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(54) ULTRASONIC ATOMIZER AND OIL-GUIDE CERAMIC

(57) An ultrasonic atomizer and an oil-guide ceramic, wherein the ultrasonic atomizer comprises an oil-guide assembly (2); the oil-guide assembly (2) comprises the oil-guide ceramic (21) and oil-storing cotton (22); the lower surface of the oil-guide ceramic (21) is provided as an uneven rough surface (212); the middle part of the rough surface (212) is provided with a concave placement groove (211); the oil-storing cotton (22) is placed in the placement groove (211); the bottom surface of the oil-storing cotton (22) is flush with the bottom surface of the rough surface (212), and both the rough surface (212) and the oil-storing cotton (22) abut against the middle part of the atomizing surface of an ultrasonic atomizing sheet (322), so that a local oil storage gap is generated at the place of contact of the rough surface (212) and the ultrasonic atomizing sheet (322), thus avoiding the phenomenon in which the ultrasonic atomizing sheet (322) is partially burnt or soaked in e-oil.

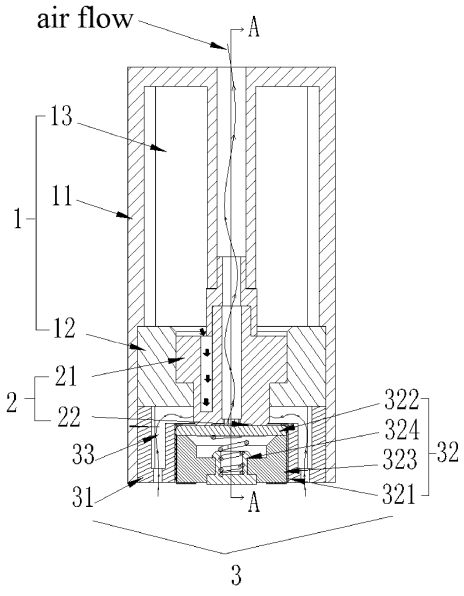

Fig. 1

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Description

Field of the Invention

[0001] The present invention relates to electronic cigarettes, in particular to an ultrasonic atomizer and an e-liquid guide ceramic.

Background of the Invention

[0002] Existing ultrasonic electronic cigarette atomizers generally guide e-liquid by means of direct communication of e-liquid guide cotton and an e-liquid cartridge. Using such e-liquid guide cotton will cause the following problems:

1. When the temperature of e-liquid in the e-liquid cartridge increases with the progress of ultrasonic atomization, the viscosity of e-liquid decreases, so that the flow rate of e-liquid on the e-liquid guide cotton rapidly increases, the e-liquid guide amount of the e-liquid guide cotton increases, and excessive e-liquid is supplied to the ultrasonic atomizing sheet, easily causing the problem that the ultrasonic atomizing sheet is soaked in e-liquid and other problems;
2. After the e-liquid guide cotton absorbs e-liquid, the pore size of the e-liquid guide cotton increases. When the temperature of the e-liquid increases with the progress of ultrasonic atomization and its viscosity decreases, the increase in the pore size of the e-liquid guide cotton also increases the e-liquid guide rate of the e-liquid guide cotton, which then easily causes the phenomenon that the ultrasonic atomizing sheet is soaked in the e-liquid, resulting in insufficient atomization of the e-liquid with the ultrasonic atomizing sheet and feeling of inhaling large smoke particles, so the user may feel himself/herselfinhaling e-liquid, with poor experience.

[0003] In addition, when the ultrasonic atomizing sheet operates, the oscillation frequencies and intensities at different positions of the same ultrasonic atomizing sheet are different, that is, the efficiencies of atomizing e-liquid into smoke at different positions of the same ultrasonic atomizing sheet are different, so the phenomenon of partial dry burning easily occurs. For example, the atomization efficiency at the center of the ultrasonic atomizing sheet is the highest, so the e-liquid at the center of the ultrasonic atomizing sheet is easily consumed, resulting in dry burning at the center of the ultrasonic atomizing sheet. After the ultrasonic atomizing sheet operates for a period of time, when the e-liquid guide rate of the e-liquid guide cotton increases, the ultrasonic atomizing sheet is easily soaked in e-liquid; and when the ultrasonic atomizing sheet is restarted after being stopped for a period of time, the e-liquid guide rate of the e-liquid guide cotton decreases, and the phenomenon of dry burning easily occurs at the center of the ultrasonic atomizing sheet to affect the taste of smoke.

Summary of the Invention

[0004] The technical problem to be solved by the present invention is to overcome the deficiencies in the prior art that the ultrasonic atomizing sheet is prone to partial dry burning or being soaked in e-liquid, and to provide an ultrasonic atomizer which has a stable e-liquid guide rate and can avoid the phenomenon that an ultrasonic atomizing sheet is partially burnt or soaked in e-liquid.

[0005] In order to solve the above technical problems, the present invention provides an ultrasonic atomizer, including an e-liquid guide assembly, wherein the e-liquid guide assembly includes an e-liquid guide ceramic and e-liquid storing cotton, the lower surface of the e-liquid guide ceramic is configured as a rough surface which is uneven, the middle part of the rough surface is provided with a placement groove which is recessed, the e-liquid storing cotton is placed in the placement groove, the bottom surface of the e-liquid storing cotton is flush with the bottom surface of the rough surface, and both the rough surface and the e-liquid storing cotton are abutted against the middle part of an atomizing surface of an ultrasonic atomizing sheet, so that a partial e-liquid storing gap isformed at the place of contact of the rough surface and the ultrasonic atomizing sheet.

[0006] E-liquid is guided by the e-liquid guide ceramic in the present invention, and the porosity of the e-liquid guide ceramic does not change with temperature changes, so the e-liquid guide rate is constant. In addition, the rough surface of the e-liquid guide ceramic is in contact with the atomizing surface of the ultrasonic atomizing sheet in the present invention, so that a partial e-liquid storing gap is formed at the place of contact of the rough surface and the ultrasonic atomizing sheet. E-liquid can be stored in these e-liquid storing gaps (that is, the e-liquid is in direct contact with the surface of the ultrasonic atomizing sheet), and the bottom surface of the e-liquid storing cotton which is placed in the placement groove is flush with the rough surface, so that the e-liquid on the rough surface can be absorbed by the e-liquid storing cotton and the e-liquid on the e-liquid storing cotton can be stored by the rough surface. When the ultrasonic atomizing sheet operates, the oscillation frequencies and intensities at different positions of the same ultrasonic atomizing sheet are different, that is, the efficiencies of atomizing e-liquid into smoke at different positions of the same ultrasonic atomizing sheet are different.Because the e-liquid storing cotton is in contact with the center of the ultrasonic atomizing sheet where the atomization efficiency is the highest, sufficient e-liquid can be supplied to the center of the ultrasonic atomizing sheet for ultrasonic atomization by means of the strong storage capacity of the e-liquid storing cotton.Even if the e-liquid on the e-liquid storing cotton is consumed, the e-liquid storing cotton can also quickly absorb e-liquid stored in the e-

liquid storing gap of the rough surface, so as to ensure the timely replenishment of e-liquid on the e-liquid storing cotton and avoid the phenomenon of dry burning at the center of the ultrasonic atomizing sheet.In addition, the atomization efficiency at the place away from the center of the ultrasonic atomizing sheet is relatively lower than that at the center of the ultrasonic atomizing sheet. In the present invention, the rough surface of the e-liquid guide ceramic is in contact with the place away from of the center of the ultrasonic atomizing sheet to provide e-liquid required for atomization, and the e-liquid on the rough surface can be absorbed by the e-liquid storing cotton, so the place away fromthe center of the ultrasonic atomizing sheet can be prevented from being soaked in e-liquid to affect the atomization efficiency.

[0007] Further, the middle part of the e-liquid guide ceramic is provided with an air outlet that axially penetrates the e-liquid guide ceramic, so that the e-liquid storing cotton is exposed at the bottom of the air outlet. When the ultrasonic atomizing sheet operates, the e-liquid on the ultrasonic atomizing sheet and the e-liquid storing cotton is ultrasonically atomized into smoke, and the smoke is carried out to the user's mouth by the air flowing into the air outlet through an air guide groove. During this process, the atomization efficiency at the center of the ultrasonic atomizing sheet is the highest. Because the e-liquid storing cotton is directly in contact with the center of the ultrasonic atomizing sheet and communicated with the air outlet (that is, the e-liquid storing cotton is exposed at the bottom of the air outlet), the e-liquid on the e-liquid storing cotton can be atomized as soon as possible, and the atomized smoke can be directly discharged to the air outlet channel through the air outlet without being blocked, so that not only can the smoke flow into the air outlet channel at the fastest speed, but also the smoke can be carried out thoroughly. In addition, the side wall of the air outlet is relatively long; and when smoke passes through the air outlet, the smoke hits the side wall of the air outlet, and the ceramic on the side wall of the air outlet absorbs large-particle e-liquid droplets, thereby preventing the user from inhaling e-liquid droplets and improving the taste of smoke.

[0008] Further, the lower surface of the e-liquid guide ceramic is provided with an air guide groove, and the air guide groove is communicated with the bottom of the air outlet, so that air flow can carry the smoke generated by the ultrasonic atomization of the ultrasonic atomizing sheet out to the air outlet.

[0009] Further, a plurality of air guide grooves are radially distributed on the lower surface of the e-liquid guide ceramic, so that air flows into the air outlet from all directions of the atomizing surface of the ultrasonic atomizing sheet, to carry the smoke generated at all positions of the atomizing surface of the ultrasonic atomizing sheet into the air outlet. Further, an e-liquid storing cavity is formed around the periphery of the air outlet, so that the distance between the e-liquid and the ultrasonic atomizing sheet is relative short, and the time for the e-liquid guide ceramic to guide the e-liquid to the ultrasonic atomizing sheet is relative short. Therefore, when the ultrasonic atomizing sheet operates, the e-liquid guide ceramic can quickly supply e-liquid to the ultrasonic atomizing sheet, to ensure continuous ultrasonic atomization on the ultrasonic atomizing sheet, so that each puff of smoke inhaled by the user is equal and the smoke tastes better.

[0010] Further, a plurality of reinforcing ribs are arranged in the e-liquid storing cavity, and the reinforcing ribs are radially distributed on the periphery of the air outlet, where the reinforcing ribs support the side wall of the air outlet to increase the strength of the overall structure of the e-liquid guide ceramic.

[0011] Further, the vertical distance between the bottom surface of the e-liquid storing cavity and the ultrasonic atomizing sheet is 0.5 mm to 8 mm. Because the distance between the bottom surface of the e-liquid storing cavity and the ultrasonic atomizing sheet is related to the transfer rate of e-liquid: the shorter the distance, the shorter the e-liquid transfer time, and the faster the e-liquid transfer; and the longer the distance, the longer the e-liquid transfer time, and the slower the e-liquid transfer. Therefore, the purpose of controlling the e-liquid transfer time and e-liquid transfer rate can be achieved by controlling the distance between the bottom surface of the e-liquid storing cavity and the ultrasonic atomizing sheet. In the present invention, the vertical distance between the bottom surface of the e-liquid storing cavity and the ultrasonic atomizing sheet is 0.5 mm to 8 mm, so that e-liquid can be transferred to the ultrasonic atomizing sheet by the e-liquid guide ceramic in time, while the ultrasonic atomizing sheet is not soaked in the e-liquid, thereby avoiding dry burning of the ultrasonic atomizing sheet due to little e-liquid, and avoiding the phenomenon that the ultrasonic atomizing sheet is soaked in e-liquid due to excessive e-liquid.

[0012] Further, the ultrasonic atomizer includes an e-liquid storing assembly with an e-liquid cartridge and an atomizing assembly, the e-liquid guide assembly and the atomizing assembly are sequentially installed at the bottom of the e-liquid storing assembly, an air outlet channel communicated with a suction nozzle is provided in the e-liquid storing assembly, an air inlet channel communicated with outside air is provided in the atomizing assembly, and the air inlet channel is communicated with the air outlet channel through the air guide groove and the air outlet on the e-liquid guide ceramic. Based on the same inventive concept, the present invention provides an e-liquid guide ceramic, the lower surface of the e-liquid guide ceramic is configured as a rough surface which is uneven, and the middle part of the rough surface is recessed to form a placement groove for placing the e-liquid storing cotton.

[0013] When the e-liquid guide ceramic of the present invention is used, the rough surface of the e-liquid guide ceramic is in contact with the ultrasonic atomizing sheet, so that partial e-liquid storing gaps are formed at the place

of contact of the rough surface and the ultrasonic atomizing sheet. E-liquid can be stored in these e-liquid storing gaps (that is, the e-liquid is in direct contact with the surface of the ultrasonic atomizing sheet), and the bottom surface of the e-liquid storing cotton placed in the placement groove is flush with the rough surface, so that the e-liquid on the rough surface can be absorbed by the e-liquid storing cotton, and the e-liquid on the e-liquid storing cotton can be stored by the rough surface. The oscillation frequencies and intensities at different positions of the same ultrasonic atomizing sheet are different, that is, the efficiencies of atomizing e-liquid into smoke at different positions of the same ultrasonic atomizing sheet are different. Meanwhile, the e-liquid storing cotton has relatively strong capacity of storing e-liquid, that is, the e-liquid storing cottonstores much e-liquid, while the e-liquid guide ceramic stores a little e-liquid, so the e-liquid storing cotton and the rough surface respectively abut against different positions of the ultrasonic atomizing sheet to avoid the phenomenon of partial dry burning of the ultrasonic atomizing sheet. For example, when the atomization efficiency at the center of the ultrasonic atomizing sheet is the highest, the e-liquid storing cotton abuts against the center of the ultrasonic atomizing sheet, so the e-liquid storing cotton supplies enough e-liquid to produce atomized e-liquid required for each puff. If the e-liquid on the e-liquid storing cotton is easily consumed, the e-liquid stored in the gaps of the rough surface can be quickly absorbed by the e-liquid storing cotton, which can ensure the timely replenishment of e-liquid on the e-liquid storing cotton.

[0014] Compared with the prior art, the present invention has the following beneficial effects:

1. The rough surface of the e-liquid guide ceramic of the present invention is in contact with the ultrasonic atomizing sheet, so that partial e-liquid storing gaps are formed at the place of contact of the rough surface and the ultrasonic atomizing sheet. E-liquid can be stored in these e-liquid storing gaps (that is, the e-liquid is in direct contact with the surface of the ultrasonic atomizing sheet), and the bottom surface of the e-liquid storing cotton placed in the placement groove is flush with the rough surface, so that the e-liquid on the rough surface can be absorbed by the e-liquid storing cotton, and the e-liquid on the e-liquid storing cotton can be stored by the rough surface. The oscillation frequencies and intensities at different positions of the same ultrasonic atomizing sheet are different, that is, the efficiencies of atomizing e-liquid into smoke at different positions of the same ultrasonic atomizing sheet are different, which can avoid the phenomenon of partial dry burning of the ultrasonic atomizing sheet, and achieve supply and demand balance of e-liquid when the ultrasonic atomizing sheet operates or stops.

2. E-liquid is guided by the combination of the e-liquid guide ceramic and the e-liquid storing cotton, the e-liquid guide ceramic is directly connected with the e-liquid in the e-liquid cartridge and transfers the e-liquid to the ultrasonic atomizing sheet and the e-liquid storing cotton, and the e-liquid storing cotton only plays a role of e-liquid storage, so the e-liquid guide amount of the e-liquid guide assembly is constant during the ultrasonic atomization, and the ultrasonic atomizing sheet will not be soaked in the e-liquid, which ensures the ultrasonic atomization efficiency and achieves stable smoke amount.

3. The center of the e-liquid guide ceramic of the present invention is provided with an air outlet penetrating the e-liquid guide ceramic, the e-liquid storing cotton is exposed at the bottom of the air-outlet, the lower surface of the e-liquid guide ceramic is provided with an air guide groove, the air guide groove is communicated with the bottom of the air outlet, and the air flow can pass by the upper surfaces of the ultrasonic atomizing sheet and the e-liquid storing cotton, so that smoke can be carried out thoroughly and in time.

Brief Description of the Drawings

[0015]

FIG. 1 is a front sectional view of a first embodiment of an ultrasonic atomizer of the present invention, where arrowsindicate the direction of air flow.

FIG. 2 is a cross-sectional view taken along line A-A in FIG. 1, where thick arrowsindicate the flow direction of e-liquid, and thin arrowsindicate the flow direction of air.

FIG. 3 is a first three-dimensional structural diagram of an e-liquid guide ceramic of the present invention.

FIG. 4 is a second three-dimensional structural diagram of an e-liquid guide ceramic of the present invention.

FIG. 5 is a partial cross-sectional view of the e-liquid guide ceramic of the present invention.

FIG. 6 is an exploded view of the ultrasonic atomizer of the present invention.

[0016] In the figures:

1, e-liquid storing assembly; 11, shell; 12, plug; 13, e-liquid cartridge; 14, air outlet channel;

2. e-liquid guide assembly; 21. e-liquid guide ceramic; 22. e-liquid storing cotton; 211. placementgroove; 212. rough surface; 213. air guide groove; 214. air outlet; 215. e-liquid storing cavity; 216. reinforcing rib;

3. atomizing assembly; 31. bottom cover; 32. atomizing head; 33. air inlet channel; 321. atomizing sleeve; 322. ultrasonic atomizing sheet; 323. insulating seat; 324. electrode assembly;

4. gasket.

Detailed Description of the Embodiments

[0017] The present invention will be further described below with reference to specific preferred embodiments, but the scope of protection of the present invention is not limited thereby.

[0018] For the convenience of description, the relative positional relationships of components, such as upper, lower, left, and right, are described according to the layout directions of the drawings in the specification, and do not limit the structure of this patent.

Embodiment 1:

[0019] As shown in FIGS. 1 to 6, an ultrasonic atomizer of this embodiment includes an e-liquid storing assembly 1, an e-liquid guide assembly 2 and an atomizing assembly 3. The e-liquid guide assembly 2 and the atomizing assembly 3 are sequentially installed at the bottom of the e-liquid storing assembly 1.

[0020] The e-liquid storing assembly 1 includes a housing 11 and a plug 12 connected to each other. An e-liquid cartridge 13 is formed byconnecting the housing 11with the plug 12. The plug 12 is preferably an elastic silica gel plug.

[0021] The e-liquid guide assembly 2 includes an e-liquid guide ceramic 21 and e-liquid storing cotton 22. The e-liquid storing cotton 22 has a thickness of 0.1 to 1.0 mm.

[0022] The middle part of the lower surface of the e-liquid guide ceramic 21 is provided with a placement groove 211, the placement groove 211 has the same size as the e-liquid storing cotton 22, and the surface roughness of the placement groove is Ra0.5 to Ra3.5. When the e-liquid storing cotton 22 is placed in the placement groove 211, the friction force between the e-liquid storing cotton 22 and the placement groove 211 is relatively large, so the e-liquid storing cotton 22 is placed more firmly. The lower surface of the e-liquid guide ceramic 21 is also configured as a rough surface 212, the roughness of the rough surface 212 is Ra0.1 to Ra7.5, and the rough surface 212 can be polished with small holes or small grooves to form an uneven surface, so that when the rough surface 212 is in contact with the ultrasonic atomizing sheet 322, certain e-liquid storing gaps that can store e-liquid are formed. Both the e-liquid storing cotton 22 and the rough surface 212 are abutted against an atomizing surface of the ultrasonic atomizing sheet 322, so that there is e-liquid on the atomizing surface of the ultrasonic atomizing sheet 322.

[0023] The center of the e-liquid guide ceramic 21 is provided with an air outlet 214 penetrating the e-liquid guide ceramic 21. The diameter of the placement groove 211 is greater than that of the air outlet 214, so a part of the e-liquid storing cotton 22 is exposed at the bottom of the air outlet 214 and is not blocked. Therefore, when the ultrasonic atomizing sheet 322 operates, e-liquid is atomized to produce a largest amount of smoke with the fastest speed at this part. The other part of the e-liquid storing cotton 22 is abutted against the ultrasonic atomizing sheet 322 by the placement groove 211, which prevents the e-liquid storing cotton 22 from skewing or wrinkling to affect the e-liquid guide effect after the e-liquid storing cotton 22 is in contact with the ultrasonic atomizing sheet 322. A plurality of air guide grooves 213 are radially distributed on the lower surface of the e-liquid guide ceramic 21, and the air guide grooves 213 penetrate the rough surface 212 and the placement groove 211 until the air guide grooves 213 are communicated with the bottom of the air outlet 214. When air flows through the air guide grooves 213, the air flow will bring the smoke generated from the surface of the rough surface 212 and the surface of the e-liquid storing cotton 22 in the placement groove 211 into the air outlet 214, and finally the smoke is inhaled by a user.

[0024] An e-liquid storing cavity 215 is formed in the e-liquid guide ceramic 21, and the e-liquid storing cavity 215 is formed around the periphery of the air outlet 214. After the e-liquid guide ceramic 21 is assembled with the e-liquid storing assembly 1, the e-liquid storing cavity 215 is communicated with the e-liquid cartridge 13, that is, e-liquid is stored in the e-liquid storing cavity 215, so that the direct contact area between the e-liquid and the e-liquid guide ceramic 21 is relative large, thereby increasing the e-liquid guide rate of the e-liquid guide ceramic 21. A reinforcing rib 216 is arranged inside the e-liquid storing cavity 215, which can not only increase the contact area between the e-liquid guide ceramic 21 and the e-liquid, but also make the internal structure of the e-liquid guide ceramic 21 stronger, facilitate assembly, and improve assembly efficiency and yieldrate.

[0025] The vertical distance between the bottom end of the e-liquid storing cavity 215 and the ultrasonic atomizing sheet 322 is 0.5 mm to 8 mm, so that the e-liquid in the e-liquid storing cavity 215 is as close as possible to the atomizing surface of the ultrasonic atomizing sheet 322. However, the time required for the e-liquid guide ceramic 21 to transfer the e-liquid to the atomizing surface of the ultrasonic atomizing sheet 322 is short. Therefore, the shorter the vertical distance between the bottom end of the e-liquid storing cavity 215 and the ultrasonic atomizing sheet 322 is, the faster the transfer of e-liquid is; and the longer the distance is, the slower the transfer of e-liquid is. When the ultrasonic atomizing sheet 322 operates, the shorter the e-liquid supply distance is, the faster the e-liquid supply is,to avoid dry burning of the ultrasonic atomizing sheet 322 and to achieve more stable smoke amount.

[0026] The atomizing assembly 3 includes a bottom cover 31 made of a conductive material, and an atomizing head 32 arranged in the bottom cover 31.

[0027] The atomizing head 32 includes a conductive hollow atomizing sleeve 321, and the ultrasonic atomizing sheet 322 and an insulating seat 323 are sequentially arranged in the inner cavity of the atomizing sleeve 321 from top to bottom. An electrode assembly 324 is ar-

ranged at the middle part of the insulating seat 323. The upper end of the atomizing sleeve 321 is connected to an upper surface electrode of the ultrasonic atomizing sheet 322 in an abutting manner, the lower end of the atomizing sleeve 321 is covered at the bottom of the insulating seat 323 as a first electrode connection terminal, a lower surface electrode of the ultrasonic atomizing sheet 322 is electrically connected to the electrode assembly 324, and the electrode assembly 324 serves as a second electrode terminal.

[0028] Both of the rough surface 212 of the e-liquid guide ceramic 21 and the e-liquid storing cotton 22 are placed on the ultrasonic atomizing sheet 322. An air outlet channel 14 is provided in the e-liquid storing assembly 1, the atomizing assembly 3 is provided with an air inlet channel 33, and the air inlet channel 33 is communicated with the air outlet channel 14 through the air guide groove 213 and the air outlet 214 on the e-liquid guide ceramic 21.

[0029] When this embodiment is used, the user inhales from a suction nozzle of the air outlet channel 14 of the e-liquid storing assembly 1, making outside air enters from the air inlet channel 33 into the air outlet channel 14 through the air guide groove 213 and the air outlet 214 on the e-liquid guide ceramic 21.E-liquid is transferred from the e-liquid cartridge 13to the ultrasonic atomizing sheet 322throughthe e-liquid guide assembly 2.The ultrasonic atomizing sheet 322 is electrically connected to an external power supply through the atomizing sleeve 321 and the electrode assembly 324 to implement ultrasonic atomization, and smoke on the ultrasonic atomizing sheet 322 and the e-liquid storing cotton 22 which is generated by ultrasonic atomization is carried out by the air flow to pass through the air outlet 214 and the air outlet channel 14 and enter to the user's mouth and is inhaled.

[0030] The forgoing descriptions are only preferred embodiments of the present application, and do not limit the present application in any form. Although the present application is disclosed above with the preferred embodiments, the present application is not limited thereto. Some variations or modifications made by any skilled person familiar with the art using the disclosed technical contents without departing from the scope of the technical solution of the present application are equivalent to the embodiments, and all fall within the scope of the technical solution.

Claims

1. An ultrasonic atomizer, comprising an e-liquid guide assembly (2), wherein the e-liquid guide assembly comprises an e-liquid guide ceramic (21) and e-liquid storing cotton (22), a lower surface of the e-liquid guide ceramic is a rough surface (212) which is uneven, a middle part of the rough surface is provided with a placement groove (211) which is recessed, the e-liquid storing cotton is placed in the placement groove, a bottom surface of the e-liquid storing cotton is flush with a bottom surface of the rough surface, and both the rough surface and the e-liquid storing cotton are abutted against a middle part of an atomizing surface of an ultrasonic atomizing sheet (322), so that a partial e-liquid storing gap is formed at the place of contact of the rough surface and the ultrasonic atomizing sheet.

2. The ultrasonic atomizer according to claim 1, wherein a middle part of the e-liquid guide ceramic is provided with an air outlet (214) that axially penetrates the e-liquid guide ceramic, and the e-liquid storing cotton is exposed ata bottom of the air outlet.

3. The ultrasonic atomizer according to claim 2, wherein the lower surface of the e-liquid guide ceramic is provided with an air guide groove (213), and the air guide groove is communicated with the bottom of the air outlet.

4. The ultrasonic atomizer according to claim 3, wherein a plurality of air guide grooves are radially distributed on the lower surface of the e-liquid guide ceramic.

5. The ultrasonic atomizer according to claim 2, wherein an e-liquid storing cavity (215) is formed around the periphery of the air outlet.

6. The ultrasonic atomizer according to claim 5, wherein a plurality of reinforcing ribs (216) are arranged in the e-liquid storing cavity, and the reinforcing ribs are radially distributed on the periphery of the air outlet.

7. The ultrasonic atomizer according to claim 5, wherein the vertical distance between a bottom surface of the e-liquid storing cavity and the ultrasonic atomizing sheet is 0.5 mm to 8 mm.

8. The ultrasonic atomizer according to claim 3, wherein further comprising an e-liquid storing assembly (1) with an e-liquid cartridge (13) and an atomizing assembly (3), wherein the e-liquid guide assembly and the atomizing assembly are sequentially installed at a bottom of the e-liquid storing assembly, an air outlet channel (14) communicated with a suction nozzle is provided in the e-liquid storing assembly, an air inlet channel (33) communicated with outside air is provided in the atomizing assembly, and the air inlet channel is communicated with the air outlet channel through the air guide groove and the air outlet on the e-liquid guide ceramic.

9. An e-liquid guide ceramic, wherein a lower surface of the e-liquid guide ceramic is a rough surface (212)

which is uneven, and a middle part of the rough surface is recessed to form a placement groove (211) for placing the e-liquid storing cotton (22).

10. The e-liquid guide ceramic according to claim 9, wherein a middle part of the e-liquid guide ceramic is provided with an air outlet (214) that axially penetrates the e-liquid guide ceramic, the lower surface of the e-liquid guide ceramic is provided with an air guide groove (213), and the air guide groove is communicated with a bottom of the air outlet.

11. The e-liquid guide ceramic according to claim 9, wherein a plurality of air guide grooves are radially distributed on the lower surface of the e-liquid guide ceramic.

12. The e-liquid guide ceramic according to claim 9, wherein an e-liquid storing cavity (215) is formed around the periphery of the air outlet channel.

13. The e-liquid guide ceramic according to claim 9, wherein a plurality of reinforcing ribs (216) are arranged in the e-liquid storing cavity, and the reinforcing ribs are radially distributed on the periphery of the air outlet.

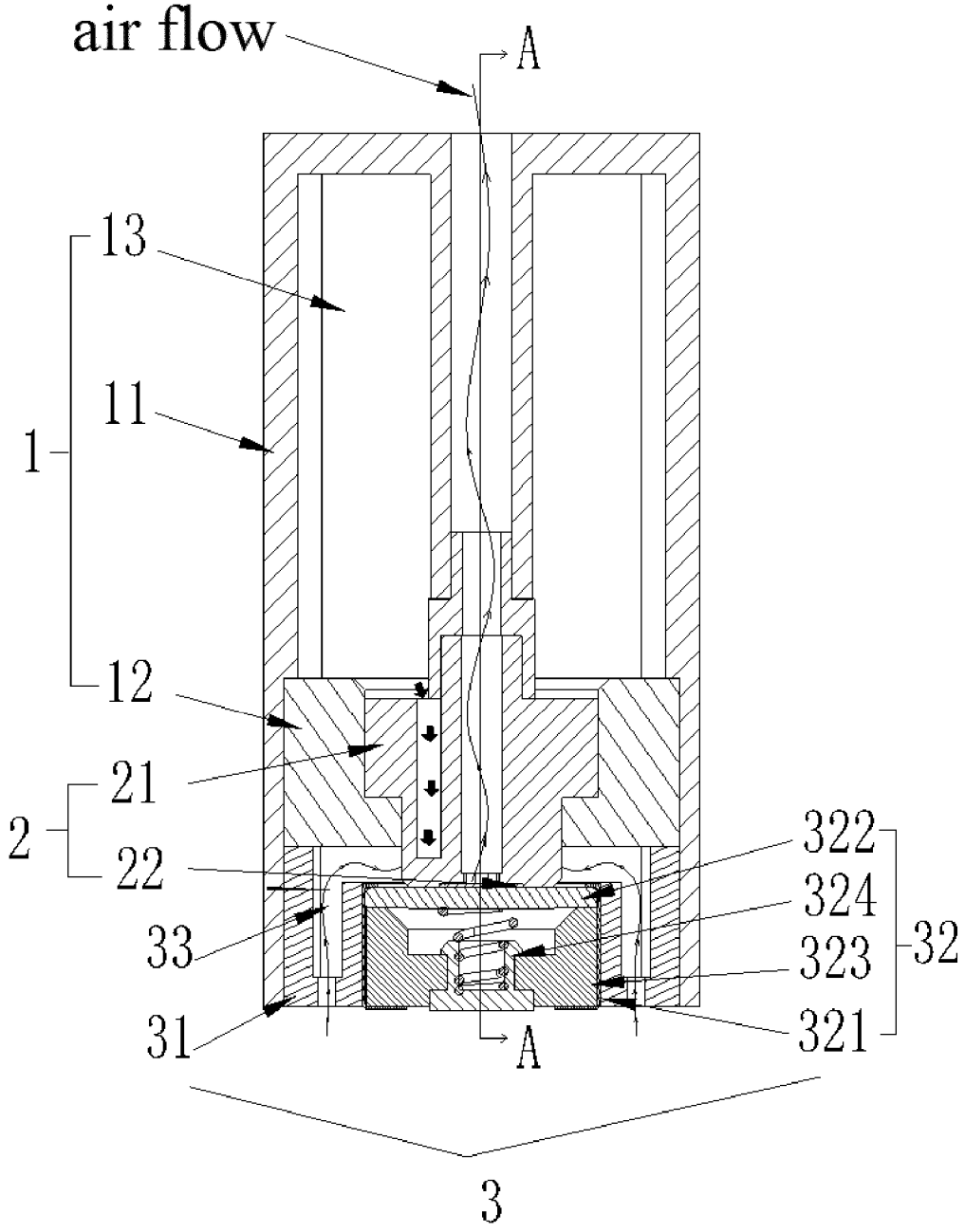

Fig. 1

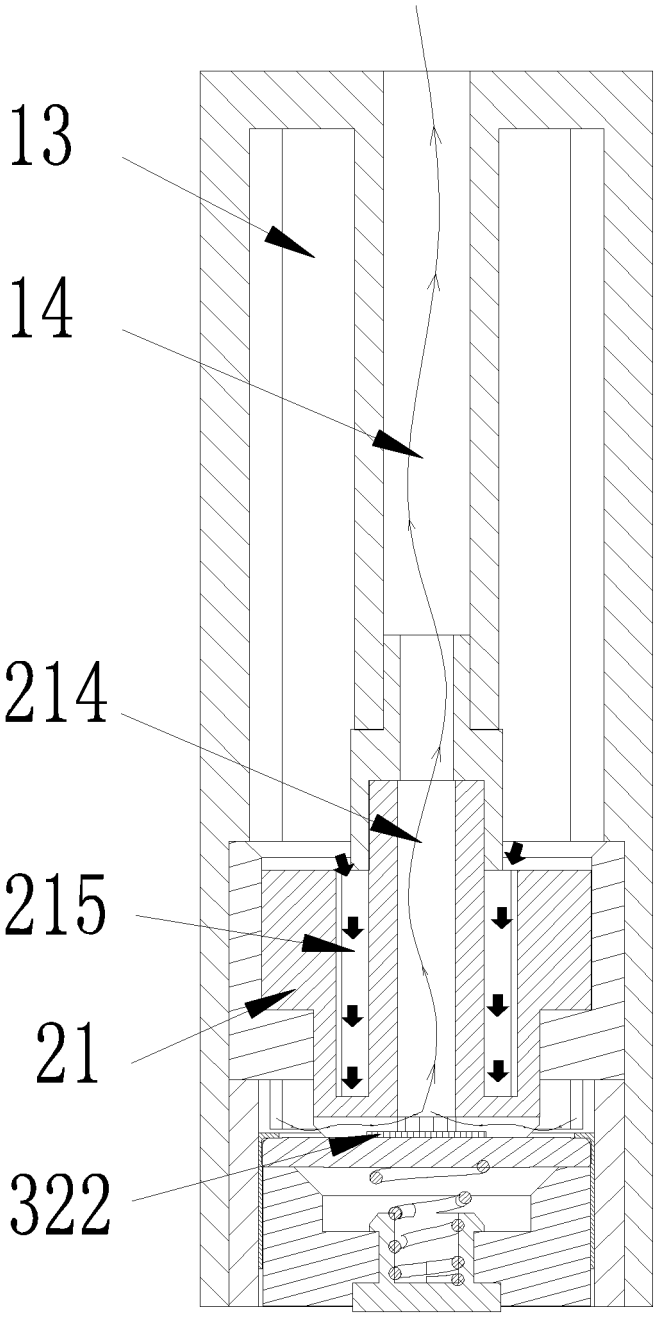

Fig. 2

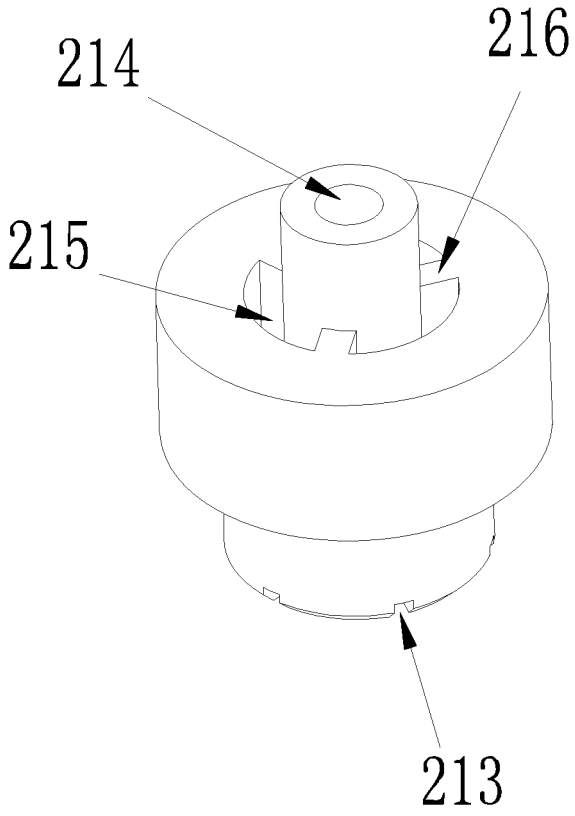

Fig. 3

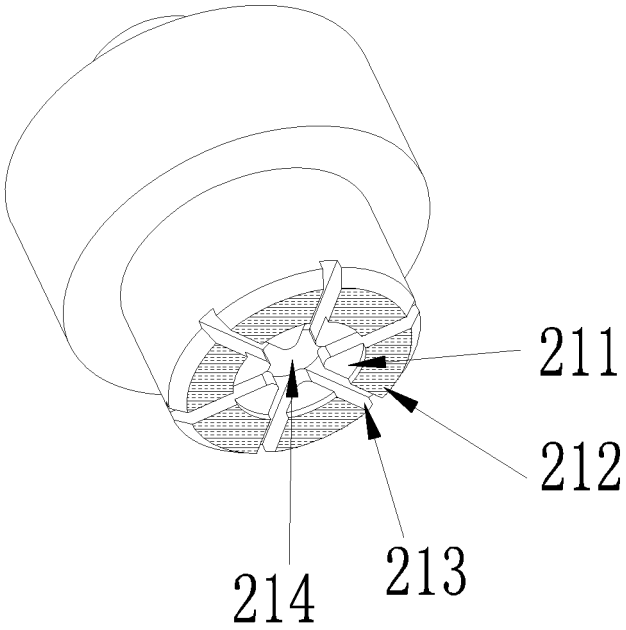

Fig. 4

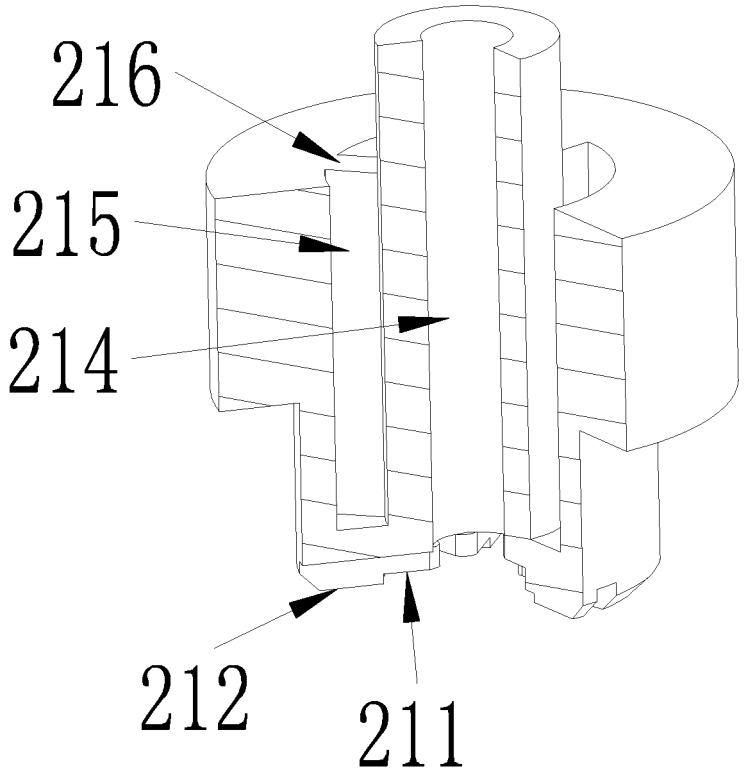

Fig. 5

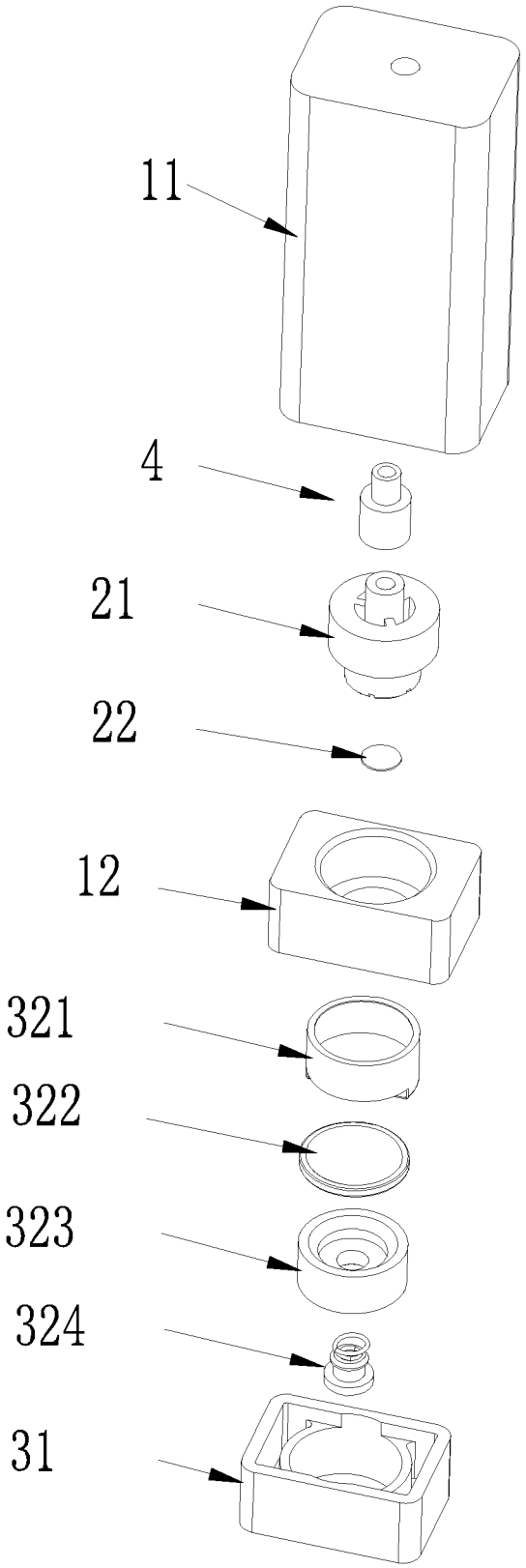

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/137454

A. CLASSIFICATION OF SUBJECT MATTER

A24F 47/00(2020.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F 47/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNTXT, VEN: 电子烟, 雾化, 超声, 陶瓷, 导油, 储油, 棉, 粗糙, 凹, 孔, 槽, 嵌, 导气, electronic, cigarette, cigar, tobacco, smok+, atomiz+, vaporiz+, ceramic?, oil, guid+, hole?, rough, coarse, concave, hollow, dent, groove, embed+, air

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 211657385 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 13 October 2020 (2020-10-13) description paragraphs 0007-0015, 0033-0043, figures 1-6	1-13
Y	CN 207011681 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 16 February 2018 (2018-02-16) description, paragraphs 0030-0042, and figures 2-4	1-13
Y	CN 105876870 A (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 24 August 2016 (2016-08-24) description, paragraphs 0022-0030, figures 1, 3-4	1-13
Y	CN 206043426 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 29 March 2017 (2017-03-29) description, paragraphs 0027-0035, figures 1, 3-4	1-13
A	CN 206433760 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 25 August 2017 (2017-08-25) entire document	1-13

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 February 2021	**24 March 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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International application No.
PCT/CN2020/137454

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 205658373 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 26 October 2016 (2016-10-26) entire document	1-13
A	KR 20130006714 U (SONEN) 22 November 2013 (2013-11-22) entire document	1-13
A	EP 3272238 A1 (CHINA TOBACCO HUNAN IND CO., LTD.) 24 January 2018 (2018-01-24) entire document	1-13

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/137454

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 211657385 U	13 October 2020	None	
CN 207011681 U	16 February 2018	None	
CN 105876870 A	24 August 2016	CN 105876870 B	05 November 2019
CN 206043426 U	29 March 2017	None	
CN 206433760 U	25 August 2017	WO 2018126848 A1	12 July 2018
CN 205658373 U	26 October 2016	None	
KR 20130006714 U	22 November 2013	KR 200470732 Y1	08 January 2014
EP 3272238 A1	24 January 2018	US 2018153217 A1	07 June 2018
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		US 10531687 B2	14 January 2020
		KR 20180129883 A	05 December 2018
		KR 102176389 B1	09 November 2020
		WO 2017197703 A1	23 November 2017
		CN 105768238 A	20 July 2016
		CN 105768238 B	24 May 2019
		JP 2019515690 A	13 June 2019
		EP 3272238 A4	14 November 2018
		CN 205624490 U	12 October 2016

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