CLAIMS

1. A permeable material compacting method comprising:

feeding permeable material between at least one set of rollers; and

decreasing a cross sectional area of the permeable material as it passes between the at least one set of rollers.

2. The permeable material compacting method of claim 1, further comprising heating the permeable material prior to the feeding thereof.

3. The permeable material compacting method of claim 1, further comprising cooling the permeable material subsequent to the decreasing the cross sectional area thereof.

4. The permeable material compacting method of claim 1, wherein the decreasing a cross sectional area of the permeable material by one set of the at least one set of rollers is primarily in a direction that is different than the decreasing a cross sectional area of the permeable material by another set of rollers of the at least one set of rollers.

5. The permeable material compacting method of claim 1, wherein the decreasing a cross sectional area of the permeable material by one set of the at least one set of rollers is primarily in a direction orthogonal to the decreasing of a cross sectional area of the permeable material by another set of rollers of the at least one set of rollers

6. The permeable material compacting method of claim 1, further comprising preventing expansion of the permeable material between at least two sets of rollers.

7. The permeable material compacting method of claim 1, further comprising positioning the permeable material radially of a mandrel.

8. The permeable material compacting method of claim 1, further comprising freezing the permeable material at a volume smaller than a volume of the permeable material prior to the decreasing the cross sectional area.

9. The permeable material compacting method of claim 1, wherein the decreasing the cross sectional area includes compacting.

10. The permeable material compacting method of claim 1, wherein the decreasing the cross sectional area is performed in steps with at least two sets of the at least one set of rollers being set to perform two of the steps.

11. The permeable material compacting method of claim 1, further comprising rotating at least one roller of the at least one set of rollers to assist in drawing the permeable material between the at least one set of rollers.

12. The permeable material compacting method of claim 1, wherein the decreasing the cross sectional area includes maintaining a substantially circular cross sectional shape of the permeable material.

13. A permeable material compacting apparatus comprising at least one set of rollers having rollers configured and oriented relative to one another to compact permeable material moved through the at least one set of rollers to thereby reduce a cross sectional area of the permeable material subsequent passing through the at least one set of rollers in comparison to a cross sectional area of the permeable material prior to passing through the at least one set of rollers.

14. The permeable material compacting apparatus of claim 13 wherein the at least one set of rollers is two sets of rollers and rotational axes of the rollers of one set of rollers are non-parallel to the rotational axes of the rollers of the other set of rollers.

15. The permeable material compacting apparatus of claim 13 wherein axes of the rollers of the at least one set of rollers are oriented substantially orthogonal to an axis of the permeable material compacted by the at least one set of rollers.

16. The permeable material compacting apparatus of claim 13 wherein at least one of the rollers is rotationally driven to aid in drawing permeable material through the at least one set of rollers.

17. The permeable material compacting apparatus of claim 13 further comprising at least one shaping form positioned between longitudinally adjacent sets of the at least one set of rollers configured to prevent expansion of the permeable material while the permeable material passes thereby.

18. The permeable material compacting apparatus of claim 13 further comprising a heating device configured to increase temperature of permeable material prior to passing by the at least one set of rollers.

19. The permeable material compacting apparatus of claim 13 further comprising a cooling device configured to decrease temperature of the permeable material after passing by the at least one set of rollers.

20. The permeable material compacting apparatus of claim 13 wherein the at least one set of rollers includes a plurality of rollers each having a rotational axis that is skewed relative to axis of each of the other rollers of the at least one set of rollers.

21. The permeable material compacting apparatus of claim 20 wherein each of the rotational axis of the rollers is skewed relative to a longitudinal axis that defines movement of permeable material through the permeable material compacting apparatus.

22. The permeable material compacting apparatus of claim 13 further comprising a heating device configured to increase temperature of permeable material as it passes the at least one set of rollers.

23. The permeable material compacting method of claim 1, further comprising heating the permeable material as it passes the at least one set of rollers.

What is claimed is:

1. A permeable material compacting method comprising:

feeding permeable material between at least one set of rollers;

rotating at least one roller of the at least one set of rollers about an axis that is skewed relative to an axis that defines a center of travel of the permeable material;

decreasing a cross sectional area of the permeable material as it passes between the at least one set of rollers; and

freezing the permeable material at a volume smaller than a volume of the permeable material prior to the decreasing the cross sectional area.

2. The permeable material compacting method of claim 1, further comprising heating the permeable material prior to the feeding thereof.

3. The permeable material compacting method of claim 1, further comprising cooling the permeable material subsequent to the decreasing the cross sectional area thereof.

4. The permeable material compacting method of claim 1, wherein the decreasing a cross sectional area of the permeable material by one set of the at least one set of rollers is primarily in a direction that is different than the decreasing a cross sectional area of the permeable material by another set of rollers of the at least one set of rollers.

5. The permeable material compacting method of claim 1, wherein the decreasing a cross sectional area of the permeable material by one set of the at least one set of rollers is primarily in a direction orthogonal to the decreasing of a cross sectional area of the permeable material by another set of rollers of the at least one set of rollers.

6. The permeable material compacting method of claim 1, further comprising positioning the permeable material radially of a mandrel.

7. The permeable material compacting method of claim 1, wherein the decreasing the cross sectional area includes compacting.

8. The permeable material compacting method of claim 1, wherein the decreasing the cross sectional area is performed in steps with at least two sets of the at least one set of rollers being set to perform two of the steps.

9. The permeable material compacting method of claim 1, further comprising rotating at least one roller of the at least one set of rollers to assist in drawing the permeable material between the at least one set of rollers.

10. The permeable material compacting method of claim 1, wherein the decreasing the cross sectional area includes maintaining a substantially circular cross sectional shape of the permeable material.

11. The permeable material compacting method of claim 1, further comprising heating the permeable material as it passes the at least one set of rollers.

12. The permeable material compacting method of claim 1, further comprising rotating the at least one roller of the at least one set of rollers about an axis that is skewed relative to at least one other roller of the at least one set of rollers.

13. The permeable material compacting method of claim 1, further comprising rotating at least one roller of the at least one set of rollers about an axis that is orthogonal to the axis that defines a center of travel of the permeable material.

14. The permeable material compacting method of claim 1, further comprising rotating at least one roller of the at least one set of rollers about an axis that is skewed relative to an axis of the permeable material compacted by the at least one set of rollers.

15. The permeable material compacting method of claim 1, further comprising preventing expansion of the permeable material as it travels between at least two sets of rollers of the at least one set of rollers.

16. The permeable material compacting method of claim 1, further comprising radially compressing the permeable material.