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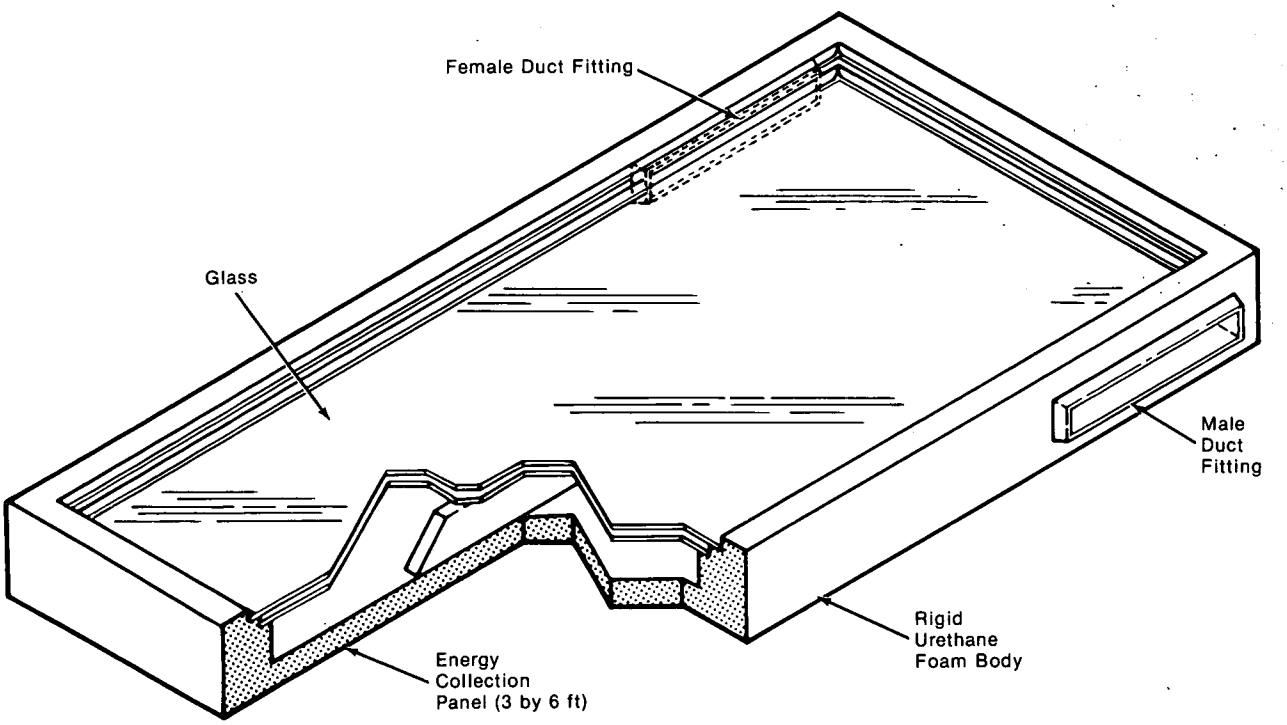
Low-Cost Hot-Air Solar Collector



Low-Cost Hot-Air Collector Assembly

The problem:

One of the major obstacles to the widespread application of solar energy to heat residential and commercial structures is the initial cost of the hardware used to collect and store the energy. One potentially economical system directly heats air by forcing it through a series of boxlike structures. The collectors are mounted in the path of the Sunlight and have no moving parts. However, the collector consists of many parts which are hand fabricated and tested before assembly, thus rendering the system uneconomical.

The solution:

A low-cost solar-energy collector system has only three components per cell. The cell parts are fabricated from readily available materials and, following a construction procedure which requires the use of only simple handtools, can be mounted in place by one person.

How it's done:

The solar collector consists of a rigid, cast urethane structure, a metal collector plate, and a covering which is transparent to solar energy. The urethane body comprises a one-piece housing, bed, and

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thermal insulator. The energy collector is fabricated from ordinary sheet-metal stock. Welding, extruding, or fastening the collector panel to the structure is not required. A transparent cover fits over the urethane body and covers the collector plate. A plan view of the collector assembly is illustrated.

Cold air is forced to enter the collector assembly between the bottom surface of the metal and the urethane body. It travels the length of the panel, around a separating rib, and back around the rib in the opposite direction. The warmed air exits the collector into a second identical collector where the process is repeated. After the heated air is forced through the required number of panels, it is ducted into the structure where the stored heat energy is used. The air, having lost the heat energy, then flows back to the collector, and the process repeats.

If the heated air is not required it is directed to a heat storage apparatus. One implementation consists of a gravel bed or similar heat storage apparatus. The thermal energy stored in the apparatus is used when there is little or no Sunlight.

The individual components of the collector system are inexpensive and readily adaptable to automated fabrication and assembly. The components are also easy to replace if damaged. For instance, if the cover is damaged the sealant surrounding the cover is removed, and the cover is replaced. No scheduled maintenance is required for any part of the collector assembly.

Note:

Requests for further information may be made in writing to:

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Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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Categories: 08 (Fabrication Technology)
04 (Materials)
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