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Field of Invention

The invention relates to a modular shed, in particular a car shed, particularly for electrically powered vehicles, or for being used as a sauna, and to a solar module to be
5 used in a modular shed according to the present invention.

State of the Art and Background of the Invention

Prior art, such as DE 20 2005 008 189 U1, or DE 295 15 728 U1, discloses a multitude
10 of different shed constructions, in particular for vehicles.

Such sheds for vehicles are usually referred to as carports and serve for the purpose of merely protecting the vehicle against precipitation. Carports of this type are usually open at the sides and consist of only a roof and a supporting structure. DE 20 2005 008 189
15 U1, for example, shows a carport having a roof which is supported by a total of eight posts. Such carports, however, have the disadvantage, on the one hand, that they are designed exclusively for serving as a shelter to a vehicle and, on the other hand, that the size or width of the carport cannot be tailored to a client's individual needs, which may consist in serving as a shelter to several vehicles or to various different vehicles
20 such as a car and a motorcycle.

Another disadvantage is that known state-of-the-art carports do not provide any means permitting to recharge an energy storing battery of an electrically powered vehicle. For this purpose, it is usually necessary to connect the vehicle to a power outlet of a near-
25 by residential building. The carport needs to be built in the vicinity of a power outlet if the recharging of an energy storing battery of a sheltered vehicle is desired, which limits the flexibility of use of a carport as far as its site of erection is concerned.

US 2007/0044391 A1 discloses a hut which may be assembled from floor modules, sidewall modules, and roof modules. The individual modules are assembled by
30 connecting means.

DE 20 2009 016 950 U1 discloses a housing for vehicles which has an integrated power source for recharging an accumulator of a vehicle sheltered in the housing. The roofing
35 construction of the housing has photovoltaic elements that are coupled to an

intermediate storage device. The housing further has a power feeding cable for connecting to the vehicle.

CN 102 277 985 A discloses a housing which is assembled from a number of modules.

- 5 The roof of the housing is assembled from a number of solar modules. The sidewalls of the housing may also be assembled from a number of solar modules.

DE 20 2012 101 572 U1 discloses a garage which has a photovoltaic system consisting of a number of photovoltaic modules arranged on its roof.

10

Object of the Invention

The invention is based on the object of providing a shed, in particular a car shed, particularly for electrically powered vehicles, which, on the one hand, may easily be
15 extended and, on the other hand, offers an improved overall functionality.

Solution according to the Invention

- This object is achieved, according to the invention, by a modular shed, in particular a
20 car shed, as claimed in the independent claim. Advantageous configurations and developments of the invention are stated in the dependent claims.

Provision is thus made for providing a modular shed, in particular a car shed, consisting of individual modules which may be assembled using connecting means to form the car
25 shed, said individual modules comprising:

- a base plate,
- two side walls that may be disposed vertically on the base plate and may be connected to the base plate, and
- a roof that is supported by the side walls and may be connected to the side walls,

30 wherein

- the base plate comprises a number of base plate modules which may be interconnected so as to form the base plate.

The car shed is characterised in that

- 35 - the roof comprises a number of solar modules which may be interconnected to form the roof, and

- at least one induction coil including its associated electronic system is incorporated in at least one base plate module, said base plate module having a connection unit by means of which the induction coil may be coupled to the solar modules.

5

By providing or inserting additional base plate modules and additional solar modules, the base plate or the roof may be enlarged so as to obtain a larger shed, for example a larger carport. A larger-sized car shed may thus be obtained by simply providing additional base plate modules and additional solar modules, without the necessity of
10 having to entirely replace an existing car shed. In addition, the car shed may thus be individually tailored to the size and number of vehicles to be sheltered, which ensures a higher degree of flexibility as far as the usability of the car shed is concerned.

By providing the solar modules, electric current may be furnished with which the power
15 storing batteries of the sheltered vehicles may be recharged. The car shed according to the present invention may thus be operated in a self-sufficient manner, without any necessity for power outlets from adjacent buildings. The car shed according to the present invention may thus even be erected in the open countryside in order to permit the sheltering and recharging of, for example, electrically powered bicycles in secluded
20 regions such as in the mountains.

The individual modules may further comprise a rear wall which comprises a number of rear wall modules which may be interconnected so as to form the rear wall. Again, the car shed may be easily enlarged by simply inserting the required additional number of
25 rear wall modules into the rear wall.

According to an advantageous configuration of the car shed according to the present invention, the solar modules, the base plate modules, and the rear wall modules are each essentially of an identical width. If, for example, a base plate module is inserted
30 between existing base plate modules, it is merely necessary to insert the corresponding number of rear wall modules and solar modules which have the same width as the inserted base plate modules.

In an advantageous configuration of the invention, the individual modules further
35 comprise an energy storage device which may be coupled to the solar modules and which may be recharged by the electrical energy provided by the solar modules. It is

thus possible to recharge sheltered electrically powered vehicles such as electrically powered bicycles even during the night by drawing the electric current needed for the recharging operation from the energy storage device at nighttime. When the sun shines, sheltered electrically powered vehicles may be directly recharged by the electric current
5 drawn from the solar modules.

Preferably, the car shed according to the invention has charging means which are coupled to the solar modules and/or to the energy storage devices and which are disposed on at least one side wall and/or on the rear wall and/or in the base plate and
10 which are designed for recharging an energy storing battery of at least one electrically powered vehicle.

The charging means may comprise at least one power outlet or at least one power outlet strip and/or at least one induction coil which may cooperate with a secondary coil of an
15 electrically powered vehicle.

In one configuration of the invention, the induction coil may be coupled to the energy storage device via the connection unit of the base plate module.

20 An inserted base plate module merely needs to be connected to the solar module and/or to the energy storage device via the connection unit. No further steps are required to ensure inductive recharging of an electrically powered vehicle. The amount of work required for extending a car shed according to the present invention may thus be substantially reduced.

25

In one configuration of the invention, at least one rear wall module has at least one power outlet or power outlet strip incorporated therein, said rear wall module having a connection unit via which the power outlet or power outlet strip may be coupled to the solar modules and/or to the energy storage device. Again, once the rear wall module
30 has been inserted, it merely needs to be connected to the solar modules and/or to the energy storage device via the connection unit in order to obtain an additional recharging facility for an additional, sheltered electrically powered vehicle.

In one configuration of the invention, a solar module comprises a number of photovoltaic cells held in position by an at least partially circumferential frame, with a lighting means
35 and/or a heating means being disposed on the rear side of the photovoltaic cells (the

rear side being the side facing away from the sun) and preferably disposed at a distance from the photovoltaic cells. In this way, the car shed may be lighted and/or heated.

Preferably, the lighting means and/or the heating means are held in position by the at
5 least partially circumferential frame.

In one configuration of the invention, the lighting means comprise a number of LEDs and/or a surface lighting means. The heating means may comprise infra-red panels.

10 In one particular configuration of the invention, the frame may have an energy storing battery arranged therein which may be coupled to the photovoltaic cells and to the lighting means and/or the heating means. This makes it possible for the lighting means and/or the heating means to also be operated without an additional energy storage device, if the shed is used, for example, as a waiting zone for a bus stop. Owing to the
15 incorporation of the energy storing battery into the frame, the lighting means and/or the heating means may also be operated at nighttime.

In another particular configuration of the car shed according to the invention, the frame may have LEDs arranged therein the light of which may be laterally coupled into a glass
20 panel, preferably an acrylic glass panel. The glass panel is preferably configured in such a manner that an even diffraction of the light coupled therein over the entire surface of the glass panel is enabled. For example, the glass panel may have a suitably processed surface.

25 The side walls of the car shed according to the present invention may have advertising spaces disposed thereon which are, for example, provided with background lighting or which are realised as one big display. The background lighting and/or the display may be operated by the electric current provided by the solar modules and/or by the electric current stored in the energy storage device.

30

In one configuration of the invention, the front side of the shed may have a glass panel or a glass front which is preferably entirely closed. In this configuration, provision may be made for one side wall to have a door through which the shed may be accessed. The accessible shed provided with the front-side glass panel may have an electric stove
35 arranged in its interior which is powered by the electric energy drawn from the solar modules and/or with the electric energy drawn from the energy storage device. The side

walls and the base plate may be lined with wooden panels. The modular shed may thus be used as a modular sauna or sauna facility which has a glass front and is supplied with energy in a self-sufficient manner. The sauna may be designed as an outdoor sauna of, for example, a hotel. The door provided in one side wall may be a connecting door
 5 between the hotel building and the sauna.

Brief Description of the Figures

Further details and characteristics of the invention as well as specific example
 10 embodiments of the invention may be seen in the following description in conjunction with the drawing. In the drawings:

- Fig. 1 is a perspective view of a car shed according to the present invention in a modular design;
 15
 Fig. 2 is a cross-section of a solar module according to the present invention having a lighting means; and
 Fig. 3 is a cross-section of a solar module according to the present invention having a heating means.
 20

Detailed Description of the Invention

Fig. 1 shows a perspective view of a modular car shed 10 according to the present
 25 invention.

The car shed 10 comprises a number of individual modules which are assembled or put together via suitable connecting means. In the embodiment shown in Fig. 1, the individual modules comprise a right side wall 20, a left side wall 21, a rear wall 22, a
 30 base plate 23, and a roof 25. In one configuration of the invention, the rear wall 22 may be dispensed with.

In the embodiment shown, the side walls 20, 21 are configured as full-area, solid walls. They may, however, have recesses or cut-outs for windows or doors. The side walls 20,
 35 21 and/or the rear wall 22 may be made of concrete or of a metal such as aluminium.

Most preferably, a powder-coated aluminium sheet in different colour shades may be used for the side walls 20, 21 and/or for the rear wall 22.

Advertising surfaces 40 may be arranged on the side walls 20, 21, with the possibility to
 5 dispose said advertising surfaces both on the outer side and on the inner side of the walls. The advertising surfaces may, for example, be provided in the form of printed posters with background lighting or in the form of versatile advertising surfaces, such as advertising displays.

10 The base plate 23 consists of a number of base plate modules 24 which are preferably each of the same width b and of the same depth. The base plate 23 may be fabricated by arranging a number of base plate modules 24 side by side. The base plate modules 24 may be joined together via a tongue-and-groove connection or via a dovetail connection.

15 In a similar manner, the rear wall 22 may be formed by a number of rear wall modules 26, said rear wall modules 26 being equally put together via suitable connecting means.

The roof 25 comprises a number of solar modules 30 which may equally be put together
 20 via suitable connection means. The roof 25 or solar modules 30 are arranged in such a manner that they are slightly inclined in the direction of the rear wall 22, so as to allow rain water to run off rearwards. For this purpose, a gutter may be provided on the rear of the car shed.

25 The solar modules 30 produce electric current with which electrically powered vehicles sheltered in the car shed may be recharged. For ensuring the recharging of sheltered electrically powered vehicles, the car shed according to the present invention has a number of charging means. Beyond the scope of the present invention, the rear wall 22 may have a number of power outlets or a power outlet strip provided thereon which are
 30 coupled to the solar modules 30.

According to the present invention, the base plate 23 may have a number of induction coils 55 provided therein which are equally coupled to the solar modules 30.

35 In order to enable a recharging of electrically powered vehicles also at times of insufficient daylight conditions or during nighttime, the car shed may advantageously be

provided with an additional energy storage device 60, for example an accumulator. The energy storage device 60 is coupled to both the solar modules 30, in order to recharge said energy storage device 60 with the electric current provided by the solar modules 30, and with the power outlet strip 50 and/or with the induction coils 55. At times of
5 insufficient daylight conditions or at nighttime, the electric energy required for recharging the electrically powered vehicles may be drawn from the energy storage device 60.

The energy storage device 60 may be incorporated into the base plate 23 or may be arranged beneath the base plate, as shown in Fig. 1.

10

The base plate modules 24 have each a number of induction coils including their associated electronic system incorporated therein. The base plate modules 24 have each a connection unit via which the induction coils and/or their electronic system may be coupled to the solar modules 30 and/or to the energy storage device 60. Thus, the
15 car shed according to the present invention may be extended in a simple manner, the insertion of an additional base plate module 24 making it possible, at the same time, to inductively recharge an additional electrically powered vehicle (i.e., the sheltered, electrically powered vehicles may be recharged in a wireless manner). The base plate modules 24 may be entirely factory made, such that when the car shed is erected, the
20 base plate modules simply need to be put together and electrically connected.

The rear wall module 26 may equally have the power outlets and/or power outlet strip 50 incorporated therein, such that the rear wall modules 26 may also be entirely factory made. The rear wall modules also have electric connecting means in order to connect
25 the rear wall modules or the power outlets and/or power outlet strip to the solar modules 30 and/or to the energy storage device 60. The base plate modules 24, the rear wall modules 26, and the solar modules 30 are preferably each of the same width b , such that when the size of the car shed 10 needs to be adapted, an identical number of corresponding modules may be inserted or removed.

30

It may go without saying that the charging means 50, 55 and/or additional charging means may be provided in order to recharge other electric devices, such as, for example, a mobile phone in a wired or wireless manner.

35 In an alternative configuration, which is beyond the scope of the present invention, the charging means 50, 55 may be dispensed with, such that the shed 10 according to the

present invention may, for example, be used as a waiting zone of, for example, a bus stop.

On the bottom side of the solar modules 30, a lighting or heating facility may be provided
5 which draws electric energy either directly from the solar modules or from the energy storage device 60.

In this manner, a modular car shed is provided which may be extended or reduced in size by inserting or removing a number of corresponding rear wall modules, base plate
10 modules, and solar modules, thus making it adaptable in a particularly easy manner to different requirements. At the same time, provision is made for the sheltered, electrically powered vehicles, such as e-bikes, electric scooters or electrically powered passenger cars, to be able to be recharged even if no external power source is available.

15 Car sheds according to the present invention are thus particularly suitable in regions where no external power source is available, for example in the mountains. In addition, when creating or erecting a car shed according to the invention, the question of whether or not an external power source is available nearby may be neglected, such that a car shed according to the present invention, since it may be operated in an entirely self-
20 sufficient manner, may be built at any given location.

In one configuration of the invention, the modular shed may also be used as a sauna or as an outdoor sauna. For this purpose, a glass panel is arranged on the front side of the shed or the front side thereof is closed with a glass panel. On one side wall or on the
25 rear wall, a door may be provided through which the sauna may be accessed. The interior of the shed may be lined with wood or with wooden panels. In the interior, an electric stove may be arranged which is coupled to the solar modules or to the energy storage device for providing the electric stove with electric energy..

30 Owing to the solar modules 30 and/or to the energy storage device 60, the sauna may be operated as a self-sufficient sauna, i.e., without an external energy source.

Fig. 2 shows a cross-section of a solar module 30 according to the present invention which may be used for fabricating a roof of a car shed according to the present invention.

The solar module 30 shown in Fig. 2 comprises a number of photovoltaic cells 31 which are held in position by an at least partially circumferential frame 32. The frame 32 may, for example, be made of aluminium. On the rear side of the photovoltaic cells 31, i.e., on the side facing away from the sun, a lighting means 33 may be provided which is, in turn, held in position by the circumferential frame 32.

Using a number of solar modules 30 of this type, it is particularly easy to fabricate a roof of a car shed according to the present invention which, on the one hand, provides electric current for recharging electrically powered vehicles and, on the other hand, provides lighting to the interior of the car shed. The electrical energy required for the operation of the lighting means 33 may be directly provided by the photovoltaic cells 31 or, if the electric energy provided by the photovoltaic cells 31 is insufficient, may be drawn from the energy storage device 60.

In an alternative configuration of the solar module 30 according to the present invention, the frame 32 may have an energy storage system of its own provided therein which is recharged by the photovoltaic cells 31 and which, for example at nighttime, provides the electric energy required for operating the lighting means 33. It is thus possible to operate the lighting means 33 even if the shed 10 has no energy storage device 60 provided thereon. This is advantageous in particular in cases in which the shed 10 according to the present invention is used, for example, as a bus shelter of a bus stop, where it is sufficient to supply enough electric energy for the operation of the lighting means 33. The circumferential frame 32 may have electric connection means provided therein via which several solar modules may be coupled together. The circumferential frame 32 may equally have electric connections provided therein by means of which the photovoltaic cells 31 of two coupled solar modules may be connected in series.

The provided lighting means 33 may include, for example, a number of light-emitting diodes (LEDs) or a surface lighting means. In one configuration of the solar module 30, the circumferential frame 32 may have a number of LEDs arranged therein the light of which may be coupled from a lateral edge into a glass panel held in position by the frame 32. The glass panel is preferably configured such that the light coupled in from a lateral edge is scattered or coupled out in a uniform manner across the entire glass surface. The glass panel provided for this purpose may, for example, be an acrylic glass panel the surface of which may be suitably roughened in order to ensure uniform scattering of the light that has been coupled in.

Fig. 3 shows an alternative configuration of a solar module 30 in which, instead of the lighting means 33 shown in Fig. 2, a heating means 35 is provided. The heating means 35 may, for example, be configured as an infra-red panel which, when in operation,
5 emits downwardly directed thermal radiation. The heating means 35 may draw electric current either directly from the photovoltaic cells 31 or from the energy storage device 60 or from an energy storage system 34 arranged in the circumferential frame 32.

The configurations of a solar module according to the present invention as shown in Fig. 2 and in Fig. 3 may also be combined, such that a solar module 30 may have a number
10 of lighting means and a number of heating means.

The utilisation of a solar module as shown in Fig. 3 is particularly advantageous in cases in which the modular shed according to the present invention is used, for example, as a
15 bus shelter of a bus stop.

Reference Signs:

	10	mobile, modular (car) shed
	20	right side wall
5	21	left side wall
	22	rear wall
	23	floor or base plate
	2	base plate modules
	25	roof
10	26	rear wall modules
	30	solar modules
	31	photovoltaic cells
	32	at least partially circumferential frame (e.g. made of aluminium)
	33	lighting means (e.g. LEDs or surface lighting means)
15	34	energy storing battery for lighting means and/or for LEDs the light of which is laterally coupled into the lighting means 33 (e.g. an acrylic glass panel)
	35	heating means (e.g. infra-red panels)
	40	advertising spaces (printed and with background lighting or versatile display device (e.g. display screen))
20	50	charging means (power outlet strip)
	55	charging means (induction coils)
	60	energy storage device (e.g. accumulator)

PATENTKRAV

1. Modulær overdækket opbevaringsplads (10), især til fartøjer, bestående af individuelle moduler, som ved hjælp af forbindelsesorganer kan sammenbygges til den overdækkede opbevaringsplads, hvor de individuelle moduler omfatter:

- en bundplade (23),
- to sidevægge (20; 21), som kan anbringes vinkelret på bundpladen og forbindes med bundpladen, og
- 10 - et tag (25), som ligger på sidevæggene (20; 21), og som kan forbindes med sidevæggene,

hvor bundpladen omfatter et antal bundplademoduler (24), som kan forbindes indbyrdes til dannelse af bundpladen,

15 **kendetegnet ved, at**

- taget (25) omfatter et antal solcellemoduler (30), som kan forbindes med hinanden til dannelse af taget, og
- i idet mindste ét bundplademodul (24) er der integreret i det mindste én induktionsspole med dertil hørende elektronik, idet bundplademodulet omfatter en forbindelsesenhed, via hvilken induktionsspolen kan forbindes med solcellemodulerne (30).
- 20

2. Overdækket opbevaringsplads (10) ifølge krav 1, hvor de individuelle moduler yderligere omfatter en bagvæg (22), som omfatter et antal bagvægsmoduler (26), som kan forbindes med hinanden til dannelse af bagvæggen.
- 25

3. Overdækket opbevaringsplads (10) ifølge ethvert af de foregående krav, hvor solcellemodulerne (30), bundplademodulerne (24) og bagvægsmodulerne (26) hver især har en i det væsentlige ens bredde (b).
- 30

4. Overdækket opbevaringsplads (10) ifølge ethvert af de foregående krav, hvor de individuelle moduler yderligere omfatter en strømlagringsindretning (60), som kan forbindes med solcellemodulerne (30) og som kan oplades med den af solcellemodulerne (30) tilvejebragte elektriske energi.
- 35

5. Overdækket opbevaringsplads (10) ifølge ethvert af de foregående krav, hvor den overdækkede opbevaringsplads omfatter ladeorganer (50, 55), som er forbundet med solcellemodulerne (30) og/eller med strømlagringsindretningen (60), og som er anbragt på i det mindste én sidevæg (20, 21) og/eller på bagvæggen (22) og/eller på eller i bundpladen (23), og som er tilvejebragt til en opladning af et strømlager for i det mindste ét elektrisk drevet fartøj.

6. Overdækket opbevaringsplads (10) ifølge krav 5, hvor ladeorganerne omfatter i det mindste en stikdåse eller i det mindste én stikdåseliste (50) og/eller i det mindste én induktionsspole, som kan samvirke med en sekundær spole i et elektrisk drevet fartøj.

7. Overdækket opbevaringsplads (10) ifølge krav 6, hvor induktionsspolen kan forbindes med strømlagringsindretningen (60) via tilslutningsenheden for bundplademodulet.

8. Overdækket opbevaringsplads (10) ifølge krav 6 eller 7, hvor der i i det mindste ét bagvægsmodul (26) er integreret i det mindste én stikdåse eller stikdåseliste (50), og hvor bagvægsmodulet omfatter en forbindelsesenhed, via hvilken stikdåsen eller stikdåselisten kan forbindes med solcellemodulerne (30) og/eller med strømlagringsindretningen (60).

20

9. Overdækket opbevaringsplads (10) ifølge ethvert af de foregående krav, hvor solcellemodulet (30) omfatter et antal fotoelektriske celler (31), som er fastholdt af en i det mindste delvis rundtgående ramme (32), idet der på bagsiden af de fotoelektriske celler og fortrinsvis i afstand fra de fotoelektriske celler er anbragt en belysningsindretning (33) og/eller en varmeindretning (35).

25

10. Overdækket opbevaringsplads (10) ifølge krav 9, hvor belysningsindretningen (33) omfatter et antal LED'er og/eller en fladebelysningsindretning og/eller hvor varmeindretningen (35) omfatter infrarøde paneler.

30

11. Overdækket opbevaringsplads (10) ifølge ethvert af kravene 9 til 10, hvor der i rammen (32) er anbragt et strømlager, som er forbundet med de fotoelektriske celler (31) og med belysningsindretningen (33) og/eller med varmeindretningen (35).

12. Overdækket opbevaringsplads (10) ifølge ethvert af kravene 9 til 11, hvor der i rammen (32) er anbragt LED'er, hvis lys sideværts kan indkobles i et glaspanel, fortrinsvis acrylglaspanel.

- 5 13. Overdækket opbevaringsplads (10) ifølge ethvert af de foregående krav, hvor der på forsiden er anbragt et glaspanel eller en glasfront, idet der i den overdækkede opbevaringsplads er anbragt en elektrisk ovn, som er forbundet med solcellemodulerne (30) og/eller med strømlagringsindretningen (60), og hvor den overdækkede opbevaringsplads er indrettet til anvendelse som sauna eller udendørs sauna.

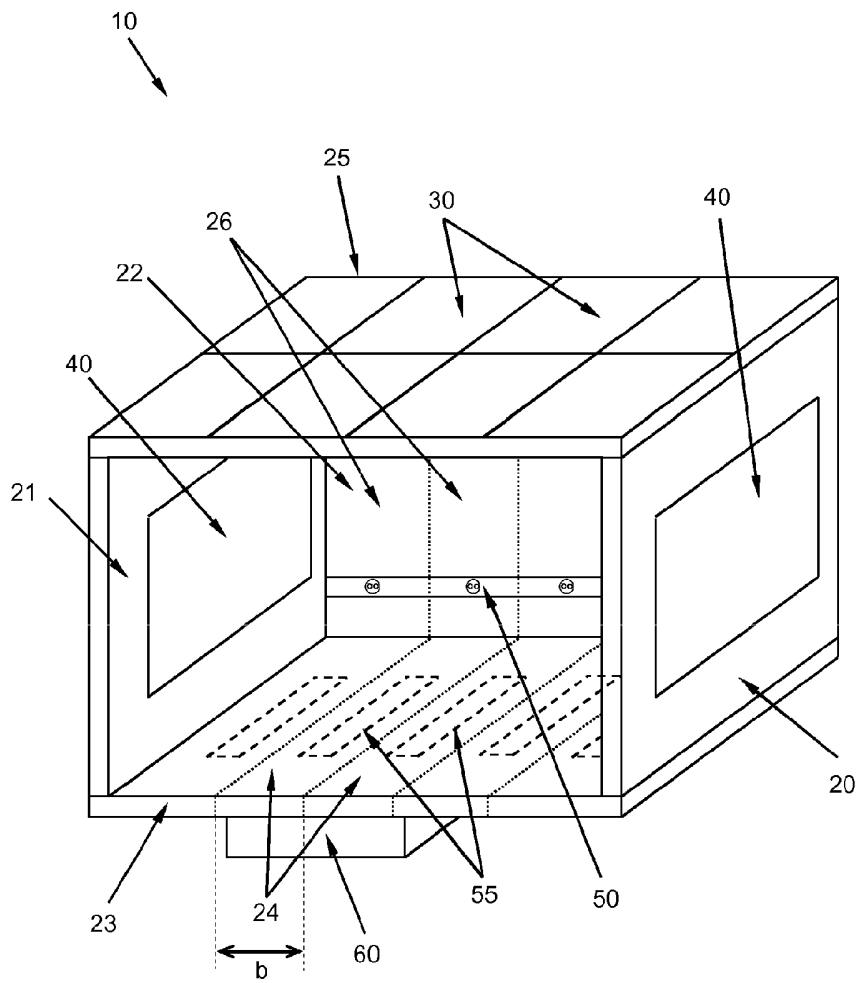


Fig. 1

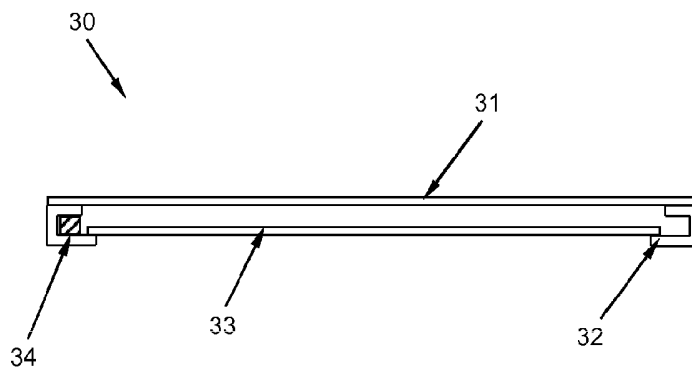


Fig. 2

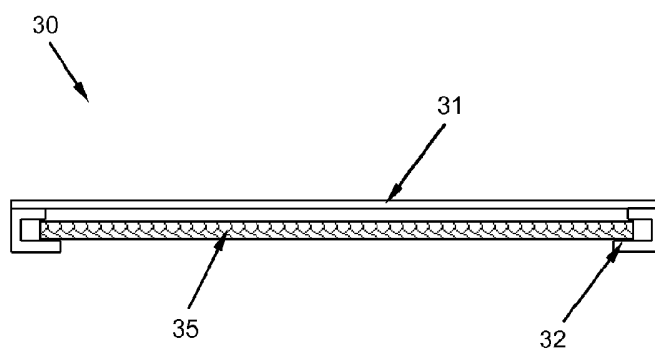


Fig. 3