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(54) **METHODS AND MECHANISMS TO INCREASE EFFICIENCIES OF ENERGY OR PARTICLE BEAM COLLECTORS**

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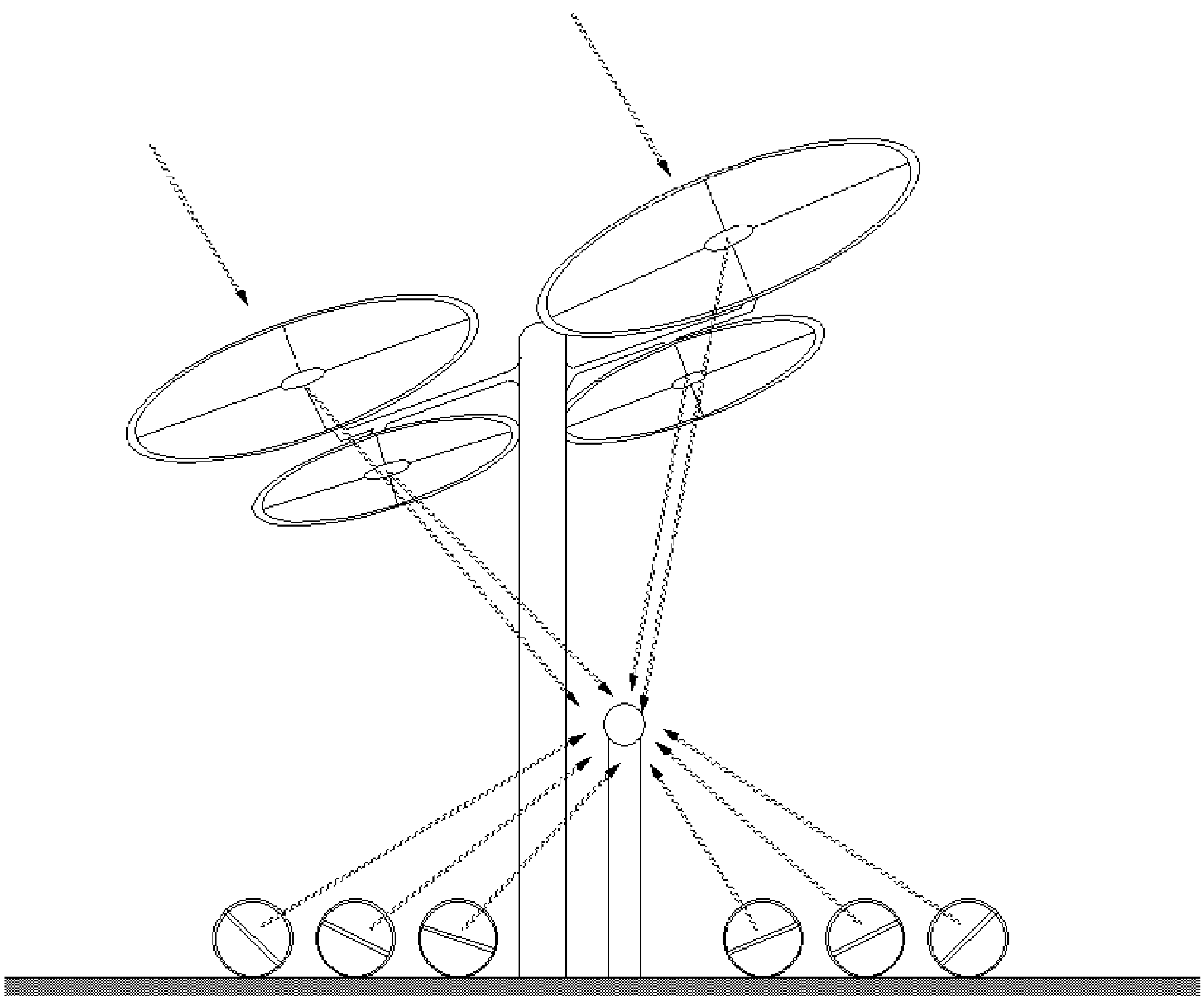
(57) **ABSTRACT**

The current invention is a Method and Mechanism to Increase Efficiencies of Energy or Particle Beam Collectors. Light may go through a transparent, open, 1-way, low emission, or transparent top that may focus light below from a thin film that is designed to be a Fresnel focusing surface that angles most of the light to a collector(s). With a 1-way mirror, or low emission film or glass top surface, light may go into the light collector unit, but most to all doesn't leave the unit. Light that gets in the light collector/concentrator units and doesn't get totally focused on the collector(s) from the top, may hit the bottom or sides, which each may be a compact linear Fresnel reflector, Fresnel reflector, photovoltaic or other energy collection, or total reflective surface, and be focused to the collector(s) from the surface, or reflected to eventually be incident on the collector(s).



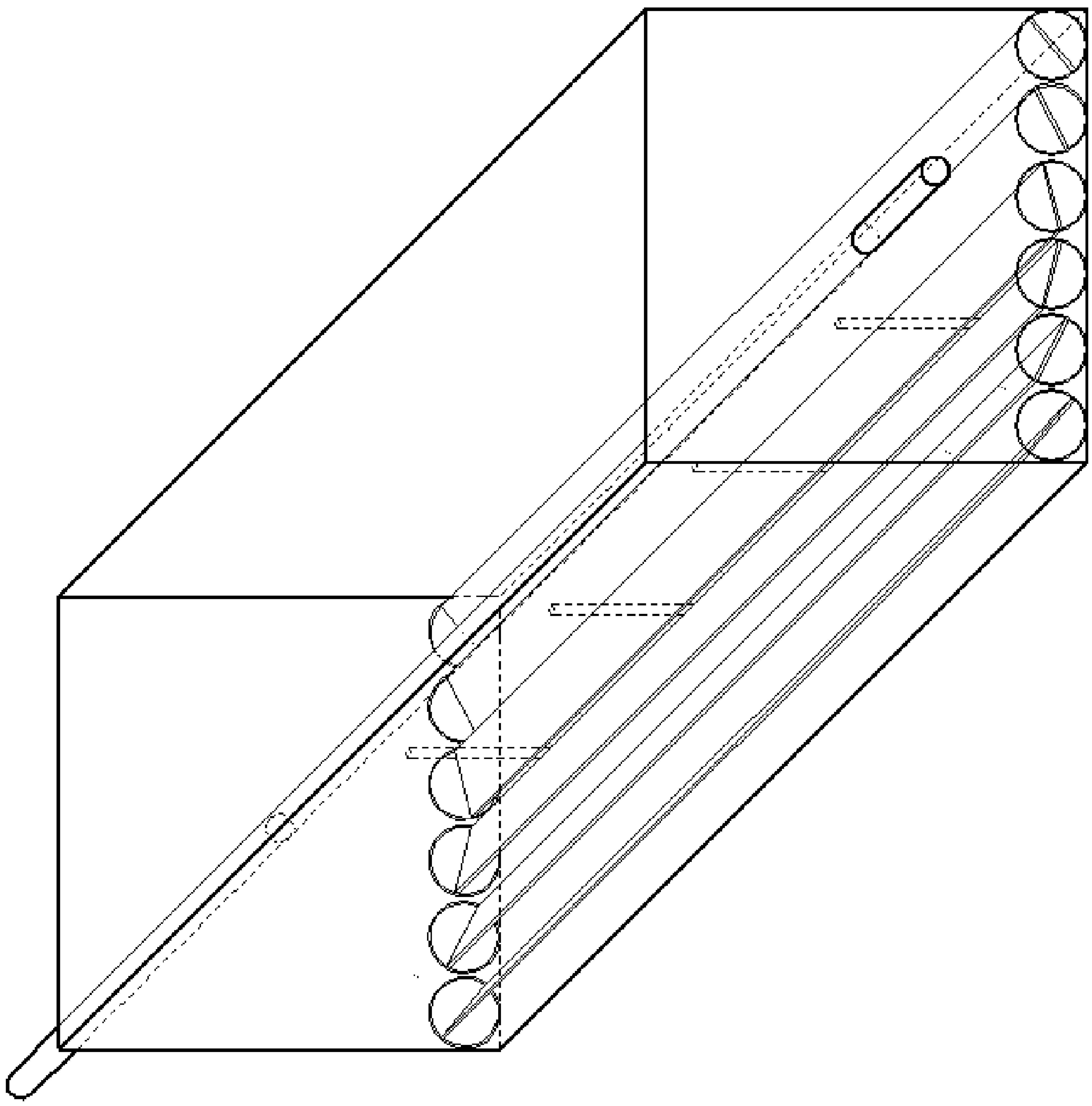


Fig. 1

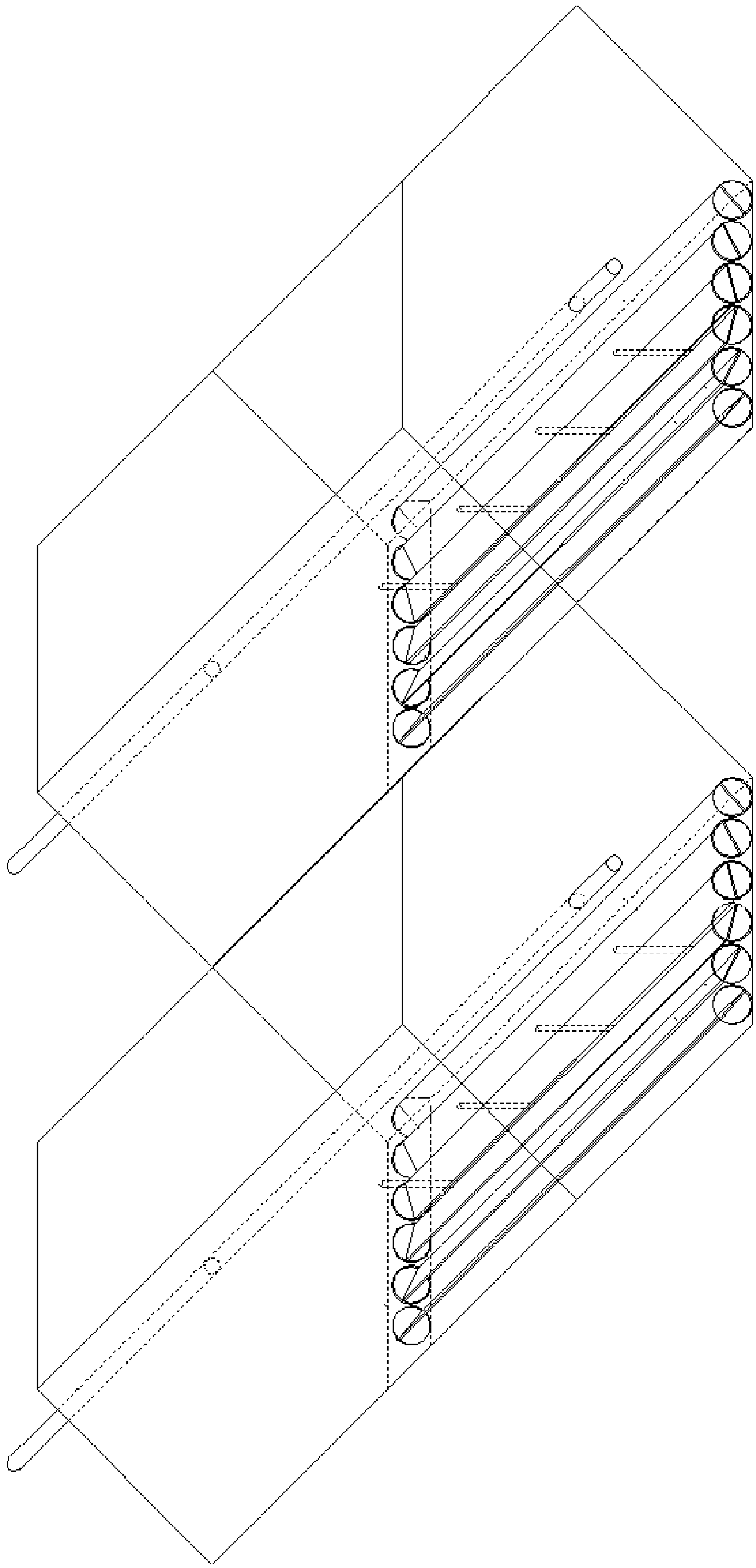


Fig. 2

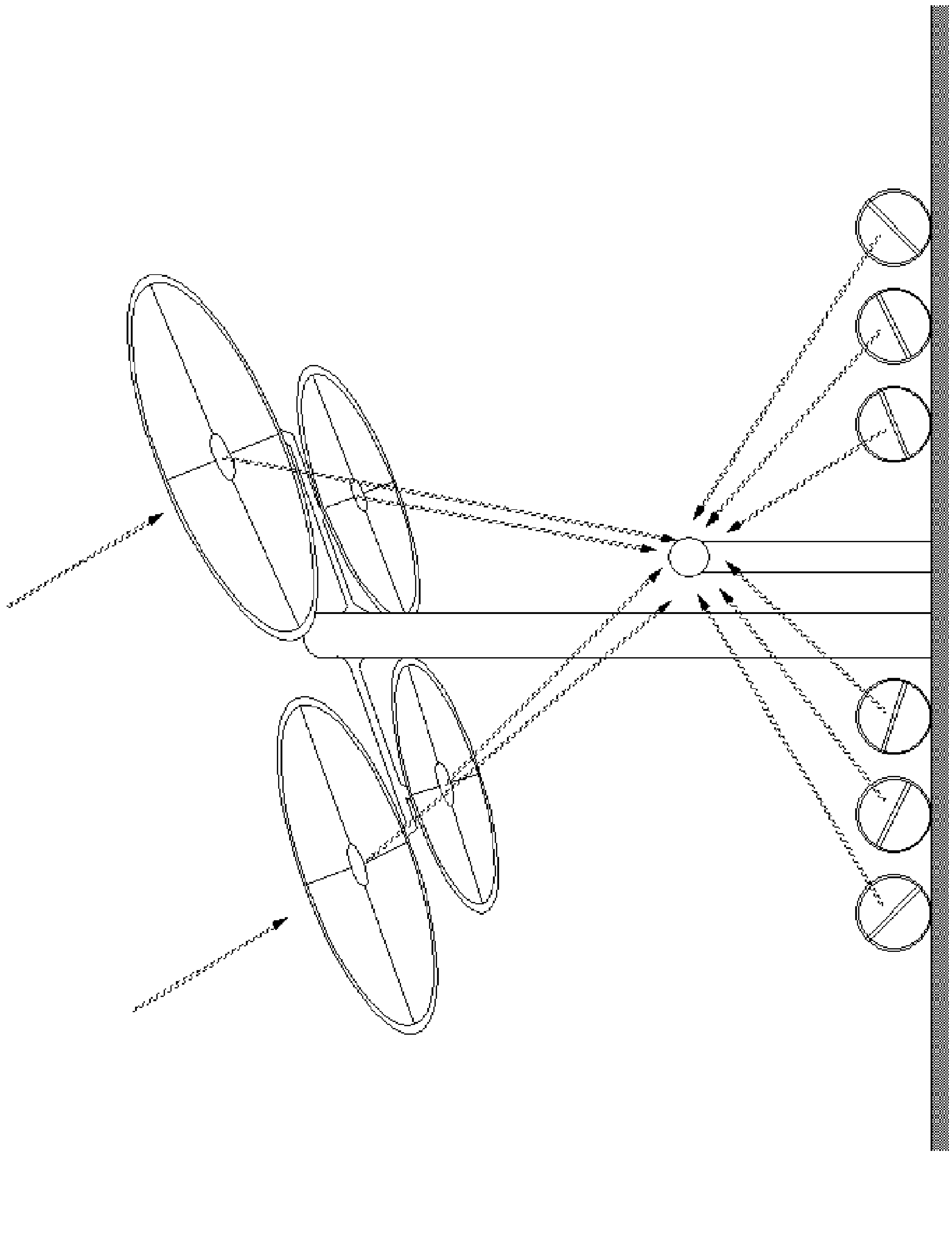


Fig. 3

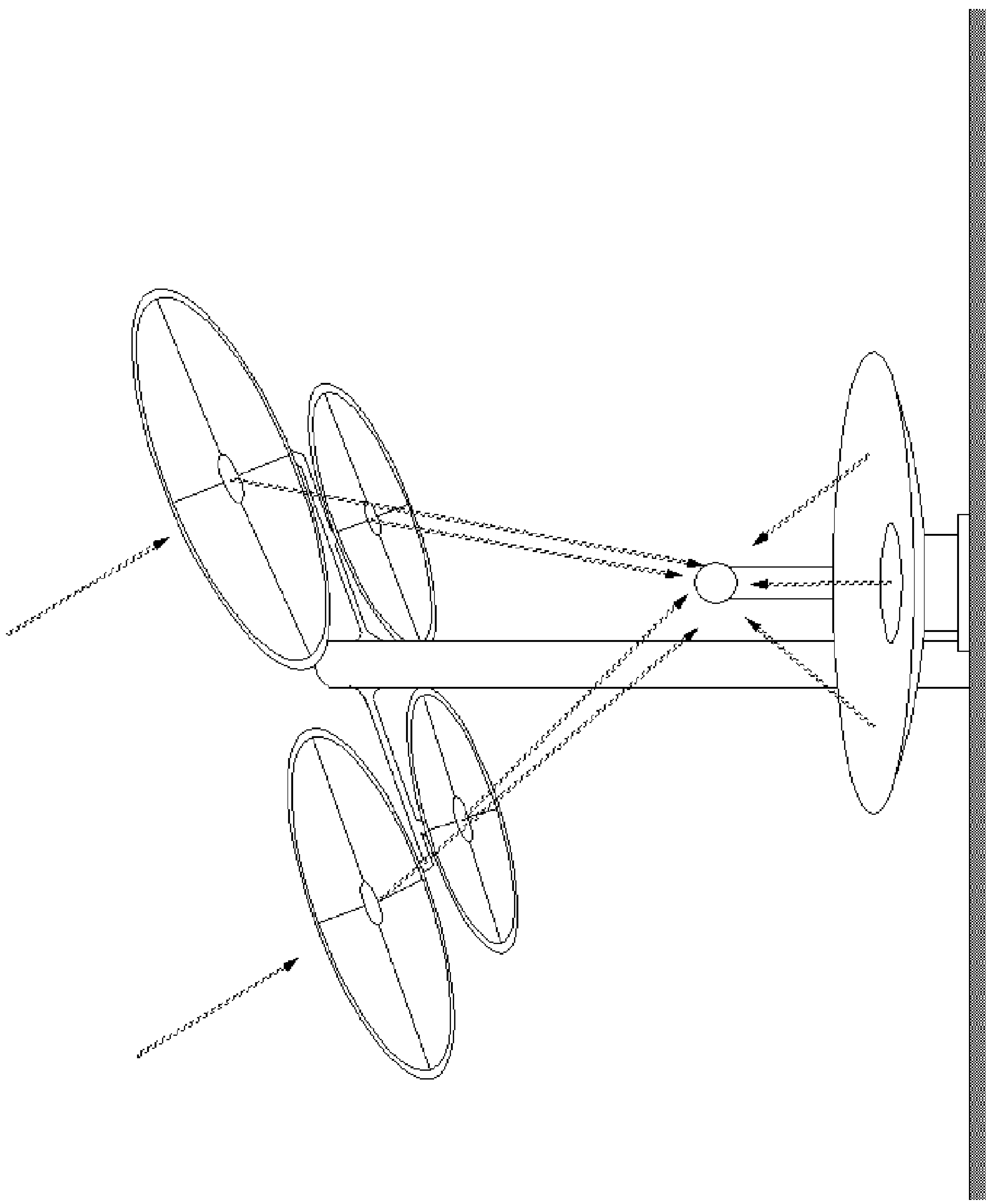


Fig. 4

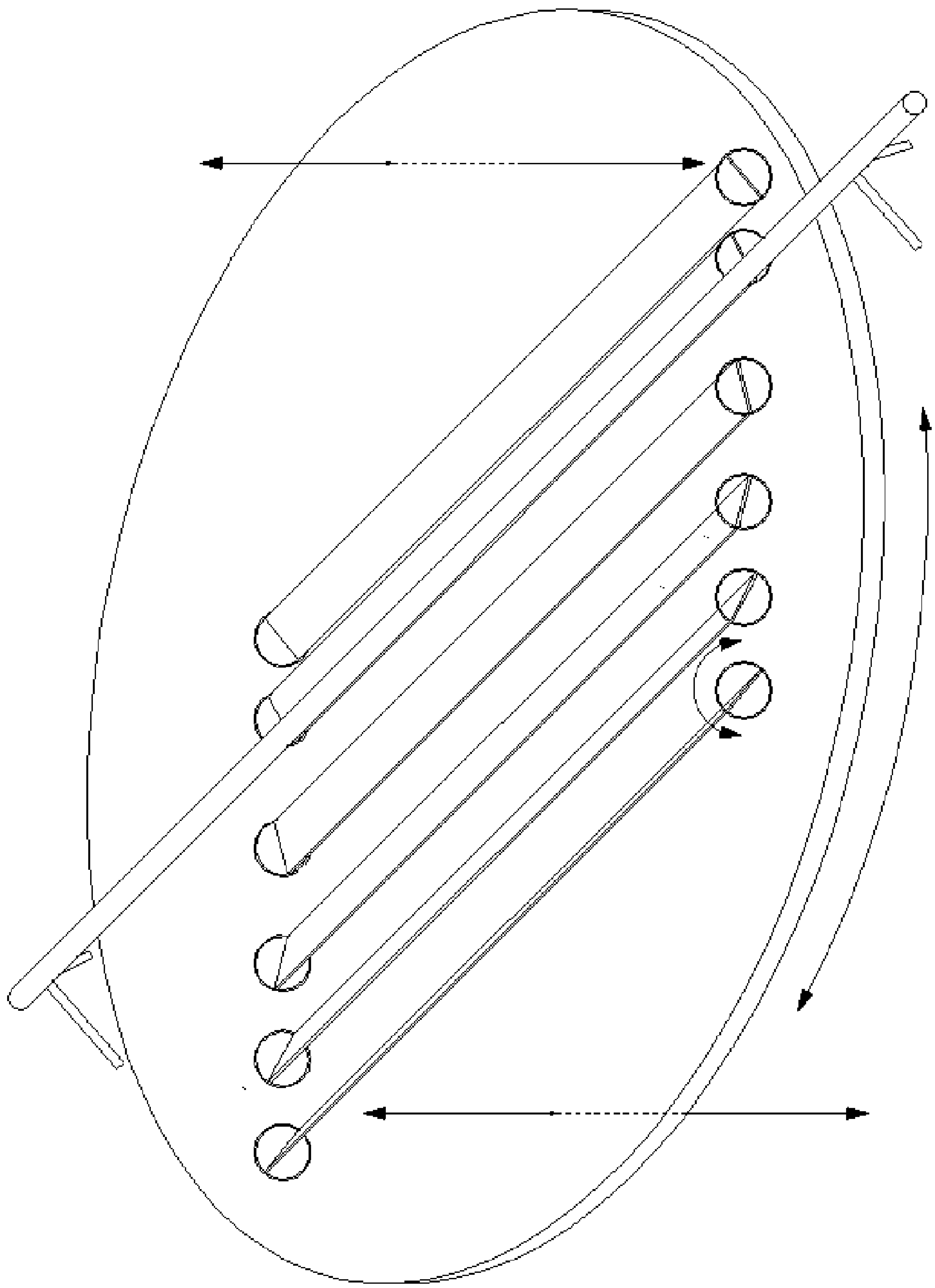


Fig. 5

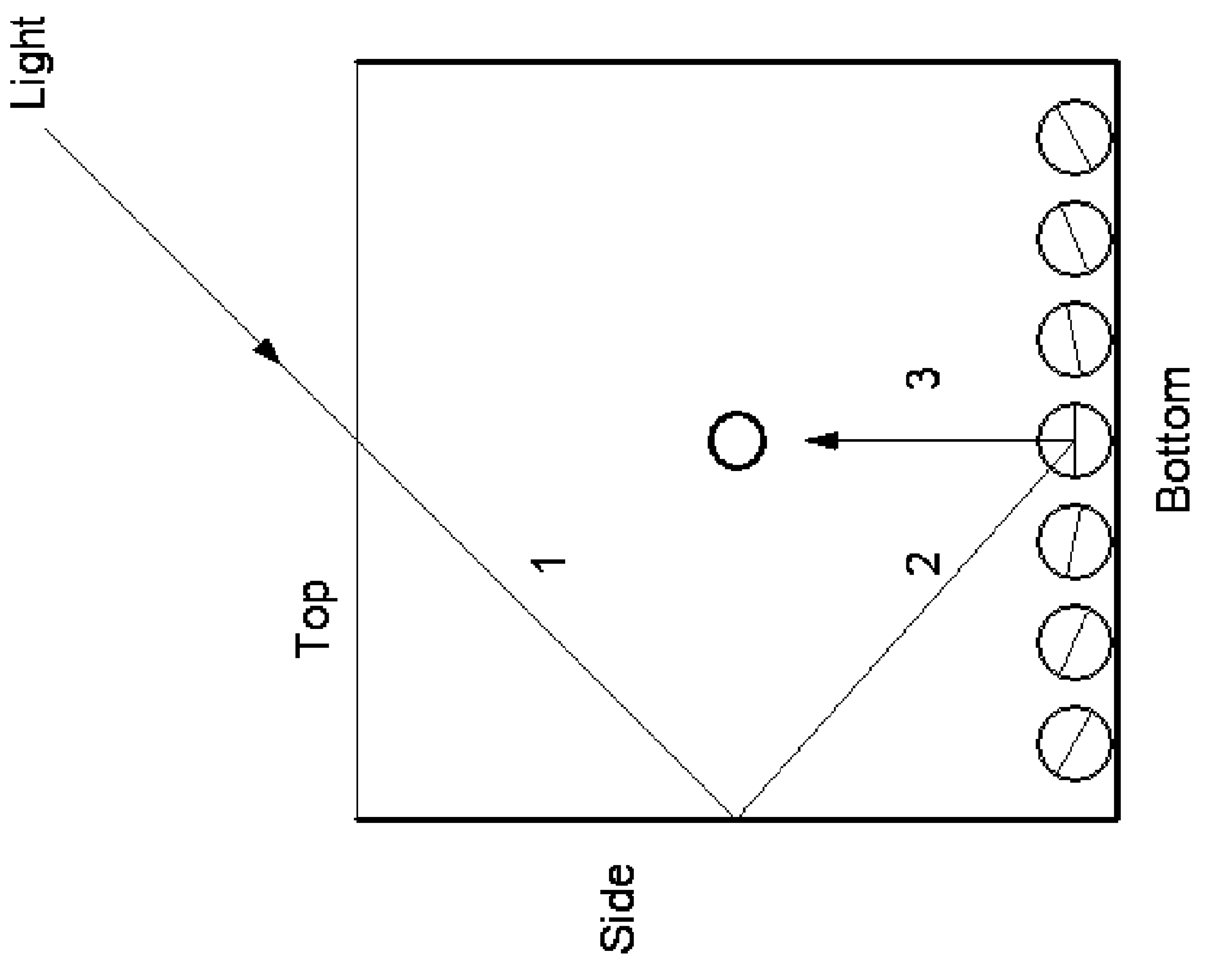


Fig. 6

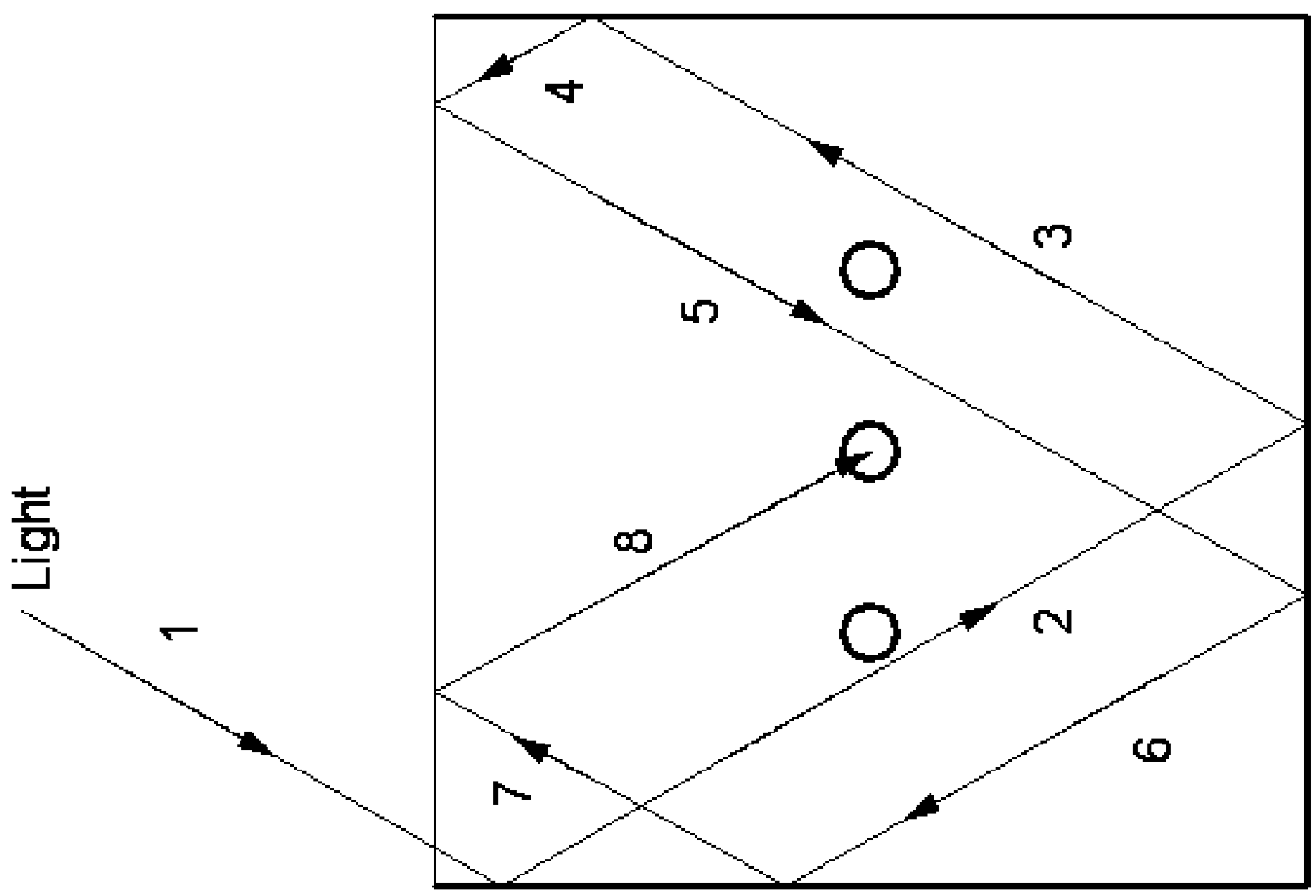


Fig. 7

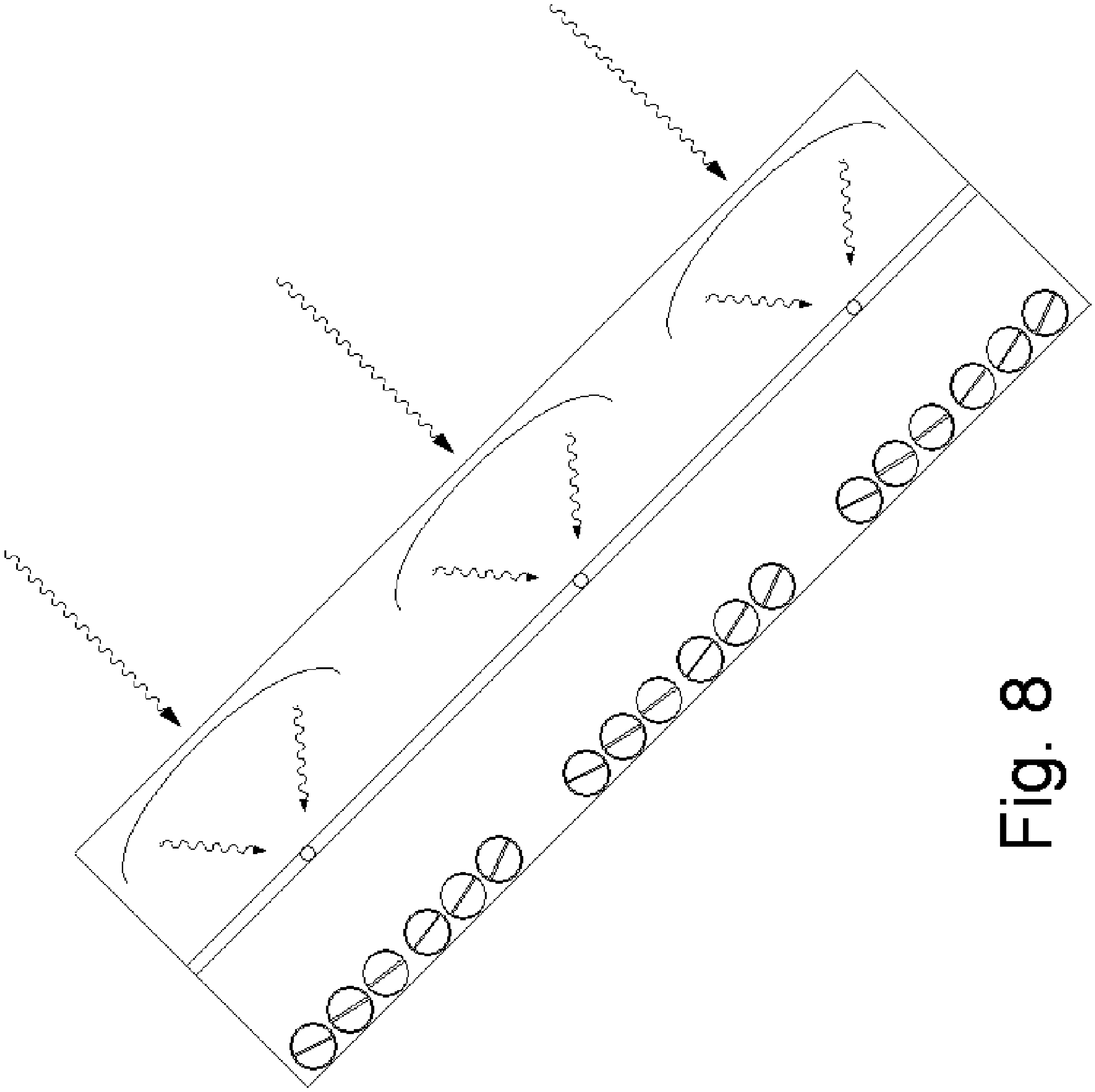


Fig. 8

METHODS AND MECHANISMS TO INCREASE EFFICIENCIES OF ENERGY OR PARTICLE BEAM COLLECTORS

PRIORITY

[0001] This application is a Non-provisional Application of Provisional Application 61/025,792 filed Feb. 3, 2008 for which priority is claimed.

BACKGROUND OF INVENTION

[0002] This invention relates to Methods and Mechanisms to Increase Efficiencies of Energy or Particle Beam Collectors.

[0003] 1. Background

[0004] Solar concentrators can be and are used in a variety of energy collection applications. These can include large-scale uses that involve numerous unit systems spread over a wide area. Solar collector systems are becoming more significant in view of growing power demands especially in this day of global warming. They are of great interest in third world countries where infrastructure and large land masses do not lend itself to construction of conventional power plants and distribution systems.

[0005] Improvements in solar and other energy or particle collector systems are needed, as current solar and other energy concentrators have significant room for improvement to increase the amount of energy concentrated, power generated and/or to maximize their efficiency.

[0006] 2. Prior Art

U.S. Pat. No. 6,668,820 by Cohen, et al. and issued on Dec. 30, 2003, is for an invention that relates to multiple reflector light or solar energy concentrators and systems using such concentrators. More particularly, the invention is concerned with an arrangement of optical elements for the efficient collection of light while minimizing complexities of optics needed to achieve light collection and concentration.

U.S. Pat. No. 6,131,565 by Mills and issued on Oct. 17, 2000 and U.S. Pat. No. 5,899,199 by Mills and issued on May 4, 1999, are for a solar energy collection system which includes n groups of arrayed reflectors and n+1 target receiver systems which represent absorbing surfaces to solar radiation that is reflected by the reflectors. The receiver systems are elevated relative to the reflectors and the reflectors are pivotally mounted to support structures 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.

U.S. Pat. No. 5,979,438 by Nakamura and issued on Nov. 9, 1999, is for a sunlight collecting system comprised of an oval mirror directed downwardly and provided at a given elevation, and a plurality of heliostats arranged on the ground about the oval mirror, each heliostat having a concave mirror for reflecting and converging sunlight L onto the oval mirror 1. The sunlight L reflected on the concave mirror of each heliostat is focused to a point at a first focal point of the oval mirror, and converged to a second focal point of the oval mirror after reflected by the oval mirror.

U.S. Pat. No. 5,578,140 by Yogev, et al. and issued on Nov. 26, 1996, is for various improvements in a solar energy plant of the kind in which incoming solar radiation is concentrated by a Fresnel reflector, i.e. a field of concentrating mirrors, and the concentrated radiation is focused into a solar receiver.

U.S. Pat. No. 5,374,317 by Lamb, et al. and issued on Dec. 20, 1994, is for a solar electric power system that utilizes multiple reflectors to concentrate sun light onto a panel of photovoltaic (PV) cells. The power system, consisting of multiple reflectors, mounted PV cells, and a heat dissipation component, is mounted on a tracker that keeps the system directed to the sun.

U.S. Pat. No. 5,062,899 by Kruer and issued on Nov. 5, 1991, is for a cassegrain optical system that provides improved collection of off-axis light yet is still characterized by a high concentration ratio.

U.S. Pat. No. 4,784,700 by Stern, et al. and issued on Nov. 15, 1988, is for a point focus solar concentrator which uses various geometries of cylindrical reflector strips some of which are tilted to simulate a point focus by overlaying the line foci of each segment at a coincident point. Several embodiments of the invention are disclosed that use cylindrical parabolic, cylindrical hyperbolic or flat reflector strips to concentrate incident solar energy for use by a solar dynamic engine located at the focal point. Also disclosed is a combined photovoltaic/solar dynamic engine concentrator energy system that uses this arrangement of mirrors.

U.S. Pat. No. 4,553,531 by Rosende and issued on Nov. 19, 1985, is for a solar radiation collector comprised of a receiver through which passes a medium to be heated by solar radiation, and a concentrator for concentrating solar radiation onto the receiver.

U.S. Pat. No. 4,173,213 by Kelly and issued on Nov. 6, 1979, is for a solar power system with high concentration linear reflective solar panels of the linear parabolic type that is intended to increase the electrical power output from conventional silicon solar cells, and heat water for steam power.

U.S. Pat. No. 4,147,158 by Chieh-Tsung and issued on Apr. 3, 1979, is for a multi-layered solar energy collector comprised of a supporting means and a plurality of collector layers structured as part of coaxial cylinders or part of concentric spheres secured to said means whereby to absorb and utilize both the direct and scattering radiation of the sunlight to produce a high temperature thermal energy output.

U.S. Pat. No. 4,131,485 by Meinel, et al. and issued on Dec. 26, 1978, is for modular structures for the collection, concentration and conversion of solar energy to another usable form such as electrical energy. The structures feature three conic section reflective surfaces, two of which focus in front of a receiver element and off the axis of the structure. The third reflective surface is utilized to redirect that energy which would otherwise miss the receiver element to improve overall efficiency.

[0007] There is still room for improvement in the art.

SUMMARY OF INVENTION

[0008] The invention involves Methods and Mechanisms to Increase Efficiencies of Energy or Particle Beam Collectors, with preferred embodiment, but not limited to, Solar Collectors. Ideas include for the light (energy waves of varying frequency) to go through a transparent top, transparent 1-way or low emission top, or International Automated Systems, Inc., like solar focusing units. That focuses light below from a thin film that is designed to be a Fresnel focusing surface that angles most of the light to a center collector. The top surface may be made of a component like a 1-way mirror, or utilizing the new low emission films or glass, so light gets in the light collector, but doesn't leave. Light that gets in the light collector and doesn't get totally focused on the collector, would hit the bottom of the unit can be a compact linear Fresnel reflector, and would be focused to the collector increasing its efficiency. Alternatively, the bottom surface could simply reflect the light, and as the light reflects along the other inner surfaces, whether they are of Fresnel, thin film Fresnel, totally reflective, 1-way or low-emission, eventually the light beams hit the central collector.

[0009] Comparably, other energy or particle beam collectors can be designed, whether of the electromagnetic spectrum, sound, or other energy wave, such that when the energy type or particle beam enters the collection device, whether the "top" for entrance is of a material or device, and focusing material or device, or with no top, once inside the device, the energy is focused, reflected, or otherwise transmitted, such that it incites on the energy collector unit(s) eventually, to collect the energy.

[0010] The electromagnetic spectrum energies for concentration can include (but aren't limited to): gamma rays, X-rays, UV (and near UV and vacuum UV), visible light, IR (and near IR and far IR), mu-waves (radar), radio waves, including, UHF-TV, VHF-TV, cellular and other band spectrum (for wireless, etc.), FM-radio, AM-radio, Tesla longitudinal waves and scalar waves, and AC and DC power. However, this patent application can also cover other types of energy/radiation/waves, such as particle beams, thermal, water, and sound, etc., waves, etc.

BRIEF DESCRIPTION OF DRAWINGS

[0011] Without restricting the full scope of this invention, the preferred form of this invention is illustrated in the following drawings:

[0012] FIG. **1** shows a cross cut of one embodiment of the invention;

[0013] FIG. **2** shows another cross cut of one embodiment of the invention;

[0014] FIG. **3** displays light focusing in several embodiments of solar collectors;

[0015] FIG. **4** displays a top/bottom embodiment of solar concentrating unit, with optional cylindrical surfaces;

[0016] FIG. **5** shows further detail of embodiment of bottom surface, with possible movement in 3 dimensions for increasing efficiency of light energy collection;

[0017] FIG. **6** shows light entering, reflecting and trapped in the collector unit; and

[0018] FIG. **7** shows different embodiment of light being trapped in the collector unit; and

[0019] FIG. **8** shows light being trapped in the collector unit.

DETAILED DESCRIPTION

[0020] The following description is demonstrative in nature and is not intended to limit the scope of the invention or its application of uses.

[0021] The current invention is a method and device to Increase Efficiencies of Energy Collectors.

[0022] The preferred embodiments for description purposes are Solar Collectors. One embodiment is where the light goes through a transparent 1-way or low emission top that focuses light below from a thin film that is designed to be a Fresnel focusing surface that angles most of the light to a center collector. The top surface can be made of a material like a 1-way mirror, or can utilize low emission films or glass, so light gets in the solar collector, but doesn't leave. Light that gets in the light collector and doesn't get totally focused on the collector, would hit the bottom of the unit which is a compact linear Fresnel reflector, and would be focused to the collector.

[0023] The top and bottom are n-sided: while 1 embodiment is hexagonal, but it could be any n-sided. A simple design would be to have the "walls" orthogonal to top and bottom and a flat or curved on n-sided surface. It could even be a Bucky-ball, or a geodesic dome, which because of its design wouldn't require 3^{rd} dimension movement to maximize light incidence.

[0024] As shown in FIGS. **1**, **2**, **3**, **6**, **7** and **8** the solar collection of the current invention has a top, bottom, and sides (if there is a third dimension to the collector), which could be a flat, curved, flat or curved Fresnel or focusing surface, with bottom and sides can be (partial or) total reflecting, and top transparent or low-emission material so light gets in, but can't leave, and by internal reflection all eventually hits the collector(s) in the center of, or elsewhere within, the unit. If there are no sides, all or the maximum amount possible of the light/energy would eventually hit the collector(s). That is, if there are no sides, just 2 parallel focusing surfaces that focus light/energy on a collector, such as in between them, then adjusting the angles of the surface in the X, Y and Z axis would provide maximum efficiency. However, if there are sides, then all of the light entering the top will eventually reflect on the internal surfaces and eventually hit the collector.

[0025] Again, for the sides, there can be none, or low-emission, or 1-way, or partial or total reflecting mirror surface, and which can be flat or curved, or thin linear or rounded Fresnel focusing surface.

[0026] As compared to prior devices that have raised glass reflectors on a flat plane, or flat reflectors in a circular carrier, the embodiments here can have top/bottom/sides. As compared to prior devices where there is movement of a carrier in 1 axis, and a light reflector moves on an axis orthogonal to the first axis, an embodiment here can also have an optional 3^{rd} axis whereby the entire array system can move, to increase incident light exposure to maximum level, on the ground to align for the maximum exposure by movement on the ground.

[0027] The current invention traps more light/energy/particle beams, such that internal reflection (and/or refraction/diffusion grating, etc.), can be used to maximize collection of energy/particle beams for use of the application.

[0028] Shown in FIG. **5**, another embodiment model would be on wheels so that besides angular movement of reflector to increase incident light along a 2-D XY axis (as shown in prior art), the total unit could move to maximize exposure to sunlight. In a preferred embodiment there is a central collecting tube going through a row of hexagonal shaped collection units, with each surface possibly a square or rectangular surface (top, bottom, and top and bottom right and left surfaces). Another instance might be square (top, bottom and 2 vertical sides). The entire row of hexagonal units could stretch linearly surrounding the collection tube that runs down the middle. The entire row, or array of rows, could be on a mobile platform. If one end of the collecting tube(s) runs to a processing plant where steam from the collector tube (or heat from heated oil or molten salts, etc.) drives a turbine, then one could think of the collection tube as a spoke on a wheel, and a motorized unit attached to the far end of the collection unit (from the processing plant area), can move the unit along the circumference to increase the angle of exposure to the sunlight (i.e. to maximize the amount of incident light).

[0029] The current invention has the advantage of taking up less area then the prior art of International Automated Systems, Inc., solar tower models per unit area of reflection and collection surface, which in prior art would not get total energy from light hitting a large area, due to overlap of devices, by their design.

[0030] In prior art, there are examples of the use of a (square or) hexagonal reflector surface that reflects to a collector. In this present application, there are embodiments that use a method and mechanism with (a) 3-dimensional collection/concentrating unit(s) that has a top, bottom and side elements with a central collector in between the top and bottom elements and sides.

[0031] For a tower or building top or other preferred embodiment, there is a third dimension of the rotation: as an example, if the carrier is rotating the reflecting surface to get maximal Fresnel exposure to the angle of the sun, the whole carrier system can rotate so that the greatest amount of incident light hits the area of the entire collector array system. That minimizes overlap or space between reflecting surfaces, and can thus improve efficiency of total collection.

[0032] Unlike in the prior art, the current invention in one embodiment has instead of being fixed on ground but angled to sun, and then moved to one side or other, has 2 axes orthogonal, and also a 3^{rd} axis moving to obtain the very best incident angle for maximum energy. This addition is useful for smaller areas of reflectors. An embodiment of the current invention is 3-dimensional and N-sided, covering top, bottom and sides. It can have the solar collector in the middle of, or otherwise within) each collection unit fixed or mobile, or at moveable angles, and with transparent, low-emission, thin film, Fresnel, thin Fresnel or other surfaces.

[0033] In alternative embodiments, the energy collector could be vertical or angled up into each collecting unit, or could be horizontal running through the N-sided collecting units with walls or not. (As embodiments, the presence or not of walls will depend on specific application and type of energy: for a collection of a row of hexagonal units to collect light, walls between units in some embodiments may not be necessary, while for collection of specific energies where there may significant energy dissipation over distance, such as in some sound or thermal energy collection applications, the presence of walls between units can increase efficiency of energy collection). Besides N-sided, it could also be semi-spherical, and even spherical for certain applications. The designs can be 3-D multi-sided or 2-D multi-sided, or flat or curved surfaces angled in 2 or 3 dimensions.

[0034] One embodiment with a mobile platform is where X, Y and Z (direction change=X, angle change=Y, and rotary change=Z (i.e., in 3^{rd} dimension)) such as on a motorized platform on the ground moved to get best light incidence, such that the bottom of the light collecting unit in one preferred embodiment is parallel to the ground, but in other applications, such as in space, it may not be.

[0035] Another preferred embodiment can serve as a solar cooker, or water or room heater. As in prior art, the entire unit can be raised on the side farthest from the sun, on a stand and angled, such as a rectangular box, such that the top surface is perpendicular to the sun light incident rays. There can be multiple transparent thin Fresnel type 1-way or low emission collectors on the top surface, and compact linear Fresnel units on the bottom, with the cooking/heating elements in between the top and bottom surfaces. There can be 1 or multiple cooking/heating areas, and there can be an element to adjust the cooking, water temperature, heating temperature by adjusting the angle of the unit in relation to the sun, or electrically or otherwise changing the properties of the top surface, or the angle of the compact linear Fresnel surface at the bottom. The tops, bottoms and sides of the invention could be of the many different from the types as listed above for the solar collector. The invention can be of simpler design though, (i.e. it can be a rectangular box, or circular). The invention can use compact linear Fresnel reflectors, and can use a plurality of reflector and sub-reflector elements.

[0036] In one embodiment, as noted in prior art, the device can have a separate drive system that is coupled to each row of reflectors, and each drive system may comprise a plurality of synchronized tracking motors or stepping motors for imparting uniform angular drive to the reflectors that form each of the rows. Drive to the reflectors may be controlled by a sensor which is arranged to detect the position of the sun and generate appropriate drive signals by way of a processor for the tracking motors that are associated with the reflectors in the respective rows. The drive signal can be generated in a computer processor that is controlled by a computer generated signal based on the position of the sun at periodic intervals. A rack of vertically extending tubular collector elements can interact with each of the receiver systems. The rack can mount all of the collectors in close spaced relationship and be arranged to deliver water to and carry steam, or heated oil, or molten salt, or other heat or energy carrying material, from each of the collector elements using a metal U-tube or other shaped arrangement. The collector elements can comprise single-ended glass tubes which have inner and outer tube components separated by an evacuated space. The outer surface of the inner tube can be coated with a solar selective surface coating which is structured to absorb solar radiation and transmit thermal energy to the heat exchange fluid which is passed through the tube. There may be a metal fin located within the inner tube component of the collector element to assist in energy transfer from the glass tube to the metal U-tube. The collector elements may be extended vertically between their upper and lower supports or may be inclined diagonally at an angle to the horizontal so as to reduce the effective height of the receiver system structure.

[0037] Multiple optical devices, (spherical, cylindrical, compound, compact linear or other) Fresnel lenses, flat glass, etc., can be used for each or all of the surfaces. Standard geometrical optics can be employed using reflection, refraction, etc., as well as newer nano- and quantum optics methods. The invention can also use ferromagnetic, diamagnetic, and/or paramagnetic surfaces, and can use magnetic or electric or other force energy or beam concentrator(s)/aligner(s), for reflection (or refraction, etc.) and collection of specific types of energies. Likewise, state of the art methods can be used for other forms of energy (i.e. whatever is best employed for that form of energy, or best materials to reflect/refract/concentrate a combination of energy/particle beam types).

[0038] Another embodiment is designed so that the width of the energy/particle beam collector is set to maximize concentrated energy hitting it, and to not block maximal amount of light reflection for concentration by the reflecting, focusing, or Fresnel surfaces. Embodiments may utilize computers to control 1 to 2 (to 3 or more) axial drives/adjusters in all dimensions for maximal light incidence and most efficient energy collection: and computer controlled circuitry may control semiconductor or dielectric or nano-qualities of surfaces as needed. Compact linear Fresnel reflectors angulation may also be controlled by computers to allow for the most efficient solar or other energy/particle beam concentration and collection.

[0039] As another embodiment, a "light trap" solar collector can have a top made of 1 way or low emission material, letting light in, so that once light is in collector unit, it will reflect off it's top surface if reflected back to the top inner surface. In this embodiment, the sides can just be internal mirrors providing total internal reflection as in the drawing, etc., and in this example the bottom is a compact linear Fresnel reflector (but the sides and bottom could in other embodiments be a different type reflecting or focusing surfaces). In this embodiment, the collector runs into the page equidistant from all sides. (For other radiation/energy types, such as sound, the top could be missing, to allow sound in and focus by a concentrating system at bottom (and or sides) to a center (or other alignment) collector. In still other embodiments, the top and bottom could both be concentrating (such as a top transparent thin Fresnel concentrator, and a bottom compact linear Fresnel reflector), and then there may be no need for sides in those embodiments The concept here is that depending on the form of energy/radiation/particle beam, the top and/or bottom and/or sides can be missing or incorporated, Also, in this example, if one imagines that the top/bottom/sides extends above and below the page, surrounding the collector system, the walls at the extreme distance to the page and parallel to it, below or above page, can be missing or 1-way or reflecting surface, flat or curved, or concentrating, etc.

[0040] Another embodiment is where there is a hexagonal top 1-way or low emission film or glass allowing light in, but if reflected back to it, the top surface acts as an internal mirror, not allowing light out. In this example, the sides and bottom are mirror surfaces, and light bounces around in the concentrating unit until it hits the collector (or collectors) for energy/particle beam/wave collection.

[0041] The current invention can use many types of heat collecting systems, including with water-steam/oils/liquid salts, etc. The support and reflecting material can be of any construction material that provides the best functionality such as (as examples, but not limited to) honeycomb construction, nanotube, carbon reinforced plastic, etc. for providing strength. The best materials or methods for solar or other radiation selective coating for collector(s), and for optimal reflection/refraction can be used. There can be flux uniformity or non-uniformity/spectral splitting, etc. based on the best methods to reflect and collect the particular energy/particle beam.

[0042] As compared to prior art (e.g. U.S. Pat. No. 5,578,140), where there may be a Fresnel concentrator on a base plane and (a) secondary reflector or mirror or dielectric mirror or concentrator that then directs light to a concentrator, in embodiments for this invention, light entering the top of the unit may be directed by a top transparent Fresnel or other focusing system to a collector or to a bottom or side(s) Fresnel system(s), or other types of surfaces of the concentrating/collection unit, etc. In addition, adjustment in all 3 dimensions of all elements and light trapping within concentrating/collection unit embodiments are new features in this patent improving efficiency of energy collection and decreasing exit from the collection unit of light that may cause harmful environmental and other interactions. Furthermore, in the prior art, the secondary reflector or mirror or dielectric mirror or concentrator may actually decrease total system efficiency by partially blocking light from reaching the base Fresnel system, and may also block light from reaching the collecting unit. (Review of figures from that prior art in comparison to this invention clarifies the difference from the prior art, and new features of this patent).

[0043] In another embodiment, in addition to the effect of light or other energy raising the energy level (e.g. temperature) of the collector, the energy converted to heat within the collection unit may further heat the collector(s).

[0044] Another preferred embodiment is where the bottom and side surfaces may be photovoltaic cells themselves of various design, and thus collect energy on those surfaces, and if any light is reflected or refracted to the other inner surfaces, light energy may be collected, reflected or refracted, etc. from the other surfaces.

[0045] Yet another embodiment is where the space between the top, sides, bottom and collection units may be decreased to 0, so that an embodiment may be a multi-layered collection device. Depending on variations of this embodiment, the center or other collector(s) may or may not be needed in specific applications, and the device may or may not be of solid state multi-layered design.

[0046] The current invention can have embodiments designed for any radiation/particle beam/wave/energy form. The electromagnetic spectrum energies for concentration can include (but aren't limited to): gamma rays, X-rays, UV (and near UV and vacuum UV), visible light, IR (and near IR and far IR), mu-waves (radar), radio waves, including, UHF-TV, VHF-TV, cellular and other band spectrum (for wireless, etc.), FM-radio, AM-radio, Tesla longitudinal waves and scalar waves, and AC and DC power. However, this patent application can also cover other types of energy/radiation/waves, such as particle beams, thermal, water, and sound, etc., waves, etc. The device and method can use different materials to best reflect energy form (such as silver, gold, aluminum each reflect different light frequencies best).

[0047] The embodiments of this patent can increase total efficiency of energy/particle beam collection. The embodiments of this patent application can decrease energy/light/particle beam reflection, emission and/or scatter from the collection unit to the outside of the collection unit. Benefits include to decrease adverse or limiting environmental effects, such as visual glare that can interfere with flying, and/or harmful or disruptive or undesired emission or scatter of forms of energy and/or particle beams.

[0048] The best materials for reflection and absorption for each embodiment are dependent on spectrum of incident radiation/energy (such as use of gold or silver or various semi-conductor or plastic or other material collection elements); similarly the best material for reflection surfaces, can be made of glass, plastic, and/or aluminum, but aren't limited to those materials. Transparent dielectric material, to enhance solar or other energy or particle beam absorption, can be utilized. The embodiments can utilize state of the art focusing, reflector, 1-way, absorption and collector elements or devices, photovoltaic, and/or other energy or particle beam collector elements or devices, etc.

[0049] Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed is:

1. A device to Increase Efficiencies of Solar Collectors comprising, having where light may go through a transparent, open, 1-way, low emission, surface or system designed with technology to effectively trap light inside collector, or transparent top that may focus light below from a thin film that is designed to be a Fresnel focusing surface that angles most of the light to a collector(s) with a 1-way mirror, or low emission film or glass top surface, light may go into the in the light collector unit, but most to all doesn't leave the unit, Light that gets in the light collector and doesn't get totally focused on the collector(s) from the top, may hit the bottom or sides of the unit, which each may be a compact flat linear or curved Fresnel reflector system, Fresnel reflector, total reflective surface, and be focused to the collector(s) from the surface, or reflected to eventually be incident on the collector(s).

2. A device according to claim **1** whereby the type of collected energy(ies) may include electromagnetic spectrum energies for concentration, which may include one of more of a set of gamma rays, X-rays, UV (and near UV and vacuum UV), visible light, IR (and near IR and far IR), mu-waves (radar), radio waves, including, UHF-TV, VHF-TV, cellular and other band spectrum, FM-radio, AM-radio, Tesla longitudinal waves and scalar waves, and AC and DC power.

3. A device according to claim **1** whereby the type of collected energy(ies) may also include other types of energy/radiation/waves, such as particle beams, thermal, water, and sound, waves.

4. A device according to claim **1** whereby total efficiency of energy/particle beam collection is increased.

5. A device according to claim **1** whereby energy/light/particle beam reflection, emission and/or scatter from the collection unit is decreased.

6. A device and method according to claim **5** whereby environmental effects are decreased.

7. A device and method according to claim **1** whereby the inner surfaces of the bottom and side surfaces are a plurality of energy beam collectors and if any energy particle beam is reflected to the other inner surfaces, energy will be collected, reflected or refracted, from the inner surface of the other surfaces of the collection unit.

8. A device and method according to claims **1** whereby the space between the top, sides, bottom and collector units may be decreased to 0, so that the device may be a solid state multi-layered device.

9. A device to Increase Efficiencies of other Energy/Particle Beam Collectors comprising: a energy trapping unit to increase collection of energy/particle beams where the energy or particle beam enters may go through a transparent, open, 1-way, low emission, surface or system designed with technology to effectively trap the energy or particle beam inside collector, or a transparent 1-way or low emission top that focuses energy/particle beam(s) below from a focusing surface or system that angles/focuses most of the energy/particle beam(s) to a center or otherwise aligned collector(s) where the top surface will trap most or all of the energy/particle beam(s) within the collector unit(s).

10. A device according to claim **1** whereby multiple types of energy beams can be collected in the same collecting units.

11. A device according to claim **9** whereby the type of collected energy(ies) may include electromagnetic spectrum energies for concentration, which may include one of more of a set of gamma rays, X-rays, UV (and near UV and vacuum UV), visible light, IR (and near IR and far IR), mu-waves (radar), radio waves, including, UHF-TV, VHF-TV, cellular and other band spectrum, FM-radio, AM-radio, Tesla longitudinal waves and scalar waves, and AC and DC power.

12. A device according to claim **9** whereby the type of collected energy(ies) may also include other types of energy/radiation/waves, such as particle beams, thermal, water, and sound, waves.

13. A device according to claim **9** whereby total efficiency of energy/particle beam collection is increased.

14. A device according to claim **9** whereby energy/light/particle beam reflection, emission and/or scatter from the collection unit is decreased.

15. A device and method according to claim **9** whereby environmental effects are decreased.

16. A device and method according to claim **9** whereby the inner surfaces of the bottom and side surfaces are a plurality of energy beam collectors and if any energy particle beam is reflected to the other inner surfaces, energy will be collected, reflected or refracted, from the inner surface of the other surfaces of the collection unit.

17. A device and method according to claims **9** whereby the space between the top, sides, bottom and collector units may be decreased to 0, so that the device may be a solid state multi-layered device.

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