CLAIMS

What is claimed is:

1. A cutting element for an earth-boring tool, comprising:
a superabrasive table positioned on a substrate;
at least one indentation in a cutting face of the superabrasive table; and
at least one spoke extending radially across at least a portion of the at least one indentation.

2. The cutting element of claim 1, wherein the at least one spoke comprises an upper surface that is substantially coplanar with a substantially planar surface of the cutting face of the superabrasive table.

3. The cutting element of claim 1, wherein the at least one spoke comprises an upper surface that is angled relative to a substantially planar surface of the cutting face of the superabrasive table.

4. The cutting element of claim 3, wherein the at least one spoke comprises an upper surface that inclines toward the cutting face in one of a direction radially toward a central axis of the superabrasive table and a direction radially away from the central axis of the superabrasive table.

5. The cutting element of claim 1, wherein the at least one spoke comprises a circumferential width that varies along a radially extending length of the at least one spoke.

6. The cutting element of claim 5, wherein the at least one spoke comprises a circumferential width that increases along a radially extending length of the at least one spoke in one of a direction away from a central axis of the superabrasive table and a direction toward the central axis of the superabrasive table.

7. The cutting element of claim 1, further comprising a shaped feature in the substrate at an interface between the superabrasive table and the substrate corresponding to the at least one indentation in the cutting face of the superabrasive table.

8. The cutting element of claim 7, wherein the shaped feature in the substrate at the interface between the superabrasive table and the substrate comprises at least one indentation in the substrate having a shape similar to a shape of the indentation in the cutting face of the superabrasive table.

9. The cutting element of claim 8, wherein at least a portion of the at least one indentation in the substrate is positioned at least one of radially outward and radially inward of the at least one indentation in the cutting face of the superabrasive table relative to a longitudinal axis of the cutting element.

10. The cutting element of claim 1, wherein the at least one indentation extends along a path generally shaped as at least one of a circle, a polygon, and a Reuleaux polygon.

11. The cutting element of claim 1, wherein a cross-section of the at least one indentation in the cutting face of the superabrasive table taken perpendicular to the cutting face is generally shaped as one of a symmetric V-shape and an asymmetric V-shape.

12. The cutting element of claim 1, wherein the superabrasive table comprises a surface having a surface roughness less than about 10 μin. root mean square (RMS).

13. An earth-boring tool, comprising:

at least one cutting element comprising:

a superabrasive table positioned on a substrate;

an indentation in a cutting face of the superabrasive table; and

at least one spoke extending radially across at least a portion of the at least one indentation.

14. The earth-boring tool of claim 13, further comprising a depth-of-cut limiting feature positioned on the earth-boring tool to facilitate interaction between uncut earth formation and the at least one indentation in the cutting face of the superabrasive table during earth-boring operations.

15. The earth-boring tool of claim 14, wherein the depth-of-cut limiting feature is aligned with a deepest portion of the at least one indentation in the cutting face.

16. A method of forming a cutting element, the method comprising:

forming a superabrasive table having a cutting face, at least one indentation in the cutting face, and at least one spoke extending radially across at least a portion of the at least one indentation; and

positioning the superabrasive table on a substrate.

17. The method of claim 16 further comprising positioning a sacrificial structure within the at least one indentation.

18. The method of claim 17, wherein positioning a sacrificial structure within the at least one indentation comprises:

positioning the sacrificial structure within a mold;

positioning powdered precursor material comprising superabrasive particles within the mold and over the sacrificial structure; and

compacting the powdered precursor material.

19. The method of claim 17, wherein positioning a sacrificial structure within the at least one indentation comprises forming the sacrificial structure to have a surface that is substantially aligned and coplanar with an adjacent, substantially planar surface of the cutting face of the superabrasive table.

20. The method of claim 16, wherein forming a superabrasive table having a cutting face and at least one indentation in the cutting face comprises:

forming the superabrasive table to have a cutting face comprising a substantially planar surface; and

performing at least one of electrical discharge machining and laser machining the superabrasive table to form the at least one indentation in the cutting face.

CLAIMS

1. A cutting element for an earth-boring tool, comprising:

a superabrasive table positioned on a substrate;

at least one indentation in a cutting face of the superabrasive table; and

at least one spoke extending radially across at least a portion of the at least one indentation,

wherein the entirety of at least one indentation is positioned radially inward from a substantially planar portion of the cutting face adjacent a cutting edge of the cutting face with respect to a longitudinal axis of the cutting element, and wherein an upper surface of the at least one spoke is substantially continuous with one or both of the substantially planar portion of the cutting face adjacent the cutting edge and a substantially planar central portion of the cutting face.

2. The cutting element of claim 1, wherein the upper surface of the at least one spoke is substantially coplanar with a substantially planar surface of the cutting face of the superabrasive table.

3. The cutting element of claim 1, wherein the upper surface of the at least one spoke is angled relative to a substantially planar surface of the cutting face of the superabrasive table.

4. The cutting element of claim 3, wherein the upper surface of the at least one spoke inclines toward the cutting face in one of a direction radially toward a central axis of the superabrasive table and a direction radially away from the central axis of the superabrasive table.

5. The cutting element of claim 1, wherein the at least one spoke comprises a circumferential width that varies along a radially extending length of the at least one spoke.

6. The cutting element of claim 5, wherein the at least one spoke comprises a circumferential width that increases along a radially extending length of the at least one spoke in one of a direction away from a central axis of the superabrasive table and a direction toward the central axis of the superabrasive table.

7. The cutting element of claim 1, further comprising a shaped feature in the substrate at an interface between the superabrasive table and the substrate corresponding to the at least one indentation in the cutting face of the superabrasive table.

8. The cutting element of claim 7, wherein the shaped feature in the substrate at the interface between the superabrasive table and the substrate comprises at least one indentation in the substrate having a shape similar to a shape of the at least one indentation in the cutting face of the superabrasive table.

9. The cutting element of claim 8, wherein at least a portion of the at least one indentation in the substrate is positioned at least one of radially outward and radially inward of the at least one indentation in the cutting face of the superabrasive table relative to a longitudinal axis of the cutting element.

10. The cutting element of claim 1, wherein the at least one indentation extends along a path generally shaped as at least one of a circle, a polygon, and a Reuleaux polygon.

11. The cutting element of claim 1, wherein a cross-section of the at least one indentation in the cutting face of the superabrasive table taken perpendicular to the cutting face is generally shaped as one of a symmetric V-shape and an asymmetric V-shape.

12. The cutting element of claim 1, wherein the superabrasive table comprises a surface having a surface roughness less than about 10 μin. root mean square (RMS).

13. An earth-boring tool, comprising:

at least one cutting element comprising:

a superabrasive table positioned on a substrate;

at least one indentation in a cutting face of the superabrasive table; and

at least one spoke extending radially across at least a portion of the at least one indentation, wherein the entirety of at least one indentation is positioned radially inward from a substantially planar portion of the cutting face adjacent a cutting edge of the cutting face with respect to a longitudinal axis of the cutting element, and wherein an upper surface of the at least one spoke is substantially continuous with one or both of the substantially planar portion of the cutting face adjacent the cutting edge and a substantially planar central portion of the cutting face.

14. The earth-boring tool of claim 13, further comprising a depth-of-cut limiting feature positioned on the earth-boring tool to facilitate interaction between uncut earth formation and the at least one indentation in the cutting face of the superabrasive table during earth-boring operations.

15. The earth-boring tool of claim 14, wherein the depth-of-cut limiting feature is aligned with a deepest portion of the at least one indentation in the cutting face.

16. A method of forming a cutting element, the method comprising:

forming a superabrasive table having a cutting face, at least one indentation in the cutting face, and at least one spoke extending radially across at least a portion of the at least one indentation, wherein the entirety of at least one indentation is positioned radially inward from a substantially planar portion of the cutting face adjacent a cutting edge of the cutting face with respect to a longitudinal axis of the cutting element, and wherein an upper surface of the at least one spoke is substantially continuous with one or both of the substantially planar portion of the cutting face adjacent the cutting edge and a substantially planar central portion of the cutting face; and

positioning the superabrasive table on a substrate.

17. The method of claim 16, further comprising positioning a sacrificial structure within the at least one indentation.

18. The method of claim 17, wherein positioning a sacrificial structure within the at least one indentation comprises:

positioning the sacrificial structure within a mold;

positioning powdered precursor material comprising superabrasive particles within the mold and over the sacrificial structure; and

compacting the powdered precursor material.

19. The method of claim 17, wherein positioning a sacrificial structure within the at least one indentation comprises forming the sacrificial structure to have a surface that is substantially aligned and coplanar with an adjacent, substantially planar surface of the cutting face of the superabrasive table.

20. The method of claim 16, wherein forming a superabrasive table having a cutting face and at least one indentation in the cutting face comprises:

forming the superabrasive table to have a cutting face comprising a substantially planar surface; and

performing at least one of electrical discharge machining and laser machining the superabrasive table to form the at least one indentation in the cutting face.