

German utility model no. DE202021104881U1

Mobile Wearable Solar Cells for Smartphones and Other Portable Electronic and Electrical Devices

Description:

In our increasingly mobile world, smartphones and portable electronic devices have become integral to our daily lives and leisure activities. While additional power banks can extend the operational time of these devices significantly, they have limited capacity and offer no additional utility.

Mobile solar cells that provide extra functionalities are a sensible solution. These portable photovoltaic cells can charge power banks and provide direct power to devices.

A common problem with portable solar cells is their unwieldiness or the fact that they constitute an additional device that impedes mobility.

There are many existing solutions for mobile solar cells, including:

- WO002019106234A1: Solar cells integrated into textiles.
- US020070151593A1: Survival suits with solar cells.
- DE000019745889A1: Heating integrated into a jacket.
- WO002018085783A1: Solar-powered lamps and other devices.

My invention improves upon existing mobile solar cells by making them not affixed to fixed objects or integrated into clothing but rather designed to be quickly and unobtrusively worn or draped over the body. Moreover, these solar cells are cost-effective and can serve additional functions.

A mobile, non-obtrusive, quickly wearable, and removable solar cell is desired, and the invention described in Claim 1 meets these requirements.

Examples of Implementation:

Possible components (also in combinations) of the flexible solar cells include (as per Claim 2) thin-film modules, mono-/polycrystalline cells, perovskite cells, printed photovoltaics, organic solar cells, amorphous cells, etc.

As illustrated in Claim 3, the flexible, mobile solar cells (1) are ideal for safety vests and workwear that can be worn over clothing and additionally equipped with LEDs (light-emitting diodes) or a screen/touchscreen (Figures 1 and 2). Other potential forms for these portable solar cells include an apron, cloak, or cape (each possibly with pockets).

In the version resembling a poncho, the front and back sides—according to Claim 4—can be connected at the shoulders, sides, or at least at the bottom ends using magnetic closures, snap buttons, Velcro fasteners, or straps.

As stated in Claim 5, the mobile photovoltaic cells are also designed as a broad shoulder strap or carrying strap with integrated solar cells, suitable for smartphones (2) and other electronic devices (Figure 3).

Additional connection cables/adapters, voltage converters, and a rechargeable battery can be stored in a waterproof pouch (according to Claim 6) (e.g., USB cables/plugs/couplings, charging controllers, or special connectors for smartphones and other electronic and electrical devices).

As illustrated in Claim 7, the standard output voltage is 5V. However, many other voltages—such as 12V for electrical devices—can also be provided.

A special charging controller is beneficial (according to Claim 8) in the mobile photovoltaic device, which optimizes the energy capture from the cells at the optimal operating point. This helps ensure the output voltage, for example, for smartphones, does not fall significantly below 5V, making further charging impossible.

As outlined in Claim 9, all electrical and electronic components of the mobile solar cells are hermetically sealed and, for comfort, partially encased in fabric, plastic, rubber, other materials, or combinations thereof.

In an example with an extra-large solar surface area, a cloak or cape—according to Claim 10—has a large, flexible solar panel rolled up at the bottom edges on the front and back. This cloak can be removed and fully unrolled as needed.

Reference List:

- (1) Mobile flexible solar cells
- (2) Smartphone or other electronic or electrical device

Claims:

1. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices,

characterized by

a combination of quickly deployable photovoltaic cells worn on the body and designed in various forms for different technical requirements.

2. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to Claim 1,

characterized by

possible components (also in combinations) of the flexible solar cells, including thin-film modules, mono-/polycrystalline cells, perovskite cells, printed photovoltaics, organic solar cells, amorphous cells, etc.

3. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

flexible, mobile solar cells also designed for safety vests and workwear with LEDs (light-emitting diode) or a screen/touchscreen, and they can take the form of an apron, cloak, or cape (each possibly with pockets).

4. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

in the form resembling a poncho, the front and back are connected at the shoulders, sides, or at least at the bottom ends with magnetic closures, snap buttons, Velcro fasteners, or straps.

5. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

the mobile photovoltaic cells are used as a broad shoulder strap or carrying strap with integrated solar cells.

6. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

a waterproof pouch can store additional connection cables/adapters, voltage converters, and a rechargeable battery (e.g., USB cables/plugs/couplings, charging controllers, or special connectors for smartphones and other electronic devices).

7. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

the standard output voltage is 5V DC, but other voltages can also be provided.

8. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

a special charging controller is integrated into the mobile photovoltaic cells to capture the energy from the cells at the optimal operating point.

9. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

all electrical and electronic components are hermetically sealed, and the mobile solar cells are partially encased in fabric, plastic, rubber, other materials, or combinations thereof.

10. Mobile wearable solar cells for smartphones and other portable electronic and electrical devices, according to any of the preceding claims,

characterized by

an extra-large photovoltaic surface area is built into a cloak or cape, with a large flexible solar surface rolled up at the bottom edges on the front and back.

Fig. 1

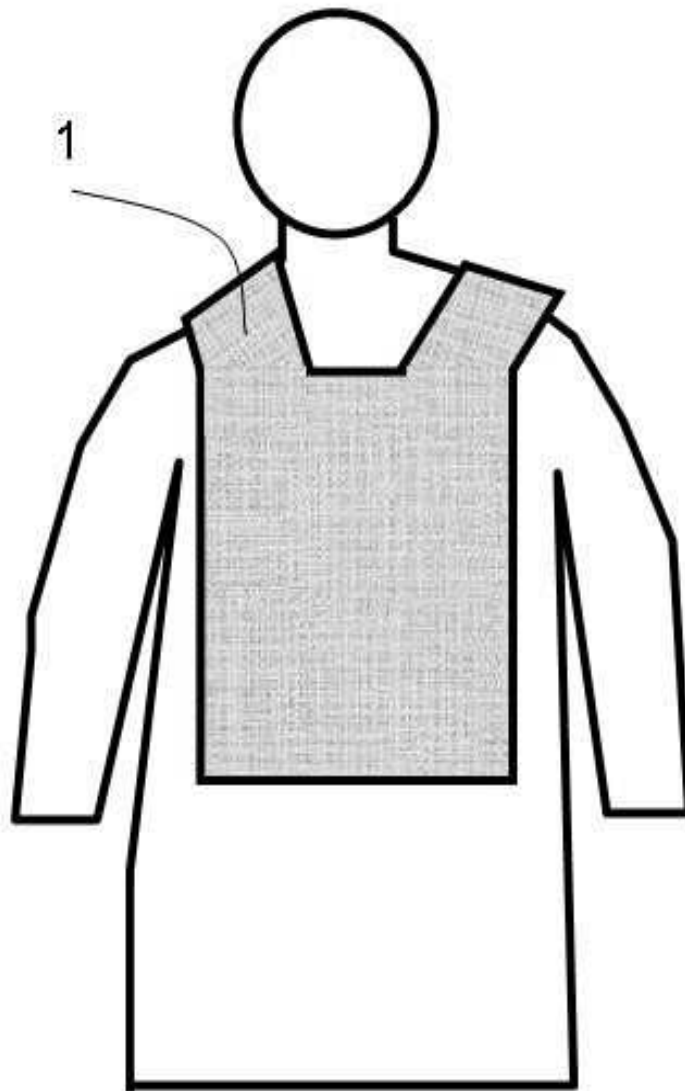


Fig. 2

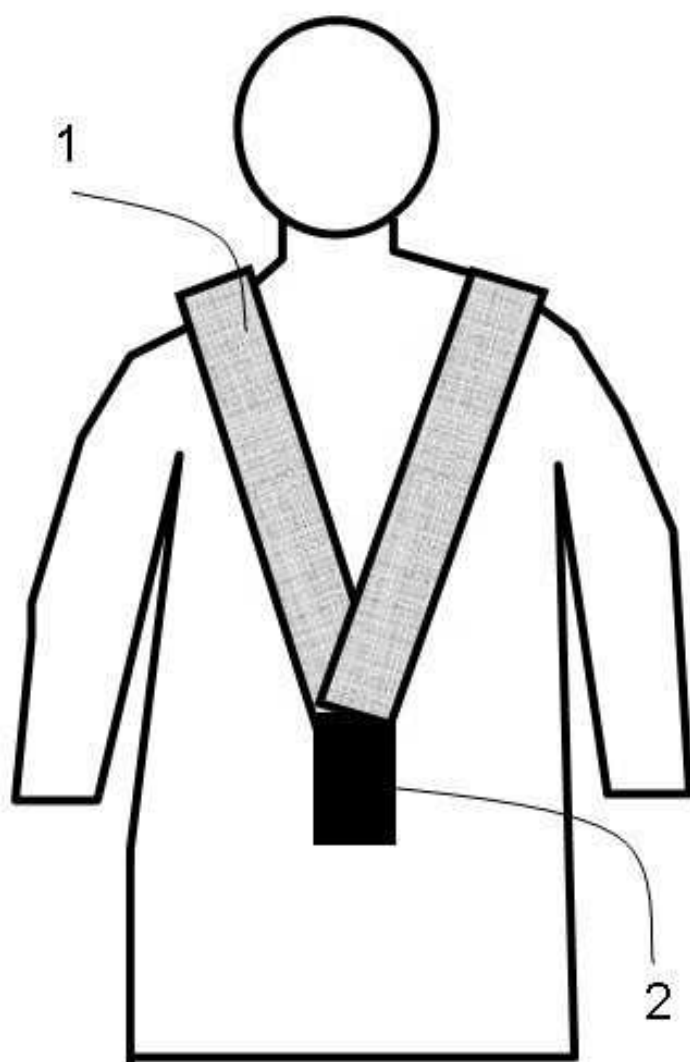


Fig. 3

