

CLAIMS

We claim

1. A manually-retractable intravenous infusion needle assembly, comprising:
a needle holder;
a needle tube;
a built-in slidable sheath; and
a protective casing;
wherein:

the needle holder comprises a tubular portion and a tailstock portion; the tubular portion and the tailstock portion are arranged in a front-and-rear manner and are connected to each other; the tubular portion is configured for the arrangement of the needle tube; the tailstock portion is configured to connect a delivery tube;

the built-in slidable sheath is through and elongated and has a C-shaped cross-section;
the protective casing is an elongated, through and hollow casing;

a rear end of the needle tube is mounted inside the tubular portion; the tubular portion is mounted in the built-in slidable sheath and is capable of sliding back and forth; the tailstock portion is provided outside a rear end of the built-in slidable sheath; the built-in slidable sheath is mounted in the protective casing and is capable of sliding back and forth; the needle holder is capable of being locked to the protective casing;

a first locking structure is provided between the needle holder and the built-in slidable sheath to lock the needle holder; a second locking structure is provided between the built-in slidable sheath and the protective casing to lock the built-in slidable sheath; and a third locking structure is provided between the needle holder and the protective casing to lock the needle holder;

when the third locking structure is unlocked, the needle holder is pulled backward to allow the tubular portion to move to a locking position of the built-in slidable sheath such that the tubular portion is locked; when the needle holder is continuously pulled backward, the built-in slidable sheath is driven to move to a locking position of the protective casing to be locked, and in this case, the needle tube is completely covered by the protective casing and a tip of the needle tube does not exceed the protective casing;

the first locking structure comprises a first positioning member and a first locking member; wherein the first positioning member is provided on an outer wall of the tubular portion and the first locking member is provided on an inner wall of the built-in slidable sheath;

when the tubular portion is moved to the locking position of the built-in slidable sheath, the first positioning member is locked by the first locking member such that the tubular portion fails to slip off from the built-in slidable sheath;

the first positioning member comprises a sliding block; the first locking member comprises a slotted hole and a first elastic arm; wherein the slotted hole is axially provided along the built-in slidable sheath; the first elastic arm is provided at a rear section of the slotted hole; the sliding block is limited to slide within the slotted hole; when the sliding block is moved along the slotted hole to a rear end of the slotted hole, the first elastic arm is driven by the sliding block to generate elastic deformation to allow the sliding block to pass through; and when the sliding block arrives at the rear end of the slotted hole, the first elastic arm recovers to a normal state such that the sliding block is locked and fails to slide reversely;

the first positioning member further comprises two side sliding blocks; wherein the two side sliding blocks are respectively provided at two sides of the sliding block;

the first locking member further comprises two first chutes; wherein the two first chutes are axially provided at two sides of the slotted hole along the built-in slidable sheath, respectively; the two side sliding blocks are respectively limited to slide within the two first chutes such that the tubular portion fails to radially slip off from the built-in slidable sheath;

the second locking structure comprises a second positioning member and a second locking member; wherein the second positioning member is provided on the built-in slidable sheath and the second locking member is provided on an inner wall of the protective casing; when the built-in slidable sheath is moved to the locking position of the protective casing, the second positioning member is locked by the second locking member such that the built-in slidable sheath fails to slip off from the protective casing;

the second positioning member comprises two bumps, wherein the two bumps are respectively provided on two axial sections of the built-in slidable sheath;

the second locking member comprises two second chutes and two second elastic arms; wherein the two second chutes are axially and symmetrically provided along the protective casing; the two second elastic arms are respectively provided at rear sections of the two second chutes;

the two bumps are respectively limited to slide within the two second chutes; when the two bumps are moved respectively along the two second chutes to rear ends of the two second chutes, the two second elastic arms are respectively driven by the two bumps to generate elastic deformation to allow the two bumps to pass through; and when the two bumps respectively

arrive at the rear ends of the two second chutes, the two second elastic arms recover to a normal state such that the two bumps are locked and fails to slide reversely; and

the third locking structure comprises a third locking member and a third positioning member, wherein the third locking member is provided on the tailstock portion and the third positioning member is provided on an outer wall of the protective casing; when the third locking member is locked on the third positioning member, the tailstock portion is locked on the protective casing, a front end of the built-in slidable sheath is limited by an inner wall of the protective casing, and a rear end of the built-in slidable sheath is limited by the tailstock portion; when the third locking member is unlocked from the third positioning member, the needle holder is capable of being pulled backward.

2. The intravenous infusion needle assembly according to claim 1, characterized in that the tailstock portion comprises a tailstock body and an assembling member; wherein the tailstock body is connected to the tubular portion; a side surface of the tailstock body is connected to the assembling member; the assembling member is parallel to a central axis of the tubular portion and clings to the outer wall of the protective casing; the assembling member is capable of being pulled to move from a side surface; the third locking member is provided on the assembling member; the third locking member comprises a recess and the third positioning member comprises a projection; and when the assembling member is pulled to move from the side surface, the recess is unlocked from the projection.

3. The intravenous infusion needle assembly according to claim 2, further comprising a wing; wherein the wing is sleeved on the assembling member; and when the wing is pulled from a side, the assembling member is pulled synchronously.

4. The intravenous infusion needle assembly according to any one of claims 1-3, characterized in that the protective casing consists of an upper casing and a lower casing, wherein the upper casing is buckled with the lower casing; the built-in slidable sheath is mounted inside the upper casing; and two axial sections of the built-in slidable sheath fit an inner wall of the lower casing.

5. The intravenous infusion needle assembly according to claim 4, characterized in that a maximum vertical distance between the needle tube and an outer wall of the lower casing is equal to or less than 1.5 mm.

6. A manually-retractable intravenous infusion needle assembly, comprising:
a needle holder;
a needle tube;
a built-in slidable sheath; and
a protective casing;
wherein:

the needle holder comprises a tubular portion and a tailstock portion; the tubular portion and the tailstock portion are arranged in a front-and-rear manner and are connected to each other; the tubular portion is configured for the arrangement of the needle tube; the tailstock portion is configured to connect a delivery tube;

the built-in slidable sheath is through and elongated and has a C-shaped cross-section;
the protective casing is an elongated, through and hollow casing;

a rear end of the needle tube is mounted inside the tubular portion; the tubular portion is mounted in the built-in slidable sheath and is capable of sliding back and forth; the tailstock portion is provided outside a rear end of the built-in slidable sheath; the built-in slidable sheath is mounted in the protective casing and is capable of sliding back and forth; the needle holder is capable of being locked to the protective casing;

a first locking structure is provided between the needle holder and the built-in slidable sheath to lock the needle holder; a second locking structure is provided between the built-in slidable sheath and the protective casing to lock the built-in slidable sheath; and a third locking structure is provided between the needle holder and the protective casing to lock the needle holder;

when the third locking structure is unlocked, the needle holder is pulled backward to allow the tubular portion to move to a locking position of the built-in slidable sheath such that the tubular portion is locked; when the needle holder is continuously pulled backward, the built-in slidable sheath is driven to move to a locking position of the protective casing to be locked, and in this case, the needle tube is completely covered by the protective casing and a tip of the needle tube does not exceed the protective casing;

the first locking structure comprises a first positioning member and a first locking member; wherein the first positioning member is provided on an outer wall of the tubular

portion and the first locking member is provided on an inner wall of the built-in slidable sheath; when the tubular portion is moved to the locking position of the built-in slidable sheath, the first positioning member is locked by the first locking member such that the tubular portion fails to slip off from the built-in slidable sheath;

the first positioning member comprises a sliding block; the first locking member comprises a slotted hole and a first elastic arm; wherein the slotted hole is axially provided along the built-in slidable sheath; the first elastic arm is provided at a rear section of the slotted hole; the sliding block is limited to slide within the slotted hole; when the sliding block is moved along the slotted hole to a rear end of the slotted hole, the first elastic arm is driven by the sliding block to generate elastic deformation to allow the sliding block to pass through; and when the sliding block arrives at the rear end of the slotted hole, the first elastic arm recovers to a normal state such that the sliding block is locked and fails to slide reversely;

the first positioning member further comprises two side sliding blocks; wherein the two side sliding blocks are respectively provided at two sides of the sliding block;

the first locking member further comprises two first chutes; wherein the two first chutes are axially provided at two sides of the slotted hole along the built-in slidable sheath, respectively; the two side sliding blocks are respectively limited to slide within the two first chutes such that the tubular portion fails to radially slip off from the built-in slidable sheath;

the second locking structure comprises a second positioning member and a second locking member; wherein the second positioning member is provided on the built-in slidable sheath and the second locking member is provided on an inner wall of the protective casing; when the built-in slidable sheath is moved to the locking position of the protective casing, the second positioning member is locked by the second locking member such that the built-in slidable sheath fails to slip off from the protective casing;

the second positioning member comprises two bumps, wherein the two bumps are respectively provided on two axial sections of the built-in slidable sheath;

the second locking member comprises two second chutes and two second elastic arms; wherein the two second chutes are axially and symmetrically provided along the protective casing; the two second elastic arms are respectively provided at rear sections of the two second chutes;

the two bumps are respectively limited to slide within the two second chutes; when the two bumps are moved respectively along the two second chutes to rear ends of the two second chutes, the two second elastic arms are respectively driven by the two bumps to generate elastic deformation to allow the two bumps to pass through; and when the two bumps respectively

arrive at the rear ends of the two second chutes, the two second elastic arms recover to a normal state such that the two bumps are locked and fails to slide reversely; and

the third locking structure comprises a third positioning member and a third locking member; wherein the third positioning member is provided on the tubular portion and the third locking member is provided on a front end of an inner wall of the protective casing; when the third positioning member is locked by the third locking member, the tubular portion is locked inside the protective casing, a front end of the built-in slidable sheath is limited by an inner wall of the protective casing, and a rear end of the built-in slidable sheath is limited by the tailstock portion; when the third positioning member is unlocked from the third locking member, the tubular portion is capable of being pulled out from the built-in slidable sheath.

7. The intravenous infusion needle assembly according to claim 6, characterized in that the third positioning member comprises two side sliding blocks, wherein the two side sliding blocks are symmetrically provided at a front end of an outer wall of the tubular portion;

the third locking member comprises two elastically-deformable bevel bumps; the bevel bumps are symmetrically provided at a front end of an inner wall of the protective casing;

when the two side sliding blocks are respectively locked by the two bevel bumps, the tubular portion is locked inside the protective casing and the built-in slidable sheath is simultaneously limited by the tailstock portion; and when the tubular portion is pulled backward, the two side sliding blocks respectively drive the two bevel bumps to generate elastic deformation such that the two side sliding blocks respectively slide through the two bevel bumps and the needle holder is pulled backward out of the protective casing.

8. The intravenous infusion needle assembly according to claim 7, further comprising a wing, wherein the wing is sleeved on the tailstock portion; the wing is a single wing or a double wing; two wings of the double wing are symmetrically provided and are overlapped after folded; and when the wing is held to be pulled backward, the needle holder is synchronously pulled.

9. The intravenous infusion needle assembly according to any one of claims 6-8, characterized in that the protective casing consists of an upper casing and a lower casing, wherein the upper casing is buckled with the lower casing; the built-in slidable sheath is mounted inside the upper casing; and two axial sections of the built-in slidable sheath fit an inner wall of the lower casing.

10. The intravenous infusion needle assembly according to claim 9, characterized in that a maximum vertical distance between the needle tube and an outer wall of the lower casing is equal to or less than 1.5 mm.

11. A manually-retractable intravenous infusion needle assembly, comprising:
a needle holder;
a needle tube;
a built-in slidable sheath; and
a protective casing;
wherein:

the needle holder comprises a tubular portion and a tailstock portion; the tubular portion and the tailstock portion are arranged in a front-and-rear manner and are connected to each other; the tubular portion is configured for the arrangement of the needle tube; the tailstock portion is configured to connect a delivery tube;

the built-in slidable sheath is through and elongated and has a C-shaped cross-section;
the protective casing is an elongated, through and hollow casing;

a rear end of the needle tube is mounted inside the tubular portion; the tubular portion is mounted in the built-in slidable sheath and is capable of sliding back and forth; the tailstock portion is provided outside a rear end of the built-in slidable sheath; the built-in slidable sheath is mounted in the protective casing and is capable of sliding back and forth; the needle holder is capable of being locked to the protective casing;

a first locking structure is provided between the needle holder and the built-in slidable sheath to lock the needle holder; a second locking structure is provided between the built-in slidable sheath and the protective casing to lock the built-in slidable sheath; and a third locking structure is provided between the needle holder and the protective casing to lock the needle holder;

when the third locking structure is unlocked, the needle holder is pulled backward to allow the tubular portion to move to a locking position of the built-in slidable sheath such that the tubular portion is locked; when the needle holder is continuously pulled backward, the built-in slidable sheath is driven to move to a locking position of the protective casing to be locked, and in this case, the needle tube is completely covered by the protective casing and a tip of the needle tube does not exceed the protective casing;

the first locking structure comprises a first positioning member and a first locking member; wherein the first positioning member is provided on an outer wall of the tubular portion and the first locking member is provided on an inner wall of the built-in slidable sheath; when the tubular portion is moved to the locking position of the built-in slidable sheath, the first positioning member is locked by the first locking member such that the tubular portion fails to slip off from the built-in slidable sheath;

the first positioning member comprises a sliding block; the first locking member comprises a slotted hole and a first elastic arm; wherein the slotted hole is axially provided along the built-in slidable sheath; the first elastic arm is provided at a rear section of the slotted hole; the sliding block is limited to slide within the slotted hole; when the sliding block is moved along the slotted hole to a rear end of the slotted hole, the first elastic arm is driven by the sliding block to generate elastic deformation to allow the sliding block to pass through; and when the sliding block arrives at the rear end of the slotted hole, the first elastic arm recovers to a normal state such that the sliding block is locked and fails to slide reversely;

the first positioning member further comprises two side sliding blocks; wherein the two side sliding blocks are respectively provided at two sides of the sliding block;

the first locking member further comprises two first chutes; wherein the two first chutes are axially provided at two sides of the slotted hole along the built-in slidable sheath, respectively; the two side sliding blocks are respectively limited to slide within the two first chutes such that the tubular portion fails to radially slip off from the built-in slidable sheath;

the second locking structure comprises a second positioning member and a second locking member; wherein the second positioning member is provided on the built-in slidable sheath and the second locking member is provided on an inner wall of the protective casing; when the built-in slidable sheath is moved to the locking position of the protective casing, the second positioning member is locked by the second locking member such that the built-in slidable sheath fails to slip off from the protective casing;

the second positioning member comprises two bumps, wherein the two bumps are respectively provided on two axial sections of the built-in slidable sheath;

the second locking member comprises two second chutes and two second elastic arms; wherein the two second chutes are axially and symmetrically provided along the protective casing; the two second elastic arms are respectively provided at rear sections of the two second chutes;

the two bumps are respectively limited to slide within the two second chutes; when the two bumps are moved respectively along the two second chutes to rear ends of the two second

chutes, the two second elastic arms are respectively driven by the two bumps to generate elastic deformation to allow the two bumps to pass through; and when the two bumps respectively arrive at the rear ends of the two second chutes, the two second elastic arms recover to a normal state such that the two bumps are locked and fails to slide reversely;

the third locking structure comprises a third positioning member and a third locking member, wherein the third positioning member is provided on the tailstock portion and the third locking member is provided at a rear end of the protective casing; and

when the third positioning member is locked by the third locking member, the tailstock portion is locked at the rear end of the protective casing, a front end of the built-in slidable sheath is limited by an inner wall of the protective casing and a rear end of the built-in slidable sheath is limited by the tailstock portion; and when the third positioning member is unlocked from the third locking member, the tailstock portion is capable of being pulled backward to move.

12. The intravenous infusion needle assembly according to claim 11, characterized in that the tailstock portion comprises a tailstock body and two pressing members; wherein the tailstock body is connected to the tubular portion; the two pressing members are respectively connected to two sides of the tailstock body; the two pressing members are both parallel to a central axis of the tubular portion; the two pressing members are capable of being oppositely pressed;

the third positioning member comprises two hooks, wherein the two hooks are respectively provided at front ends of the two pressing members;

the third locking member comprises two slots, wherein the two slots are respectively provided at two sides of the rear end of the protective casing; and

when the two pressing members are held to be oppositely pressed, the two hooks are respectively unlocked from the two slots.

13. The intravenous infusion needle assembly according to claim 12, further comprising a wing; wherein the wing is sleeved on the protective casing; the wing is a single wing or a double wing; two wings of the double wing are symmetrically provided and are overlapped after folded.

14. The intravenous infusion needle assembly according to any one of claims 11-13, characterized in that the protective casing consists of an upper casing and a lower casing,

wherein the upper casing is buckled with the lower casing; the built-in slidable sheath is mounted inside the upper casing; and two axial sections of the built-in slidable sheath fit an inner wall of the lower casing.

15. The intravenous infusion needle assembly according to claim 14, characterized in that a maximum vertical distance between the needle tube and an outer wall of the lower casing is equal to or less than 1.5 mm.