

CLAIMS

What is claimed is:

1. A heating element of a vaporizer device comprising a reservoir containing vaporizable material and a wicking element in fluid communication with the reservoir, the heating element comprising:

a heating portion comprising at least two tines spaced apart from one another, the heating portion being preformed to define an interior volume configured to receive the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element, the heating portion being configured to contact at least two separate surfaces of the wicking element; and

at least two legs coupled to the at least two tines and spaced apart from the heating portion, the at least two legs configured to electrically communicate with a power source,

wherein power is configured to be supplied to the heating portion from the power source to generate heat, thereby vaporizing the vaporizable material stored within the wicking element.

2. The heating element of claim 1, wherein the at least two legs includes four legs.

3. The heating element of claim 2, wherein the heating portion is configured to contact at least three separate surfaces of the wicking element.

4. The heating element of claim 1, wherein the at least two tines comprises:

a first side tine portion;

a second side tine portion opposing the first side tine portion; and

a platform tine portion connecting the first side tine portion with the second side tine portion, the platform tine portion being positioned approximately perpendicular to a portion of the first side tine portion and the second side tine portion,

wherein the first side tine portion, the second side tine portion, and the platform tine portion defines the interior volume in which the wicking element is positioned.

5. The heating element of claim 4, wherein the at least two legs are located away from the heating portion by a bridge.

6. The heating element of claim 1, wherein each of the at least two legs includes a cartridge contact positioned at an end of each of the at least two legs, the cartridge contact configured to electrically communicate with the power source, the cartridge contact being angled and extending away from the heating portion.

7. The heating element of claim 4, wherein the at least two tines includes a first pair of tines and a second pair of tines.
8. The heating element of claim 7, wherein the tines of the first pair of tines are evenly spaced from one another.
9. The heating element of claim 7, wherein the tines of the first pair of tines are spaced apart by a width.
10. The heating element of claim 9, wherein the width is greater at an inner region of the heating element adjacent the platform tine portion than the width at an outer region of the heating element adjacent an outer edge of the first side tine portion opposite the inner region.
11. The heating element of claim 2, wherein the vaporizer device is configured to measure a resistance of the heating element at each of the four legs to control a temperature of the heating element.
12. The heating element of claim 1, further comprising a heat shield configured to insulate the heating portion from a body of the vaporizer device.
13. The heating element of claim 1, wherein the vaporizer device further comprises a heat shield configured to surround at least a portion of the heating element and insulate the heating portion from a body of a wick housing configured to surround at least a portion of the wicking element and the heating element.
14. The heating element of claim 1, wherein the heating portion is folded between the heating portion and the at least two legs to isolate the heating portion from the at least two legs.
15. The heating element of claim 1, wherein the heating portion further comprises at least one tab that extends from a side of the at least two tines to allow for easier entry of the wicking element to the interior volume of the heating portion.
16. The heating element of claim 15, wherein the at least one tab extends away from the interior volume at an angle.
17. The heating element of claim 1, wherein the at least two legs includes a capillary feature, the capillary feature causing an abrupt change in capillary pressure to thereby prevent the vaporizable material from flowing beyond the capillary feature.
18. The heating element of claim 17, wherein the capillary feature comprises one or more bends in the at least two legs.
19. The heating element of claim 17, wherein the at least two legs extend at an angle

towards the interior volume of the heating portion, the angled at least two legs defining the capillary feature.

20. A vaporizer device comprising:

a reservoir containing vaporizable material;

a wicking element in fluid communication with the reservoir; and

a heating element comprising:

a heating portion comprising at least two tines spaced apart from one another, the heating portion being preformed to define an interior volume configured to receive the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element, the heating portion being configured to contact at least two separate surfaces of the wicking element; and

at least two legs coupled to the at least two tines and spaced apart from the heating portion, the at least two legs configured to electrically communicate with a power source,

wherein power is configured to be supplied to the heating portion from the power source to generate heat, thereby vaporizing the vaporizable material stored within the wicking element.

21. The vaporizer device of claim 20, wherein the at least two legs includes four legs.

22. The vaporizer device of claim 20, wherein the heating portion is configured to contact at least three separate surfaces of the wicking element.

23. The vaporizer device of claim 20, wherein the at least two tines comprises:

a first side tine portion;

a second side tine portion opposing the first side tine portion; and

a platform tine portion connecting the first side tine portion with the second side tine portion, the platform tine portion being positioned approximately perpendicular to a portion of the first side tine portion and the second side tine portion,

wherein the first side tine portion, the second side tine portion, and the platform tine portion defines the interior volume in which the wicking element is positioned.

24. The vaporizer device of claim 23, wherein the at least two legs are located away from the heating portion by a bridge.

25. The vaporizer device of claim 20, wherein each of the at least two legs includes a cartridge contact positioned at an end of each of the at least two legs, the cartridge contact

configured to electrically communicate with the power source, the cartridge contact being angled and extending away from the heating portion.

26. The vaporizer device of claim 20, wherein the at least two tines includes a first pair of tines and a second pair of tines.

27. The vaporizer device of claim 26, wherein the tines of the first pair of tines are evenly spaced from one another.

28. The vaporizer device of claim 26, wherein the tines of the first pair of tines are spaced apart by a width, wherein the width is greater at an inner region of the heating element adjacent the platform tine portion than the width at an outer region of the heating element adjacent an outer edge of the first side tine portion opposite the inner region.

29. A method of forming an atomizer assembly for a vaporizer device, the method comprising:

securing a wicking element to an interior volume of a heating element, the heating element comprising:

a heating portion comprising at least two tines spaced apart from one another;
and

at least two legs spaced from the heating portion, the legs configured to electrically communicate with a power source of the vaporizer device,

wherein the heating portion is configured to contact at least two surfaces of the wicking element; and

coupling the heating element to a wick housing configured to surround at least a portion of the wicking element and the heating element.

30. The method of claim 29, wherein the securing further comprises sliding the wicking element into the interior volume of the heating element.

31. A heating element of a vaporizer device, comprising:

a heating portion comprising one or more heater traces integrally formed and spaced apart from one another, the one or more heater traces configured to contact at least a portion of a wicking element of the vaporizer device;

a connecting portion configured to receive power from a power source and direct the power to the heating portion; and

a plating layer having a plating material that is different from a material of the heating portion, the plating layer configured to reduce contact resistance between the heating element and the power source, thereby localizing heating of the heating element to the heating portion.

32. The heating element of claim 31, wherein the plating layer comprises one or more layers deposited onto the connecting portion.

33. The heating element of claim 31, wherein the plating layer is integrally formed with the connecting portion.

34. The heating element of claim 32, wherein the plating layer includes an adhering plating layer and an outer plating layer.

35. The heating element of claim 34, wherein at least the outer plating layer is configured to reduce contact resistance between the heating element and the power source.

36. The heating element of claim 34, wherein the adhering plating layer is deposited onto the heating element to adhere the outer plating layer to the heating element.

37. The heating element of claim 31, wherein the material of the heating portion comprises nichrome.

38. The heating element of claim 31, wherein the plating layer comprises gold.

39. A method of forming a heating element for a vaporizer cartridge comprising a reservoir containing vaporizable material and a wicking element in fluid communication with the reservoir, the method comprising:

providing a planar substrate comprising a resistive heating material;

stamping the planar substrate into a desired shape of the heating element; and

folding the planar substrate to isolate a heating portion of the heating element from a connecting portion of the heating element, the heating portion configured to heat the vaporizable material to generate an aerosol, and the connecting portion configured to electrically communicate with a power source to provide power to the heating portion.

40. The method of claim 39, wherein the heating portion of the folded planar substrate defines an interior volume.

41. The method of claim 40, further comprising: securing the wicking element to the heating element by inserting the wicking element into the interior volume such that the heating portion contacts the wicking element on at least two surfaces of the wicking element.

42. The method of claim 39, wherein the heating portion of the folded planar substrate comprises opposing side tine portions that define the interior volume, wherein the opposing side tine portions are approximately parallel to one another.

43. The method of claim 42, wherein the connecting portion is positioned approximately parallel to the opposing side tine portions.

44. The method of claim 42, wherein the connecting portion is spaced from the opposing side line portions and extends at an angle towards the interior volume.

45. The method of claim 39, further comprising depositing a plating layer onto at least a portion of a surface of the planar substrate to reduce contact resistance on at least the portion of the surface of the planar substrate.

46. A wick housing of a vaporizer cartridge configured to be coupled to a vaporizer body, the wick housing comprising:

an outer wall; and

an interior volume defined by the outer wall, the interior volume configured to receive a portion of a heating element and a wicking element of the vaporizer device.

47. The wick housing of claim 46, wherein the heating element comprises a heating portion and a connecting portion, the heating portion configured to heat vaporizable material stored in the wicking element to generate an aerosol, the connecting portion configured to electrically communicate with a power source to provide power to the heating portion, and wherein the portion of the heating element is the heating portion.

48. The wick housing of claim 47, wherein the outer wall is configured to be positioned between the heating portion and the connecting portion.

49. The wick housing of claim 47, wherein the outer wall comprises two opposing short sides and two opposing long sides.

50. The wick housing of claim 49, wherein each of the two opposing long sides includes a recess configured to releasably couple the vaporizer cartridge to a corresponding feature of the vaporizer body.

51. The wick housing of claim 50, wherein the recess is positioned proximate to an intersection between a long side of the two opposing long sides and a short side of the two opposing short sides.

52. The wick housing of claim 51, wherein each of the two opposing long sides includes two recesses.

53. The wick housing of claim 49, wherein the outer wall further comprises a base positioned approximately perpendicular to the two opposing short sides and two opposing long sides.

54. The wick housing of claim 53, wherein the base comprises one or more slots, wherein air pressure caused by the flow of vaporizable material within the heater portion is configured to escape through the one or more slots.

55. The wick housing of claim 49, wherein at least one of the two opposing short sides comprises a chip recess configured to receive an identification chip.

56. The wick housing of claim 55, wherein the chip recess comprises at least two walls configured to surround and retain the identification chip.

57. The wick housing of claim 56, wherein the at least two walls comprises at least four walls.

58. The wick housing of claim 47, wherein the outer wall comprises:
two opposing short sides;
two opposing long sides;
a base positioned approximately perpendicular to the two opposing short sides and the two opposing long sides; and
an opening opposite the base.

59. The wick housing of claim 58, further comprising an outer rim surrounding the opening and extending away from the opening.

60. The wick housing of claim 59, wherein the outer wall comprises a capillary feature, the capillary feature causing an abrupt change in capillary pressure between the heating element and the wick housing to thereby prevent the vaporizable material from flowing beyond the capillary feature.

61. The wick housing of claim 60, wherein the capillary feature comprises a curved surface formed at the intersection between at least one of the two opposing long sides and the outer rim.

62. The wick housing of claim 61, wherein the curved surface has a radius that is sufficient to break tangency points between the outer surface and the outer rim.

63. The wick housing of claim 60, wherein the capillary feature is positioned within a cutout in the outer wall, the cutout configured to space the heating element from the outer wall, thereby preventing excess heat from contacting the outer wall.

64. The wick housing of claim 46, further comprising a cutout in the outer wall configured to space the heating element from the outer wall, thereby preventing excess heat from contacting the outer wall.

65. An atomizer assembly of a vaporizer device, the atomizer assembly comprising:
a wicking element;
the wick housing of any of claims 46-64; and
the heating element of any of claims 1-19 and 31-38.

66. A heating element of a vaporizer device comprising a reservoir containing vaporizable material and a wicking element in fluid communication with the reservoir, the heating element comprising:

a heating portion comprising at least two tines spaced apart from one another;
a cartridge contact configured to be in electrical communication with a power source; and

a leg extending between the heating portion and the cartridge contact,
wherein the heating portion is configured to be crimped around the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element and contacts at least two surfaces of the wicking element.

67. The heating element of claim 66, wherein the leg includes at least four legs.

68. The heating element of claim 66, further comprising a heat shield configured to insulate the heating portion from a body of the vaporizer device.

69. The heating element of claim 66, wherein the vaporizer device comprises a heat shield configured to surround at least a portion of the heating element and insulate the heating portion from a body of a wick housing.

70. The heating element of claim 66, further comprising a plating layer including one or more layers that are deposited onto the heating element to reduce contact resistance between the heating element and the power source.

71. The heating element of claim 66, further comprising a plating layer including one or more layers that are deposited onto the heating element, wherein the plating layer includes an adhering plating layer and an outer plating layer.

72. The heating element of claim 71, wherein at least the outer plating layer is configured to reduce contact resistance.

73. The heating element of claim 71, wherein the adhering plating layer is deposited onto the heating element to adhere the outer plating layer to the heating element.

74. The heating element of claim 66, wherein the heating element is stamped and/or cut from a flat substrate material.

75. The heating element of claim 74, wherein the substrate material comprises nichrome.

76. The heating element of claim 75, wherein the outer plating layer comprises gold.

77. The heating element of claim 66, wherein the cartridge contact is configured to be positioned external to a body of the vaporizer cartridge to contact a vaporizer body.

78. A method of forming a heating element for a vaporizer cartridge comprising a reservoir containing vaporizable material and a wicking element in fluid communication with the reservoir, the method comprising:

providing a planar substrate comprising a resistive heating material;

stamping the planar substrate into a desired shape; and

securing the heating element to the wicking element, the securing comprising crimping at least a portion of the heating element about the wicking element such that the heating element contacts the wicking element on at least three surfaces of the wicking element.

79. The method of claim 78, further comprising depositing a plating layer onto at least a portion of a surface of the planar substrate to reduce contact resistance at at least the portion of the surface of the planar substrate.

80. A heating element of a vaporizer device comprising a reservoir containing vaporizable material and a wicking element in fluid communication with the reservoir, the heating element comprising:

a heating portion comprising at least two tines spaced apart from one another;
and

at least two legs spaced from the heating portion, the legs configured to be in electrical communication with a power source,

wherein the heating portion is configured to be crimped around the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element and contacts at least two surfaces of the wicking element.

81. The heating element of claim 80, wherein the at least two legs includes four legs.

82. The heating element of claim 80, wherein the heating portion is configured to contact at least three separate surfaces of the wicking element.

83. The heating element of claim 80, wherein the at least two tines comprises:

a first side tine portion;

a second side tine portion opposing the first side tine portion; and

a platform tine portion connecting the first side tine portion with the second side tine portion, the platform tine portion being positioned approximately perpendicular to the first side tine portion and the second side tine portion,

wherein the first side tine portion, the second side tine portion, and the platform

tine portion defines an interior volume in which the wicking element is positioned.

84. The heating element of claim 83, wherein the at least two legs are located away from the heating portion by a bridge, wherein the bridge includes a capillary feature that prevents the vaporizable material from flowing beyond the capillary feature from the interior volume.

85. The heating element of claim 80, wherein each of the at least two legs includes a cartridge contact located at an end of each of the at least two legs, the cartridge contact configured to be in electrical communication with a power source, the cartridge contact being angled and extending away from the heating portion.

86. The heating element of claim 83, wherein the at least two tines includes a first pair of tines and a second pair of tines.

87. The heating element of claim 86, wherein the tines of the first pair of tines are evenly spaced from one another.

88. The heating element of claim 86, wherein the tines of the first pair of tines are spaced apart by a width.

89. The heating element of claim 88, wherein the width is greater located at an inner region of the heating element adjacent the platform tine portion than the width located at an outer region of the heating element adjacent an outer edge of the first side tine portion.

90. The heating element of claim 81, wherein the vaporizer device is configured to measure a resistance of the heating element at each of the four legs to control a temperature of the heating element.

91. A vaporizer device comprising:

a reservoir containing vaporizable material;

a wicking element in fluid communication with the reservoir; and

a heating element comprising:

a heating portion comprising at least two tines spaced apart from one another;

and

at least two legs spaced from the heating portion, the legs configured to be in electrical communication with a power source,

wherein the heating portion is configured to be crimped around the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element and contacts at least two surfaces of the wicking element.