CLAIMS

1. A process for effecting separation of an operative material from a gaseous feed material, comprising:

over a first time interval, within a first apparatus, separating a first fraction of the operative material in response to permeation of the first fraction of the operative material through a first membrane that includes a polymeric phase and a liquid phase, with effect that residual materials, including unseparated operative material is discharged and, within a second apparatus, from the residual materials, separating a second fraction of the operative material in response to permeation of the second fraction of the operative material through a second membrane that includes a polymeric phase and a liquid phase; and

after the first time interval, disposing a liquid material relative to the first membrane of the first apparatus, such that a first fraction of the liquid material replenishes the liquid phase of the first membrane of the first apparatus, and residual liquid material is collected by a redistributor and redistributed such that the residual liquid material becomes disposed relative the second membrane of the second apparatus, such that a second fraction of the liquid material replenishes the liquid phase of the second membrane of the second apparatus.

2. The process as claimed in claim 1;

wherein, during the first time interval:

a fraction of the liquid material, of the liquid phase of the first membrane, becomes depleted; and

a fraction of the liquid material, of the liquid phase of the second membrane, becomes depleted.

3. The process as claimed in claim 1;

wherein each one of the first and second membranes, independently, includes a

polysaccharide.

4. The process as claimed in claim 1;

wherein each one of the first and second membranes, independently, includes chitosan.

5. The process as claimed in claim 1;

wherein for each one of the first and second membranes, independently, the liquid material includes water.

6. The process as claimed in claim 1;

wherein:

within the first apparatus, the permeation of the first fraction of the operative material through the first membrane is effected while at least one slower-permeating compound, of the gaseous feed material, is permeating through the first membrane; and

within the second apparatus, the permeation of the second fraction of the operative material through the second membrane is effected while at least one slower-permeating compound, of the gaseous material, is permeating through the second membrane.

7. The process as claimed in claim 1;

wherein:

within the first apparatus, the permeation of the first fraction of the operative material through the first membrane is effected while at least one slower-permeating compound, of the gaseous feed material, is permeating through the first membrane, with effect that the gaseous feed material is fractionated;

within the second apparatus, the permeation of the second fraction of the operative material through the second membrane is effected while at least one slower-permeating compound, of the gaseous material, is permeating through the second membrane, with effect that the residual material is fractionated.

8. The process as claimed in claim 6;

wherein:

for the permeation though the first membrane within the first apparatus:

the first fraction includes at least one operative compound;

for each one of the at least one operative compound of the first fraction, there is provided an operative compound-associated operative ratio defined by the ratio of the molar rate of permeation of the operative compound to the mole fraction of the operative compound within the feed material receiving space, such that a plurality of operative compound-associated operative ratios are defined, and at least one of the plurality of operative compound-associated operative ratios is a minimum operative compound-associated operative ratio; and

for each one of the at least one permeating slower permeating compound, the ratio of the molar rate of permeation of the slower permeating compound to the mole fraction of the slower permeating compound within the feed material receiving space is less than the minimum operative compound-associated operative ratio, such that, for each one of the at least one operative compound, the molar concentration of the operative compound within a gaseous permeate, that is permeated from the gaseous feed receiving space, through the first membrane, and into the permeate receiving space, is greater than the molar concentration of the operative compound within the gaseous feed material; and

for the permeation though the second membrane within the second apparatus:

the second fraction includes the at least one operative compound;

for each one of the at least one operative compound of the second fraction, there is provided an operative compound-associated operative ratio defined by the ratio of the molar rate of permeation of the operative compound to the mole fraction of the operative compound within the feed material receiving space, such that a plurality of operative compound-associated operative ratios are defined, and at least one of the plurality of operative compound-associated operative ratios is a minimum operative compound-associated operative ratio; and

for each one of the at least one permeating slower permeating compound, the ratio of the molar rate of permeation of the slower permeating compound to the mole fraction of the slower permeating compound within the feed material receiving space is less than the minimum operative compound-associated operative ratio, such that, for each one of the at least one operative compound, the molar concentration of the operative compound within a

gaseous permeate, that is permeated from the gaseous feed receiving space, through the second membrane, and into the permeate receiving space, is greater than the molar concentration of the operative compound within the gaseous feed material.

9. The process as claimed in claim 8;

wherein:

each one of the at least one operative compound, independently, is an olefin; and

each one of the at least one slower permeating compound, independently, is a paraffin.

10. The process as claimed in claim 1;

wherein:

the redistributor includes a collector for collecting the discharged residual materials from the first apparatus, and also includes a plurality of outlet ports for effecting supplying of the discharged residual materials, that is collected by the collector, to the second apparatus.

11. The process as claimed in claim 10;
wherein:

while the residual liquid material is being collected by and redistributed by the redistributor, the liquid level of the liquid that is being collected by the collector is at least 0.5 inches.

12. A process for effecting fractionation of gaseous feed material via a membrane that includes a polymeric phase and a liquid phase, comprising:

over a first time interval, within a first apparatus, fractionating the gaseous feed material via a first membrane that includes a polymeric phase and a liquid phase, with effect that retentate is discharged and, within a second apparatus, receiving the

discharged retentate and fractionating the retentate via a second membrane that includes a polymeric phase and a liquid phase; and

after the first time interval, and over a second time interval, disposing a liquid material relative to the membrane of the first apparatus, such that a first fraction of the liquid material replenishes the liquid phase of the first membrane of the first apparatus, and residual liquid materials are collected by a redistributor and redistributed such that the residual liquid materials becomes disposed relative the second membrane of the second apparatus, such that a second fraction of the liquid material replenishes the liquid phase of the second membrane of the second apparatus.

13. The process as claimed in claim 12;

wherein, during the first time interval:

a fraction of the liquid material, of the liquid phase of the first membrane, becomes depleted; and

a fraction of the liquid material, of the liquid phase of the second membrane, becomes depleted.

14. The process as claimed in claim 12;

wherein each one of the first and second membranes, independently, includes a polysaccharide.

15. The process as claimed in claim 12;

wherein each one of the first and second membranes, independently, includes chitosan.

16. The process as claimed in claim 12;

wherein for each one of the first and second membranes, independently, the liquid material includes water.

17. The process as claimed in claim 12;

wherein, during the second time interval:

within the first apparatus, the fractionating is effected while the replenishing is effected; and

within the second apparatus, the fractionating is effected while the replenishing is effected.

18. The process as claimed in claim 12;

wherein:

the gaseous feed material includes olefinic material, that is defined by at least one olefin, and paraffinic material, that is defined by at least one paraffin; the fractionating within the first apparatus is with effect that the retentate is enriched in the paraffinic material relative to the gaseous feed material; and the fractionating within the second apparatus is with effect that a second retentate and a second permeate are obtained, with effect that the second retentate is enriched in the paraffinic material relative to the retentate received by the first apparatus.

19. The process as claimed in claim 12;

wherein:

the redistributor includes a collector for collecting the discharged residual materials from the first apparatus, and also includes a plurality of outlet ports for effecting supplying of the discharged residual materials, that is collected by the collector, to the second apparatus.

20. The process as claimed in claim 19;

wherein:

while the residual liquid materials are being collected by and redistributed by the redistributor, the liquid level of the liquid that is being collected by the collector is at least 0.5 inches.