distillation assemblies being downstream from the first mentioned two microchannel distillation assemblies.

[0033] **FIG. 10** is a schematic illustration of an alternate embodiment of a microchannel distillation assembly that can be used in accordance with the invention.

[0034] **FIG. 11** is a schematic illustration of an alternate embodiment of a distillation process using six microchannel distillation assemblies in accordance with the invention, two of the microchannel distillation assemblies being downstream from a first microchannel distillation assembly, and three of the microchannel distillation assemblies being downstream from the first mentioned two microchannel distillation assemblies.

[0035] **FIG. 12** is a schematic illustration of a microchannel distillation unit that can be used in accordance with the inventive process, the microchannel distillation unit comprising a process microchannel and an adjacent heat exchange channel, the process microchannel containing a plurality of microchannel distillation sections or stages.

[0036] **FIG. 13** is a diagram illustrating the McCabe-Thiele graphical method for calculating the number of distillation sections or stages for a distillation unit.

[0037] **FIG. 14** is a schematic illustration of an alternate embodiment of a microchannel distillation unit that can be used in accordance with the inventive process.

[0038] **FIG. 15** is a schematic illustration of an alternate embodiment of a microchannel distillation unit that can be used in accordance with the inventive process.

[0039] **FIG. 16** is a schematic illustration of an alternate embodiment of a microchannel distillation unit that can be used in accordance with the inventive process.

[0040] **FIG. 17** is a schematic illustration of an alternate embodiment of a microchannel distillation unit that can be used in accordance with the inventive process.

[0041] **FIG. 18** is a schematic illustration of an alternate embodiment of a microchannel distillation unit that can be used in accordance with the inventive process.

[0042] **FIG. 19** is a schematic illustration of an alternate embodiment of a microchannel distillation unit that can be used in accordance with the inventive process.

[0043] **FIG. 20** is a schematic illustration of a microchannel distillation section or stage that can be used in accordance with the inventive process, the microchannel distillation section being in the form of bubble cap unit.

[0044] **FIG. 21** is a schematic illustration of two microchannel distillation sections or stages that can be used in accordance with the inventive process, the microchannel distillation sections being divided by microchannel distillation trays, each of the trays comprising a capture structure for collecting liquid and an opening for permitting the flow of a vapor phase through the tray.

[0045] **FIG. 22** is a schematic illustration showing a method for introducing gaseous feed into a microchannel distillation unit that can be used in accordance with the invention.

[0046] **FIGS. 23 and 24** are schematic illustrations showing methods for introducing a two-phase feed stream comprising a gas and a liquid into a microchannel distillation unit that can be used in accordance with the invention.

[0047] **FIG. 25** is a schematic illustration of a flow distribution network that can be used in accordance with the invention.

[0048] **FIG. 26** is a schematic illustration showing a method for introducing a liquid feed stream into a microchannel distillation unit that can be used in accordance with the invention.

[0049] **FIG. 27** is a photograph of a wicking region that can be used in accordance with the inventive process, the wicking region comprising a wire mesh that is resistance welded to the surface of a process microchannel wall.

[0050] **FIG. 28** is a photograph of a wicking region that can be used in accordance with the inventive process, the wicking region comprising a plurality of thin, laser etched channels that can be formed in shims used in making the process microchannels for the inventive process.

[0051] **FIG. 29** is a schematic illustration of a microchannel distillation unit which can be used in accordance with the inventive process, the microchannel distillation unit comprising a process microchannel and an adjacent heat exchange channel, the heat exchange channel comprising separate heat exchange zones wherein separate heating or cooling loops are used to heat or cool the separate heat exchange zones.

[0052] **FIG. 30** is a schematic illustration of a microchannel distillation unit which can be used in accordance with the inventive process, the microchannel distillation unit comprising a process microchannel and an adjacent heat exchange channel, the heat exchange channel comprising separate heat exchange zones wherein separate heating or cooling loops are used to heat or cool the separate heat exchange zones, the outlets of some of the heating or cooling loops being used as feed for other heating or cooling loops.

[0053] **FIG. 31** is a schematic illustration of a microchannel distillation unit which can be used in accordance with the inventive process, the microchannel distillation unit comprising a process microchannel and an adjacent heat exchange channel, the heat exchange channel comprising separate heat exchange zones wherein separate heating or cooling loops are used to heat or cool the separate heat exchange zones, some of the heating or cooling loops being nested with other heating or cooling loops.

[0054] **FIG. 32** is a schematic illustration of a microchannel condenser that can be used with the inventive process.

[0055] **FIG. 33** is a schematic illustration of the microchannel condenser illustrated in **FIG. 32** taken along line I-I in **FIG. 32**.

[0056] **FIG. 34** is a schematic illustration of the microchannel condenser illustrated in **FIG. 32** taken along line II-II in **FIG. 32**.

[0057] **FIG. 35** is a schematic illustration of a microchannel reboiler that can be used with the inventive process.

[0058] **FIG. 36** is a schematic illustration of the microchannel reboiler illustrated in **FIG. 35** taken along line I-I in **FIG. 35**.