SINGLE-HANDEDLY ACTUATABLE SHIELD FOR NEEDLES

FIELD OF THE INVENTION

The subject invention relates to single-handedly actuatable shield for hypodermic needles, blood collection needles, catheter needles and other medical implements to help prevent accidental needle sticks.

DESCRIPTION OF THE PRIOR INFORMATION

An accidental needle stick involving a used needle cannula can transmit disease. As a result, most prior art needle cannulas are used with a safety shield for preventing accidental needle sticks.

Most prior art hypodermic needle assemblies have a cap-like safety shield telescoped over the needle cannula prior to use. The proximal portions of the shield may be frictionally retained on a needle hub. The needle assembly is placed in condition for use by merely removing the cap-like safety shield. Re-shielding of the needle after use, using the removable needle shield, is generally discouraged because of the potential for accidental needle sticks.

The prior art has addressed the problem of post-injection unshielded needle cannula by providing sharps collectors and a variety of needle assemblies having self-contained shields which are activatable after injection.

An example of an improved needle shield is taught in U.S. Patent Nos.: 5,348,544; 5,735,827; 5,738,655; and 5,910,130. Such a needle shield has the advantage of being single-handedly activated and while in its collapsed needle exposing position minimizes the amount of projecting structure which can limit the view of the needle cannula or interfere with the injection process.

This shieldable needle assembly includes a needle guard which is slidably movable along the needle cannula from a proximal position substantially adjacent to a hub to a distal position surrounding the distal end of the needle cannula. The needle assembly further includes a hinged arm for initiating movement of the needle guard and for controlling the amount of movement of the needle guard along the needle cannula. The hinged arm assembly includes a proximal segment hingedly connected to the needle hub and a distal segment articulated to portions of the proximal segment remote from the hub and to the

needle guard. In the collapsed needle exposing position the hinged arm is folded upon itself and is substantially adjacent to the hub. However, distally directed forces may be exerted on the hinged arm to urge the hinged arm assembly into an extended condition in which its segments are substantially linearly arrayed and generally parallel to the needle cannula. The dimensions of the segments of the hinged arm assembly are selected to permit distal portions of the needle guard to move beyond the distal end of the needle cannula and prevent proximal portions of the needle guard from moving beyond the end of the needle cannula. Movement of the hinged arm assembly from the collapsed condition to the extended condition may be facilitated by an energy source such as a spring intended to propel the needle guard in a distal direction toward the needle shielding position.

There is still a need for an improved single-handedly actuated shield for needles that includes structure for resisting excessive forces improperly applied to the needle assembly after use which could re-expose the distal end of the needle.

SUMMARY OF THE INENTION

A shieldable needle assembly of the present invention includes a needle cannula having a proximal end and a distal tip. A guard having a proximal end, an opposed distal end and a side wall extending therebetween is slidably movable along the needle cannula from a first position substantially adjacent to the proximal end of the needle cannula to a second position where the distal tip of the needle cannula is intermediate the opposed proximal and distal ends of the guard. A hinged arm having proximal and distal segments articulated to one another through an intermediate hinge is provided for movement of the hinged arm between a first position where the segments are substantially collapsed onto one another and a second position where the segments are extended from one another. The proximal segment of the hinged arm is articulated to a portion of the needle assembly adjacent to the proximal end of the needle. The distal end of the distal segment of the hinged arm is articulated to the guard. The proximal and distal segments of the hinged arm have respective lengths for permitting the guard to move from the first position to the second position on the needle cannula and for preventing the guard from moving distally beyond the second position. An energy storing and releasing structure, such as a spring, is connected to the hinged arm for urging the guard along the needle cannula toward the second needle protecting position. Structure is provided for limiting the reverse rotation of the proximal and distal segments around the intermediate hinge after the guard is in the second position.

Structure for limiting reverse rotation of the intermediate hinge includes a discontinuity on the hinge and an arm discontinuity on either of the proximal and distal segments of the hinged arm. The structure for limiting reverse rotation may include a radial projection on a hinge pin and a discontinuity on the proximal segment wherein the hinge projection snaps substantially irreversibly past the arm discontinuity as the guard moves onto the second position.

Structure may also be provided for limiting continued rotation of the proximal and distal segments around the intermediate hinge after the guard is in its second position. The structure for limiting further continued open rotation may include a contact surface on the proximal end of the distal segment and a contact surface on the distal end of the proximal element. These contact surfaces are positioned to contact each other after the guard is in its second position. The contact surfaces may be on one or more raised projections.

Structure may also be provided to limit upward angular rotation of the guard with respect to the distal element when the guard is in its second position. Such structure may include a stop surface on the guard and a stop surface on the distal end of the distal element to limit upward angular rotation of the guard to an angle equal to or slightly more than the angle between the guard and the distal element when the guard is in its first position.

The proximal end of the guard may further include a proximal wall having an aperture therethrough wherein the needle cannula slidably extends through the aperture of the proximal wall of the guard. The distal end of the guard includes a distal wall having an aperture slidably engaging around the needle cannula when the guard is disposed at its first position. The distal wall is positioned distally beyond the tip of the needle cannula when the guard is in its second position.

The shieldable needle assembly may further include a clip. The clip is configured to cover the tip of the needle cannula when the guard is in the second position on the needle cannula. The clip may be made of metal such as stainless steel or another material highly resistant to puncturing.

The shieldable needle assembly may further include a needle hub securely engaging the proximal end of the needle cannula. The proximal segment of the hinge arm is articulated to the hub.

The shieldable needle assembly may include the hub and proximal segment of the hinge arm being unitary with one another.

The shieldable needle assembly may include spring means which is substantially unbiased when the guard is in the first position. The spring means may be a coil spring. The

coil spring may be positioned to extend from a portion of the needle assembly adjacent to the proximal end of the needle cannula to a location on the proximal segment of the hinged arm.

The spring means may include an over-center hinge extending from the proximal segment of the hinged arm and said portion of the needle assembly adjacent to the proximal end of the needle cannula.

The shieldable needle assembly may further include a hypodermic syringe barrel engaging the proximal end of the needle cannula wherein the proximal segment of the hinged arm is articulated to the hypodermic syringe barrel.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a hypodermic syringe having a shieldable needle assembly of the present invention.

Fig. 2 is a partial side elevational view of the syringe and shieldable needle assembly of Fig. 1.

Fig. 3 is a cross-sectional view of the shieldable needle assembly of Fig. 1 taken along line 3-3.

Fig. 4 is a cross-sectional view similar to Fig. 3 but showing the shield in a partially extended position.

Fig. 5 is a perspective view of the shieldable needle assembly showing the needle shield in its fully extended condition shielding the tip of the needle cannula.

Fig. 6 is a side-elevational view of the needle assembly of Fig. 5.

Fig. 7 is a cross-sectional view of the needle shield assembly of fig. 5 taken along line 7-7.

Fig. 8 is an enlarged perspective view of the intermediate hinge of the needle assembly of Fig. 6.

Fig. 9 is a side elevational view of the intermediate hinge of Fig. 8.

Fig. 10 is a side elevational view of the needle shield assembly showing structure to help prevent further inward rotation of the intermediate hinge after the needle tip has been shielded.

Fig. 11 illustrates another structure to prevent further inward rotation of the intermediate hinge.

Fig. 12 is still another structure for preventing further inward rotation of intermediate hinge.

Fig. 13 is a side elevation view of the needle shield assembly of the present invention showing structure for preventing upward rotation of the needle guard after it is in its needle shielding position.

Fig. 14 is a cross-sectional view similar to Fig. 4 showing an alternative embodiment wherein the spring element is a coil spring.

DETAILED DESCRIPTION

A shieldable, single-handedly activated, needle assembly in accordance with the subject invention is identified generally by numeral **20** in Figs. 1-9 Needle assembly **20** includes a needle cannula **21** having a proximal end **22**, a distal tip **23** and a lumen **25** extending therethrough. Distal tip **23** in this embodiment includes a bevel **26** aligned at an acute angle to the longitudinal axis of the needle cannula.

Needle assembly **20** further includes a needle hub **27** which is securely engaged to proximal end **22** of the needle cannula. Needle assembly **20** may be connected to a fluid transfer device such as hypodermic syringe **28** as shown in Figs. 1 and 2. The syringe includes a barrel **29** having opposed proximal and distal ends **31** and **32** respectively and a fluid chamber **33** extending therebetween. Proximal end **31** of the syringe barrel is open and slidably receives a plunger **34**. Distal end **32** of the syringe barrel includes an elongate tip **35** having a passageway **37** extending therethrough. Distal end **32** of the syringe barrel preferably includes a luer collar **38** concentrically surrounding tip **35**. The luer collar includes an internal thread which may be engaged by the needle hub.

Tip **23** of needle cannula **21** may become contaminated after being used to deliver medication to a patient. Needle assembly **20** enables unimpeded use of the needle cannula and hypodermic syringe and insures effective shielding of tip **23** of the needle cannula immediately after withdrawal from a patient, as explained herein.

The preferred shieldable needle assembly **20** includes a guard **40** which includes a cap portion **41** and a clip **43**. Cap **41** is preferably molded from a thermoplastic material to include a side wall **44** preferably extending circumferentially through more than 180 degrees, and having opposed proximal and distal ends **45** and **46** respectively. Side wall **46** is preferably longer than bevel tip **18** of the needle cannula. Cap **41** further includes an end wall **47** extending across distal end **46** of side wall **44**. End wall **47** includes an aperture **49** which is slidable along needle cannula **21**.

Clip **43** of needle guard 40 is retained between needle cannula **21** and cap **41**. Clip **43** includes a distal wall **50** that is configured to be biased against needle cannula **21**. However,

sufficient distal movement of cap **41** will cause distal wall **50** of the clip to pass beyond tip **23** of the needle cannula. Distal wall **50** of the clip will then be biased over tip **23** as illustrated in Fig. 7. Clip **43** is preferably made of metal such as stainless steel or other material exhibiting good penetration resistance. Clip **43** provides more protection against penetration by tip **23** than could be provided by a plastic cap alone. Additionally, a clip made of metal or other puncture-resistant material enables the plastic of the shieldable needle assembly to be selected for its resiliency and other performance characteristics with less concern for the ability of the plastic to resist needle punctures.

Needle assembly **20** further includes a hinged arm assembly **51** having a proximal segment **53** and a distal segment **55** which are articulated to one another at hinge pins **56**. Proximal segment **53** of hinged arm assembly **51** is articulated to hub **27** at a proximal hinge **57**. Distal segment **55** of the hinged arm assembly is articulated to cap **41** at a distal hinge **58**. Hub **27**, cap **41** and hinged arm **51** may be unitary with one another. However, in the preferred embodiment shown herein proximal and distal segments **53** and **55** are snapped into engagement with one another through hinge pins **56**. Proximal hinge **57** between hub **27** and proximal segment **53** of the hinged arm assembly is preferably an over-center spring hinge. More particularly, hinge **57** includes a substantially non-biasing hinge member **59** and spring element **61**. Non-biasing hinge member **59** defines the rotational path about which the proximal segment of the hinged arm assembly will rotate relative to the needle hub. Spring element **61** in this preferred embodiment includes first and second segments **62** and **63** which are substantially orthogonally aligned to one another in an unbiased condition, as shown in Fig. 2. However, first and second segments **62** and **63** of the spring element can be resiliently deflected from the unbiased angle alignment into a more linear alignment.

Rotation of proximal segment **53** of the hinged arm assembly from the alignment shown in Fig. 2 toward the alignment shown in Fig. 4 will cause segments **62** and **63** to leave spring element **61** to be deflected from the approximate right angle condition shown in Fig. 2 toward the more linear orientation as shown in Fig. 4. The user of syringe **28** and needle assembly **20** must manually overcome the forces attributable to the resiliency of spring element **61** to move proximal segment **53** of the hinged arm assembly from the orientation of Fig. 2 to the orientation of Fig. 4. The resiliency inherent in spring element **61** will urge the spring hinges back toward an undeflected approximate right angle condition. This resiliency will effectively propel proximal segment **53** of the hinged arm assembly from orientation illustrated in Fig. 4 to that toward the orientation illustrated in Figs. 6 and 7 with proximal segment **53** being adjacent to needle cannula **21**. Simultaneously, distal segment **55** will

rotate into substantially parallel alignment with the needle cannula and guard **40** will slide distally toward tip **23** of the needle cannula.

The self-propelling feature enabled by hinge **57** is desirable and facilitates one-handed actuation of the needle guard. Equally important, is the fact that hinge **57** is in a stable condition in its Fig. 2 orientation with substantially no stored energy exerting pressure on the plastic components of the shieldable needle assembly. Stored energy acting on plastic can affect the reliability and performance of the part. In this instance, however, the stored energy is accumulated only after proximal segment **53** of hinged arm assembly **51** is moved from the stable position of Fig. 2 into the Fig. 4 orientation. The accumulated energy then performs work for the user by moving the hinged arm assembly toward its Figs. 6 and 7 orientation. Hinge **57** will again be stable with substantially no stored energy Figs. 6 and 7 orientation where the needle cannula is safely shielded. Another feature of the present invention is that the spring element while in the orientation of Figs. 1 and 2 will resist accidental or inadvertent pressure which would tend to force the guard toward the second position where the clip covers the end of the needle.

Proximal segment **63** of hinged arm assembly **51** includes a pair of parallel spaced-apart arms **64** and **65** which terminate at the linear bearing slots **67** and **68** respectively. The bearing slots are dimensioned to receive hinge pins **56** which in this embodiment are unitarily molded as part of distal segment **55** of the hinged arm assembly.

As shown in Figs. 1-3, distal segment **55** can be articulated around hinge pins **56** into a collapsed position. The relatively small dimensions of each segment **52** and **53**, and the nesting of those segments in a collapsed condition substantially eliminates visual or physical obstruction of the cannula by the hinged arm assembly. The hinged arm assembly is preferably aligned to define a plane which passes symmetrically through the bevel 26 on the tip of the needle cannula. Thus, the hinged arm assembly can be used as a guide to achieve a desired alignment of the bevel prior to insertion of the needle into a vein in the patient. If it is desirable to have the bevel tip facing upwardly, the user of the syringe merely orients the collapsed hinged arm assembly of Figs. 1-3 to point upwardly. The hinged arm assembly can also facilitate the initial threaded engagement of the needle hub into the luer collar **38** of syringe barrel **29**.

After using syringe **28**, proximal and distal segments **53** and **55** of the hinged arm assembly can be articulated about hinges **56**, **57** and **59** toward an extended position, with guard **40** slidably telescoping along the needle cannula and away from the needle hub.

This extension of the hinged arm assembly from the collapsed condition of Figs. 1-3 to the extended position of Figs. 5-7 can be generated entirely from locations proximally on needle cannula **21**. More particularly, proximal member **53** of the hinged arm assembly extends radially outwardly from the needle cannula sufficiently to define a proximally-facing actuation surface extending transversely from the syringe barrel. Thus, distally directed pressure by a finger on the hand engaging the syringe barrel will urge the hinged arm assembly from its collapsed condition toward its extended condition and thereby urge guard **40** toward distal tip **21** of the needle cannula.

Proximal and distal segments of the hinged arm assembly are dimensioned to permit end wall **47** of cap **41** and distal wall **50** of clip **43** to pass distally beyond tip **23** of the needle cannula as shown in Fig. 7. However, the respective length of the proximal and distal segments **53** and **55** of the hinged arm assembly prevent complete separation of the guard from the needle cannula. Additionally, the configuration of clip **43** causes the needle cannula to be biasingly trapped by clip **43**.

After the hinged arm assembly is extended to the position illustrated in Figs. 5-7 needle assembly is not reusable and should be disposed of in a safe manner. The normal forces associated with safe disposal of needles and syringes will not re-expose the needle tip. A person applying excessive bending forces to the needle assembly, after use, in an attempt to improperly re-expose the needle tip by extending the guard past the end of the needle tip would likely bend the needle cannula and make it unsuitable for use. In order to make the hinged arm assembly of the present invention more rigid and resistant to unauthorized excessive force to improperly reuse the needle, additional features are provided to prevent excessive additional rotation of the hinged element after the tip of the needle cannula is shielded. In particular, structure is provided for limiting reverse rotation of the proximal and distal segments of the hinged arm assembly around the intermediate hinge after the guard is in the needle protecting position. Referring to Figs. 8-9, the preferred structure for limiting reverse rotation of the intermediate hinge includes a discontinuity on one or both hinge pins **56** for engaging a discontinuity on either the proximal or the distal segment of the hinge arm depending on which arm the hinge pin is attached to. In this preferred embodiment, hinge pin is attached to the proximal end of the distal segment and the discontinuity is contained in the distal end of the proximal segment. In particular, radial projection **70** is positioned on hinge pins **56** and is positioned to snap over projections **71** in bearing slots **67** and **68**. Radial projection **70** and projection **71** are shaped to pass over each other with minimal resistance as the hinge moves in direction **A**, transverse to the needle cannula while being shaped to

strongly resist reverse rotation of the intermediate hinge, i.e., moving the hinge in direction **B** transverse to the needle cannula. This feature is especially useful if unauthorized reuse is attempted by disabling or removing the metal clip to re-expose the needle through the distal end of the guard.

A recess may be positioned in one or both bearing slots to contain the radial projection or projections while the hinged arm is in its first needle exposing position wherein segments **53** and **55** are substantially collapsed on one another. In this embodiment there is a recess **72** in each of the bearing slots **67** and **68**. Radial projections **70** on hinge pins **56** are positioned in recesses **72** when the hinged arm is in its first needle exposing position. In this position the radial projections are in a relaxed, stress-free, state and have little or no contact with any portion of the bearing slots **67** and **68**. This relationship of the projections **70** and recesses **72** can help stabilize the hinged arm assembly and help hold it in its first needle expositing position. In this case, initial movement of the hinged arm assembly toward its second needle protecting position will require an additional force to snap the projections **70** out of the recesses **72**.

Referring to Figs. 10-12, it is also desirable to provide structure for limiting the continued opening rotation of the proximal and distal segments around the intermediate hinge after the guard is in its second needle protecting position. To limit continued opening rotation of the needle assembly in the alternative embodiment of Fig. 10 includes contact surface **73** on the proximal end of distal segment **55** and a contact surface **75** on the distal end of proximal segment **53**. The contact surfaces are positioned to contact each other after said guard is in its second needle protecting position to prevent further continued rotation of the proximal and distal segments of the hinged arm assembly around the intermediate hinge. In this embodiment, both contact surfaces take the form of radial projections **76** and **77** respectively and contact each other as the hinge pins move in direction **A**.

Fig. 11 illustrates another alternative structure for limiting continued opening rotation of the proximal and distal segments around the intermediate hinge after the guard is in its needle protecting position. In this embodiment, hinge pins **156** include radial lugs **170** and ledges **171** in the bearing slots. The ledges and the radial lugs are positioned to abruptly resist further opening rotation of the intermediate hinge after the guard is in its needle protecting position.

Fig. 12 illustrates another alternative structure for limiting continued open rotation of the intermediate hinge. In this embodiment, hinge pins **256** each contain a radial projection **270** which is similar to the radial projection **70** illustrated in Figs. 8 and 9. However, in this

embodiment, the bearing slots include a resisting surface **271** which resists further opening rotation of the intermediate hinge. This embodiment may also include an inwardly-directed projection on each of the bearing slots to also resist reverse rotation of the intermediate hinge after the needle guard is in its second needle protecting position.

Fig. 13 illustrates another alternative embodiment of the present invention. In this embodiment a stop surface **80** on cap **41** of guard **40**, and a stop surface **81** on the distal end of distal segment **55** are positioned to limit further angular upward rotation (indicated by letter **C**). This feature is a further safeguard to prevent improper forceful re-exposure of the needle tip. It should be noted that the stop surfaces **80** and **81** have to be positioned as far apart as necessary for the hinged assembly to collapse upon itself in the needle expositing position.

Fig. 14 illustrates an alternative embodiment wherein the spring element is a coil spring. This embodiment functions substantially the same as the embodiments of Figs. 1-7. In this embodiment needle assembly **320** includes a needle cannula **321** and a guard **340** slidably movable along the needle cannula from a first position substantially adjacent to a hub **327** to a second position wherein a distal tip of the needle cannula is within a guard. Like the embodiment of Figs. 1-7, needle assembly **320** has a hinged arm **351** having a proximal segment **353** and a distal segment **355** articulated to one another through hinge **356** for movement between the first and second position. The proximal segment of the hinged arm is articulated to the hub through proximal hinge **357** and the distal end of the distal segment is articulated to the guard through hinge **358**. A coil spring **361** preferably extends from the needle hub to proximal segment **353**. Coil spring **361** is stretched by moving hinged arm **353** from the needle exposing position where the guard that is adjacent to the hub toward the needle protecting position as illustrated in Fig. 14. To achieve orientation of Fig. 14 the coil spring is stretched. The energized coil spring contracts urging the needle guard distally toward the tip of the needle cannula substantially as explained in the preceding embodiment of Figs. 1-7.

The spring element of the present invention can comprise a variety of materials and configurations of energy storing and releasing elements. The spring element material may include elastomeric materials, thermoplastic materials and/or metal and the like. Spring element configurations may vary widely from straight elastomeric elements to specifically shaped coil springs, cantilever springs, and combinations thereof formed for the specific application. All of these spring elements are within the purview of the present invention with

the spring element of Figs. 1-7 and the spring element of Fig. 14 being merely representative of these many possibilities.

What is claimed is:

1. A shieldable needle assembly comprising:

a needle cannula having a proximal end and a distal tip;

a guard having a proximal end, an opposed distal end and a side wall extending therebetween, said guard being slidably movable along said needle cannula from a first position substantially adjacent said proximal end of said needle cannula to a second position where said distal tip of said needle cannula is intermediate said opposed proximal and distal ends of said guard;

a hinged arm having proximal and distal segments articulated to one another through a hinge, for movement between a first position where said segments are substantially collapsed onto one another and a second position where said segments are extended from one another, said proximal segment of said hinged arm being articulated to a portion of said needle assembly adjacent said proximal end of said needle cannula, said distal segment of said hinged arm being articulated to said guard, said proximal and distal segments of said hinged arm having respective lengths for permitting said guard to move from said first position to said second position on said needle cannula, and for preventing said guard from moving distally beyond said second position;

spring means connected to said hinged arm for urging said guard along said needle cannula toward said second position; and

means for limiting reverse rotation of said proximal and distal segments around said hinge after said guard is in said second position.

2. The shieldable needle assembly of claim 1 wherein said means for limiting includes a discontinuity on said hinge and an arm discontinuity on either of said proximal and distal segments of said hinged arm.

3. The shieldable needle assembly of claim 2 where said discontinuity on said hinge is a radial projection, and said arm discontinuity is a discontinuity on said proximal segment wherein said hinge projection snaps irreversibly past said arm discontinuity as said guard moves into said second position.

4. The shieldable needle assembly of claim 3 wherein a recess in said arm contains said radial projection when said guard is in its first position.

5. The shieldable needle assembly of claim 4 wherein said radial projection and said recess are configured to help retain said guard in said first position and require an additional force to dislodge said radial projection from said recess to move said guard toward said second position.

6. The shieldable needle assembly of claim 1 further including means for limiting continued opening rotation of said proximal and distal segments around said hinge after said guard is in said second position.

7. The shieldable needle assembly of claim 6 wherein said means for limiting continued opening rotation includes a contact surface on said proximal end of said distal segment and a contact surface on said distal end of said proximal element, said contact surfaces being positioned to contact each other after said guard is in said second position.

8. The shieldable needle assembly of claim 7 wherein said contact surface on said proximal end of said distal element includes a raised projection.

9. The shieldable needle assembly of claim 1 further including a stop surface on said guard and a stop surface on said distal end of said distal element positioned to limit upward angular rotation of said guard with respect to said distal element to an angle equal to or slightly more than the angle between said guard and said distal element when said guard is in said first position.

10. The shieldable needle assembly of claim 1, wherein said proximal end of said guard comprises a proximal wall having an aperture therethrough, and wherein said needle cannula slidably extends through said aperture of said proximal wall of said guard.

11. The shieldable needle assembly of claim 1, wherein said distal end of said guard comprises a distal end wall having an aperture slidably engaged around said needle cannula when said guard is disposed at said first position, said distal end wall being distally beyond said tip of said needle cannula when said guard is in said second position.

12. The shieldable needle assembly of claim 1, wherein said guard includes a clip, said clip being configured to cover said tip when said guard is in said second position on said needle cannula.

13. The shieldable needle assembly of claim 1, further comprising a needle hub securely engaging said proximal end of said needle cannula, said proximal segment of said hinged arm being articulated to said hub.

14. The shieldable needle assembly of claim 13, wherein said hub and said proximal segment of said hinged arm are unitary with one another.

15. The shieldable needle assembly of claim 1, wherein said spring means is substantially unbiased when said guard is in said first position.

16. The shieldable needle assembly of claim 1, wherein said spring means is a coil spring.

17. The shieldable needle assembly of claim 16, wherein said coil spring extends from a portion of said needle assembly adjacent said proximal end of said needle cannula to a location on said proximal segment of said hinged arm.

18. The shieldable needle assembly of claim 1, wherein said spring means comprises an over-center hinge extending unitarily from said proximal segment of said hinged arm and said portion of said needle assembly adjacent said proximal end of said needle cannula.

19. The shieldable needle assembly of claim 1, further comprising a hypodermic syringe barrel engaging said proximal end of said needle cannula, said proximal segment of said hinged arm being articulated to said hypodermic syringe barrel.

20. The shieldable needle assembly of claim 12 wherein said clip is made of metal.

21. A shieldable needle assembly comprising:

a needle cannula having a proximal end and a distal tip;

a guard having a proximal end, an opposed distal end and a side wall extending therebetween, said guard being slidably movable along said needle cannula from a first

position substantially adjacent said proximal end of said needle cannula to a second position where said distal tip of said needle cannula is intermediate said opposed proximal and distal ends of said guard;

a hinged arm having proximal and distal segments articulated to one another through a hinge, for movement between a first position where said segments are substantially collapsed onto one another and a second position where said segments are extended from one another, said proximal segment of said hinged arm being articulated to a portion of said needle assembly adjacent said proximal end of said needle cannula, said distal segment of said hinged arm being articulated to said guard, said proximal and distal segments of said hinged arm having respective lengths for permitting said guard to move from said first position to said second position on said needle cannula, and for preventing said guard from moving distally beyond said second position;

spring means connected to said hinged arm for urging said guard along said needle cannula toward said second position;

means for limiting continued opening rotation of said proximal and distal segments around said hinge after said guard is in said second position; and

a clip retained by said guard, said clip being configured to cover said tip when said guard is in said second position on said needle cannula.

22. A shieldable needle assembly comprising:

a needle cannula having a proximal end and a distal tip;

a guard having a proximal end, an opposed distal end and a side wall extending therebetween, said guard being slidably movable along said needle cannula from a first position substantially adjacent said proximal end of said needle cannula to a second position where said distal tip of said needle cannula is intermediate said opposed proximal and distal ends of said guard;

a hinged arm having proximal and distal segments articulated to one another through a hinge, for movement between a first position where said segments are substantially collapsed onto one another and a second position where said segments are extended from one another, said proximal segment of said hinged arm being articulated to a portion of said needle assembly adjacent said proximal end of said needle cannula, said distal segment of said hinged arm being articulated to said guard, said proximal and distal segments of said hinged arm having respective lengths for permitting said guard to move from said first

position to said second position on said needle cannula, and for preventing said guard from moving distally beyond said second position;

spring means connected to said hinged arm for urging said guard along said needle cannula toward said second position; and

means for limiting continued opening rotation of said proximal and distal segments around said hinge after said guard is in said second position.

23. The shieldable needle assembly of claim 22, wherein said guard includes a clip, said clip being configured to cover said tip when said guard is in said second position on said needle cannula.

24. The shieldable needle assembly of claim 22 wherein said means for limiting continued opening rotation includes a contact surface on said proximal end of said distal segment and a contact surface on said distal end of said proximal element, said contact surfaces being positioned to contact each other after said guard is in said second position.

25. The shieldable needle assembly of claim 24 wherein said contact surface on said proximal end of said distal element includes a raised projection.

26. The shieldable needle assembly of claim 22 further including means for limiting reverse rotation of said proximal and distal segments around said hinge after said guard is in said second position.

27. The shieldable needle assembly of claim 26 wherein said means for limiting reverse rotation includes a discontinuity on said hinge and an arm discontinuity on either of said proximal and distal segments of said hinged arm.

28. The shieldable needle assembly of claim 27 where said discontinuity on said hinge is a radial projection, and said arm discontinuity is a discontinuity on said proximal segment wherein said hinge projection snaps irreversibly past said arm discontinuity, as said guard moves into said second position.

29. The shieldable needle assembly of claim 22 further including a stop surface on said guard and a stop surface on said distal end of said distal element positioned to limit upward

angular rotation of said guard with respect to said distal element to an angle equal to or slightly more than the angle between said guard and said distal element when said guard is in said first position.

30. The shieldable needle assembly of claim 22, further comprising a needle hub securely engaging said proximal end of said needle cannula, said proximal segment of said hinged arm being articulated to said hub.

31. The shieldable needle assembly of claim 30, wherein said hub and said proximal segment of said hinged arm are unitary with one another.

32. The shieldable needle assembly of claim 22, further comprising a hypodermic syringe barrel engaging said proximal end of said needle cannula, said proximal segment of said hinged arm being articulated to said hypodermic syringe barrel.