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(54) Title: SPIRAL SHAPED SOLAR PANEL

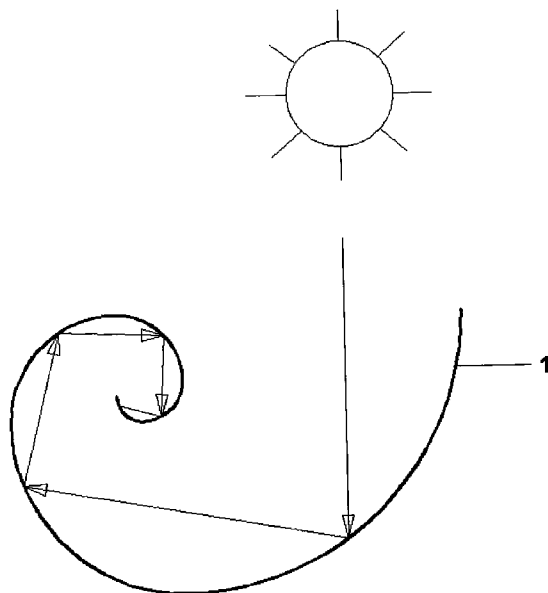


Figure 1

(57) Abstract: The present invention relates to obtaining a
solar panel (1), which occupies less space and enables higher
efficiency in the generation of the electricity from the solar
rays as compared to the conventional solar panel systems,
owing to the spiral shape, especially the golden ratio-based
spiral shape, given to the solar panels (1).

Spiral Shaped Solar Panel

Technical Field

5 The present invention relates to obtaining a solar panel, which occupies less space and enables higher efficiency in the generation of the electricity from the solar rays as compared to the conventional solar panel systems, owing to the spiral shape, especially the golden ratio-based spiral shape, given to the solar panels.

State of the Art

10 The use of solar cells and panels, which collect the solar rays to obtain energy, becomes increasingly more common every passing day for the purpose of meeting the energy demand. While some of these systems directly convert the rays into the energy by absorbing the same, some other systems enable the electricity to be obtained by performing the cycle processes.

15 The solar panels are comprised by the solar batteries and the solar cells. These batteries and cells enable the energy to be obtained by way of absorption of the solar rays. The panels are formed by combining the solar energy cells.

The common conventional systems using the solar panels are distinguished by the positioning of the solar panels on the most suitable slope with respect to the solar rays,
20 depending on the geographical location of the solar panels.

In the solar panels produced according to the state of the art, it was considered that the highest efficiency would be obtained mainly by means of a flat surface and the common use was thus shifted in this direction. Although the small solar energy systems placed on the roofs are appropriate for supplying the energy needs of the houses, the use of such systems
25 for meeting the greater needs requires a considerable area. The requirement for such area increases depending on the energy need. In case the area is used for the solar farms, the possibility of using the area for other purposes is eliminated. As a result, the developing countries, with the agriculture as the primary source of income, may face difficulties related to the sources of income due to such area requirement. Agricultural issue is not the sole
30 factor for the strict legal limitation in some countries about using agricultural areas for the purpose of solar energy generation. The existing solar or electric cars and flying objects that run on electricity need higher energy within very small area. Therefore, it should be required that the optimum generation is achieved within optimum area. Optimization is mandatory. For

instance, drones (multi-copters) may not fly with solar energy due to problem of weight and efficiency of existing solar panels.

A new development occurs every day regarding the use of solar panels. The research and development studies continue for the purpose of achieving the use of panels with greater efficiency as well as providing the panels with the ability of motion. With these improvements, it is mainly aimed to improve the energy efficiency obtained so that the extensive area requirement may be eliminated.

Besides the flat type panel applications, the parabolic or dish-like shaped collector structures are also used. However, these structures are still under development.

The improvement and development efforts for the solar energy systems continue based on different ideas and designs. Owing to the studies, the efficiency is enhanced day by day.

On the other hand, although the novel technologies such as parabolic trough, parabolic dish, solar tower and solar furnace are included among the existing systems, as most of these systems are solar thermal systems, they are not relevant to the present invention described in this specification. Instead of directly generating the electrical energy from the sun, these systems cover the utilization of the thermal benefit of the sun to enable the rotation of the mechanical systems via the vapor pressure, which mechanical systems will in turn rotate the generator, thereby resulting in the generation of the electrical energy. In brief, the electricity is generated in these systems by way of a series of energy conversions. In contrast, the electricity is directly obtained in the photovoltaic systems. Consequently, the photovoltaic system is preferred in the present invention. However, it should not be construed that the invention is dependent on this system and that a different system may not be used.

The golden ratio is a form frequently encountered in nature and is in fact based on a mathematical expression. This expression may be used in everything designed to be compatible with the number $1,6180339887498948420 \dots \approx 1,618$. The golden ratio is used in many fields, from the mathematics to physics and arts.

There is a relationship between Fibonacci number sequence and the golden ratio, according to which the ratio of two successive numbers in the sequence approaches the golden ratio as the numbers increase. This is only one of the examples for the golden ratio.

It is known that the number pi was used in the construction of the great Egyptian pyramids. However, it was also proven by many researches that the golden ratio, in other words the number phi (Φ), was also used and it was stated that the perfectness of the pyramids could be attributed to the golden ratio.

The golden ratio is used not only in mathematics, but commonly also in the art. Leonardo Da Vinci, who achieved perfection in his paintings by applying the golden ratio, made use of this ratio in almost all of his works, notably Mona Lisa.

Since the golden ratio is regarded as the symbol of perfectness in nature, the solar panels prepared in this manner will also enable the greater use of the energy of the solar rays in order to obtain electricity, owing to the solar rays which are refracted many times once they enter the cell. One of the most important reasons for choosing the spiral design, primarily the design based on the golden ratio, is to enable a greater extent of utilization of the solar energy.

10

Figures to aid in the Description of the Invention

The spiral shaped solar panel, which is realized to achieve the objects of the present invention, is shown in the enclosed figures in which:

15

Figure 1. Profile view of the spiral solar panel based on the golden ratio

Figure 2. Top view of the spiral solar panel based on the golden ratio

Figure 3. Front view of the spiral solar panel based on the golden ratio

Figure 4. Profile view of the spiral solar panel

20

Figure 5. Profile view of the flat surface solar panel in a state brought into the spiral form

Figure 6. Profile view of an embodiment of the spiral solar panel having a frame

Figure 7. Profile view of an embodiment of the spiral solar panel that is fixed with tabs and handles

25

Reference Numbers to aid in the Description of the Invention

The parts in the figures are individually assigned with reference numerals, the designations for which are provided below.

1. Spiral Solar Panel

2. Panel Frame

3. Tabs/ Handles

4. Adjustable bands

Description of the Invention

- 5 The invention relates to an increase in the efficiency of energy generation and a reduction in the occupied area owing to a different form obtained by changing the shape of the solar panels in a manner different from the current uses of the solar panels.

The invention is based on obtaining more energy by means of the reflection of the solar rays entering the spiral, according to the principle that the solar rays reflect by making the same
10 angle with the surface as the angle of incidence. Each reflecting ray will provide an energy input for the panel system and will exit the spiral by way of reflecting in the same manner as it enters the spiral. In this way, it will be possible to make greater use of the rays.

The solar panel (1) according to the invention occupies much less area than the existing systems. Thus, it is possible to reduce the size of the solar farms as the amount of energy
15 obtained from unit area is increased. It will be possible to obtain more energy from the same area by replacing the existing panels with the spiral panels (1) when it is time to renew the panels.

The cells and batteries that run on photovoltaic system are preferred for the spiral solar panels (1). These cells and batteries are preferred, because they directly convert the solar
20 energy into the electrical energy. In this way, the energy conversion costs will be reduced. However, the invention should not be construed to be limited to the photovoltaic systems. The photovoltaic systems may be used in two different ways. First of these is the systems with grid connection. In these systems, the energy is obtained and directly used. Since there is no electricity storage system, it is required to obtain electricity from the grid in case of
25 insufficient production and to feed the grid in case of excessive production. The other is the off-grid systems. In these systems, the electricity is stored in the electricity storage units such as batteries and/or the like, in order to allow the use at a later time. Thus, in case of insufficient electricity, the electricity is extracted from the units where the excessive electricity has been previously stored.

- 30 The spiral panels (1) that comply with the desired efficiency may be used for the new solar farms planned to be built. In this way, it becomes possible to obtain considerable savings in the area, and the fertile lands, the use of which could otherwise be prevented by such systems, may be used for other purposes. Even though the widespread use of the solar

panels occurs mainly in the dry lands, the installation of the panels also in the areas used for agriculture in mandatory conditions especially in the developing countries and thus the preclusion of the income that could be obtained from such areas is a situation that is encountered.

- 5 The solar panels are also effectively used in providing the individual energy needs of the houses by way of setting the panels on the roofs, especially in the regions where the hot climate conditions prevail and the rate of sun utilization is high. Regarding such uses also, it is possible to develop the systems that occupy less space by preferring the spiral solar panels (1).
- 10 Due to the savings they provide in the area, the spiral solar panels (1), being lighter in weight and smaller in size, enable the energy to be obtained in every means of sea, air and land transport. When used in the transport vehicles, the efficiency will increase during the hours when it is possible to make the biggest use of the solar rays, i.e. during the daytime hours, and the use will also be possible during the hours when the sun light is unavailable, owing to
- 15 the contribution from the energy storage systems.

- The invention has a spiral shape with a profile view which is formed in accordance with the number phi (Φ), that is, the golden ratio. In an embodiment of the invention, in order to preserve the golden ratio-based spiral shape of said panel, there is provided a frame (2), which is manufactured by bending any light-weight and bendable material, preferably
- 20 aluminum. According to another embodiment, the invention is obtained by directly giving the spiral shape to the solar panels, without using a frame. The solar panels are manufactured with the spiral shape or they are fixed via tabs, handles (3) or other systems in such a way that they can preserve their shape. The tab/handle (3) structure may be separate from the panel system and may be adjustable. The spiral form may be given to the panel (1) by
- 25 means of the adjustable bands (4). An illustrative example is provided in the figures, but the invention is not limited to this illustration.

Although the spiral panel according to the invention is preferably a golden ratio spiral, it may also be a spiral with cornered structure formed by combining the spirals with different angles or the flat panels.

- 30 Owing to the invention, a saving in the range of 65-75% may be obtained in the area and an increase of 180-220% may be achieved in the energy. These rates may vary according to the area where the invention is to be placed and the position of the sun.

The invention is not limited to the exemplary applications shown and described herein and the different options, which fall within the scope of the appended claims and which will be readily apparent to the persons skilled in the art, are possible.

CLAIMS

1. Spiral shaped solar panel characterized in that the solar panel, which enables to improve the energy efficiency and provide savings in area, is used in a form bent into a spiral according to different ratios, notably the golden ratio.
- 5 2. Spiral shaped solar panel according to Claim 1 characterized in that the spiral shape is formed by arranging more than one panel cells side by side.
3. Spiral shaped solar panel according to Claim 1 characterized in that the spiral shape is formed by sticking to the golden ratio and arranging more than one panel cells side by side.
- 10 4. Spiral shaped solar panel according to Claim 1 characterized in that a spiral-like form is obtained by joining more than flat panel cells end to end and arranging them side by side.
5. Spiral shaped solar panel according to Claim 1 characterized in that an embodiment of the invention has a frame (2) with spiral form manufactured from light-weight and bendable materials that can preserve their form.
- 15 6. Spiral shaped solar panel according to Claim 5 characterized in that an embodiment of the invention has a frame (2) with spiral form manufactured from aluminum or from the materials with aluminum alloy.
7. Spiral shaped solar panel according to Claim 5 characterized in that the frame (2) constitutes a surface enabling the solar batteries and/or cells (1) to be covered.
- 20 8. Spiral shaped solar panel according to Claim 5 characterized in that the frame (2) is covered with the batteries and/or cells (1) not only on the interior surface thereof but also on the sun-exposed exterior surface thereof.
9. Spiral shaped solar panel according to Claim 1 characterized in that an embodiment of the solar panel (1) is manufactured in spiral form.
- 25 10. Spiral shaped solar panel according to Claim 1 characterized in that the efficiency increase in the solar panel (1) is obtained owing to the reflection of the solar rays after they enter the spiral.
11. Spiral shaped solar panel according to Claim 1 characterized in that an embodiment of the solar panel (1) has at least one tab/handle (3), which enables the spiral form to be preserved and which fixes the spiral form in at least one location of the panel.
- 30 12. Spiral shaped solar panel according to Claim 11 characterized in that the tab/handle (3) is an apparatus with separate and adjustable structure and comprises adjustable bands (4).

12. Spiral shaped solar panel according to Claim 1 characterized in that it enables the use in line with the energy need in all and/or some of the vehicles providing the sea, air and land transport.

13. Spiral shaped solar panel according to Claim 1 characterized in that it provides savings in area by replacing the panels in the conventional solar farms.

14. Spiral shaped solar panel according to Claim 1 characterized in that it provides savings in area by bringing the panels into the spiral form in the conventional solar farms.

15. Spiral shaped solar panel according to Claim 1 characterized in that the panels used on the roofs of the houses and the business places are enabled to occupy less space by way of being provided with the spiral form.

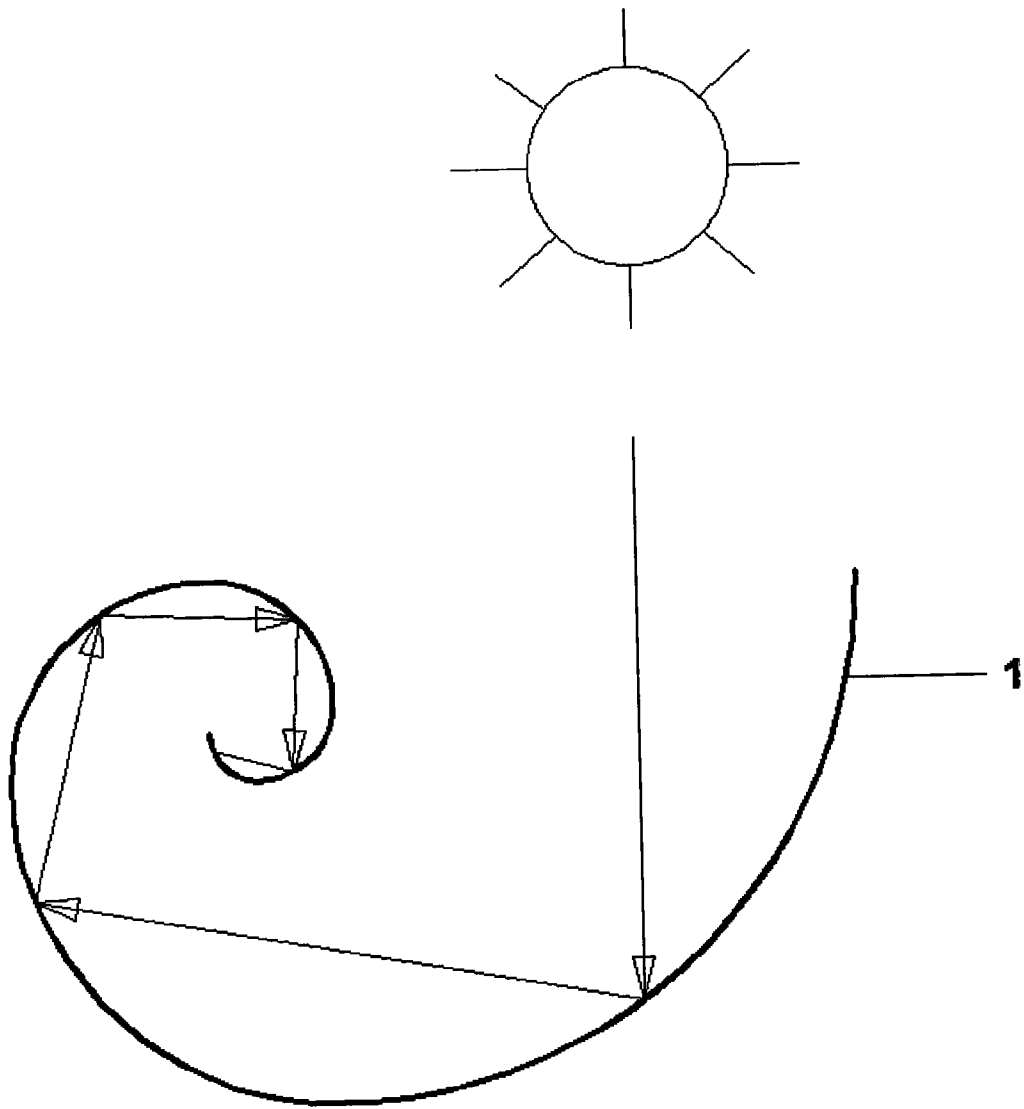


Figure 1

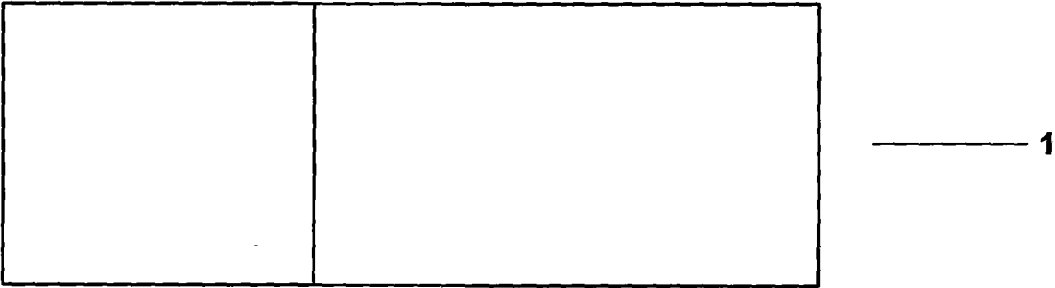


Figure 2

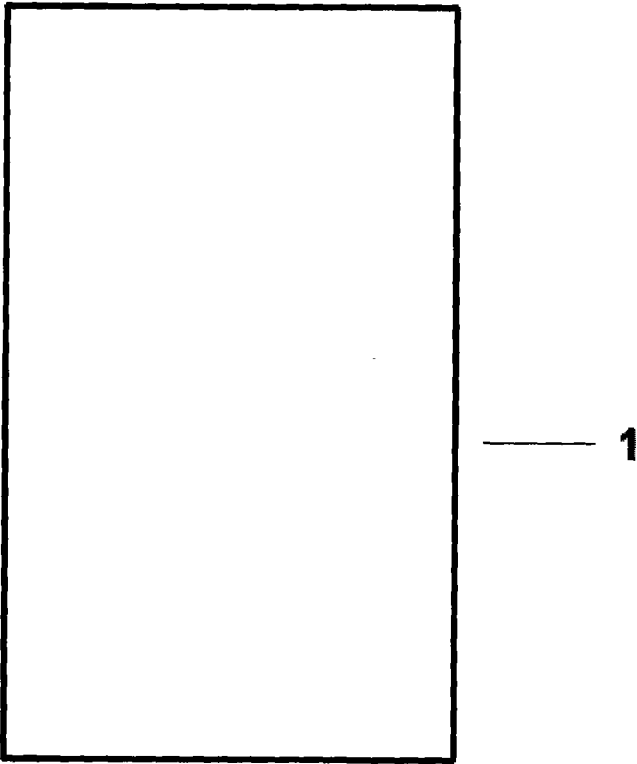


Figure 3

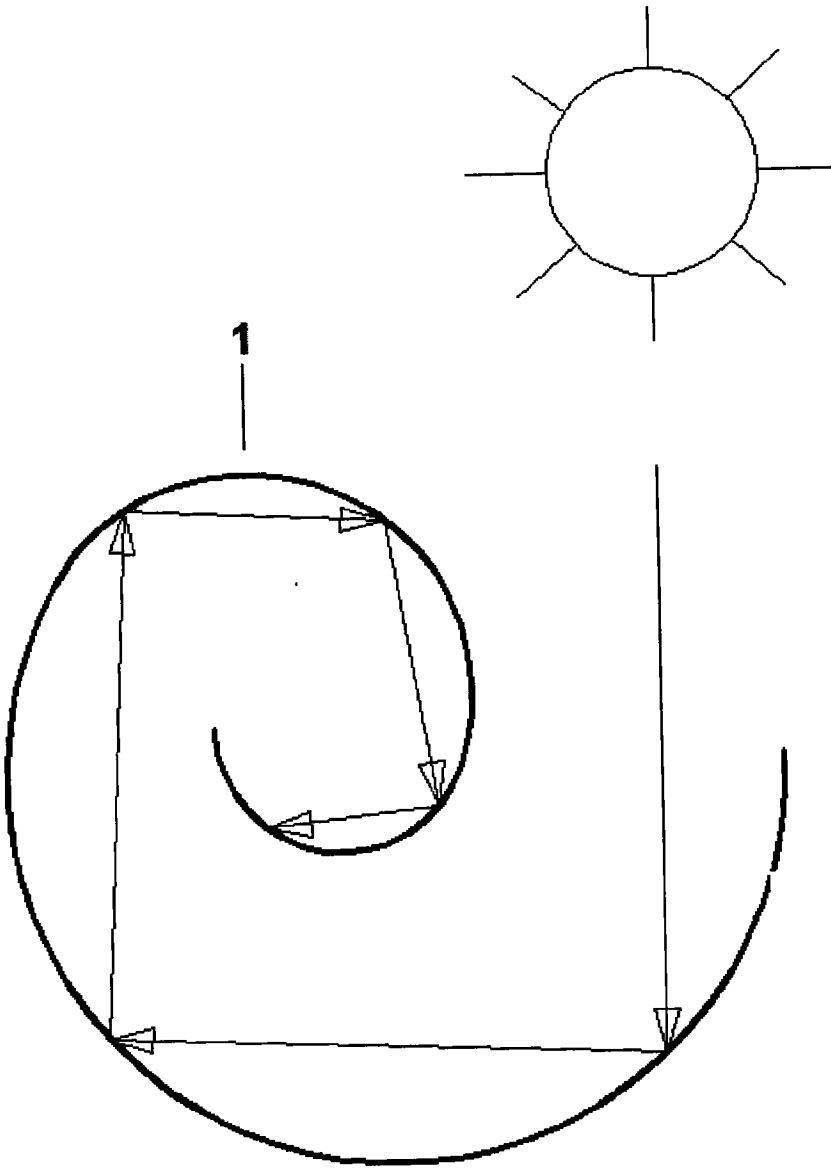


Figure 4

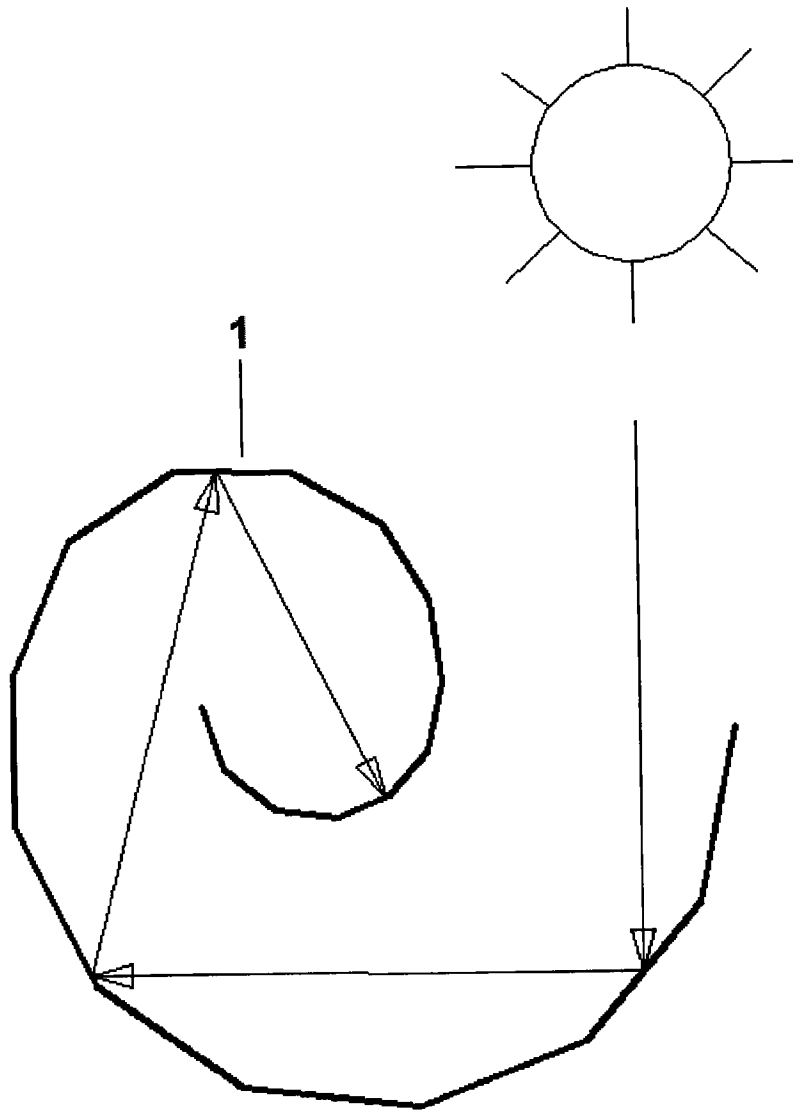


Figure 5

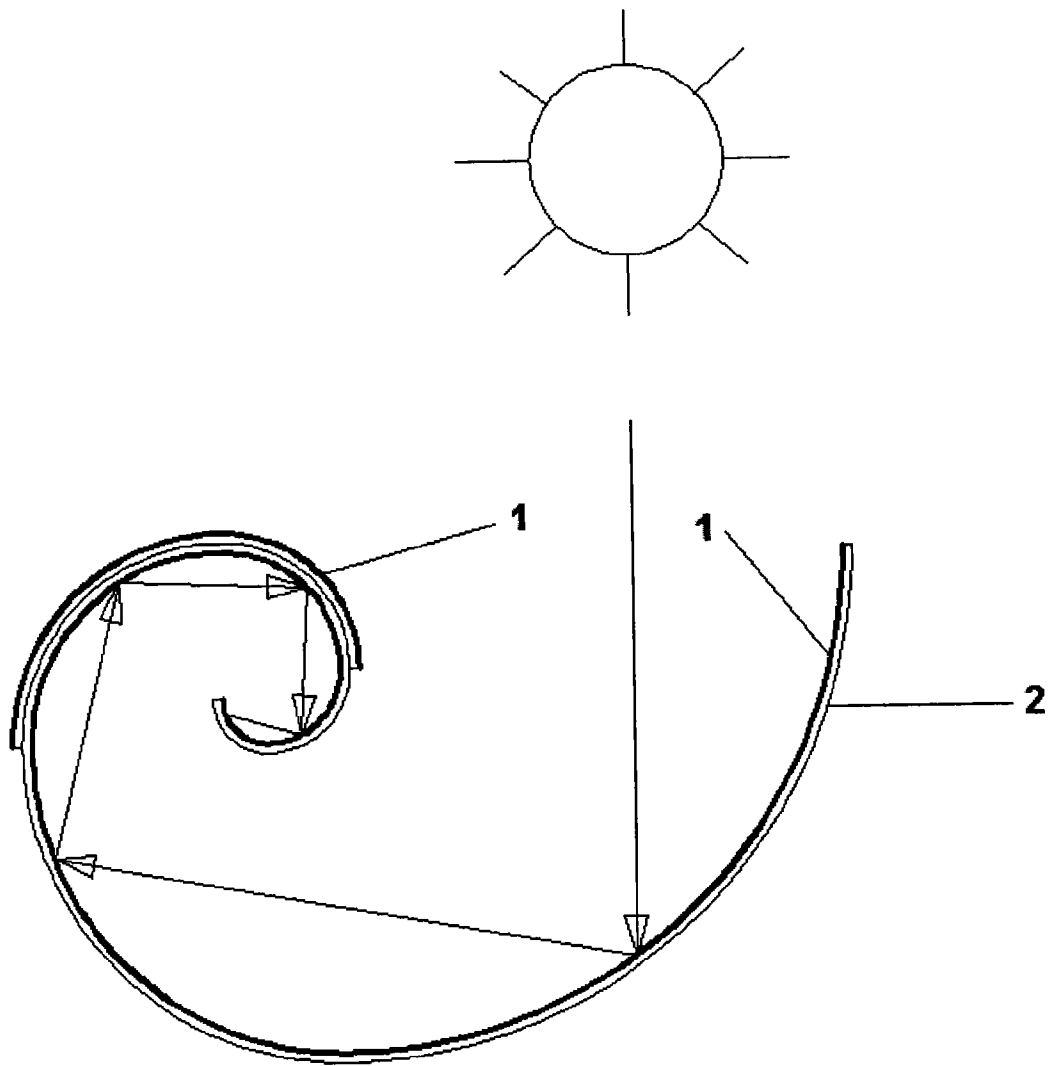


Figure 6

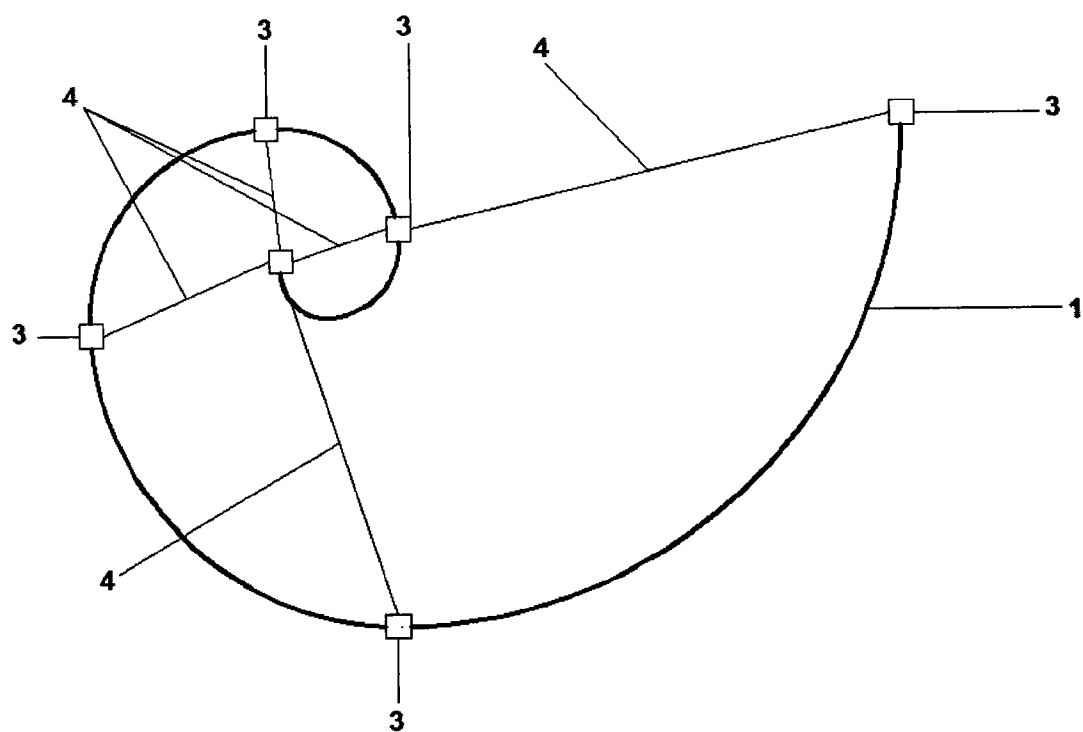


Figure 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2015/000359

A. CLASSIFICATION OF SUBJECT MATTER
INV. F24J2/10
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F24J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	----- WO 2010/137051 A2 (DWA S R L [IT]; CARMELLO CLAUDIO [IT]) 2 December 2010 (2010-12-02) page 9, line 11 - page 12, line 11 page 14, line 9 - page 17, line 7; figures 1-13	1,5,9
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Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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