said needle device, wherein the top section forming the second arm of the second part of the said needle safety device deflectably rests on the said needle, and wherein the said needle safety device is removable from the said enclosure in the said catheter housing once the needle tip is received in the said needle safety device upon withdrawal of the needle from the said catheter tube.

[19] BRIEF DESCRIPTION OF THE DRAWINGS

[20] Preferred embodiments of the invention are described in the following description with reference to the appended drawings and wherein:

[21] FIGS. 1 (a) and 1 (b) illustrate an exploded view of the IV catheter assembly with the needle safety device in accordance with the present invention;

[22] FIG. 2 illustrates a perspective view of the IV catheter assembly in its assembled position in accordance with the present invention;

[23] FIG. 3 (a) and 3 (b) illustrate an exploded view of the needle safety device in accordance with the present invention;

[24] FIG. 4 illustrates a perspective view of the needle safety device in its assembled position in accordance with the present invention;

[25] FIGS. 5 (a) and 5 (b) illustrate a longitudinal sectional view and side view respectively of the needle safety device in accordance with the present invention.

[26] FIGS. ~~6 (a) illustrates a see-through side view of the enlarged IV catheter assembly with the needle safety device being retained in the enclosure of the catheter housing,~~ 6 (~~b~~a) and 6 (~~e~~b) illustrate a side view of the IV catheter assembly with the needle safety device movably arranged on the needle in accordance with the present invention;

[27] FIGS. 7 (a), 7 (b) and 7 (c) illustrate a perspective view, side view and a longitudinal sectional view respectively of the IV catheter assembly with the needle safety device securing the tip of the needle in accordance with the present invention;

[28] DETAILED DESCRIPTION OF THE INVENTION

[29] As used herein, the term "proximal" refers to a location on the IV catheter assembly 10 with a needle safety device 12 of this invention closest to the clinician using the assembly 10 and farthest from the patient in connection with whom the assembly 10 is used in its normal operation. Conversely, the term "distal" refers to a location on the IV catheter assembly 10 with the needle safety device 12 of this invention farthest from the clinician using the assembly 10 and closest to the patient in connection with whom the assembly 10 is used in its normal operation.

[30] The term “axial direction” refers to the direction indicated by ‘A’.

[31] Referring now to appended drawings, Figs. 1 (a) and 1(b) illustrate an exploded view of the IV catheter assembly 10 in accordance with the invention. The catheter assembly 10 includes catheter housing 14, a catheter tube 16, wings 18, a port 20, needle housing 22, a needle safety device 12 and a needle 24. The catheter housing 14 comprises a

sheet having spring-like properties, such as steel or the like. Alternatively, the disclosure herein encompasses the scope of the second part 44 of the needle safety device 12 to be formed from a suitable plastic material having suitable spring-like properties.

[42] The ring 46 having elastic properties surrounds the middle section 52 part of the first part 42 as well as the middle section 68 part of the second part 44. When surrounding the first 42 and second part 44, the ring 46 forces the second part 44 to be inclined slightly inwards towards the first part 42. As shown in Fig. 3 (b), the middle section 52 of the first part 42 of the needle safety device 12 at its outer surface is provided with a generally semi-circular projection(s) 82 along with depression(s) 84 running sub-stantially parallel to the said projection 82. Likewise, the middle section 68 of the second part 44 of the needle safety device 12 is provided with a bulge 78 extending outwardly in an opposite direction to the elongate wings 76 provided therein. The said projection 82 and bulge 78 prevents the ring 46 from axially sliding off facilitating thereby a firm surrounding of the first 42 and second 44 part of the needle safety device 12 by the said ring 46.

[43] The ring 46 is made from a suitable material such as suitable elastomeric material having elastic properties, for example, rubber or synthetic rubber. The elastic properties of the ring 46 ensure the tension facilitating further the deflection of first and second arm 70 of the first and second part 44 respectively of the needle safety device 12. Further, the substantially circular shape of the ring 46 is configured so that the deflectable top section 64 forming the second arm 70 of the second part 44 is deflected against a restoring force of the ring 46 when the needle 24 extends all the way through the needle safety device 12 between the first 54 and second arm 70.

[44] Further, the catheter assembly 10 comprises a needle 24, as shown in Figs. 6 (a) and 6(b) having a needle shaft 38 comprising a proximal section 26 and a distal section 28. The distal section 28 of the needle shaft 38 forms a needle tip 36 and the proximal section 26 of the needle shaft 38 is attached to the needle housing 22. Both, the distal section 28 and the proximal section 26 of the needle shaft 38 generally have the same outer profile. The needle shaft 38 is provided with an enlargement 86 in its outer profile close to the distal section 28 forming the needle tip 36. The enlargement 86 renders the outer diameter of the needle 24 greater than the diameter of the bore 56 provided in the needle safety device 12. The enlargement 86 prevents the needle safety device 12 from sliding off the needle 24 when the needle tip 36 is received between the first 54 and second 70 arms as illustrated in Figs. 7 (a), 7 (b) and 7 (c) of the needle safety device 12. Moreover, the said needle tip 36 on being received between the said first 54 and said second arm 70 of the said needle safety device 12 allows the bore 56 in the base section 50 of the said first part 42 of the said needle safety device 12 to rest generally underneath the said enlargement 86 protecting the said needle tip 36. The enlargement 86 can be, for example, a bulge or a crimp. Alternatively, the enlargement 86 can be, for example, a hole or a slot.

[45] As can be seen from Figs 1 (a) and 1 (b), prior to the use of the IV catheter assembly 10 the needle 24 extends through the catheter tube 16 and the needle safety device 12 is arranged movably in the catheter housing 14. In this situation, the top section 64 forming the second arm 70 of the second part 44 deflectably rests on the needle 24. The needle shaft 38 is securely positioned in the groove 60 provided in the inner wall 58 of the second part 44. The needle shaft 38 is, thus, supported in the groove 60. Due to which the top section 64 of the second part 44 forming the second arm 70 of the needle safety device 12 is deflected outwards, i.e. away from the needle 24 against a restoring force of the ring 46 having elastic properties. This deflected situation is called the deflected state of the needle safety device 12 and is illustrated further in Figs. 6 (a), and 6 (b) and 6 (c).

[46] As opposed to the deflected state, when the needle 24 does not extends through the needle safety device 12 as shown in Figs. 5 (a) and 5 (b), the deflectable top section 64 forming the second arm 70 is drawn inwardly towards the top section 48 of the first part 42 of the needle safety device 12 due to the elastic properties of the ring 46 sur-rounding the said first and second part 44. This situation is referred to as the reposited state of the needle safety device 12. As shown further in Figs. 7 (a), 7 (b) and 7 (c), when the second arm 70 passes over the length of the needle shaft 38, and when the said second arm 70 does not deflectably rests on the needle 24, the said second arm 70 is likewise drawn inwardly towards the top section 48 forming the first arm 54 of the first part 42 of the needle safety device 12 due to the elastic properties of the ring 46 surrounding the said second and first part 42. This situation when the second arm 70 no longer deflectably rests on the needle 24 causes the said second arm 70 to reposit itself due to the restoring force being aided through the use of ring 46 having elastic properties.

[47] As shown in Fig. 1 (b), when the needle 24 is being withdrawn from the catheter tube 16 of the catheter assembly 10 the needle 24 moves relative [Figs. 6(a) and 6 (b)] to the needle safety device 12 until the needle tip 36 is received in the said needle safety device 12. Once the needle tip 36 is received in the needle safety device 12, as shown in Fig. 7 (b), the enlargement 86 [Fig. 6 (a)] of the needle shaft 38 engages with the base section 50, 66 of the needle safety device 12 such that the safety device 12 can be pulled out of the catheter housing 14 together with the needle 24. In such a situation, the engagement between the enlargement 86 and the base section 50, 66 of the needle safety device 12 prevents the needle tip 36 from being removed from the needle safety device 12. Thus, as shown in Figs. 7(a), 7(b) and 7(c) the needle tip 36 is securely entrapped being safely surrounded by the needle safety device 12.

[48] In use, while the needle 24 is being withdrawn from the catheter tube 16, the needle safety device 12 is retained in enclosure 30 of the catheter housing 14. In order to maintain the retainment of the needle safety device 12 in the enclosure 30 of the catheter housing 14, both the top section 48 part of the first part 42 forming the first arm 54 and the top

WE CLAIM:

1. A needle safety device (12) for a medical device, in particular for an IV catheter assembly (10), being movably arranged on a needle (24) comprising:

a first part (42) made of a suitable plastic material;

a second part (44) preferably made of a strip of suitable metal sheet;

and a ring (46) surrounding the said first part (42) and said second part (44) having elastic properties made of suitable elastomeric material wherein

the said first part (42) comprises a base section (50), a middle section (52) and a top section (48) forming a first arm (54);

the said second part (44) comprises a base section (66) being adapted to engage with the base section (50) of the said first part (42), a middle section (68) and top section (64) forming a deflectable second arm;

wherein the said top section (48) of the said first part (42) is substantially semi-cylindrical in shape and extends from the said base section (50) entirely through the said middle section (52) in the axial direction; and

wherein the said top section (48) of the said first part comprises at least two projections (62) facing the top section (64) of the said second part (44) ensuring the outer profile of the said needle (24) to movably rest in a groove (60) provided in an inner wall (58) of the said top section (48) of the said first part (42), wherein the said groove (60) is substantially semi-circular and extends in an axial direction towards the said base section (50) along its entire length.

2. The needle safety device (12) according to claim 1, wherein the said base section (50) of the said first part (42) is substantially cylindrical in shape comprising a through bore (56) with a profile adapted to the principal outer profile of a needle shaft (38) extending entirely through the said middle section (52) in the axial direction towards the said top section (48) to receive the needle (24).

~~3. The needle safety device (12) according to claim 1, wherein the said top section (48) of the said first part (42) is substantially semi-cylindrical in shape and extends from the said base section (50) entirely through the said middle section (52) in the axial direction.~~

~~4. The needle safety device (12) according to claim 1, wherein the said groove~~

~~(60) is substantially semi-circular and extends in an axial direction towards the said base section (50) along its entire length.~~

~~5~~3. The needle safety device (12) according to claim 1, wherein the said base section (66) of the second part (44) extends generally perpendicular to the said top section (64) of the said second part (44).

~~6~~4. The needle safety device (12) according to claim ~~5~~3, wherein the said base section (66) of the second part (44) is provided with a generally circular hole (72) to receive the needle (24) in confirmation with the bore (56) provided in the base section (50) of the first part (42).

~~7~~5. The needle safety device (12) according to claim ~~6~~4, wherein the said base section (66) is provided with an opening (74) to receive a pin formed in the base section (50) of the first part (42) when the said second part (44) is mounted on the said first part (42).

~~8~~6. The needle safety device (12) according to claim 1, wherein the said middle section (68) of the second part (44) comprises two elongate wings (76) being bent inwards therefrom towards the middle section (52) of the said first part (42) by an angle of about 90º being in a direction opposite to a bulge (78) provided in the said middle section (68) of the said second part (44).

~~9~~7. The needle safety device (12) according to claim 1, wherein the said top section (64) of the second part (44) has a generally V-like shape with the peak (80) of the V pointing in the axial direction defining a space which covers and/or stops the distal end of the needle tip (36).

~~10~~8. The needle safety device (12) according to claim 1, wherein the said ring (46) surrounds the said first part (42) and said second part (44) covering generally the middle section parts (52, 66) of the said first part (42) and said second part (44).

~~11~~9. The needle safety device (12) according to claim ~~10~~8, wherein the said ring (46) is configured so that the top section (64) forming the second arm (70) of the

said second part (44) having deflectable properties is deflected outwardly against a restoring force of the said ring (46) when the needle (24) extends all the way through the needle safety device (12) such that the said second arm (70) rests deflectably on the needle shaft (38) of the needle (24).

~~12~~10. The needle safety device (12) according to claim 1, wherein both the said first part (42) forming the first arm (54) and second part (44) forming the second arm (70) are provided with shoulders (90) in their top section parts (48, 64) facilitating the retainment of the needle safety device (12) in a catheter housing (14).

~~13~~11. An IV catheter assembly 10, comprising:

a catheter tube (16);

a needle housing (22);

a catheter housing (14) having a proximal section (26) and a distal section (28), wherein the said distal section (28) is joined to the catheter tube (16) and the proximal section (26) defines an enclosure (30) to retain therein a needle safety device (12) according to any one of claims 1 to 12 prior to use;

a needle (24) having a needle shaft (38) with a proximal section (26) and a distal section (28), wherein the said distal section (28) defines a needle tip (36) and the proximal section (26) is attached to the said needle housing (22);

a said needle safety device (12) movably arranged on the said needle (24) in between the said catheter housing (14) and said needle housing (22), wherein the said needle (24) extends through the said needle device (12), wherein the top section (48) forming the second arm (70) of the second part (44) of the said needle safety device (12) deflectably rests on the said needle (24), and wherein the said needle safety device (12) is removable from the said enclosure (30) in the said catheter housing (14) once the needle tip (36) is received in the said needle safety device (12) upon withdrawal of the needle (24) from the said catheter tube (16).

~~14~~12. The IV catheter assembly (10) according to claim ~~13~~11, wherein one or more projections or protrusions or recesses or depressions or combinations thereof are provided in the said enclosure (30) of the said catheter housing (14) to facilitate retainment of the said needle device (12).

~~15~~13. The IV catheter assembly (10) according to claim ~~13~~11, wherein the said needle shaft (38) has an enlargement (86) near the distal section (28) of the said needle (24) rendering the outer diameter of the said needle shaft (38) generally greater than the diameter of the bore (56) provided in the said needle safety
device (12).

~~16~~14. The IV catheter assembly (10) according to any of the claims ~~13~~ 11 to ~~15~~13, wherein the said needle tip (36) on being received between the said first (54) and said second arm (70) of the said needle safety device (12) allows the bore (56) in the base section (50) of the said first part (42) of the said needle safety device (12) to rest generally underneath the said enlargement (86) protecting the said needle tip (36).