CLAIMS

1. A gas turbine engine, comprising:

a heat exchanger that exchanges heat with a bleed airflow to provide a conditioned airflow;

a bearing compartment in fluid communication with said heat exchanger, wherein a first passageway communicates said conditioned airflow to said bearing compartment, said conditioned airflow is communicated radially between a bearing housing of said bearing compartment and a diffuser case; and

a nozzle assembly in fluid communication with said bearing compartment, and a second passageway communicates said conditioned airflow from said bearing compartment and then through a plurality of openings of said nozzle assembly.

2. The gas turbine engine as recited in claim 1, wherein said nozzle assembly is a tangential onboard injection (TOBI) nozzle.

3. The gas turbine engine as recited in claim 1, comprising a rotor assembly downstream from said nozzle assembly, wherein said rotor assembly is conditioned by said conditioned airflow from said nozzle assembly.

4. The gas turbine engine as recited in claim 1, wherein said first passageway and said second passageway include tubing.

said bearing compartment, wherein said support includes at least one opening for communicating said conditioned airflow from said bearing compartment into said second passageway.

6. The gas turbine engine as recited in claim 1, wherein said bleed airflow is communicated from a compressor section of the gas turbine engine.

7. The gas turbine engine as recited in claim 1, wherein said heat exchanger exchanges heat between said bleed airflow and a fan airflow to render said conditioned airflow.

8. The gas turbine engine as recited in claim 1, wherein said conditioned airflow is communicated radially outwardly from said bearing housing of said bearing compartment.

9. A gas turbine engine, comprising:

a compressor section, a combustor section and a turbine section circumferentially disposed about an engine centerline axis;

a buffer cooling system that establishes a buffer cooled cooling air path that conditions a part of at least one of said compressor section and said turbine section, wherein said buffer cooling system includes a heat exchanger, a passageway and a nozzle assembly, and said buffer cooled cooling air path extends from said heat exchanger through said passageway, and then through said nozzle assembly to condition hardware of at least one of said compressor section and said turbine section; and

a second nozzle assembly, wherein a first portion of a conditioned airflow of said buffer cooled cooling air path is communicated through said nozzle assembly to condition said turbine section and a second portion of said conditioned airflow is communicated through said second nozzle assembly to condition said compressor section.

10. The gas turbine engine as recited in claim 9, wherein said hardware includes a rotor assembly.

11. The gas turbine engine as recited in claim 9, wherein said nozzle assembly is a tangential onboard injection (TOBI) nozzle.

wherein said buffer cooled cooling air path extends through a portion of said bearing compartment between said passageway and said nozzle assembly.

13. The gas turbine engine as recited in claim 12, wherein said buffer cooled cooling air path communicates a conditioned airflow radially outwardly from a bearing housing of said bearing compartment.

14. The gas turbine engine as recited in claim 9, wherein said heat exchanger exchanges heat between a bleed airflow and a fan airflow to render a conditioned airflow that is communicated along said buffer cooled cooling air path.

15. The gas turbine engine as recited in claim 9, wherein said first portion of said conditioned airflow is communicated downstream through said passageway and said second portion is communicated upstream through a second, different passageway.

16. A method of conditioning a portion of a gas turbine engine, comprising:

removing heat from a bleed airflow to render a conditioned airflow;

communicating the conditioned airflow through at least a portion of a bearing compartment of the gas turbine engine, wherein the conditioned airflow is communicated radially between a bearing housing of the bearing compartment and a diffuser case; and

feeding the conditioned airflow from the bearing compartment through a plurality of openings of a nozzle assembly to a downstream location of the gas turbine engine.

17. The method as recited in claim 16, comprising the step of cooling a rotor assembly of the gas turbine engine with the conditioned airflow.

18. The method as recited in claim 16, wherein the step of communicating the conditioned airflow includes:

communicating the conditioned airflow from a heat exchanger, through a passageway, then through the bearing compartment, and then through the nozzle assembly.

Claims

1. A gas turbine engine, comprising:

a heat exchanger that exchanges heat with a bleed airflow to provide a conditioned airflow;

a bearing compartment in fluid communication with said heat exchanger, wherein a first passageway communicates said conditioned airflow to said bearing compartment, said conditioned airflow is communicated radially between a bearing housing of said bearing compartment and a diffuser case and then through an opening of a strut that extends radially between said diffuser case and said bearing compartment; and

a nozzle assembly in fluid communication with said bearing compartment, and a second passageway communicates said conditioned airflow from said bearing compartment and then through a plurality of openings of said nozzle assembly.

2. The gas turbine engine as recited in claim 1, wherein said nozzle assembly is a tangential onboard injection (TOBI) nozzle.

3. The gas turbine engine as recited in claim 1, comprising a rotor assembly downstream from said nozzle assembly, wherein said rotor assembly is conditioned by said conditioned airflow from said nozzle assembly.

4. The gas turbine engine as recited in claim 1, wherein said first passageway and said second passageway include tubing.

5. The gas turbine engine as recited in claim 1, comprising a support associated with said bearing compartment, wherein said support includes at least one opening for communicating said conditioned airflow from said bearing compartment into said second passageway.

6. The gas turbine engine as recited in claim 1, wherein said bleed airflow is communicated from a compressor section of the gas turbine engine.

7. The gas turbine engine as recited in claim 1, wherein said heat exchanger exchanges heat between said bleed airflow and a fan airflow to render said conditioned airflow.

8. The gas turbine engine as recited in claim 1, wherein said conditioned airflow is communicated radially outwardly from said bearing housing of said bearing compartment.

9. A gas turbine engine, comprising:

a compressor section, a combustor section and a turbine section circumferentially disposed about an engine centerline axis;

a buffer cooling system that establishes a buffer cooled cooling air path that conditions a part of at least one of said compressor section and said turbine section, wherein said buffer cooling system includes a heat exchanger, a passageway and a nozzle assembly, and said buffer cooled cooling air path extends from said heat exchanger, through said passageway, and then through said nozzle assembly to condition hardware of at least one of said compressor section and said turbine section; and

a second nozzle assembly, wherein a first portion of a conditioned airflow of said buffer cooled cooling air path is communicated through said nozzle assembly to condition said turbine section and a second portion of said conditioned airflow is communicated through said second nozzle assembly to condition said compressor section.

10. The gas turbine engine as recited in claim 9, wherein said hardware includes a rotor assembly.

11. The gas turbine engine as recited in claim 9, wherein said nozzle assembly is a tangential onboard injection (TOBI) nozzle.

12. The gas turbine engine as recited in claim 9, comprising a bearing compartment, wherein said buffer cooled cooling air path extends through a portion of said bearing compartment between said passageway and said nozzle assembly.

13. The gas turbine engine as recited in claim 12, wherein said buffer cooled cooling air path communicates a conditioned airflow radially outwardly from a bearing housing of said bearing compartment.

14. The gas turbine engine as recited in claim 9, wherein said heat exchanger exchanges heat between a bleed airflow and a fan airflow to render a conditioned airflow that is communicated along said buffer cooled cooling air path.

15. The gas turbine engine as recited in claim 9, wherein said first portion of said conditioned airflow is communicated downstream through said passageway and said second portion is communicated upstream through a second, different passageway.

16. A method of conditioning a portion of a gas turbine engine, comprising:

removing heat from a bleed airflow to render a conditioned airflow;

communicating the conditioned airflow through at least a portion of a bearing compartment of the gas turbine engine, wherein the conditioned airflow is communicated radially between a bearing housing of the bearing compartment and a diffuser case and then through an opening of a strut that extends radially between the diffuser case and the bearing compartment; and

feeding the conditioned airflow from the bearing compartment through a plurality of openings of a nozzle assembly to a downstream location of the gas turbine engine.

17. The method as recited in claim 17, comprising the step of cooling a rotor assembly of the gas turbine engine with the conditioned airflow.

18. The method as recited in claim 17, wherein the step of communicating the conditioned airflow includes:

communicating the conditioned airflow from a heat exchanger, through a passageway, then through the bearing compartment, and then through the nozzle assembly.