COMBUSTOR LINER SUPPORT AND SEAL ASSEMBLY

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to gas turbine engines. More particularly, the present invention relates to a structure for supporting a combustor liner in a gas turbine engine.

2. Description of Related Prior Art

U.S. Pat. No. 6,347,508 sets forth a combustor liner support and seal assembly. Applying the reference numerals used in the '508 patent, an outer combustor liner 28*b* is supported at its aft end 71 with an inner mounting ring 60 having a plurality of projections or lugs 74. An outer ring 62 includes first and second flanges 92, 94 disposed on opposite sides of the lugs 74. Pins 100 are welded in apertures 104 defined in the flange 94 and extend into slots 76 defined in the lugs 74. The cooperation between the pins 100 and the slots 76 allows the ring 62 and the lugs 74 to move radially with respect to another. Relative radial movement can be desirable because different thermal coefficients of expansion between the combustor liner 28*b*/mounting ring 60 and the outer ring 62 can lead to undesirable higher thermal gradients and stresses within the liner if the two parts are fixed to one another.

SUMMARY OF THE INVENTION

The invention is a combination that includes a gas turbine engine extending along an axis. The gas turbine engine includes an annular combustor with a combustor liner. The combination of the invention also includes a plurality of projections extending from the combustor liner and spaced from one another circumferentially about the axis. The combination of the invention also includes a free-standing ring disposed about the combustor liner and positioned adjacent to the plurality of projections along the axis. The plurality of projections engage a corresponding circumferentially-facing portion of the free-standing ring and circumferentially support the combustor liner while allowing relative radial displacement between the combustor liner and the free-standing ring. The combination of the invention also includes a rolling assembly operably disposed between the free-standing ring and the plurality of projections to reduce binding during the relative radial displacement.

BRIEF DESCRIPTION OF THE DRAWINGS

Advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the detailed description below when considered in connection with the accompanying drawings, wherein:

FIG. **1** is a simplified schematic view of a gas turbine engine according to the exemplary embodiment of the invention;

FIG. **2** is a cross-sectional view of a rolling assembly according to the exemplary embodiment of the invention;

FIG. **3** is the cross-sectional view of FIG. **2** shown in perspective view;

FIG. **4** is a perspective view looking aft of a plurality of projections according to the exemplary embodiment of the invention and a portion of a free-standing ring according to the exemplary embodiment of the invention;

FIG. **5** is a close-up of a portion of the perspective view of FIG. **4**;

FIG. **6** is a perspective view of a portion of an annular seal according to the exemplary embodiment of the invention;

FIG. **7** is a perspective view of a cross-section through the combustor liner support and seal assembly; and

FIG. **8** is a perspective view looking forward of the plurality of projections and a portion a free-standing ring.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENT

The present invention sets forth several improvements to the combustor liner support and seal assembly set forth in U.S. Pat. No. 6,347,508. Therefore, the '508 patent is hereby incorporated by reference in its entirety.

FIG. **1** is a schematic representation of a gas turbine engine **10**. The gas turbine engine **10** extends along a longitudinal axis **12**. As used herein, forms of the terms "radial" and "circumference" as applied to some structure refer to the relationship between the structure and the axis **12**. The gas turbine engine **10** has a generally annular configuration, however other configurations can be practiced in alternative embodiments of the present invention. The exemplary gas turbine engine **10** includes a fan section **14**, a compressor section **16**, a combustor section **18**, and a turbine section **20** that are integrated to produce an aircraft flight propulsion engine. This particular type of gas turbine engine is generally referred to as a turbo-fan. An alternate form of a gas turbine engine that can be practiced with the invention includes a compressor, a combustor, and a turbine integrated to produce an aircraft flight propulsion engine without a fan section. It should be understood that the term aircraft is generic, including without limitation helicopters, airplanes, missiles, space devices and other substantially similar devices. It is also noted that numerous configurations of turbine engines can practiced with the invention. For example, multiple compressor and turbine sections can be incorporated, with intercoolers connected between the compressor stages. Also, reheat combustion chambers can be added between the turbine stages. All of the various configurations of gas turbine engines described above and/or known in the art can be practiced with the invention. It is also noted that the present invention can be practiced in operating environments other than aircraft propulsion, such as industrial applications including but not limited to pumping sets for gas and oil transmission lines, electricity generation, and naval propulsion.

The compressor section **16** includes a rotor **22** having a plurality of compressor blades **24**. The rotor **22** is fixed to a rotatable shaft **26**. A plurality of compressor vanes **28** are positioned adjacent to the compressor blades **24** to direct the flow of air through compressor section **16**. The combustor section **18** includes an inner combustor liner **30** and an outer combustor liner **32**. The liners **30**, **32** cooperate with one another to define the inner and outer boundaries of an annular combustion chamber **34**. The outer combustor liner **32** is concentrically mounted relative to an outer casing or housing **36** to define an annular fluid passage **38** that surrounds the chamber **34**. Also, the inner combustor liner **30** is concentrically mounted relative to the shaft **26** to define an annular fluid passage **40** surrounded by the chamber **34**. Fuel is introduced