CLAIMS

1. A catheter assembly comprising:

a catheter hub containing a septum actuator and a septum, the septum actuator configured to pierce the septum when a force is applied to the septum actuator, a catheter extending distally from the catheter hub; and

a needle shield connected to the catheter hub, the needle shield containing a needle hub, the needle hub containing a needle, wherein the needle hub is initially positioned at a distal end of the needle shield such that the needle extends distally out through the catheter, and wherein, the needle hub is configured to retract proximally into the needle shield such that a distal end of the needle is captured within the needle shield;

wherein the needle hub includes one or more protrusions that extend distally from an outer diameter of a distal end of the needle hub; and

wherein the septum actuator includes one or more channels formed in a proximal end of the septum actuator, wherein, when the needle hub is positioned at the distal end of the needle shield, the one or more protrusions of the needle hub insert into the one or more channels thereby interlocking the needle hub with the septum actuator to provide greater rigidity between the catheter hub and the needle shield against vertical forces applied to the catheter assembly, wherein the one or more protrusions are configured to separate from the one or more channels to allow an access device to be connected to the catheter hub.

2. The catheter assembly of claim 1, wherein the septum actuator includes two channels and the needle hub includes two protrusions.

3. The catheter assembly of claim 2, wherein when the catheter assembly is positioned to be inserted into vasculature of a patient, the channels are positioned at a top and bottom of the septum actuator to provide greater rigidity against vertical forces applied to the catheter assembly.

4. The catheter assembly of claim 1, wherein the septum actuator is positioned completely within the catheter hub such that the needle hub extends into the catheter hub to interlock with the septum actuator.

5. The catheter assembly of claim 1, wherein an outer diameter of each protrusion matches an outer diameter of the corresponding channel.

6. The catheter assembly of claim 1, wherein the one or more protrusions extend into the catheter hub when the one or more protrusions insert into the one or more channels.

7. The catheter assembly of claim 1, wherein the catheter assembly is an intravenous catheter assembly.

8. The catheter assembly of claim 1, wherein the needle shield is detachable from the catheter hub to allow another access device to be connected to the catheter hub.

9. A catheter assembly comprising:

a catheter hub having a distal end from which a catheter extends and a proximal end forming a proximal opening of a lumen, the lumen extending to the distal end of the catheter hub, the catheter hub including a septum positioned within the lumen and a septum actuator positioned proximal to the septum and configured to be forced through the septum to create a fluid pathway through the septum, a proximal end of the septum actuator including one or more channels; and

a needle shield having a distal end configured to couple to the proximal end of the catheter hub, the needle shield containing a needle hub having a distal end from which a needle extends, the distal end of the needle hub including one or more protrusions corresponding to the one or more channels of the septum actuator, the needle hub having a first position and a second position within the needle shield, the one or more protrusions extending distally from an outer diameter of the needle hub;

wherein, when the needle hub is in the first position, the one or more protrusions of the needle hub are inserted into the one or more channels of the septum actuator to provide greater rigidity between the catheter hub and the needle shield against vertical forces applied to the catheter assembly, and when in the second position, the needle hub is positioned towards a proximal end of the needle shield such that a distal end of the needle is contained within the needle shield, wherein the one or more protrusions are configured to separate from the one or more channels to allow an access device to be connected to the catheter hub.

10. The catheter assembly of claim **9**, wherein the proximal end of the septum actuator includes two channels.

11. The catheter assembly of claim **10**, wherein when the catheter assembly is positioned to be inserted into vasculature of a patient, the two channels are positioned at a top and bottom of the proximal end to provide greater rigidity against vertical forces.

12. The catheter assembly of claim **9**, wherein the septum actuator is positioned completely within the catheter hub such that, when in the first position, the needle hub extends into the catheter hub.

13. The catheter assembly of claim **9**, wherein an outer diameter of each channel matches an outer diameter of the corresponding protrusion.

14. The catheter assembly of claim **9**, wherein at least one of the one or more channels is positioned at a side of the proximal end.

15. A catheter assembly comprising:

a catheter hub having a distal end from which a catheter extends and a proximal end forming a proximal opening of a lumen, the lumen extending to the distal end of the catheter hub, the catheter hub including a septum positioned within the lumen and a septum actuator positioned proximal to the septum and configured to be forced through the septum to create a fluid pathway through the septum, a proximal end of the septum actuator including one or more channels; and

a needle shield having a distal end configured to be selectively coupled to the proximal end of the catheter hub, the needle shield containing a needle hub having a distal end from which a needle extends, the distal end of the needle hub including one or more protrusions corresponding to the one or more channels of the actuator, the one or more protrusions extending from a distal-most surface of the distal end of the needle hub, the needle hub initially being positioned at the distal end of the needle shield such that the needle extends through the catheter hub and out through a distal end of the catheter, the needle hub further being configured to retract proximally into the needle shield after the needle has been used to insert the catheter into a vasculature of a patient;

wherein, prior to the needle hub being, retracted, the one or more protrusions of the needle hub are positioned

within the one or more channels of the septum actuator to provide greater rigidity between the catheter hub and the needle shield against vertical forces applied to the catheter assembly, wherein the one or more protrusions are configured to separate from the one or more channels to allow an access device to be connected to the catheter hub.

16. The catheter assembly of claim **15**, wherein the one or more protrusions comprise two protrusions.

17. The catheter assembly of claim **16**, wherein when the catheter assembly is positioned to be inserted into vasculature of a patient, the two protrusions are positioned at a top and bottom of the distal end.

18. The catheter assembly of claim **15**, wherein, prior to the needle hub being retracted, the one or more protrusions extend into the catheter hub.

19. The catheter assembly of claim **15**, wherein the protrusions extend distally from an outer diameter of the needle hub.