Stirling Engine Encyclopedia Article

Stirling Engine

The following sections of this BookRags Literature Study Guide is offprint from Gale's For Students Series: Presenting Analysis, Context, and Criticism on Commonly Studied Works: Introduction, Author Biography, Plot Summary, Characters, Themes, Style, Historical Context, Critical Overview, Criticism and Critical Essays, Media Adaptations, Topics for Further Study, Compare & Contrast, What Do I Read Next?, For Further Study, and Sources.

(c)1998-2002; (c)2002 by Gale. Gale is an imprint of The Gale Group, Inc., a division of Thomson Learning, Inc. Gale and Design and Thomson Learning are trademarks used herein under license.

The following sections, if they exist, are offprint from Beacham's Encyclopedia of Popular Fiction: "Social Concerns", "Thematic Overview", "Techniques", "Literary Precedents", "Key Questions", "Related Titles", "Adaptations", "Related Web Sites". (c)1994-2005, by Walton Beacham.

The following sections, if they exist, are offprint from Beacham's Guide to Literature for Young Adults: "About the Author", "Overview", "Setting", "Literary Qualities", "Social Sensitivity", "Topics for Discussion", "Ideas for Reports and Papers". (c)1994-2005, by Walton Beacham.

All other sections in this Literature Study Guide are owned and copyrighted by BookRags, Inc.

Contents

Stirling Engine Encyclopedia Article.....1

Contents.....2

Stirling Engine.....3

Stirling Engine

As water, wind, and animal power gave way to the Industrial Revolution, steam engines provided the cheap power necessary for mass production. They were notoriously dangerous and unreliable, often shoddily built of unsuitable materials, and they exploded with tragic frequency. Moved by such calamities, Scottish clergyman Robert Stirling (1790-1878) decided to find a safer alternative, one without a pressurized boiler. The result was an external-combustion engine that alternately heats, compresses, and cools a gas (Stirling used air) to produce energy. Although it never replaced the steam engine as Stirling hoped, it proved to be a quiet and efficient machine that still intrigues scientists today.

The Stirling engine has five major components: a *heater*, which burns fuel in an external-combustion chamber, is connected to a gas-filled cylinder. Inside, the *power piston* compresses the gas as it is heated. The hot gas expands, and the force generated is transmitted to a drive mechanism. At this point the *displacer piston* moves down, pushing the gas through the *regenerator* and the *cooler*. Then the cycle starts again as the gas enters the heater. The regenerator, or heat exchanger, stores the thermal energy produced as the gas is compressed and returns it to the system. This process, known as a thermodynamic cycle, was discovered by Nicolas Carnot (1796-1832) in his search for an efficient engine. Stirling was the first to put the concept to practical use.

Stirling's engines were patented in 1816 and manufactured through the 1920s. Small and reliable, they performed limited tasks like pumping water. A factory model was built in 1843, but it proved too expensive for commercial use. Stirling engines powered portable generators during World War II in the Netherlands. In the 1970s, Ford and Philips tried without success to develop a Stirling engine for automobiles.

Today the Stirling engine uses hydrogen or helium instead of air, but has found application only as a cryogenic refrigerator. There have been sporadic efforts to adapt it for wider industry, but results have been disappointing, although its theoretical efficiency continues to tantalize researchers.