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(54) SEPARATOR, RANGE HOOD, AND RANGE HOOD AND COOKER ALL-IN-ONE MACHINE

(57) The present application provides a separator, a range hood, and a range hood and cooker all-in-one machine. The separator comprises: a housing provided with an inlet and an outlet; a filtering portion provided within the housing, wherein the filtering portion and the inner surface of the housing enclose a first cavity and a second cavity, the first cavity and the second cavity are located at different sides of the filtering portion, the first cavity communicates with the inlet, and the second cavity communicates with the outlet; the filtering portion comprises a first draining wall and a second draining wall, the first draining wall comprises a first end and a second end arranged opposite to each other, the second draining wall comprises a third end and a fourth end arranged opposite to each other, the first end is away from the third end, the second end is proximal to the fourth end, and the inlet is located between the first end and the third end.

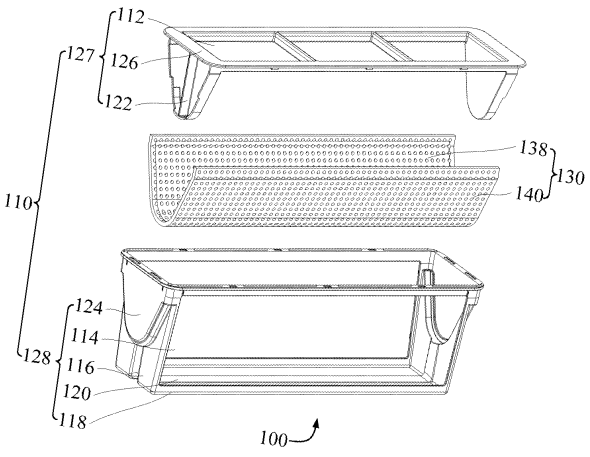

FIG. 3

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Description

FIELD

[0001] The present application relates to the technical field of filtering devices, and specifically, relates to a separator, a range hood, and a range hood and cooker all-in-one machine.

BACKGROUND

[0002] In related art, a separator comprises a filter screen, while the structure of the filter screen is not reasonably arranged, the filtering area of the filter screen is relatively small, oil adheres to the filter screen and cannot fall off easily, and then the filtering effect of the separator is poor.

SUMMARY

[0003] The present application aims to solve at least one of the technical problems in the prior art or related art.

[0004] Therefore, the first aspect of the present application provides a separator.

[0005] The second aspect of the present application provides a range hood.

[0006] The third aspect of the present application provides a range hood and cooker all-in-one machine.

[0007] In view of this, the first aspect of the present application provides a separator, comprising: a housing, provided with an inlet and an outlet; a filtering portion, provided within the housing, wherein the filtering portion and the inner surface of the housing enclose a first cavity and a second cavity, the first cavity and the second cavity are located at different sides of the filtering portion, the first cavity communicates with the inlet, and the second cavity communicates with the outlet; the filtering portion comprises a first draining wall and a second draining wall, the first draining wall comprises a first end and a second end arranged opposite to each other, the second draining wall comprises a third end and a fourth end arranged opposite to each other, the first end is away from the third end, the second end is proximal to the fourth end, and the inlet is located between the first end and the third end.

[0008] The separator provided in the present application comprises the housing and the filtering portion. The housing is provided with the inlet and the outlet. The filtering portion is provided within the housing, and the filtering portion and the inner surface of the housing enclose the first cavity and the second cavity.

[0009] Specifically, a first side of the filtering portion and the inner surface of the housing enclose the first cavity, and a second side of the filtering portion and the inner surface of the housing enclose the second cavity, that is, the first cavity and the second cavity are located at the two opposite sides of the filtering portion.

[0010] It can be understood that the housing is provided with the inlet and the outlet, the inlet communicates with the first cavity, the outlet communicates with the second cavity, and the filtering portion communicates with the first cavity and the second cavity.

[0011] Oil fume enters the first cavity via the inlet of the housing, and enters the second cavity via the filtering portion after being filtered by the filtering portion, and then is discharged out of the separator via the outlet. Wherein, the oil fume flows through the filtering portion, the oil particles and water vapor contained in the oil fume will adhere to the filtering portion, then the function of separating oil and oil fume is achieved, and smoke subjected to the filtration of the filtering portion will flow out of the separator via the outlet of the housing, and this lowers the influence of the discharged oil fume on the environment.

[0012] Furthermore, the filtering portion comprises the first draining wall and the second draining wall, the first draining wall comprises the first end and the second end, the first end and the second end are arranged opposite to each other, the second draining wall comprises the third end and the fourth end, and the third end and the fourth end are arranged opposite to each other.

[0013] The first end of the first draining wall is away from the third end of the second draining wall, the second end of the first draining wall is proximal to the fourth end of the second draining wall, and the inlet is located between the first end and the third end. That is, along the direction deviating from the inlet, the distance between the first draining wall and the second draining wall decreases gradually.

[0014] This arrangement enables that the filtering portion can form a sufficiently large filtering area in a relatively small space, to ensure that the filtering portion has an enough filtering area for filtering the oil fume to improve a filtering efficiency. In addition, this arrangement enables that the oil adhering to the filtering portion after filtration can more easily flow downward along the first draining wall and the second draining wall of the filtering portion, and is finally collected in the housing, and this decreases the oil adhering to the filtering portion, and can lower the cleaning frequency of the filtering portion and can also ensure the filtering effect of the filtering portion. Moreover, the first draining wall and the second draining wall are arranged inclined, and the first draining wall and the second draining wall are arranged to form a certain angle (not a right angle) with respect to an air intake direction, and then this can increase the probability that the oil fume collides with and contacts the filtering portion, and thus can increase the probability that the oil adheres to the filtering portion, and then can improve the filtering efficiency.

[0015] The above separator according to the present application can also have the following additional technical features.

[0016] In the above embodiment, furthermore, the housing comprises a side wall and a bottom wall, the side wall is connected to the circumferential side of the bottom wall, the side wall is provided with an outlet, and the por-

tion of the side wall located between the outlet and the bottom wall and the bottom wall enclose a liquid storage area; the filtering portion and the bottom wall are spaced apart, the second end of the filtering portion is closer to the liquid storage area than the first end, and the fourth end of the filtering portion is closer to the liquid storage area than the third end.

[0017] In the embodiment, the housing comprises the bottom wall and the side wall, the side wall is connected to the circumferential side of the bottom wall, and the side wall is provided with the outlet, that is, the side wall is used as a carrier of the outlet. The side wall is provided with the outlet, the outlet and the bottom wall are spaced apart, and the bottom wall and the side wall enclose a groove structure. In other words, the side wall is provided with the outlet, there is a distance between the outlet and the bottom wall, and the portion of the side wall located between the outlet and the bottom wall and the bottom wall enclose the liquid storage area.

[0018] When the oil adhering to the filtering portion increases, the oil and condensed water will flow to the liquid storage area along the surface of the filtering portion, and thus the oil can be collected in the liquid storage area.

[0019] Furthermore, the second end of the filtering portion is closer to the liquid storage area than the first end, and the fourth end of the filtering portion is closer to the liquid storage area than the third end, that is, the relatively large portion of an area enclosed by the filtering portion is proximal to the inlet, the relatively small portion of the area enclosed by the filtering portion is proximal to the liquid storage area, and thus, the oil particles and water vapor adhering to the filtering portion will be effectively drained to the liquid storage area along the filtering portion, and this has a good draining effect.

[0020] Specifically, the filtering portion is arranged in a U shape.

[0021] In any of the above embodiments, furthermore, the top wall of the housing is provided with at least a portion of the inlet.

[0022] In the embodiment, the position of the inlet is further defined, specifically, the housing further comprises the top wall, the side wall is connected between the top wall and the bottom wall, and at least a portion of the inlet is provided in the top wall. That is, the inlet is wholly provided in the top wall of the housing, or a portion of the inlet is provided in the top wall of the housing, and the other portion of the inlet is provided in the side wall of the housing.

[0023] As the top wall of the housing is provided with at least a portion of the inlet, the side wall of the housing is provided with the outlet, that is, at least a portion of the inlet and the outlet are located at different sides of the housing, thus, this can prolong the flow path of the oil fume in the housing, and the oil fume can fully contact the filtering portion, and this helps increase the probability that the oil fume collides with and contacts the filtering portion, and can increase the probability that the oil fume adheres to the filtering portion, and improves the filtering efficiency.

[0024] In any of the above embodiments, furthermore, the included angle between the first draining wall and the second draining wall is greater than or equal to 30° and is less than or equal to 150°.

[0025] In the embodiment, the cooperating structure of the first draining wall and the second draining wall is further defined, specifically, the included angle between the first draining wall and the second draining wall is greater than or equal to 30° and is less than or equal to 150°, that is, the inclined angle of the first draining wall and the second draining wall is defined, and this arrangement enables that the filtering portion can form a sufficiently large filtering area in a relatively small space, to ensure that the filtering portion has an enough filtering area for filtering the oil fume to improve a filtering efficiency. In addition, this arrangement enables that the oil adhering to the filtering portion after filtration can more easily flow downward along the first draining wall and the second draining wall of the filtering portion, and is finally collected in the housing, and this decreases the oil adhering to the filtering portion, and can lower the cleaning frequency of the filtering portion and can also ensure the filtering effect of the filtering portion. Moreover, the first draining wall and the second draining wall are arranged inclined, and the first draining wall and the second draining wall are arranged to form a certain angle (not a right angle) with respect to the air intake direction, and then this can increase the probability that the oil fume collides with and contacts the filtering portion, and thus can increase the probability that the oil adheres to the filtering portion, and then can improve the filtering efficiency.

[0026] In any of the above embodiments, the filtering portion is bent to form the first draining wall and the second draining wall.

[0027] In the embodiment, the structure of the filtering portion is further defined, and the filtering portion is bent to form the first draining wall and the second draining wall, that is, the filtering portion integrally forms the first draining wall and the second draining wall, as this structure arrangement saves the assembling procedure of the first draining wall and the second draining wall, then the assembling and subsequent disassembling procedures of the first draining wall and the second draining wall are simplified, which helps improve the assembling and disassembling efficiency, and then can lower production and maintenance costs. In addition, the filtering portion is bent to form the first draining wall and the second draining wall, and then this can ensure the requirement for the precision of the size of the filtering portion.

[0028] In any of the above embodiments, furthermore, the filtering portion comprises multiple layers of filter screens arranged in a stacked manner.

[0029] In the embodiment, the structure of the filtering portion is further defined, specifically, the filtering portion comprises multiple layers of filter screens arranged in a stacked manner, and this arrangement can increase the thickness of the filtering portion, and helps decrease the

meshes of the filtering portion, and the oil can more easily adhere to the filtering portion, and then this arrangement helps improve the filtering effect of the filtering portion.

[0030] In any of the above embodiments, furthermore, at least a portion of the outer edge of the filtering portion is bent.

[0031] In the embodiment, the structure of the filtering portion is further defined, and at least a portion of the outer edge of the filtering portion is bent.

[0032] Specifically, at least one of the first end of the first draining wall, the second end of the first draining wall, the third end of the second draining wall, the fourth end of the second draining wall, the end portion of the portion of the filtering portion located between the first end and the second end, and the end portion of the portion of the filtering portion located between the third end and the fourth end is bent.

[0033] Specifically, the outer edge of the filtering portion comprises multiple sides, and at least one side of the multiple sides is bent.

[0034] This arrangement can enhance the structural strength of the filtering portion, the multiple layers of filter screens will not scatter, and the overall binding strength of the multiple layers of filter screens is enhanced. In addition, this arrangement enables that the outer edge of the multiple layers of filter screens forms an integral structure, therefore, the outer edge of the filtering portion does not hurt hands, and this facilitates the assembling of the filtering portion and the housing, and helps simplify the assembling difficulty of the separator and helps improve the assembling efficiency of the separator.

[0035] In any of the above embodiments, furthermore, the multiple layers of filter screens at least comprise: a first filter screen; and a second filter screen stacked on one side of the first filter screen away from the inlet, wherein the thickness of the second filter screen is greater than that of the first filter screen.

[0036] In the embodiment, the types of the multiple layers of filter screens are classified, and the multiple layers of filter screens at least comprise the first filter screen and the second filter screen, wherein, the thickness of the second filter screen is greater than that of the first filter screen, that is, the rigidity and the strength of the second filter screen are greater than those of the first filter screen. The second filter screen is placed on the outer side of the first filter screens, or, the first filter screens are placed at the inner side of the second filter screen. The second filter screen has a function of supporting and fixing the first filter screens, and the second filter screen can protect the first filter screens and lower the probability that the first filter screens deform under the effect of an external force. The filtering effect of the filtering portion can be ensured.

[0037] In any of the above embodiments, furthermore, there are multiple layers of first filter screens, and the multiple layers of first filter screens are stacked at one side of the second filter screen.

[0038] In the embodiment, it is defined that there are multiple layers of first filter screens, and it is defined that the cooperating structure of the multiple layers of first filter screens and the second filter screen is to stack the multiple layers of first filter screens at one side of the second filter screen, the second filter screen will protect the multiple layers of first filter screens at its inner side, and the multiple layers of first filter screens will not deform under the effect of an external force. The thickness of the first filter screen is less than that of the second filter screens, that is, the number of the first filter screen with a less thickness is greater than that of the second filter screen with a greater thickness, and this arrangement helps lower the thickness of the filtering portion while ensures the filtering effect of the filtering portion.

[0039] In any of the above embodiments, furthermore, the multiple layers of filter screens further comprise a third filter screen, and the first filter screens are stacked between the second filter screens and the third filter screen, and the thickness of the third filter screen is greater than that of the first filter screens.

[0040] In the embodiment, the types of the multiple layers of filter screens are further classified, and the multiple layers of filter screens further comprise the third filter screen, and the first filter screens are clamped between the second filter screen and the third filter screen. That is, the second filter screen and the third filter screen will protect the first filter screens located at their inner sides, and the first filter screens will not deform under the effect of an external force. The thickness of the first filter screen is less than that of the third filter screen, that is, the rigidity and the strength of the third filter screen are better than those of the first filter screen. The third filter screen is placed on the outer side of the first filter screens, or, the first filter screens are placed at the inner side of the third filter screen. The third filter screen has a function of supporting and fixing the first filter screens, and the third filter screen can protect the first filter screens and lower the probability that the first filter screens deform under the effect of an external force. The filtering effect of the filtering portion can be ensured.

[0041] In any of the above embodiments, furthermore, any of the second filter screen and the third filter screen is greater than or equal to 0.3mm and is less than or equal to 0.8mm, and the thickness of the first filter screen is greater than or equal to 0.2mm and is less than or equal to 0.8mm; the mesh of any of the second filter screen and the third filter screen is recorded as a first mesh, the mesh of the first filter screen is recorded as a second mesh, the length of the first mesh in a first direction is W1, the length of the first mesh in a second direction is recorded as W2, along a third direction the distance between any two adjacent first meshes is recorded as W3, the length of the second mesh in the first direction is recorded as W4, the length of the second mesh in the second direction is recorded as W5, along the third direction the distance between any two adjacent second meshes is recorded as W6, wherein, $3mm \leq W1 \leq 8mm$, $3mm \leq W2 \leq 8mm$, $0.3mm \leq W3 \leq 2mm$, $2mm \leq W4 \leq 7mm$,

2mm≤W5≤7mm, 0.2mm≤W6≤2mm.

[0042] In the embodiment, the thickness relation of the second filter screen and the third filter screen is defined, specifically, the thickness of the second filter screen is greater than or equal to 0.3mm and is less than or equal to 0.8mm, and the thickness of the third filter screen is greater than or equal to 0.3mm and is less than or equal to 0.8mm. Wherein, the thickness of the second filter screen comprises 0.4mm, 0.5mm, 0.6mm, 0.7mm, etc., and is not listed herein one by one. Wherein, the thickness of the third filter screen comprises 0.4mm, 0.5mm, 0.6mm, 0.7mm, etc., and is not listed herein one by one.

[0043] Furthermore, the thickness of the first filter screen is greater than or equal to 0.2mm and is less than or equal to 0.8mm, for example, the thickness of the first filter screen comprises 0.3mm, 0.4mm, 0.5mm, 0.6mm, 0.7mm, etc., and is not listed herein one by one.

[0044] Furthermore, the mesh of any of the second filter screen and the third filter screen is recorded as the first mesh, the mesh of the first filter screen is recorded as the second mesh.

[0045] The length of the first mesh in the first direction is W1, the length of the first mesh in the second direction is recorded as W2, and along the third direction the distance between any two adjacent first meshes is recorded as W3, wherein, 3mm≤W1≤8mm, 3mm≤W2≤8mm, 0.3mm≤W3≤2mm.

[0046] The length of the second mesh in the first direction is recorded as W4, the length of the second mesh in the second direction is recorded as W5, and along the third direction the distance between any two adjacent second meshes is recorded as W6, wherein, 2mm≤W4≤7mm, 2mm≤W5≤7mm, 0.2mm≤W6≤2mm.

[0047] In any of the above embodiments, furthermore, each layer of filter screen comprises a mesh area, and the mesh areas of any two adjacent layers of filter screens are in a staggered arrangement.

[0048] In the embodiment, the cooperating structure of the multiple layers of filter screens is further defined, specifically, each layer of filter screen comprises the mesh area, and the mesh areas of any two adjacent layers of filter screens are in a staggered arrangement, therefore, the multiple layers of stacked mesh areas enclose a dense screen with a relatively small mesh, which has a relatively fine filtering effect to the oil.

[0049] Specifically, two adjacent layers of mesh areas are respectively recorded as a first mesh area and a second mesh area, the second mesh area rotates a certain angle with respect to the first mesh area and is stacked, for example, the second mesh area rotates 30°, 45°, 60°, 90°, or etc., with respect to the first mesh area, which is not listed herein one by one. Therefore, the first mesh area and the second mesh area will shelter each other, and then a smaller mesh is formed. When the number of the filter screens is greater than two layers, multiple layers of mesh areas are stacked and then a filtering portion with a tiny mesh will be obtained.

[0050] For example, when the filtering portion comprises four layers of filter screens, the four layers of mesh areas are stacked in an order of 0°, 90°, 0° and 90°, and then the filtering portion with a tiny mesh can be formed.

[0051] Specifically, two adjacent layers of mesh areas are respectively recorded as the first mesh area and the second mesh area, and the second mesh area moves a certain distance with respect to the first mesh area and then is staggered. That is, two adjacent layers of mesh areas translate and are staggered by a certain distance and are stacked, thus, the first mesh area and the second mesh area will shelter each other, and then a smaller mesh is formed. When the number of the filter screens is greater than two layers, multiple layers of mesh areas are stacked and then the filtering portion with a tiny mesh will be obtained.

[0052] For example, when the filtering portion comprises four layers of filter screens, the four layers of mesh areas are stacked by a displacement of 0mm, 5mm, 0mm and 5mm, and then the filtering portion with a tiny mesh can be formed.

[0053] In any of the above embodiments, furthermore, the top wall of the housing is provided with the inlet and multiple support frames, and the side wall is provided with multiple inserting grooves; the multiple support frames are spaced apart along the circumferential direction of the top wall, and each support frame is inserted into one inserting groove, and a portion of the outer edge of the filtering portion is clamped between the support frame and the inserting groove.

[0054] In the embodiment, the side wall is connected to the bottom wall, and the side wall is arranged along the circumferential direction of the bottom wall, the end portion of the side wall deviating from the bottom wall encloses an opening, the top wall of the housing can cover the opening, that is, the top wall can seal the opening, and the oil fume will not enter the cavities via the connection of the top wall and the side wall, and can only enter the housing via the inlet, and the oil fume entering the separator needs to flow through the filtering portion and then can flow out of the separator via the outlet. This arrangement can ensure the separating effect of the separator.

[0055] Furthermore, through reasonably arranging the cooperating structure of the side wall and the support frames, the side wall is provided with multiple inserting grooves, and each support frame cooperates with one inserting groove.

[0056] The filtering portion is respectively inserted into the inserting grooves, the multiple support frames of the top wall are inserted into the inserting grooves, and the filtering portion is clamped between the support frames and the inserting grooves. This arrangement can meet the detachable use requirement for the filtering portion and the housing.

[0057] Specifically, the filter screen comprises a stainless-steel filter screen, an aluminum alloy filter screen or an activated carbon screen, that is, the filter screen is a filter member with tiny holes, when the oil fume passes

the filtering portion, the oil in the oil fume collides with the tiny holes of the filtering portion and adheres to the filtering portion, and therefore, the effect of filtering the oil can be achieved. The oil is left on the filtering portion and gradually drips down under the effect of gravity, and is collected in the liquid storage area, and this is convenient for the regular cleaning of a user.

[0058] The second aspect of the present application provides a range hood, comprising the separator according to any of the embodiments in the first aspect.

[0059] The range hood provided in the present application comprises the separator; as the range hood comprises the separator in the first aspect, it has all the beneficial effects of the above separator, which are not repeated herein.

[0060] The third aspect of the present application provides a range hood and cooker all-in-one machine, comprising: a cooking stove provided with an air inlet; an air duct structure connected to the air inlet; a fan assembly provided within the air duct structure; and the separator in any of the embodiments according to the first aspect, wherein the separator is provided at the air duct structure, and is located at the air inlet.

[0061] The range hood and cooker all-in-one machine provided in the present application comprises the cooking stove, the air duct structure, the fan assembly and the separator. As the range hood and cooker all-in-one machine comprises the separator in the first aspect, it has all the beneficial effects of the above separator, which are not repeated herein.

[0062] The additional aspects and advantages of the present application will be obvious in the following description, or can be understood through the implementation of the present application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0063] The above and/or additional aspects and advantages of the present application will be obvious and understood easily from the following description of the embodiments in combination with the accompanying drawings. Wherein,

FIG. 1 is an exploded view of a range hood and cooker all-in-one machine of an embodiment of the present application;

FIG. 2 is a sectional view of a range hood and cooker all-in-one machine of an embodiment of the present application;

FIG. 3 is an exploded view of a separator of an embodiment of the present application;

FIG. 4 is a sectional view of a separator of an embodiment of the present application;

FIG. 5 is a schematic view of the structure of a filtering portion of an embodiment of the present application;

FIG. 6 is a schematic view of the structure of a filtering portion of a first embodiment of the present application;

FIG. 7 is a schematic view of the structure of a filtering portion of a second embodiment of the present application;

FIG. 8 is a schematic view of a portion of the structure of a first filter screen of an embodiment of the present application;

FIG. 9 is a schematic view of a portion of the structure of a second filter screen of an embodiment of the present application;

FIG. 10 is an exploded view of the filtering portion of the first embodiment of the present application;

FIG. 11 is an exploded view of the filtering portion of the second embodiment of the present application;

FIG. 12 is a schematic view of the structure of a first mesh area of the first embodiment of the present application;

FIG. 13 is a schematic view of the structure of a second mesh area of the first embodiment of the present application;

FIG. 14 is a schematic view of the structure of the first mesh area and the second mesh area of the first embodiment of the present application;

FIG. 15 is a schematic view of the structure of the first mesh area of the second embodiment of the present application;

FIG. 16 is a schematic view of the structure of the second mesh area of the second embodiment of the present application; and

FIG. 17 is a schematic view of the structure of the first mesh area and the second mesh area of the second embodiment of the present application.

[0064] Wherein, the corresponding relationships between the reference signs and the component names in FIG.1 to FIG. 17 are as follows:

100 separator; 110 housing; 112 inlet; 114 outlet; 116 side wall; 118 bottom wall; 120 liquid storage area; 122 support frame; 124 inserting groove; 126 top wall; 127 cover body; 128 seat body; 130 filtering portion; 132 first filter screen; 134 second filter screen; 136 third filter screen; 138 first draining wall; 140 second draining wall; 142 mesh area; 144 first mesh area; 146 second mesh area; 150 first cavity; 160 second cavity; 200 range hood and cooker all-in-one machine; 210 cooking stove; 212 air inlet; 220 air duct structure; 230 fan assembly; 232 electric motor; and 234 wind wheel.

DETAILED DESCRIPTION OF THE APPLICATION

[0065] To more clearly understand the above purposes, features and advantages of the present application, the present application will be further detailed hereinafter in combination with the accompanying drawings and embodiments. It should be indicated that in the case of no conflict, the embodiments and the features in the embodiments of the present application can be combined with each other.

[0066] Many details are illustrated in the following de-

scription for the convenience of a thorough understanding to the present application, but the present application can also be implemented using other embodiments other than these described herein. Therefore, the protection scope of the present application is not limited to the specific embodiments disclosed in the following text.

[0067] A separator 100, a range hood and a range hood and cooker all-in-one machine 200 according to some embodiments of the present application are described hereinafter by referring to FIG. 1 to FIG. 17.

[0068] As shown in FIG. 1, FIG. 2, FIG. 3, FIG. 4, FIG. 5, FIG. 6 and FIG. 7, the separator 100 according to some embodiments of the present application comprises a housing 110 and a filtering portion 130.

[0069] The housing 110 is provided with an inlet 112 and an outlet 114.

[0070] The filtering portion 130 is provided within the housing 110, and the filtering portion 130 and the inner surface of the housing 110 enclose a first cavity 150 and a second cavity 160.

[0071] The first cavity 150 and the second cavity 160 are located at different sides of the filtering portion 130.

[0072] The first cavity 150 communicates with the inlet 112.

[0073] The second cavity 160 communicates with the outlet 114.

[0074] The filtering portion 130 comprises a first draining wall 138 and a second draining wall 140.

[0075] The first draining wall 138 comprises a first end and a second end arranged opposite to each other.

[0076] The second draining wall 140 comprises a third end and a fourth end arranged opposite to each other.

[0077] The first end is away from the third end, the second end is proximal to the fourth end, and the inlet 112 is located between the first end and the third end.

[0078] In this embodiment, the separator 100 comprises the housing 110 and the filtering portion 130. The housing 110 is provided with the inlet 112 and the outlet 114. The filtering portion 130 is provided within the housing 110, and the filtering portion 130 and the inner surface of the housing 110 enclose the first cavity 150 and the second cavity 160.

[0079] Specifically, a first side of the filtering portion 130 and the inner surface of the housing 110 enclose the first cavity 150, and a second side of the filtering portion 130 and the inner surface of the housing 110 enclose the second cavity 160, that is, the first cavity 150 and the second cavity 160 are located at the two opposite sides of the filtering portion 130.

[0080] It can be understood that the housing 110 is provided with the inlet 112 and the outlet 114, the inlet 112 communicates with the first cavity 150, the outlet 114 communicates with the second cavity 160, and the filtering portion 130 communicates with the first cavity 150 and the second cavity 160.

[0081] Oil fume enters the first cavity 150 via the inlet 112 of the housing 110, and enters the second cavity 160 via the filtering portion 130 after being filtered by the filtering portion 130, and then is discharged out of the separator 100 via the outlet 114. Wherein, the oil fume flows through the filtering portion 130, the oil particles and water vapor contained in the oil fume will adhere to the filtering portion 130, then the function of separating oil and oil fume is achieved, and smoke subjected to the filtration of the filtering portion 130 will flow out of the separator 100 via the outlet 114 of the housing 110, and this lowers the influence of the discharged oil fume on the environment.

[0082] Furthermore, the filtering portion 130 comprises the first draining wall 138 and the second draining wall 140, the first draining wall 138 comprises the first end and the second end, the first end and the second end are arranged opposite to each other, the second draining wall 140 comprises the third end and the fourth end, and the third end and the fourth end are arranged opposite to each other.

[0083] The first end of the first draining wall 138 is away from the third end of the second draining wall 140, the second end of the first draining wall 138 is proximal to the fourth end of the second draining wall 140, and the inlet 112 is located between the first end and the third end. That is, along the direction deviating from the inlet 112, the distance between the first draining wall 138 and the second draining wall 140 decreases gradually.

[0084] This arrangement enables that the filtering portion 130 can form a sufficiently large filtering area in a relatively small space, to ensure that the filtering portion 130 has an enough filtering area for filtering the oil fume to improve a filtering efficiency. In addition, this arrangement enables that the oil adhering to the filtering portion 130 after filtration can more easily flow downward along the first draining wall 138 and the second draining wall 140 of the filtering portion 130, and is finally collected in the housing 110, and this decreases the oil adhering to the filtering portion 130, and can lower the cleaning frequency of the filtering portion 130 and can also ensure the filtering effect of the filtering portion 130. Moreover, the first draining wall 138 and the second draining wall 140 are arranged inclined, and the first draining wall 138 and the second draining wall 140 are arranged to form a certain angle (not a right angle) with respect to an air intake direction, and then this can increase the probability that the oil fume collides with and contacts the filtering portion 130, and thus can increase the probability that the oil adheres to the filtering portion 130, and then can improve the filtering efficiency.

[0085] Specifically, the arrows in FIG. 2 and FIG. 4 indicate the flow direction of the oil fume.

[0086] In some embodiments, as shown in FIG. 3 and FIG. 4, the housing 110 comprises the side wall 116 and the bottom wall 118, and the side wall 116 is connected to the circumferential side of the bottom wall 118.

[0087] The side wall 116 is provided with an outlet 114.

[0088] The portion of the side wall 116 located between the outlet 114 and the bottom wall 118 and the bottom wall 118 enclose a liquid storage area 120.

[0089] The filtering portion 130 and the bottom wall 118 are spaced apart.

[0090] The second end of the filtering portion 130 is closer to the liquid storage area 120 than the first end, and the fourth end of the filtering portion 130 is closer to the liquid storage area 120 than the third end.

[0091] In the embodiment, the housing 110 comprises the bottom wall 118 and the side wall 116, the side wall 116 is connected to the circumferential side of the bottom wall 118, and the side wall 116 is provided with the outlet 114, that is, the side wall 116 is used as a carrier of the outlet 114. The side wall 116 is provided with the outlet 114, the outlet 114 and the bottom wall 118 are spaced apart, and the bottom wall 118 and the side wall 116 enclose a groove structure. In other words, the side wall 116 is provided with the outlet 114, there is a distance between the outlet 114 and the bottom wall 118, and the portion of the side wall 116 located between the opening and the bottom wall 118 and the bottom wall 118 enclose the liquid storage area 120.

[0092] When the oil adhering to the filtering portion 130 increases, the oil and condensed water will flow to the liquid storage area 120 along the surface of the filtering portion 130, and thus the oil can be collected in the liquid storage area 120.

[0093] Furthermore, the second end of the filtering portion 130 is closer to the liquid storage area 120 than the first end, and the fourth end of the filtering portion 130 is closer to the liquid storage area 120 than the third end, that is, the relatively large portion of a area enclosed by the filtering portion 130 is proximal to the inlet 112, the relatively small portion of the area enclosed by the filtering portion 130 is proximal to the liquid storage area 120, and thus, the oil particles and water vapor adhering to the filtering portion 130 will be effectively drained to the liquid storage area 120 along the filtering portion 130, and this has a good draining effect.

[0094] Specifically, the filtering portion 130 is arranged in a U shape.

[0095] In some embodiments, as shown in FIG. 2, FIG. 3 and FIG. 4, the top wall 126 of the housing 110 is provided with at least a portion of the inlet 112.

[0096] In this embodiment, the position of the inlet 112 is further defined, specifically, the housing 110 further comprises the top wall 126, the side wall 116 is connected between the top wall 126 and the bottom wall 118, and at least a portion of the inlet 112 is provided in the top wall 126. That is, the inlet 112 is wholly provided in the top wall 126 of the housing 110, or a portion of the inlet 112 is provided in the top wall 126 of the housing 110, and the other portion of the inlet 112 is provided in the side wall 116 of the housing 110.

[0097] As the top wall 126 of the housing 110 is provided with at least a portion of the inlet 112, the side wall 116 of the housing 110 is provided with the outlet 114, that is, at least a portion of the inlet 112 and the outlet 114 are located at different sides of the housing 110, thus, this can prolong the flow path of the oil fume in the housing 110, and the oil fume can fully contact the filtering portion 130, and this helps increase the probability that the oil fume collides with and contacts the filtering portion 130, and can increase the probability that the oil fume adheres to the filtering portion 130, and improves the filtering efficiency.

[0098] In some embodiments, as shown in FIG. 5, the included angleα between the first draining wall 138 and the second draining wall 140 is greater than or equal to 30° and is less than or equal to 150°.

[0099] In this embodiment, the cooperating structure of the first draining wall 138 and the second draining wall 140 is further defined, specifically, the included angle between the first draining wall 138 and the second draining wall 140 is greater than or equal to 30° and is less than or equal to 150°, that is, the inclined angle of the first draining wall 138 and the second draining wall 140 is defined, and this arrangement enables that the filtering portion 130 can form a sufficiently large filtering area in a relatively small space, to ensure that the filtering portion 130 has an enough filtering area for filtering the oil fume to improve a filtering efficiency. In addition, this arrangement enables that the oil adhering to the filtering portion 130 after filtration can more easily flow downward along the first draining wall 138 and the second draining wall 140 of the filtering portion 130, and is finally collected in the housing 110, and this decreases the oil adhering to the filtering portion 130, and can lower the cleaning frequency of the filtering portion 130 and can also ensure the filtering effect of the filtering portion 130. Moreover, the first draining wall 138 and the second draining wall 140 are arranged inclined, and the first draining wall 138 and the second draining wall 140 are arranged to form a certain angle (not a right angle) with respect to the air intake direction, and then this can increase the probability that the oil fume collides with and contacts the filtering portion 130, and thus can increase the probability that the oil adheres to the filtering portion 130, and then can improve the filtering efficiency.

[0100] Specifically, the value of the included angle α between the first draining wall 138 and the second draining wall 140 contains 40°, 50°, 60°, 70°, 80°, 90°, 100°, 110°, 120°, 130°, 140°, etc., which is not listed one by one herein.

[0101] In some embodiments, the filtering portion 130 is bent to form the first draining wall and the second draining wall 140.

[0102] In this embodiment, the structure of the filtering portion 130 is further defined, and the filtering portion 130 is bent to form the first draining wall and the second draining wall 140, that is, the filtering portion 130 integrally forms the first draining wall 138 and the second draining wall 140, as this structure arrangement saves the assembling procedure of the first draining wall and the second draining wall 140, then the assembling and subsequent disassembling procedures of the first draining wall and the second draining wall 140 are simplified, which helps improve the assembling and disassembling efficiency,

and then can lower production and maintenance costs. In addition, the filtering portion 130 is bent to form the first draining wall and the second draining wall 140, and then this can ensure the requirement for the precision of the size of the filtering portion 130.

[0103] In some other embodiments, the first draining wall 138 and the second draining wall 140 are detachably connected, and the detachable connection manner of the first draining wall 138 and the second draining wall 140 comprises while is not limited to the following types: a snapped connection, a threaded connection, magnetic absorption and a fastening connection through a fastener (for example, a screw, a bolt, or a rivet). The first draining wall 138 and the second draining wall 140 are detachably connected, that is, the assembling and dissembling of the first draining wall 138 and the second draining wall 140 and the assembling positions of the first draining wall 138 and the second draining wall 140 can be decided according to actual circumstances, and this can meet the use needs of different models of separators 100, achieves good product adaptability, and improves the use performance of products.

[0104] In some embodiments, as shown in FIG. 10 and FIG. 11, the filtering portion 130 comprises multiple layers of filter screens arranged in a stacked manner.

[0105] In this embodiment, the structure of the filtering portion 130 is further defined, specifically, the filtering portion 130 comprises multiple layers of filter screens arranged in a stacked manner, and this arrangement can increase the thickness of the filtering portion130, and helps decrease the meshes of the filtering portion 130, and the oil can more easily adhere to the filtering portion 130, and then this arrangement helps improve the filtering effect of the filtering portion 130.

[0106] In some embodiments, as shown in FIG. 6 and FIG. 7, at least a portion of the outer edge of the filtering portion 130 is bent.

[0107] In this embodiment, the structure of the filtering portion 130 is further defined, and at least a portion of the outer edge of the filtering portion 130 is bent.

[0108] Specifically, at least one of the first end of the first draining wall 138, the second end of the first draining wall 138, the third end of the second draining wall 140, the fourth end of the second draining wall 140, the end portion of the portion of the filtering portion 130 located between the first end and the second end, and the end portion of the portion of the filtering portion 130 located between the third end and the fourth end is bent.

[0109] Specifically, the outer edge of the filtering portion 130 comprises multiple sides, and at least one side of the multiple sides is bent.

[0110] This arrangement can enhance the structural strength of the filtering portion 130, the multiple layers of filter screens will not scatter, and the overall binding strength of the multiple layers of filter screens is enhanced. In addition, this arrangement enables that the outer edge of the multiple layers of filter screens forms an integral structure, therefore, the outer edge of the filtering portion 130 does not hurt hands, and this facilitates the assembling of the filtering portion 130 and the housing 110, and helps simplify the assembling difficulty of the separator 100 and helps improve the assembling efficiency of the separator 100.

[0111] Wherein, as shown in FIG. 6, the outer edge of the filtering portion 130 comprises four sides, and two sides of the four sides are bent. As shown in FIG. 7, the outer edge of the filtering portion 130 comprises four sides, and the four sides are bent.

[0112] In some embodiments, as shown in FIG. 11, the multiple layers of filter screens at least comprise a first filter screen 132 and a second filter screen 134.

[0113] The second filter screen 134 is stacked on one side of the first filter screen 132 away from the inlet 112.

[0114] The thickness of the second filter screen 134 is greater than that of the first filter screen 132.

[0115] In this embodiment, the types of the multiple layers of filter screens are classified, and the multiple layers of filter screens at least comprise the first filter screen 132 and the second filter screen 134, wherein, the thickness of the second filter screen 134 is greater than that of the first filter screen 132, that is, the rigidity and the strength of the second filter screen 134 are greater than those of the first filter screen 132. The second filter screen 134 is placed on the outer side of the first filter screens 132, or, the first filter screens 132 are placed at the inner side of the second filter screen 134. The second filter screen 134 has a function of supporting and fixing the first filter screens 132, and the second filter screen 134 can protect the first filter screens 132 and lower the probability that the first filter screens 132 deform under the effect of an external force. The filtering effect of the filtering portion 130 can be ensured.

[0116] In some embodiments, as shown in FIG. 11, there are multiple layers of first filter screens 132, and the multiple layers of first filter screens 132 are stacked at one side of the second filter screen 134.

[0117] In this embodiment, it is defined that there are multiple layers of first filter screens 132, and it is defined that the cooperating structure of the multiple layers of first filter screens 132 and the second filter screen 134 is to stack the multiple layers of first filter screens 132 at one side of the second filter screen 134, the second filter screen 134 will protect the multiple layers of first filter screens 132 at its inner side, and the multiple layers of first filter screens 132 will not deform under the effect of an external force. The thickness of the first filter screen 132 is less than that of the second filter screens 134, that is, the number of the first filter screen 132 with a less thickness is greater than that of the second filter screen 134 with a greater thickness, and this arrangement helps lower the thickness of the filtering portion 130 while ensures the filtering effect of the filtering portion 130.

[0118] In some embodiments, as shown in FIG. 10, the multiple layers of filter screens further comprise a third filter screen 136.

[0119] The first filter screens 132 are stacked between

the second filter screens 134 and the third filter screen 136, and the thickness of the third filter screen 136 is greater than that of the first filter screens 132.

[0120] In this embodiment, the types of the multiple layers of filter screens are further classified, and the multiple layers of filter screens further comprise the third filter screen 136, and the first filter screens 132 are clamped between the second filter screen 134 and the third filter screen 136. That is, the second filter screen 134 and the third filter screen 136 will protect the first filter screens 132 located at their inner sides, and the first filter screens 132 will not deform under the effect of an external force. The thickness of the first filter screen 132 is less than that of the third filter screen 136, that is, the rigidity and the strength of the third filter screen 136 are better than those of the first filter screen 132. The third filter screen 136 is placed on the outer side of the first filter screens 132, or, the first filter screens 132 are placed at the inner side of the third filter screen 136. The third filter screen 136 has a function of supporting and fixing the first filter screens 132, and the third filter screen 136 can protect the first filter screens 132 and lower the probability that the first filter screens 132 deform under the effect of an external force. The filtering effect of the filtering portion 130 can be ensured.

[0121] Specifically, when there are multiple layers of first filter screens 132, the multiple layers of first filter screens 132 are located between the second filter screens 134 and the third filter screen 136.

[0122] Specifically, the thickness of the second filter screen 134 is equal to that of the third filter screen 136.

[0123] Or, the thickness of the second filter screen 134 is greater than that of the third filter screen 136.

[0124] Or, the thickness of the second filter screen 134 is less than that of the third filter screen 136.

[0125] In some embodiments, as shown in FIG. 8 and FIG. 9, any of the second filter screen 134 and the third filter screen 136 is greater than or equal to 0.3mm and is less than or equal to 0.8mm, and the thickness of the first filter screen 132 is greater than or equal to 0.2mm and is less than or equal to 0.8mm; the mesh of any of the second filter screen 134 and the third filter screen 136 is recorded as a first mesh, the mesh of the first filter screen 132 is recorded as a second mesh, the length of the first mesh in a first direction is W1, the length of the first mesh in a second direction is recorded as W2, along a third direction the distance between any two adjacent first meshes is recorded as W3, the length of the second mesh in the first direction is recorded as W4, the length of the second mesh in the second direction is recorded as W5, along the third direction the distance between any two adjacent second meshes is recorded as W6, wherein, $3mm \le W1 \le 8mm$, $3mm \le W2 \le 8mm$, $0.3mm \le W3 \le 2mm$, $2mm \le W4 \le 7mm$, $2mm \le W5 \le 7mm$, $0.2mm \le W6 \le 2mm$.

[0126] In this embodiment, the thickness relation of the second filter screen 134 and the third filter screen 136 is defined, specifically, the thickness of the second filter screen 134 is greater than or equal to 0.3mm and is less than or equal to 0.8mm, and the thickness of the third filter screen 136 is greater than or equal to 0.3mm and is less than or equal to 0.8mm. Wherein, the thickness of the second filter screen 134 comprises 0.4mm, 0.5mm, 0.6mm, 0.7mm, etc., and is not listed herein one by one. Wherein, the thickness of the third filter screen 136 comprises 0.4mm, 0.5mm, 0.6mm, 0.7mm, etc., and is not listed herein one by one.

[0127] Furthermore, the thickness of the first filter screen 132 is greater than or equal to 0.2mm and is less than or equal to 0.8mm, for example, the thickness of the first filter screen 132 comprises 0.3mm, 0.4mm, 0.5mm, 0.6mm, 0.7mm, etc., and is not listed herein one by one.

[0128] Furthermore, the mesh of any of the second filter screen 134 and the third filter screen 136 is recorded as the first mesh, and the mesh of the first filter screen 132 is recorded as the second mesh.

[0129] The length of the first mesh in the first direction is W1, the length of the first mesh in the second direction is recorded as W2, and along the third direction the distance between any two adjacent first meshes is recorded as W3, wherein, $3mm \le W1 \le 8mm$, $3mm \le W2 \le 8mm$, $0.3mm \le W3 \le 2mm$.

[0130] The length of the second mesh in the first direction is recorded as W4, the length of the second mesh in the second direction is recorded as W5, and along the third direction the distance between any two adjacent second meshes is recorded as W6, wherein, $2mm \le W4 \le 7mm$, $2mm \le W5 \le 7mm$, $0.2mm \le W6 \le 2mm$.

[0131] Specifically, the value of W1 contains 4mm, 5mm, 6mm, 7mm, etc., and is not listed one by one herein.

[0132] Specifically, the value of W2 contains 4mm, 5mm, 6mm, 7mm, etc., and is not listed one by one herein.

[0133] Specifically, the value of W3 contains 0.5mm, 1mm, 1.5mm, etc., and is not listed one by one herein.

[0134] Specifically, the value of W4 contains 3mm, 4mm, 5mm, 6mm, etc., and is not listed one by one herein.

[0135] Specifically, the value of W5 contains 3mm, 4mm, 5mm, 6mm, etc., and is not listed one by one herein.

[0136] Specifically, the value of W6 contains 0.5mm, 1mm, 1.5mm, etc., and is not listed one by one herein.

[0137] In some embodiments, as shown in FIG. 12, FIG. 13, FIG. 14, FIG. 15, FIG. 16 and FIG. 17, each layer of filter screen comprises a mesh area 142, and the mesh areas 142 of any two adjacent layers of filter screens are in a staggered arrangement.

[0138] In this embodiment, the cooperating structure of the multiple layers of filter screens is further defined, specifically, each layer of filter screen comprises the mesh area 142, and the mesh areas 142 of any two adjacent layers of filter screens are in a staggered arrangement, therefore, the multiple layers of stacked mesh areas 142 enclose a dense screen with a relatively small

mesh, which has a relatively fine filtering effect to the oil.

[0139] Specifically, as shown in FIG. 12, FIG. 13 and FIG. 14, two adjacent layers of mesh areas 142 are respectively recorded as a first mesh area 144 and a second mesh area 146, the second mesh area 146 rotates a certain angle with respect to the first mesh area 144 and is stacked, for example, the second mesh area 146 rotates 30°, 45°, 60°, 90°, or etc., with respect to the first mesh area 144, which is not listed herein one by one. Therefore, the first mesh area 144 and the second mesh area 146 will shelter each other, and then a smaller mesh is formed. When the number of the filter screens is greater than two layers, multiple layers of mesh areas 142 are stacked and then a filtering portion 130 with a tiny mesh will be obtained.

[0140] For example, when the filtering portion 130 comprises four layers of filter screens, the four layers of mesh areas 142 are stacked in an order of 0°, 90°, 0° and 90°, and then the filtering portion 130 with a tiny mesh can be formed.

[0141] Specifically, as shown in FIG. 15, FIG. 16 and FIG. 17, two adjacent layers of mesh areas 142 are respectively recorded as the first mesh area 144 and the second mesh area 146, and the second mesh area 146 moves a certain distance with respect to the first mesh area 144 and then is staggered. That is, two adjacent layers of mesh areas 142 translate and are staggered by a certain distance and are stacked, thus, the first mesh area 144 and the second mesh area 146 will shelter each other, and then a smaller mesh is formed. When the number of the filter screens is greater than two layers, multiple layers of mesh areas 142 are stacked and then the filtering portion 130 with a tiny mesh will be obtained.

[0142] For example, when the filtering portion 130 comprises four layers of filter screens, the four layers of mesh areas 142 are stacked by a displacement of 0mm, 5mm, 0mm and 5mm, and then the filtering portion 130 with a tiny mesh can be formed.

[0143] In some embodiments, as shown in FIG. 3, the top wall 126 of the housing 110 is provided with the inlet 112 and multiple support frames 122.

[0144] The side wall 116 is provided with multiple inserting grooves 124.

[0145] The multiple support frames 122 are spaced apart along the circumferential direction of the top wall 126.

[0146] Each support frame 122 is inserted into one inserting groove 124, and a portion of the outer edge of the filtering portion 130 is clamped between the support frame 122 and the inserting groove 124.

[0147] In the embodiment, the side wall 116 is connected to the bottom wall 118, and the side wall 116 is arranged along the circumferential direction of the bottom wall 118, the end portion of side wall 116 deviating from the bottom wall 118 encloses an opening, the top wall 126 of the housing 110 can cover the opening, that is, the top wall 126 can seal the opening, and the oil fume will not enter the cavities via the connection of the top wall 126 and the side wall 116, and can only enter the housing 110 via the inlet 112, and the oil fume entering the separator 100 needs to flow through the filtering portion 130 and then can flow out of the separator 100 via the outlet 114. This arrangement can ensure the separating effect of the separator 100.

[0148] Furthermore, through reasonably arranging the cooperating structure of the side wall 116 and the support frames 122, the side wall 116 is provided with multiple inserting grooves 124, and each support frame 122 cooperates with one inserting groove 124.

[0149] The filtering portion 130 is respectively inserted into the inserting grooves 124, the multiple support frames 122 of the top wall 126 are inserted into the inserting grooves 124, and the filtering portion 130 is clamped between the support frames 122 and the inserting grooves 124. This arrangement can meet the detachable use requirement for the filtering portion 130 and the housing 110.

[0150] In some embodiments, the filter screen comprises a stainless-steel filter screen, an aluminum alloy filter screen or an activated carbon screen.

[0151] In this embodiment, the filter screen comprises a stainless-steel filter screen, an aluminum alloy filter screen or an activated carbon screen, and the filter screen is a filter member with tiny holes, when the oil fume passes the filtering portion 130, the oil in the oil fume collides with the tiny holes of the filtering portion 130 and adheres to the filtering portion 130, and therefore, the effect of filtering the oil can be achieved. The oil is left on the filtering portion 130 and gradually drips down under the effect of gravity, and is collected in the liquid storage area 120, and this is convenient for the regular cleaning of a user.

[0152] A range hood according to some other embodiments of the present application comprises the separator 100 according to any of the above embodiments.

[0153] In the embodiment, the range hood comprises the separator 100.

[0154] The separator 100 comprises the housing 110 and the filtering portion 130. The housing 110 is provided with the inlet 112 and the outlet 114. The filtering portion 130 is provided within the housing 110, and the filtering portion 130 and the inner surface of the housing 110 enclose the first cavity 150 and the second cavity 160.

[0155] Specifically, a first side of the filtering portion 130 and the inner surface of the housing 110 enclose the first cavity 150, and a second side of the filtering portion 130 and the inner surface of the housing 110 enclose the second cavity 160, that is, the first cavity 150 and the second cavity 160 are located at the two opposite sides of the filtering portion 130.

[0156] It can be understood that the housing 110 is provided with the inlet 112 and the outlet 114, the inlet 112 communicates with the first cavity 150, the outlet 114 communicates with the second cavity 160, and the filtering portion 130 communicates with the first cavity 150 and the second cavity 160.

[0157] Oil fume enters the first cavity 150 via the inlet 112 of the housing 110, and enters the second cavity 160 via the filtering portion 130 after being filtered by the filtering portion 130, and then is discharged out of the separator 100 via the outlet 114. Wherein, the oil fume flows through the filtering portion 130, the oil particles and water vapor contained in the oil fume will adhere to the filtering portion 130, then the function of separating oil and oil fume is achieved, and smoke subjected to the filtration of the filtering portion 130 will flow out of the separator 100 via the outlet 114 of the housing 110, and this lowers the influence of the discharged oil fume on the environment.

[0158] Furthermore, the filtering portion 130 comprises the first draining wall 138 and the second draining wall 140, the first draining wall 138 comprises the first end and the second end, the first end and the second end are arranged opposite to each other, the second draining wall 140 comprises the third end and the fourth end, and the third end and the fourth end are arranged opposite to each other.

[0159] The first end of the first draining wall 138 is away from the third end of the second draining wall 140, the second end of the first draining wall 138 is proximal to the fourth end of the second draining wall 140, and the inlet 112 is located between the first end and the third end. That is, along the direction deviating from the inlet 112, the distance between the first draining wall 138 and the second draining wall 140 decreases gradually.

[0160] This arrangement enables that the filtering portion 130 can form a sufficiently large filtering area in a relatively small space, to ensure that the filtering portion 130 has an enough filtering area for filtering the oil fume to improve a filtering efficiency. In addition, this arrangement enables that the oil adhering to the filtering portion 130 after filtration can more easily flow downward along the first draining wall 138 and the second draining wall 140 of the filtering portion 130, and is finally collected in the housing 110, and this decreases the oil adhering to the filtering portion 130, and can lower the cleaning frequency of the filtering portion 130 and can also ensure the filtering effect of the filtering portion 130. Moreover, the first draining wall 138 and the second draining wall 140 are arranged inclined, and the first draining wall 138 and the second draining wall 140 are arranged to form a certain angle (not a right angle) with respect to an air intake direction, and then this can increase the probability that the oil fume collides with and contacts the filtering portion 130, and thus can increase the probability that the oil adheres to the filtering portion 130, and then can improve the filtering efficiency.

[0161] As shown in FIG. 1 and FIG. 2, a range hood and cooker all-in-one machine 200 according to still some embodiments of the present application comprises: a cooking stove 210 provided with an air inlet 212; an air duct structure 220 connected to the air inlet 212; a fan assembly 230 provided within the air duct structure 220; and the separator 100 in any of the embodiments, wherein the separator 100 is provided at the air duct structure 200, and is located at the air inlet 212.

[0162] In this embodiment, the range hood and cooker all-in-one machine 200 comprises the cooking stove 210, the air duct structure 220, the fan assembly 230 and the separator 100.

[0163] The separator 100 comprises the housing 110 and the filtering portion 130. The housing 110 is provided with the inlet 112 and the outlet 114. The filtering portion 130 is provided within the housing 110, and the filtering portion 130 and the inner surface of the housing 110 enclose the first cavity 150 and the second cavity 160.

[0164] Specifically, a first side of the filtering portion 130 and the inner surface of the housing 110 enclose the first cavity 150, and a second side of the filtering portion 130 and the inner surface of the housing 110 enclose the second cavity 160, that is, the first cavity 150 and the second cavity 160 are located at the two opposite sides of the filtering portion 130.

[0165] It can be understood that the housing 110 is provided with the inlet 112 and the outlet 114, the inlet 112 communicates with the first cavity 150, the outlet 114 communicates with the second cavity 160, and the filtering portion 130 communicates with the first cavity 150 and the second cavity 160.

[0166] Oil fume enters the first cavity 150 via the inlet 112 of the housing 110, and enters the second cavity 160 via the filtering portion 130 after being filtered by the filtering portion 130, and then is discharged out of the separator 100 via the outlet1 14. Wherein, the oil fume flows through the filtering portion 130, the oil particles and water vapor contained in the oil fume will adhere to the filtering portion 130, then the function of separating oil and oil fume is achieved, and smoke subjected to the filtration of the filtering portion 130 will flow out of the separator 100 via the outlet 114 of the housing 110, and this lowers the influence of the discharged oil fume on the environment.

[0167] Furthermore, the filtering portion 130 comprises the first draining wall 138 and the second draining wall 140, the first draining wall 138 comprises the first end and the second end, the first end and the second end are arranged opposite to each other, the second draining wall 140 comprises the third end and the fourth end, and the third end and the fourth end are arranged opposite to each other.

[0168] The first end of the first draining wall 138 is away from the third end of the second draining wall 140, the second end of the first draining wall 138 is proximal to the fourth end of the second draining wall 140, and the inlet 112 is located between the first end and the third end. That is, along the direction deviating from the inlet 112, the distance between the first draining wall 138 and the second draining wall 140 decreases gradually.

[0169] This arrangement enables that the filtering portion 130 can form a sufficiently large filtering area in a relatively small space, to ensure that the filtering portion 130 has an enough filtering area for filtering the oil fume

to improve a filtering efficiency. In addition, this arrangement enables that the oil adhering to the filtering portion 130 after filtration can more easily flow downward along the first draining wall 138 and the second draining wall 140 of the filtering portion 130, and is finally collected in the housing 110, and this decreases the oil adhering to the filtering portion 130, and can lower the cleaning frequency of the filtering portion 130 and can also ensure the filtering effect of the filtering portion 130. Moreover, the first draining wall 138 and the second draining wall 140 are arranged inclined, and the first draining wall 138 and the second draining wall 140 are arranged to form a certain angle (not a right angle) with respect to an air intake direction, and then this can increase the probability that the oil fume collides with and contacts the filtering portion 130, and thus can increase the probability that the oil adheres to the filtering portion 130, and then can improve the filtering efficiency.

[0170] As shown in FIG. 1 and FIG. 2, the range hood and cooker all-in-one machine 200 comprises the cooking stove 210, the air duct structure 220, the fan assembly 230 and the separator 100. The separator 100 is mounted at the air duct structure 220, and can be taken out from the air duct structure 220 and cleaned.

[0171] As shown in FIG. 2, the separator 100 is located at the air inlet 212, and the separator 100 is used to filter the oil fume which is generated during cooking and sucked from the air inlet 212.

[0172] The air duct structure 220 is hoisted with the fan assembly 230, and the fan assembly 230 comprises an electric motor 232 and a wind wheel 234. When the electric motor 232 and the wind wheel 234 are electrified and then operate, a negative pressure suction force is generated, and the oil fume near the air inlet 212 is sucked into the air duct structure 220, when the oil fume passes the separator 100, the oil in the oil fume is intercepted and condensed by the filtering portion 130, and the filtered oil fume is discharged to a smoke pipe from the air outlet of the air duct structure 220 after passing the air duct structure 220.

[0173] As shown in FIG. 2, the separator 100 is provided at the air inlet 212, the oil fume sucked from the air inlet 212 is first filtered by the separator 100, then enters the air duct structure 220 via the passage at the right side of the separator 100, then passes the air duct structure 220 and the wind wheel 234 at the bottom portion, and is finally discharged via the air outlet of the air duct structure 220.

[0174] As shown in FIG. 3, the separator 100 comprises the housing 110 and the filtering portion 130. The housing 110 comprises a cover body 127 and a seat body 128, the cover body 127 is provided with the inlet 112, the seat body 128 is provided with the outlet 114, and the cover body 127 and the outlet 114 are connected detachably. The cover body 127 comprises the support frame 122, and the seat body 128 comprises the inserting groove 124.

[0175] The seat body 128 is provided with the inserting groove 124, and the inserting groove 124 is a V-shaped groove; after the filtering portion 130 is assembled to the seat body 128, the cover body 127 compresses the filtering portion 130 and fixes it on the seat body 128.

[0176] The bottom portion of the seat body 128 is provided with the liquid storage area 120, and the liquid storage area 120 can be used to collect and store oil.

[0177] As shown in FIG. 4, the separator 100 is provided with the inlet 112 and the outlet 114, and the oil fume entering the range hood and cooker all-in-one machine 200 from the air inlet 212 enters the separator 100 and then is discharged via the air outlet.

[0178] When the oil fume passes the filtering portion 130, the oil particles contained in the oil fume will adhere to the tiny holes of the filtering portion 130, and then are left on the filtering portion 130, and then the effect of separating the oil and the oil fume is achieved. When the oil adhering to the filtering portion 130 increases, the oil will flow along the surface of the filtering portion 130 to the lower end of the filtering portion 130 and drips down to the liquid storage area 120, and thus the oil can be collected in the separator 100.

[0179] As shown in FIG. 5, the filtering portion 130 is arranged in a V shape. Wherein, the included angle α of the filtering portion 130 is greater than or equal to 30° and is less than or equal to 150°. This arrangement enables that the filtering portion 130 still has a sufficiently large filtering area in a relatively small space for filtering the oil fume, and the filtering efficiency is improved. Thus, the filtered oil can more easily flow downward along the side of the filtering portion 130, and is finally collected in the liquid storage area 120. As the first draining wall 138 and the second draining wall 140 of the filtering portion 130 are inclined to a certain extent, their sides form a certain angle with respect to the air intake direction, and then this can increase the probability that the oil fume collides with and contacts the mesh of the filtering portion 130, and thus can increase the probability that the oil adheres to the filtering portion 130 and then improve the filtering efficiency.

[0180] In order that the edge of the filtering portion 130 does not hurt hand, and to make assembling easy, a bending edge is provided at the edge of the filtering portion 130, that is, the edge of the filtering portion 130 is bent. The bending edge is to bend a material with a certain width 180° until it fits a mesh surface.

[0181] As shown in FIG. 6, the bending edge can be provided at the two long sides of the filtering portion 130, and thus the strength of the filtering portion 130 can be enhanced. As shown in FIG. 7, the bending edge can be provided at the four sides of the filtering portion 130, and thus the strength of the filtering portion 130 is better.

[0182] The material of the filtering portion 130 comprises aluminum alloy, stainless-steel, cold-rolled sheet, etc., and is not listed one by one herein. The filtering portion 130 comprises multiple layers of filter screens.

[0183] A single layer of filter screen is to individually punch a mesh with a certain size in the above material,

and then multiple layers of filter screens are stacked according to a certain staggering rule to form the filtering portion 130.

[0184] As shown in FIG. 8, the second filter screen 134 is a screen provided on the outer side of the first filter screen 132, and the second filter screen 134 plays a role of providing support, increasing the overall rigidity of the filtering portion 130 and meanwhile protecting the first filter screen 132 at the inner layer.

[0185] The thickness of the second filter screen 134 is greater than or equal to 0.3mm and is less than or equal to 0.8mm.

[0186] The mesh of the second filter screen 134 is recorded as a first mesh, the length of the first mesh in the first direction is W1, the length of the first mesh in the second direction is recorded as W2, along the third direction the distance between any two adjacent first meshes is recorded as W3, wherein, $3mm \leq W1 \leq 8mm$, $3mm \leq W2 \leq 8mm$, $0.3mm \leq W3 \leq 2mm$.

[0187] As shown in FIG. 9, the first filter screen 132 is a screen provided at the inner side of the second filter screen 134, and has a function of forming tiny holes by stacking multiple layers and sticking and intercepting the oil in the oil fume.

[0188] The thickness of the first filter screen 132 is greater than or equal to 0.2mm and is less than or equal to 0.8mm.

[0189] The mesh of the first filter screen 132 is recorded as a second mesh. The length of the second mesh in the first direction is recorded as W4, the length of the second mesh in the second direction is recorded as W5, along the third direction the distance between any two adjacent second meshes is recorded as W6, wherein, $2mm \leq W4 \leq 7mm$, $2mm \leq W5 \leq 7mm$, $0.2mm \leq W6 \leq 2mm$.

[0190] The arrangement of the above mesh size enables that the second filter screen 134 and the first filter screen 132 more easily form tiny holes through stacking several layers to filter the oil.

[0191] The filtering portion 130 comprises the first filter screen 132 and the second filter screen 134.

[0192] As shown in FIG. 10, the filtering portion 130 comprises the second filter screen 134, the third filter screen 136 and three layers of first filter screens 132.

[0193] As shown in FIG. 11, the filtering portion 130 comprises the second filter screen 134 and four layers of first filter screens 132.

[0194] Wherein, the number of the layers of the filter screens can also be six, seven, eight, etc., and is not listed one by one herein.

[0195] The second filter screen 134 and the first filter screen 132 need to be stacked according to a certain staggering rule, otherwise the meshes may be aligned, and then a staggering effect cannot be formed, and tiny holes suitable for filtering the oil cannot be formed.

[0196] Specifically, the filter screens can be made to rotate a certain angle to form staggering. As shown in FIG. 12 to FIG. 14, two adjacent layers of first filter screens 132 rotate 90° with respect to each other and then are stacked, at this moment, the meshes of two layers of first filter screens 132 will shelter each other, and smaller meshes can be formed. If several layers of the first filter screens 132 are further stacked, a desired filtering portion 130 with tiny holes can be obtained.

[0197] Specifically, the filter screens can be made to move a certain distance to form staggering. As shown in FIG. 15 to FIG. 17, two adjacent layers of first filter screens 132 translate and are staggered by a certain distance and are stacked, at this moment, the meshes of two layers of first filter screens 132 will shelter each other, and smaller meshes can be formed. If several layers of the first filter screens 132 are further stacked, a desired filtering portion 130 with tiny holes can be obtained.

[0198] The filter screens are stacked through the above staggering rules, and the respective layers of filter screens have a suitable gap therebetween for passing airflow, and can also effectively stick and intercept the oil.

[0199] In the specification of the present application, the term of "multiple" indicates two or more than two, unless otherwise explicitly defined; the terms of "mounting", "connected with", "connected to", "fixing" and the like should be understood in a broad sense, for example, the term "connected to" may be a fixed connection, and may also be a detachable connection, or an integral connection; and the term "connected with" may be a direct connection and may also be an indirect connection through an intermediate medium. A person of ordinary skills in the art could understand the specific meanings of the terms in the present application according to specific situations.

[0200] In the description of the present specification, the descriptions of the phrases "one embodiment", "some embodiments" and "specific embodiments" and the like mean that the specific features, structures, materials or characteristics described in combination with the embodiment(s) or example(s) are included in at least one embodiment or example of the present application. In the specification, the schematic representation of the above phrases does not necessarily refer to the same embodiment or example. Moreover, the particular features, structures, materials or characteristics described may be combined in a suitable manner in any one or more of the embodiments or examples. The descriptions above are only some embodiments of the present application, and are not used to limit the present application. For a person skilled in the art, the present application may have various changes and variations. Any modifications, equivalent substitutions, improvements, etc. made within the principle of the present application shall all be included in the protection scope of the present application.

Claims

1. A separator (100), comprising:

a housing (110), provided with an inlet (112) and an outlet (114); and
a filtering portion (130), provided within the housing (110),
wherein the filtering portion (130) and an inner surface of the housing (110) enclose a first cavity (150) and a second cavity (160), the first cavity (150) and the second cavity (160) are located at different sides of the filtering portion (130), the first cavity (150) communicates with the inlet (112), and the second cavity (160) communicates with the outlet (114); and
the filtering portion (130) comprises a first draining wall (138) and a second draining wall (140), the first draining wall (138) comprises a first end and a second end arranged opposite to each other, the second draining wall (140) comprises a third end and a fourth end arranged opposite to each other, the first end is away from the third end, the second end is proximal to the fourth end, and the inlet (112) is located between the first end and the third end.

2. The separator (100) according to claim 1, wherein:

the housing (110) comprises a side wall (116) and a bottom wall (118), the side wall (116) is connected to the circumferential side of the bottom wall (118), the side wall (116) is provided with the outlet (114), and a portion of the side wall (116) located between the outlet (114) and the bottom wall (118) and the bottom wall (118) enclose a liquid storage area (120);
the filtering portion (130) and the bottom wall (118) are spaced apart, the second end of the filtering portion (130) is closer to the liquid storage area (120) than the first end, and the fourth end of the filtering portion (130) is closer to the liquid storage area (120) than the third end.

3. The separator (100) according to claim 1 or 2, wherein a top wall (126) of the housing (110) is provided with at least a portion of the inlet (112).

4. The separator (100) according to any one of claims 1 to 3, wherein an included angle between the first draining wall (138) and the second draining wall (140) is greater than or equal to 30° and is less than or equal to 150°.

5. The separator (100) according to any one of claims 1 to 4, wherein the filtering portion (130) is arranged to bend to form the first draining wall (138) and the second draining wall (140).

6. The separator (100) according to any one of claims 1 to 5, wherein the filtering portion (130) comprises: multiple layers of filter screens arranged in a stacked manner.

7. The separator (100) according to claim 6, wherein at least a portion of an outer edge of the filtering portion (130) is bent.

8. The separator (100) according to claim 6 or 7, wherein the multiple layers of filter screens at least comprise:

a first filter screen (132); and
a second filter screen (134) stacked on one side of the first filter screen away from the inlet (112), wherein a thickness of the second filter screen (134) is greater than that of the first filter screen (132).

9. The separator (100) according to claim 8, wherein there are multiple layers of first filter screens (132), and the multiple layers of first filter screens (132) are stacked on one side of the second filter screen (134).

10. The separator (100) according to claim 8, wherein the multiple layers of filter screens further comprise: a third filter screen (136), wherein the first filter screen (132) is stacked between the second filter screen (134) and the third filter screen (136), and a thickness of the third filter screen (136) is greater than that of the first filter screen (134).

11. The separator (100) according to any one of claims 6 to 10, wherein each layer of filter screen comprises a mesh area (142), and the mesh areas (142) of any two adjacent layers of filter screens are in a staggered arrangement; and
the filter screen comprises a stainless-steel filter screen, an aluminum alloy filter screen or an activated carbon screen.

12. The separator (100) according to claim 2, wherein a top wall (126) of the housing (110) is provided with the inlet (112) and multiple support frames (122), and the side wall (116) is provided with multiple inserting grooves (124); and
the multiple support frames (122) are spaced apart along the circumferential direction of the top wall (126), and each support frame (122) is inserted into one inserting groove (124), and a portion of an outer edge of the filtering portion (130) is clamped between the support frame (122) and the inserting groove (124).

13. A range hood, comprising:
the separator (100) according to any one of claims 1 to 12.

14. A range hood and cooker all-in-one machine (200), comprising:

a cooking stove (210), wherein the cooking stove (210) is provided with an air inlet (212);
an air duct structure (220), connected to the air inlet (212);
a fan assembly (230), provided within the air duct structure (220); and
the separator (100) according to any one of claims 1 to 12, wherein the separator (100) is provided at the air duct structure (220), and the separator (100) is located at the air inlet (212).

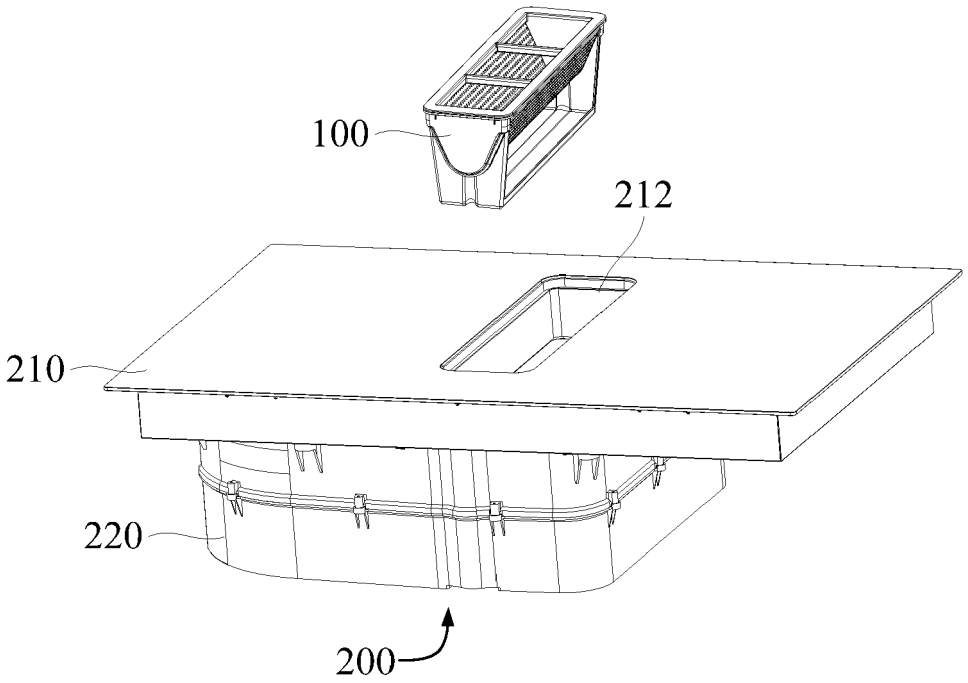

FIG.1

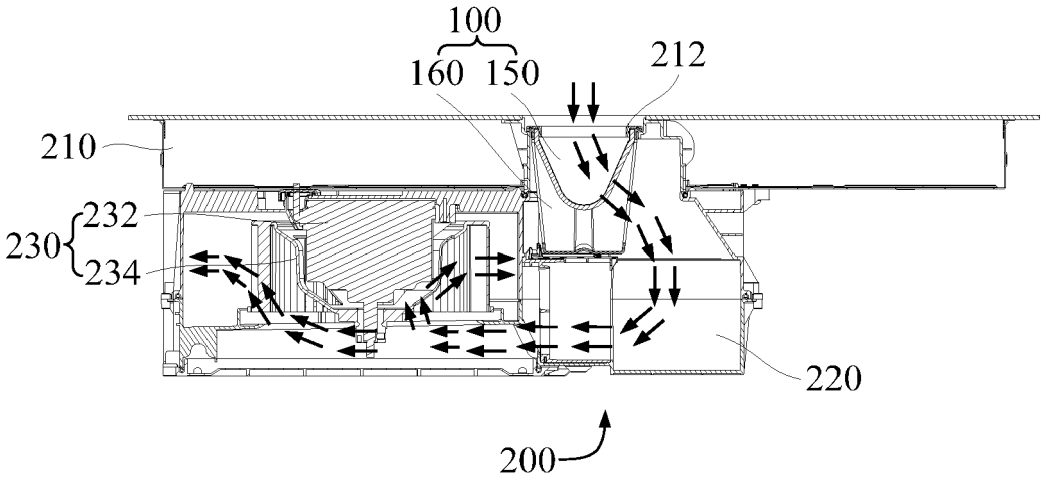

FIG. 2

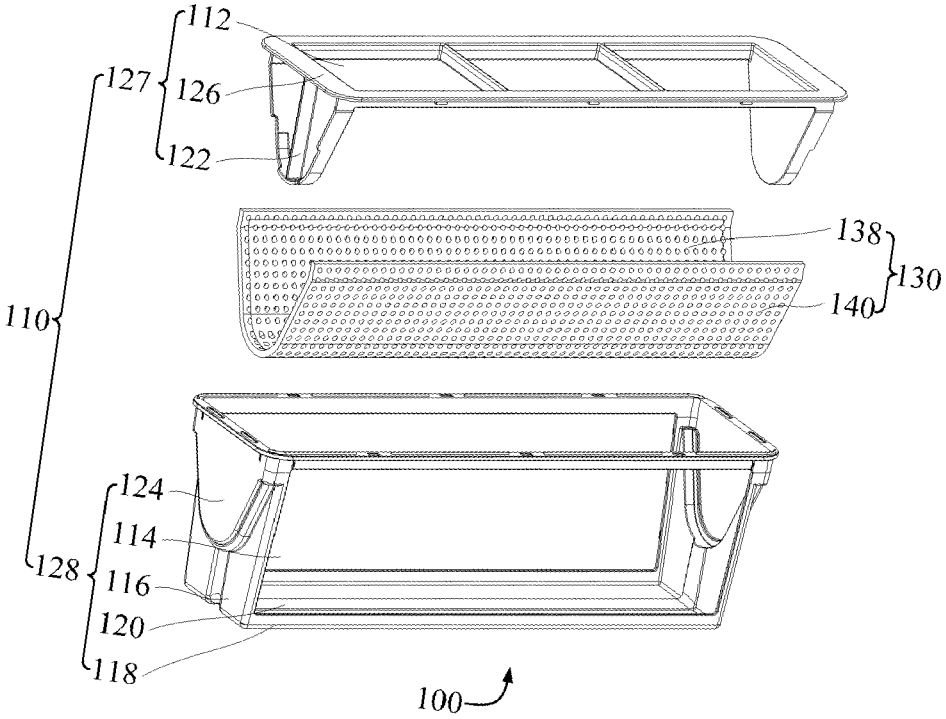
112
127
126
122
138
130
140
110
124
114
128
116
120
118
100

FIG. 3

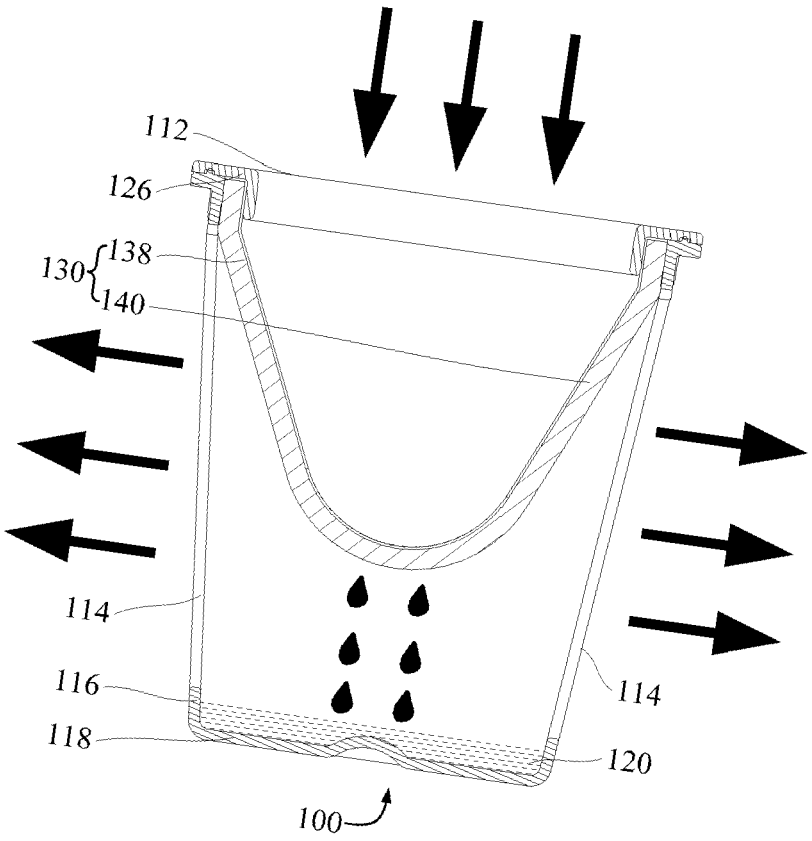
112
126
130
138
140
114
116
118
120
114
100

FIG. 4

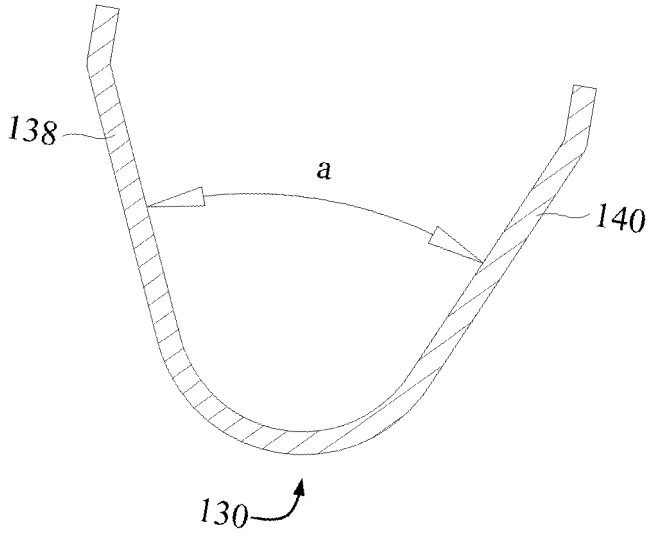

FIG. 5

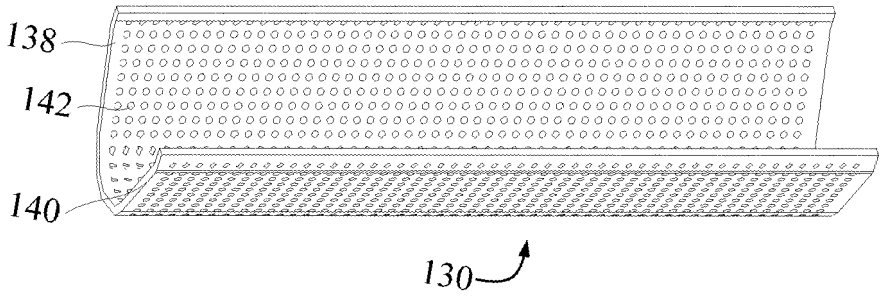

FIG. 6

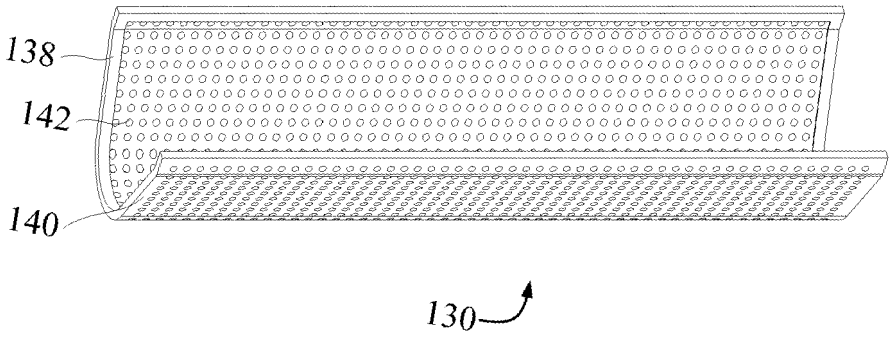

FIG. 7

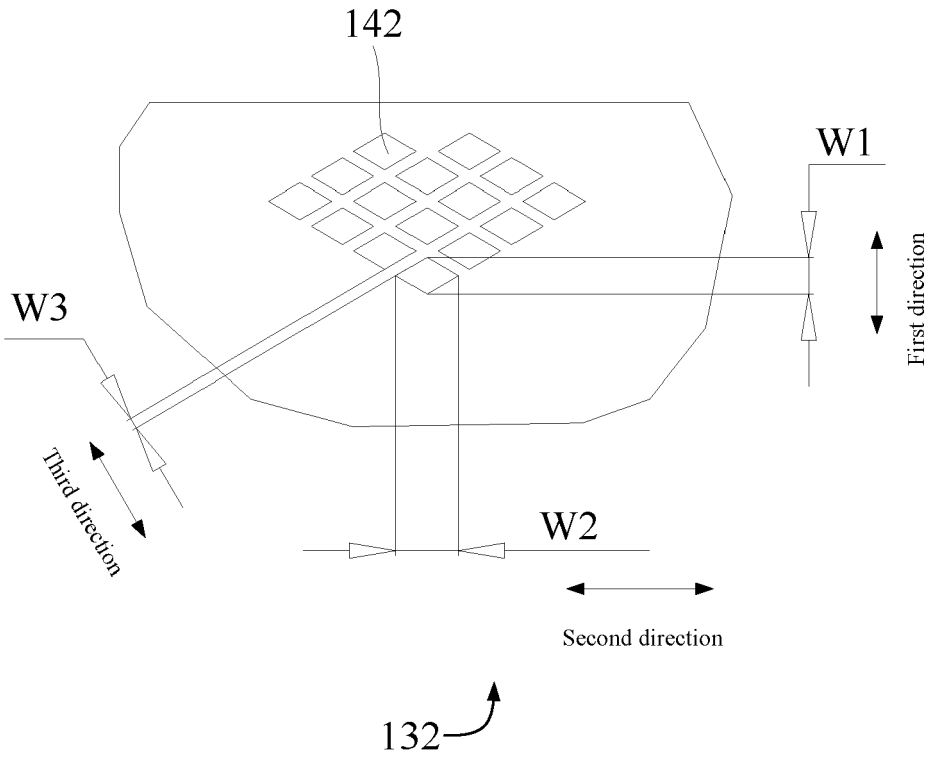
142
W1
First direction
W3
Third direction
W2
Second direction
132

FIG. 8

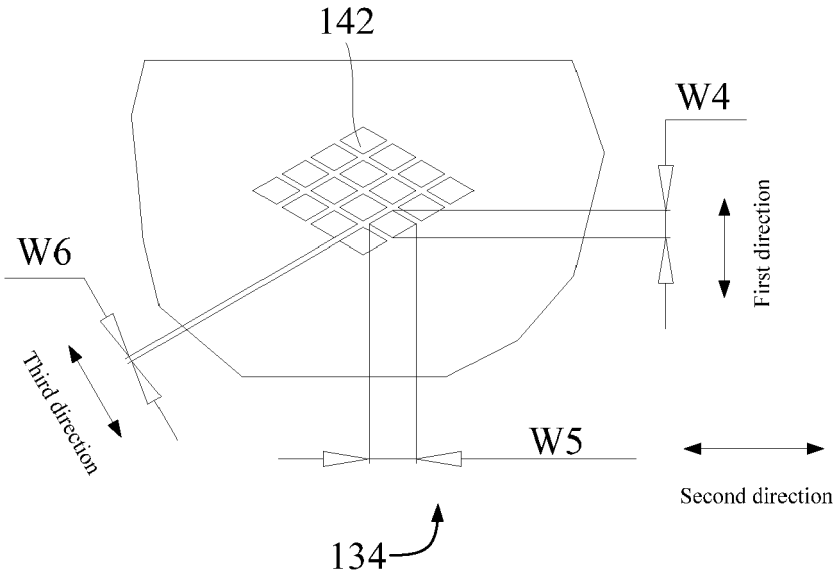
142
W4
First direction
W6
Third direction
W5
Second direction
134

FIG. 9

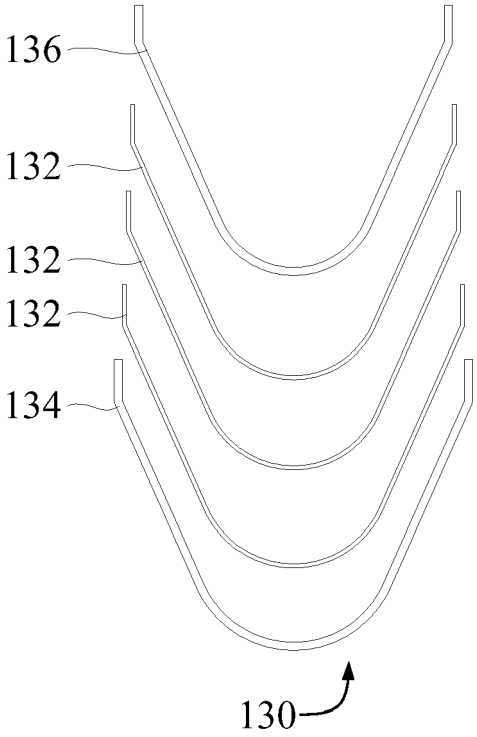

FIG. 10

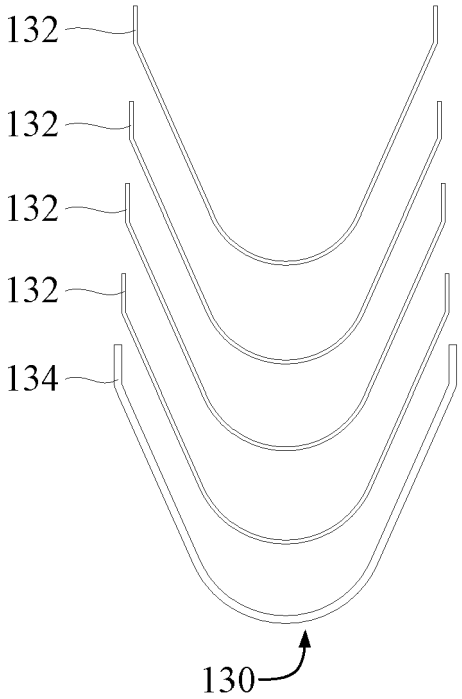

FIG.11

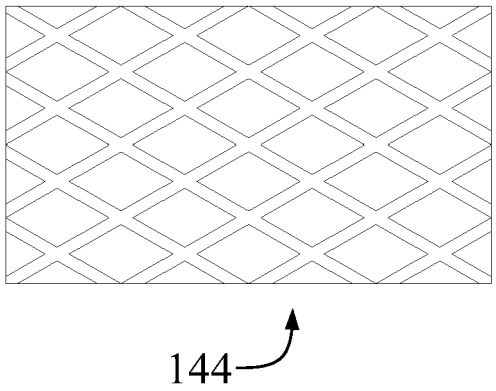

FIG. 12

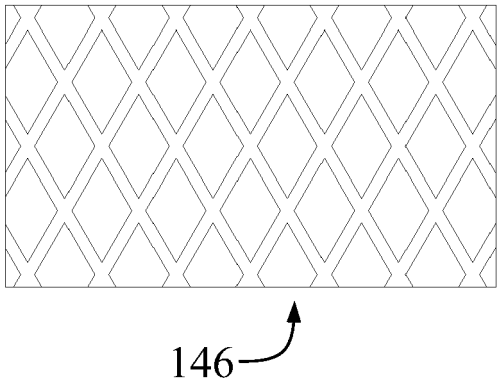

FIG. 13

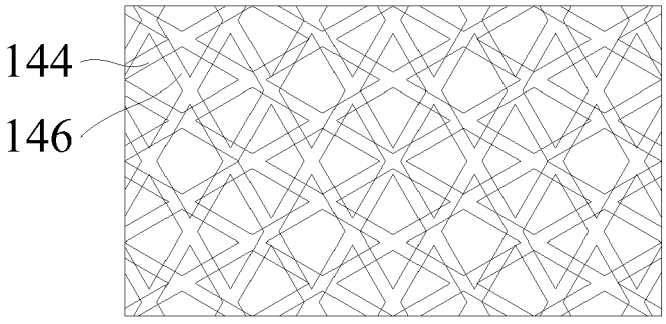

FIG. 14

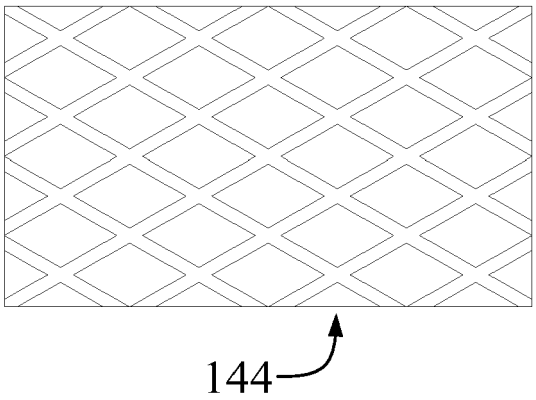

FIG. 15

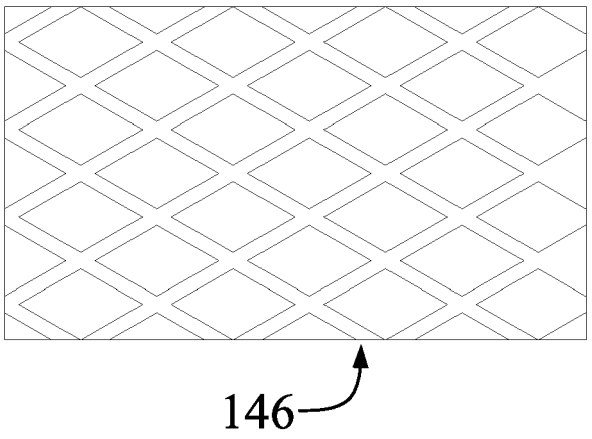

FIG. 16

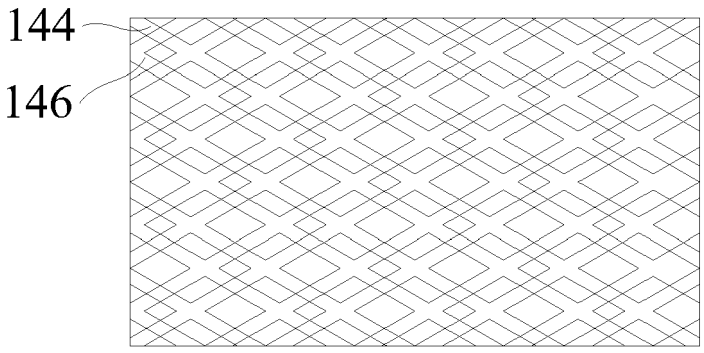

FIG. 17

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EUROPEAN SEARCH REPORT

Application Number
EP 24 16 6662

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	CN 217 472 962 U (FOSHAN SHUNDE MIDEA ELECTRICAL HEATING APPLIANCES MFG CO LTD) 23 September 2022 (2022-09-23) * paragraphs [0010], [0093], [0117]; claims 1,4,6,12,14,15; figures 1-6,16-18 *	1-7, 11-14 10	INV. F24C15/20
X	EP 4 001 775 A1 (FABER SPA [IT]) 25 May 2022 (2022-05-25) * paragraphs [0016] - [0018], [0023] - [0025]; figures 1-7 *	1-9,11, 13,14	
Y	CN 211 176 975 U (GUANGDONG ATLAN ELECTRONIC APPLIANCE MFT CO LTD) 4 August 2020 (2020-08-04) * paragraph [0017] *	10	

TECHNICAL FIELDS SEARCHED (IPC)

F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 July 2024	Fest, Gilles

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 16 6662

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15-07-2024

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CN 217472962 U	23-09-2022	NONE	
EP 4001775 A1	25-05-2022	EP 4001775 A1	25-05-2022
		ES 2948018 T3	25-08-2023
		PL 4001775 T3	02-10-2023
		PT 4001775 T	14-06-2023
CN 211176975 U	04-08-2020	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82