

# Sunpower Patent Piston Stirling Engine

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**The Star Drive** Phillip Hills 2021-09-02 In May 2018 NASA called a press conference to announce the successful test-run of their tiny nuclear reactor KRUSTY (Kilopower Reactor Using Stirling Technology). This revolutionary technology, which runs on heat alone, may have profound consequences for the future of mankind, enabling us to maintain permanent bases on the Moon, on Mars and other planets, and eventually power a starship. On earth too it could have enormous benefits as a new way to generate power at a time when climate change is threatening our very existence. This book is the amazing story behind this invention, which began with Robert Stirling's original designs for a heat exchange engine in 1816. An invention truly ahead of its time, the practical application of the Stirling Engine has taxed the minds of scientists and inventors for almost 200 years. Only now is it possible for its full potential to be realised. Phillip Hills weaves science and history together to tell the story of one of the most exciting scientific developments the world has ever seen.

**Gas Abstracts** 1985

**Official Gazette of the United States Patent and Trademark Office** 1997

**Sun II** International Solar Energy Society 1979

*The Secretary's Annual Report to Congress* United States. Department of Energy 1991

**Solar Energy Index** George Machovec 2013-10-22 Solar Energy Index is an index of resources dealing with solar energy, including archival materials from the International Solar Energy Society collection; references to articles in major solar journals; patents and pamphlets; National Technical Information Service reports; unbound conference proceedings; and other assorted reports. Both theoretical and "how-to-do-it" publications are well represented. This book places particular emphasis on terrestrial solar thermal and photovoltaic applications of solar energy. Subjects are classified according to physics, terrestrial wind, collectors, space heating and cooling, economics, materials, distillation, thermal-electric power systems, photoelectricity, solar furnaces, cooking, biological applications, water heaters, photochemistry, energy storage, mechanical devices, evaporation, sea power, space flight applications, and industrial applications. Topics covered range from wind energy and bioconversion to ocean thermal energy conversion, heliohydroelectric power plants, solar cells, turbine generation systems, thermionic converters, batteries and fuel cells, and pumps and engines. This monograph will be of interest to government officials and policymakers concerned with solar energy.

**Energy Research Abstracts** 1990

**Index of Patents Issued from the United States Patent and Trademark Office** 1990

**Seven Pillars of Wisdom** T.E. Lawrence 2020-01-01 Because it seems almost impossible that one man can be this brilliant and do so much. A masterpiece of autobiography.

**Heat Pumps for Energy Efficiency and Environmental Progress** J. Bosma 2012-12-02 The 70 papers collected in this volume present an up to date review of the trends in heat pump technology. The heat pump is reviewed both as being part of a more comprehensive system, and as a refined device providing energy and greenhouse gas emission reductions. Its implementation in a system or process must be carefully considered at an early stage of design or development, and process integration is discussed in detail as a valuable tool for industry. The heat pump is proving to be a highly effective energy conserving tool, particularly when designed and used as an integral part of a system. Environmental benefits are gained when energy is conserved, and heat pumps can make a major contribution in this area. However, some heat pumps use working fluids which are environmentally unfriendly, and the progress that has been made in the field of alternative refrigerants is reported on. The volume will prove an indispensable reference source on the wide-ranging applications that have been developed since the last international conference, on such topics as heat pump field trials, pilot plants and development programmes.

*Alternative Sources of Energy* 1987

**Proceedings of the ... Intersociety Energy Conversion Engineering Conference** 1989

**Liquid Piston Stirling Engines** C. D. West 1995

**Official Gazette of the United States Patent and Trademark Office** United States. Patent and Trademark Office 1986

**Index of Patents Issued from the United States Patent Office** 1982

**Free Piston Stirling Engines** Graham Walker 2012-12-06 DEFINITION AND NOMENCLATURE A Stirling engine is a mechanical device which operates on a closed regenerative thermodynamic cycle with cyclic compression and expansion of the working fluid at different temperature levels. The flow of working fluid is controlled only by the internal volume changes, there are no valves and, overall, there is a net conversion of heat to work or vice-versa. This generalized definition embraces a large family of machines with different functions; characteristics and configurations. It includes both rotary and reciprocating systems utilizing mechanisms of varying complexity. It covers machines capable of operating as a prime mover or power system converting heat supplied at high temperature to output work and waste heat at a lower temperature. It also covers work-consuming machines used as refrigerating systems and heat pumps abstracting heat from a low temperature source and delivering this plus the heat equivalent of the work consumed to a higher temperature. Finally it covers work-consuming devices used as pressure generators compressing a fluid from a low pressure to a higher pressure. Very similar machines exist which operate on an open regenerative cycle where the flow of working fluid is controlled by valves. For convenience these may be called Ericsson engines but unfortunately the distinction is not widely established and regenerative machines of both types are frequently called 'Stirling engines'.

**Proceedings of the 16th Intersociety Energy Conversion Engineering Conference, Atlanta, Georgia, August 9-14, 1981** 1981

**Cryocoolers 11** Ronald G. Jr. Ross 2007-05-08 Composed of papers written by leading engineers and scientists in the field, this valuable collection reports the most recent advances in cryocooler development, contains extensive performance test results and comparisons, and relates the latest experience in integrating cryocoolers into advanced applications.

**Liquid Piston Engines** Aman Gupta 2017-07-24 Whether used in irrigation, cooling nuclear reactors, pumping wastewater, or any number of other uses, the liquid piston engine is a much more efficient, effective, and "greener" choice than many other choices available to industry. Especially if being used in conjunction with solar panels, the liquid piston engine can be extremely cost-effective and has very few, if any, downsides or unwanted side effects. As industries all over the world become more environmentally conscious, the liquid piston engine will continue growing in popularity as a better choice, and its low implementation and operational costs will be attractive to end-users in developing countries. This is the only comprehensive, up-to-date text available on liquid piston engines. The first part focuses on the identification, design, construction and testing of the liquid piston engine, a simple, yet elegant, device which has the ability to pump water but which can be manufactured easily without any special tooling or exotic materials and which can be powered from either combustion of organic matter or directly from solar heating. It has been tested, and the authors recommend how it might be improved upon. The underlying theory of the device is also presented and discussed. The second part deals with the performance, troubleshooting, and maintenance of the engine. This volume is the only one of its kind, a groundbreaking examination of a fascinating and environmentally friendly technology which is useful in many industrial applications. It is a must-have for any engineer, manager, or technician working

with pumps or engines.

**Stirling Engine Design Manual** William Martini 2013-01-25 For Stirling engines to enjoy widespread application and acceptance, not only must the fundamental operation of such engines be widely understood, but the requisite analytic tools for the stimulation, design, evaluation and optimization of Stirling engine hardware must be readily available. The purpose of this design manual is to provide an introduction to Stirling cycle heat engines, to organize and identify the available Stirling engine literature, and to identify, organize, evaluate and, in so far as possible, compare non-proprietary Stirling engine design methodologies. This report was originally prepared for the National Aeronautics and Space Administration and the U. S. Department of Energy.

**"Energy for the Marketplace"** 1983

**Proceedings of the 24th Intersociety Energy Conversion Engineering Conference: Systems, cycles, and engines** 1989

**Advances in Cryogenic Engineering** Joseph Waynert 2004-07-22 All papers have been peer-reviewed. The Cryogenic Engineering Conference covers applications and systems at temperatures where ordinary gases are liquids or solids, generally less than 150 K (-120°C or 185°F). It covers the newest approaches to producing low temperatures and to the use of systems at low temperatures, such as new superconducting magnets, high temperature superconducting electrical power applications, space applications and the properties of fluids and materials at these temperatures. Design, construction, testing, and characterization of cryogenic systems are presented. Topics include: Hydrogen: Past, Present, and Future; Liquefied Natural Gas; Liquid Helium: Refrigeration and Supply; Large Scale Cryogenic Systems; Large Scale Cryogenic Test Facilities; Expanders, Pumps, and Compressors; Large Cryosystem Components and Issues; Cryogenic Instrumentation, Controls, and Measurements; Cryostats: Design and Performance; Cryostates and Cryogenics for Herschel-Planck Mission; Superconducting RF Systems; Thermal Insulation; Material, Property Measurements; Low Temperature Superconducting Magnet Systems; High Temperature Superconducting Magnet Systems; High Temperature Superconducting Cables; High Current Leads; Helium II Phenomena; Fluid Dynamics, Heat Transfer, and Thermodynamics; Cryogenics at Zero G; Cryocooler Programs Overviews; Cryocooler Reliability; Stirling Cryocoolers; Pulse Tube - G-M Type; Pulse Tube JT and Heat Exchanger Modeling and Performance Issues; Brayton, Collins, Sorption Cryocoolers; JT and Thermoacoustic Cryocoolers; Magnetic Refrigeration; Hybrid Cycle Cryocoolers; Terrestrial Applications of Cryocoolers; and Novel Concepts or Devices.

*A Short History of the Steam Engine* Henry Winram Dickinson 2011-02-17 A highly readable history of the stationary steam engine, intelligible to the non-specialist reader and engineer alike.

**Compact Heat Exchangers** Alexander Louis London 1990 Heat exchangers are a crucial part of aerospace, marine, cryogenic and refrigeration technology. These essays cover such topics as complicated flow arrangements, complex extended surfaces, two-phase flow and irreversibility in heat exchangers, and single-phase heat transfer.

**Government Reports Announcements & Index** 1992

**Stirling Cycle Engine Analysis**, Israel Urieli 1984

**"Energy--the Spark and Lifeline of Civilization"** 1982

**Stirling Cycle Engines** Allan J. Organ 2013-11-15 Some 200 years after the original invention, internal design of a Stirling engine has come to be considered a specialist task, calling for extensive experience and for access to sophisticated computer modelling. The low parts-count of the type is negated by the complexity of the gas processes by which heat is converted to work. Design is perceived as problematic largely because those interactions are neither intuitively evident, nor capable of being made visible by laboratory experiment. There can be little doubt that the situation stands in the way of wider application of this elegant concept. Stirling Cycle Engines re-visits the design challenge, doing so in three stages. Firstly, unrealistic expectations are dispelled: chasing the Carnot efficiency is a guarantee of disappointment, since the Stirling engine has no such pretensions. Secondly, no matter how complex the gas processes, they embody a degree of intrinsic similarity from engine to engine. Suitably exploited, this means that a single computation serves for an infinite number of design conditions. Thirdly, guidelines resulting from the new approach are condensed to high-resolution design charts – nomograms. Appropriately designed, the Stirling engine promises high thermal efficiency, quiet operation and the ability to operate from a wide range of heat sources. Stirling Cycle Engines offers tools for expediting feasibility studies and for easing the task of designing for a novel application. Key features: Expectations are re-set to realistic goals. The formulation throughout highlights what the thermodynamic processes of different engines have in common rather than what distinguishes them. Design by scaling is extended, corroborated, reduced to the use of charts and fully illustrated. Results of extensive computer modelling are condensed down to high-resolution Nomograms. Worked examples feature throughout. Prime movers (and coolers) operating on the Stirling cycle are of increasing interest to industry, the military (stealth submarines) and space agencies. Stirling Cycle Engines fills a gap in the technical literature and is a comprehensive manual for researchers and practitioners. In particular, it will support effort world-wide to exploit potential for such applications as small-scale CHP (combined heat and power), solar energy conversion and utilization of low-grade heat.

**Soft Energy Notes** 1978

**Mobile Electric Power Technologies for the Army of the Future** 1988

**Papers Presented at the International Symposium on Industrial Application of Heat Pumps** Herbert Simon Stephens 1981

*Solar Energy Update* 1983-04

**Stirling Engines** Graham Walker 1980

**Scientific and Technical Aerospace Reports** 1990

*Stirling Engines, Progress Towards Reality* Institution of Mechanical Engineers (Great Britain). Power Industries Division 1982

**Making a Business from Biomass in Energy, Environment, Chemicals, Fibers, and Materials** R. P. Overend 1997

**Official Gazette of the United States Patent and Trademark Office** 2007

**Large Engineering Systems 4** 1983

**Air Engines** Theodor Finkelstein 2001 The original Air Engines (also known as a heat, hot air, caloric, or Stirling engines), predated the modern internal combustion engine. This early engine design always had great potential for high efficiency/low emission power generation. However, the primary obstacle to its practical use in the past has been the lack of sufficiently heat resistant materials. This obstacle has now been eliminated due to the higher strength of modern materials and alloys. Several companies in the U.S. and abroad are successfully marketing new machines based on the Air Engine concept. Allan Organ and Theodor Finkelstein are two of the most respected researchers in the field of Air Engines. Finkelstein is considered a pioneer of Stirling cycle simulation. The historical portion of the book is based on four famous articles he published in 1959. The rest of the chapters assess the development of the air engine and put it in the modern context, as well as investigate its future potential and applications. The audience for this book includes mechanical engineers working in power related industries, as well as researchers, academics, and advanced students concerned with recent developments in power generation. Co-published by Professional Engineering Publishing, UK, and ASME Press.