) through which the arm (69) extends in the ready position.

3. An IV catheter of claim 2, wherein the distal end of the horizontal lower segment (78) extends upwardly to a front wall (82) with an opening (84) which is coaxial with the rear wall opening (76) through which the needle shaft passes.

4. An IV catheter of claim 3, wherein an upper segment (86) extends in the proximal direction from the upper end of the front wall (82) and contacts the inner wall of the catheter hub (26).

5. An IV catheter of claim 4, wherein the entire length of the upper segment (86) contacts the inner wall of the catheter hub (26).

6. An IV catheter of any one of the preceding claims, wherein the interior of the catheter hub (26) is provided with a retaining means in the form of a bump (62, 68) by which the needle guard (40, 40a) is in retaining relation with the interior of the catheter hub (26) in a fixed longitudinal position in the ready position.

7. An IV catheter of any one of the preceding claims, wherein the needle shaft has a slot (60, 90, 178) slightly proximal to the needle tip for secure retainment of the needle guard (40, 40a) on the needle (16) in the retracted blocking position.

8. An IV catheter of any one of the preceding claims, wherein the arm (50, 69, 150) of the needle guard (40, 40a) is adapted to clamp onto the needle shaft in the retracted blocking position.

9. An IV catheter of any one of the preceding claims, wherein the needle guard (40, 40a) is connected to the needle hub (12) by a tether (64, 92) to prevent removal of the needle (16) from the needle guard (40, 40a) clamped to the needle (16) in the retracted blocking position.

10. An IV catheter of any one of the preceding claims, wherein the needle guard has a second arm (174) also in connection with the rear wall (168) and adapted to be positioned on and urged by the needle shaft (18) into retaining relation with the interior of the catheter hub (26) in the ready position.

11. An IV catheter of any one of the preceding claims 1 and 6 to 10, wherein the upper and the lower end of the rear wall (168) are in retaining contact with the inner upper and inner lower interior wall of the catheter hub (26) in the ready position.

12. An IV catheter of any one of the preceding claims 1 and 6 to 11, wherein the interior of the catheter hub (26) is provided with a retaining means in the form of an annular

groove (48, 164).

13. An IV catheter of any one of the preceding claims 1 to 9,
wherein the interior of the catheter hub (26) is provided with a retaining means in the form of a bump (62, 68).

14. An IV catheter of any one of claims 4 or 5,
wherein the needle guard (40a) comprises surrounding walls.

Patentansprüche

1. IV-Katheter umfassend einen schlauchförmigen Katheter (24); eine Nadel (16);

- einen am proximalen Ende des schlauchförmigen Katheters (24) angebrachten Katheteransatz (26);
- einen am proximalen Ende der Nadel (16) angebrachten Nadelansatz (12), wobei die Nadel (16) einen Nadelschaft und eine Nadelspitze (18) aufweist, wobei die Nadel (16) in dem schlauchförmigen Katheter (24) aufgenommen ist, wenn sie in Bereitschaftsstellung ist, und wobei die Nadel (16) von der Bereitschaftsstellung, in der sich die Nadelspitze (18) außerhalb des Katheteransatzes (26) befindet, in eine zurückgezogene Blockierungsstellung, in der sich die Nadelspitze (18) im Inneren des Katheteransatzes (26) befindet, beweglich ist; und
- einen Federclip-Nadelschutz (40, 40a), der in der Bereitschaftsstellung im Inneren des Katheteransatzes (26) gehalten wird und derart ausgestaltet ist, dass er die Nadelspitze (18) abdeckt und blockiert und in der zurückgezogenen Blockierungsstellung auf dem Nadelschaft befestigt ist, wobei

der Nadelschutz (40, 40a) umfasst:

- eine Rückwand (54, 74, 168) mit einer Rückwandöffnung (58, 76, 170) für den Nadelschaft,
- einen querverlaufenden Arm (50, 69, 150), der mit der Rückwand (54, 74, 168) in Verbindung steht und eine Armöffnung (56, 70, 158) aufweist, durch die sich der Nadelschaft in der Bereitschaftsstellung und in der zurückgezogenen Blockierungsstellung erstreckt, wobei die Armöffnung (56, 70, 158) mit der Rückwandöffnung (58, 76, 170) koaxial ist und größer als diese ist;

wobei eine distale Endwand (42, 65, 152) in der Bereitschaftsstellung auf dem distalen Ende des Arms (50, 69, 150) auf dem Nadelschaft angeordnet ist und von dem Nadelschaft in Halteeingriff mit dem Inneren des Katheteransatzes (26) in der Bereitschaftsstellung gedrückt wird und derart ausgestaltet ist, dass sie sich im Inneren des Katheteransatzes (26) distal von der Nadelspitze (18) bewegt, um die Nadelspitze (18) in der zurückgezogenen Blockierungsstellung, in welcher der Halteeingriff mit dem Inneren des Katheteransatzes (26) gelöst ist, abzudecken und zu blockieren.

2. IV-Katheter nach einem der vorhergehenden Ansprüche,
wobei sich ein horizontales unteres Segment (78) distal von der Rückwand (74) des Nadelschutzes (40a) erstreckt und eine Öffnung (80) aufweist, durch die sich der Arm (69) in der Bereitschaftsstellung erstreckt.

3. IV-Katheter nach Anspruch 2,
wobei sich das distale Ende des horizontalen unteren Segments (78) aufwärts zu einer Vorderwand (82) mit einer Öffnung (84) erstreckt, die mit der Rückwandöffnung (76), durch die der Nadelschaft verläuft, koaxial ist.

4. IV-Katheter nach Anspruch 3,
wobei sich ein oberes Segment (86) in der proximalen Richtung vom oberen Ende der Vorderwand (82) erstreckt und die Innenwand des Katheteransatzes (26) kontaktiert.

5. IV-Katheter nach Anspruch 4,
wobei die gesamte Länge des oberen Segments (86) die Innenwand des Katheteransatzes (26) kontaktiert.

6. IV-Katheter nach einem der vorhergehenden Ansprüche,
wobei das Innere des Katheteransatzes (26) mit einem Haltemittel in Form einer Erhebung (62, 68) versehen ist, über die der Nadelschutz (40, 40a) mit dem Inneren des Katheteransatzes (26) in einer festgelegten Längsposition in der Bereitschaftsstellung in Haltebeziehung steht.

7. IV-Katheter nach einem der vorhergehenden Ansprüche,
wobei der Nadelschaft einen Schlitz (60, 90, 178) etwas proximal der Nadelspitze für den sicheren Halt des Nadelschutzes (40, 40a) auf der Nadel (16) in der zurückgezogenen Blockierungsstellung aufweist.

8. IV-Katheter nach einem der vorhergehenden Ansprüche,
wobei der Arm (50, 69, 150) des Nadelschutzes (40, 40a) auf dem Nadelschaft in der zurückgezogenen Blockierungsstellung befestigt werden kann.

9. IV-Katheter nach einem der vorhergehenden Ansprüche,
wobei der Nadelschutz (40, 40a) über eine Haltevorrichtung (64, 92) mit dem Nadelansatz (12) in Verbindung steht, um eine Entfernung der Nadel (16) von dem an der Nadel (16) befestigten Nadelschutz (40, 40a) in der zurückgezogenen Blockierungsstellung zu verhindern.

10. IV-Katheter nach einem der vorhergehenden Ansprüche,
wobei der Nadelschutz einen zweiten Arm (174) aufweist, der ebenfalls mit der Rückwand (168) in Verbindung steht und derart ausgestaltet ist, dass er auf dem Nadelschaft (18) positioniert ist und von dem Nadelschaft (18) in Haltebeziehung mit dem Inneren des Katheteransatzes (26) in der Bereitschaftsstellung gedrückt wird.

11. IV-Katheter nach einem der vorhergehenden Ansprüche 1 und 6 bis 10,
wobei das obere und untere Ende der Rückwand (168) mit der inneren oberen und der inneren unteren Innenwand des Katheteransatzes (26) in der Bereitschaftsstellung in Haltekontakt steht.

12. IV-Katheter nach einem der vorhergehenden Ansprüche 1 und 6 bis 11,
wobei das Innere des Katheteransatzes (26) mit einem Haltemittel in Form einer ringförmigen Rille (48, 164) versehen ist.

13. IV-Katheter nach einem der vorhergehenden Ansprüche 1 bis 9,
wobei das Innere des Katheteransatzes (26) mit einem Haltemittel in Form einer Erhebung (62, 68) versehen ist.

14. IV-Katheter nach einem der Ansprüche 4 oder 5,
wobei der Nadelschutz (40a) Umgebungswände umfasst.

Revendications

1. Cathéter IV comprenant un cathéter tubulaire (24); une aiguille (16);

- un embout de cathéter (26) fixé à l'extrémité proximale du cathéter tubulaire (24);
- un embout d'aiguille (12) fixé à l'extrémité proximale de l'aiguille (16) présentant une tige d'aiguille et une pointe d'aiguille (18), l'aiguille (16) étant reçue à l'intérieur du cathéter tubulaire (24) lorsqu'elle est dans une position prête et étant mobile de la position prête dans laquelle la pointe d'aiguille (18) est à l'extérieur de l'embout de cathéter (26) à une position de blocage rétractée dans laquelle la pointe d'aiguille (18) se trouve à l'intérieur de l'embout de cathéter (26); et
- un garde-aiguille à clip à ressort (40, 40a) retenu dans la position prête à l'intérieur de l'embout de cathéter (26) et qui est adapté pour recouvrir et bloquer la pointe d'aiguille (18) et pour se fixer sur la tige d'aiguille dans la position de blocage rétractée, dans lequel

le garde-aiguille (40, 40a) comprend:

- une paroi arrière (54, 74, 168) présentant une ouverture de paroi arrière (58, 76, 170) pour la tige d'aiguille,
- un bras transversal (50, 69, 150) qui est en liaison avec la paroi arrière (54, 74, 168), et qui présente une ouverture de bras à travers (56, 70, 158) laquelle la tige d'aiguille s'étend dans la position prête et la position de blocage rétractée, l'ouverture de bras (56, 70, 158) étant coaxiale par rapport à l'ouverture de paroi arrière (58, 76, 170) et plus grande que l'ouverture de paroi arrière (58, 76, 170),

une paroi d'extrémité distale (42, 65, 152) sur l'extrémité distale du bras (50, 69, 150) qui est positionnée sur la tige d'aiguille dans la position prête et est poussée par la tige d'aiguille en une mise en prise de retenue avec l'intérieur de l'embout de cathéter (26) dans la position prête et qui est adaptée pour être mobile à l'intérieur de l'embout de cathéter (26) distalement par rapport à ladite pointe d'aiguille (18) pour recouvrir et bloquer la pointe d'aiguille (18) de la position de blocage rétractée dans laquelle la mise en prise de retenue avec l'intérieur de l'embout de cathéter (26) est libérée.

2. Cathéter IV selon l'une quelconque des revendications précédentes,
dans lequel un segment inférieur horizontal (78) qui s'étend distalement par rapport à la paroi arrière (74) du garde-aiguille (40a) et présente une ouverture (80) à travers le laquelle le bras (69) s'étend dans la position prête.

3. Cathéter IV selon la revendication 2,
dans lequel l'extrémité distale dudit segment inférieur horizontal (78) s'étend vers le haut jusqu'à une paroi avant (82) présentant une ouverture (84) qui est coaxiale par rapport à l'ouverture de paroi arrière (76) à travers laquelle la tige d'aiguille passe.

4. Cathéter IV selon la revendication 3,
dans lequel un segment supérieur (86) s'étend dans la direction proximale depuis l'extrémité supérieure de la paroi avant (82) et vient en contact avec la paroi interne de l'embout de cathéter (26).

5. Cathéter IV selon la revendication 4, dans lequel la totalité de la longueur du segment supérieur (86) vient en contact avec la paroi interne de l'embout de cathéter (26).

6. Cathéter IV selon l'une quelconque des revendications précédentes, dans lequel l'intérieur de l'embout de cathéter (26) est fourni avec un moyen de retenue sous forme de renflement (62, 68) par lequel le garde-aiguille (40, 40a) est en situation de retenue avec l'intérieur de l'embout de cathéter (26) dans une position longitudinale fixe dans la position prête.

7. Cathéter IV selon l'une quelconque des revendications précédentes, dans lequel la tige d'aiguille présente une fente (60, 90, 178) légèrement proximale par rapport à la pointe d'aiguille pour assurer la retenue du garde-aiguille (40, 40a) sur l'aiguille (16) dans la position de blocage rétractée.

8. Cathéter IV selon l'une quelconque des revendications précédentes, dans lequel le bras (50, 69, 150) du garde-aiguille (40, 40a) est adapté pour se fixer sur la tige d'aiguille dans la position de blocage rétractée.

9. Cathéter IV selon l'une quelconque des revendications précédentes, dans lequel le garde-aiguille (40, 40a) est relié à l'embout d'aiguille (12) par une attache (64, 92) de manière à empêcher l'enlèvement de l'aiguille (16) du garde-aiguille (40, 40a) fixé sur l'aiguille (16) dans la position de blocage rétractée.

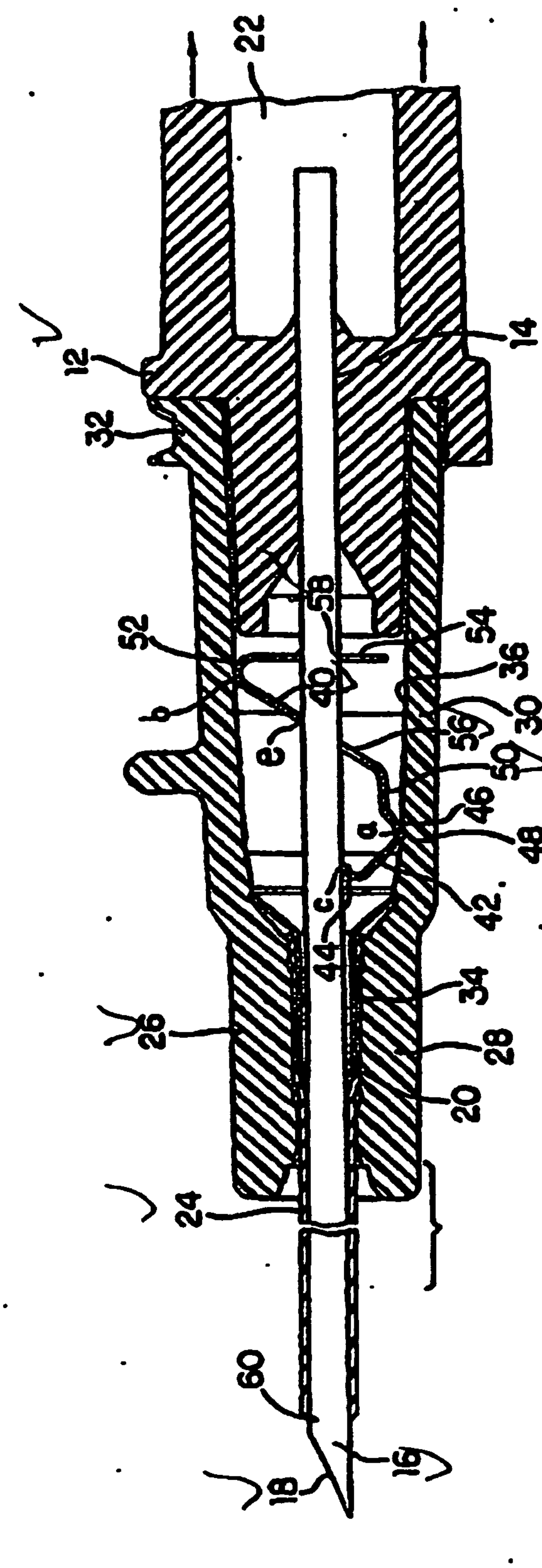
10. Cathéter IV selon l'une quelconque des revendications précédentes, dans lequel le garde-aiguille est doté d'un second bras (174) également en liaison avec la paroi arrière (168) et est conçu pour être positionné sur la tige d'aiguille (18) et poussé par cette dernière en situation de retenue avec l'intérieur de l'embout de cathéter (26) dans la position prête.

11. Cathéter IV selon l'une quelconque des revendications 1 et 6 à 10, dans lequel les extrémités supérieure et inférieure de la paroi arrière (168) sont en contact de retenue avec la paroi interne inférieure et interne supérieure de l'embout de cathéter (26) dans la position prête.

12. Cathéter IV selon l'une quelconque des revendications 1 et 6 à 11, dans lequel l'intérieur de l'embout de cathéter (26) est fourni avec un moyen de retenue sous forme de rainure annulaire (48, 164).

13. Cathéter IV selon l'une quelconque des revendications 1 à 9, dans lequel l'intérieur de l'embout de cathéter (26) est fourni avec un moyen de retenue sous forme de renflement (62, 68).

14. Cathéter IV selon l'une quelconque des revendications 4 ou 5, dans lequel le garde-aiguille (40a) comporte des parois l'entourant.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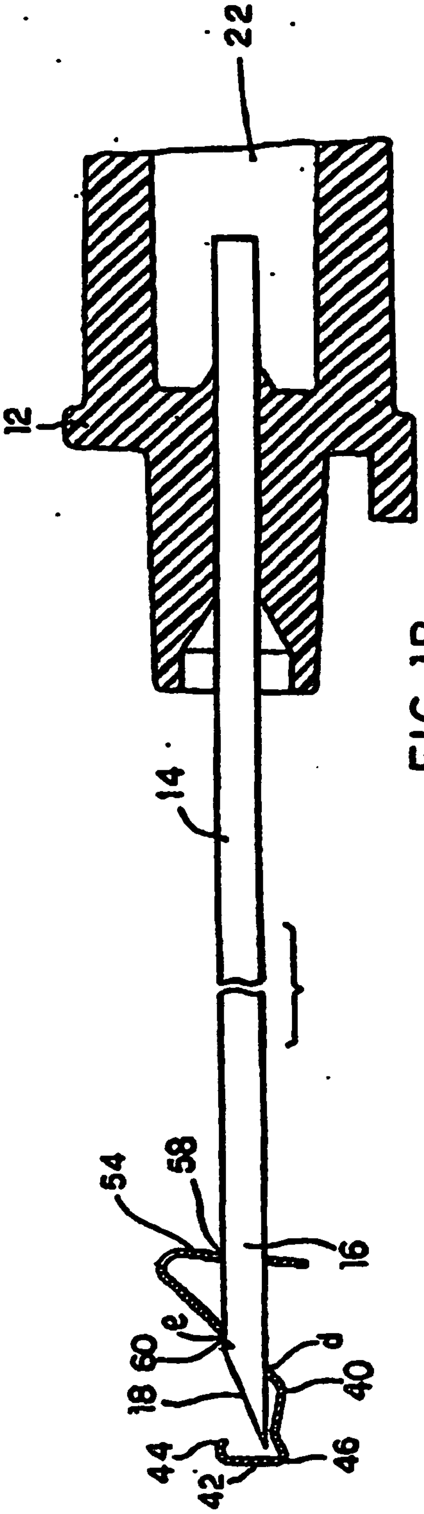
14
12
32
52
58
54
36
40
b
e
30
56
50
46
a
48
c
42
44
34
26
28
20
24
10
60
18
16

FIG. 1A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12
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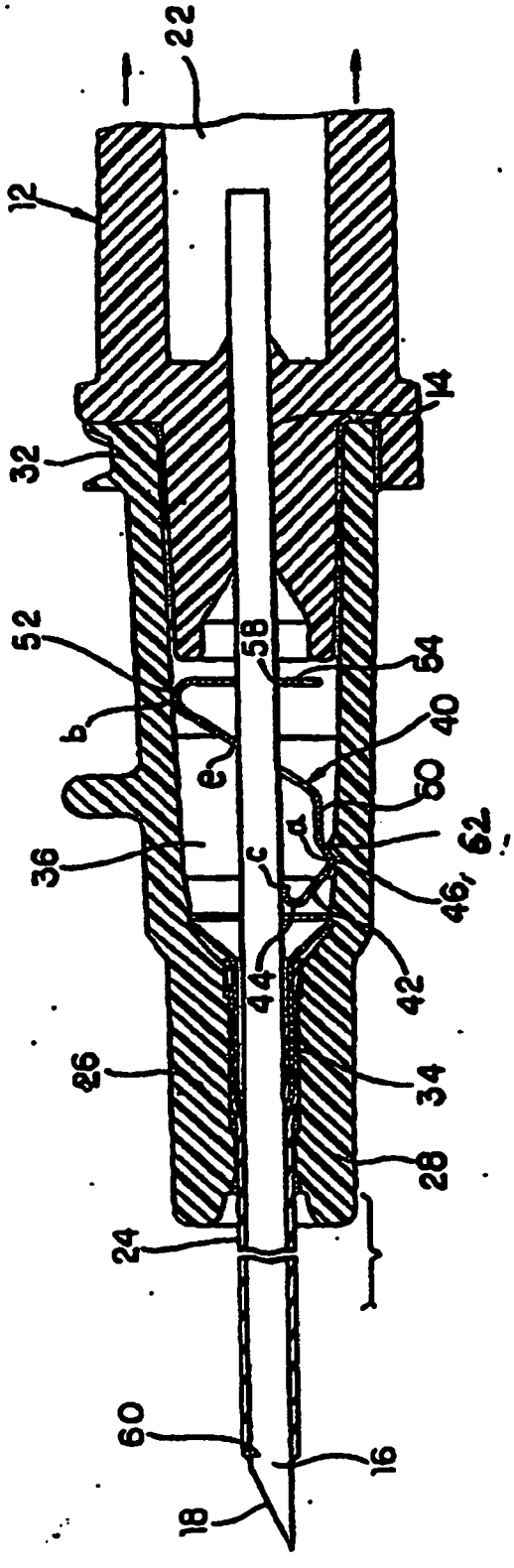
54
58
16
e
60
18
d
40
44
42
46

FIG. 1B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12
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32
52
58
54
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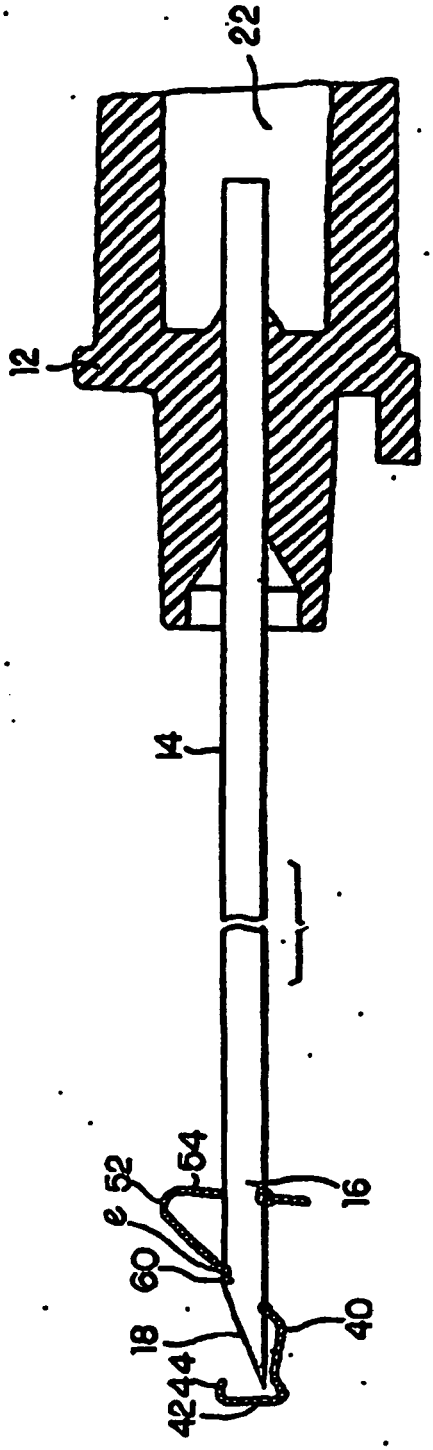
36
c
a
46, 62
44
42
26
34
28
24
60
16
18

FIG. 2A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64
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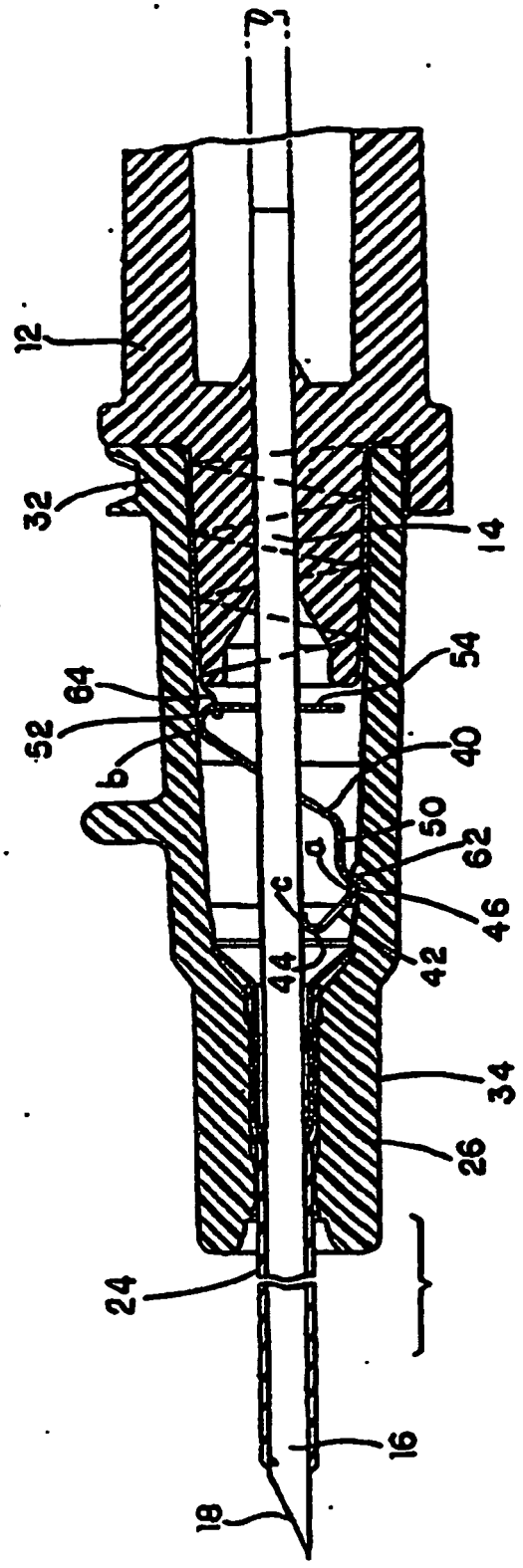
40
42
44

FIG. 2B


12
32
14
64
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52
40
b
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62
c
a
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44
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34
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24
16
18

FIG. 3A

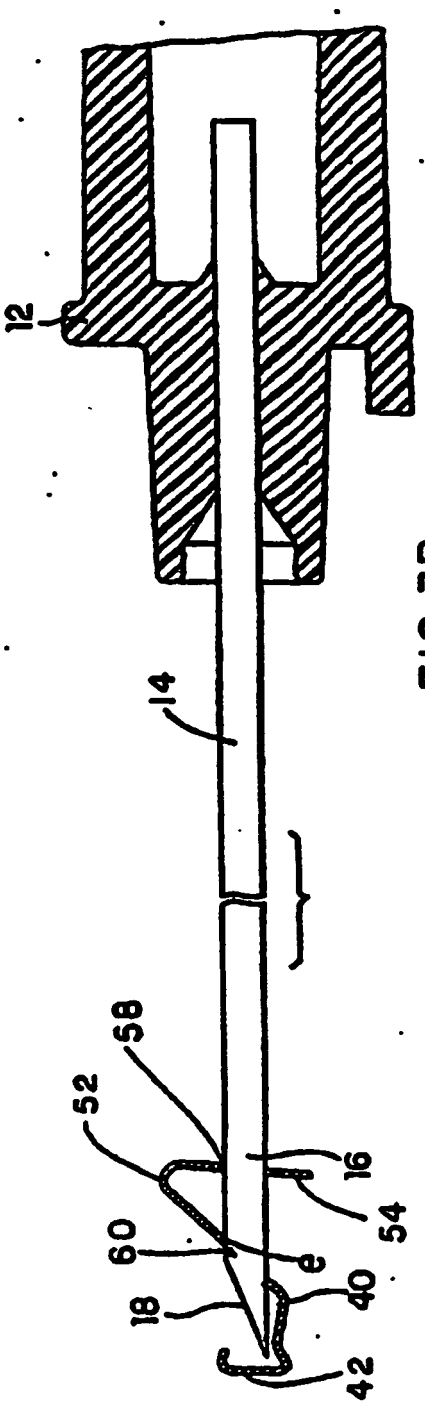

12
14
58
52
16
54
60
d
18
40
42

FIG. 3B

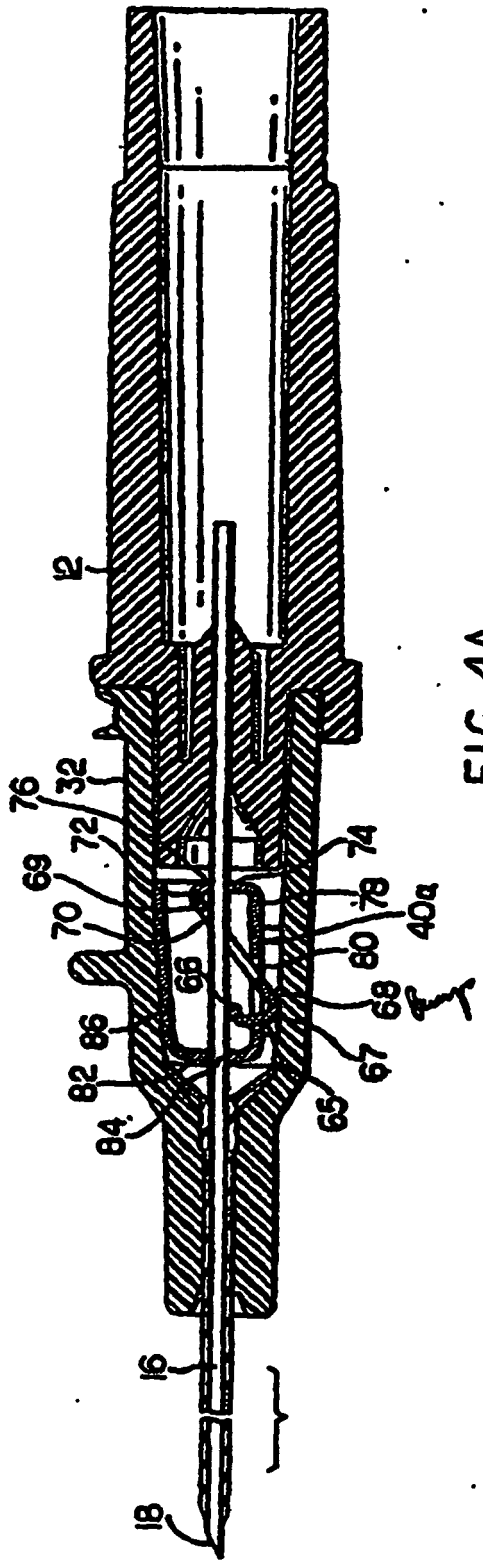
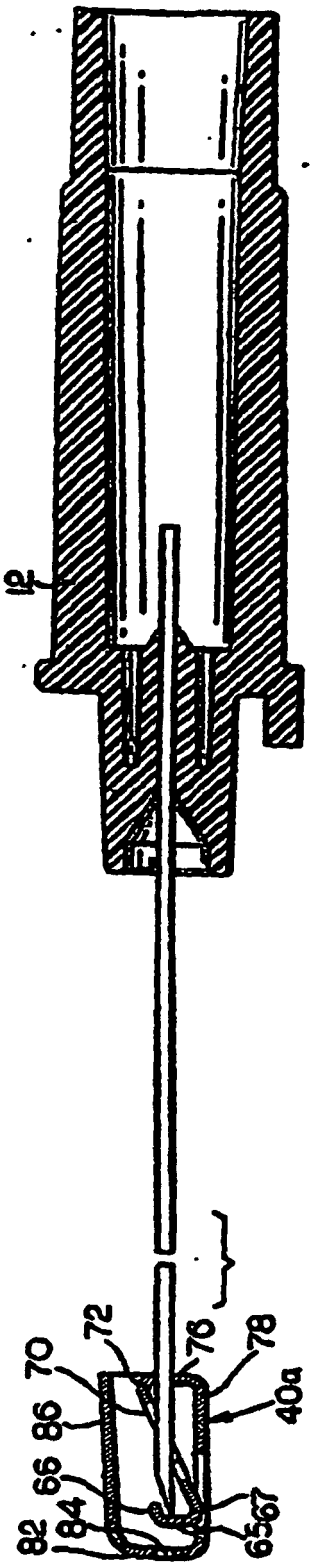

12
76
32
72
74
69
78
70
40a
80
66
68
86
67
82
65
84
16
18

FIG. 4A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72
76
70
78
86
40a
66
84
82
65
67

FIG. 4B

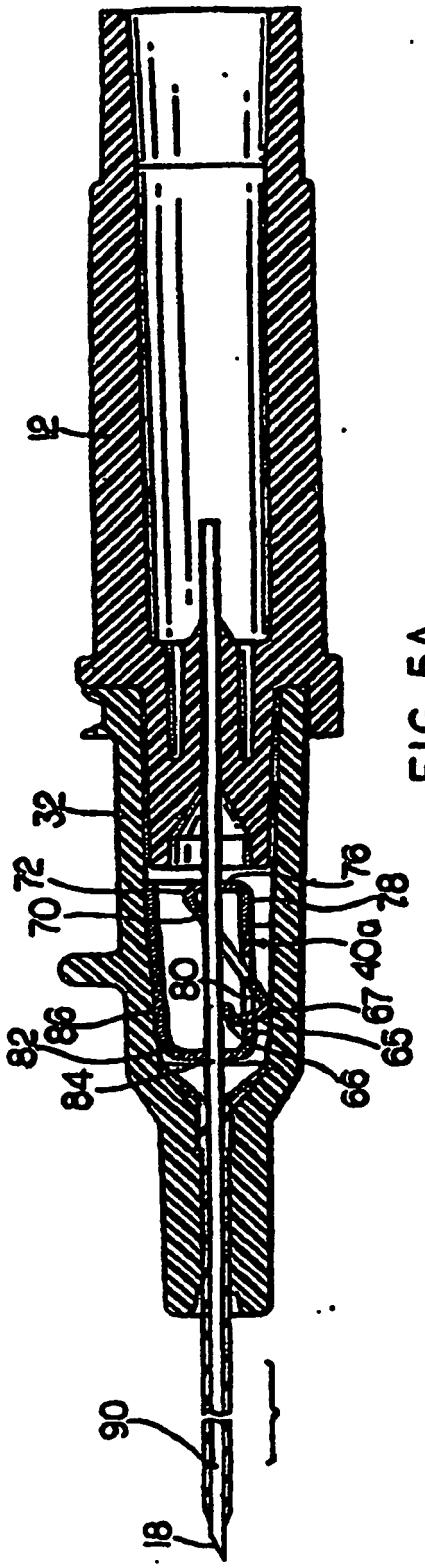
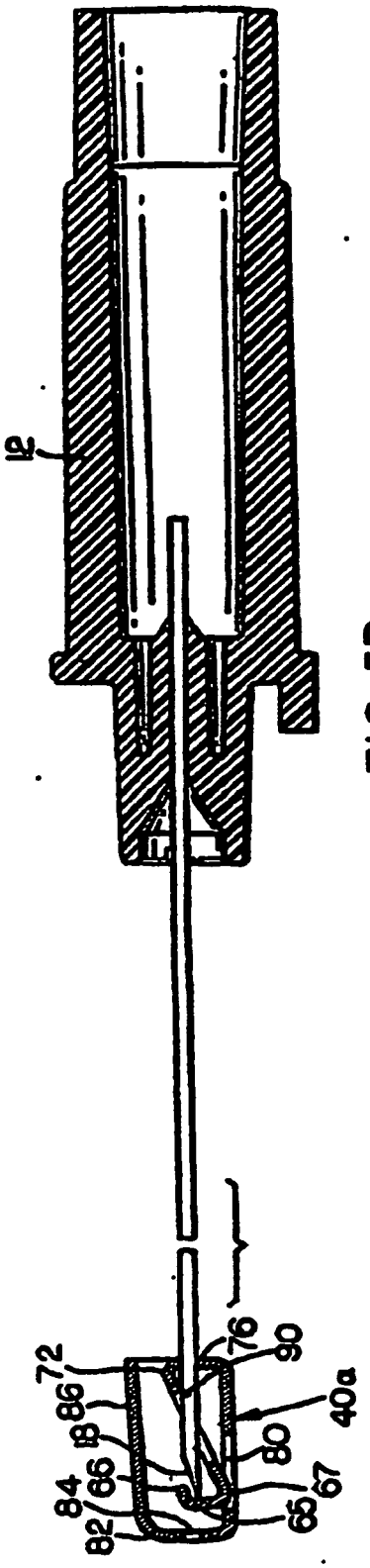

12
32
72
70
76
78
40a
80
67
65
66
82
86
84
90
18

FIG. 5A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76
90
86
40a
80
84
66
67
82
65

FIG. 5B

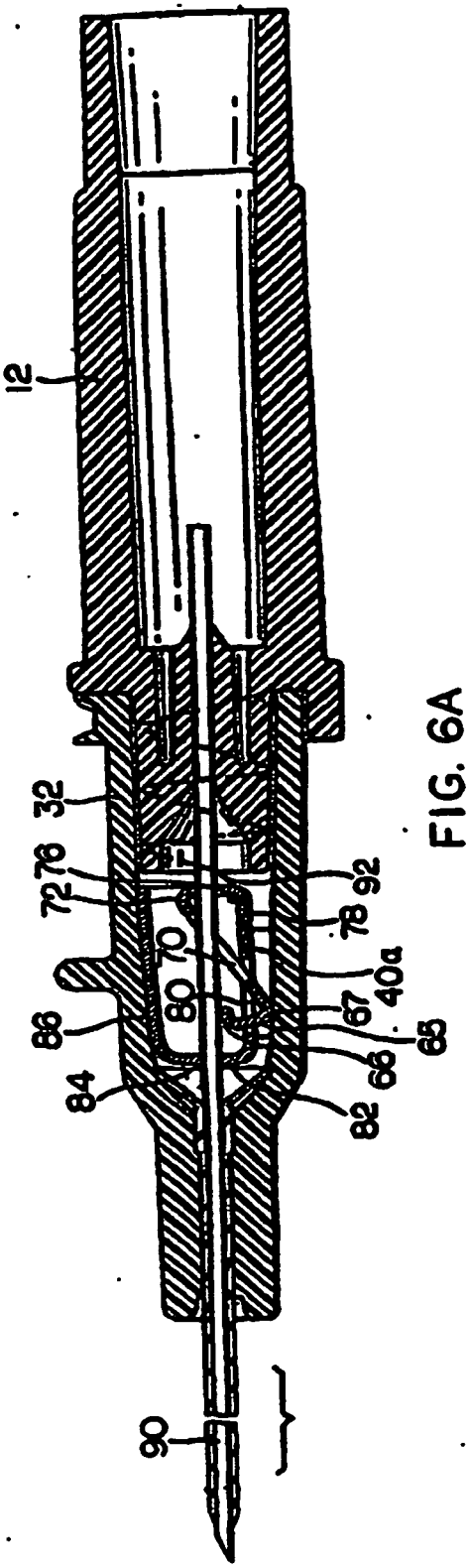
12
32
76
72
78
92
70
40a
80
86
67
65
66
84
82
90

FIG. 6A

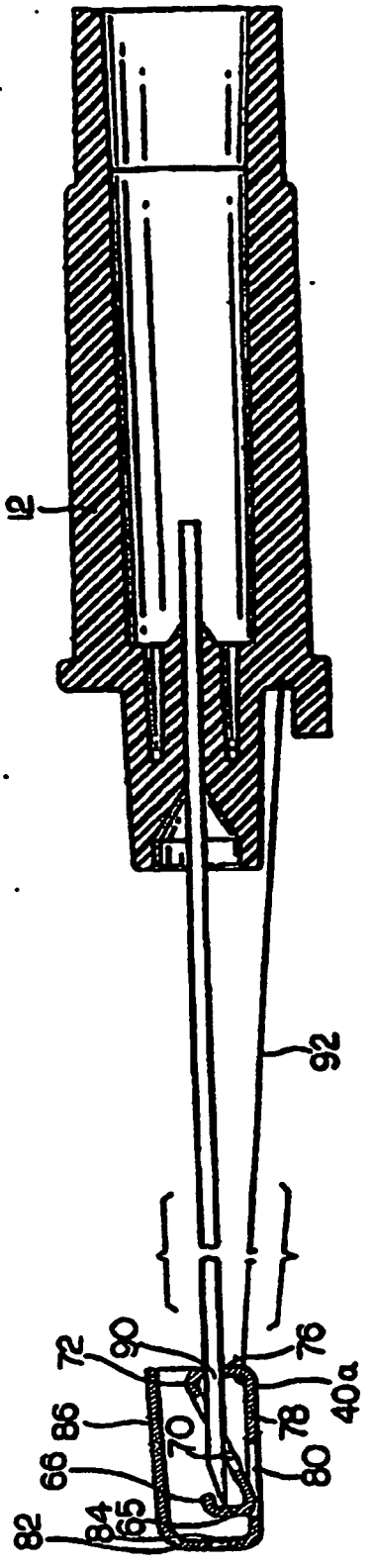
12
92
72
90
76
40a
86
78
70
66
80
84
65
82

FIG. 6B

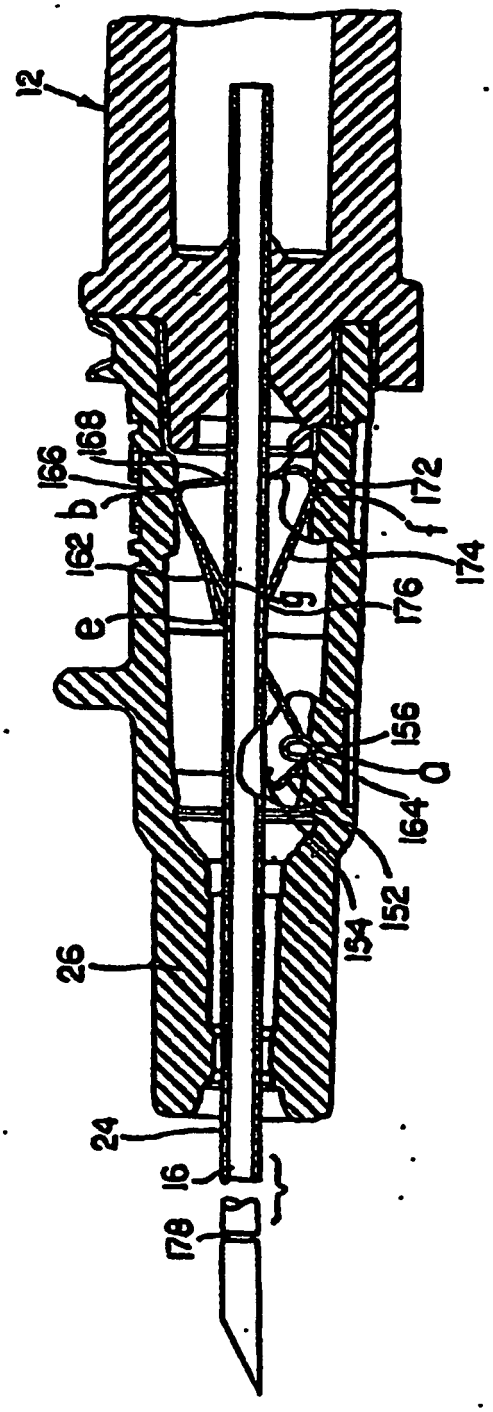

FIG. 8A

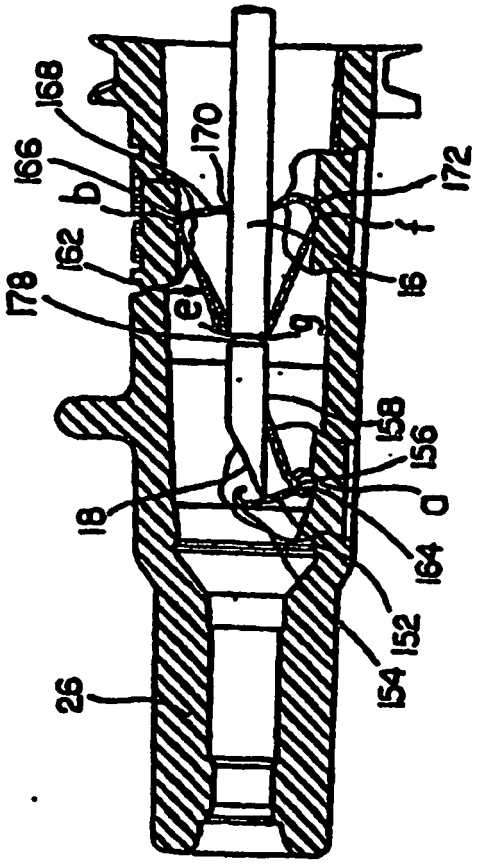

FIG. 8B

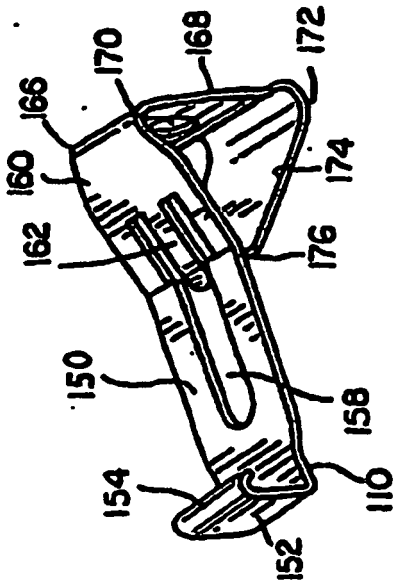

FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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