condenser **260**, as indicated by arrows **262**. The distillate product D may accumulate in the distillate product receiving cavity **280** (**FIG. 2**), and be withdrawn from the microchannel distillation assembly **200**, as indicated by arrow **264**. Alternatively, as indicated in **FIG. 3**, the distillate product D may be withdrawn from the microchannel condenser **260** and microchannel distillation assembly **200** A, as indicated by arrow **262***a*. Part of the distillate product D may be returned to the microchannel distillation column or apparatus **210** where it flows through the microchannel distillation column or apparatus **210** in the form of a liquid phase. Vapor exhaust may be withdrawn from the microchannel condenser **260**, as indicated by arrow **263**, and combined with the feed F, subjected to further processing, or discarded. The liquid phase, in the form of bottoms product B, may flow into the bottoms product receiving cavity **285**, as indicated by arrows **272**, and be withdrawn from the microchannel distillation assembly **200**, as indicated by arrow **288**. Part of the bottoms product may be vaporized in the microchannel reboiler **270** and returned to the microchannel distillation column or apparatus **210** where it flows through the microchannel distillation column or apparatus **210** in the form of a vapor phase. The ratio between the amount of distillate product D that is removed from the system and the amount that is returned to the system may be referred to as the reflux ratio. The ratio between the amount of bottoms product B that is removed from the system and the amount that is returned to the system may be referred to as the boil-up ratio. These ratios can vary and can be determined by those skilled in the art. Heat exchange fluid enters the microchannel distillation column or apparatus **210**, as indicated by arrows **252** and **256**, flows in the heat exchange channel **214**, and exits the microchannel distillation column or apparatus **210**, as indicated by arrows **254** and **258**.

[**0096**] The distillation process illustrated in **FIG. 7** uses two microchannel distillation assemblies, namely microchannel distillation assemblies **100** and **100**A. The microchannel distillation process illustrated in **FIG. 7** is similar to the microchannel distillation assembly **100** illustrated in **FIG. 1** with the exception that the process illustrated in **FIG. 7** is suitable for effecting separation between three components, namely, components X, Y and Z, from a feed F comprising components X, Y and Z. Components Y and Z are more volatile than component X, and component Z is more volatile than component Y. Microchannel distillation assemblies **100** and **100**A illustrated in **FIG. 7** have the same construction and function in the same manner as microchannel distillation assembly **100** in **FIG. 1**. The feed F containing components X, Y and Z flows into microchannel distillation column or apparatus **110**, as indicated by line **112**. A mixture enriched with component X is separated as first bottoms product B^1. Part of the first bottoms product B^1 can be recirculated back through microchannel distillation column or apparatus **110** in the same manner as discussed above for microchannel distillation column or apparatus **110** in **FIG. 1**. The remainder of the first bottoms product B^1 is withdrawn from the system, as indicated by arrow **132**. A mixture enriched with components Y and Z is separated as a first distillate product D^1. Part of the first distillate product D^1 can be recirculated back through microchannel distillation column or apparatus **110** in the same manner as discussed above for microchannel distillation unit **110** in **FIG. 1**. The remainder of the first distillate product D^1 flows to microchannel distillation column or apparatus **110***a*, as indicated by line **122**, wherein a second distillate product D^2 enriched with component Z is withdrawn from the microchannel distillation column or apparatus **110***a*, as indicated by line **122***a*. A second bottoms product B^2 containing an enriched concentration of component Y is withdrawn from microchannel distillation column or apparatus **110***a*, as indicated by line **132***a*. The second distillate product D^2 and second bottoms product B^2 can be partially recirculated back through the microchannel distillation column or apparatus **110***a* in the same manner as discussed above for microchannel distillation column or apparatus **110** in **FIG. 1**. An advantage of this process is that the microchannel distillation columns or apparatuses **110** and **110***a* can be combined in a single construction wherein heat exchange economies can be achieved. For example, a relatively cold part of one microchannel distillation unit may cool a relatively hot part of another microchannel distillation unit.

[**0097**] The distillation process, using microchannel distillation assemblies **200** and **200**A, illustrated in **FIG. 8**, is similar to the distillation process illustrated in **FIG. 2** with the exception that the distillation process illustrated in **FIG. 8** is suitable for effecting separation between three components, namely, components X, Y and Z, from a feed composition F comprising components X, Y and Z. Components Y and Z may be more volatile than component X, and component Z may be more volatile than component Y. Microchannel distillation assemblies **200** and **200**A illustrated in **FIG. 8** function in the same manner as the microchannel distillation assembly **200** illustrated in **FIG. 2**. The features of microchannel distillation assembly **200**A that are the same as those for the microchannel distillation assembly **200** are identified with the same numeral except that the numeral is followed by the letter A. The feed F containing components X, Y and Z flows into microchannel distillation assembly **200** through inlet **291** and then into microchannel distillation column or apparatus **210** through feed port **230**, as indicated by arrow **232**. A fluid mixture enriched with component X is separated as the first bottoms product B^1. Part of the first bottoms product B^1 can be recirculated back through microchannel distillation column or apparatus **210** in the same manner as discussed above for microchannel distillation column or apparatus **210** illustrated in **FIG. 2**. The remainder of the first bottoms product B^1 may be withdrawn from the system, as indicated by arrow **288**. A fluid mixture enriched with components Y and Z may be separated as the first distillate product D^1. Part of the first distillate product D^1 can be recirculated back through microchannel distillation column or apparatus **210** in the same manner as discussed above for microchannel distillation column or apparatus **210** illustrated in **FIG. 2**. The remainder of the first distillate product D^1 flows to microchannel distillation assembly **200**A, as indicated by line **264**, wherein a second distillate product D^2 is enriched with component Z. D^2 may be withdrawn from the microchannel distillation column or apparatus **210**A, as indicated by arrow **264** A. A second bottoms product B^2 containing an enriched concentration of component Y may be withdrawn from microchannel distillation column or apparatus **210**A, as indicated by arrow **288** A. The second distillate product D^2 and second bottoms product B^2 can be partially recirculated back through the microchannel distillation column or apparatus **210**A in the same manner as discussed above for microchannel distillation column or apparatus **210** illustrated in **FIG. 2**.