CLAIMS

What is claimed is:

1. An airfoil for a gas turbine engine, comprising:

an airfoil body that extends between a leading edge and a trailing edge; and

a cooling circuit defined within said airfoil body, wherein said cooling circuit includes at least one trip strip disposed within a cavity of said cooling circuit between a leading edge inner wall and a first rib, wherein said at least one trip strip includes an increasing height in a direction from said first rib toward said leading edge inner wall.

2. The airfoil as recited in claim 1, wherein said airfoil is a blade.

3. The airfoil as recited in claim 1, wherein said airfoil is a vane.

4. The airfoil as recited in claim 1, wherein said cavity extends between a suction side inner wall and a pressure side inner wall and said increasing height extends in a direction from one of said suction side inner wall and said pressure side inner wall toward the other of said suction side inner wall and said pressure side inner wall.

5. The airfoil as recited in claim 1, wherein said at least one trip strip includes a leading edge portion adjacent said leading edge inner wall and a trailing edge portion adjacent to said first rib.

6. The airfoil as recited in claim 5, wherein said leading edge portion is generally perpendicular to said leading edge inner wall.

7. The airfoil as recited in claim 5, wherein a gap extends between said leading edge portion of said at least on trip strip and said leading edge inner wall.

8. The airfoil as recited in claim 1, wherein said at least one trip strip is hockey stick shaped.

9. The airfoil as recited in claim 1, wherein said at least on trip strip includes at least two trip strips that are arranged in a V-shaped chevron configuration.

10. The airfoil as recited in claim 9, wherein said at least two trip strips are staggered along said cavity of said cooling circuit.

11. The airfoil as recited in claim 1, wherein said at least on trip strip includes at least a first trip strip and a second trip strip having a different configuration from said first trip strip.

12. The airfoil as recited in claim 11, wherein said first trip strip and said second trip strip are non-symmetrically arranged relative to a mean camber line of said cavity of said cooling circuit.

13. A gas turbine engine, comprising:

a compressor section;

a combustor section in fluid communication with said compressor section;

a turbine section in fluid communication said combustor section;

an airfoil disposed in at least one of said compressor section and said turbine section, wherein said airfoil includes an airfoil body that extends between a leading edge and a trailing edge;

a cooling circuit disposed within said airfoil body and having a cavity adjacent to said leading edge, wherein said cavity includes a leading edge inner wall, a suction side inner wall and a pressure side inner wall; and

a trip strip that includes a leading edge portion that extends a first distance from at least one of said suction side inner wall and said pressure side inner wall and a trailing edge portion that extends a second distance from at least one of said suction side inner wall and said pressure side inner wall, wherein said first distance is greater than said second distance.

14. The gas turbine engine as recited in claim 13, wherein said leading edge portion is adjacent to said leading edge inner wall and said trailing edge portion is adjacent to a rib of said cavity.

15. The gas turbine engine as recited in claim 13, wherein said leading edge portion is generally perpendicular to said leading edge inner wall.

16. The gas turbine engine as recited in claim 13, wherein the gas turbine engine is a land based gas turbine engine.

17. The gas turbine engine as recited in claim 13, wherein the gas turbine engine is a turbofan gas turbine engine.

18. A method for cooling an airfoil of a gas turbine engine, comprising the steps of:

communicating a cooling airflow through a cavity of a cooling circuit of the airfoil; and

directing a first portion of the cooling airflow axially along an upstream face of at least one trip strip of the cooling circuit toward a leading edge of the airfoil to cool the leading edge of the airfoil.

19. The method as recited in claim 18, comprising the step of:
providing a gap between a leading edge inner wall of the airfoil and a leading edge portion of the at least one trip strip.

20. The method as recited in claim 18, comprising the step of:
directing a second portion of the cooling airflow across a height of the at least one trip strip.

CLAIMS

1. An airfoil for a gas turbine engine, comprising:

an airfoil body that extends between a leading edge and a trailing edge; and

a cooling circuit defined within said airfoil body, wherein said cooling circuit includes at least one trip strip disposed within a cavity of said cooling circuit between a leading edge inner wall and a first rib, wherein said at least one trip strip includes a continuously increasing height in a direction from said first rib toward said leading edge inner wall.

2. The airfoil as recited in claim 1, wherein said airfoil is a blade.

3. The airfoil as recited in claim 1, wherein said airfoil is a vane.

4. The airfoil as recited in claim 1, wherein said cavity extends between a suction side inner wall and a pressure side inner wall and said increasing height extends in a direction from one of said suction side inner wall and said pressure side inner wall toward the other of said suction side inner wall and said pressure side inner wall.

5. The airfoil as recited in claim 1, wherein said at least one trip strip includes a leading edge portion adjacent said leading edge inner wall and a trailing edge portion adjacent to said first rib.

6. The airfoil as recited in claim 5, wherein said leading edge portion is generally perpendicular to said leading edge inner wall.

7. The airfoil as recited in claim 5, wherein a gap extends between said leading edge portion of said at least one trip strip and said leading edge inner wall.

8. The airfoil as recited in claim 1, wherein said at least one trip strip is hockey stick shaped.

9. The airfoil as recited in claim 1, wherein said at least one trip strip includes at least two trip strips that are arranged in a V-shaped chevron configuration.

10. The airfoil as recited in claim 9, wherein said at least two trip strips are staggered along said cavity of said cooling circuit.

11. The airfoil as recited in claim 1, wherein said at least one trip strip includes at least a first trip strip and a second trip strip having a different configuration from said first trip strip.

12. The airfoil as recited in claim 11, wherein said first trip strip and said second trip strip are non-symmetrically arranged relative to a mean camber line of said cavity of said cooling circuit.

13. A gas turbine engine, comprising:

a compressor section;

a combustor section in fluid communication with said compressor section;

a turbine section in fluid communication said combustor section;

an airfoil disposed in at least one of said compressor section and said turbine section, wherein said airfoil includes an airfoil body that extends between a leading edge and a trailing edge;

a cooling circuit disposed within said airfoil body and having a cavity adjacent to said leading edge, wherein said cavity includes a leading edge inner wall, a suction side inner wall and a pressure side inner wall; and

a trip strip that includes a leading edge portion that extends a first distance from at least one of said suction side inner wall and said pressure side inner wall and a trailing edge portion that extends a second distance from at least one of said suction side inner wall and said pressure side inner wall, wherein said first distance is greater than said second distance such that said leading edge portion extends further toward a center of said cavity than said trailing edge portion.

14. The gas turbine engine as recited in claim 13, wherein said leading edge portion is adjacent to said leading edge inner wall and said trailing edge portion is adjacent to a rib of said cavity.

15. The gas turbine engine as recited in claim 13, wherein said leading edge portion is generally perpendicular to said leading edge inner wall.

16. The gas turbine engine as recited in claim 13, wherein the gas turbine engine is a land based gas turbine engine.

17. The gas turbine engine as recited in claim 13, wherein the gas turbine engine is a turbofan gas turbine engine.

18. A method for cooling an airfoil of a gas turbine engine, comprising the steps of:

communicating a cooling airflow through a cavity of a cooling circuit of the airfoil, the cavity extending between a leading edge inner wall and a first rib; and

directing a first portion of the cooling airflow axially along an upstream face of at least one trip strip of the cooling circuit toward a leading edge of the airfoil to cool the leading edge of the airfoil, the at least one trip strip including a thickness that continuously increases in a direction that extends from the first rib toward the leading edge inner wall.

19. The method as recited in claim 18, comprising the step of:

providing a gap between the leading edge inner wall of the airfoil and a leading edge portion of the at least one trip strip.

20. The method as recited in claim 18, comprising the step of:

directing a second portion of the cooling airflow across a height of the at least one trip strip.