Claims

1. An aseptic closure system for attaching to a container, the closure system comprises:

an upper section and a lower section, wherein at least one of either the upper section or the lower section includes a mounting component for removably attaching the upper section to the lower section;

the upper section includes an upper valve housing having at least one inlet port and at least one outlet port, the inlet port and the outlet port each include a conduit that permits fluid communication through the port with an interior of the upper valve housing, each port is configured to fluidly communicate with at least one component of which it is desired to maintain an aseptic connection,

the lower section includes a top deck with an attachment mechanism located on a lower portion of the top deck for engaging with a top of the container, a lower valve housing is formed on and extends upward from an upper surface of the top deck, the lower valve housing includes two conduits that permit fluid communication through the lower valve housing to an interior of the lower section;

an upper rotary valve is mounted to the upper valve housing and configured to rotate relative to the upper valve housing, the upper rotary valve includes a cylindrical upper valve shaft that is rotatable within an upper bore extending through the upper valve housing, and two upper shaft conduits that extend through the upper valve shaft and are positioned such that, when the upper rotary valve is in an open state, the upper valve shaft conduits align with the inlet port and outlet port conduits and the lower valve housing conduits, thereby permitting fluid communication between the upper section and the lower valve housing;

the upper rotary valve has a closed state wherein the upper valve shaft is rotated relative to the upper valve housing such that the upper shaft conduits are not aligned with the inlet port and outlet port conduits and the lower valve housing conduits, and fluid communication between the upper section and the lower valve housing is prohibited by the upper valve shaft;

a lower rotary valve is mounted to the lower valve housing and is configured to rotate relative to the lower valve housing, the lower rotary valve includes a cylindrical lower valve shaft that is rotatable within a lower bore extending through the lower valve housing, and includes two lower shaft conduits that extend through the lower rotary valve shaft and are located such that, when the lower rotary valve is in an open state, the lower

shaft conduits align with the lower valve housing conduits and, if the upper rotary valve is in its open state, fluid communication is permitted between the upper section and the lower section; and

the lower rotary valve has a closed state wherein the lower valve shaft is rotated relative to the lower valve housing such that the lower shaft conduits are not aligned with the lower valve housing conduits and fluid communication between the upper section and the lower section is prohibited by the lower valve shaft.

2. The aseptic closure system of claim 1, wherein the mounting component is a mounting bracket on the upper valve housing, the mounting bracket extending downward from a base of the upper valve housing, the mounting bracket includes four walls that fit snuggly around an external surface of the lower valve housing so as to enclose a portion of the lower valve housing within the walls.

3. The aseptic closure system of claim 2 wherein the mounting bracket includes two open apertures on opposite sides of the bracket that snap onto ends of the lower valve shaft where the lower valve shaft extends out of either side of the bore of the lower valve housing, thereby removably securing the upper section to the lower section.

4. The aseptic closure system of any of the preceding claims, wherein the upper valve housing includes an extension that extends downward from a lower end of each of the inlet port conduit and outlet port conduit, each extension engages with an upper end of an opening corresponding one of the lower valve housing conduits.

5. The aseptic closure system of claim 4, wherein each extension and opening has a tapered interface that provide a press fit connection with one another to facilitate an aseptic connection between the upper valve housing and the lower valve housing.

6. The aseptic closure system of any of the preceding claims, wherein the inlet port, outlet port and the upper valve housing are formed as an integral component.

7. The aseptic closure system of any of the preceding claims, wherein inlet port and outlet port include hose barbs for connecting with tubing.

8. The aseptic closure system of any of the preceding claims, wherein the at least one component is selected from a fluid media bag, a secondary container, or processing equipment.

9. The aseptic closure system of any of the preceding claims, wherein the lower section further includes a skirt and wherein the attachment mechanism is threads formed on an internal surface of the skirt that are configured to removably engage with mating threads on the container.

10. The aseptic closure system of any of the preceding claims, wherein the upper valve shaft includes a tab formed on one end that can be grasped by a user for rotating the upper rotary valve relative to the upper valve housing between its open and closed states, and wherein the lower valve shaft includes a tab formed on one end of the lower valve shaft that can be grasped by a user for rotating the lower rotary valve relative to the lower valve housing between its open and closed states.

11. The aseptic closure system of claim 10, wherein the upper valve housing includes first and second stops for interacting with the tabs, the first stop is located so as to limit the rotation of the tab on the upper valve shaft such that when the tab contacts the first stop the upper rotary valve is in its closed state, and the second stop is located so that when the tab on the lower valve shaft contacts the lower stop when the lower rotary valve is in its open state.

12. The aseptic closure system of claim 11, wherein the first and second stops and the tabs are arranged such that the lower rotary valve cannot be rotated to its closed state until the upper rotary valve is first rotated to its closed state.

13. The aseptic closure system of any of the preceding claims, wherein the lower rotary valve is connected to the upper valve housing.

14. An aseptic closure system for attaching to a container, the closure system comprises:

an upper section and a lower section, wherein at least one of either the upper section or the lower section includes a mounting bracket for removably attaching the upper section to the lower section;

the upper section includes an upper valve housing having at least one inlet port and at least one outlet port, the inlet port and the outlet port each include a conduit that permits fluid communication through the port with an interior of the upper valve housing, each port is configured to fluidly communicate with at least one component of which it is desired to maintain an aseptic connection,

the lower section includes a top deck with an attachment mechanism located on a lower portion of the top deck for engaging with a top of the container, a lower valve housing is formed on and extends upward from an upper surface of the top deck, the lower valve housing includes two conduits that permit fluid communication through the lower valve housing to an interior of the lower section;

an upper rotary valve is mounted to the upper valve housing and configured to rotate relative to the upper valve housing, the upper rotary valve includes a cylindrical upper valve shaft that is rotatable within an upper bore extending through the upper valve housing, and two upper shaft conduits that extend through the upper valve shaft and are positioned such that, when the upper rotary valve is in an open state, the upper valve shaft conduits align with the inlet port and outlet port conduits and the lower valve housing conduits, thereby permitting fluid communication between the upper section and the lower valve housing;

the upper rotary valve has a closed state wherein the upper valve shaft is rotated relative to the upper valve housing such that the upper shaft conduits are not aligned with the inlet port and outlet port conduits and the lower valve housing conduits such that fluid communication between the upper section and the lower valve housing is prohibited by the upper valve shaft;

a lower rotary valve is mounted to the lower valve housing and is configured to rotate relative to the lower valve housing, the lower rotary valve includes a cylindrical lower valve shaft that is rotatable within a lower bore extending through the lower valve housing, and includes two lower shaft conduits that extend through the lower rotary valve shaft and are located such that, when the lower rotary valve is in an open state, the lower shaft conduits align with the lower valve housing conduits and, if the upper rotary valve

is in its open state, fluid communication is permitted between the upper section and the lower section;

the lower rotary valve has a closed state wherein the lower valve shaft is rotated relative to the lower valve housing such that the lower shaft conduits are not aligned with the lower valve housing conduits, such that fluid communication between the upper section and the lower section is prohibited by the lower valve shaft;

the mounting bracket removably connecting the upper valve housing to the lower valve housing, the mounting bracket extending either downward from a lower portion of the upper valve housing or upward from an upper portion of the lower valve housing;

wherein the upper valve shaft includes a tab formed on one end that can be grasped by a user for rotating the upper rotary valve relative to the upper valve housing between its open and closed states; and

wherein the lower valve shaft includes a tab formed on one end of the lower valve shaft that can be grasped by a user for rotating the lower rotary valve relative to the lower valve housing between its open and closed states.

15. The aseptic closure system of claim 14, wherein the mounting bracket includes four walls that snuggly engage an external surface of the lower valve housing so as to enclose a portion of the lower valve housing within the walls, and the mounting bracket includes two open apertures on opposite sides of the bracket that snap onto ends of the lower valve shaft where the lower valve shaft extents out of either side of the bore of the lower valve housing, thereby removably securing the upper section to the lower section.

16. The aseptic closure system of either claim 14 or 15, wherein the lower rotary valve is connected to the upper valve housing.

17. The aseptic closure system of any of claims 14-16, wherein the upper valve housing includes first and second stops for interacting with the tabs, the first stop is located so as to limit the rotation of the tab on the upper valve shaft such that when the tab contacts the first stop the upper rotary valve is in its closed state, and the second stop is located so that when the tab on the lower valve shaft contacts the lower stop when the lower rotary valve is in its open state.

18. The aseptic closure system of claim 17, wherein the first and second stops and the tabs are arranged such that the lower rotary valve cannot be rotated to its closed state until the upper rotary valve is first rotated to its closed state.

19. The aseptic closure system of any of claims 14-18, wherein the inlet port, outlet port and the upper valve housing are formed as an integral component.

20. The aseptic closure system of any of claims 14-19, wherein the lower section further includes a skirt and wherein the attachment mechanism is threads formed on an internal surface of the skirt that are configured to removably engage with mating threads on the container.