US 20140267797A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2014/0267797 A1**

(43) **Pub. Date: Sep. 18, 2014**

Clarke et al.

(54) **SYSTEM METHOD AND APPARATUS FOR SOLAR POWERED DISPLAY PANELS**

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(21) Appl. No.: **14/217,526**

(22) Filed: **Mar. 18, 2014**

Related U.S. Application Data

(60) Provisional application No. 61/786,840, filed on Mar. 15, 2013.

Publication Classification

(51) **Int. Cl.**

G02F 1/133	(2006.01)
H04N 5/232	(2006.01)
G02F 1/1333	(2006.01)
F21L 4/08	(2006.01)
G02F 1/1335	(2006.01)

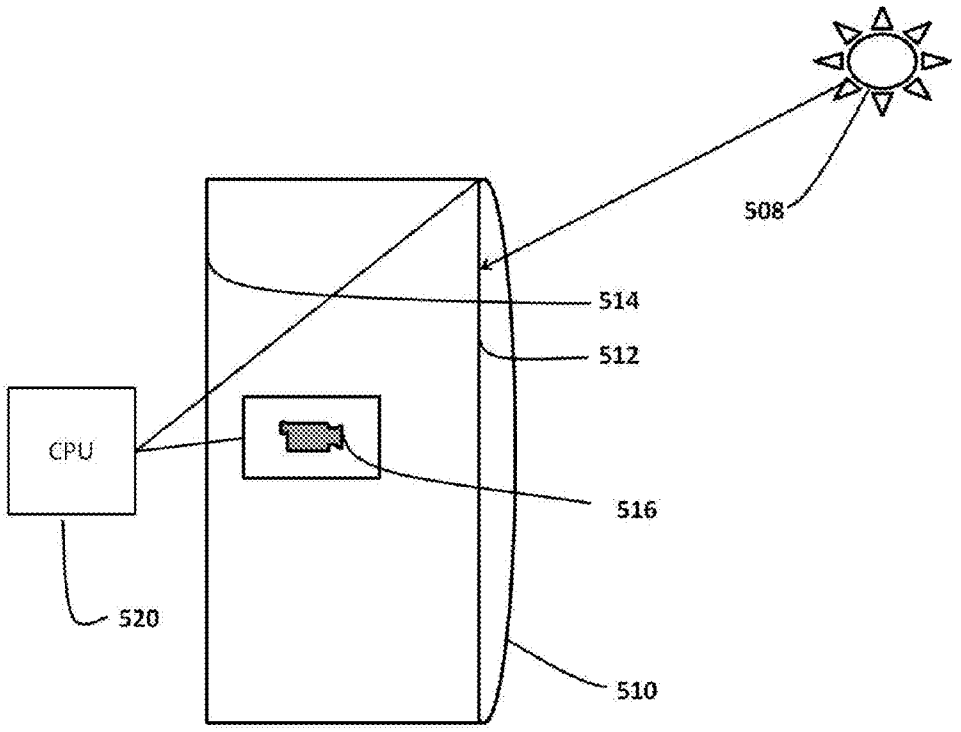
(52) **U.S. Cl.**

CPC ***G02F 1/13306*** (2013.01); ***F21L 4/08*** (2013.01); ***G02F 1/133603*** (2013.01); ***G02F 1/133385*** (2013.01); ***H04N 5/23222*** (2013.01); *G02F 2001/13324* (2013.01)

USPC **348/207.1**; 362/97.1; 349/116; 349/69

(57) **ABSTRACT**

A method, apparatus, and system for using solar panels to power display panels, wherein the solar panels are powered by solar energy which passes through the display panels. Variations of this disclosure include embodiments where cameras are hidden behind the display panels to display false images or video opposing display panels, embodiments where the display panels show prerecorded feed, or variations where a magnifying glass display panel amplifies the energy to the solar panels. In one preferred embodiment of the disclosure, the display panel may serve the dual function of acting as both monitor and magnifying glass thereby amplifying the solar energy absorbed in an environment that obscures said energy. A preferred embodiment of this disclosure comprises solar panels on the front face of the tiles of an led monitor, protruded by LED bulbs, said solar panels behind the display panel and send collected energy to a rechargeable battery.



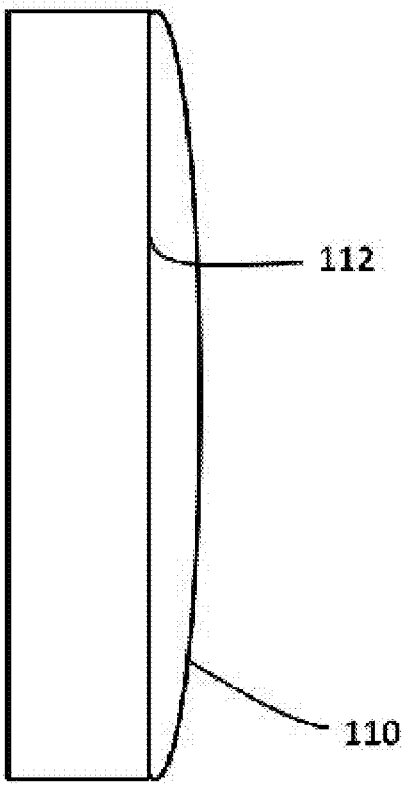


Fig. 1

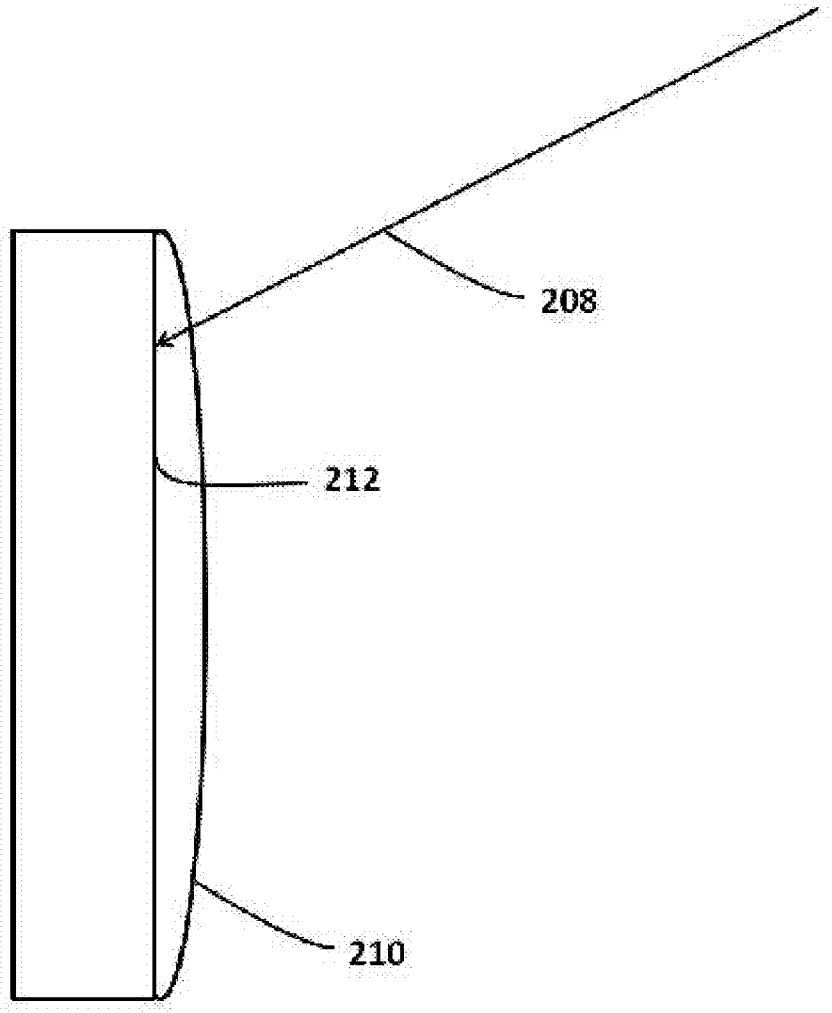


Fig. 2

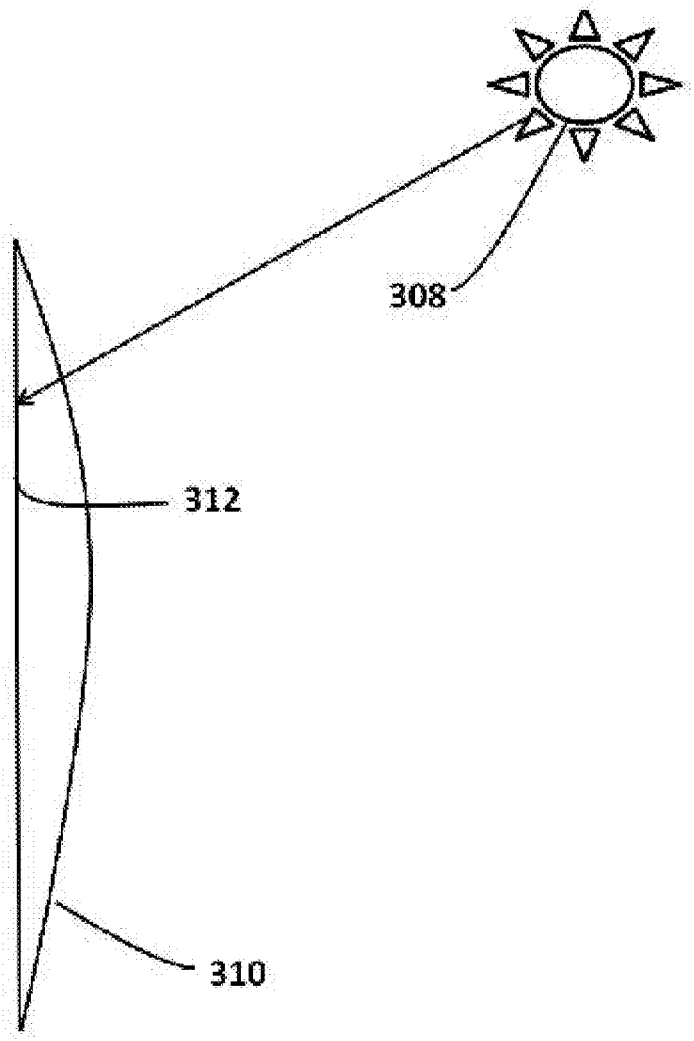


Fig. 3

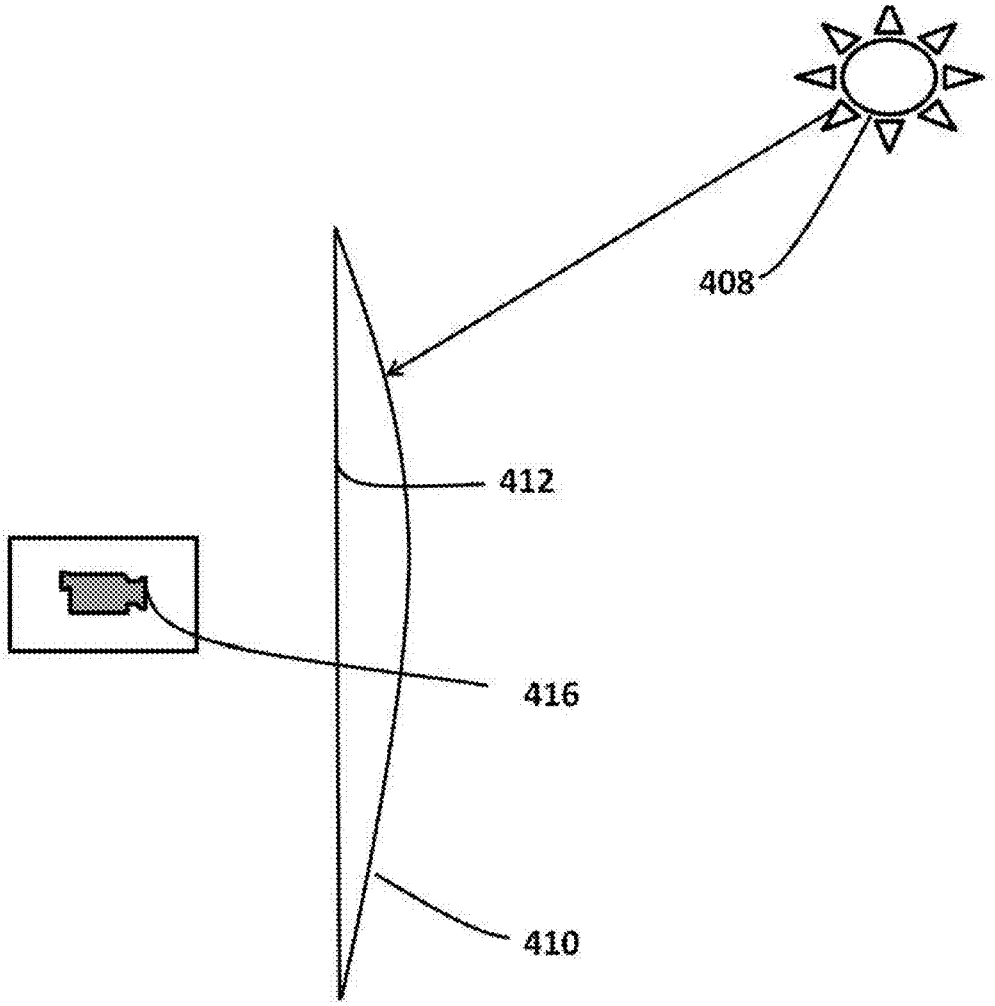


Fig. 4

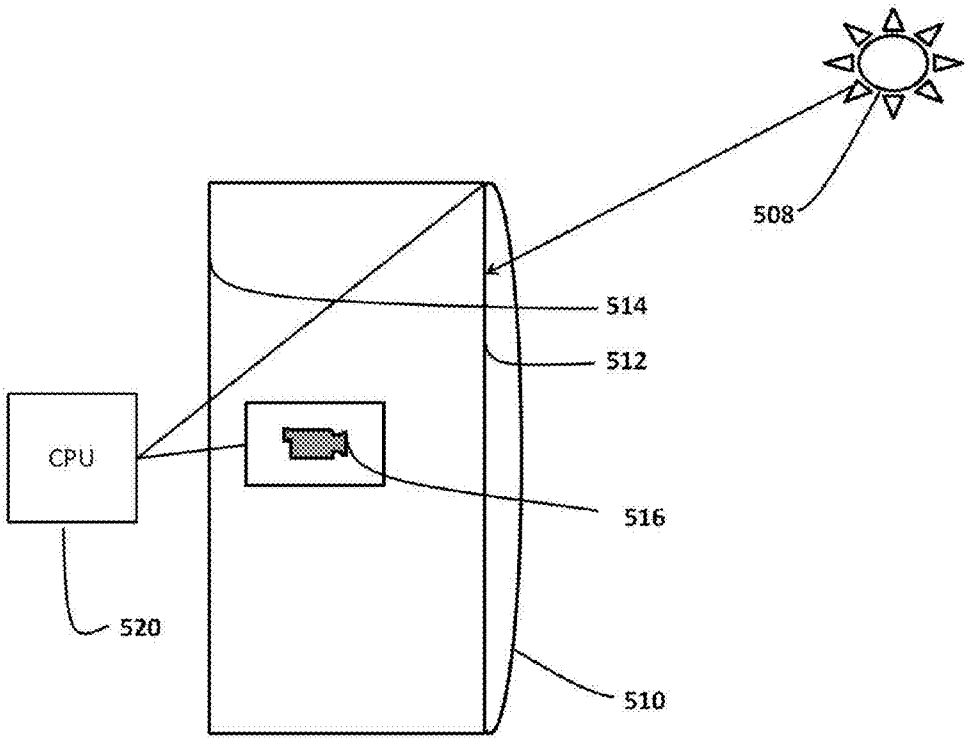


Fig. 5

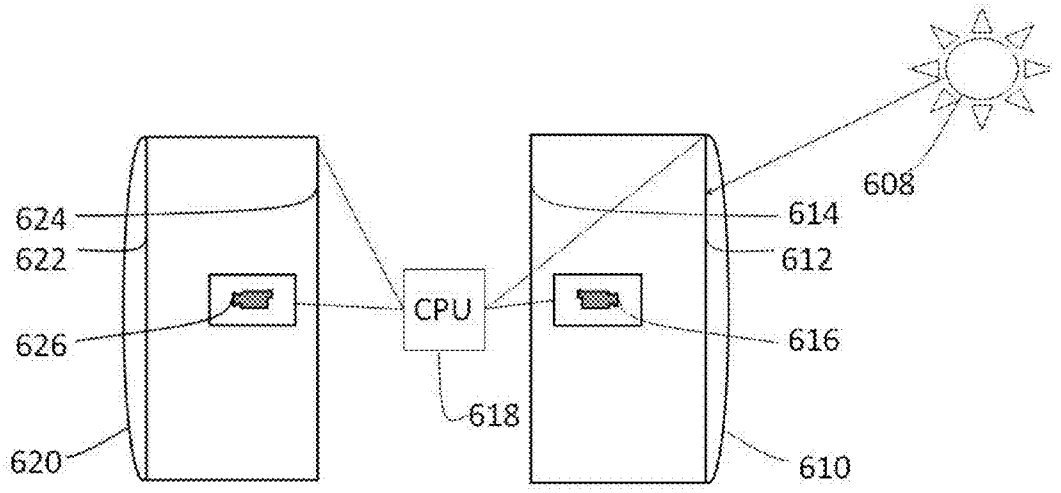


Fig. 6

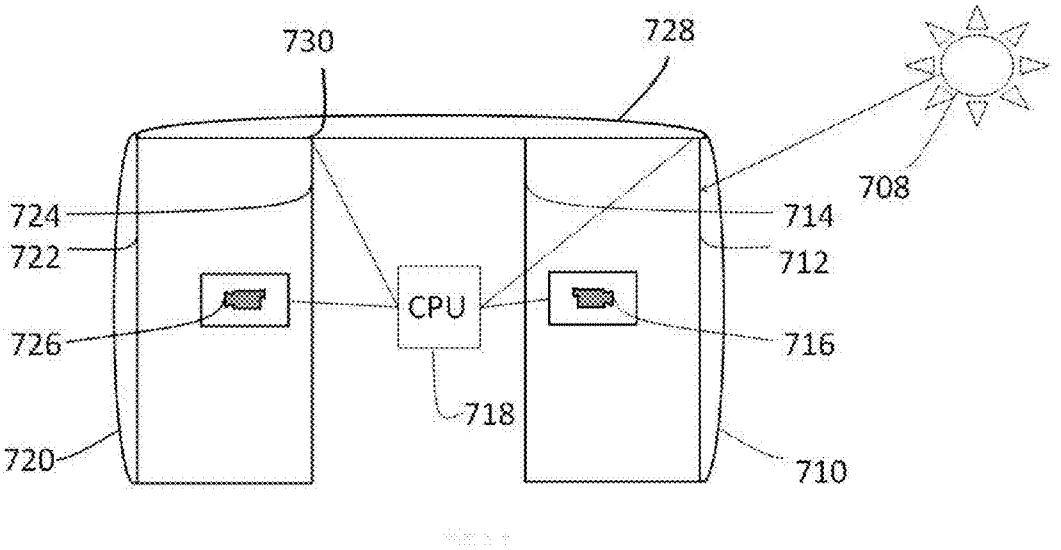


Fig. 7

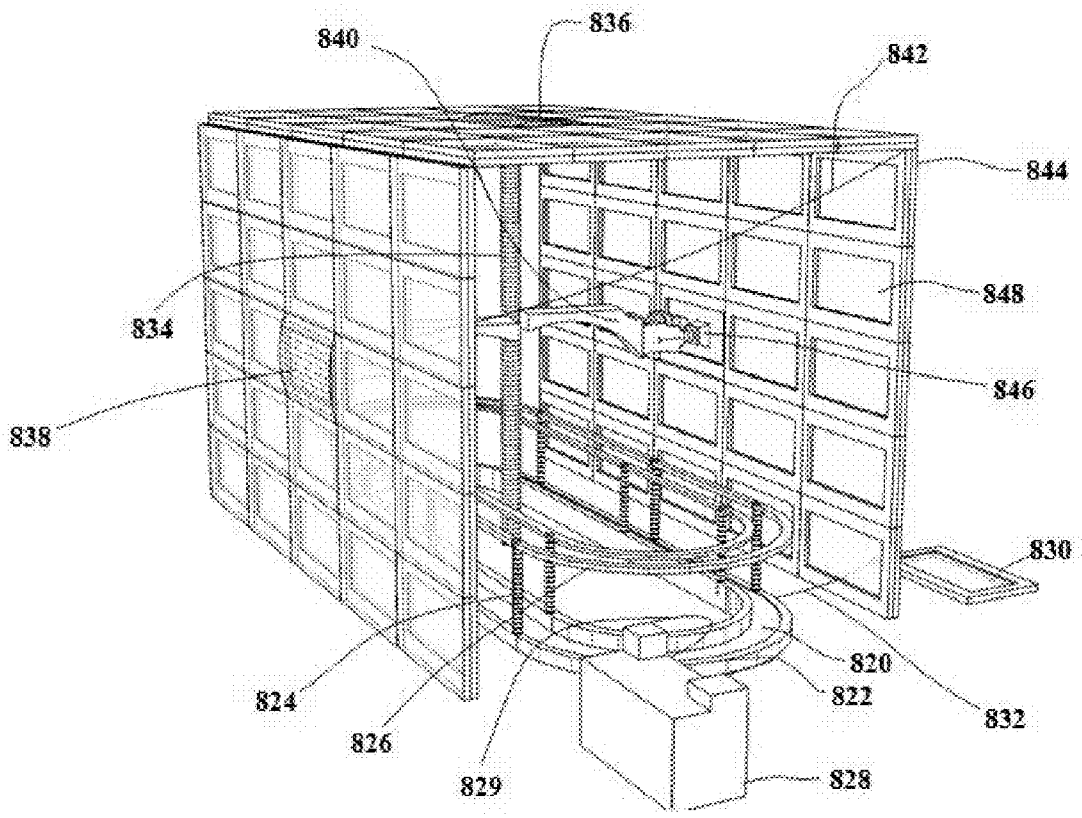


Fig. 8

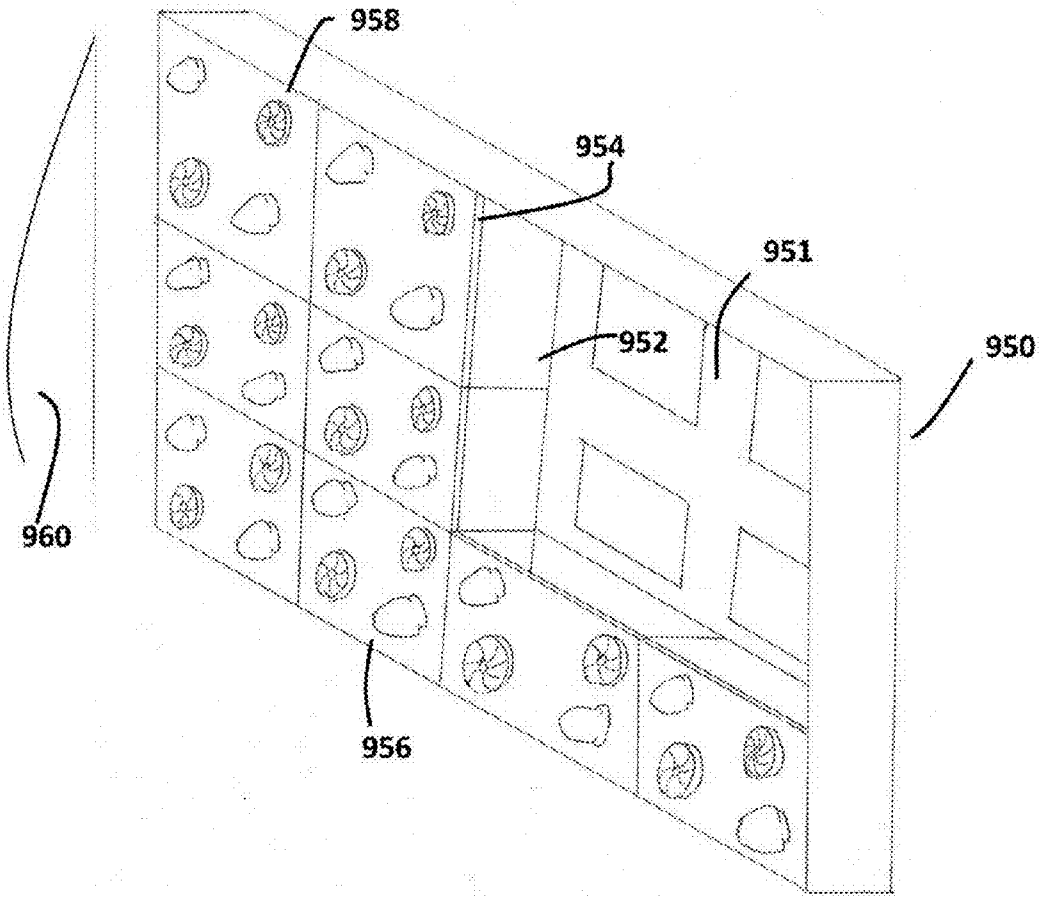


Fig. 9

SYSTEM METHOD AND APPARATUS FOR SOLAR POWERED DISPLAY PANELS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 61/786,840 filed Mar. 15, 2013. The entire disclosure of U.S. Provisional Application No. 61/786,840 is incorporated herein by reference.

TECHNICAL FIELD

[0002] The general field of the disclosure herein relates to methods, systems, or apparatuses involving absorption of solar energy and display panels. More specifically this absorption may be carried out wherein the solar panel is directly behind the display panel and the display panel allows some form of light to pass through and power the solar panel. The methods, systems, and apparatuses of the disclosure involve the solar panel being used to power the display device, any number of solar panels being used to power any number of display devices, or any number of solar panels being used to power any number of display devices and other apparatuses, including but not limited to moving objects, facilities, or cameras which may collect feed by looking through said display panels, or said display panels and said solar panels, and may relay said feed to any number of other display panels, including those directly behind said solar panels. The solar panels may work in conjunction with any number of other sources of energy including but not limited to kinetic energy absorbed from a user's movement, a rechargeable DC battery, or one another, to power the display devices or any other apparatuses.

BACKGROUND

[0003] Solar power is a form of alternative energy with seemingly limitless potential. Whereas the world's resources are finite, the power generated by the Sun and the billions of stars via fission reactions is seemingly limitless. Solar power has been used for everything from powering homes to powering auxiliary batteries for space flight. Studies have shown that the solar panels we use contain several drawbacks. ("Removing the Rare Element Limitations From Solar Energy" Pleging, Steven, AltEnergyMag.com, October, 2011). Pleging's study finds that the main drawbacks to solar panels include rarity, expense and efficiency. Solar panels are currently rare and expensive because the photovoltaic ("PV") panels currently used to in their manufacture contain rare earth materials. He states that PV manufacturers use rare elements to create their semiconductor layers at very small scales (1-8 μm). Elements such as gallium arsenide, tellurium and indium have limited global supplies that are controlled by only a few countries. Solar panel power conversion efficiency ("PCE") is often limited to less than 17% of the energy absorbed, and currently leading manufacturers are able to achieve about 20-22% PCE. At that efficiency a 1 m^2 solar panel is capable of supplying approximately 220 watts of electrical energy. That is a little less than the amount of energy consumed by an average 42" Liquid Crystal Display ("LCD") monitor, whereas the surface area of 1 m^2 is approximately equivalent to a 60" LCD monitor. That means that a solar panel is currently incapable of fully powering an LCD monitor of equal surface area. While this may make it seem that a solar panel is incapable of powering such a display device, several solar panels used in tandem may overcome such limitations. Solar Panel efficiency has also increased steadily over time from the first solar panels in the 2% efficiency range. Furthermore display monitor energy consumption has also gone down from the plasma screen televisions which required 350 watts of electrical energy to power a 42" screen, to the energy efficient Light Emitting Diode ("LED") monitors which currently require as low as 96 watts of energy for power. That means a modern solar panel of equal area could easily power such a screen. A solar panel imbedded beneath the surface of such a screen would receive a reduced amount of solar energy to power it, but even then could power such a monitor if more than half of the solar is absorbed or refracted by the outer display panel. Certain complications exist in solar panels existing behind a display panel, due to the orientation of the sun or the fact that LED monitors use LCD screens which may polarize in a way to allow sunlight to pass through at certain times and not pass through at others, depending on whether the panels are active or inactive. There are methods of overcoming these obstacles, including but not limited to using a rechargeable battery to store energy collected by the solar panels when the liquid crystal displays are polarized to allow light through, and using that reserve energy for power, or having external solar panels not covered by display monitors. Such a system may have uses including but not limited to advertising and hiding objects.

SUMMARY OF THE INVENTION

[0004] This disclosure is a system, method, and apparatus for using solar panels to power display panels, wherein the solar panels are powered by light from the sun, which passes through the display panels. Variations of this disclosure include embodiments where cameras are hidden behind the display panels to display false images or video on any number of display panels, embodiments where the display panels show prerecorded images or video feed, or any combination therein. In one preferred embodiment of the disclosure, the display panel may serve the dual function of acting as both monitor and magnifying glass, or contain a magnifying glass directly behind it, thereby amplifying the solar energy absorbed. One preferred embodiment of this disclosure may be a display apparatus comprising an LED display monitor, wherein the display panel allows some solar energy to pass through the screen to an area where the LED lights are located. In this embodiment the LED lights my protrude through an array of solar panels which function as tiles in the cabinet and may be wired from the other side to provide power to the display apparatus. In other embodiments cameras may be located in the display panel or the tiles as well.

[0005] Among the objectives of this disclosure is to provide a system, method, and device for powering display monitors without the need for sources of energy other than the sun. This could be used for a variety of purposes, including but not limited to: advertising, by displaying a changing image on an automobile which does not draw the automobiles internal power; changing the color of an automobile by displaying a different color or image on display monitors, surrounding the automobile's exterior, at the selection of the user, without using the vehicles own battery, or by supplementing it; hiding a building by displaying the image directly behind it; or hiding a plane by displaying an image of what's directly above, behind, below, or in front of it to any external observer.

[0006] While it is envisioned that this disclosure will be used for the purposes of advertisement, false image projec-

tion (such as making a car appear to be a different color), or hiding objects, other uses are possible.

[0007] While the preferred embodiments of the disclosure are shown in the accompanying drawings, it to be understood that said embodiments are susceptible to modification and alteration while still maintaining the spirit of my invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Referring to the drawings, FIG. **1** is an illustration of my apparatus including a display panel overtop of a solar panel.

[0009] FIG. **2** is an illustration of my system for a display panel overtop of a solar panel, wherein the solar panel absorbs energy and transmits it to power the display panel.

[0010] FIG. **3** is an illustration of my method for absorbing energy from the sun, which passes through a display panel and into a solar panel, wherein the solar panel may absorb the energy and transmits it to power the display panel.

[0011] FIG. **4** is an illustration of my disclosure wherein a camera is behind the display panel, solar panel or any combination therein, and can relay an image to the display panel or another display panel.

[0012] FIG. **5** is an illustration of my disclosure wherein a camera is assisted in relaying images to any number of display panels by a computer processor, which may alter the image so that it matches what the perspective would be of an observer who may be detected by the camera, and their proximity analyzed by the computer processor such that it alters the display panel accordingly.

[0013] FIG. **6** is an illustration of my disclosure wherein a network of cameras is assisted, by a computer processor, in relaying images to any number of display panels facing the opposite direction of said cameras.

[0014] FIG. **7** is an illustration of my disclosure wherein a network of cameras is assisted, by a computer processor, in relaying images to any number of display panels facing the opposite direction of said cameras, and a feed is displayed on an overhead camera projecting a false image of what was once an accurate representation of what was there from that perspective.

[0015] FIG. **8** is a perspective view of a circular treadmill with a projection tent, solar panel, image array, battery backup power which all interface with the invention in the system of said embodiment.

[0016] FIG. **9** is a cross-sectional orthogonal view of an led monitor comprising a display panel, an led cabinet, comprising several LED tiles, the front face of which may be comprised of solar panels, which may contain a plurality of holes, through which LED bulbs and cameras may protrude.

DETAILED DESCRIPTION

[0017] In this disclosure the term 'display panel' refers to any panel which may display a feed on a screen, including but not limited to a monitor which displays a single image, a monitor which may display a range of images, a monitor which may display a video, or a monitor which may display a video feed that alters based on the perspective of an observer. The display panel may be further comprised of a variety of tools, including but not limited to a magnifying glass, or have a magnifying glass imbedded directly underneath it; any number of camera's imbedded into or beneath it; or any number of solar panels imbedded into or beneath it. The display panel may display feed it receives from any external or internal feed, including but not limited to cameras, a dvr, or a computer processor.

[0018] The computer processor is a device which receives, processes, stores, or transmits (information or data) or any combination thereof. Any number of cameras may send a signal to the computer processor, any display device, or any combination therein. The computer processor may receive the data or information from a variety of sources including but not limited to any cameras, other computer processors, the internet, preloaded data, or any combination thereof. The computer processor may then process the data information in a number of different ways including but not limited to analyzing it comparatively against the distance from another display panel or against data from another camera, and displaying a feed based on that data which adjusts for the distance between display panels or observers accordingly.

[0019] In some embodiments of the disclosure the device may be a display panel, **110**, directly overtop of a solar panel, **112**, directly imbedded into an apparatus. In certain embodiments apparatus may include the display panel's wiring in a compartment behind said solar panel. In other embodiments the apparatus may require no such wiring compartment.

[0020] In some embodiments of the disclosure solar energy, **208**, may pass through a display panel, **210**, and feed a solar panel, **212**, directly imbedded into an apparatus. The Solar Energy may be used to power a display panel.

[0021] In other embodiments the display apparatus may be powered by other sources, including but not limited to other solar panels, and only supplemented by the solar panel imbedded into the apparatus. In other embodiments the solar panel may be used to supply power to the display panel, as well as other objects, including but not limited to rechargeable batteries.

[0022] In some embodiments of the disclosure solar energy may come directly from the sun, **308**, through a display panel, **310**, and feed a solar panel, **312**.

[0023] In certain embodiments the lack of a wiring compartment may allow on observer to see through both the solar panel and the display device from one side of the apparatus, either transparently or translucently.

[0024] In some embodiments of the disclosure solar energy, **408**, may pass through a display panel, **410**, and feed a solar panel, **412**. The Solar Energy may be used to power the display apparatus, as well as a camera, which may be located somewhere behind the solar panel, **416**. The camera may supply a feed to a variety of display panels, including but not limited to one directly in front of it, such that the feed it records is displayed on either side of said display panel, or both sides of said display panel.

[0025] In certain embodiments this could serve the purpose of simultaneously allowing an observer on one side of the display panel being able to see the same image an observer on another side of the panel is seeing, making them aware of what the other observer is seeing when they look at the display panel. This may work best if the display apparatus has a display panel on both sides.

[0026] In some embodiments of the disclosure solar energy, **508**, may pass through a display panel, **510**, and feed a solar panel, **512**, directly imbedded into an apparatus, **514**, also housing any number of camera, **516**. These cameras may supply a feed to any number of computer processor, **518**, which feed any number of display panels. In certain embodiments the cameras may be located between the display panel

and the solar panel. In other embodiments the camera may be behind both the camera and the solar panel and be forced to see through both of them. In other embodiments the camera or a network of cameras may be imbedded into the solar panel or the display panel.

[0027] In certain embodiments the display panel may also have a microscopic lens imbedded into it or under it, which serves the purpose of amplifying the solar energy which may then be absorbed by the solar panel. In these instances if overheating becomes a problem for the solar panel integrity, the solar panel can be used to directly power any number of cooling devices, including but not limited to cooling rods and fans, which would only activate when the solar panels activate, thereby indicating that the same solar energy which may cause it to overheat is present.

[0028] In some embodiments of the disclosure solar energy, **608**, may pass through a display panel, **610**, and feed a solar panel, **612**, directly imbedded into an apparatus, **614**, also housing any number cameras, **616**. The camera may supply feed to a computer processor, **618**, which analyzes and sends the feed to another display panel, **620**, which faces the opposite direction of the camera that has sent its feed to the computer processor. In certain embodiments the opposite display panel may be directly in front of a solar panel, **622**, which absorbs solar energy when the sun faces it, and is housed in an apparatus, **624**, that may also contain any number of cameras, **626**.

[0029] In certain embodiments this could serve the purpose of simultaneously allowing an observer on one side of the display panel being able to see the image collected by a camera behind the opposite display panel, which the computer then transmits to the display panel, which may be on the opposite side of a wall or a ship's hull in certain embodiments. This would allow the user to know what is on the other side of the wall or the hull of a ship, which in certain embodiments may be hidden to the naked eye, by the opposite display panel displaying an image from a camera on the opposite side of the building, or the ship.

[0030] In some embodiments of the disclosure solar energy, **708**, may pass through a display panel, **710**, and feed a solar panel, **712**, directly imbedded into an apparatus, **714**, also housing a any number of cameras, **716**. The cameras may supply a feed of data to a computer processor, **718**, which analyzes and feeds the data to an opposite display panel, **720**, which faces the opposite direction of the camera that feeds the data to the computer processor. In certain embodiments the opposite display panel may be directly in front of a solar panel, **722**, which absorbs solar energy when the sun faces it, and is housed in an apparatus, **724**, that may also contain any number of cameras, **726**. Any number of display panels, **728**, may also be located above this system, and may contain a solar panel imbedded in them as well, **730**.

[0031] In this embodiment the above solar panel may be used for added energy and cooling. Additionally the above display may simply project an image or a looped feed of any number of images or videos that were taken from its location previously. This could be used to hide an object including but not limited to a building, tent, or city, from being seen from above.

[0032] Another embodiment may involve an apparatus, **820**, comprising a circular track or moving walkway, **822**, with supports, **824**, for handle bars, **826**, which in certain embodiments may be powered by a battery, **828**, which may be wired, **829**, to the system, or a solar panel, **830**, which may be wired, **832**, to the system to supply power.

[0033] In some variations of the embodiment, the apparatus may be supplemented by a canopy pole, **834**, attached to an overhead canopy, **836**, which can be comprised of solar panels, which can also be present in side panels and used to display images on the display panels, **838**, (which may be directly over top of the solar panels, allowing just enough light to pass through to power the display, or charging a battery to do so at a time when enough light cannot pass through to power it) including false images as collected by any number of cameras, **840**, connected via a wire, **842**, or wirelessly to a display panel.

[0034] In this embodiment a tent **844** can be mounted above the system for benefits including added shade; concealment, through a false images being recorded on any number of cameras, **846**, and displayed on a display monitor; protection from the elements; and additional solar absorption through panels comprising the tent, **848**.

[0035] An embodiment of this disclosure may be a display apparatus, **950**, comprising a frame, **951**, upon which may be placed multiple LED tiles, **952**, comprising solar panels on their front face, **954** with holes drilled for an array of LED bulbs, **956**, and cameras, **958**, behind an LCD display panel, **960**.

[0036] In such an embodiment the solar panels may directly power the LEDs and cameras or send energy to any number of rechargeable batteries to later power the LEDs and cameras or both. In certain variations the rechargeable battery may be imbedded in the frame of the LED tiles, or elsewhere in the cabinet of the monitor. In other variations the rechargeable battery may be external to the display apparatus.

[0037] In other variations of this embodiment the display panel may itself be, or contain behind it a magnifying glass to amplify the solar panel energy collected. In cases where the environment does not provide the cooling necessary a system could be designed to cool the solar panels and avoid overheating, such that when the solar panels detect light, they supply solar power to devices which provide cooling, including but not limited to cooling coils and fans. This process may reduce the energy expenditure devoted to cooling to times when it is needed because at all other times sunlight will not reach the solar panels and they should not overheat.

[0038] It is understood that the various preferred embodiments are shown and described above to illustrate different possible features of the invention and the varying ways in which these features may be combined. Apart from combining the different features of the above embodiments in varying ways, other modifications are also considered to be within the scope of the invention.

[0039] The invention is not intended to be limited to the preferred embodiments described above, but rather is intended to be limited only by the claims set out below. Thus, the invention encompasses all alternate embodiments that fall literally or equivalently within the scope of these claims.

1. A display apparatus comprising:

one or more solar panels;

a display panel overtop of the solar panels;

wherein light passes through the display panel, thereby supplying energy to the solar panels, which in turn power the display panel.

2. The display apparatus described in claim **1**, wherein the display apparatus comprises a liquid crystal display panel.

3. The display apparatus described in claim **2**, wherein light emitting diodes mounted behind the display panel are imbedded to tiles, one or more faces of which is composed of one or more solar panels.

4. The display apparatus described in claim **1**, wherein:

the display panel is a liquid crystal display panel, directly in front one or more solar panels; and

wherein the display panel further comprises one or more cameras.

5. The display apparatus described in claim **4**, wherein a magnifying glass is imbedded within the display apparatus, directly behind the display panel.

6. The display apparatus described in claim **5**, further comprising a cooling system,

wherein the cooling system is powered by the solar panels, such that the cooling system becomes active only when solar energy feed the solar panels.

7. The display apparatus described in claim **3**, further comprising a rechargeable battery;

wherein the rechargeable battery supplies power to the light emitting diodes at any time the display apparatus is active but unable to receive power from the solar panels.

8. The display apparatus described in claim **1**, wherein a camera is imbedded beneath the display panel system, and wherein the camera transmits a signal of data collected to any computer processor or any adjacent processor.

9. The display apparatus described in claim **7**, wherein a camera is imbedded beneath the display panel system, and wherein the camera transmits a signal of data collected to any computer processor or any adjacent processor,

wherein the light is absorbed by solar panels imbedded beneath the display panels, and the energy collected by the solar panels is used to power the display panels.

10. The display apparatus described in claim **7**, wherein one or more cameras transmits a signal to a computer which transmits a signal to a display device directly opposite the camera.

11. A system of display panels which allow external light to pass through the display panels,

wherein the light is absorbed by solar panels imbedded beneath the display panels, and the energy collected by the solar panels is used to power the display panels.

12. The system described in claim **11**, further comprising:

any number of cameras imbedded beneath the display panels; or

any number of cameras imbedded beneath the solar panels;

wherein the cameras transmit a signal to any display panel via any wired or wireless means.

13. The system described in claim **12**, wherein the cameras transmit collected data to a display panel facing the opposite direction of the camera.

14. The system described in claim **12**, wherein the video cameras transmit collected data in real time to a display panel facing the opposite direction of the video camera, thereby projecting a false image.

15. The system described in claim **14**, wherein an array of display panels surround an object, thereby placing false images around the object.

16. A method of hiding an object comprising:

utilizing one or more display panels;

utilizing one or more solar panels; and

utilizing one or more cameras;

wherein the display devices allow light to pass through;

wherein the solar panels power the display panels,

wherein the cameras see through the display panels, or

wherein the cameras are imbedded in the display panels, and

wherein the cameras send data to a computer processor;

wherein the computer processor analyzes and adjusts the data;

wherein the computer processor sends the data to any number of display panels;

wherein the display panels displays an image as collected by any number of cameras facing the opposite direction of the display panels, and adjusted by the computer processors, such that the image appears to an observer to be the same as if the object were not present.

17. The method described in claim **16**, wherein an overhead display device projects an adjusted overhead feed of the area beneath the object;

wherein the feed was collected at a time before the object was present;

such that it appears to an aerial observer to be the same as if the object were not present.

18. The method described in claim **17**, wherein the overhead feed is a still image.

19. The method described in claim **18**, wherein the overhead feed is a prerecorded video feed;

20. The method described in claim **19**, wherein the object is surrounded on all sides by an array of display devices such that an observer from any direction cannot visually detect the object with the naked eye.

* * * * *