PANELED COMBUSTION LINER HAVING NODES

CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of U.S. Provisional Patent Application No. 61,203,811, filed Dec. 29, 2008, and is incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates generally to combustors for heat generating equipment, and more particularly, to a paneled combustion liner for an engine.

BACKGROUND

Combustion processes, such as, for example, those employed in the combustor of a gas turbine, ramjet or pulsejet engine, as well as those employed in other heat generating equipment, whether for flame combustion, such as, for example, premixed flame combustion and diffusion flame combustion, as well as for catalytic combustion, operate at high temperatures. In some machines, a combustion liner is employed to at least partially contain the combustion process and to separate the heat generated by the combustion process the structural portions of the combustor and/or other parts of the machine.

SUMMARY

The present invention relates to combustors, and provides a combustion liner operative to at least partially contain a combustion process. The combustion liner includes a support structure that supports a plurality of panels. In one embodiment, the panels are in the form of thermal barrier panels that are attached to the support structure.

BRIEF DESCRIPTION OF THE DRAWINGS

The description herein makes reference to the accompanying drawings wherein like reference numerals refer to like parts throughout the several views, and wherein:

FIG. **1** schematically depicts portions of a gas turbine engine that may be employed in accordance with an embodiment of the present invention.

FIG. **2** is a partial cross section of an embodiment of a gas turbine engine in which a combustion liner in accordance with an embodiment of the present invention may be employed.

FIG. **3** is an enlarged cross-sectional view of a paneled combustion liner in accordance with an embodiment of the present invention.

FIGS. **4**A-**4**D schematically depict portions of a support structure for a paneled combustion liner in accordance with an embodiment of the present invention.

FIGS. **5**A and **5**B schematically depict panels employed in a paneled combustion liner in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

For purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings, and specific language will be used to describe the same. It will nonetheless be understood that no limitation of the scope of the invention is intended by the illustration and description of certain embodiments of the invention. In addition, any alterations and/or modifications of the illustrated and/or described embodiment(s) are contemplated as being within the scope of the present invention. Further, any other applications of the principles of the invention, as illustrated and/or described herein, as would normally occur to one skilled in the art to which the invention pertains, are contemplated as being within the scope of the present invention.

Referring now to the drawings, and in particular, FIG. **1**, a non-limiting example of portions of a gas turbine engine **10** employed in accordance with an embodiment of the present invention are schematically illustrated. In the present embodiment, gas turbine engine **10** includes a compressor **12**, a turbine **14** and a combustor **16** disposed between compressor **12** and turbine **14**.

In the embodiment of FIG. **1**, various features, components and interrelationships therebetween of aspects of an embodiment of the present invention are depicted. However, the present invention is not limited to the particular embodiment of FIG. **1** and/or the components, features and interrelationships therebetween as are illustrated in FIG. **1** and described herein.

Gas turbine engine **10** may be a single-spool engine or a multi-spool engine, and may be in the form of a turboshaft, turbofan, turboprop or turbojet engine. In other embodiments, gas turbine engine **10** may be in other forms, such as, for example, a ramjet, scramjet or pulsejet engine, an aero-derivative industrial engine, a marine engine, or in the form of a portion of a cogeneration plant, e.g., a combined heat and power plant. In the present embodiment, gas turbine engine **10** is an aero-engine, wherein combustor **16** is mounted adjacent compressor **12** and turbine **14**. Alternatively, it is contemplated that in other embodiments, combustor **16** may be located remotely from compressor **12** and turbine **14**, e.g., for certain industrial and/or power generation installations. In still other embodiments, compressor **12** may be remotely located relative to turbine **14** and combustor **16**, e.g., in combined heat and power installations, where compressor **12** may pressurize air for delivery to other systems, e.g., fuel cells, prior to the air being received at combustor **16**.

Referring now to FIGS. **2** and **3**, a partial cross section of gas turbine engine **10** with an annular combustor **16** in accordance with an embodiment of the present invention is depicted. Although an annular configuration is shown, it will be understood that other combustor configurations may be employed in other embodiments. The present invention is not limited to any particular combustor size or shape unless specifically stated to the contrary.

In one form, combustor **16** of the present embodiment includes a plurality of fuel injectors **18**, a plurality of igniters **20** and an annular paneled combustion liner **22**. In other embodiments, combustor **16** may employ a single fuel injector and/or a single ignitor During normal operation, pressurized air is received in combustor **16**, some of which is mixed with fuel injected by fuel injectors **18**, and ignited by igniters **20**. The combustion process may be self-sustaining, after which point igniters **20** are deactivated. In one form, the combustion process is contained within paneled combustion liner **22**, e.g., radially. In other embodiments, the combustion process may only be partially contained by the combustor, e.g., in single-sided combustor arrangements. Paneled combustion liner **22** includes an opening that delivers hot gases from the combustion process from the outlet of combustor **16** to the inlet of turbine **14**.