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STERILE LAMINAR AIRFLOW DEVICE

Field of Invention

The present invention relates to a compact, portable, lightweight, low power consuming, convenient, versatile and sterile laminar airflow device, useful in obtaining workspace
5 substantially devoid of airborne particulate contaminants. More particularly, the present invention relates to an apparatus for obtaining a working platform devoid of both biological and a-biological contaminants for tissue culture operations, watch and electronic device assembling, initiation of aseptic cultures of micro-organisms from field samples *'in situ'*.

10 Background of the Invention

In tissue culture and industries like electronic industry, watch industry etc., the requirements for clean area are near absolute and even a small leakage or mishandling can lead to disastrous results in the production line. Such is the essentiality of the clean area or clean benches that substantial amount of money goes into the erection of these structures
15 and the maintenance of the same. Maintaining these structures is also expensive leading to an escalation in the ultimate cost of production.

UV cabinets, which are being used for this purpose, have the drawback of limited oxygen supply. This leads to restricted use. Also, it may endanger the safety of the user if the sprayed alcohol / rectified spirit inside the chamber does not dry up. Further, these are
20 quite bulky and unsuitable for portability and do not offer flexibility in their usage e.g. in the electronic industry, as the materials need to be placed much before use.

The horizontal and vertical sterile laminar air flow systems which is also presently being used have the disadvantage of being heavy, bulky, and expensive in terms of cost and maintenance, because of which they are unsuitable for low end applications, where sterile
25 environment is not required intensively, and more often a high infrastructure cost can not be afforded, such as micro-electronics works, cottage tissue culture practices, demonstration and teaching in schools; for field activities such as collection of biological samples like microbes and plants from far off places. Field applicability is further limited by the inevitable high power inputs required. At times, it becomes the limiting factor in
30 dissemination of technologies at the grass root levels where these could be more suitable.

It is well known that the hills, because of congenial environmental conditions are very rich in biodiversity that needs to be conserved. Taking plant or microbe samples and bringing them to the base laboratory are always accompanied with dangers of cross contamination leading to spoilage of precious materials and time as well. Therefore, the suitability of a

low power consuming, portable, sterile laminar airflow device is highly desirable.

Objects of the Invention

The main object of the present invention is to provide a compact, lightweight, versatile and convenient sterile laminar airflow device.

5 Another object of the present invention is to provide a portable sterile laminar airflow device with a working platform with a sterile environment for carrying out aseptic operations.

Yet another object of the present invention is to provide a light weight, portable, compact, low power consuming sterile laminar air flow device that can be conveniently used in far
10 flung remote areas for '*in situ*' aseptic inoculation of biological samples such as plants and microbes for establishment of their cultures.

Still another object of the present invention is to provide a sterile laminar airflow device suitable for integration with other devices that may at times require sterile environment, such as the workbench of an enlarging device, thus increasing the versatility of
15 applications.

One more object of the present invention is to provide a low cost sterile laminar airflow device for demonstration and teaching purpose.

One another object of the present invention is to provide a low cost sterile laminar airflow device for promotion of plant tissue culture as a cottage industry.

20 Another object of the present invention is to provide a portable, versatile, convenient sterile laminar airflow device, that is small in size, requires less space and can therefore, be used for desktop sterile air applications

Summary of the Invention

The present invention relates to a compact, portable, lightweight, low power consuming,
25 convenient, versatile and sterile laminar airflow device, useful in obtaining workspace substantially devoid of airborne particulate contaminants.

Detailed Description of the invention

Accordingly, the present invention provides a sterile laminar airflow device, useful in obtaining workspace substantially devoid of airborne particulate contaminants, said device
30 comprising a body (C) divided into an upper & lower chambers: the upper chamber housing one or more pre-filtration members (B), a motor (T) mounted with fan (S), one or more HEPA filters (U), which are mounted on a gasket (V); and the lower chamber provided with a front panel (M) and housing a removable platform (X) and a perforated plane (N).

In an embodiment of the present invention, the body is made up of materials selected from the group comprising of solid wood, laminated wood, stainless steel or any other metal sheets and lightweight high-strength plastic.

5 In another embodiment of the present invention, the lightweight high-strength plastic is selected from the group comprising of Polycarbonate, fibre-glass and reinforced strengthened glass, plexi glass, polymethacrylate, polyester, polyethylene, polypropylene and polymethyl pentene (TPX).

In still another embodiment of the present invention, the body has provisions for housing the dust filter, fan and HEPA filters.

10 In yet another embodiment of the present invention, the length to width ratio of the laminar sterile airflow device is in the range of 3 to 2.

In one more embodiment of the present invention, the fan is of twin turbo types and it ensures continuous downward movement of sterile air.

15 In one another embodiment of the present invention, the twin turbo fan is a heavy-duty axial fan

In an embodiment of the present invention, the front panel is preferably of sliding type.

In another embodiment of the present invention, the front panel has upward and downward restricted movement.

20 In still another embodiment of the present invention, the front panel can be held at any desired position.

In yet another embodiment of the present invention, the platform is made up of materials selected from the group comprising of steel, wood, non-corrosive polyethylic material, non-corrosive polyplast material and non-corrosive metallic material.

25 In one more embodiment of the present invention, the base of the lower chamber is perforated and with or without provision for removing the central part.

In one another embodiment of the present invention, the central part of the perforated platform is made removable by a slit and groove mechanism, enabling integration of the device with other devices that may at times require sterile environment.

30 In an embodiment of the present invention, the perforated plate is made up of a non-corrosive material selected from the group comprising of metals, synthetic materials and wood.

In another embodiment of the present invention, the HEPA-filter opening towards the lower chamber is covered with a plastic grill.

35 The present invention further provides a compact, portable, lightweight, low power consuming, convenient and versatile sterile laminar airflow device, useful in obtaining

workspace substantially devoid of airborne particulate contaminants, said device comprising a body (C) provided with mounts (O) and divided into upper & lower chambers; upper chamber provided with a removable panel (D) at the front for access to the internal components, housing a pre-filtration member (B) capable of retaining suspended particles in the air, a motor (T) with a twin turbo fan (S) compartmentalized by a partition (R) into a suction channel for pushing the air entrapped in the pre-filtration member (B) unidirectionally through the air tight exhaust channel and the HEPA filter (U), which is mounted on a leak proof spongy rubber gasket (V), placed in the path of pressurized air, for further cleansing of the air of any biological or abiological air borne particulate contaminants so as to ensure a continuous flow of sterile air into the lower chamber and upon the removable solid platform (X) / perforated plane (N); switches with indicator lights (H) on the side for controlling the operations; a speed controller (E) for regulating fan or motor speed; a large centrally located handle (A) at the top for ease of carrying with single hand; buckles for attaching standard shoulder straps (W); a lower chamber with an assembly for a UV tube (J) with germicidal properties; openable panels on sides (L, P) with hinge joints (K) along the rear vertical axis, and a lower front panel (M) with such height that at completely closed position it does not obstruct the removal of front panel of the upper chamber; openable by sliding movement in vertical plane along the vertical slot (Q) in the body, through a horizontal slot (Y) at the front above the lower chamber, facilitated by an appropriately placed handle (F) with provision for holding the whole panel at different heights, with the help of notches (G) along the side edges, which are obstructed by the ball, spring and screw system (I) fixed to the body wall; fibrous mat packing provided in the horizontal slot 'Y' to prevent free movement of air and dust particles.

In an embodiment of the present invention, the device is provided with a handle as a carrying device.

In another embodiment of the present invention, the device is provided with buckles on the sides for attachment of shoulder strap.

In still another embodiment of the present invention, the device is provided with an illumination device.

In yet another embodiment of the present invention, the illumination device is selected from the group comprising of tube, bulb and halogen lamp.

In one more embodiment of the present invention, the front and side panels may be transparent or opaque.

In one another embodiment of the present invention, the front and side panels are made up of unbreakable UV stabilized material.

In an embodiment of the present invention, the front panel should preferably be of sliding type.

- 5 In another embodiment of the present invention, the front panel has upward and downward restricted movement.

In still another embodiment of the present invention, the front panel can be held at any desired position.

- 10 In yet another embodiment of the present invention, the front panel is held at different positions by a screw and spring mechanism.

In one more embodiment of the present invention, the device is provided with removable legs to have clearance from the table.

In one another embodiment of the present invention, the device is provided with an UV source.

- 15 In an embodiment of the present invention, the UV source is UV tube.

In another embodiment of the present invention, the UV tube is fixed below the upper chamber.

In still another embodiment of the present invention, device for measuring air pressure is installed in the upper chamber.

- 20 In yet another embodiment of the present invention, the air pressure-measuring device monitors and regulates the inside pressure, and hence the airflow through the HEPA filters. In one more embodiment of the present invention, the switches control the air flow and light intensities.

- 25 In one another embodiment of the present invention, the control switch is selected from the group comprising of ON-OFF click type switch, sliding type switch, and dimmer type switch with rotary motion.

In an embodiment of the present invention, the device is provided with a platform with perforations.

- 30 In another embodiment of the present invention, the platform is made up of materials selected from the group comprising of steel, wood, non-corrosive polyethylic material, non-corrosive polyplast material and non-corrosive metallic material.

In still another embodiment of the present invention, the central part of the perforated platform is made removable by a slit and groove mechanism, enabling integration of the device with other devices that may at times require sterile environment.

In yet another embodiment of the present invention, the base of the lower chamber is perforated and with or without provision for removing the central part.

In one more embodiment of the present invention, the pre-filter is covered with a perforated plate.

- 5 In one another embodiment of the present invention, the perforated plate is made up of a non-corrosive material selected from the group comprising metal, synthetic material and wood.

In an embodiment of the present invention, the HEPA-filter opening towards the lower chamber has been covered with a plastic grill.

- 10 In another embodiment of the present invention, the entire device can be carried in a lightweight box.

In still another embodiment of the present invention, the device can be operated on both ordinary power supply and battery.

- 15 In yet another embodiment of the present invention, the device can be used as workbench of an enlarging device.

Brief Description of the accompanying Drawings

In the drawings accompanying the specification, **Figure I** represents the perspective view of the present device called 'STERIFLOW' embodying the present invention.

- 20 In the drawings accompanying the specification, **Figure II** represents the perspective view of the vertical section taken on the line 2-2 of FIG. I.

In the drawings accompanying the specification, **Figure III** represents the front view of the vertical section taken on the line 2-2 of FIG I, indicating the direction of the airflow streamlines that would affect particulate trajectories in the STERIFLOW.

- 25 Details of the individual parts of the device called 'STERIFLOW' are given below by way of illustration, and this should not be construed to limit the invention in any manner:

A) Handle: Swing type handle, centrally located at the top of the body such that it does not come into the way of the air inlet.

B) Pre-filter: A fibrous washable filter sheet with large pore size and folded setup for high surface area to filter restrict the intake of suspended dust particles.

- 30 **C) Body:** A wooden cabinet 35 x 25 x 50 (cm): W x D x H and wall thickness 2cm having provided with rubberised mounts (O) of 2cm height; and divided into upper & lower chambers; upper chamber of internal dimensions 31 x 21 x 21 (cm) : W x D x H, with a removable panel (D) at the front for access to the internal components, housing a filtration member (B) capable

of retaining suspended particles in the air, a motor (T) with a twin turbo fan (S) compartmentalized by a partition (R) into a suction channel for pushing the air entrapped in the pre-filtration member (B) unidirectionally through the air tight exhaust channel and the HEPA filter (U), which is mounted on a leak proof spongy rubber gasket (V), placed in the path of pressurized air, for further cleansing of the air of any biological or abiological air borne particulate contaminants so as to ensure a continuous flow of sterile air into the lower chamber and on the removable solid platform (X) / perforated plane (N); a lower chamber of internal dimensions 35 x 21 x 23 (cm) : W x D x H, with an assembly for UV tube (J) with germicidal properties, a solid platform (X) and a perforated plane (N); switches with indicator lights (H) on the side for controlling the operations; a speed controller (E) for regulating fan or motor speed; a large centrally located handle (A) at the top for ease of carrying with a single hand, g) buckles for attaching standard shoulder straps (W); openable panels on sides (L, P) with hinge joints (K) along the rear vertical axis, and a front panel (M) with height = 27 cm so that at closed position it does not obstruct the removal of front panel of the upper chamber; openable by sliding movement in vertical plane along the vertical slot (Q) in the body, through a horizontal slot (Y) at the front above the lower chamber, facilitated by an appropriately placed handle (F) with provision for holding the whole panel at different heights, with the help of notches along the side edges (G), which are obstructed by the ball, spring & screw system (I) fixed to the body wall; fibrous mat packing fixed to the body, between the front panel of the lower chamber and the boundaries of the horizontal slot above the lower chamber for the vertically slidable front panel to prevent free movement of air.

D) Upper Front Panel: A wooden panel 6 mm in thickness, fixed in front position of the upper chamber with screws, and allows access to the internal components for servicing.

E) Regulator: An electronic fan regulator with maximum capacity of 600 watts operatable at 240V AC 50 Hz electricity supply, to regulate the speed of the motor, turbo fan and hence, the speed of the sterile air flow

- H) Indicator Switches:** Two indicator switches of 6 Amp capacity, operable at 250 V AC, placed on the side of the body (C) to facilitate the switching on and off the motor (T) and the germicidal UV lamp (J).
- 5 **J) Germicidal UV Lamp:** A 'Sankyo Denki', Japan brand 21 cm long 6 Watt shortwave UV tube placed at the rear side, below the upper chamber to evenly illuminate the lower chamber and any objects kept on the working platform (N).
- 10 **M) Lower Front Panel:** 4 mm thick rectangular UV stabilized transparent polycarbonate plate of dimensions 32 x 27 (cm): W x H, the left and right margins of which are notched (G) at regular intervals, which when obstructed by the ball, spring & screw system (I) provide a mechanism of holding it at desired heights. The lower edge is partially trimmed in an oblique manner to avoid obstruction by the ball, spring screw system (I) during the initial insertion into the body (C). The shape and size are such that upon complete closure it does not obstruct with the removal of the upper front panel (D). It has a handle (F) fixed to it as a site for gripping with hand, to facilitate its vertical movement.
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- 20 **N) Perforated Plate:** A removable stainless steel perforated plate, with such shape that it fits well into the working platform (X). The perforations facilitate partial vertically downward flow of the sterile air. The perforated plate can be replaced by a solid plate made of laminated wood, glass, stainless steel or any other non-corrosive material as desired but not limited to them.
- 25
- 30 **O) Rubberized legs:** 2 cm tall rubberized legs that keep the working platform (X) raised above the surface, thus allowing air passage from beneath the working platform. It also dampens the vibrations in the body due to activity of the motor (T), resulting in a smoother operation.
- S) Twin turbo fan:** A pair of turbo fans are provided to minimize any recirculation of air due to leakage from the exhaust channel

to the suction channel, and to maximize the unidirectional flow of air so as to build up higher pressures required to drive the air through the HEPA filter.

T) Motor: The fan motor has the following specifications:

- 5 i. Power : 200 Watts, (0.003 units/minute)
- ii. Operation voltage : 230V AC, 50 Hz,
- iii. Current : 0.95 Amp,
- iv. Suction strength : 650 mm water column,
- v. Speed : 15500 ~16000 rpm

10 **U) HEPA filter:** A setup of high surface area folded filter membrane with a cut off pore size of 0.2 microns located at the end of the exhaust channel in the upper chamber, upon passing through which the air pressurized by the motor and twin turbo fan generate a vertically downwards stream of sterile air into the
15 lower chamber hence, creating a sterile environment above the working platform (X).

V) Spongy rubber strip: A strip of spongy rubber is sandwiched along the circumference of the HEPA module, between the HEPA module and the lower wall of the upper chamber of the body
20 (C) to which the HEPA module is fixed, to avoid any air leakage from the upper chamber into the lower chamber except through the HEPA filter.

The working of the sterile airflow device STERIFLOW for obtaining a continuous flow of clean air at the perforated bench area is described below:

25 The STERIFLOW is switched on so that the air is sucked into the upper chamber because of the fan and is filtered through the pre-filter which retains the dust particles. Soon the pressure builds up within the upper chamber and the air is then forced through the HEPA filter which takes care of any remaining suspended particles both biological and
30 abiological so that clean air flows in a continuous stream across the filter and onto the working area which also gets cleared of any suspended particles after 10-12 minutes and can be used for sterile operations. In case of biological operations, the use of UV light for atleast 10 minutes is recommended to kill already existing contaminants. A spirit lamp or a gas burner to flame sterilize the mouths of the culture vessels before carrying out operations involving live biological material can also be used.

The following examples are given by way of illustration of the utility of the present invention (STERIFLOW) for raising aseptic cultures and should not be construed to limit the scope of the present invention.

EXAMPLE - 1

5 In the example, the pre-sterilized petriplates were first kept in the working platform along the arms of a cross stretching across the corners of the working platform for 10 minutes with UV light on and then still hot sterilized liquid MS medium containing sucrose (30% w/v), vitamins and agar for solidification, was poured into them and allowed to solidify for 15 minutes. The petriplates were then sealed with parafilm (M/s Sigma, USA) and
10 incubated to check for any contamination for 3 weeks. No contamination in these petriplates confirmed the proper working of the present invention.

EXAMPLE - 2

The STERIFLOW as shown in Fig I was used for raising the aseptic cultures of the nodal explants of a bamboo (*Dendrocalamus hamiltonii*). The nodal explants after surface
15 sterilization with 0.04% solution of HgCl_2 (w/v) containing a drop of liquid detergent were transferred on to the modified Murashige and Skoog (1962) medium containing a cytokinin, benzyl adenine and an auxin, 2,4-dichlorophenoxy acetic acid (2,4-D; 1.0 mg/l each). There was no contamination because of any bacteria or fungi even after three weeks of incubation period, affirming that the STERIFLOW is working in the desirable manner.

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Main advantages of the present invention are:

1. The present invention is a low power consuming, portable, versatile, convenient device capable of providing continuous flow of clean air on a working platform making it suitable for all those industries requiring clean areas at the working
25 benches.
2. It provides a light weight, portable, compact, low energy consuming sterile laminar air flow cabinet that can be conveniently used in far flung remote areas for 'in situ' aseptic inoculation of biological samples such as plants and microbes for establishment of cultures.
- 30 3. Provision of a large handle for carrying and buckles for attaching flexible shoulder belts, in addition to the small compact size and light weight, make the device truly portable.
4. It is a low cost sterile laminar air flow cabinet for promotion of plant tissue culture as a cottage industry, demonstration and education in schools and colleges, and for

industries with low end requirement such as watch industry and micro-electronics industry.

5. It being small in size, requires less space and can therefore, be used for desktop sterile air applications.
- 5 6. The working platform being partially removable, the device can be integrated with other devices that may at times require sterile environment, such as the workbench of an image enlarging device, thus increasing the versatility of applications.
7. Provision for opening or closing the front and the side panels, make manipulation inside the sterile zone within the lower chamber possible from any direction as per
10 convenience.
8. Maintenance is negligible as except for the HEPA filters, the rest of the items are available easily in the market.

Claims

1. A sterile laminar airflow device useful in obtaining workspace substantially devoid of airborne particulate contaminants, said device comprising a body (C) divided into an upper and lower chambers; the upper chamber housing one or more pre-filtration members (B), a motor (T) mounted with fan (S), and one or more filters (U) located below the motor; and the lower chamber provided with a front panel (M), a removable platform (X) located at the lower portion of the chamber and a perforated plane (N) placed on the removable platform.
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2. A device as claimed in claim 1, further comprising removable legs or mounts (O) for providing clearance from any surface on which the device is kept.
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3. A device as claimed in claim 1, wherein the motor (T) with the fan (S) is compartmentalized by a partition (R) into a suction channel through the pre-filter and the filter (U) for pushing the entrapped air unidirectionally into the lower chamber.
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4. A device as claimed in claim 1, further comprising one or more switches (H) on the sides of the device for controlling the operations; a speed controller (E) for regulating fan or motor speed; an illuminating device; and a UV source with germicidal properties being provided in the lower chamber.
5. A device as claimed in claim 1, further comprising openable panels on sides (L, P) with hinge joints (K) along the rear vertical axis, a lower front panel (M) provided with a handle (F) of such height that at completely closed position it does not obstruct the removal of front panel of the upper chamber; a vertical slot (Q) and a horizontal slot (Y) for moving the front panel, notches (G) and spring and screw mechanism (I) along the side edges to hold the front panel at different heights.
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6. A device as claimed in claim 1, wherein a large centrally located handle (A) is provided at the top of the device and buckles for attaching shoulder straps.
7. A device as claimed in claim 4, wherein the UV source is a UV tube.
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8. A device as claimed in claim 4, wherein the illuminating device is selected from the group comprising of tube, bulb and halogen lamp.
9. A device as claimed in claim 1, wherein the body is made up of materials selected from the group comprising of solid wood, laminated wood, stainless steel or any other metal sheets and lightweight high-strength plastics.
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10. A device as claimed in claim 7, wherein the lightweight high-strength plastic is selected from the group comprising of Polycarbonate, fibre-glass reinforced strengthened glass, plexi glass, polymethacrylate, polyester, polyethylene, polypropylene and polymethyl pentene (TPX).
- 5 11. A device as claimed in claim 1, wherein the length to width ratio of the laminar airflow device is in the range of 3: 2.
12. A device as claimed in claim 1, wherein the fan is a twin turbo fan which ensures continuous downward movement of sterile air.
13. A device as claimed in claim 1, wherein the turbo fan is a heavy-duty axial fan
- 10 14. A compact, portable, lightweight, low power consuming, convenient and versatile sterile laminar airflow device useful in obtaining workspace substantially devoid of airborne particulate contaminants, said device comprising a body (C) provided with mounts (O) and divided into upper & lower chambers; upper chamber provided with a removable panel (D) at the front for access to the internal components, 15 housing a pre-filtration member (B) capable of retaining suspended particles in the air, a motor (T) with a twin turbo fan (S) compartmentalized by a partition (R) into a suction channel for pushing the air entrapped in the pre-filtration member (B) unidirectionally through the air tight exhaust channel and the HEPA filter (U) , which is mounted on a leak proof spongy rubber gasket (V), placed in the path of 20 pressurized air, for further cleansing of the air of any biological or abiological air borne particulate contaminants so as to ensure a continuous flow of sterile air into the lower chamber and upon the removable solid platform (X) / perforated plane (N); switches with indicator lights (H) on the side for controlling the operations; a speed controller (E) for regulating fan or motor speed; a large centrally located 25 handle (A) at the top for ease of carrying with single hand; buckles for attaching standard shoulder straps (W); a lower chamber with an assembly for a UV source (J) with germicidal properties; openable panels on sides (L, P) with hinge joints (K) along the rear vertical axis, and a lower front panel (M) with such height that at completely closed position it does not obstruct the removal of front panel of the 30 upper chamber; openable by sliding movement in vertical plane along the vertical slot (Q) in the body, through a horizontal slot (Y) at the front above the lower chamber, facilitated by an appropriately placed handle (F) with provision for holding the whole panel at different heights, with the help of notches (G) along the side edges, which are obstructed by the ball, spring and screw system (I) fixed to

the body wall; and fibrous mat packing provided in the horizontal slot 'Y' to prevent free movement of air and dust particles.

15. A device as claimed in claim 14, wherein the device is provided with a handle as a carrying device.
- 5 16. A device as claimed in claim 14, wherein the device is provided with buckles on the sides for attachment of shoulder strap.
17. A device as claimed in claim 14, wherein the device is provided with an illumination device.
18. A device as claimed in claim 17, wherein the illumination device is selected from
10 the group comprising of tube, bulb and halogen lamp.
19. A device as claimed in claim 14, wherein the front and side panels may be transparent or opaque.
20. A device as claimed in claim 19, wherein the front and side panels are made up of unbreakable UV stabilized material.
- 15 21. A device as claimed in claim 19, wherein the front panel may be of sliding type.
22. A device as claimed in claim 19, wherein the front panel has upward and downward movement.
23. A device as claimed in claim 19, wherein the front panel can be held at any desired position.
- 20 24. A device as claimed in claim 19, wherein a screw and spring mechanism holds the front panel in any desired position.
25. A device as claimed in claim 14, wherein the device is provided with removable legs for clearance.
26. A device as claimed in claim 14, wherein the UV source is UV tube.
- 25 27. A device as claimed in claim 26, wherein the UV tube is fixed below the upper chamber.
28. A device as claimed in claim 14, wherein an air pressure measuring device is installed in the upper chamber for monitoring and regulating pressure inside the device, and hence the air flowing through the HEPA filter.
- 30 29. A device as claimed in claim 14, wherein the switches control the air flow and light intensities.
30. A device as claimed in claim 29, wherein the control switch is selected from the group comprising of ON-OFF click type switch, sliding type switch, and dimmer type switch with rotary motion.

31. A device as claimed in claim 14, wherein the device is provided with a platform with perforations.
32. A device as claimed in claim 31, wherein the platform is made up of materials selected from the group comprising of steel, wood, non-corrosive polyethylic material, non-corrosive polyplast material and non-corrosive metallic material.
33. A device as claimed in claim 31, wherein the central part of the perforated platform is made removable by a slit and groove mechanism, enabling integration of the device with other devices that may at times require sterile environment.
34. A device as claimed in claim 14, wherein the base of the lower chamber is perforated and with or without provision for removing the central part.
35. A device as claimed in claim 14, wherein the pre-filter is covered with a perforated plate.
36. A device as claimed in claim 35, wherein the perforated plate is made up of a non-corrosive materials selected from the group comprising of metals, synthetic materials and wood.
37. A device as claimed in claim 14, wherein the HEPA-filter is covered with a plastic grill.
38. A device as claimed in claim 14, wherein the entire device may be carried in a light weight box.
39. A device as claimed in claim 14, wherein the device can be operated on both ordinary power supply and battery.
40. A device as claimed in claim 14, wherein the device can be used as workbench of an enlarging device.