Claims:

~~1. An apparatus for applying a cleaning material, the apparatus comprising:~~

~~a roll of cleaning material attached to a moving cleaner device that places a portion of the cleaning material against a portion of a continuously moving flexible electronics web surface to clean debris from that portion of the moving flexible electronics web surface using the portion of the cleaning material; and~~

~~wherein the continuously moving flexible electronics web surface has a plurality of portions and each portion moves over a cleaning point over time and the cleaning material roll has a plurality of portions and each portion of the cleaning material is adjacent the cleaning point over time and the cleaning material moves at a same speed as the moving flexible electronics web surface so that the continuous moving flexible electronics web surface is cleaned.~~

~~2. The apparatus of claim 1, wherein the moving cleaner device further comprises a source cylinder and a take-up cylinder wherein the cleaning material is rolled off of the source cylinder and rolled onto the take-up cylinder after the cleaning material has cleaned the moving flexible electronics web surface.~~

~~3. The apparatus of claim 2, wherein the source cylinder and the take-up cylinder each have a motor that drives a motion of the cleaning material past the cleaning point.~~

~~4. The apparatus of claim 3, wherein the cleaning material has a width equal to a width of the moving flexible electronics web surface.~~

~~5. The apparatus of claim 2, wherein the source cylinder further comprises a sensor that determines an amount of cleaning material remaining on the source cylinder.~~

~~6. The apparatus of claim 2, wherein the moving cleaner device further comprises a roller that generates a contact patch between the cleaning material and the moving flexible electronics web surface at the cleaning point.~~

~~7. The apparatus of claim 6 further comprising a second roller underneath the continuously moving flexible electronics web surface that presses the portion of the continuously moving flexible electronics web surface at the cleaning point against the portion of the cleaning material.~~

8. The apparatus of claim 6, wherein the moving cleaner device further comprises a bracket connected to the roller, the source cylinder and the take-up cylinder that reverses a direction of the cleaning material wherein the cleaning material rolls off the take-up cylinder and is taken up by the source cylinder so that the cleaning material is reused.

9. The apparatus of claim 8, wherein the bracket rotates 180 degrees to reverse the direction of the cleaning material.

10. The apparatus of claim 9, wherein the moving cleaner device further comprises an integrated control system that controls the operation of the two cylinders, the sensor and the bracket.

11. The apparatus of claim 1, wherein the cleaning material moves in a direction past the cleaning point that is the same as a direction of movement of the continuously moving flexible electronics web surface.

12. The apparatus of claim 1, wherein the cleaning material further comprises a cleaning layer being one of a polyimide layer and a polymer layer.

13. The apparatus of claim 12, wherein the polymer layer has a Durometer Shore of between about 40 and about 100 and surface energy of 15 to 40 dynes/cm2.

14. The apparatus of claim 12, wherein the polymer layer is a silicon containing polymer layer.

15. The apparatus of claim 12, wherein the cleaning layer has a thickness of between 20 and 300 microns.

16. The apparatus of claim 15, wherein the cleaning material further comprises a web layer underneath the cleaning layer.

17. The apparatus of claim 16, wherein the web layer has a thickness of between 20 and 300 microns.

18. A method for cleaning a continuously moving flexible electronics web surface, comprising:

moving, at a same speed as the continuously moving flexible electronics web surface, a cleaning material layer;

contacting, at a cleaning point, a portion of the moving cleaning material with a portion of the continuously moving flexible electronics web surface; and

removing debris from the portion of the continuously moving flexible electronics web surface when the portion of the moving cleaning material contacts the portions of the continuously moving flexible electronics web surface.

19. The method of claim 18, wherein moving the cleaning material further comprises unrolling the cleaning material from a source cylinder and rolling the cleaning material, after the cleaning material has contacted the continuously moving flexible electronics web surface, onto a take-up cylinder.

20. The method of claim 19, wherein moving the cleaning material further comprises driving the source cylinder and the take-up cylinder.

21. The method of claim 19 further comprising determining, by a sensor at the source cylinder, an amount of cleaning material remaining on the source cylinder.

22. The method of claim 19, wherein contacting the cleaning material to the continuously moving flexible electronics web surface at the cleaning point further comprises generating, by a roller, contact between the cleaning material and the continuously moving flexible electronics web surface at the cleaning point.

23. The method of claim 22, wherein contacting the cleaning material to the continuously moving flexible electronics web surface at the cleaning point further comprises pressing, by a roller underneath the continuously moving flexible electronics web surface, the portion of the continuously moving flexible electronics web surface at the cleaning point against the portion of the cleaning material.

24. The method of claim 22, wherein moving the cleaning material further comprises moving the roller, the source cylinder and the take-up cylinder to reverse a direction of motion of the cleaning material wherein the cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the cleaning material is reused.

~~25. The method of claim 24, wherein moving the roller, the source cylinder and the take-up cylinder further comprising rotating the roller, the source cylinder and the take-up cylinder 180 degrees to reverse the direction of the cleaning material.~~

~~26. An apparatus for cleaning a continuously moving cleaning material being used to clean debris from a flexible electronics roll, the apparatus comprising:~~

~~a roll of cleaning material attached to a moving device that places a portion of the cleaning material against a portion of a continuously moving cleaning material to clean debris from that portion of the continuously moving cleaning material using the portion of the cleaning material; and~~

~~wherein the cleaning material has a plurality of portions and each portion moves over a cleaning point over time and the continuously moving cleaning material has a plurality of portions and each portion is adjacent the cleaning point over time and the cleaning material moves at a same speed as the continuously moving cleaning material so that the continuously moving cleaning material is cleaned.~~

~~27. The apparatus of claim 26, wherein the moving device further comprises a source cylinder and a take-up cylinder wherein the cleaning material is rolled off of the source cylinder and rolled onto the take-up cylinder after the cleaning material has cleaned the continuously moving cleaning material.~~

~~28. The apparatus of claim 27, wherein the source cylinder and the take-up cylinder each have a motor that drives a motion of the cleaning material past the cleaning point.~~

~~29. The apparatus of claim 28, wherein the cleaning material has a width equal to a width of the continuously moving cleaning material.~~

~~30. The apparatus of claim 27, wherein the source cylinder further comprises a sensor that determines an amount of cleaning material remaining on the source cylinder.~~

~~31. The apparatus of claim 27, wherein the moving device further comprises a roller that generates a contact patch between the cleaning material and the continuously moving cleaning material at the cleaning point.~~

~~32. The apparatus of claim 31, wherein the moving device further comprises a bracket connected to the roller, the source cylinder and the take-up cylinder that reverses a direction of the cleaning material wherein the cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the cleaning material is reused.~~

~~33. The apparatus of claim 32, wherein the bracket rotates 180 degrees to reverse the direction of the cleaning material.~~

~~34. The apparatus of claim 33, wherein the moving cleaning device further comprises an integrated control system that controls the operation of the two cylinders, the sensor and the bracket.~~

~~35. The apparatus of claim 26, wherein the cleaning material moves in a direction that is the same as a direction of the continuously moving cleaning material.~~

~~36. The apparatus of claim 26, wherein the cleaning material further comprises a cleaning layer being one of a polyimide layer and a polymer layer.~~

~~37. The apparatus of claim 36, wherein the polymer layer has a Durometer Shore of between about 40 and about 100 and surface energy of 15 to 40 dynes/cm2.~~

~~38. The apparatus of claim 36, wherein the polymer layer is a silicon containing polymer layer.~~

~~39. The apparatus of claim 36, wherein the cleaning material has a thickness of between 20 and 300 microns.~~

~~40. The apparatus of claim 39, wherein the cleaning material further comprises a web layer underneath the cleaning layer.~~

~~41. The apparatus of claim 40, wherein the web layer has a thickness of between 20 and 300 microns.~~

~~42. A method for cleaning a continuously moving cleaning material, comprising:~~

~~moving, at a same speed as the continuously moving cleaning material, a cleaning material layer;~~

~~contacting, at a cleaning point, a portion of the moving cleaning material with a portion of the continuously moving cleaning material; and~~

~~removing debris from the portion of the continuously moving cleaning material when the portion of the moving cleaning material contacts the portions of the continuously moving cleaning material.~~

~~43. The method of claim 42, wherein moving the cleaning material further comprises unrolling the cleaning material from a source cylinder and rolling the cleaning material, after the cleaning material has contacted the continuously moving cleaning material, onto a take-up cylinder.~~

~~44. The method of claim 43, wherein moving the cleaning material further comprises driving the source cylinder and the take-up cylinder.~~

~~45. The method of claim 44 further comprising determining, by a sensor at the source cylinder, an amount of cleaning material remaining on the source cylinder.~~

~~46. The method of claim 43, wherein contacting the cleaning material to the continuously moving cleaning material at the cleaning point further comprises generating, by a roller, contact between the cleaning material and the continuously moving cleaning material at the cleaning point.~~

~~47. The method of claim 46, wherein moving the cleaning material further comprises moving the roller, the source cylinder and the take-up cylinder to reverse a direction of motion of the cleaning material wherein the cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the cleaning material is reused.~~

~~48. The method of claim 47, wherein moving the roller, the source cylinder and the take-up cylinder further comprising rotating the roller, the source cylinder and the take-up cylinder 180 degrees to reverse the direction of the cleaning material.~~

~~49~~ 1. An apparatus for applying a cleaning material, the apparatus comprising:

a length of cleaning material attached to a moving cleaner device that moves and places a portion of the cleaning material against a portion of a moving flexible electronics roll to clean

debris from that portion of the moving flexible electronics ~~web surface~~roll using the portion of the cleaning material;

a length of second cleaning material attached to a moving device that places a portion of the second cleaning material against a portion of the ~~continuously~~ moving cleaning material to clean debris from that portion of the ~~continuously~~ moving cleaning material using the portion of the second cleaning material; and

wherein the moving flexible electronics ~~web surface~~roll has a plurality of portions and each portion moves over a cleaning point over time and the cleaning material length has a plurality of portions and each portion is adjacent the cleaning point over time and the cleaning material moves at a same speed as the moving flexible electronics ~~web surface~~roll so that the ~~continuous~~ moving flexible electronics ~~web surface~~roll is cleaned and wherein the second cleaning material length has a plurality of portions and each portion passes a second cleaning point over time and the ~~second~~moving cleaning material length has the plurality of portions and each portion is adjacent the second cleaning point over time and the second cleaning material moves at a same speed as the ~~continuously~~ moving cleaning material so that the moving cleaning material is cleaned at the second cleaning point.

~~50~~ 2. The apparatus of claim ~~49~~ 1, wherein the moving cleaner device further comprises a source cylinder and a take-up cylinder wherein the cleaning material is rolled off of the source cylinder and rolled onto the take-up cylinder after the cleaning material has cleaned the moving flexible electronics ~~web surface~~roll.

~~51~~ 3. The apparatus of claim ~~50~~ 2, wherein the source cylinder and the take-up cylinder each have a motor that drives a motion of the cleaning material past the cleaning point~~.~~

~~52. The apparatus of claim 51,~~ and wherein the cleaning material has a width equal to a width of the moving flexible electronics ~~web surface~~.

~~53~~ 4. The apparatus of claim ~~50~~ 2, wherein the source cylinder further comprises a sensor that determines an amount of cleaning material remaining on the source cylinder.

~~54~~ 5. The apparatus of claim ~~50~~ 2, wherein the moving cleaner device further comprises a roller that generates a contact patch between the cleaning material and the moving flexible electronics web surface at the cleaning point.

~~55~~ 6. The apparatus of claim ~~54~~ 5 further comprising a roller underneath the moving flexible electronics web surface that presses the portion of the moving flexible electronics ~~web surface~~ at the cleaning point against the portion of the cleaning material.

~~56~~ 7. The apparatus of claim ~~54~~ 5, wherein the moving cleaner device further comprises a bracket connected to the roller, the source cylinder and the take-up cylinder that reverses a direction of the cleaning material wherein the cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the cleaning material is reused.

~~57~~ 8. The apparatus of claim ~~56~~ 7, wherein the bracket rotates 180 degrees to reverse the direction of the cleaning material~~.~~

~~58. The apparatus of claim 57,~~ and wherein the moving cleaner device further comprises an integrated control system that controls the operation of the two cylinders, the sensor and the bracket.

~~59~~ 9. The apparatus of claim ~~49~~ 1, wherein the cleaning material moves in a direction that is the same as a direction of the moving flexible electronics ~~web surface~~roll.

~~60~~ 10. The apparatus of claim ~~49~~ 1, wherein the moving device further comprises a source cylinder and a take-up cylinder wherein the second cleaning material is rolled off of the source cylinder and rolled onto the take-up cylinder after the second cleaning material has cleaned the ~~continuously~~ moving cleaning material.

~~61~~ 11. The apparatus of claim ~~60~~ 10, wherein the source cylinder and the take-up cylinder each have a motor that drives a motion of the second cleaning material~~.~~

~~62. The apparatus of claim 61,~~ and wherein the second cleaning material has a width equal to a width of the cleaning material.

~~63~~ 12. The apparatus of claim ~~60~~ 10, wherein the source cylinder further comprises a sensor that determines an amount of second cleaning material remaining on the source cylinder.

~~64~~ 13. The apparatus of claim ~~60~~ 10, wherein the moving device further comprises a roller that generates a contact patch between the second cleaning material and the ~~continuously~~ moving cleaning material at the second cleaning point.

~~65~~ 14. The apparatus of claim ~~64~~ 13, wherein the moving device further comprises a bracket connected to the roller, the source cylinder and the take-up cylinder that reverses a direction of the second cleaning material wherein the second cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the second cleaning material is reused.

~~66~~ 15. The apparatus of claim ~~65~~ 14, wherein the bracket rotates 180 degrees to reverse the direction of the second cleaning material and reuse the second cleaning material.

~~67~~ 16. The apparatus of claim ~~66~~ 15, wherein the moving cleaning device further comprises an integrated control system that controls the operation of the two cylinders, the sensor and the bracket.

~~68~~ 17. The apparatus of claim ~~49~~ 1, wherein the second cleaning material moves in a direction that is the same as a direction of the ~~continuously~~ moving cleaning material.

~~69. A method for cleaning a continuously moving flexible electronics web surface, comprising:~~

~~moving, at a same speed as the continuously moving flexible electronics web surface, a cleaning material layer;~~

~~contacting, at a cleaning point, a portion of the moving cleaning material with a portion of the continuously moving flexible electronics web surface;~~

~~removing debris from the portion of the continuously moving flexible electronics web surface when the portion of the moving cleaning material contacts the portions of the continuously moving flexible electronics web surface; and~~

~~moving a roll of second cleaning material as the same speed as the cleaning material, and contacting, at a second cleaning point, a portion of the second cleaning material against a portion of the continuously moving cleaning material layer to clean debris from that portion of the continuously moving cleaning material using the portion of the material.~~

~~70. The method of claim 69, wherein moving the cleaning material further comprises unrolling the cleaning material from a source cylinder and rolling the cleaning material, after the~~

cleaning material has contacted the continuously moving flexible electronics web surface, onto a take-up cylinder.

71. The method of claim 70, wherein moving the cleaning material further comprises driving the source cylinder and the take-up cylinder.

72. The method of claim 70 further comprising determining, by a sensor at the source cylinder, an amount of cleaning material remaining on the source cylinder.

73. The method of claim 70, wherein contacting the cleaning material to the continuously moving flexible electronics web surface at the cleaning point further comprises generating, by a roller, contact between the cleaning material and the continuously moving flexible electronics web surface at the cleaning point.

74. The method of claim 73, wherein contacting the cleaning material to the continuously moving flexible electronics web surface at the cleaning point further comprises pressing, by a roller underneath the continuously moving flexible electronics web surface, the portion of the continuously moving flexible electronics web surface at the cleaning point against the portion of the cleaning material.

75. The method of claim 73, wherein moving the cleaning material further comprises moving the roller, the source cylinder and the take-up cylinder to reverse a direction of motion of the cleaning material wherein the cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the cleaning material is reused.

76. The method of claim 75, wherein moving the roller, the source cylinder and the take-up cylinder further comprising rotating the roller, the source cylinder and the take-up cylinder 180 degrees to reverse the direction of the cleaning material.

77. The method of claim 69, wherein moving the second cleaning material further comprises unrolling the second cleaning material from a source cylinder and rolling the second cleaning material, after the second cleaning material has contacted the cleaning material, onto a take-up cylinder.

78. The method of claim 77, wherein moving the second cleaning material further comprises driving the source cylinder and the take-up cylinder.

79. The method of claim 78 further comprising determining, by a sensor at the source cylinder, an amount of second cleaning material remaining on the source cylinder.

80. The method of claim 77, wherein contacting the second cleaning material to the cleaning material at the second cleaning point further comprises generating, by a roller, contact between the second cleaning material and the cleaning material at the second cleaning point.

81. The method of claim 80, wherein moving the second cleaning material further comprises moving the roller, the source cylinder and the take-up cylinder to reverse a direction of motion of the second cleaning material wherein the second cleaning material rolls off the take-up cylinder is taken up by the source cylinder so that that the second cleaning material is reused.

82. The method of claim 71, wherein moving the roller, the source cylinder and the take-up cylinder further comprising rotating the roller, the source cylinder and the take-up cylinder 180 degrees to reverse the direction of the second cleaning material.

83. A cleaning material for removing small particles from a flexible electronics roll without leaving residues, the cleaning material comprising:

a cleaning layer;

a web film formed underneath the cleaning layer that supports the cleaning layer; and

wherein the cleaning layer and web film are rolled up to form the cleaning material roll.

84. The cleaning material of claim 83, wherein the cleaning layer further comprising one of a polyimide layer and a polymer layer.

85. The cleaning material of claim 84, wherein the polymer layer has a Durometer Shore of between about 40 and about 100 and surface energy of 15 to 40 dynes/cm2.

86. The cleaning material of claim 84, wherein the polymer layer is a silicon containing polymer layer.

87. The cleaning material of claim 83, wherein the cleaning layer has a thickness of between 20 and 300 microns.

88. The cleaning material of claim 83 further comprising a release layer formed on top of the cleaning layer.

~~89. The cleaning material of claim 87, wherein the web film has a thickness of between 20 and 300 microns.~~

~~90. The cleaning material of claim 89, wherein the web film is one of polyester, polyethylene and polyimide.~~