section and the pump engagement section comprises a first port connected to the inlet section of the tubing, a second port connected to the pump engagement section of the tubing, and a valve disposed between the first and second ports. The valve includes a rotatable stem to selectively communicate the first port with the second port. The stem includes a flow passage extending through the stem from an inlet end of the flow passage to an outlet end of the flow passage whereby the inlet end of the flow passage communicates with the first port and the outlet end of the flow passage communicates with the second port to place the inlet section of the tubing in communication with the pump engagement section of the tubing. The flow passage increases in cross-sectional area from the inlet end toward the outlet end, wherein the cross-sectional area of the flow passage changes at different rates through the flow passage from the inlet end to the outlet end, wherein the flow passage includes a first section and a second section, the first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end, the second section extending from the first section toward the outlet end, the second section widening at a rate different from the first section as the second section extends from the first section toward the outlet end.

[0005] In another aspect a fitting assembly for use in a cassette configured for attachment to a pumping apparatus generally comprises a first port, a second port, and a valve disposed between the first and second ports. The valve includes a stem rotatably mounted to selectively communicate the first port with the second port. The stem includes a flow passage extending through the stem from an inlet end of the flow passage to an outlet end of the flow passage whereby the inlet end of the flow passage communicates with the first port and the outlet end of the flow passage communicates with the second port to place the inlet section of the tubing in communication with the pump engagement section of the tubing, the flow passage increasing in cross-sectional area from the inlet end toward the outlet end, wherein the flow passage includes a first section and a second section, the first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end, the second section extending from the first section toward the outlet end, the second section widening at a rate different from the first section as the second section extends from the first section toward the outlet end, and the cassette comprising: a body configured for releasable attachment to the pumping apparatus to mount the cassette to the pumping apparatus; and a fitting releasably mountable to the body, the fitting including a valve mechanism comprising the first port, the second port, and the valve disposed between the first and second ports, the valve including the stem rotatably mounted to selectively communicate the first port

with the second port, the stem including a flange to secure the fitting to the pumping apparatus when the stem is rotated to communicate the first port with the second port~~the cross-sectional area of the flow passage changes at different rates through the flow passage from the inlet end to the outlet end~~.

[0005a] In yet another aspect a pump set for use with a pumping apparatus generally comprises tubing for carrying a liquid, the tubing comprising an inlet section for connection to a liquid source and a pump engagement section configured for engagement by the pumping apparatus to pump the liquid through the tubing; a valve mechanism attached to the tubing between the inlet section and the pump engagement section, the valve mechanism comprising a first port connected to the inlet section of the tubing, a second port connected to the pump engagement section of the tubing, and a valve disposed between the first and second ports, the valve including a rotatable stem to selectively communicate the first port with the second port, the stem including a flow passage extending through the stem from an inlet end of the flow passage to an outlet end of the flow passage whereby the inlet end of the flow passage communicates with the first port and the outlet end of the flow passage communicates with the second port to place the inlet section of the tubing in communication with the pump engagement section of the tubing, the flow passage increasing in cross-sectional area from the inlet end toward the outlet end, wherein the cross-sectional area of the flow passage changes at different rates through the flow passage from the inlet end to the outlet end; wherein the flow passage includes a first section and a second section, the first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end, the second section extending from the first section toward the outlet end, the second section widening at a rate different from the first section as the second section extends from the first section toward the outlet end; and a cassette for use with the pumping apparatus, the cassette comprising: a body configured for releasable attachment to the pumping apparatus to mount the cassette to the pumping apparatus; and a fitting releasably mountable to the body, the fitting including the valve mechanism comprising the first port, the second port, and the valve disposed between the first and second ports, the valve including the stem rotatably mounted to selectively communicate the first port with the second port, the stem including a flange to secure the fitting to the pumping apparatus when the stem is rotated to communicate the first port with the second port.

[0006] In embodiments, a cassette for use with a pumping apparatus generally comprises a body configured for releasable attachment to the pumping apparatus to mount the

cassette to the pumping apparatus, and a fitting releasably mountable to the body. The fitting including a valve mechanism comprising a first port, a second port, and a valve disposed between the first and second ports. The valve includes a stem rotatably mounted to selectively communicate the first port with the second port. The stem including a flange configured for engagement with a catch on the pumping apparatus to secure the fitting to the pumping apparatus when the stem is rotated to communicate the first port with the second port.

[0007] In embodiments, a cassette for use with a pumping apparatus generally comprises a body configured for releasable attachment to the pumping apparatus to mount the cassette to the pumping apparatus. The body comprises a front, a back, a top, a bottom, and a curved guide wall extending downward from the top of body. A fitting is mounted on the body. The fitting has an inlet port for attaching inlet tubing to the cassette and an outlet port for attaching outlet tubing to the cassette. The outlet port is recessed from the top of the body. The curved

What is claimed:

1. A pump set for use with a pumping apparatus, the pump set comprising:

tubing for carrying a liquid, the tubing comprising an inlet section for connection to a liquid source and a pump engagement section configured for engagement by the pumping apparatus to pump the liquid through the tubing; and

a valve mechanism attached to the tubing between the inlet section and the pump engagement section, the valve mechanism comprising a first port connected to the inlet section of the tubing, a second port connected to the pump engagement section of the tubing, and a valve disposed between the first and second ports, the valve including a rotatable stem to selectively communicate the first port with the second port, the stem including a flow passage extending through the stem from an inlet end of the flow passage to an outlet end of the flow passage whereby the inlet end of the flow passage communicates with the first port and the outlet end of the flow passage communicates with the second port to place the inlet section of the tubing in communication with the pump engagement section of the tubing, the flow passage increasing in cross-sectional area from the inlet end toward the outlet end, wherein the cross-sectional area of the flow passage changes at different rates through the flow passage from the inlet end to the outlet end,

wherein the flow passage includes a first section and a second section, the first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end, the second section extending from the first section toward the outlet end, the second section widening at a rate different from the first section as the second section extends from the first section toward the outlet end.

2. A pump set as set forth in claim 1, wherein a maximum rate of increase in the cross-sectional area of the flow passage occurs generally intermediate the inlet end and outlet end of the flow passage.

~~3. A pump set as set forth in claim 1, wherein the flow passage includes a first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end.~~

~~4. A pump set as set forth in claim 3, wherein the flow passage includes a second section extending from the first section toward the outlet end, the second section widening at a rate~~

~~different from the first section as the second section extends from the first section toward the outlet end.~~

~~5~~3. A pump set as set forth in claim ~~4~~1, wherein the flow passage includes a third section extending from the second section toward the outlet end, the third section widening at a rate different from the second section as the third section extends from the second section toward the outlet end.

~~6~~4. A pump set as set forth in claim ~~5~~3, wherein the flow passage includes a fourth section extending from the third section to the outlet end, the fourth section widening at a rate different from the third section as the fourth section extends from the third section to the outlet end.

~~7~~5. A pump set as set forth in claim 1 , wherein the tubing comprises a first ~~inlet element~~tubing for connection to a first liquid source and a second ~~inlet element~~tubing for connection to a second liquid source, the first port being connected to the first ~~inlet element of the~~ tubing, the valve mechanism comprising a third port connected to ~~the second inlet element of the~~a third tubing, the stem being rotatably mounted to selectively communicate ~~the outlet end of the flow passage with~~ the first and third ports, the outlet end of the flow passage remaining in communication with the second port when the inlet end is rotated between the first and third ports.

~~8~~6. A pump set as set forth in claim 7, wherein longitudinal axes of the first port, second port, third port and flow passage are generally coplanar.

~~9~~7. A pump set as set forth in claim 1, further comprising a cassette configured for releasable attachment to the pumping apparatus, the tubing and the valve mechanism being releasably mounted to the cassette.

~~10~~8. A pump set as set forth in claim 1, wherein the first port has a non-uniformly circular shaped opening for communicating liquid to the flow passage in the valve stem.

9. A pump set as set forth in claim 1, wherein the valve includes a stem holder for mounting the stem, the stem holder defining stops positioned to be engaged by the flange to limit rotation of the stem in the stem holder.

10. A pump set as set forth in claim 9, wherein the stem holder has a recessed portion configured to receive a catch when the body is attached to the pumping apparatus.

11. A pump set as set forth in claim 9, wherein the flange projects radially outward from the stem.

12. A pump set as set forth in claim 11, wherein the flange has a generally fan shape that extends radially around the stem.

~~11~~13. A fitting assembly for use in a cassette configured for attachment to a pumping apparatus, the fitting assembly comprising:

a first port,

a second port, and

a valve disposed between the first and second ports, the valve including a stem rotatably mounted to selectively communicate the first port with the second port, the stem including a flow passage extending through the stem from an inlet end of the flow passage to an outlet end of the flow passage whereby the inlet end of the flow passage communicates with the first port and the outlet end of the flow passage communicates with the second port to place the inlet section of the tubing in communication with the pump engagement section of the tubing, the flow passage increasing in cross-sectional area from the inlet end toward the outlet end, wherein the flow passage includes a first section and a second section, the first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end, the second section extending from the first section toward the outlet end, the second section widening at a rate different from the first section as the second section extends from the first section toward the outlet end, and

the cassette comprising:

a body configured for releasable attachment to the pumping apparatus to mount the cassette to the pumping apparatus; and

a fitting releasably mountable to the body, the fitting including a valve mechanism comprising the first port, the second port, and the valve disposed between the first and second ports, the valve including the stem rotatably mounted to selectively communicate the first port with the second port, the stem including a flange to secure the fitting to the pumping apparatus when the stem is rotated to communicate the first port with the second port~~the cross-sectional area of the flow passage changes at different rates through the flow passage from the inlet end to the outlet end~~.

14. A fitting assembly as set forth in claim 13, wherein the tubing and the valve mechanism being releasably mounted to the cassette.

~~12~~15. A fitting assembly as set forth in claim ~~11~~13, wherein a maximum rate of increase in the cross-sectional area of the flow passage occurs generally intermediate the inlet end and outlet end of the passage.

~~13~~16. A fitting assembly as set forth in claim ~~12~~13, wherein the first port has a non-uniformly circular- shaped opening for communicating liquid to the flow passage in the valve stem.

17. A fitting assembly as set forth in claim 13, wherein the flow passage includes a third section extending from the second section toward the outlet end the third section widening at a rate different from the second section as the third section extends from the second section toward the outlet end.

18. A fitting assembly as set forth in claim 17, wherein the flow passage includes a fourth section extending from the third section to the outlet end, the fourth section widening at a rate different from the third section as the fourth section extends from the third section to the outlet end.

19. A fitting assembly as set forth in claim 13, wherein the valve includes a stem holder for mounting the stem, the stem holder defining stops positioned to be engaged by the flange to limit rotation of the stem in the stem holder.

20. A fitting assembly as set forth in claim 19, wherein the stem holder has a recessed portion configured to receive a catch when the body is attached to the pumping apparatus.

21. A fitting assembly as set forth in claim 13, wherein the flange projects radially outward from the stem.

22. A fitting assembly as set forth in claim 21, wherein the flange has a generally fan shape that extends radially around the stem.

23. A pump set for use with a pumping apparatus, comprising:

tubing for carrying a liquid, the tubing comprising an inlet section for connection to a liquid source and a pump engagement section configured for engagement by the pumping apparatus to pump the liquid through the tubing;

a valve mechanism attached to the tubing between the inlet section and the pump engagement section, the valve mechanism comprising a first port connected to the inlet section of the tubing, a second port connected to the pump engagement section of the tubing, and a valve disposed between the first and second ports, the valve including a rotatable stem to selectively communicate the first port with the second port, the stem including a flow passage extending through the stem from an inlet end of the flow passage to an outlet end of the flow passage whereby the inlet end of the flow passage communicates with the first port and the outlet end of the flow passage communicates with the second port to place the inlet section of the tubing in communication with the pump engagement section of the tubing, the flow passage increasing in cross-sectional area from the inlet end toward the outlet end, wherein the cross-sectional area of the flow passage changes at different rates through the flow passage from the inlet end to the outlet end;

wherein the flow passage includes a first section and a second section, the first section extending from the inlet end toward the outlet end, the first section widening as the first section extends from the inlet end, the second section extending from the first section toward the outlet end, the second section widening at a rate different from the first section as the second section extends from the first section toward the outlet end; and

a cassette for use with the pumping apparatus, the cassette comprising:

a body configured for releasable attachment to the pumping apparatus to mount the cassette to the pumping apparatus; and

a fitting releasably mountable to the body, the fitting including the valve mechanism comprising the first port, the second port, and the valve disposed between the first and second ports, the valve including the stem rotatably mounted to selectively communicate the first port with the second port, the stem including a flange to secure the fitting to the pumping apparatus when the stem is rotated to communicate the first port with the second port.

24. A pump set as set forth in claim 23, wherein the valve includes a stem holder for mounting the stem, the stem holder defining stops positioned to be engaged by the flange to limit rotation of the stem in the stem holder.

25. A pump set as set forth in claim 24, wherein the stem holder has a recessed portion configured to receive a catch when the body is attached to the pumping apparatus.

26. A pump set as set forth in claim 23, wherein the flange projects radially outward from the stem.

27. A pump set as set forth in claim 26, wherein the flange has a generally fan shape that extends radially around the stem.

28. A pump set as set forth in claim 23, wherein a maximum rate of increase in the cross-sectional area of the flow passage occurs generally intermediate the inlet end and outlet end of the flow passage.

29. A pump set as set forth in claim 23, wherein the flow passage includes a third section extending from the second section toward the outlet end, the third section widening at a rate different from the second section as the third section extends from the second section toward the outlet end.

30. A pump set as set forth in claim 29, wherein the flow passage includes a fourth section extending from the third section to the outlet end, the fourth section widening at a rate different from the third section as the fourth section extends from the third section to the outlet end.

31. A pump set as set forth in claim 23, wherein the tubing and the valve mechanism being releasably mounted to the cassette.

32. A pump set as set forth in claim 23, wherein the first port has a non-uniformly circular-shaped opening for communicating liquid to the flow passage in the valve stem.

~~14. A pump set as set forth in claim 1, further comprising a cassette for use with a pumping apparatus, the cassette comprising:~~

~~a body configured for releasable attachment to the pumping apparatus to mount the cassette to the pumping apparatus; and~~

~~a fitting releasably mountable to the body, the fitting including the valve mechanism comprising the first port, the second port, and the valve disposed between the first and second ports, the valve including the stem rotatably mounted to selectively communicate the first port with the second port, the stem including a flange to secure the fitting to the pumping apparatus when the stem is rotated to communicate the first port with the second port.~~

~~15. A pump set as set forth in claim 14, wherein the valve includes a stem holder for mounting the stem, the stem holder defining stops positioned to be engaged by the flange to limit rotation of the stem in the stem holder.~~

~~16. A pump set as set forth in claim 15, wherein the stem holder has a recessed portion configured to receive a catch when the body is attached to the pumping apparatus.~~

~~17. A pump set as set forth in claim 16, wherein the flange projects radially outward from the stem.~~

~~18. A pump set as set forth in claim 17, wherein the flange has a generally fan shape that extends radially around the stem.~~