CLAIMS

What is claimed is:

1. A gas turbine engine comprising:

a fan including a plurality of fan blades rotatable about an axis;

a compressor section;

a combustor in fluid communication with the compressor section;

a fan drive turbine in communication with the combustor, wherein the fan drive turbine has a first exit area at a first exit point and is configured to rotate at a first speed;

a second turbine section including a second exit area at a second exit point and being configured to rotate at a second speed that is faster than the first speed, wherein a first performance quantity is defined as a product of the first speed squared and the first area, a second performance quantity is defined as a product of the second speed squared and the second area; and a ratio of the first performance quantity to the second performance quantity is between about 0.5 and about 1.5;

a gear system configured to provide a speed reduction between the fan drive turbine and the fan, and to transfer shaft power input from the fan drive turbine to the fan at an efficiency greater than about 98% and less than 100%;

a mount flexibly supporting portions of the gear system, the mount extending from a static structure of the engine to accommodate at least radial movement between the gear system and the static structure; and

a lubrication system configured to provide lubricant to the gear system and to remove thermal energy from the gear system.

2. The gas turbine engine as recited in claim 1, wherein the lubrication system includes a capacity for removing an amount of energy that is greater than zero and less than about 2% of the energy input into the gear system during operation of the gas turbine engine.

3. The gas turbine engine as recited in claim 1, wherein said fan delivers a portion of air into a bypass duct, and a bypass ratio being defined as the portion of air

delivered into the bypass duct divided by the amount of air delivered into the compressor section, with the bypass ratio being greater than about 6.0.

4. The gas turbine engine as recited in claim 1, wherein the mount includes a load limiter for limiting movement of the gear system responsive to an unbalanced condition.

5. The gas turbine engine as recited in claim 3, wherein the bypass ratio is greater than about 10.0.

6. The gas turbine engine as recited in claim 1, wherein the ratio is above or equal to about 0.8.

7. The gas turbine engine as recited in claim 1, wherein a pressure ratio across the fan drive turbine is greater than about 5:1.

8. The gas turbine engine as recited in claim 1, including a ratio of a sea level take-off flat-rated static thrust provided by the gas turbine engine, to a combined volume of the fan drive turbine and the second turbine that is greater than or equal to about 1.5 lbf/inch^3 and less than or equal to about 5.5 lbf/inch^3.

9. A gas turbine engine comprising:

a fan including a plurality of fan blades rotatable about an axis;

a compressor section;

a combustor in fluid communication with the compressor section;

a turbine section including a fan drive turbine and a second turbine in communication with the combustor, wherein a ratio of sea level take-off flat-rated static thrust provided by the gas turbine engine to a volume of the turbine section is greater than or equal to about 1.5 lbf/inch^3 and less than about 5.5 lbf/inch^3;

a gear system configured to provide a speed reduction between the fan drive turbine and the fan, and to transfer power input from the fan drive turbine to the fan at an efficiency greater than about 98% and less than 100%;

a mount flexibly supporting portions of the gear system, the mount extending from a static structure of the engine to accommodate at least radial movement between the gear system and the static structure; and

a lubrication system configured to provide lubricant to the gear system and to remove thermal energy from the gear system.

10. The gas turbine engine as recited in claim 9, wherein the lubrication system includes a capacity for removing an amount of energy that is greater than zero and less than about 2% of the energy input into the gear system during operation of the gas turbine engine.

11. The gas turbine engine as recited in claim 9, wherein the mount includes a load limiter for limiting movement of the gear system responsive to an unbalanced condition.

12. The gas turbine engine as recited in claim 9, wherein said fan delivers a portion of air into a bypass duct, and a bypass ratio being defined as the portion of air delivered into the bypass duct divided by the amount of air delivered into the compressor section, with the bypass ratio being greater than about 6.0.

13. The gas turbine engine as recited in claim 9, wherein the ratio is greater than or equal to about 2.0 $lbf/inch^3$.

14. The gas turbine engine as recited in claim 9, wherein the ratio is greater than or equal to about 4.0 $lbf/inch^3$.

15. A gas turbine engine comprising:

a fan including a plurality of fan blades rotatable about an axis;

a compressor section;

a combustor in fluid communication with the compressor section;

a fan drive turbine in communication with the combustor;

a gear system configured to provide a speed reduction between the fan drive turbine and the fan, and to transfer power input from the fan drive turbine to the fan at an efficiency greater than about 98% and less than 100%;

a mount flexibly supporting portions of the gear system, the mount extending from a static structure of the engine to accommodate at least radial movement between the gear system and the static structure; and

a lubrication system configured to provide lubricant to the gear system and to remove thermal energy from the gear system.

16. The gas turbine engine as recited in claim 15, wherein the lubrication system includes a capacity for removing an amount of energy that is greater than zero and less than about 2% of energy input into the gear system during operation of the gas turbine engine.

17. The gas turbine engine as recited in claim 15, wherein said fan delivers a portion of air into a bypass duct, and a bypass ratio being defined as the portion of air delivered into the bypass duct divided by the amount of air delivered into the compressor section, with the bypass ratio being greater than about 6.0.

18. The gas turbine engine as recited in claim 15, wherein the mount includes a load limiter for limiting movement of the gear system responsive to an unbalanced condition.

19. The gas turbine engine as recited in claim 17, wherein the bypass ratio is greater than about 10.0.

20. The gas turbine engine as recited in claim 15, wherein a pressure ratio across the fan drive turbine is greater than about 5:1.

CLAIMS

What is claimed is:

1. A gas turbine engine comprising:

a fan including a plurality of fan blades rotatable about an axis;

a compressor section;

a combustor in fluid communication with the compressor section;

a fan drive turbine in communication with the combustor, wherein the fan drive turbine has a first exit area at a first exit point and is configured to rotate at a first speed;

a second turbine section including a second exit area at a second exit point and being configured to rotate at a second speed that is faster than the first speed, wherein a first performance quantity is defined as a product of the first speed squared and the first area, a second performance quantity is defined as a product of the second speed squared and the second area; and a ratio of the first performance quantity to the second performance quantity is between 0.5 and 1.5;

a gear system configured to provide a speed reduction between the fan drive turbine and the fan, and to transfer shaft power input from the fan drive turbine to the fan at an efficiency greater than 98% and less than 100%;

a mount flexibly supporting portions of the gear system, the mount extending from a static structure of the engine to accommodate at least radial movement between the gear system and the static structure; and

a lubrication system configured to provide lubricant to the gear system and to remove thermal energy from the gear system.

2. The gas turbine engine as recited in claim 1, wherein the lubrication system includes a capacity for removing an amount of energy that is greater than zero and less than 2% of the energy input into the gear system during operation of the gas turbine engine.

3. The gas turbine engine as recited in claim 1, wherein said fan delivers a portion of air into a bypass duct, and a bypass ratio being defined as the portion of air delivered into the bypass

duct divided by the amount of air delivered into the compressor section, with the bypass ratio being greater than 6.0.

4. The gas turbine engine as recited in claim 1, wherein the mount includes a load limiter for limiting movement of the gear system responsive to an unbalanced condition.

5. The gas turbine engine as recited in claim 3, wherein the bypass ratio is greater than 10.0.

6. The gas turbine engine as recited in claim 1, wherein the ratio is above or equal to 0.8.

7. The gas turbine engine as recited in claim 1, wherein a pressure ratio across the fan drive turbine is greater than 5:1.

8. The gas turbine engine as recited in claim 1, including a ratio of a sea level take-off flat-rated static thrust provided by the gas turbine engine, to a combined volume of the fan drive turbine and the second turbine that is greater than or equal to 1.5 lbf/inch^3 and less than or equal to 5.5 lbf/inch^3.

9. A gas turbine engine comprising:

a fan including a plurality of fan blades rotatable about an axis;

a compressor section;

a combustor in fluid communication with the compressor section;

a turbine section including a fan drive turbine and a second turbine in communication with the combustor, wherein a ratio of sea level take-off flat-rated static thrust provided by the gas turbine engine to a volume of the turbine section is greater than or equal to 1.5 lbf/inch^3 and less than 5.5 lbf/inch^3;

a gear system configured to provide a speed reduction between the fan drive turbine and the fan, and to transfer power input from the fan drive turbine to the fan at an efficiency greater than 98% and less than 100%;

a mount flexibly supporting portions of the gear system, the mount extending from a static structure of the engine to accommodate at least radial movement between the gear system and the static structure; and

a lubrication system configured to provide lubricant to the gear system and to remove thermal energy from the gear system.

10. The gas turbine engine as recited in claim 9, wherein the lubrication system includes a capacity for removing an amount of energy that is greater than zero and less than 2% of the energy input into the gear system during operation of the gas turbine engine.

11. The gas turbine engine as recited in claim 9, wherein the mount includes a load limiter for limiting movement of the gear system responsive to an unbalanced condition.

12. The gas turbine engine as recited in claim 9, wherein said fan delivers a portion of air into a bypass duct, and a bypass ratio being defined as the portion of air delivered into the bypass duct divided by the amount of air delivered into the compressor section, with the bypass ratio being greater than 6.0.

13. The gas turbine engine as recited in claim 9, wherein the ratio is greater than or equal to 2.0 $lbf/inch^3$.

14. The gas turbine engine as recited in claim 9, wherein the ratio is greater than or equal to 4.0 $lbf/inch^3$.

15. A gas turbine engine comprising:

a fan including a plurality of fan blades rotatable about an axis;

a compressor section;

a combustor in fluid communication with the compressor section;

a fan drive turbine in communication with the combustor;

a gear system configured to provide a speed reduction between the fan drive turbine and the fan, and to transfer power input from the fan drive turbine to the fan at an efficiency greater than 98% and less than 100%;

a mount flexibly supporting portions of the gear system, the mount extending from a static structure of the engine to accommodate at least radial movement between the gear system and the static structure; and

a lubrication system configured to provide lubricant to the gear system and to remove thermal energy from the gear system.

16. The gas turbine engine as recited in claim 15, wherein the lubrication system includes a capacity for removing an amount of energy that is greater than zero and less than 2% of energy input into the gear system during operation of the gas turbine engine.

17. The gas turbine engine as recited in claim 15, wherein said fan delivers a portion of air into a bypass duct, and a bypass ratio being defined as the portion of air delivered into the bypass duct divided by the amount of air delivered into the compressor section, with the bypass ratio being greater than 6.0.

18. The gas turbine engine as recited in claim 15, wherein the mount includes a load limiter for limiting movement of the gear system responsive to an unbalanced condition.

19. The gas turbine engine as recited in claim 17, wherein the bypass ratio is greater than 10.0.

20. The gas turbine engine as recited in claim 15, wherein a pressure ratio across the fan drive turbine is greater than 5:1.