CLAIMS:

1. A coating device defining a slot adapted to receive a membrane substrate having protrusions formed on the substrate, the coating device comprising a guide section configured to engage the protrusions, one or more dope outlets and a coating knife.

2. The coating device of claim 1 comprising two dope outlets wherein dope is fed through the dope outlets to both sides of the substrate at an essentially equal pressure.

3. The coating device of claim 1 or 2 wherein the one or more dope outlets are located between the guide section and the coating knife.

4. The coating device of any preceding claim comprising a metering system adapted to supply dope to the one or more dope outlets at a controlled rate.

5. The coating device of any preceding claim further comprising a drive bar adapted to pull a substrate through the coating device at a selected speed.

6. The coating device of any preceding claim having a dope pump separated from the one or more dope outlets by a valve.

7. The coating device of claim 6 wherein the dope pump is a metering pump.

8. The coating device of any preceding claim having a controller adapted to

a) generally simultaneously start a flow of dope and movement of the membrane substrate at a selected rate through the coating knife; and,

b) stop the flow of dope before the membrane substrate leaves the coating device.

9. A process for coating a permeate sheet having protrusions formed on the permeate sheet, the process comprising the steps of,

a) locating the permeate sheet relative to a coating knife, the coating knife having a pattern corresponding to the permeate sheet;

b) providing generally equal amounts of a dope simultaneously to both sides of the permeate sheet; and,

c) drawing the permeate sheet through the coating knife at a controlled speed.

10. The process of claim 9 further comprising a step of metering the flow of dope.

11. The process of claim 9 or 10 wherein the permeate sheet is drawn through the coating knife at a generally constant speed and the flow of dope is at a generally constant rate.

12. The process of claim 11 wherein the permeate sheet is drawn from the coating knife through an air gap to a bath and the length of the air gap is selected to give a desired residence time at the constant speed.

13. A sheet forming device comprising a matched set of a cylindrical roller and a fixed platen.

14. The device of claim 13 comprising holes between the platen and a vacuum chamber.

15. The device of claims 13 or 14 comprising a heating system to heat the roller.

16. The device of any of claims 13 to 15 having a temperature control system able to cool the platen.

17. The device of any of claims 13 to 16 having a guide system adapted to allow the roller to move over the platen while maintaining a selected spacing between the roller and platen.

18. The device of any of claims 13 to 17 having a drive system for moving the roller across the platen.

19. A process for forming a sheet of material comprising steps of,

a) placing the sheet on a grooved platen; and,

b) rolling an embossed roller across the platen.

20. The process of claim 19 further comprising heating the roller.

21. The process of claim 19 or 20 further comprising maintaining a selected spacing between the roller and the platen.

22. The process of any of claims 19 to 21 further comprising a step of cooling the platen.

23. The process of any of claims 19 to 22 further comprising a step of biasing the sheet towards the platen.

24. The process of claim 23 wherein the sheet is biased towards the platen by air pressure.

25. The process of claim 23 or 24 wherein the sheet is biased towards the platen by a vacuum applied through the platen.

CLAIMS:

1. A coating device defining a slot adapted to receive a membrane substrate having protrusions formed on the substrate, the coating device comprising a guide section configured to engage the protrusions, one or more dope outlets and a coating knife.

2. The coating device of claim 1 comprising two dope outlets wherein dope is fed through the dope outlets to both sides of the substrate at an essentially equal pressure.

3. The coating device of claim 1 or 2 wherein the one or more dope outlets are located between the guide section and the coating knife.

4. The coating device of any preceding claim comprising a metering system adapted to supply dope to the one or more dope outlets at a controlled rate.

5. The coating device of any preceding claim further comprising a drive bar adapted to pull a substrate through the coating device at a selected speed.

6. The coating device of any preceding claim having a dope pump separated from the one or more dope outlets by a valve.

7. The coating device of claim 6 wherein the dope pump is a metering pump.

8. The coating device of any preceding claim having a controller adapted to

a) generally simultaneously start a flow of dope and movement of the membrane substrate at a selected rate through the coating knife; and,

b) stop the flow of dope before the membrane substrate leaves the coating device.

9. A process for coating a permeate sheet having protrusions formed on the permeate sheet, the process comprising the steps of,

a) locating the permeate sheet relative to a coating knife, the coating knife having a pattern corresponding to the permeate sheet;

b) providing generally equal amounts of a dope simultaneously to both sides of the permeate sheet; and,

b) providing generally equal amounts of a dope simultaneously to both sides of the permeate sheet; and,

c) drawing the permeate sheet through the coating knife at a controlled speed.

10. The process of claim 9 further comprising a step of metering the flow of dope.

11. The process of claim 9 or 10 wherein the permeate sheet is drawn through the coating knife at a generally constant speed and the flow of dope is at a generally constant rate.

12. The process of claim 11 wherein the permeate sheet is drawn from the coating knife through an air gap to a bath and the length of the air gap is selected to give a desired residence time at the constant speed.