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Secondary Reflectors for Economical Sun-Tracking Energy Collection System: A Concept

Two new secondary reflectors are being proposed for a new Sun-tracking energy collection system [see NASA Tech Brief B75-10209 (NPO-13579)]. The mechanism is simpler and lower in cost because it moves the heat-collector pipe to stay in focus with the Sun. Normally, expensive tracking mechanisms are used to move heavy solar energy-collecting reflectors.

In the new configuration, solar energy is collected by a large main reflector installed on the ground. The heat-collector pipe is situated on a tracking mechanism above the main reflector. The secondary reflectors are placed adjacent to the pipe. Solar energy bouncing off the main reflector is focused onto the pipe by the secondary reflectors. These are moved with the pipe to track the Sunrays coming from the main reflector.

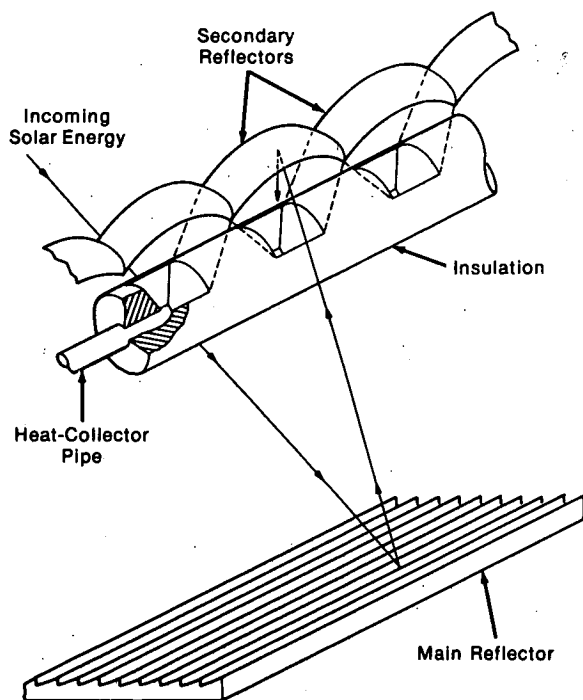


Figure 1. Doubly-Curved Concave Secondary Reflectors

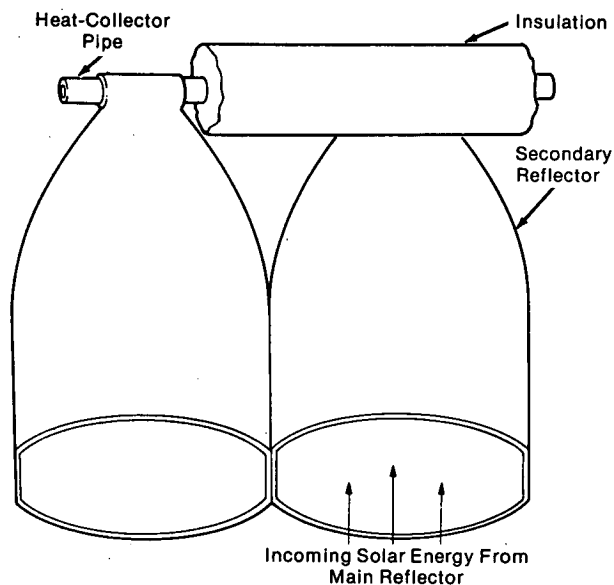


Figure 2. Bell-Shaped Secondary Reflectors

The secondary reflectors can be configured in two ways. In Figure 1 the reflectors are doubly-curved concave strips focused onto different sections of the pipe. Beams coming from the main reflector are focused onto the pipe, forming concentrated hotspots to heat the fluid inside. This results in a higher-temperature than can be produced with uniformly-heated pipe. The entire configuration moves over the main reflector surfaces to stay in focus with the Sun.

In Figure 2, two of a series of bell-shaped reflectors are shown. Energy entering the open mouth of a bell is trapped inside. The hotspots formed on the pipe can reradiate only through a restricted solid angle. This prevents heat loss from the pipe due to reradiation. Heat losses by convection are also prevented because of the geometry. Hot air in the vicinity of the pipe is not allowed to escape because the upper end of the bell is closed.

(continued overleaf)

Note:

Requests for further information may be directed to:

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Patent status:

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