

AN OIL-SEPARATING PRIMARY FILTER

Utility Model Patent — English Translation

English translation prepared for reference only. In case of any discrepancy, the original Chinese patent publication (CN 210302876 U) shall prevail.

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(54)	Title of utility model	An Oil-Separating Primary Filter

(57) ABSTRACT

The present utility model provides an oil-separating primary filter, comprising a box body and a front cover plate. The box body comprises an air inlet end and an air outlet end. A grid plate is fixed at one end of the box body and is disposed on a side close to the air outlet end. A clearance groove is provided at an inner side of the other end of the box body, and an oil-separating plate is provided in the clearance groove. The oil-separating plate comprises an outer frame and a plurality of inclined baffle plates fixed to an inner side of the outer frame, with a gap between every two inclined baffle plates. An activated-carbon adsorption layer, a filter element layer and a pleated layer are sequentially provided between the oil-separating plate and the grid plate. A front end of the front cover plate is provided with a plurality of umbrella-shaped protrusions, and a bottom edge of each umbrella-shaped protrusion is provided with a plurality of air-permeable holes. The primary filter of the present utility model can block most oily liquid and prevent it from entering the filter element, thereby prolonging the service life of the filter element.

CLAIMS

1. An oil-separating primary filter, characterized by comprising a box body (1) and a front cover plate (2), the box body (1) comprising an air inlet end (101) and an air outlet end (102); a grid plate (11) is fixed at one end of the box body (1), and the grid plate (11) is disposed on a side close to the air outlet end (102); a clearance groove is provided at an inner side of the other end of the box body (1), and an oil-separating plate (3) is provided in the clearance groove; the oil-separating plate (3) comprises an outer frame (31) and a plurality of inclined baffle plates (32) fixed to an inner side of the outer frame (31), with a gap between every two inclined baffle plates (32); an activated-carbon adsorption layer (4), a filter element layer (5) and a pleated layer (6) are sequentially provided between the oil-separating plate (3) and the grid plate (11); a front end of the front cover plate (2) is provided with a plurality of umbrella-shaped protrusions (21), and a bottom edge of each umbrella-shaped protrusion (21) is provided with a plurality of air-permeable holes (22).
2. The oil-separating primary filter according to claim 1, characterized in that an inner side face of the clearance groove is further provided with a silicone cushion layer (7).
3. The oil-separating primary filter according to claim 1, characterized in that the grid plate (11) is a metal mesh.
4. The oil-separating primary filter according to claim 1, characterized in that the filter element layer (5) is made of honeycomb sponge.
5. The oil-separating primary filter according to claim 1, characterized in that the pleated layer (6) is a pleated polyester fiber filter mesh.

DESCRIPTION

An Oil-Separating Primary Filter

TECHNICAL FIELD

[0001] The present utility model relates to the field of filters, and in particular to an oil-separating primary filter.

BACKGROUND ART

[0002] An air filter is generally composed of filter layers and a frame, and air filters can be classified into multiple grades such as primary, intermediate and high-efficiency filters according to their filtering effects. A primary air filter is mainly used to capture particulate dust having a diameter of 5 to 10 micrometers and various suspended matters, is widely applied in various air-conditioning equipment and air-conditioning systems, and is also used for primary protection in multi-stage filtration systems.

[0003] At present, most primary filters on the market have poor oil-separating performance. When the filter element in the filter has adsorbed excessive oily liquid, since the filter element generally has a porous structure, the oily liquid in the interior is difficult to remove during cleaning, and the filter element can only be scrapped; the filter element needs to be replaced frequently and has a short service life.

SUMMARY OF THE UTILITY MODEL

[0004] In view of the above problems, the present utility model provides an oil-separating primary filter, which can block most oily liquid and prevent it from entering the filter element, thereby prolonging the service life of the filter element.

[0005] To achieve the above object, the present utility model solves the above problem through the following technical solutions:

[0006] An oil-separating primary filter comprises a box body and a front cover plate. The box body comprises an air inlet end and an air outlet end. A grid plate is fixed at one end of the box body and is disposed on a side close to the air outlet end. A clearance groove is provided at an inner side of the other end of the box body, and an oil-separating plate is provided in the clearance groove. The oil-separating plate comprises an outer frame and a plurality of inclined baffle plates fixed to an inner side of the outer frame, with a gap between every two inclined baffle plates. An activated-carbon adsorption layer, a filter element layer and a pleated layer are sequentially provided between the oil-separating plate and the grid plate. A front end of the front cover plate is provided with a plurality of umbrella-shaped protrusions, and a bottom edge of each umbrella-shaped protrusion is provided with a plurality of air-permeable holes.

[0007] Specifically, an inner side face of the clearance groove is further provided with a silicone cushion layer.

[0008] Specifically, the grid plate is a metal mesh.

[0009] Specifically, the filter element layer is made of honeycomb sponge.

[0010] Specifically, the pleated layer is a pleated polyester fiber filter mesh.

[0011] The beneficial effects of the present utility model are as follows:

[0012] First, in the primary filter provided by the present utility model, a front end of the front cover plate is provided with a plurality of umbrella-shaped protrusions, and the air-permeable holes are arranged at bottom portions of the umbrella-shaped protrusions. When gas passes through the front cover plate, most of the gas first contacts the front ends of the umbrella-shaped protrusions, and oily liquid is blocked and remains at the front ends of the umbrella-shaped protrusions; when the gas passes through the oil-separating plate, due to the blocking action of the inclined baffle plates, part of the oily liquid is blocked and remains on the inclined baffle plates, thus achieving a relatively good oil-separating effect. The oily liquid in the gas can be blocked to a relatively great extent, preventing a large amount of oily liquid from entering the filter element layer and prolonging the service life of the filter element layer;

[0013] Second, an activated-carbon adsorption layer, a filter element layer and a pleated layer are added, and the multiple filter layers can improve the overall dust-removal effect.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a structural schematic view of an oil-separating primary filter according to the present utility model.

[0015] FIG. 2 is an enlarged view of part A in FIG. 1.

[0016] The reference numerals are as follows: box body 1; grid plate 11; air inlet end 101; air outlet end 102; front cover plate 2; umbrella-shaped protrusions 21; air-permeable holes 22; oil-separating plate 3; outer frame 31; inclined baffle plates 32; activated-carbon adsorption layer 4; filter element layer 5; pleated layer 6; silicone cushion layer 7.

DETAILED DESCRIPTION OF EMBODIMENTS

[0017] The present utility model will be described in further detail below in conjunction with the embodiments and the accompanying drawings, but the embodiments of the present utility model are not limited thereto.

[0018] As shown in FIGS. 1-2:

[0019] An oil-separating primary filter comprises a box body 1 and a front cover plate 2. The box body 1 comprises an air inlet end 101 and an air outlet end 102. A grid plate 11 is fixed at one end of the box body 1 and is disposed on a side close to the air outlet end 102. A clearance groove is provided at an inner side of the other end of the box body 1, and an oil-separating plate 3 is provided in the clearance groove. The oil-separating plate 3 comprises an outer frame 31 and a plurality of inclined baffle plates 32 fixed to an inner side of the outer frame 31, with a gap between every two inclined baffle plates 32. An activated-carbon adsorption layer 4, a filter element layer 5 and a pleated layer 6 are sequentially provided between the oil-separating plate 3 and the grid plate 11. The gas passes through the activated-carbon adsorption layer 4, the filter element layer 5 and the pleated layer in sequence, and most dust can be adsorbed, providing an excellent dust-removal effect. A front end of the front cover plate 2 is provided with a plurality of umbrella-shaped protrusions 21, and a bottom edge of each umbrella-shaped protrusion 21 is provided with a plurality of air-permeable holes 22. When gas passes through the front cover plate 2, most of the gas first contacts the front ends of the umbrella-shaped protrusions 21 before entering the air-permeable holes 22, and oily liquid is blocked and remains at the front ends of the umbrella-shaped protrusions 21; when the gas passes through the oil-separating plate 3, due to the blocking action of the inclined baffle plates 32, part of the oily liquid is blocked and remains on the inclined baffle plates 32, thus achieving a relatively good oil-separating effect. The oily liquid in the gas can be blocked to a relatively great extent, preventing a large amount of oily liquid from entering the filter element layer 5 and prolonging the service life of the filter element layer 5.

[0020] Preferably, in order to improve the sealing effect at edges of the oil-separating plate 3, an inner side face of the clearance groove is further provided with a silicone cushion layer 7.

[0021] Preferably, the grid plate 11 is a metal mesh. The metal mesh has relatively high hardness and can protect the pleated layer 6, preventing the pleated layer 6 from being damaged or deformed by relatively large air pressure.

[0022] Preferably, the filter element layer 5 is made of honeycomb sponge. The honeycomb sponge has an excellent filtering effect and can adsorb most of the dust.

[0023] Preferably, the pleated layer 6 is a pleated polyester fiber filter mesh.

[0024] The above embodiments only illustrate one embodiment of the present utility model, and the description thereof is relatively specific and detailed, but it should not be construed as limiting the patent scope of the present utility model. It should be noted that those of ordinary skill in the art may make various modifications and improvements without departing from the concept of the present utility model, and these all fall within the protection scope of the present utility model. Therefore, the patent protection scope of the present utility model shall be subject to the appended claims.

DRAWINGS

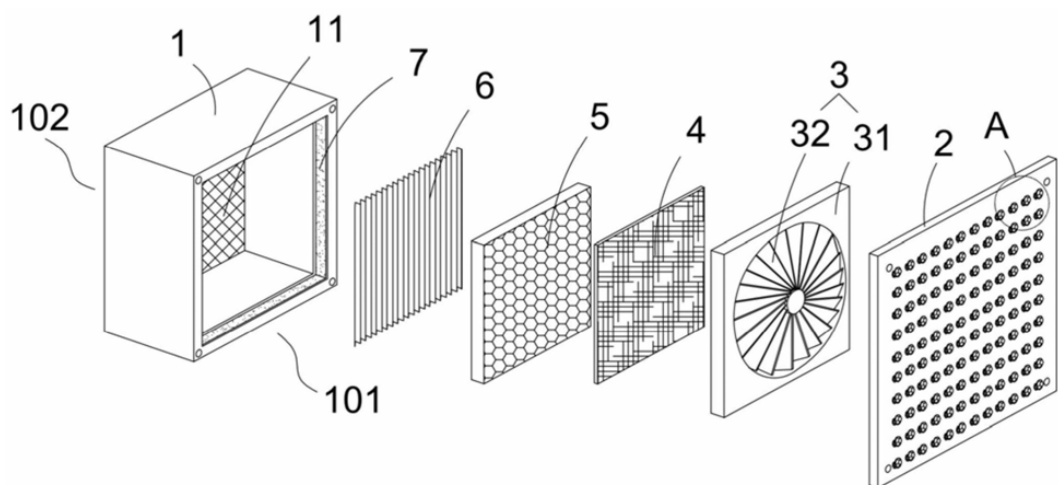


FIG. 1 — Structural schematic view of the oil-separating primary filter

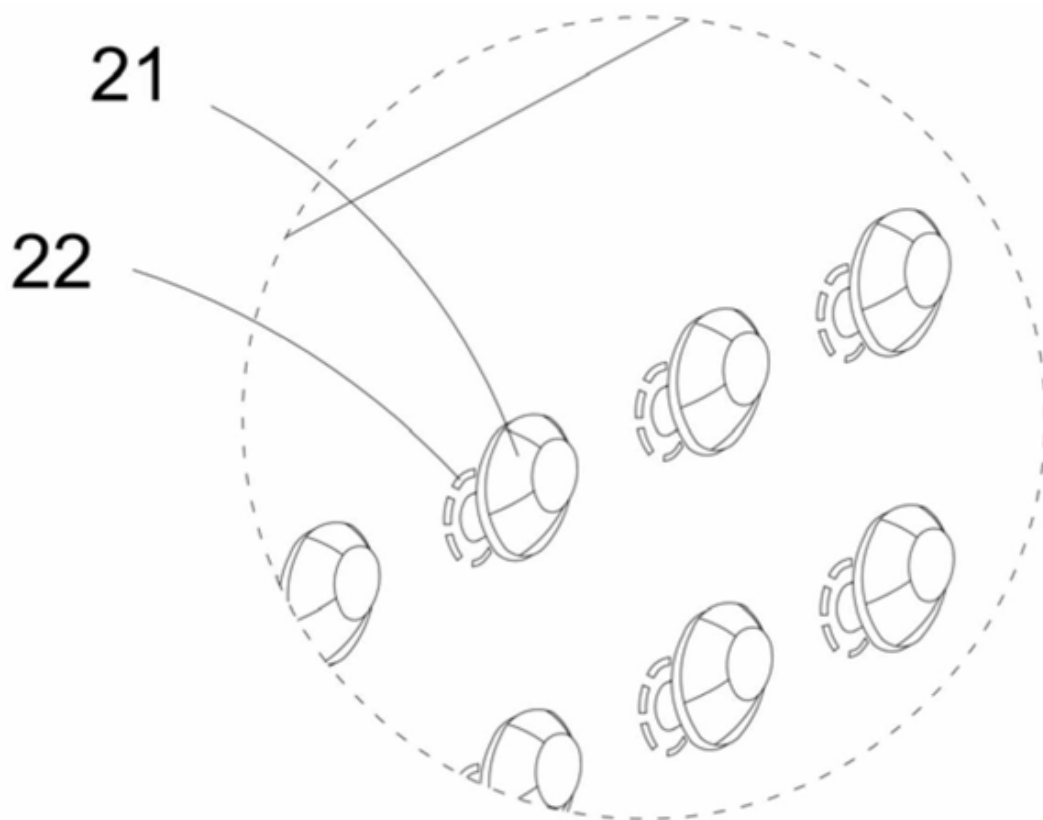


FIG. 2 — Enlarged view of part A in FIG. 1