CLAIMS

1. A fan blade comprising:

a main body extending between a leading edge and a trailing edge, and channels formed into said main body, with a plurality of ribs extending intermediate the channels, the fan blade having a dovetail, and an airfoil extending radially outwardly from said dovetail; and

at least two materials deposited within said channels, with a first material being selected to provide additional stiffness to the fan blade, and a second material being selected for damping characteristics.

2. The fan blade as set forth in claim 1, wherein at least one of said channels extends into the main body to a closed end, from an open end.

3. The fan blade as set forth in claim 2, further comprising a cover skin bonded to at least one of the ribs.

4. The fan blade as set forth in claim 3, wherein the cover skin covers the open end of the at least one channel.

5. The fan blade as set forth in claim 1, wherein said first material is utilized in a channel at radially inner locations, while said second material is utilized within the same channel at radially outer locations.

6. The fan blade as set forth in claim 1, wherein at least one of the channels includes only said first material.

7. The fan blade as set forth in claim 1, wherein at least one other of the channels includes only said second material.

8. The fan blade as set forth in claim 1, wherein said second material is a rubber foam.

9. The fan blade as set forth in claim 1, wherein said first material is a metal foam.

10. The fan blade as set forth in claim 1, wherein a node is identified on an area of bending concern along said airfoil, and said second material is included in at least one of said channels at a location selected to support said airfoil at said node.

11. The fan blade as set forth in claim 10, wherein there is said first material both radially outwardly and radially inwardly of said second material in the channel associated with said node.

12. The fan blade as set forth in claim 1, wherein both said first and second material are of a lower density than the material forming said main body.

13. The fan blade as set forth in claim 1, wherein said first material has a greater stiffness relative to said second material, and said second material has better damping characteristics than said first material.

14. The fan blade as set forth in claim 1, wherein at least one channel has no material.

15. A method of designing a fan blade comprising the steps of:

identifying areas within a hollow fan blade that would benefit from additional stiffening, and other areas which would benefit from additional damping;

placing a damping material in channels formed within the fan blade at the locations which will benefit from additional damping; and

placing a stiffening material at locations within the channel that will benefit from additional stiffness.

16. The method as set forth in claim 15, further comprising:

identifying a vibrational node in the hollow fan blade.

17. The method as set forth in claim 16, further comprising:

placing a damping material in said channels at an area associated with said node.

18. A gas turbine engine comprising:

a fan section delivering air into a compressor section, air is compressed by the compressor section and delivered into a combustor where it is mixed with fuel and combusted, products of the combustion pass downstream over a turbine section; and

said fan section including a plurality of fan blades, with said fan blades comprising a main body extending between a leading edge and a trailing edge, and channels formed into said main body, with a plurality of ribs extending intermediate the channels, the fan blade having a dovetail, and an airfoil extending radially outwardly from said dovetail, and at least two materials deposited within said channels, with a first material being selected to provide additional stiffness to the fan blade, and a second material being selected for damping characteristics.

19. The gas turbine engine as set forth in claim 18, wherein at least one of said channels extends into the main body to a closed end, from an open end.

20. The gas turbine engine as set forth in claim 18, further comprising a cover skin bonded to at least one of the ribs.

CLAIMS

1. A fan blade comprising:

a main body extending between a leading edge and a trailing edge, and channels formed into said main body, with a plurality of ribs extending intermediate the channels, the fan blade having a dovetail, and an airfoil extending radially outwardly from said dovetail; and

there being filler material within at least some of said channels, and the filler material across the entirety of said channels including at least two different materials, with a first filler material having greater stiffness than a second filler material, and the second filler material having greater damping characteristics than the first filler material; and

a cover skin overlying the plurality of channels, and said plurality of ribs to cover an open end of the plurality of channels.

2. The fan blade as set forth in claim 1, wherein said channels extend into the main body to a closed end, from said open end.

3. The fan blade as set forth in claim 1, wherein said first material is utilized in at least one channel at radially inner locations, while said second material is utilized within the same channel at radially outer locations.

4. The fan blade as set forth in claim 1, wherein at least one of the channels includes only said first material.

5. The fan blade as set forth in claim 1, wherein at least one other of the channels includes only said second material.

6. The fan blade as set forth in claim 1, wherein said second material is a rubber foam.

7. The fan blade as set forth in claim 1, wherein said first material is a metal foam.

8. The fan blade as set forth in claim 1, wherein a node is identified on an area of bending concern along said airfoil, and said second material is included in at least one of said channels at a location selected to support said airfoil at said node.

9. The fan blade as set forth in claim 8, wherein there is said first material both radially outwardly and radially inwardly of said second material in the channel associated with said node.

10. The fan blade as set forth in claim 1, wherein both said first and second material are of a lower density than the material forming said main body.

11. The fan blade as set forth in claim 1, wherein said first material has a greater stiffness relative to said second material, and said second material has better damping characteristics than said first material.

12. The fan blade as set forth in claim 1, wherein at least one channel has no material.

13. A gas turbine engine comprising:

a fan section delivering air into a compressor section, air is compressed by the compressor section and delivered into a combustor where it is mixed with fuel and combusted, products of the combustion pass downstream over a turbine section; and

said fan section including a plurality of fan blades, with said fan blades comprising a main body extending between a leading edge and a trailing edge, and channels formed into said main body, with a plurality of ribs extending intermediate the channels, the fan blade having a dovetail, and an airfoil extending radially outwardly from said dovetail, and at least there being filler material within at least some of said channels, and the filler material across the entirety of all said channels including at least two different materials, with a first filler material having greater stiffness than a second filler material, and the second filler material having greater damping characteristics than the first filler material;

a cover skin overlying the plurality of channels, and contacting said plurality of ribs to cover an open end of the plurality of channels; and

said first material being utilized in at least one channel at radially inner locations, while said second material being utilized within the same channel at radially outer locations.

14. The gas turbine engine as set forth in claim 13, wherein said first material is one of an aluminum foam and a corrugated material.

15. The gas turbine engine as set forth in claim 14, wherein said second material is a rubber foam.

16. The gas turbine engine as set forth in claim 13, wherein said second material is a rubber foam.

17. The fan blade as set forth in claim 1, wherein said first material is one of an aluminum foam and a corrugated material.

18. The fan blade as set forth in claim 17, wherein said second material is a rubber foam.