

Title of the Invention

A Box Unit Device for Blowing and Supplying Clean Air Flow

Cross-Reference to related Applications

None

Field of the Invention

The present invention relates to a box unit device for blowing and supplying clean air flow from ceilings of a clean room equipped with high precision machines.

Description of the Related Art

Conventional box unit devices for blowing and supplying clean air flow from ceilings of a clean room are specifically designed and manufactured as differently sized and shaped box units depending on sizes of various manufacturing machines for semiconductor devices and others, their locations, and the back side structures of the ceilings, and then placed in all the area of the back side of the ceilings for blowing and supplying clean air flow into the clean room. Such typical outer sizes of the box unit devices are e. g., 610mm x 1220mm, 750mm x 1500mm, 900mm x 1500mm, 750mm x 1800mm, 1200mm x 1200mm in aspect ratio, and they are very heavy.

Background of the Invention

In general, many box unit devices for blowing and supplying clean air flow are placed just over various manufacturing machines and storage area of semi-finished products, and they are placed in accordance with structures of supporting frames for them in the back side of the ceilings, and hence outer boxes of unit devices must be designed and manufactured not only by the previously shown typical dimensions, but also by a few millimeters or centimeters differed dimensions, and resultantly work load of individually assembling components for blowing clean air flow whose power depend on the sizes of the boxes is so much increased, and very long lead time is required to manufacture a number of such box unit devices, also there is difficulty in having definite stock of such box unit devices, and consequently there is a serious problem of delayed schedule of works for placement of such box unit devices in the back side of the ceilings.

In such many differently sized outer boxes, inside each one of the outer boxes an AC motor whose power is dependent on the size of the box, a controller, a different sized fan are built in, and hence number of such components is increased, and consequently there is another problem of large workers' load.

Function test before shipment of such differently sized box unit devices requires large scale test equipments, and that causes a further problem in handling and operating them.

Summary of the Invention

The present invention terminates the previously shown problems in constructing a clean room system to blow and supply clean air flow into a clean room, wherein many differently sized box unit devices for blowing and supplying clean air flow are placed in all the area of the back side of the ceilings of the said clean room, and provides differently sized box unit devices by utilizing a commonly applicable module assembled of components for blowing clean air flow which can be built in each of differently sized outer boxes to manufacture the box unit devices such that a module is built in each outer box with fixing components.

Brief Description of the Drawings

Figure 1 shows a squint view of an embodiment of a common module, a cross sectional views of the module and differently sized boxes.

Figure 2 shows a cross sectional view of a box unit in which the module is fixed.

Figure 3 (a) shows an example of placement of the box unit devices in back side of ceilings in a clean room, (b) shows a cross sectional view of the clean room.

Detailed Description of Preferred Embodiment

The present invention, in a clean room system to blow and supply clean air flow into a clean room, wherein many differently sized box unit devices for

blowing and supplying clean air flow are placed in all area of back side of ceilings of the said clean room, provides a commonly applicable module assembled of components for blowing clean air flow, which can be built in each of differently sized outer boxes, to manufacture the said box unit devices such that the said common module is built in each of the said differently sized outer boxes with fixing components, and provides differently sized box unit devices for blowing and supplying clean air flow to be placed at the back side of the ceilings.

Referring to Figure 1 and 2, components for blowing clean air flow are assembled as the said common module 2, whose size is small and view is convex shaped, and which can be easily built in a differently sized outer box 1a. Reference numeral 3 is a DC motor with function of variable rotation speed control in the said module, reference numeral 4 is horizontal rotation fan attached to a shaft of the said motor, and reference numeral 5 is a controller of the said motor.

The said common module 2 having the said DC motor 3 with a controller for variable rotation speed is functionally tested to confirm its operations and air blow parameters using small test equipments before shipment, and when the said common module 2 passes the test, the said common module, which is smaller than a box unit device 1, is to be stored in a space saved area.

Referring to Figure 2, the said common module 2, which is small and convex shaped, can be easily built in and fixed by caulking in the said differently sized outer box 1a with a differently sized attachment 6, thereafter differently sized box unit device 1 for blowing and supplying clean air flow is efficiently manufactured. Reference numeral 7 is a replaceable air filter attached to blowing aperture 1b. The said common module is tested before building in the said outer box 1a, and hence the said box unit device 1 can be packed and shipped immediately after manufacturing, and space for storing the said box unit device 1 is not needed.

The said DC motor with a controller for variable rotation speed in the said common module 2 enables high efficient operation of the said horizontal

rotation fan 4 and air blowing efficiency of the said box unit device 1 is not degraded even when the said box unit device 1 is comparably large, because the rotation speed of the said DC motor can be controlled to maintain required clean air flow parameters. Higher efficiency characteristic of the said DC motor 3 at lower loading makes it possible to apply the said common module 2 as a low power module.

Referring to Figure 3, many differently sized box unit devices the same as 1, which are installed in a clean room 8, are placed in all area of back side of ceilings 9 by a specific combination of placement depending on the area shape. And all the said installed box unit devices the same as 1 blow and supply clean air flow into the said clean room 8. Reference numeral 10 is perforated floor, reference numeral 11 is air circulation path, and reference numeral 12 is a manufacturing machine.

The present invention provides the said common module 2 assembled of components for blowing clean air flow, which can be built in any differently sized outer box without degrading air blow efficiency, and resultantly utilization of the said common module enables simple and quick operation of assembling components for blowing clean air flow in a differently sized outer box, and contributes to termination of lead time delay of manufacturing such box unit devices.

Utilization of the said common module contributes to reduction of workers' load and high efficient operation of building components in differently sized outer boxes.

Functional test of the said box unit device for blowing and supplying clean air flow is replaced by test of the said common module before building in the said outer box, and that contributes to application of small test equipments by simple test operation. In stead of many manufactured differently sized box units, the said common modules, which are smaller than box unit devices, are stored in a space saved area.

The said box unit device for blowing and supplying clean air flow built of the said common module assembled of components for blowing clean air flow

contributes to both of minimization of inventory of the said differently sized outer boxes and the said common modules, and cost reduction.

Applying the said DC motor with a controller for variable rotation speed as a motor in the said common module contributes to no degradation of efficiency of blowing clean air flow in spite of utilization of the said common module, because the rotation speed of the said DC motor can be controlled to maintain required clean air flow parameters.

The present invention is widely applicable to manufacture differently sized box unit devices for blowing and supplying clean air flow into a clean room.

While the foregoing has been particularly shown and described with reference to particular embodiments thereof, it will be understood by those skilled in the art that various other changes in the form and details may be made without departing from the spirit and scope thereof. It is to be understood that various changes may be made in adapting to different embodiments without departing from the border concepts disclosed herein and comprehended by the claims that follow.

What is Claimed is:

1.

A box unit device for blowing and supplying clean air flow, wherein the size of the said box unit size is differently determined, in a clean room system to blow and supply clean air flow into a clean room, wherein many differently sized box unit devices for blowing and supplying clean air flow are placed in all the area of back side of ceilings of the said clean room, comprising; a common module assembled of components for blowing clean air flow such that the said module can be easily built in a differently sized outer box; a differently sized outer box wherein the said common module is built in with fixing components.

2.

The box unit device for blowing and supplying clean air flow in accordance with claim 1, wherein the said common module contains a DC motor used as a motor for blowing clean air flow, which has a controller for variable rotation speed for high efficient blowing clean air flow and can be functionally tested at the said module.

3.

The box unit device for blowing and supplying clean air flow in accordance with any of claims 1 or 2, wherein the said common module whose side view is convex shaped and can easily be attached in an outer box.