Concentrated Solar Thermal:
Fresnel Lens Company - Portfolio Overview

— Ausra, Inc. —

Photo Credit: Ausra, Inc.

"Earth As Art" Image courtesy of USGS EROS Data Center Earth As Art 2.

Executive Summary

Ausra's patent portfolio is focused on the conversion of solar radiation to thermal energy for use in utility-scale applications. According to its website, "Ausra's core technology, the Compact Linear Fresnel Reflector (CLFR) solar collector and steam generation system, was originally conceived in the early 1990s at Sydney University. It was first commercialized by Solar Heat and Power Pty Ltd. in 2004 in Australia and is now being refined and built at large scale by Ausra around the world."

At the writing of this report, Ausra's portfolio consists of 33 total patents and published patent applications filed among the US, EP and WO patent offices. Four of Ausra's patent filings are granted patents and twenty-nine are published patent applications. The group of 33 patents was deduplified to remove multiple filings of the same invention in more than one of the searched patent offices (US, EP, WO). The order for prioritizing the group of patents was 1) granted US patents, 2) granted EP patents, 3) US applications without corresponding granted patents, 4) EP applications without corresponding granted patents and finally 5) WO applications. The resulting 15 fundamental patent documents and summaries of their associated claims are described in the following pages. Equivalent filings of the fundamental patents in the searched patent offices are listed for reference.

Through a careful examination of the claims within Ausra's portfolio, we have concluded that the company is methodically filing patents, each focused on a specific aspect or component of an overall concentrating solar thermal (CST) energy system. The technologies on which Ausra's patent portfolio is based can be grouped into the following four categories that relate to CST energy generation and storage: *sunlight reflection, solar heat collection, thermal energy storage, and power plant systems*. Some patents in Ausra's portfolio have claims directed towards more than one of these categories. We provide a brief description of each of the four categories, as well as a technology table grouping each patent, on the following pages.

Patent Number	Document Title	Sunlight Reflection	Solar Heat Collection	Thermal Energy Storage	Power Plant Systems
EP 815401B1	Solar energy collector system	X	X		
WO 1996030705A1	Solar energy collector system	X	X		
US 5899199A	Solar energy collector system	X	X		
EP 985118B1	Solar energy collector system	X	X		
WO 1998028579A1	Solar energy collector system	X	X		
US 6131565A	Solar energy collector system	X	X		
EP 1644670A1	Carrier for a solar energy reflector element	X			
WO 2005003647A1	Carrier for a solar energy reflector element	X			
US 20060157050A1	Carrier for a solar energy reflector element	X			
WO 2005003645A1	Solar energy reflector support system	X			
EP 1644669A1	Carrier and drive arrangement for solar energy reflector system	X			
WO 2005003646A1	Carrier and drive arrangement for solar energy reflector system	X			
US 20060144393A1	Carrier and drive arrangement for a solar energy reflector system	X			
EP1728030A1	Multi-tube solar collector structure		X		
WO 2005078360A1	Multi-tube solar collector structure		X		
US 20070157923A1	Multi-tube solar collector structure		X		
WO 2007104080A1	Thermal power plant incorporating subterranean cooling of a condenser coolant			X	X
WO 2008006174A1	Thermal energy storage system			X	
EP 2043930A1	THERMAL ENERGY STORAGE SYSTEM			X	
WO 2008022409A1	Energy collector system having east-west extending linear reflectors	X	X		
WO 2008092194A1	Solar energy collector heliostat	X			

Patent #	**US 6,131,565A**	**Filing Date**	6/18/99
Title	Solar energy collector system	**Publication Date**	10/17/00
Original Assignee	STANWELL CORPORATION LIMITED	**Priority Date**	12/20/96
Inventors	David Mills	**Priority Country**	Australia
Equivalent Filings	EP 985118B1; WO 1998028579A1	**Priority Document #**	AU19964293A

Original Abstract

A solar energy collection system which includes n groups (13, 14) of arrayed reflectors (15) and n+1 target receiver systems (10, 11, 12) which represent absorbing surfaces to solar radiation that is reflected by the reflectors (15). The receiver systems (10, 11, 12) are elevated relative to the reflectors (15) and the reflectors are pivotally mounted to support structures (19) in a manner such that they may be positioned angularly to reflect incident radiation (I.sub.1, I.sub.2) toward one or the other of the receiver systems (10, 11, 12). The collector system is characterized in that a majority at least of the reflectors (15) within each group (13, 14) are arranged to be driven simultaneously to pivot through the same angle (.o slashed.), in that the reflectors (15) within each group (13, 14) are arrayed in two sub-groups (21 and 22), and in that a majority at least of the reflectors (15) within the respective sub-group (21 and 22) are oriented permanently toward respective ones of the receiver systems (10,

IP Checkups Claims Summary

This granted US patent is primarily focused on a **solar energy collector system** made up of groups of reflectors and receiver systems. The 1st claim describes groups of pivotally mounted reflectors arranged in parallel rows at least above ground level. The claim further stipulates a drive means which imparts pivotal movement to the reflectors in a manner to adjust for small incremental changes in the angle of incident solar radiation. There are two receiver systems, one on each end of the group of reflectors. Reflectors are arranged in sub-groups and a majority of the reflectors are linked mechanically, allowing their pivotal movement to be substantially simultaneous. A majority of reflectors are permanently mounted to reflect incident solar radiation towards one receiver, whereas a minority of reflectors are arranged to shift their direction from one receiver to the other. Each receiver system comprises a solar-to-thermal energy exchange system which includes at least one rack of collector elements through which a heat exchange fluid (water) is passed. Each collector element comprises a glass tube, whose inner wall is coated with a cermet solar selective surface coating, through which the heat exchange fluid is passed. As solar radiation is reflected onto a receiver, the heat exchange fluid inside the receiver is heated and thermal energy is generated.

Collector System: Aerial View

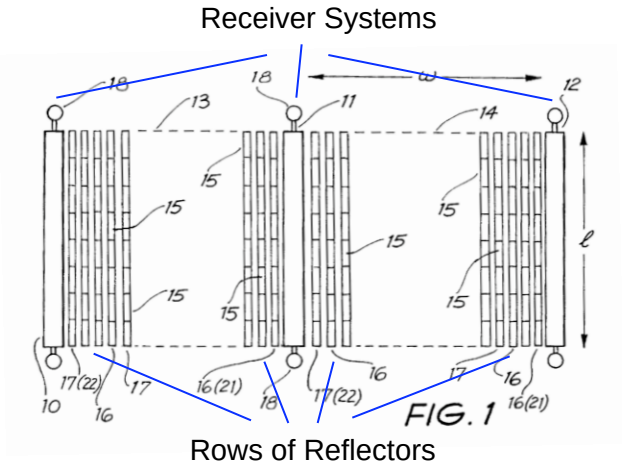

FIG. 1

Collector System: Side View

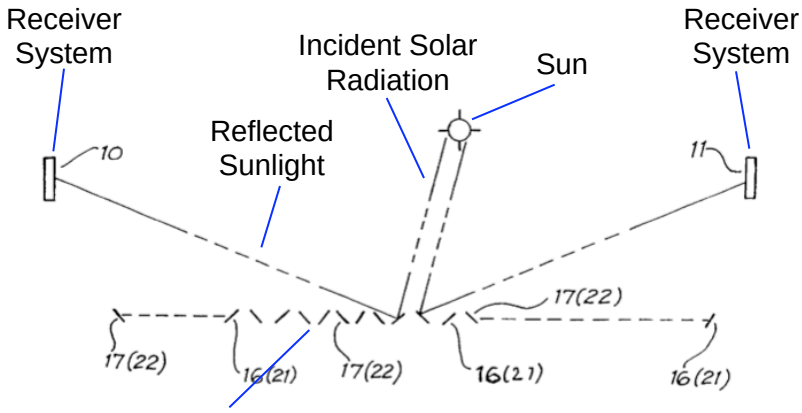

FIG. 2

Forward Citations

Ausra Patent #:	WO 1996030705A1
Title:	Solar Energy Collector System
Filing Date:	3/28/96
Publication Date:	10/3/96

Citing Patent #	Citing Assignee	Title	File Date	Pub Date
WO 1998028579A1	SOLSEARCH PTY LTD	SOLAR ENERGY COLLECTOR SYSTEM	12/19/97	7/2/98
EP 985118B1	SOLSEARCH PTY. LTD.	SOLAR ENERGY COLLECTOR SYSTEM	12/19/97	6/11/03
US 6,349,718B1	SURIA HOLDINGS SARL	Device for heating with solar energy	8/17/00	2/26/02

Ausra Patent #:	EP 815401B1
Title:	Solar Energy Collector System
Filing Date:	3/28/96
Publication Date:	5/28/03

Citing Patent #	Citing Assignee	Title	File Date	Pub Date
WO 2008022409A1	SOLAR HEAT AND POWER PTY LTD	ENERGY COLLECTOR SYSTEM HAVING EAST-WEST EXTENDING LINEAR REFLECTORS	8/27/07	2/28/08

Ausra Patent #:	US 5899199A
Title:	Solar Energy Collector System
Filing Date:	9/24/97
Publication Date:	5/4/99

Citing Patent #	Citing Assignee	Title	File Date	Pub Date
US 6,131,565A	STANWELL CORP LTD	Solar energy collector system	6/18/99	10/17/00
US 6,349,718B1	SURIA HOLDINGS SARL	Device for heating with solar energy	8/17/00	2/26/02
WO 2003019083A1	SOLAR ROOF INTERNAT LLC	MULTIPLE REFLECTOR SOLAR CONCENTRATORS AND SYSTEMS	8/23/02	3/6/03

Ausra Patent #:	WO 1998028579A1
Title:	Solar Energy Collector System
Filing Date:	12/19/97
Publication Date:	7/2/98

Citing Patent #	Citing Assignee	Title	File Date	Pub Date
WO 2006111940A2	LOKURLU AHMET	COLLECTOR AND COLLECTOR ARRANGEMENT FOR GENERATING HEAT FROM INCIDENT RADIATION	4/21/06	10/26/06
DE 202008011468U1	NIKOLIC ZIVOMIR	Sonnenkollektor	8/28/08	12/4/08