US 20050045174A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0045174 A1**

Ghausi (43) **Pub. Date: Mar. 3, 2005**

(54) **SOLAR COOKER AND HEATER**

(76) Inventor: **Nemat U. Ghausi**, Elk Grove, CA (US)

Correspondence Address:
Nemat Ghausi
3121 Harbour Shore Lane
Elk Grove, CA 95758 (US)

(21) Appl. No.: **10/652,650**

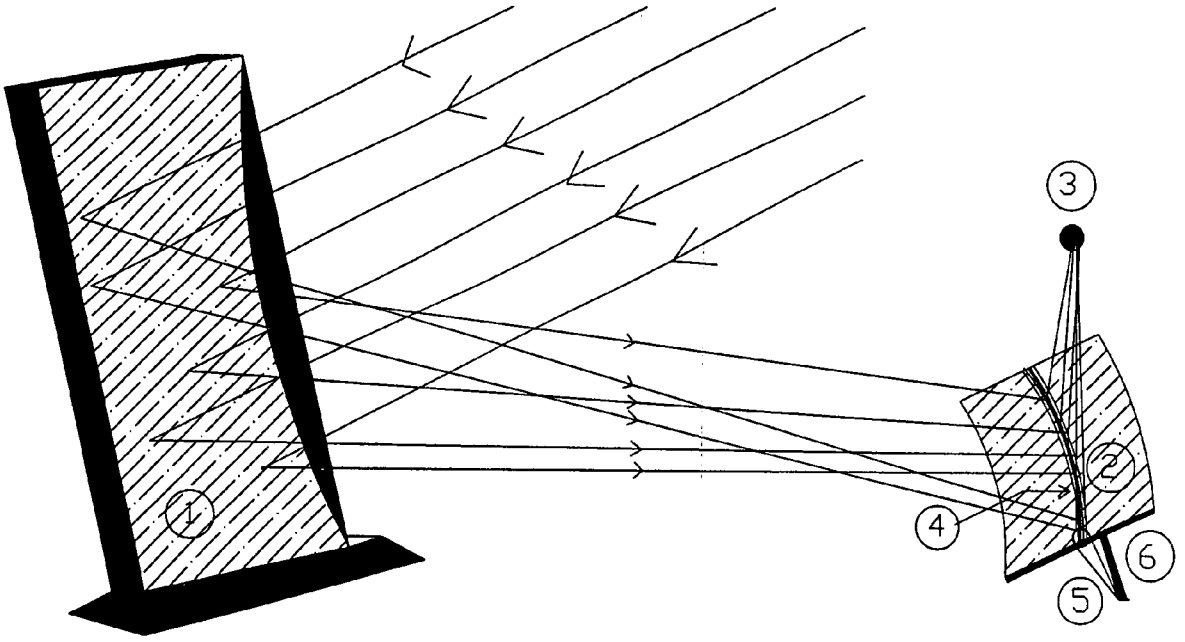
(22) Filed: **Sep. 2, 2003**

Publication Classification

(51) **Int. Cl.**[7] **F24J 2/02**
(52) **U.S. Cl.** **126/682**

(57) **ABSTRACT**

The Solar Cooker is easy to build solar radiation collection system with the ability to produce high radiation energy from a large reflector or reflectors. The system consists of a main primary radiation reflector and a secondary radiation reflector that are made from reflective materials such as: mylar, film, mirror, metal etc. The secondary reflector is much narrower and smaller then the main reflector. The primary reflector sheet is curved to parabolic form and reflects the radiation in linear form to the secondary reflector. The secondary reflector, at a 90 degree angle from the main reflector, transfers the linear reflected line to a smaller area. The system is designed to be sole energy producer or an auxiliary energy generator for the solar ovens that are design to collect radiation from the top.



1- primary reflector
2- secondary reflector
3- focal point (heated area)
4- reflected line of primary
5- reflector adjust. Frame
6- adj.& control of focal piont

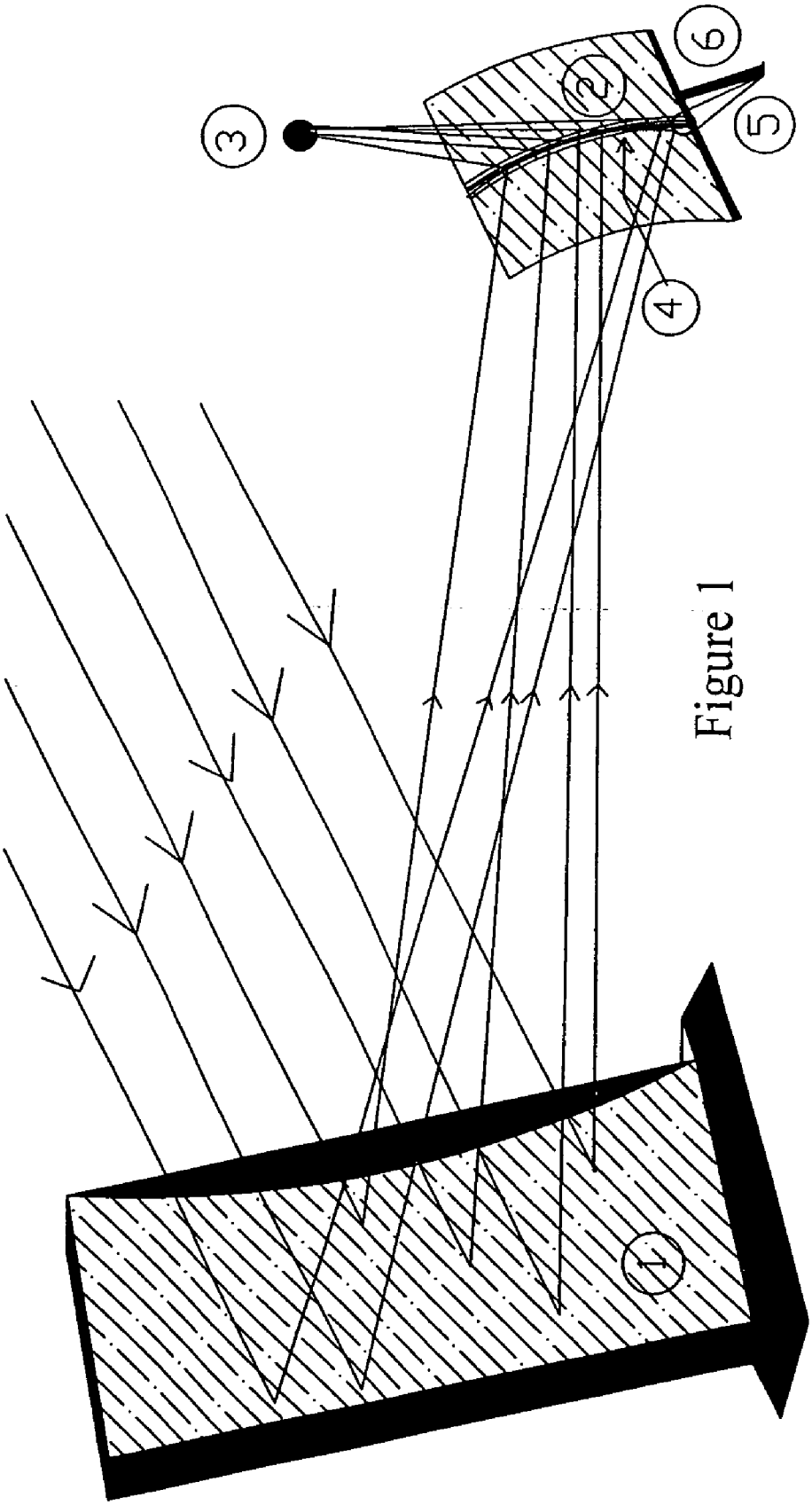


Figure 1

1- primary reflector
2- secondary reflector
3- focal point (heated area)
4- reflected line of primary
5- reflector adjust. Frame
6- adj.& control of focal piont

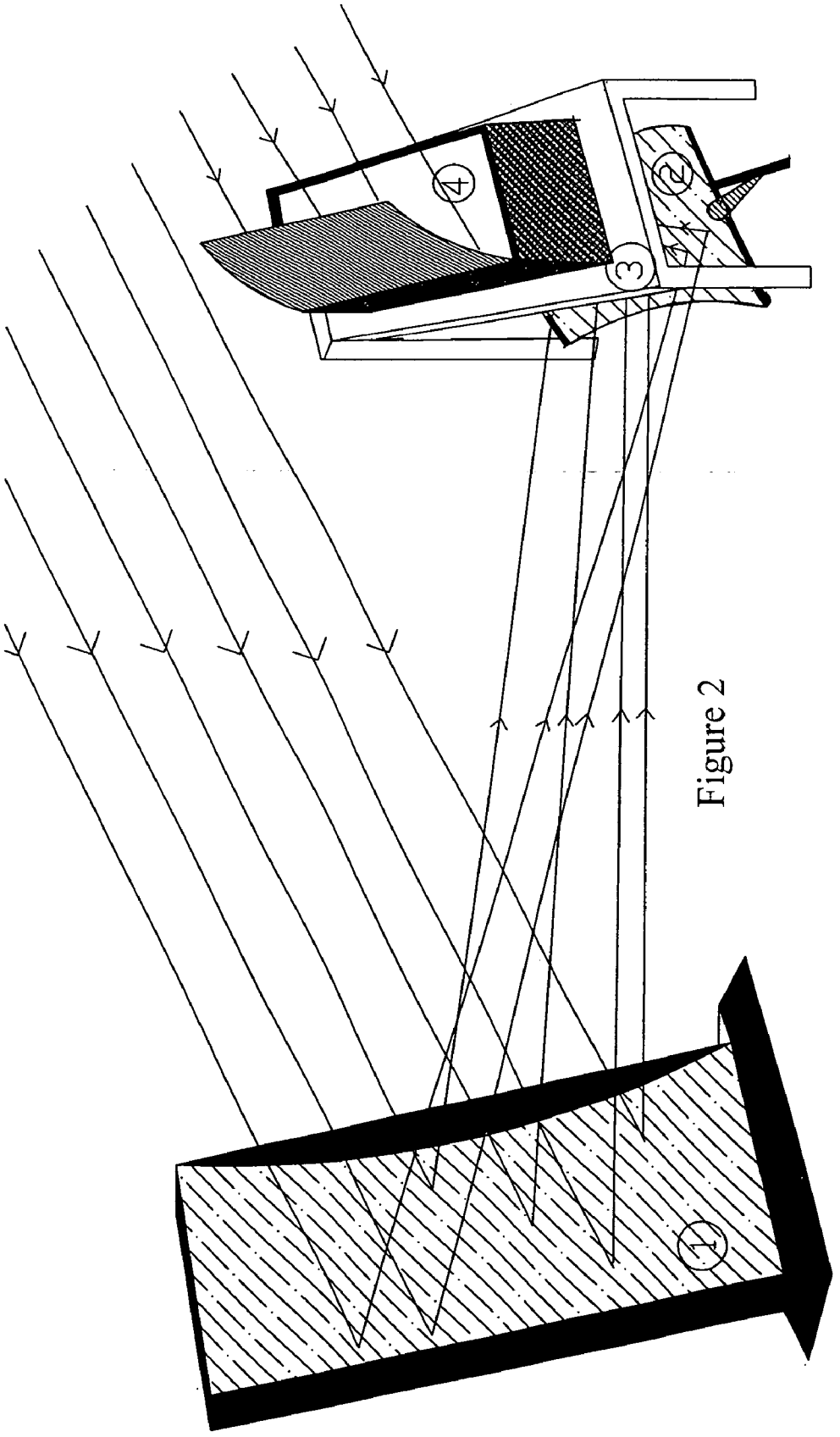
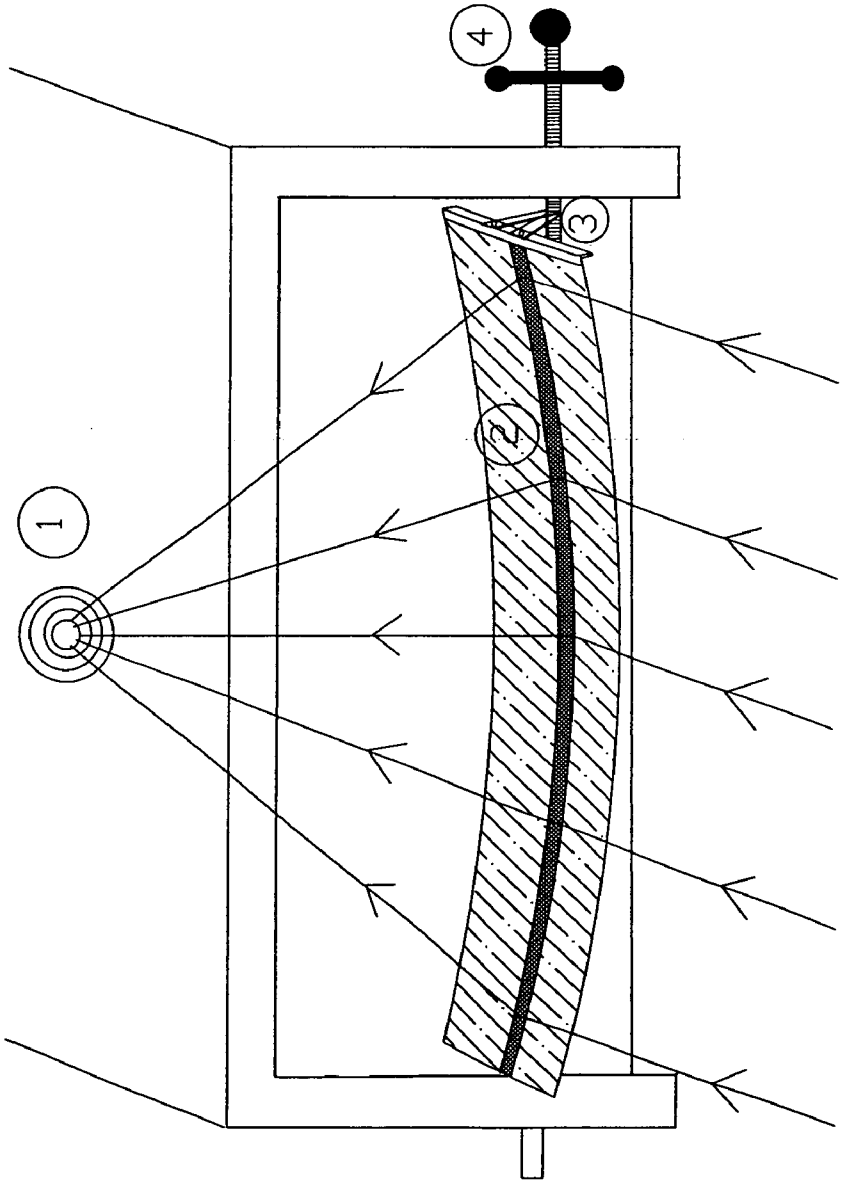


Figure 2

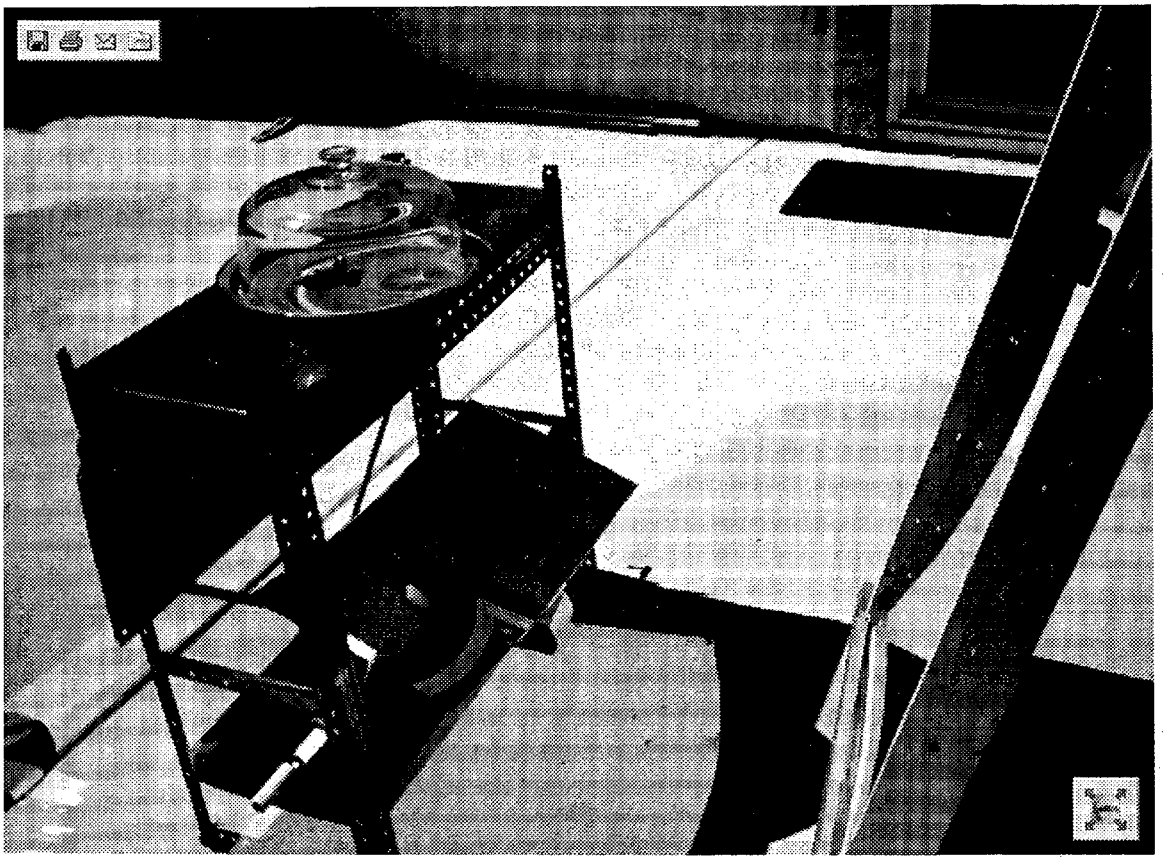
1- primary reflector 2- secondary reflector
3- housing of sec. refl. 4- solar oven(heated from top & bottom)

Figure 3



1 - Focal point (heated area)
2 - Secondary reflector
3 - Secondary reflector adjust. & control
4 - secondary reflector focal control

Figure 4



SOLAR COOKER AND HEATER

[0001] The Solar Cooker is an economical and easy to build solar radiation collection system with the ability to produce high radiation energy. The amount of energy produced depends on the size of the primary reflector or on the number of primary reflectors used to reflect the radiation to the secondary reflector. The system consists of a main primary radiation reflector (or primary reflectors) and a secondary radiation reflector. The surface of primary and secondary reflectors are made from reflective materials such as: mylar, film, mirror, metal etc. The secondary reflector is much smaller and narrower then the main reflector. The primary reflector sheet is curved (bent) close to parabolic form as possible and reflects the radiation in linear form (line) to the secondary reflector. The secondary reflector, which is curved (bent) at a 90 degree angle from the main reflector, transfers and changes the linear reflected line to a point (spot, smaller area). The primary and secondary reflectors are design to be in a fixed position and/or adjustable, movable and detachable. Both the primary and or secondary reflector has a mechanism for adjusting the inclination for focusing purposes. The system accommodates multiple primary reflectors that are focus on a secondary reflector to produce more radiation energy. The system is designed to be sole energy producer or an auxiliary energy generator for the solar ovens that are design to collect radiation from the top.

BACKGROUND OF INVENTION

[0002] The system is one of the most economical methods of harnessing the radiation from the sun. The system acts like a huge magnifying glass or a dish in the size of the primary reflector which is focused to produce energy.

[0003] Most of the related U.S. Patents are based on heating from the top where sun energy is collected and others use parabolic dish type collectors to collect solar radiation.

[0004] U.S. Pat. No. 3,938,497 to Andrassy discloses a moveable apparatus to find a favorable position of the sun. Likewise U.S. Pat. No. 4,111,184 discloses how a parabolic reflector is adjusted to the sun.

[0005] U.S. Pat. No. 4,249,511 to Krisst et al. discloses a parabolic dish reflector which acts as a grill in focal point.

[0006] U.S. Pat. No. 4,696,285 to Zwach discloses a primary and a secondary parabolic dish which reflect the radiation from the top.

[0007] U.S. Pat. No. 4,848,320 to Burn et al. discloses a collapsible reflector with a self-leveling tray to keep the food level within the interior of the oven.

[0008] U.S. Pat. No. 4,841,946 to Marks discloses dish type solar collector an heater and the movements of the unit is controlled electronically.

SUMMARY

[0009] The design is a solar heating and cooking system which uses a curved (bent) flat sheet of reflector material and reflects a line to a secondary much smaller reflector, which in turn reflects the line to a point. The system heats and cooks from the top and from the bottom just like a grill.

[0010] Nemat Ghausi

[0011] 3121 Harbour Shore Lane

[0012] Elk Grove, Calif. 95758

[0013] Aug. 11, 2003

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] **FIG. 1** show the principle of operation.

[0015] **FIG. 2** shows the side view of the system.

[0016] **FIG. 3** shows the close up of secondary reflector in a housing unit.

[0017] **FIG. 4** shows a photo of a prototype where the temperature reached over 400 degrees f under glass cover in open air.

What is claimed is:

1- The system consists of a primary reflector that reflects radiation in a linear form to the secondary reflector. The secondary reflector converts the linear line or lines to a point or spot. The main reflector consists of a sheet of reflector curved close to parabolic, to focus radiation to in a line form. If the curve of the reflector sheet is a perfect parabolic curve, the line produced is a sharp line. The curvature of the reflector sheet does not have to be perfect parabolic curves. If the curve of the primary sheet is not a perfect parabolic then the lines of various thickness will be produced depending on the roughness and closeness to a parabolic curve. The secondary reflector is curved (bent) in 90 degrees angle from the primary reflector. The reflected radiation lines from the primary reflector is changed by the secondary reflector and focused to a spot (point). A perfect parabolic curved sheet produces sharper lines from the main reflector to secondary. That in return means a sharper point from the secondary reflector and higher radiation energy.

2- The system in claim 1, accepts multiple primary reflectors; each of which are focused on a secondary reflector.

3- The system in claim 1 accommodates electronic circuits, sensors and servomotors to align the reflectors to the sun during the day. Or, the inclination of the primary reflector is controlled by supporting rod or by means of a locking mechanism.

4- The primary reflector in claim 1 accommodates inclination adjustability and can be mounted in a fixed position and the secondary reflector is adjustable and movable to obtain the desired maximum radiation. For manual operation, the primary reflector accommodates wheels for ease of movement.

5- The length of the secondary reflector is longer than the width of the widest primary reflector. The secondary reflector is even larger, if to accommodate different positions of the sun and multiple numbers of primary reflectors.

6- The secondary reflector accommodates inclination adjustability and can be mounted in a fixed location and the primary reflector is adjustable and movable to obtain desired focus and radiation. If the secondary reflector optionally has an elongated parabolic shape which will add to the efficiency of the claim 1 system.

7- The secondary reflector is housed in proper heat resisting materials and covered on the other three sides for safety.

8- The system in claim 1 is easy to use and heats from the bottom; like cooking on a grill.

9- The secondary reflector accommodates adjusting the amount of radiation by controlling the focal point. A mechanism to squeeze and/or release is used to control and change the focal point.

10- The secondary reflector's housing unit accommodates electric coils for cooking when there is no sun.

11- The system in claim 1 is easy to manufacture when compared to parabolic dishes or some other concave options.

12- The system in claim 1 is accommodating and serves as an auxiliary heating system for the solar oven which collects radiation from the top.

13- The system in claim 1 is accommodating and serves as water heater by placing a water tank in place of an oven unit.

14- The system in claim 1 accommodates and serves as heat generator for electric power or power to power storage depot.

15- The system in claim 1 accommodates all in one unit. That is the primary reflector is in the bottom and the secondary reflector is a lens type reflector and located just under the cooking surface.

16- The principle of operation of primary reflector in claim 1 accommodates a large reflector surface more radiation energy for the ovens or energy depot (water tanks) that collects radiation from the top.

* * * * *