CLAIMS

~~What is claimed is:~~

1. A piston for a cartridge configured to deploy a projectile, the piston comprising:

a piston body having a first end opposite a second end; and

a piston opening defined through the piston body from the first end to the second end, wherein the piston opening between the first end and the second end comprises a smaller diameter than the piston opening proximate at least one of the first end or the second end.

2. The piston of claim 1, wherein the piston opening proximate the first end comprises a chamfered edge.

3. The piston of claim 1, wherein the piston opening proximate the first end is sized and shaped to receive a filament wire.

4. The piston of claim 1, wherein the piston opening proximate the second end is sized and shaped to receive a screw.

5. The piston of claim 4, wherein the piston opening proximate the first end is configured to receive a filament wire.

6. The piston of claim 1, wherein the piston opening proximate the second end comprises a recess sized and shaped to receive a screw and a washer.

7. The piston of claim 1, wherein a first middle portion of the piston opening proximate the first end comprises a greater diameter than a second middle portion of the piston opening proximate the second end.

8. The piston of claim 1, wherein a middle outer diameter of the piston body between the first end and the second end is greater than an end outer diameter of at least one of the piston body at the first end or the piston body at the second end.

9. A cartridge:

a cartridge body defining a piston stop on an inner surface of the cartridge body;

a piston disposed within the cartridge body, wherein the piston is configured to travel forward during a deployment to contact the piston stop, wherein the piston is electrically coupled to the cartridge body before, during, and after the deployment; and

a projectile disposed within the cartridge body forward the piston, wherein the projectile is electrically coupled to the piston.

10. The cartridge of claim 9, wherein the projectile remains electrically coupled to the piston before, during, and after the deployment.

11. The cartridge of claim 9, wherein the projectile comprises a wire-tether having a first end coupled to the projectile and a second end coupled to the piston.

12. The cartridge of claim 9, wherein before, during, and after the deployment the piston is electrically coupled to the cartridge body at a radially outer surface of the piston.

13. The cartridge of claim 12, wherein an axially forward surface of the radially outer surface of the piston is configured to contact the piston stop during the deployment.

14. The cartridge of claim 13, wherein the axially forward surface of the radially outer surface of the piston is configured to electrically couple the piston to the piston stop.

15. The cartridge of claim 9, wherein the piston comprises a piston opening defined through the piston from a first piston end of the piston to a second piston end of the piston.

16. The cartridge of claim 15, wherein the projectile comprises a ~~wire-tether~~filament having a first end coupled to the projectile and a second end inserted through the piston opening at the first piston end of the piston.

17. The cartridge of claim 16, further comprising a screw inserted through the second piston end of the piston, wherein the screw couples the second end of the filament to the piston.

18. The cartridge of claim 17, further comprising a washer coupled between the screw and the piston, wherein the washer is configured to electrically couple the second end of the filament to the piston.

19. The cartridge of claim 18, wherein the washer contacts an inner surface of the piston opening.

20. The cartridge of claim 18, wherein the washer is configured to position the second end of the filament such that the second end of the filament contacts an inner surface of the piston opening.

~~21. A piston for a cartridge configured to deploy a projectile, the piston comprising:~~

~~a piston body having a first end opposite a second end;~~

~~a piston conductive body defining a first portion of the piston body, wherein the piston conductive body comprises an electrically conductive material; and~~

~~a piston body overmold defining a second portion of the piston body, wherein the piston body overmold is configured to selectively expose a surface of the piston conductive body, and wherein the piston body overmold comprises an electrically non-conductive material.~~

~~22. The piston of claim 21, wherein the piston body overmold is coupled to an inner surface of the piston conductive body and an outer surface of the piston conductive body.~~

~~23. The piston of claim 21, wherein the piston body overmold surrounds the piston conductive body at the first end of the piston body.~~

~~24. The piston of claim 23, wherein the piston body overmold selectively exposes the piston conductive body at the second end of the piston body.~~

~~25. The piston of claim 21, further comprising a piston opening defined through the piston body from the first end to the second end.~~

~~26. The piston of claim 25, wherein the piston opening is defined through the piston conductive body and the piston body overmold.~~

~~27. The piston of claim 25, wherein the piston opening proximate the first end of the piston body is defined through the piston body overmold, and wherein the piston opening proximate the second end of the piston body is defined through the piston conductive body.~~

~~28. The piston of claim 27, wherein the piston opening defined through the piston body overmold comprises a smaller diameter than the piston opening defined through the piston conductive body.~~

~~29. The piston of claim 27, wherein the piston opening defined through the piston body overmold at the first end of the piston body comprises a chamfered edge.~~

~~30. The piston of claim 21, wherein the piston overmold body selectively exposes an exposed surface of the piston conductive body, and wherein the exposed surface comprises a portion of piston conductive body extending radially outward from the piston body.~~

~~31. The piston of claim 30, wherein the exposed surface of the piston conductive body comprises at least one of a radially outward surface or an axially forward surface.~~

~~32. The piston of claim 21, wherein the piston overmold body selectively exposes a coupling point of the piston conductive body, and wherein the coupling point comprises a portion of piston conductive body extending axially aft from the piston body.~~

~~33. The piston of claim 32, wherein the coupling point comprises a mechanical feature configured to couple the piston body to a retaining clip.~~

~~34. The piston of claim 33, wherein the coupling point is sized and shaped to receive a force from at least one of a propulsion module or a plug.~~

~~35. A retaining clip for a cartridge inner assembly, the retaining clip comprising:~~

~~a clip body;~~

~~a first clip end of the clip body configured to couple to a piston of the cartridge inner assembly; and~~

~~a second clip end of the clip body configured to couple to a propulsion module of the cartridge inner assembly, wherein at least one of the first clip end or the second clip end are configured to decouple during a deployment of the cartridge inner assembly.~~

~~36. The retaining clip of claim 35, further comprising a retaining clip opening defined from the first clip end through to the second clip end.~~

~~37. The retaining clip of claim 36, wherein the retaining clip opening is configured to enclose one or more components of the cartridge inner assembly before the deployment of the cartridge inner assembly.~~

~~38. The retaining clip of claim 36, wherein the retaining clip opening is configured to at least partially enclose at least one of the piston or the propulsion module before the deployment of the cartridge inner assembly.~~

~~39. The retaining clip of claim 36, wherein before the deployment the retaining clip opening is configured to enclose a component of the cartridge inner assembly and at least partially enclose the piston and the propulsion module.~~

~~40. The retaining clip of claim 35, wherein the first clip end is configured to mechanically or chemically decouple from the piston during the deployment.~~

~~41. The retaining clip of claim 35, wherein the second clip end is configured to mechanically or chemically decouple from the propulsion module during the deployment.~~

~~42. A cartridge inner assembly comprising:~~

~~a piston;~~

~~a propulsion module; and~~

~~a retaining clip comprising:~~

~~a retaining clip body;~~

~~a first clip end of the retaining clip body, wherein the first clip end is coupled to the piston; and~~

~~a second clip end of the retaining clip body, wherein the second clip end is coupled to the propulsion module.~~

~~43. The cartridge inner assembly of claim 42, wherein the piston is at least partially enclosed by the retaining clip body at the first clip end.~~

~~44. The cartridge inner assembly of claim 42, wherein the propulsion module is at least partially enclosed by the retaining clip body at the second clip end.~~

~~45. The cartridge inner assembly of claim 42, further comprising a plug enclosed within the retaining clip body between the piston and the propulsion module.~~

~~46. The cartridge inner assembly of claim 42, wherein the first clip end of the retaining clip body is configured to decouple from the piston in response to a deployment of the propulsion module.~~

~~47. The cartridge inner assembly of claim 42, wherein the second clip end of the retaining clip body is configured to decouple from the propulsion module in response to a deployment of the propulsion module.~~

~~48. A retaining clip for a cartridge comprising:~~

~~a retaining clip body disposed within the cartridge, wherein retaining clip body comprise a first clip end opposite a second clip end;~~

~~a piston clip defined on the first clip end, wherein the piston clip is configured to mechanically engage a piston disposed within the cartridge; and~~

~~a propulsion module clip defined on the second clip end, wherein the propulsion module clip is configured to mechanically engage a propulsion module disposed within the cartridge.~~

~~49. The retaining clip of claim 48, wherein at least one of the piston clip or the propulsion module clip comprise a plurality of mechanical grips.~~

~~50. The retaining clip of claim 48, wherein the piston clip comprises a portion of the first clip end extending at least one of axially forward the retaining clip body or radially inward the retaining clip body.~~

~~51. The retaining clip of claim 48, wherein the propulsion module clip comprises a portion of the second clip end extending at least one of axially aft the retaining clip body or radially inward the retaining clip body.~~

~~52. The retaining clip of claim 48, wherein the piston clip is circumferentially offset from the propulsion module clip.~~

~~53. The retaining clip of claim 48, wherein at least one of the piston clip or the propulsion module clip comprise a frangible material configured to break during a deployment of the propulsion module.~~

~~54. The retaining clip of claim 48, wherein at least one of the piston clip or the propulsion module clip comprise a plurality of circumferentially offset mechanical grips.~~

~~55. A cartridge inner assembly comprising:~~

~~a propulsion module configured to provide a propulsive force during a deployment;~~

~~a piston configured to travel forward during the deployment; and~~

~~a plug configured to transfer the propulsive force from the propulsion module to the piston, the plug comprising:~~

~~a plug body;~~

~~a first plug end of the plug body, wherein the first plug end is configured to insert within the piston; and~~

~~a second plug end of the plug body, wherein the second plug end is configured to at least partially enclose the propulsion module.~~

~~56. The cartridge inner assembly of claim 55, wherein the first plug end comprises a smaller diameter than the second plug end.~~

~~57. The cartridge inner assembly of claim 55, wherein the piston comprises:~~

~~a piston body having a first end opposite a second end;~~

~~a piston opening defined through the piston body from the first end to the second end; and~~

~~a screw coupled within the piston body.~~

~~58. The cartridge inner assembly of claim 57, wherein the first plug end of the plug body is configured to insert within the piston opening.~~

~~59. The cartridge inner assembly of claim 58, wherein the first plug end of the plug body is positioned within the piston opening proximate the screw.~~

~~60. The cartridge inner assembly of claim 58, wherein the first plug end of the plug body is configured to transfer the propulsive force to a shoulder of the second end of the piston body circumferentially defining the piston opening.~~

~~61. The cartridge inner assembly of claim 55, wherein the second plug end of the plug body comprises a recessed surface defining a circumferential edge extending axially aft the recessed surface.~~

~~62. The cartridge inner assembly of claim 61, wherein the recessed surface is configured to contact the propulsion module while the circumferential edge is configured to at least partially enclose the propulsion module.~~

~~63. The cartridge inner assembly of claim 55, wherein the plug comprises an electrically non-conductive material.~~

64. A plug for a cartridge of a conducted electrical weapon comprising:

a plug body;

a first end of the plug body; and

a second end of the plug body, wherein the first end of the plug body comprises a smaller diameter than the second end of the plug body, and wherein the second end of the plug body comprises a recessed surface defining a circumferential edge extending axially aft the recessed surface.

65. The plug of claim 64, wherein the plug comprises a cylindrical shape.

66. The plug of claim 64, wherein the plug comprises an electrically non-conductive material.

67. The plug of claim 64, wherein the plug comprises a rubber material.

68. The plug of claim 64, wherein the first end of the plug body is sized and shaped to be received within a piston.

69. The plug of claim 64, wherein the second end of the plug body is sized and shaped to at least partially enclose a propulsion module.

70. A cartridge for a less-lethal weapon comprising:

a cartridge body defining a piston stop on an inner surface of the cartridge body;

a propulsion module configured to provide a propulsive force during a deployment;

a piston disposed within the cartridge body, wherein the piston is configured to travel forward during the deployment to contact the piston stop; and

a plug configured to transfer the propulsive force from the propulsion module to the piston, the plug comprising:

a plug body;

a first plug end of the plug body, wherein the first plug end is configured to insert within the piston; and

~~a second plug end of the plug body, wherein the second plug end is configured to contact the propulsion module.~~

~~71. The cartridge of claim 70, wherein the plug is coupled to the piston and configured to travel forward with the piston during the deployment.~~

~~72. The cartridge of claim 70, wherein the plug is coupled to the propulsion module and configured to remain with the propulsion module during the deployment.~~

~~73. The cartridge of claim 70, wherein the plug comprises a shape complimentary with the cartridge body.~~

~~74. The cartridge of claim 70, further comprising a retaining clip coupled to the piston and the propulsion module, wherein the retaining clip encloses the plug.~~

~~75. A cartridge body comprising:~~

~~a first end opposite a second end;~~

~~an elongated portion defined at the first end;~~

~~a wide portion defined at the second end;~~

~~a first step defined between the elongated portion and the wide portion; and~~

~~a second step defined on the elongated portion between the first end and the first step.~~

~~76. The cartridge body of claim 75, wherein the wide portion comprises a greater diameter than the elongated portion.~~

~~77. The cartridge body of claim 75, wherein a first portion of the elongated portion from the first step to the second step comprises a greater outer diameter than a second portion of the elongated portion from the second step to the first end.~~

~~78. The cartridge body of claim 77, wherein a first diameter of the wide portion is greater than a second diameter of the first portion of the elongated portion and a third diameter of the second portion of the elongated portion.~~

~~79. The cartridge body of claim 75, wherein an inner diameter of the elongated portion remains consistent from the first end to the first step.~~

~~80. The cartridge body of claim 75, wherein an inner diameter of the wide portion remains consistent from the first step to the second end.~~

~~81. The cartridge body of claim 75, wherein the wide portion at the second end is sized and shaped to removably receive a cartridge inner assembly.~~

~~82. A cartridge for a less-lethal weapon comprising:~~

~~a cartridge body having a first end opposite a second end, the cartridge body comprising:~~

~~a first body portion comprising a first outer diameter; and~~

~~a second body portion comprising a second outer diameter, wherein the first outer diameter is smaller than the second outer diameter;~~

~~a cartridge inner assembly removably disposed within the cartridge body proximate the second end of the cartridge body;~~

~~a projectile disposed forward the cartridge inner assembly within the cartridge body; and~~

~~a blast door coupled to the second body portion of the cartridge body.~~

~~83. The cartridge of claim 82, wherein the cartridge body comprises an elongated portion and a wide portion, wherein the elongated portion is defined by the first body portion and the second body portion, and wherein the wide portion is defined by a third body portion.~~

~~84. The cartridge of claim 83, wherein the third body portion comprises a third outer diameter, and wherein the third outer diameter is greater than the first outer diameter and the second outer diameter.~~

85. The cartridge of claim 84, wherein the first body portion comprises a first inner diameter, the second body portion comprises a second inner diameter, and the third body portion comprises a third inner diameter, and wherein the third inner diameter is greater than each of the first inner diameter and the second inner diameter.

86. The cartridge of claim 85, wherein the first inner diameter is substantially similar to the second inner diameter.

87. The cartridge of claim 82, wherein the blast door comprises a blast door width, the first body portion comprises a first width, and the second body portion comprises a second width, and wherein the second width is greater than each of the first width and the blast door width.

88. The cartridge of claim 87, wherein the blast door width and the first width together are substantially similar to the second width.

89. The cartridge of claim 87, wherein the blast door width and the first width together are smaller than the second width.

90. The cartridge of claim 82, wherein the cartridge body comprises an opening defined from the first end through the second end, wherein the blast door obstructs the opening at the first end.

91. The cartridge of claim 90, wherein the blast door is coupled to the first body portion and extends axially aft towards the second body portion.

92. The cartridge of claim 91, wherein the blast door is configured to decouple from the first body portion during a deployment.

93. A cartridge body comprising:

a first body portion comprising a first outer diameter;

a second body portion comprising a second outer diameter; and

a third body portion comprising a third outer diameter, and wherein each of the first outer diameter, the second outer diameter, and the third outer diameter are different.

94. The cartridge body of claim 93, wherein the third outer diameter is greater than the first outer diameter and the second outer diameter.

95. The cartridge body of claim 93, wherein the first outer diameter is smaller than the second outer diameter.

96. The cartridge body of claim 93, wherein the first body portion comprises a first inner diameter, the second body portion comprises a second inner diameter, and the third body portion comprises a third inner diameter, and wherein the third inner diameter is greater than the first inner diameter and the second inner diameter.

97. The cartridge body of claim 96, wherein the first inner diameter is the same as the second inner diameter.

98. The cartridge body of claim 93, wherein the first body portion and the second body portion define an elongated body, and wherein the third body portion defines a wide body.

99. The cartridge body of claim 98, wherein the elongated body between the first body portion and the second body portion defines a step.

100. The cartridge body of claim 98, wherein a step is defined between the elongated body and the wide body.

101. The cartridge body of claim 93, wherein each of the first body portion, the second body portion, and the third body portion are cylindrically shaped.

102. An electrode for a conducted electrical weapon comprising:

an electrode body having a first body end opposite a second body end; and

an electrode head comprising a first head end opposite a second head end, wherein the electrode head defines a middle portion between the first head end and the second head end, wherein the second head end is coupled to and disposed within the first body end, wherein the middle portion is forward the first body end, and wherein the middle portion comprises a middle portion diameter less than a first diameter of the first head end and a second diameter of the second head end.

103. The electrode of claim 102, wherein the first diameter is less than the second diameter.

104. The electrode of claim 102, further comprising an attachment coupled to the middle portion of the electrode head.

105. The electrode of claim 104, wherein a thickness of the attachment and the middle portion diameter together are less than the second diameter.

106. The electrode of claim 104, wherein a thickness of the attachment and the middle portion diameter together are substantially similar to the second diameter.

107. The electrode of claim 104, wherein the attachment contacts the first head end and the middle portion, and wherein the attachment comprises a first thickness proximate the first head end and a second thickness proximate the middle portion.

108. The electrode of claim 107, wherein the first thickness and the first diameter are substantially similar in size to the second thickness and the middle portion diameter.

109. The electrode of claim 107, wherein at least one of the first thickness and the first diameter or the second thickness and the middle portion diameter are smaller in size than the second diameter.

~~110. The electrode of claim 107, wherein at least one of the first thickness and the first diameter or the second thickness and the middle portion diameter are substantially similar in size to the second diameter.~~

~~111. The electrode of claim 102, wherein the electrode head comprises an hourglass shape.~~

~~112. An electrode for a conducted electrical weapon comprising:~~

~~an electrode body having a first body end opposite a second body end;~~

~~an electrode head coupled to the first body end;~~

~~a rear nozzle disposed within the electrode body forward the second body end; and~~

~~a plurality of coupling points defined on the electrode body, the plurality of coupling points comprising a first coupling point coupling the electrode body to the electrode head, a second coupling point coupling the electrode body to the rear nozzle, and a third coupling point configured to couple the electrode body to a piston.~~

~~113. The electrode of claim 112, wherein the first coupling point is proximate the first body end, the third coupling point is proximate the second body end, and the second coupling point is between the first body end and the second body end.~~

~~114. The electrode of claim 113, wherein the second coupling point is closer to the third coupling point than the first coupling point.~~

~~115. The electrode of claim 112, wherein each of the electrode head, the rear nozzle, and the piston are at least partially disposed within the electrode body.~~

~~116. The electrode of claim 112, wherein the third coupling point is configured to decouple during a deployment.~~

~~117. The electrode of claim 112, wherein the first coupling point and the second coupling point are configured to remain coupled before, during, and after a deployment.~~

~~118. The electrode of claim 112, wherein the first coupling point is configured to decouple in response to a force of impact.~~

~~119. The electrode of claim 112, wherein one or more of the plurality of coupling points comprises a press fit coupling.~~

~~120. The electrode of claim 112, wherein one or more of the plurality of coupling points comprises a portion of the electrode body deformed radially inward.~~

~~121. The electrode of claim 112, wherein one or more of the plurality of coupling points comprises a protrusion extending radially inward from an inner surface of the electrode body.~~

~~122. An electrode for a conducted electrical weapon comprising:~~

~~an electrode body having a first body end opposite a second body end;~~

~~an electrode head coupled to the first body end, wherein the electrode head comprises a first head end opposite a second head end; and~~

~~an attachment coupled to a radially outer surface of the electrode head between the first head end and the second head end.~~

~~123. The electrode of claim 122, wherein the attachment is further coupled to the first head end.~~

~~124. The electrode of claim 122, wherein the attachment comprises an absorber configured to at least partially receive a force of impact.~~

~~125. The electrode of claim 124, wherein the attachment further comprises a spear.~~

~~126. The electrode of claim 122, wherein the electrode head comprises varying diameters across the radially outer surface, and wherein the attachment is coupled to the electrode head across the varying diameters.~~

~~127. The electrode of claim 122, wherein the first head end comprises a first diameter, the second head end comprises a second diameter, and a middle portion between the first head end and the second head end comprises a middle diameter, and wherein the middle diameter is smaller than each of the first diameter and the second diameter.~~

~~128. The electrode of claim 127, wherein the attachment comprises an aft inner surface that is radially inward from the first head end.~~

~~129. The electrode of claim 128, wherein the aft inner surface of the attachment is radially outward from the middle portion.~~

~~130. The electrode of claim 129, wherein the aft inner surface of the attachment is axially forward the second head end.~~

~~131. The electrode of claim 122, wherein the attachment comprises a training head.~~

~~132. The electrode of claim 131, wherein the training head comprises a plurality of hooks on a front surface of the training head.~~

~~133. The electrode of claim 131, wherein the training head comprises a retaining clip configured to engage a middle portion of the electrode head between the first head end and the second head end.~~

~~134. The electrode of claim 122, wherein the electrode head comprises a channel defined at the first head end, and wherein the attachment covers the channel.~~

~~135. The electrode of claim 122, wherein the attachment comprises a first attachment and a second attachment.~~

136. The electrode of claim 135, wherein the first attachment is coupled to a forward surface of the first head end, and wherein the second attachment is coupled to the radially outer surface of the electrode head between the first head end and the second head end.

137. The electrode of claim 135, wherein the first attachment comprises an electrically conductive material, and wherein the second attachment comprises an electrically non-conductive material.

138. The electrode of claim 135, wherein the first attachment comprises a spear, and wherein the second attachment comprises an absorber.

139. A cartridge for a conducted electrical weapon comprising:

a cartridge body;

a piston disposed within the cartridge body; and

an electrode disposed within the cartridge body forward the piston, the electrode comprising:

an electrode body having a first end opposite a second end; and

an electrode head coupled to the first end, wherein a portion of the piston is disposed within the second end, and wherein the second end of the electrode body is coupled to the piston.

140. The cartridge of claim 139, wherein the cartridge body comprises a piston stop, wherein the piston is configured to contact the piston stop during a deployment, and wherein in response to the piston contacting the piston stop the electrode body is configured to decouple from the piston.

141. The cartridge of claim 139, wherein the electrode comprises a filament comprising a first filament end opposite a second filament end, wherein the first filament end is coupled to the electrode head, and wherein the second filament end is coupled to the piston.

142. The cartridge of claim 141, wherein the second filament end remains coupled to the piston before, during, and after a deployment.

~~143. The cartridge of claim 141, wherein the electrode head, the filament, the piston, and the cartridge body are in electrical series.~~