CLAIMS:

1. An airfoil comprising:

a leading edge and a trailing edge;

a suction surface and a pressure surface, the suction surface and the pressure surface both extending axially to connect the leading edge to the trailing edge, the suction surface and the pressure surface both extending radially from a root section of the airfoil to the a tip section of the airfoil;

a tip shelf formed along the tip section, the tip shelf including a triangular cooling pocket.

2. The airfoil of claim 1, wherein the triangular pocket includes a first side that is open to and continuous with the pressure surface.

3. The airfoil of claim 2, wherein the triangular pocket includes a second side attached to the first side at a first point located near the pressure surface, the second side having a second side wall extending from the first point across the tip section toward the suction surface at an acute angle.

4. The airfoil of claim 3, wherein the triangular pocket includes a third side attached to the second side at a second point located between the pressure surface and the suction surface, the third side having a third side wall extending from the second point across the tip section toward the pressure surface.

5. The airfoil of claim 4, wherein the third side is attached to the first side at a third point located near the pressure surface, the third side wall extending from the third point across the tip section to the second point at an acute angle.

6. The airfoil of claim 1, wherein a cooling hole is located inside of the triangular pocket.

7. The airfoil of claim 1, wherein a cooling slot is located inside of the triangular pocket.

8. A rotor blade for a gas turbine engine, the rotor blade comprising:

an airfoil including a convex surface and a concave surface, both the convex surface and the concave surface extending radially from a root section to a tip section and axially from a leading edge to a trailing edge, wherein a mean camber line is defined midway between the convex surface and the concave surface;

a tip shelf extending axially along the tip section between the mean camber line and the concave surface, the tip shelf including at least one wall positioned perpendicular to fluid flow streamlines.

9. The rotor blade of claim 8, wherein the tip shelf includes a plurality of shelf sections and each self section includes a wall positioned perpendicular to fluid flow streamlines.

10. The rotor blade of claim 9, wherein the walls positioned perpendicular to fluid flow streamlines are connected by a plurality of opposing walls to form a zig-zag perimeter for the tip shelf.

11. The rotor blade of claim 10, wherein the tip shelf is radially open to the concave surface.

12. The rotor blade of claim 10, furthering comprising:

a squealer pocket located on the tip section.

13. The rotor blade of claim 12, wherein at least a portion of the squealer pocket is located axially upstream from the tip shelf.

14. The rotor blade of claim 10, further comprising:

a plurality of cooling outlets formed in the tip shelf to maintain a pocket of cooling fluid along the tip section.

15. An airfoil for a gas turbine engine, the airfoil comprising:

a leading edge and a trailing edge, the leading edge and the trailing edge both extending from a root section to a tip section;

a pressure surface and a suction surface, the pressure surface and the suction surface both extending between the leading edge and the trailing edge, the pressure surface and the suction surface defining a mean camber line therebetween; and

a tip shelf located at the tip section, the tip shelf including a plurality of triangular recesses, each triangular recess having three sides, wherein two of the sides are defined by perimeter walls.

16. The airfoil of claim 15, wherein one side of each triangular recess is open to the pressure surface.

17. The airfoil of claim 15, wherein the tip shelf extends along more than 50% of a chord line of the airfoil.

18. The airfoil of claim 15, wherein the triangular recesses are located between the mean camber line and the pressure surface.

19. The airfoil of claim 15, further comprising:

at least one cooling hole or cooling slot located in each triangular recess.

20. The airfoil of claim 15, wherein at least one perimeter wall of each triangular recess is oriented perpendicular to streamlines of fluid flow.

CLAIMS

1. An airfoil comprising:

a leading edge and a trailing edge;

a suction surface and a pressure surface, the suction surface and the pressure surface both extending axially to connect the leading edge to the trailing edge, the suction surface and the pressure surface both extending radially from a root section of the airfoil to a tip section of the airfoil, wherein the tip section has a tip surface, and wherein a mean camber line is defined midway between the suction surface and the pressure surface;

a tip shelf formed along the tip section, the tip shelf comprising:

a first tip pocket floor recessed from the tip surface;

a first wall extending from a first location proximate the pressure surface towards the mean camber line;

a second wall extending from a second location proximate the pressure surface towards the mean camber line, wherein the first and second walls intersect, and wherein the first tip pocket floor, the first wall and the second wall define a first triangular cooling pocket; a second tip pocket floor recessed from the tip surface;

a third wall extending from the second location proximate the pressure surface towards the mean camber line; and a fourth wall extending from a third location proximate the pressure surface towards the mean camber line, wherein the third and fourth walls intersect, and wherein the second tip pocket floor, the third wall and fourth wall define a second triangular cooling pocket.

2. The airfoil of claim 1, wherein the first triangular pocket includes a first side that is open to and continuous with the pressure surface.

3. The airfoil of claim 1, wherein the first wall extends from the first location proximate the pressure surface across the tip section toward the suction surface at an acute angle.

4. The airfoil of claim 1, wherein the second wall extends from the second location proximate the pressure surface across the tip section toward the suction surface at an acute angle.

5. The airfoil of claim 1, wherein a cooling hole is located inside of the first triangular pocket.

6. The airfoil of claim 1, wherein a cooling slot is located inside of the first triangular pocket.

7. A rotor blade for a gas turbine engine, the rotor blade comprising:

an airfoil including a convex surface and a concave surface, both the convex surface and the concave surface extending radially from a root section to a tip section and axially from a leading edge to a trailing edge, wherein a mean camber line is defined midway between the convex surface and the concave surface;

a tip shelf extending axially along the tip section between the mean camber line and the concave surface, wherein the tip shelf includes a plurality of shelf sections and each shelf section includes a wall positioned perpendicular to fluid flow streamlines, and wherein the walls positioned perpendicular to fluid flow streamlines are connected by a plurality of opposing walls to form a zig-zag perimeter for the tip shelf.

8. The rotor blade of claim 7, wherein the tip shelf is radially open to the concave surface.

9. The rotor blade of claim **7**, furthering comprising:

a squealer pocket located on the tip section.

10. The rotor blade of claim **9**, wherein at least a portion of the squealer pocket is located axially upstream from the tip shelf.

11. The rotor blade of claim **7**, further comprising:

a plurality of cooling outlets formed in the tip shelf to maintain a pocket of cooling fluid along the tip section.

12. An airfoil for a gas turbine engine, the airfoil comprising:

a leading edge and a trailing edge, the leading edge and the trailing edge both extending from a root section to a tip section;

a pressure surface and a suction surface, the pressure surface and the suction surface both extending between the leading edge and the trailing edge, the pressure surface and the suction surface defining a mean camber line therebetween; and

a tip shelf located at the tip section, the tip shelf including a plurality of triangular recesses, each triangular recess having three sides and a substantially planar floor, wherein two of the sides are defined by perimeter walls, wherein at least one perimeter wall of each triangular recess is oriented perpendicular to streamlines of fluid flow.

13. The airfoil of claim **12**, wherein one side of each triangular recess is open to the pressure surface.

14. The airfoil of claim **12**, wherein the tip shelf extends along more than 50% of a chord line of the airfoil.

15. The airfoil of claim **12**, wherein the triangular recesses are located between the mean camber line and the pressure surface.

16. The airfoil of claim **12**, further comprising:

at least one cooling hole or cooling slot located in each triangular recess.