CLAIMS

1. A food cutter having a food travel axis, the food cutter comprising:

a blade carrier; and

a plurality of disc blades mounted to the blade carrier,

each of the plurality of disc blades defining a corresponding blade rotation axis, each disc blade being rotatable relative to the blade carrier about the corresponding blade rotation axis, the corresponding blade rotation axis of the disc blade being perpendicular to and offset from the food travel axis,

each disc blade having a perimeter edge at a constant radius from the corresponding blade rotation axis,

the perimeter edge of each disc blade having a series of alternating peaks and valleys, each peak and valley having an amplitude in a direction parallel to the corresponding blade rotation axis.

2. The food cutter of claim 1, wherein the perimeter edge of each disc blade abuts the perimeter edge of at least one other disc blade.

3. The food cutter of claim 1 or 2, wherein the perimeter edge of each disc blade abuts the food travel axis.

4. The food cutter of any one of claims 1 to 3, wherein:
the plurality of disc blades includes a first disc blade and a second disc blade, and
the second disc blade is positioned downstream of the first disc blade.

5. The food cutter of any one of claims 1 to 4, wherein each disc blade is freely rotatable relative to the blade carrier about the corresponding blade rotation axis.

6. The food cutter of any one of claims 1 to 3, wherein:
the plurality of disc blades includes a first disc blade, and
the first disc blade is drivingly coupled to a rotary driver.

7. The food cutter of any one of claims 1 to 6, wherein the plurality of disc blades includes a circular arrangement of disc blades surrounding the food travel axis.

8. The food cutter of claim 7, wherein the circular arrangement of disc blades comprises at least three disc blades.

9. The food cutter of claim 7 or 8, wherein the circular arrangement of disc blades are evenly distributed along an imaginary circle that surrounds the food travel axis.

10. The food cutter of any one of claims 7 to 9, wherein the perimeter edge of each disc blade in the circular arrangement of disc blades is abutting the perimeter edge of each other disc blade in the circular arrangement of disc blades.

11. The food cutter of any one of claims 7 to 10, wherein the perimeter edge of each disc blade in the circular arrangement of disc blades is abutting the food travel axis.

12. The food cutter of any one of claims 1 to 11, wherein the perimeter edge of each disc blade has the same number of peaks and valleys.

13. The food cutter of claim 1, wherein the plurality of disc blades includes at least a first row of disc blades and a second row of disc blades.

14. The food cutter of claim 13, wherein:
the blade rotation axis of each disc blade in the first row of disc blades is collinear with the blade rotation axis of each other disc blade in the first row of disc blades, and

the blade rotation axis of each disc blade in the second row of disc blades is collinear with the blade rotation axis of each other disc blade in the second row of disc blades.

15. The food cutter of claim 13 or 14, wherein:
the perimeter edge of each disc blade in the first row of disc blades abuts the perimeter edge of a respective disc blade in the second row of disc blades.

16. The food cutter of any one of claims 13 to 15, wherein:
the blade rotation axis of each disc blade in the first row of disc blades is parallel with the blade rotation axis of each disc blade in the second row of disc blades.

17. The food cutter of any one of claims 13 to 16, wherein:
the plurality of disc blades includes at least a third row of disc blades and a fourth row of disc blades,

the blade rotation axis of each disc blade in the third row of disc blades is collinear with the blade rotation axis of each other disc blade in the third row of disc blades,

the blade rotation axis of each disc blade in the fourth row of disc blades is collinear with the blade rotation axis of each other disc blade in the fourth row of disc blades,

the perimeter edge of each disc blade in the third row of disc blades abuts the perimeter edge of a respective disc blade in the fourth row of disc blades, and

the blade rotation axis of each disc blade in the third and fourth rows of disc blades is non-parallel with the blade rotation axis of each disc blade in the first and second rows of disc blades.

18. The food cutter of claim 17, wherein:
the blade rotation axis of each disc blade in the third and fourth rows of disc blades is perpendicular to the blade rotation axis of each disc blade in the first and second rows of disc blades.

19. The food cutter of claim 17 or 18, wherein:
the third and fourth rows of disc blades are positioned downstream of the first and second rows of disc blades.

20. A food cutter having a food travel axis, the food cutter comprising:

a blade carrier; and

a plurality of disc blades mounted to the blade carrier,

each of the plurality of disc blades defining a corresponding blade rotation axis, each disc blade being rotatable relative to the blade carrier about the corresponding blade rotation axis, the corresponding blade rotation axis of the disc blade being perpendicular to and offset from the food travel axis,

each disc blade having a perimeter edge at a constant radius from the corresponding blade rotation axis,

each of the plurality of disc blades having a corresponding incision axis that is parallel to the food travel axis and tangent to the perimeter edge of the disc blade, wherein the incision axis of each of the plurality of disc blades is substantially collinear with the incision axis of at least one other of the plurality of disc blades,

wherein the plurality of disc blades includes a first disc blade and a second disc blade, and the second disc blade is positioned downstream of the first disc blade.

21. The food cutter of claim 20, wherein each disc blade is freely rotatable relative to the blade carrier about the corresponding blade rotation axis.

22. The food cutter of claim 20 or 21, wherein:
the first disc blade is drivingly coupled to a rotary driver.

23. The food cutter of any one of claims 20 to 22, wherein the plurality of disc blades includes a circular arrangement of disc blades surrounding the food travel axis.

24. The food cutter of claim 23, wherein the circular arrangement of disc blades comprises at least 3 disc blades.

25. The food cutter of claim 23, wherein the circular arrangement of disc blades are evenly distributed along an imaginary circle that surrounds the food travel axis.

26. The food cutter of any one of claims 23 to 25, wherein the perimeter edge of each disc blade in the circular arrangement of disc blades is abutting the perimeter edge of each other disc blade in the circular arrangement of disc blades.

27. The food cutter of any one of claims 23 to 24, wherein the perimeter edge of each disc blade in the circular arrangement of disc blades is abutting the food travel axis.

28. The food cutter of any one of claims 20 to 27, wherein the perimeter edge of each disc blade has the same number of peaks and valleys.

29. The food cutter of claim 20, wherein the plurality of disc blades includes at least a first row of disc blades and a second row of disc blades.

30. The food cutter of claim 29, wherein:

the blade rotation axis of each disc blade in the first row of disc blades is collinear with the blade rotation axis of each other disc blade in the first row of disc blades, and

the blade rotation axis of each disc blade in the second row of disc blades is collinear with the blade rotation axis of each other disc blade in the second row of disc blades.

31. The food cutter of claim 29 or 30, wherein:
the incision axis of each disc blade in the first row of disc blades is substantially collinear with the incision axis of a respective disc blade in the second row of disc blades.

32. The food cutter of any one of claims 29 to 31, wherein:
the perimeter edge of each disc blade in the first row of disc blades abuts the perimeter edge of a respective disc blade in the second row of disc blades.

33. The food cutter of any one of claims 29 to 32, wherein:
the blade rotation axis of each disc blade in the first row of disc blades is parallel with the blade rotation axis of each disc blade in the second row of disc blades.

34. The food cutter of any one of claims 29 to 33, wherein:
the plurality of disc blades includes at least a third row of disc blades and a fourth row of disc blades,

the blade rotation axis of each disc blade in the third row of disc blades is collinear with the blade rotation axis of each other disc blade in the third row of disc blades,

the blade rotation axis of each disc blade in the fourth row of disc blades is collinear with the blade rotation axis of each other disc blade in the fourth row of disc blades,

the perimeter edge of each disc blade in the third row of disc blades abuts the perimeter edge of a respective disc blade in the fourth row of disc blades, and

the blade rotation axis of each disc blade in the third and fourth rows of disc blades is non-parallel with the blade rotation axis of each disc blade in the first and second rows of disc blades.

35. The food cutter of claim 34, wherein:
the blade rotation axis of each disc blade in the third and fourth rows of disc blades is perpendicular to the blade rotation axis of each disc blade in the first and second rows of disc blades.

36. The food cutter of claim 34 or 35, wherein:

the third and fourth rows of disc blades are positioned downstream of the first and second rows of disc blades.

37. A method of cutting food into food pieces, the method comprising:

moving a food item in a downstream direction along a food travel axis toward a plurality of rotatable disc blades,

wherein the food item strikes the plurality of disc blades, wherein each disc blade defines a corresponding blade rotation axis;

wherein each disc blade penetrates the food item,

each disc blade having a perimeter edge with a series of alternating peaks and valleys, each peak and valley having an amplitude in a direction parallel to the corresponding blade rotation axis,

moving the food item downstream through the plurality of disc blades,

wherein each disc blade in the plurality of disc blades is rotated as the food item moves through the plurality of disc blades; and

cutting the food item into food pieces by incisions made by the plurality of disc blades by moving the food item through the plurality of disc blades.

38. The method of claim 37, wherein:

each disc blade is freely rotatable about a respective blade rotation axis, and

each disc blade is rotated at a blade rotation speed governed by interaction between: (i) the food item, and (ii) the peaks and valleys of each disc blade that pierce the food item.

39. The method of claim 37, wherein:
each disc blade is rotated about its corresponding blade rotation axis by a rotary driver.

40. The method of any one of claims 37 to 39, wherein:

in moving the food item downstream through the plurality of disc blades, each disc blade forms an incision in the food item with a terminal end in an interior of the food item, and

the incision formed by each disc blade cooperates with the incision formed by at least one other disc blade to divide the food item into food pieces.

41. The method of claim 40, wherein:

the terminal end of the incision formed by each disc blade abuts the terminal end of the incision formed by at least one other disc blade.

42. The method of any one of claims 37 to 39, wherein:

in moving the food item downstream through the plurality of disc blades, each disc blade forms an incision in the food item, and

the incision formed by each disc blade has a wavy profile defined by the peaks and valleys of that disc blade.

43. The method of claim 42, wherein:

the wavy profile of each incision includes peaks and valleys that alternate in the downstream direction.

44. The method of any one of claims 37 to 39, wherein:

in moving the food item downstream through the plurality of disc blades, each disc blade forms an incision in the food item, and

said dividing the food item into food pieces comprises dividing the food item into a plurality of wedges, each wedge having a first face intersecting a second face at a wedge apex, each of the first and second faces having been made by the incision formed by a different one of the plurality of disc blades.

45. The method of claim 44, wherein:

each of the first and second faces of each wedge has a wavy profile defined by the peaks and valleys of the disc blade that formed the incision that made each face.

46. The method of claim 45, wherein:
the wavy profile of each of the first and second faces includes peaks and valleys that alternate in the downstream direction.

47. The method of any one of claims 37 to 39, wherein:

the food pieces are food slices, and

the method further comprises

striking a second plurality of disc blades with the food slices,

moving the food slices downstream through the second plurality of disc blades,

wherein each disc blade in the second plurality of disc blades is rotated as the food slices move through the second plurality of disc blades, wherein each disc blade in the second plurality of disc blades is rotated at a blade rotation speed governed by interaction between: (i) the food slices and (ii) the peaks and valleys of each disc blade that pierce the food item; and

cutting the food slices into food sticks by incisions made by the second plurality of disc blades by moving the food item through the plurality of disc blades.

48. The method of claim 47, wherein:

the plurality of disc blades is a first plurality of disc blades,

the incisions made by the first plurality of disc blades are substantially parallel,

the incisions made by the second plurality of disc blades are substantially parallel, and

the incisions made by the first plurality of disc blades are non-parallel to the incisions made by the second plurality of disc blades.

49. The method of claim 47 or 48, wherein:

the incisions made by the first plurality of disc blades are substantially perpendicular to the incisions made by the second plurality of disc blades.

50. The method of any one of claims 47 to 49, wherein:

each food stick has an upstream end, a downstream end, and four sides each extending from the upstream end to the downstream end, and

the four sides of each food stick were made by the incisions of two different disc blades of the first plurality of disc blades and by two different disc blades of the second plurality of disc blades.

51. The method of any one of claims 47 to 49, wherein:

each food stick has an upstream end, a downstream end, and four sides each extending from the upstream end to the downstream end, and

each of the four sides of each food stick has a wavy profile including peaks and valleys that alternate in the downstream direction.

52. The method of claim 37, wherein:

each disc blade is freely rotatable about a respective blade rotation axis, and

the blade rotation axis of each disc blade is perpendicular to and offset from the food travel axis.

53. The method of claim 52, wherein:

the perimeter edge of each disc blade is at a constant radius from a blade rotation axis of that disc blade.

54. The method of claim 52 or 53, wherein:

the perimeter edge of each disc blade abuts the perimeter edge of at least one other disc blade.

55. A method of cutting food into food pieces, the method comprising:

moving a food item in a downstream direction along a food travel axis toward a plurality of rotatable disc blades,

wherein the food item strikes the plurality of disc blades, wherein each disc blade defines a corresponding blade rotation axis,

wherein the plurality of disc blades includes at least a first disc blade and a second disc blade, the second disc blade being downstream of the first disc blade,

wherein the food item striking the plurality of disc blades comprises the food item striking the first disc blade followed by the second disc blade,

wherein each disc blade penetrates the food item,

wherein each disc blade has a perimeter edge at a constant radius from the corresponding blade rotation axis;

moving the food item downstream through the plurality of disc blades; and

cutting the food item into food pieces by incisions made by the plurality of disc blades by moving the food item through the plurality of disc blades, each disc blade forming an incision in the food item with a terminal end in an interior of the food item, and the terminal end of each incision abutting the terminal end of an incision formed by at least one other of the plurality of disc blades,

wherein the terminal end of the incision formed by the first disc blade abuts the terminal end of the incision formed by the second disc blade.

56. The method of claim 55, wherein:

the perimeter edge of each disc blade abuts the perimeter edge of at least one other disc blade.

57. The method of claim 55 or 56, wherein:

the incision formed by each disc blade cooperates with the incision formed by at least one other disc blade to divide the food item into food pieces.

58. The method of any one of claims 55 to 57, wherein:

the incision formed by each disc blade has a wavy profile that includes peaks and valleys that alternate in the downstream direction.