CLAIMS:

1. An electrical discharge assembly for processing a workpiece having a first surface, a second surface, and a cooling passage communicating between the first and second surfaces, the passage having a first portion open at the first surface and a second portion open at the second surface, the assembly comprising:

a first electrode having a first shape for machining the first portion of the cooling passage; and

a second electrode having a second shape for machining the second portion of the cooling passage.

2. The electrical discharge assembly of claim 1, wherein the first and second electrodes are configured to be inserted into the cooling passage at the first portion.

3. The electrical discharge assembly of claim 2, wherein the second electrode is shaped to extend through the cooling passage and beyond the second surface when the second electrode is inserted into the cooling passage.

4. The electrical discharge assembly of claim 1, wherein the first and second electrodes are arranged on the electrode discharge assembly in an alternating arrangement.

5. The electrical discharge assembly of claim 1, wherein the first electrode has a greater cross-sectional area than the second electrode.

6. The electrical discharge assembly of claim 4, wherein a center-to-center distance between the first electrode and the second electrode is generally equal to a center-to-center distance between adjacent cooling passages in the workpiece.

7. The electrical discharge assembly of claim 6, further comprising:

an electrode support, wherein the first and second electrodes are positioned so that the first electrode can machine the first portion of the cooling passage and

the second electrode can machine a second portion of an adjacent cooling passage simultaneously.

8. The electrical discharge assembly of claim 1, wherein the first electrode has a portion with a generally triangular prism shape and the second electrode is generally cylindrical.

9. The electrical discharge assembly of claim 1, wherein the first and second electrodes are copper tungsten.

10. The electrical discharge assembly of claim 1 further comprising:
a power supply for electrically powering the first and second electrodes.

11. The electrical discharge assembly of claim 1 further comprising:
a delivery system for supplying a dielectric fluid to the cooling passage.

12. A method for repairing cooling passages in a workpiece, the method comprising:
positioning a first electrode having a first shape in a cooling passage in the workpiece;
electrically powering the first electrode to machine a first portion of the cooling passage;
positioning a second electrode having a second shape in the cooling passage; and
electrically powering the second electrode to machine a second portion of the cooling passage.

13. The method of claim 12, wherein the first electrode has a portion with a generally triangular prism shape and the second electrode is generally cylindrical.

14. The method of claim 12, wherein the first and second electrodes are copper tungsten.

15. The method of claim 12 further comprising:

supplying a dielectric fluid to the cooling passage.

16. A method for repairing cooling passages in a workpiece, each cooling passage having a first portion and a second portion, the method comprising:

positioning a first set of electrodes having a first shape in a first set of cooling passages in the workpiece;

positioning a second set of electrodes having a second shape in a second set of cooling passages in the workpiece;

electrically powering the first set of electrodes to machine the first portions of the first set of cooling passages;

electrically powering the second set of electrodes to machine the second portions of the second set of cooling passages;

positioning the first set of electrodes in the second set of cooling passages;

positioning the second set of electrodes in the first set of cooling passages;

electrically powering the first set of electrodes to machine the first portions of the second set of cooling passages; and

electrically powering the second set of electrodes to machine the second portions of the first set of cooling passages.

17. The method of claim 12, wherein the steps of positioning the first set of electrodes in the first set of cooling passages and positioning the second set of electrodes in the second set of cooling passages are performed simultaneously, and wherein the steps of electrically powering the first set of electrodes and electrically powering the second set of electrodes are performed simultaneously.

18. An electrical discharge assembly for repairing cooling passages of a workpiece, the cooling passages including a metering portion and a diffused portion, the electrical assembly comprising:

a first electrode having a portion with a generally triangular prism shape for machining a diffused portion of the cooling passage in the workpiece; and

a second generally cylindrical electrode for machining the metering portion of the cooling passage.

19. The electrical discharge assembly of claim 19, wherein the second electrode is laterally spaced from the first electrode on the electrode discharge assembly a center-to-center distance generally equal to a center-to-center distance between adjacent cooling passages.

20. The electrical discharge assembly of claim 19, wherein the first and second electrodes are copper tungsten.

21. A method for repairing a workpiece having a cooling passage, the method comprising:

removing a ceramic coating from the workpiece;

removing a bond coating from the workpiece;

brazing the workpiece;

applying a bond coating to the workpiece;

removing braze material and bond coating from the cooling passage, wherein the step of removing braze material and bond coating comprises:

positioning a first electrode having a first shape in the cooling passage;

electrically powering the first electrode to machine a first portion of the cooling passage;

positioning a second electrode having a second shape in the cooling passage; and

electrically powering the second electrode to machine a second portion of the cooling passage; and

applying a ceramic coating to the workpiece.

CLAIMS

1. An electrical discharge assembly for processing a workpiece having a first surface, a second surface, and a cooling passage communicating between the first and second surfaces, the passage having a first portion open at the first surface and a second portion open at the second surface, the assembly comprising:

a plurality of first electrodes having a first shape for machining the first portion of the cooling passage; and

a plurality of second electrodes having a second shape for machining the second portion of the cooling passage, wherein the first and second electrodes are arranged on the electrode discharge assembly in an alternating arrangement.

2. The electrical discharge assembly of claim **1**, wherein the first and second electrodes are configured to be inserted into the cooling passage at the first portion.

3. The electrical discharge assembly of claim **2**, wherein the second electrode is shaped to extend through the cooling passage and beyond the second surface when the second electrode is inserted into the cooling passage.

4. The electrical discharge assembly of claim **1**, wherein the first and second electrodes are generally equally spaced along the assembly.

5. The electrical discharge assembly of claim **1**, wherein the first electrode has a greater cross-sectional area than the second electrode.

6. The electrical discharge assembly of claim **1** further comprising:

a delivery system for supplying a dielectric fluid to the cooling passage.

7. The electrical discharge assembly of claim 1, further comprising:

an electrode support, wherein the pluralities of first and second electrodes are positioned so that one of the first electrodes can machine the first portion of the cooling passage and an adjacent second electrode can machine a second portion of an adjacent cooling passage simultaneously.

8. The electrical discharge assembly of claim 1, wherein the first electrode has a portion with a generally triangular prism shape and the second electrode is generally cylindrical.

9. The electrical discharge assembly of claim 1, wherein the first and second electrodes are copper tungsten.

10. The electrical discharge assembly of claim 1 further comprising:

a power supply for electrically powering the first and second electrodes.

11. An electrical discharge assembly for repairing cooling passages of a workpiece, the cooling passages including a metering portion and a diffused portion, the electrical discharge assembly comprising:

a plurality of first electrodes having a portion with a generally triangular prism shape for machining a diffused portion of the cooling passage in the workpiece; and

a plurality of second generally cylindrical electrodes for machining the metering portion of the cooling passage, wherein the first and second electrodes are arranged on the electrode discharge assembly in an alternating arrangement.

12. The electrical discharge assembly of claim **11**, wherein the first and second electrodes are generally equally spaced along the electrode discharge assembly.

13. The electrical discharge assembly of claim **11**, wherein the first and second electrodes are copper tungsten.