

Multi-layer Air Purification Filter

FIELD OF THE INVENTION

The patent application relates to a multi-layer air purification filter.

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BACKGROUND OF THE INVENTION

Along with the progress of the society and the improvement of the living standard of the people, higher requirement to life quality has been put forward by the people. For example, buying houses, home decoration, the application and promotion of the petroleum, the coal, the natural gas, the chemicals, the automobile and the like are taken by normal people. However, they make indoor and/or outdoor air pollution at some extent, while improving our living standard. Especially, in recent years, the home-decoration has become more and more luxurious, the problem of the indoor and outdoor air pollution caused by overuse of household chemicals and activities of human being such as smoking, cooking and so on can't be ignored. Moreover the environment has a direct impact on people's health. Therefore the traditional filter material can't meet people's demand, especially in aspects of antibacterium, removal of the toxic and harmful gases and so on.

SUMMARY OF THE INVENTION

To solve the above-mentioned problem, the present patent application provides a multi-layer air purification filter which has simple structure, good effect of filtration and functions of removing the moisture and the harmful chemical substances and antibacterium.

The technical scheme that the present invention has adopted to solve the problem is:

A multi-layer air purification filter, comprising square grids arranged at outer layers, a cellular grid sandwiched between two square grids and a fiber cloth layer containing activated-carbon arranged between the square grid and the cellular grid, wherein a fibre mesh and a molecular sieve layer are arranged in the cellular grid.

Preferably, the square grid has a structure of two layers, which comprise a casing and a fibre mesh stuck on the casing.

Preferably, the cellular grid has a structure of five layers, which comprise two cellular casings, two fibre meshes sandwiched between the two cellular casings and a molecular sieve layer sandwiched between the two fibre meshes.

5 Preferably, the multi-layer air purification filter further comprises an upper end cover and a lower end cover which are arranged at two ends of the filter and fixedly clamped the above-mentioned square grids, honeycomb grids and fiber cloth layer.

Further, a mounting slot is provided on the inner sidewalls of the upper end cover and the lower end cover, and a protrusion which is able to engage with the cellular grid is arranged within the mounting slot.

10 Advantageous effect of the present invention is: the first square grid containing fibre mesh may be used for filtering the filiform dust firstly. The cellular grid containing the fibre mesh and the molecular sieve layer is able to adsorb the water and filter the harmful substances such as the methanol, the ethanol, the hydrogen sulfide, the sulfur dioxide, the ethylene, the propene and the like. The fibre cloth of black activated-carbon has excellent
15 effects in sterilizing and removing of harmful chemical substances. The whole product has an effect of multi-layer filtration, greatly improving the air purification efficiency. Moreover, it can be used widely, such as, in various air purification equipments to purify the living spaces of the human being, which comprises the inner space of the car.

20 **BRIEF DESCRIPTION OF THE DRAWINGS**

A further description of the present invention is made with reference to the accompanying drawings and embodiments:

Figure 1 is an overall profile of an embodiment of the present invention;

Figure 2 is a schematic view of the structure of the present invention;

25 Figure 3 is a schematic view of the structure of the cellular grid of the present invention;

Figure 4 is a schematic view of the structure of the end cover of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The multi-layer air purification filter as shown in figure 1 to 3 comprises square grids 1 arranged at outer layers, a cellular grid 2 sandwiched between two square grids 1, and a fiber cloth layer 3 containing activated-carbon arranged between the square grid 1 and the cellular grid 2. The fibre cloth of black activated-carbon has excellent effects in sterilizing and removing of harmful chemical substances. A fiber mesh 4 and a molecular sieve layer 5 are arranged within the cellular grid 2.

Wherein, the square grid 1 has a structure of two layers, which comprise a casing and a **fibre mesh 4** stuck on the casing, the fibre mesh 4 is stuck on the casing of the square grid 1 by means of injection molding. Certainly, the square grid 1 may not be provided with the fibre mesh 4. Because the first filter grid of the present invention has the square grid 1 containing the fibre mesh 4, the filiform dust may be filtered firstly. The last square grid 1 has no need to be provided with the fibre mesh 4 since the cellular grid 2 in the middle of the multi-layer air purification filter performs a fine filtration, so it mainly functions as fixation and protection. The cellular grid 2 is bonded together by ultrasonic welding.

Wherein, as shown in figure 3, the cellular grid 2 has a structure of five layers, which comprises two cellular casings 21, two fibre meshes 4 sandwiched between the two cellular casings 21 and a molecular sieve layer 5 sandwiched between the two fibre meshes 4. The fibre mesh 4 is also stuck onto the cellular casing 21 of the cellular grid 2 by means of injection molding, the molecular sieve layer 5 consists of zeolites which are dispersed evenly on the fibre mesh 4 by a granulator device. The cellular grid 2 containing the fibre mesh 4 and the molecular sieve layer 5 can adsorb water and filter the substances harmful to human being with a aperture of 4A, such as methylalcohol, ethanol, hydrogen sulphide, sulfur dioxide, ethylene, propene and the like.

In addition, an upper end cover 61 and a lower end cover 62 for fixedly clamping the above-mentioned square grid 1, cellular grid 2 and fiber cloth layer 3 are arranged at two ends of the filter according to the present invention. The fiber cloth layer 3 is positioned between the square grid 1 and the cellular grid 2 by means of ultrasonic welding. Mounting slots 63 are provided on the inner sidewalls of the upper end cover 61 and the lower end cover 62, a protrusion 64 which is able to engage with the cellular grid 2 is arranged within the mounting slot 63, as shown in figure 4. During assembly, the square grid 1, the cellular grid 2 and the fiber cloth layer 3 are inserted orderly into the mounting

slot 63 of the upper end cover 61 or the lower end cover 62, and the cellular grid 2 will be locked by the protrusion 64, then the other end cover is mounted onto another end to complete the whole assembly of the filter. Each outer sidewall of the upper end cover 61 and the lower end cover 62 is further provided with a buckle which can engage the filter
5 onto the external equipment.

The above description is only principle and embodiment of the present invention, any simple modifications and variations made according to the spirit of the present invention are all included within the scope of the claims appended hereto.

Claims

1. A multi-layer air purification filter, characterized in that, comprising square grids (1) arranged on outer layers, a cellular grid (2) sandwiched between two square grids (1),
5 and a fiber cloth layer (3) containing activated-carbon arranged between the square grid (1) and the cellular grid (2), wherein a fibre mesh (4) and a molecular sieve layer (5) are arranged in the cellular grid (2).

2. The multi-layer air purification filter according to claim 1, characterized in that, the square grid (1) has a structure of two layers, which comprises a casing and a fibre
10 mesh (4) stuck onto the casing.

3. The multi-layer air purification filter according to claim 1, characterized in that, the cellular grid (2) has a structure of five layers, which comprises two cellular casings (21), two fibre meshes (4) sandwiched between the two cellular casings (21) and a molecular sieve layer (5) sandwiched between two fibre meshes (4).

4. The multi-layer air purification filter according to claim 1, characterized in that, further comprising a upper end cover (61) and a lower end cover (62) arranged at two
15 ends of the filter and fixedly clamping the above-mentioned square grid (1), cellular grid (2) and fiber cloth layer (3).

5. The multi-layer air purification filter according to claim 4, characterized in that, a
20 mounting slot (63) is arranged on the inner sidewalls of the upper end cover (61) and the lower end cover (62), a protrusion (64) which is able to engage with the cellular grid (2) is arranged within the mounting slot (63).