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(54) ATOMIZING DEVICE AND ELECTRONIC CIGARETTE

(57) Provided are an atomizing device and an electronic cigarette, which belong to the technical field of electronic smoking sets. The atomizing device includes a housing (1), a divider (2) and a heating element (3). The tail cap (13) of the housing (1) has a first air inlet hole (131), a second air inlet hole (132) and an air outlet hole (133). A first air passage (10) is formed between the housing body (11) and the divider (2), and the first air passage (10) communicates with the first air inlet hole (131). A second air passage (20) is formed between the heating element (3) and the divider (2), the heating element (3) has a middle air passage (30), the first air passage (10) and second air passage (20) communicate with the middle air passage (30), and the middle air passage (30) is configured to accommodate a to-be-atomized object (100).

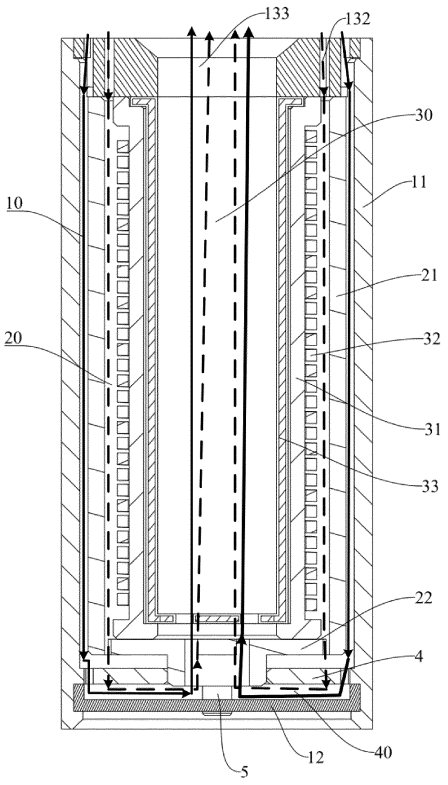

FIG. 14

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of electronic smoking sets, and for example, to an atomizing device and an electronic cigarette.

BACKGROUND

[0002] The electronic cigarette heats and atomizes the tobacco to generate smoke, through which the user can taste a smell similar to a regular cigarette. In this process, the tobacco does not burn. Since the smoke generated by the electronic cigarette does not have harmful substances in regular cigarettes such as tar and suspended particles, the electronic cigarette is favored by a large number of users.

[0003] The electronic cigarette heats the tobacco through an atomizing device. Specifically, the atomizing device includes a housing, a heating element mounted in the housing and a tobacco chamber for accommodating the tobacco, and the heating element is disposed around the tobacco chamber in a circle. One end of the housing has an air inlet, air enters the housing through the air inlet and is heated by the heating element, and the heated air flows through the tobacco from one end of the tobacco and into the mouth of the user. Since the tobacco is a loose porous medium, the heated air can smoothly flow through the tobacco.

[0004] However, since the heating element is disposed close to the housing, the heat generated by the heating element is transferred to the housing, leading to a too-high temperature of the housing which easily scalds the user when the user grasps the housing. Therefore, the electronic cigarette is inconvenient for the user to grasp and has low safety.

SUMMARY

[0005] The present disclosure provides an atomizing device and an electronic cigarette.

[0006] The atomizing device includes a housing, a divider and a heating element.

[0007] The housing includes a housing body and a tail cap connected to one end of the housing body, and the tail cap has a first air inlet hole, a second air inlet hole and an air outlet hole.

[0008] The divider is of a cylindrical shape and disposed inside the housing body, a first air passage is formed between the housing body and an outer side wall of the divider, and the first air passage communicates with the first air inlet hole.

[0009] The heating element is disposed in the divider, a second air passage is formed between the heating element and an inner side wall of the divider, the heating element has a middle air passage, the second air passage communicates with the second air inlet hole, the middle air passage communicates with the air outlet hole, the first air passage and the second air passage separately communicate with the middle air passage, and the middle air passage is configured to accommodate a to-be-atomized object.

[0010] In an embodiment of the present disclosure, multiple first air inlet holes are provided, and the multiple first air inlet holes are equiangularly distributed in a circular matrix around the air outlet hole.

[0011] Multiple second air inlet holes are provided, and the multiple second air inlet holes are equiangularly distributed in a circular matrix around the air outlet hole.

[0012] In an embodiment of the present disclosure, the divider includes a dividing cylinder and a dividing plate fixedly connected to one end of the dividing cylinder, the first air passage is formed between the housing body and an outer side wall of the dividing cylinder, the second air passage is formed between the heating element and an inner side wall of the dividing cylinder, a head cap is connected to the other end of the housing body, a confluence chamber is formed between the dividing plate and the head cap, the dividing plate has multiple fourth through holes communicating with the second air passage and multiple fifth through holes communicating with the middle air passage, the first air passage communicates with the confluence chamber, the second air passage communicates with the confluence chamber through the multiple fourth through holes, and the middle air passage communicates with the confluence chamber through the multiple fifth through holes.

[0013] In an embodiment of the present disclosure, the housing further includes a support plate disposed in the confluence chamber and fixedly connected to an inner wall of the housing body, the support plate has multiple first flow-dividing holes communicating with the first air passage, multiple second flow-dividing holes communicating with the second air passage and a third flow-dividing hole communicating with the middle air passage, and the multiple second flow-dividing holes are in one-to-one correspondence with the multiple fourth through holes.

[0014] In an embodiment of the present disclosure, a side of the dividing plate facing the support plate has a protruding cylinder and multiple protruding blocks, the protruding cylinder extends into the third flow-dividing hole and is in contact with or connected to a hole wall of the third flow-dividing hole, the middle air passage communicates with the protruding cylinder, the multiple protruding blocks abut the support plate, and the other end of the dividing cylinder abuts the tail cap.

[0015] In an embodiment of the present disclosure, the heating element includes a support of a cylindrical shape, an electromagnetic induction coil wound around an outside of the support and an induction heating body fixedly disposed on an inside of the support, the second air passage is formed between the support, the electromagnetic induction coil and the inner side wall of the divider, the induction heating body has the middle air passage, and

the induction heating body is configured to be capable of generating a corresponding eddy current and radiating heat under a magnetic field formed by the electromagnetic induction coil.

[0016] In an embodiment of the present disclosure, the induction heating body includes a metal core and a Teflon sleeve enclosing an outer surface of the metal core, and the Teflon sleeve is limited in the support.

[0017] In an embodiment of the present disclosure, one of the inner wall of the housing body and an outer wall of the divider has a first positioning recess, the other one of the inner wall of the housing body and the outer wall of the divider has a first positioning protrusion, and the first positioning protrusion is configured to be placed in the first positioning recess.

[0018] One of an inner wall of the divider and an outer wall of the heating element has a second positioning recess, the other one of the inner wall of the divider and the outer wall of the heating element has a second positioning protrusion, and the second positioning protrusion is configured to be placed in the second positioning recess.

[0019] In an embodiment of the present disclosure, the tail cap has multiple third positioning protrusions, the inner wall of the housing body has multiple third positioning recesses, the plurality of third positioning recesses are in one-to-one correspondence with the multiple third positioning protrusions, and one of the multiple third positioning protrusions is configured to be placed in a respective one of the multiple third positioning recesses.

[0020] Each of at least one positioning protrusion of the plurality of third positioning protrusions is fixedly connected to a fourth positioning protrusion, the inner wall of the housing body has a fourth positioning recess corresponding to the fourth positioning protrusion, the divider has a fifth positioning recess corresponding to the fourth positioning protrusion, a part of the fourth positioning protrusion is configured to be placed in the fourth positioning recess, and another part of the fourth positioning protrusion is configured to be placed in the fifth positioning recess.

[0021] An embodiment of the present disclosure provides an electronic cigarette including any one of the preceding atomizing devices.

BRIEF DESCRIPTION OF DRAWINGS

[0022]

FIG. 1 is structural view one of an atomizing device according to an embodiment of the present disclosure;

FIG. 2 is a top view of an atomizing device according to an embodiment of the present disclosure;

FIG. 3 is structural view two of an atomizing device according to an embodiment of the present disclosure;

FIG. 4 is an exploded view of an atomizing device according to an embodiment of the present disclosure;

FIG. 5 is sectional view one of an atomizing device according to an embodiment of the present disclosure;

FIG. 6 is a structural view of a housing body according to an embodiment of the present disclosure;

FIG. 7 is a structural view of a housing body and a support plate according to an embodiment of the present disclosure;

FIG. 8 is structural view one of a divider according to an embodiment of the present disclosure;

FIG. 9 is structural view two of a divider according to an embodiment of the present disclosure;

FIG. 10 is an assembly view of a divider and a tail cap according to an embodiment of the present disclosure;

FIG. 11 is a structural view of a tail cap according to an embodiment of the present disclosure;

FIG. 12 is an assembly view of a divider and a heating element according to an embodiment of the present disclosure;

FIG. 13 is sectional view two of an atomizing device according to an embodiment of the present disclosure; and

FIG. 14 is sectional view three of an atomizing device according to an embodiment of the present disclosure.

Reference list

[0023]

1	housing
11	housing body
111	first positioning recess
112	third positioning recess
113	fourth positioning recess
12	head cap
13	tail cap
131	first air inlet hole
132	second air inlet hole
133	air outlet hole
134	third positioning protrusion
135	fourth positioning protrusion

2 divider
21 dividing cylinder
22 dividing plate
221 fourth through hole
222 fifth through hole
223 protruding cylinder
224 protruding block
23 first positioning protrusion
24 second positioning recess
25 fifth positioning recess
3 heating element
31 support
32 electromagnetic induction coil
33 induction heating body
331 metal core
332 Teflon sleeve
34 second positioning protrusion
4 support plate
41 first flow-dividing hole
42 second flow-dividing hole
43 third flow-dividing hole
5 electrode
10 first air passage
20 second air passage
30 middle air passage
40 confluence chamber
100 to-be-atomized object

DETAILED DESCRIPTION

[0024] To make solved problems, adopted technical solutions and achieved effects of the present disclosure more apparent, the technical solutions of the present disclosure are described hereinafter in conjunction with drawings and embodiments. It is to be understood that the specific embodiments set forth below are intended to illustrate and not to limit the present disclosure. In addition, it should be noted that for ease of description, only part, instead of all, related to the present disclosure is illustrated in the drawings.

[0025] In the description of the present disclosure, unless otherwise expressly specified and limited, the term "connected to each other", "connected" or "fixed" is to be construed in a broad sense, for example, as fixedly connected, detachably connected or integrated; mechanically connected or electrically connected; directly connected to each other or indirectly connected to each other via an intermediary; or internal connection between two components or interaction relations between two components. For those of ordinary skill in the art, specific meanings of the preceding terms in the present disclosure may be construed based on specific situations.

[0026] In the present disclosure, unless otherwise expressly specified and limited, when a first feature is described as "above" or "below" a second feature, the first feature and the second feature may be in direct contact or be in contact via another feature between the two features. Moreover, when the first feature is described as "on", "above" or "over" the second feature, the first feature is right on, above or over the second feature, or the first feature is obliquely on, above or over the second feature, or the first feature is simply at a higher level than the second feature. When the first feature is described as "under", "below" or "underneath" the second feature, the first feature is right under, below or underneath the second feature or the first feature is obliquely under, below or underneath the second feature, or the first feature is simply at a lower level than the second feature.

[0027] In the description of this embodiment, the orientation or position relationships indicated by terms "above", "below", "right" and the like are based on the orientation or position relationships shown in the drawings. These orientations or position relationships are merely for ease of description and simplifying an operation and do not indicate or imply that the referred device or element has a specific orientation and is constructed and operated in a specific orientation. Thus, these orientations or position relationships are not to be construed as limiting the present disclosure. In addition, the terms "first" and "second" are used only to distinguish between descriptions and have no special meaning.

Embodiment one

[0028] An embodiment provides an atomizing device. The temperature of the circumferential outer surface of the atomizing device is ensured to be relatively low, so that the probability of scalding the user is reduced, the grip by the user is facilitated, and thus the atomizing device has relatively high safety.

[0029] As shown in FIG. 1 to FIG. 4, the atomizing device includes a housing 1 of a cylindrical shape and a divider 2 and a heating element 3 which are separately fixedly disposed inside the housing 1.

[0030] The housing 1 includes a housing body 11 of a cylindrical shape and a head cap 12 and a tail cap 13 which are connected to two ends of the housing body 11, respectively. In an embodiment, the head cap 12 is hermetically connected to one end of the housing body 11, and the tail cap 13 is hermetically connected to the other end of the housing body 11. As shown in FIG. 1, the tail cap 13 has a first air inlet hole 131, a second air inlet hole 132 and an air outlet hole 133. In an embodiment, the first air inlet hole 131, the second air inlet hole 132 and the air outlet hole 133 may penetrate the tail cap 13 along an axial direction of the housing body 11. The first air inlet hole 131 and the second air inlet hole 132 are used for air entering the atomizing device, and the air outlet hole 133 is used for air carrying the tobacco smell (that is, atomized particles) flowing out of the atomizing device. The shape of the housing body 11 may be set according to actual requirements. In some embodiments, the housing body 11 is of the cylindrical shape.

[0031] As shown in FIG. 5, the divider 2 is of a cylindrical shape and fixedly disposed in the housing body 11. A first air passage 10 is formed between an inner

side wall of the housing body 11 and an outer side wall of the divider 2. The first air passage 10 communicates with the first air inlet hole 131 so that air can enter the first air passage 10 through the first air inlet hole 131. In an embodiment, the axis of the divider 2 coincides with the axis of the housing body 11.

[0032] With continued reference to FIG. 5, the heating element 3 is fixedly disposed in the divider 2. In some embodiments, the axis of the heating element 3 coincides with the axis of the divider 2. A second air passage 20 is formed between an outer wall of the heating element 3 and an inner side wall of the divider 2, and the heating element 3 has a middle air passage 30. The second air passage 20 communicates with the second air inlet hole 132 so that air can enters the second air passage 20 through the second air inlet hole 132; the middle air passage 30 communicates with the air outlet hole 133 so that air in the atomizing device can flow out through the middle air passage 30 and the air outlet hole 133; the first air passage 10 and the second air passage 20 separately communicate with the middle air passage 30 so that the air in the first air passage 10 and the air in the second air passage 20 can both flow into the middle air passage 30; and the middle air passage 30 is configured to accommodate a to-be-atomized object 100 so that the air flowing into the middle air passage 30 can heat the to-be-atomized object 100 and thus the to-be-atomized object 100 is atomized and generates smoke. In some embodiments, the shape and size of the middle air passage 30 match the shape and size of the to-be-atomized object 100 such that when the to-be-atomized object 100 is located in the middle air passage 30, an outer wall of the to-be-atomized object 100 is in close contact with an inner wall of the heating element 3. In an embodiment, the to-be-atomized object 100 is a structure such as tobacco and a cartridge and does not burn after being heated. It is to be noted that the to-be-atomized object 100 has a portion located outside the middle air passage 30 for being put into the mouth of a user.

[0033] The atomizing device provided in the embodiment is used as below. As shown in FIG. 13, the to-be-atomized object 100 is inserted into the middle air passage 30, a switch of the heating element 3 is turned on, and then the user sucks one end of the to-be-atomized object 100 which is located outside the middle air passage 30; since the to-be-atomized object 100 is a loose porous medium, a negative pressure is generated in the middle air passage 30; at this moment, air enters the first air passage 10 from the first air inlet hole 131 and enters the second air passage 20 from the second air inlet hole 132, the air in the first air passage 10 can carry away the heat emitted by the heating element 3 to the housing body 11, and the air in the second air passage 20 can also carry away the heat emitted by the heating element 3 to the housing body 11; that is, the air in the first air passage 10 and the air in the second air passage 20 are heated, and the heated air in the first air passage 10 and the heated air in the second air passage 20 both enter the middle air passage 30, and pre-heat or heat the to-be-atomized object 100 in the middle air passage 30; therefore, the to-be-atomized object 100 is directly heated in combination with the heating element 3, so that the to-be-atomized object 100 is atomized to form smoke, and the smoke is inhaled into the mouth of the user. In FIG. 14, the thick solid line indicates the flow path of the air entering through the first air inlet hole 131, and the thick broken line indicates the flow path of the air entering through the second air inlet hole 132.

[0034] According to the atomizing device provided in the embodiment, the first air inlet hole 131 communicates with the first air passage 10, the second air inlet hole 132 communicates with the second air passage 20, and the first air passage 10 and the second air passage 20 both communicate with the middle passage 30 so that both the first air passage 10 and the second air passage 20 are used for air entering. In this manner, parallel air entering through the first air passage 10 and the second air passage 20 is achieved; parallel air entering of the atomizing device can carry away the heat which may be transmitted to the housing body 11, and the divider 2 can also absorb part of the heat, so that the thermal resistance between the heating element 3 and the housing body 11 is increased, and relatively less heat is transmitted to the housing body 11; therefore, the temperature of the housing body 11 is ensured to be relatively low, the probability of scalding the user is reduced, the grip by the user is facilitated, and thus the atomizing device has relatively high safety.

[0035] In an embodiment, as shown in FIG. 1 and FIG. 2, multiple first air inlet holes 131 are provided, and the multiple first air inlet holes 131 are equiangularly distributed in a circular matrix around the air outlet hole 133 so that air enters from a circumferential direction of the heating element 3 and thus can block heat being transferred to the housing body 11 in the circumferential direction of the heating element 3, the temperature of various positions of the housing body 11 is relatively low, and the uniformity of the temperature of the housing body 11 is improved. In an embodiment, the circular matrix refers to the array arrangement of the multiple first air inlet holes 131 along a circumferential direction of the tail cap 13.

[0036] In an embodiment, as shown in FIG. 2, multiple second air inlet holes 132 are provided, and the multiple second air inlet holes 132 are closer to the air outlet hole 133 than the multiple first air inlet holes 131. The multiple second air inlet holes 132 are equiangularly distributed in a circular matrix around the air outlet hole 133, so that the uniformity of the temperature of the housing body 11 is further improved.

[0037] In an embodiment, the first air inlet holes 131 and the second air inlet holes 132 are all bar-shaped holes or arc-shaped holes extending along a circumferential direction of the housing body 11.

[0038] In an embodiment, as shown in FIG. 8 and FIG. 9, the divider 2 includes a dividing cylinder 21 and a dividing plate 22 fixedly connected to one end of the divid-

ing cylinder 21. In an embodiment, the dividing plate 22 is fixedly connected to an end of the dividing cylinder 21 close to the head cap 12. The first air passage 10 is formed between the housing body 11 and an outer side wall of the dividing cylinder 21, and the second air passage 20 is formed between the heating element 3 and an inner side wall of the dividing cylinder 21.

[0039] Moreover, a confluence chamber 40 is formed between the dividing plate 22 and the head cap 12, the dividing plate 22 has multiple fourth through holes 221 communicating with the second air passage 20 and multiple fifth through holes 222 communicating with the middle air passage 30, the first air passage 10 communicates with the confluence chamber 40, the second air passage 20 communicates with the confluence chamber 40 through the multiple fourth through holes 221, and the middle air passage 30 communicates with the confluence chamber 40 through the multiple fifth through holes 222. The air in the first air passage 10 and the air in the second air passage 20 both enter the confluence chamber 40 and flow into the middle air passage 30 through the confluence chamber 40. The arrangement of the confluence chamber 40 enables the air in the first air passage 10 to be sufficiently mixed with the air in the second air passage 20, so that the temperature of the air entering the middle air passage 30 is prevented from being too low, and thus the atomization effect is improved.

[0040] In an embodiment, as shown in FIG. 4 and FIG. 7, the housing 1 further includes a support plate 4 disposed in the confluence chamber 40 and fixedly connected to an inner wall of the housing body 11, and the support plate 4 has multiple first flow-dividing holes 41 communicating with the first air passage 10, multiple second flow-dividing holes 42 communicating with the second air passage 20 and a third flow-dividing hole 43 communicating with the middle air passage 30. The multiple first flow-dividing holes 41 are equiangularly distributed in a circular matrix around the third flow-dividing hole 43, and the multiple second flow-dividing holes 42 are equiangularly distributed in a circular matrix around the third flow-dividing hole 43. Moreover, the multiple second flow-dividing holes 42 are in one-to-one correspondence with the multiple fourth through holes 221. Each second flow-dividing hole 42 corresponds to a respective fourth through hole 221 in the axial direction of the housing body 11 so that the air flowing out of the fourth through hole 221 flows to the second flow-dividing hole 42, and thus the flow resistance is reduced. In an embodiment, the support plate 4 is formed integrally with the housing body 11 to have relatively high connection strength.

[0041] In an embodiment, as shown in FIG. 8, a side of the dividing plate 22 facing the support plate 4 has a protruding cylinder 223 and multiple protruding blocks 224. In an embodiment, the axis of the protruding cylinder 223 may coincide with the axis of the housing body 11. As shown in FIG. 4, the protruding cylinder 223 extends into the third flow-dividing hole 43 and is in contact with or connected to a hole wall of the third flow-dividing hole 43, and the middle air passage 30 communicates with the protruding cylinder 223. The air mixed in the confluence chamber 40 enters the middle air passage 30 through the protruding cylinder 223 and the multiple fourth through holes 221. The multiple protruding blocks 224 abut the support plate 4, and another end of the dividing cylinder 21 abuts the tail cap 13. The divider 2 is limitedly fixed in the housing body 11 by the support plate 4 and the tail cap 13 so that the divider 2 is prevented from moving in the axial direction of the housing body 11.

[0042] The heating element 3 may be a heating device in the related art. The embodiment provides a heating element 3. As shown in FIG. 3 and FIG. 4, the heating element 3 includes a support 31 of a cylindrical shape, an electromagnetic induction coil 32 wound around an outside of the support 31 and an induction heating body 33 fixedly disposed on an inside of the support 31. The cross section of the support 31 may be I-shaped, and the electromagnetic induction coil 32 may be wound in the middle of the support 31 and is limited by protruding structures at two ends of the support 31. The second air passage 20 is formed between the support 31, the electromagnetic induction coil 32 and the inner side wall of the divider 2, and the induction heating body 33 includes the middle air passage 30. That is, the induction heating body 33 is of a cylindrical shape. The induction heating body 33 is capable of generating a corresponding eddy current under a magnetic field formed by the electromagnetic induction coil 32 and radiating heat, thereby heating the to-be-atomized object 100 and the air in the second air passage 20. In the embodiment, for the principle that induction heating body 33 and the electromagnetic induction coil 32 cooperate with each other to generate heat, reference may be made to the related art, which is not limited in the embodiment.

[0043] In an embodiment, the head cap 12 further has a first electrode hole, the support plate 4 further has a second electrode hole, and the dividing plate 22 further has a third electrode hole. The atomizing device further includes electrodes 5 penetrating the first electrode hole, the second electrode hole and the third electrode hole in sequence, and the electrodes 5 are electrically connected to the electromagnetic induction coil 32 and are configured to transmit electric energy.

[0044] In an embodiment, as shown in FIG. 4 or FIG. 13, the induction heating body 33 includes a metal core 331 and a Teflon sleeve 332 enclosing an outer surface of the metal core 331. The Teflon sleeve 332 is made of Teflon and has good heat transfer performance. The Teflon sleeve 332 is limited in the support 31. In some embodiments, limiting edges are provided on two ends of the support 31, respectively, and the Teflon sleeve 332 abuts the two limiting edges.

[0045] In an embodiment, one of the inner wall of the housing body 11 and an outer wall of the divider 2 has a first positioning recess 111, the other one of the inner wall of the housing body 11 and the outer wall of the divider 2 has a first positioning protrusion 23. The first

positioning protrusion 23 is configured to be placed in the first positioning recess 111 for positioning assembly of the housing body 11 with the divider 2 and also for circumferential limiting on the divider 2 by the housing body 11. As shown in FIG. 6 and FIG. 8, the inner wall of the housing body 11 has the first positioning recess 111, and the outer wall (specifically an outer wall of the dividing cylinder 21) of the divider 2 has the first positioning protrusion 23. The first positioning protrusion 23 extends from one end of the dividing cylinder 21 to the other end of the dividing cylinder 21.

[0046] In addition, one of an inner wall of the divider 2 and an outer wall of the heating element 3 has a second positioning recess 24, and the other one of the inner wall of the divider 2 and the outer wall of the heating element 3 has a second positioning protrusion 34. The second positioning protrusion 34 is configured to be placed in the second positioning recess 24 for positioning assembly of the divider 2 with the heating element 3 and for circumferential limiting on the heating element 3 by the divider 2. As shown in FIG. 9 and FIG. 12, the inner wall of the divider 2 has the second positioning recess 24, and the outer wall of the heating element 3 has the second positioning protrusion 34. In the embodiment, the second positioning protrusion 34 is disposed on the protruding structure of the support 31.

[0047] In an embodiment, as shown in FIG. 10 and FIG. 11, the tail cap 13 has multiple third positioning protrusions 134 which are disposed in a circumferential direction, and the inner wall of the housing body 11 has multiple third positioning recesses 112 which are in one-to-one correspondence with the multiple third positioning protrusions 134. One of the multiple third positioning protrusions 134 is configured to be placed in a respective one of the multiple third positioning recesses 112 for achieving positioning mounting of the tail cap 13 with the housing body 11.

[0048] In an embodiment, as shown in FIG. 9 to FIG. 11, each of at least one of the multiple third positioning protrusions 134 is fixedly connected to a fourth positioning protrusion 135. The fourth positioning protrusion 135 is located on a third positioning protrusion 134. In an embodiment, a surface of a third positioning protrusion 134 facing the divider 2 has a fourth positioning protrusion 135, the inner wall of the housing body 11 has a fourth positioning recess 113 corresponding to the fourth positioning protrusion 135, and the divider 2 has a fifth positioning recess 25 corresponding to the fourth positioning protrusion 135. A part of the fourth positioning protrusion 135 is configured to be placed in the fourth positioning recess 113, and another part of the fourth positioning protrusion 135 is configured to be placed in the fifth positioning recess 25. That is, the fourth positioning protrusion 135 is inserted into both the fourth positioning recess 113 and the fifth positioning recess 25, so that simultaneous positioning of the housing body 11, the dividing cylinder 21 and the tail cap 13 is achieved.

[0049] The atomizing device provided in the above embodiments has beneficial effects described below.

1) The atomizing device has low air resistance. The tail end of the atomizing device has multiple external air inlet vents, that is, multiple first air inlet holes 131 and multiple second air inlet holes 132. Each layer of air vents are equiangularly distributed in a circular matrix. At the head end, all the air flows converge in the confluence chamber 40 and enter the middle air passage 30, and finally the gas generated by heating the heat-not-burn tobacco or herb flows uniformly from the surface of the loose porous medium to the mouth, having the negative air pressure, of the consumer.

2) The atomizing device has no heating on the external surface. The first air passage 10 and the second air passage 20 form multiple layers of air flows, and the multiple layers of internal air flows can completely carry away the heat that may be transmitted to the housing body 11, fully ensuring that the circumferential outer surface of the housing body 11 is approximately at a normal temperature.

3) The atomizing device has the effect that sufficient heating and no burning. The electromagnetic field eddy current generated by the electromagnetic induction coil 32 which is electrified generates an electromagnetic induction heating effect with the metal core 331 of the induction heating body 33 in the middle. According to the heating principle, the surface temperature of the induction heating body 33 can be substantially constant and the junction temperature in the center of the induction heating body 33 can be relatively high. Since the current can be controlled and output very accurately, the temperature generated by the electromagnetic induction heating effect can be finely controlled and thus precise temperature control can be achieved. In summary, substantially-equivalent heating effects can be obtained by heating both the surface and the center of the heat-not-burn tobacco or herbal, and the disadvantage of poor heating effect of the center can be prevented.

Embodiment two

[0050] The embodiment two differs from embodiment one in that the structure of the divider 2 is different.

[0051] In the embodiment, the divider 2 includes multiple dividing cylinders which are coaxially sleeved with each other and a dividing plate connected to an end of the multiple dividing cylinders. Inner diameters of the multiple dividing cylinders are different, and a dividing air passage can be formed between two adjacent dividing cylinders. The tail cap 13 further has a third air inlet hole communicating with the dividing air passage. The dividing plate has a hole structure communicating with the dividing air passage. The dividing air passage commu-

nicates with the middle air passage 30 through the hole structure. Air enters the dividing air passage through the third air inlet hole, absorbs heat emitted by the heating element 3 in the dividing air passage, flows out through the hole structure and flows into the middle air passage 30. It is to be noted that a confluence chamber may be formed between the dividing plate and the head cap 12, the air flowing out from the hole structure enters the confluence chamber and is mixed with the air flowing out from the first air passage 10 and the air flowing out from the second air passage 20, and the mixed air enters the middle air passage 30. It is to be noted that a first air passage 10 is formed between an outer cylinder and the housing body 11, and a second air passage 20 is formed between an inner cylinder and the housing body 11. Multiple dividing cylinders are disposed, so that at least one dividing air passage can be formed, the air in the dividing air passage can absorb the heat emitted by the heating element 3, and thus the temperature of the housing body 11 is further reduced.

[0052] Other structures of the embodiment are the same as the corresponding structures of Embodiment one and have the same beneficial effects, which are not repeated in the embodiment.

Embodiment three

[0053] The embodiment provides an electronic cigarette including any one of the atomizing devices described in embodiment one and embodiment two. The electronic cigarette provided in the embodiment has a better heating effect, and the temperature of the circumferential surface of the electronic cigarette is relative low, so that the user will not be burned, and thus the electronic cigarette has relatively high safety and comfort.

Claims

1. An atomizing device, comprising:

   a housing (1), wherein the housing (1) comprises a housing body (11) and a tail cap (13) connected to one end of the housing body (11), and the tail cap (13) has a first air inlet hole (131), a second air inlet hole (132) and an air outlet hole (133);
   a divider (2), wherein the divider (2) is of a cylindrical shape and disposed inside the housing body (11), a first air passage (10) is formed between the housing body (11) and an outer side wall of the divider (2), and the first air passage (10) communicates with the first air inlet hole (131); and
   a heating element (3), wherein the heating element (3) is disposed in the divider (2), a second air passage (20) is formed between the heating element (3) and an inner side wall of the divider (2), the heating element (3) has a middle air passage (30), the second air passage (20) communicates with the second air inlet hole (132), the middle air passage (30) communicates with the air outlet hole (133), the first air passage (20) and the second air passage (30) separately communicate with the middle air passage (30), and the middle air passage (30) is configured to accommodate a to-be-atomized object (100).

2. The atomizing device according to claim 1, wherein a plurality of first air inlet holes (131) are provided, and the plurality of first air inlet holes (131) are equiangularly distributed in a circular matrix around the air outlet hole (133); and
   a plurality of second air inlet holes (132) are provided, and the plurality of second air inlet holes (132) are equiangularly distributed in a circular matrix around the air outlet hole (133).

3. The atomizing device according to claim 2, wherein the divider (2) comprises a dividing cylinder (21) and a dividing plate (22) fixedly connected to one end of the dividing cylinder (21), the first air passage (10) is formed between the housing body (11) and an outer side wall of the dividing cylinder (21), the second air passage (20) is formed between the heating element (3) and an inner side wall of the dividing cylinder (21), a head cap (12) is connected to another end of the housing body (11), a confluence chamber (40) is formed between the dividing plate (22) and the head cap (12), the dividing plate (22) has a plurality of fourth through holes (221) communicating with the second air passage (20) and a plurality of fifth through holes (222) communicating with the middle air passage (30), the first air passage (10) communicates with the confluence chamber (40), the second air passage (20) communicates with the confluence chamber (40) through the plurality of fourth through holes (221), and the middle air passage (30) communicates with the confluence chamber (40) through the plurality of fifth through holes (222).

4. The atomizing device according to claim 3, wherein the housing (1) further comprises a support plate (4) disposed in the confluence chamber (40) and fixedly connected to an inner wall of the housing body (11), the support plate (4) has a plurality of first flow-dividing holes (41) communicating with the first air passage (10), a plurality of second flow-dividing holes (42) communicating with the second air passage (20) and a third flow-dividing hole (43) communicating with the middle air passage (30), and the plurality of second flow-dividing holes (42) are in one-to-one correspondence with the plurality of fourth through holes (221).

5. The atomizing device according to claim 4, wherein

a side of the dividing plate (22) facing the support plate (4) has a protruding cylinder (223) and a plurality of protruding blocks (224), the protruding cylinder (223) extends into the third flow-dividing hole (43) and is in contact with or connected to a hole wall of the third flow-dividing hole (43), the middle air passage (30) communicates with the protruding cylinder (223), the plurality of protruding blocks (224) abut the support plate (4), and another end of the dividing cylinder (21) abuts the tail cap (13).

6. The atomizing device according to any one of claims 1 to 5, wherein the heating element (3) comprises a support (31) of a cylindrical shape, an electromagnetic induction coil (32) wound around an outside of the support (31) and an induction heating body (33) fixedly disposed on an inside of the support (31), the second air passage (20) is formed between the support (31), the electromagnetic induction coil (32) and the inner side wall of the divider (2), the induction heating body (33) has the middle air passage (30), and the induction heating body (33) is configured to be capable of generating a corresponding eddy current and radiating heat under a magnetic field formed by the electromagnetic induction coil (32).

7. The atomizing device according to claim 6, wherein the induction heating body (33) comprises a metal core (331) and a Teflon sleeve (332) enclosing an outer surface of the metal core (331), and the Teflon sleeve (332) is limited in the support (31).

8. The atomizing device according to any one of claims 1 to 5, wherein one of the inner wall of the housing body (11) and an outer wall of the divider (2) has a first positioning recess (111), the other one of the inner wall of the housing body (11) and the outer wall of the divider (2) has a first positioning protrusion (23), and the first positioning protrusion (23) is configured to be placed in the first positioning recess (111); and
one of an inner wall of the divider (2) and an outer wall of the heating element (3) has a second positioning recess (24), the other one of the inner wall of the divider (2) and the outer wall of the heating element (3) has a second positioning protrusion (34), and the second positioning protrusion (34) is configured to be placed in the second positioning recess (24).

9. The atomizing device according to any one of claims 1 to 5, wherein the tail cap (13) has a plurality of third positioning protrusions (134), the inner wall of the housing body (11) has a plurality of third positioning recesses (112) , the plurality of third positioning recesses (112) are in one-to-one correspondence with the plurality of third positioning protrusions (134), and one of the plurality of third positioning protrusions (134) is configured to be placed in a respective one of the plurality of third positioning recesses; and each of at least one of the plurality of third positioning protrusions (134) is fixedly connected to a fourth positioning protrusion (135), the inner wall of the housing body (11) has a fourth positioning recess (113) corresponding to the fourth positioning protrusion (135), the divider (2) has a fifth positioning recess (25) corresponding to the fourth positioning protrusion (135), a part of the fourth positioning protrusion (135) is configured to be placed in the fourth positioning recess (113), and another part of the fourth positioning protrusion (135) is configured to be placed in the fifth positioning recess (25).

10. An electronic cigarette, comprising the atomizing device according to any one of claims 1 to 9.

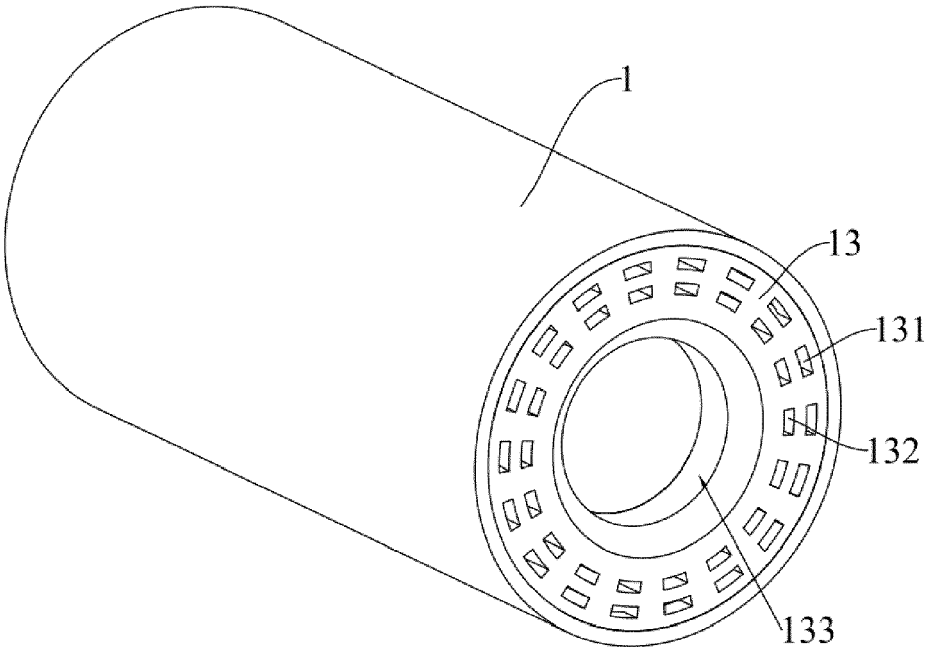

FIG. 1

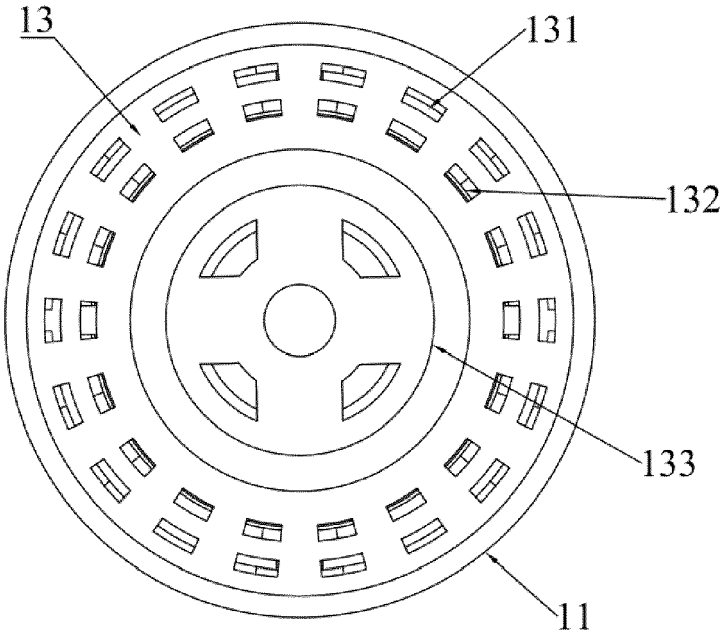

FIG. 2

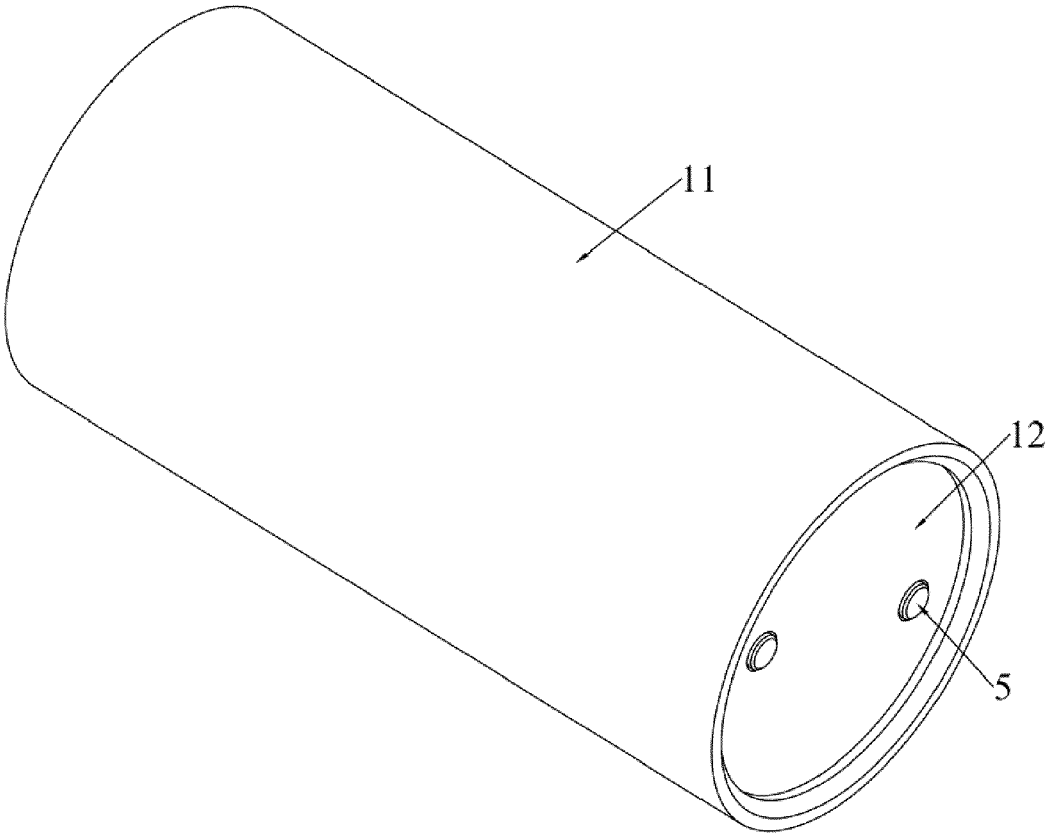

FIG. 3

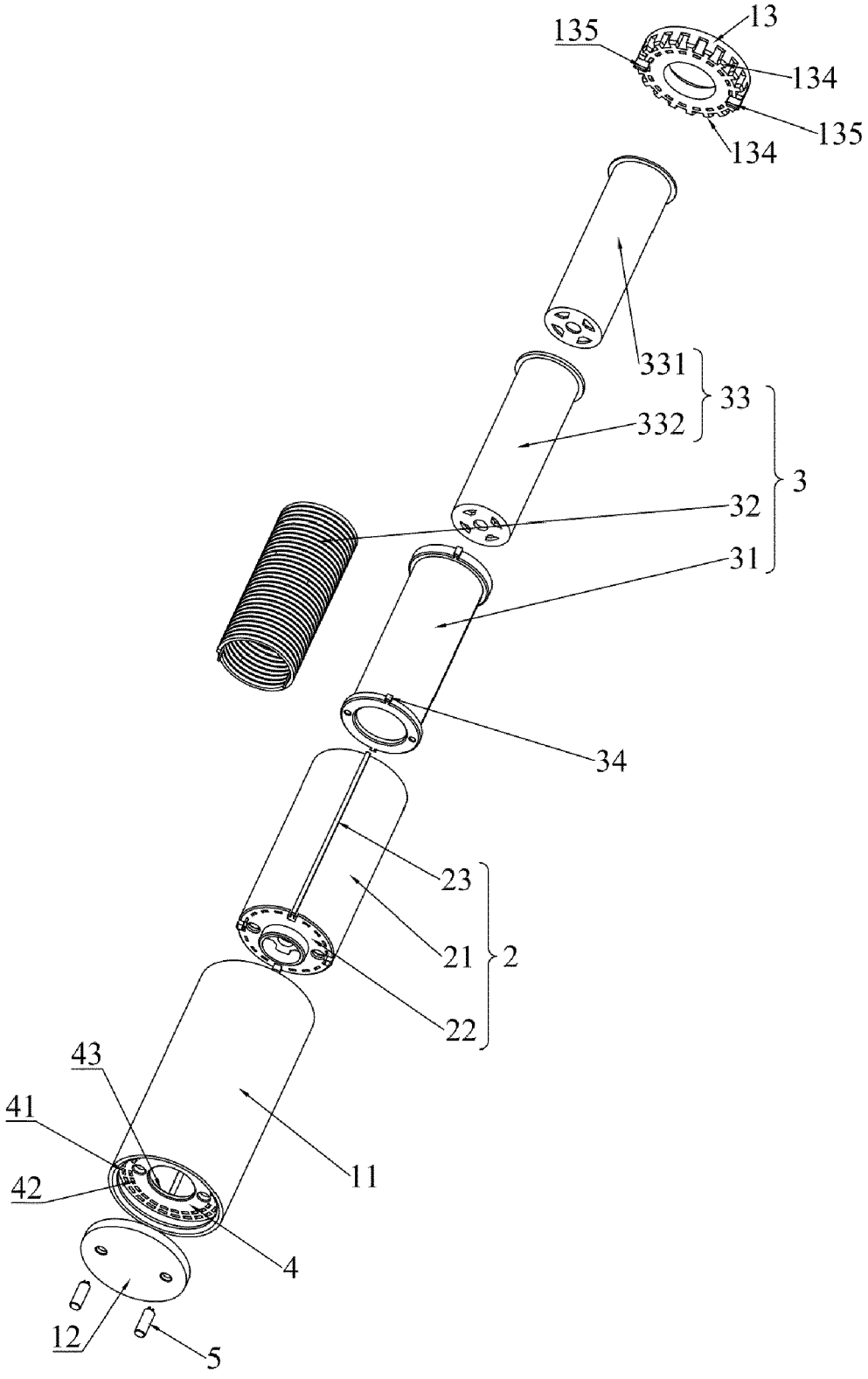

FIG. 4

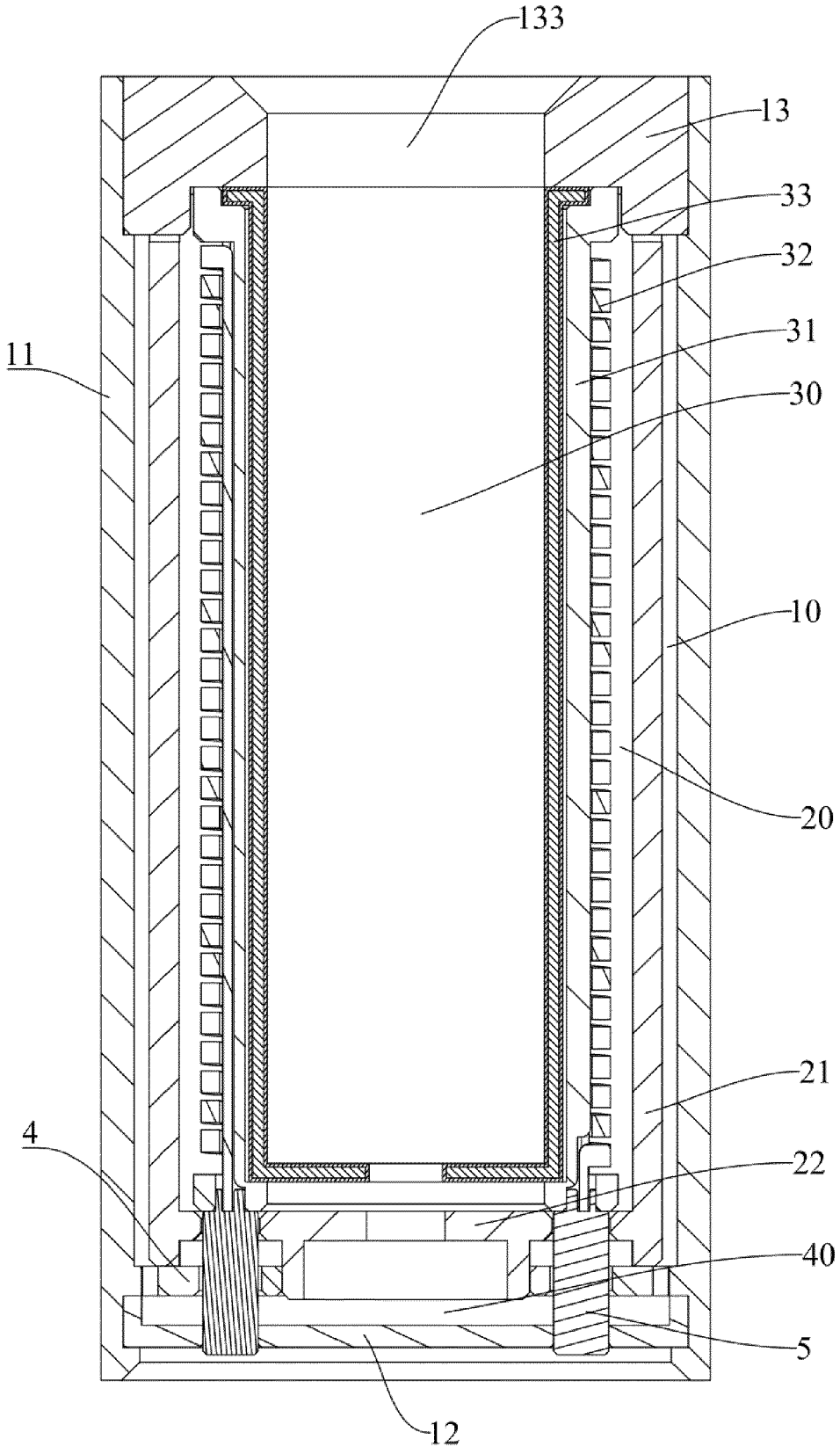

FIG. 5

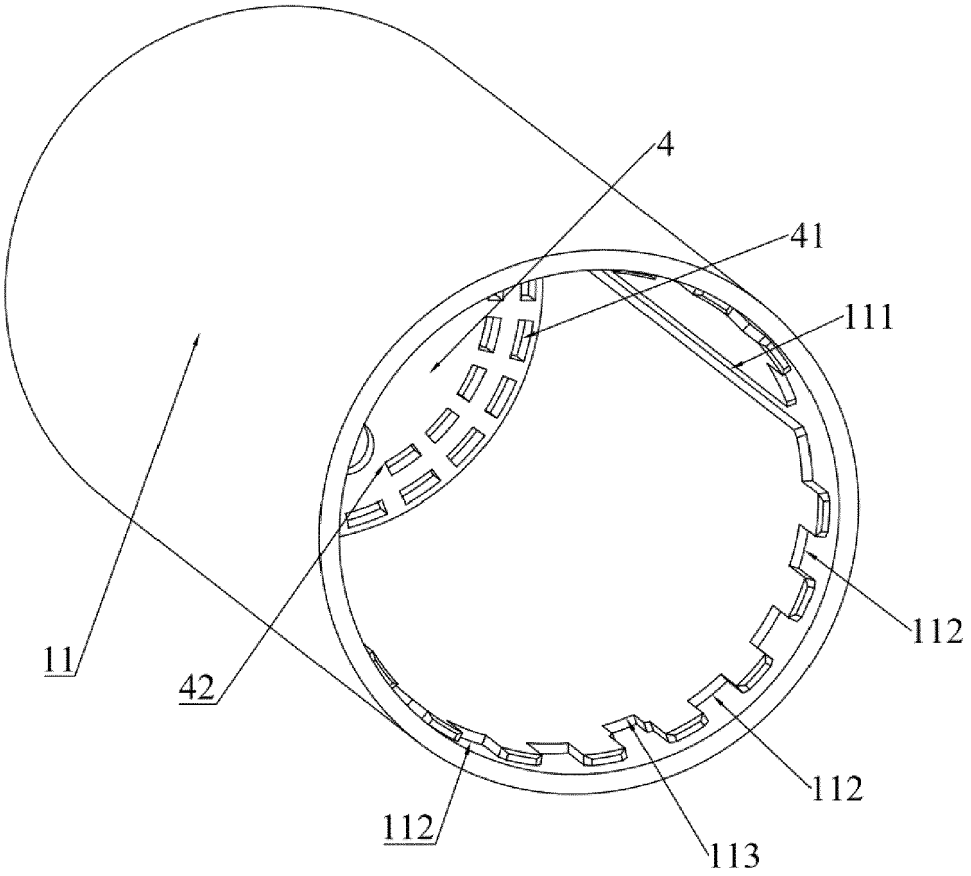

FIG. 6

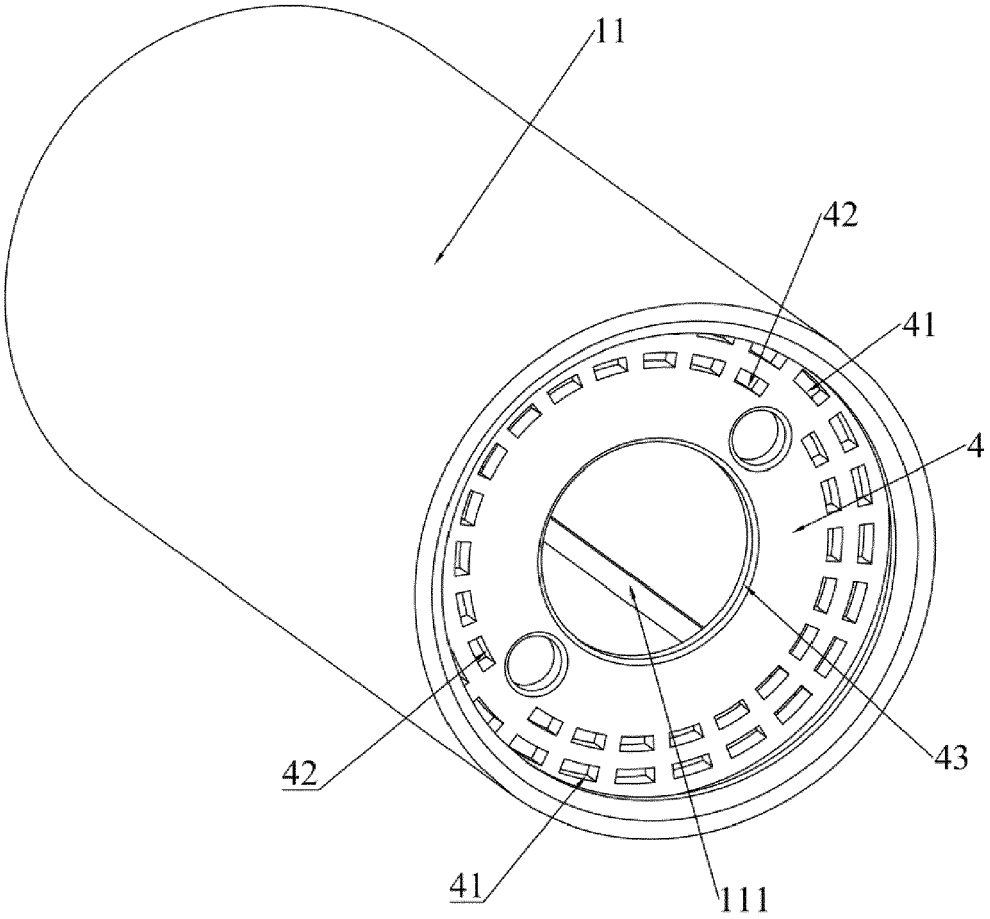

FIG. 7

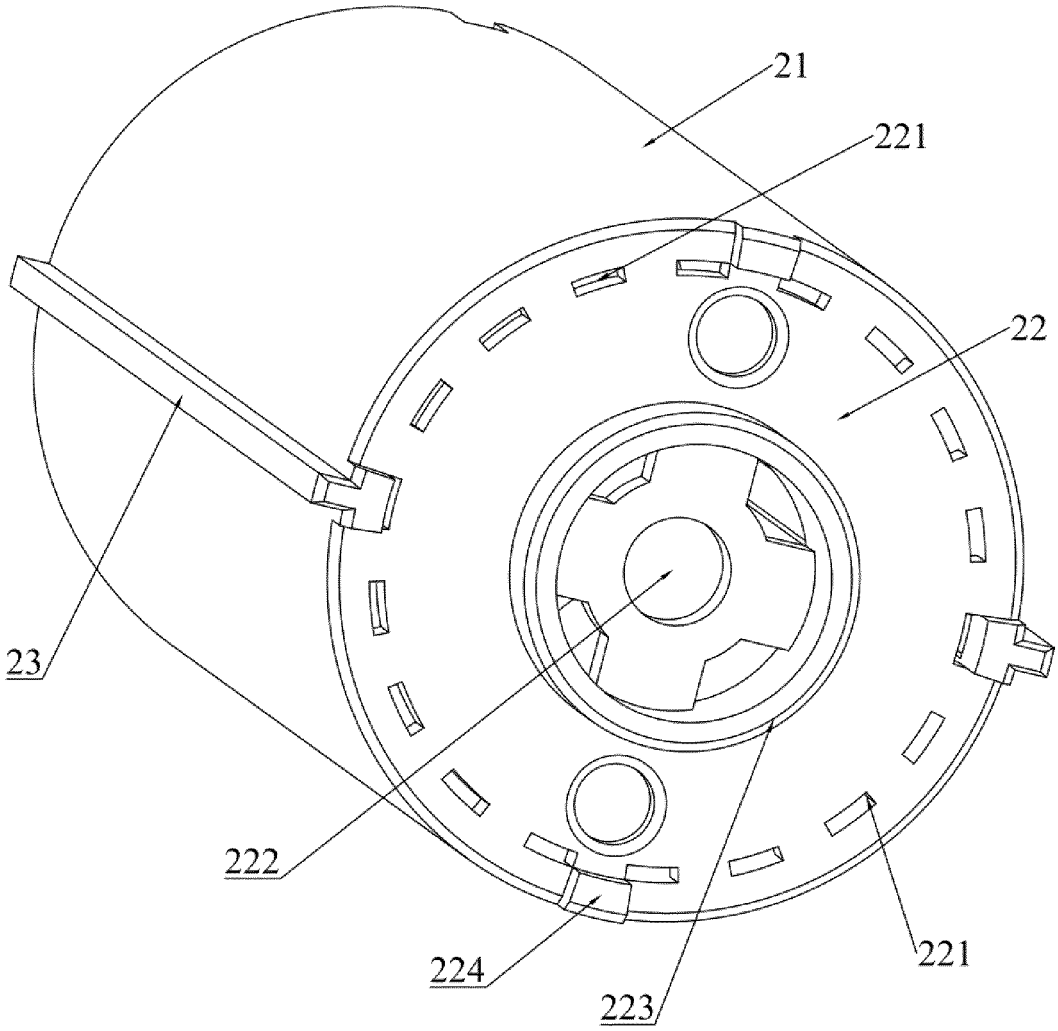

FIG. 8

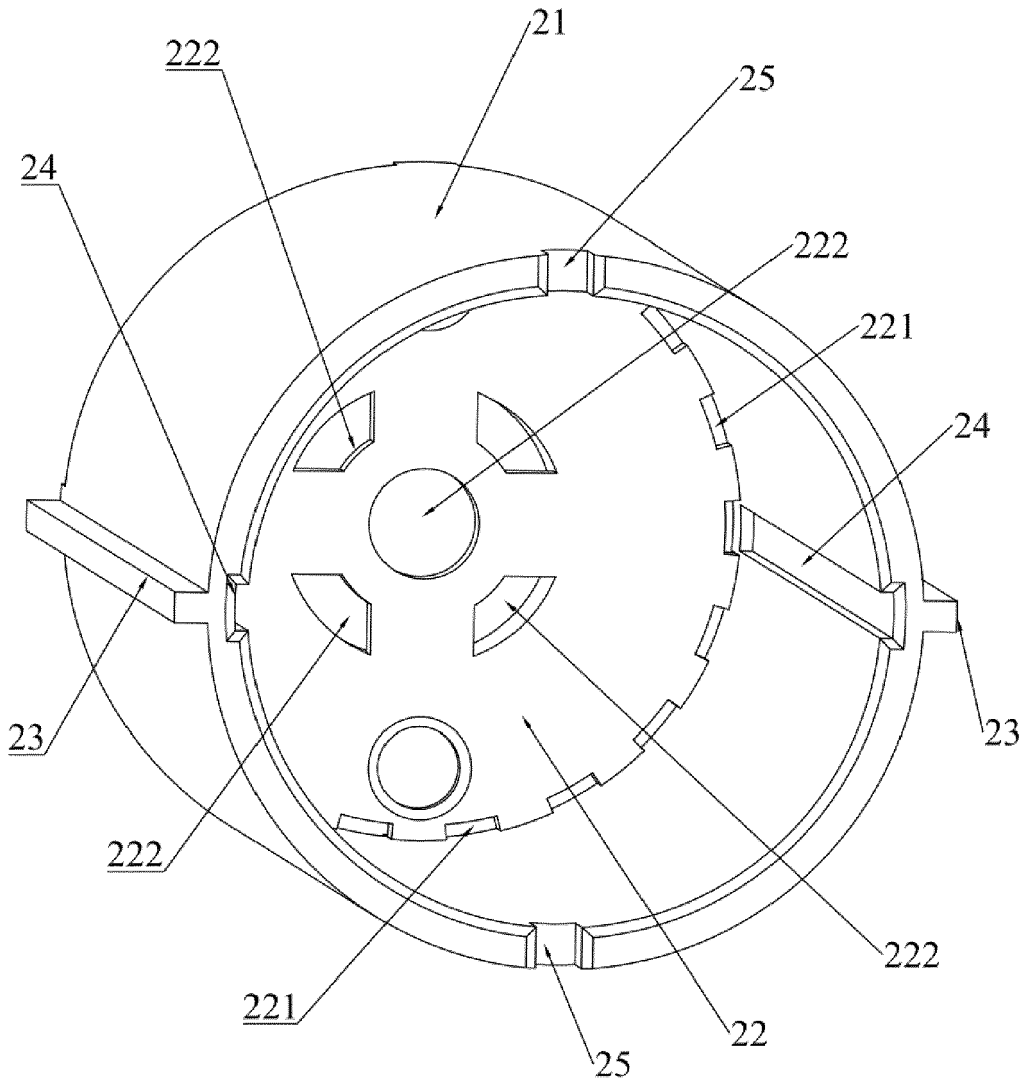

FIG. 9

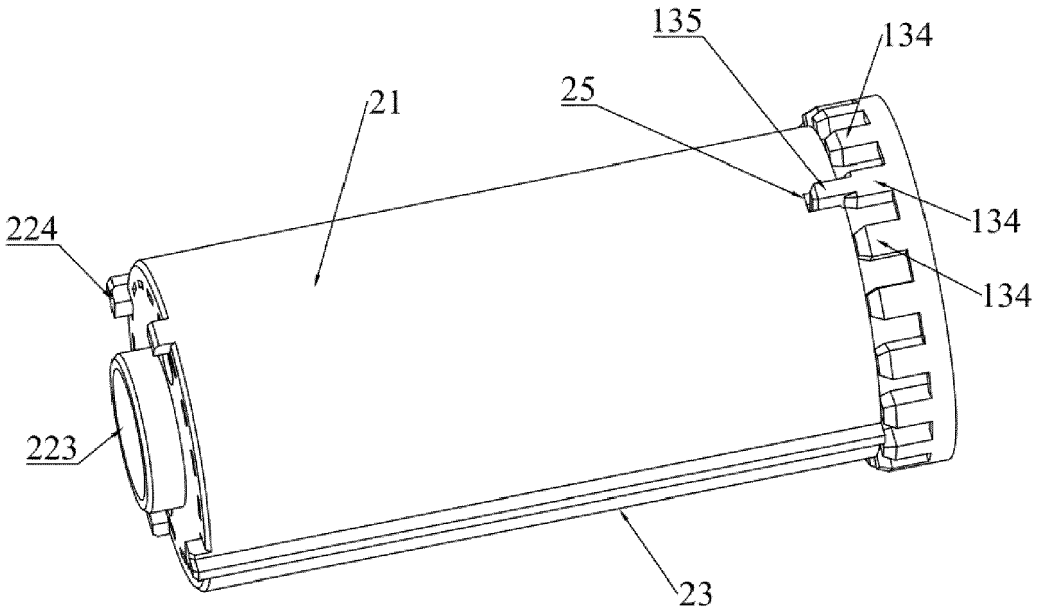

FIG. 10

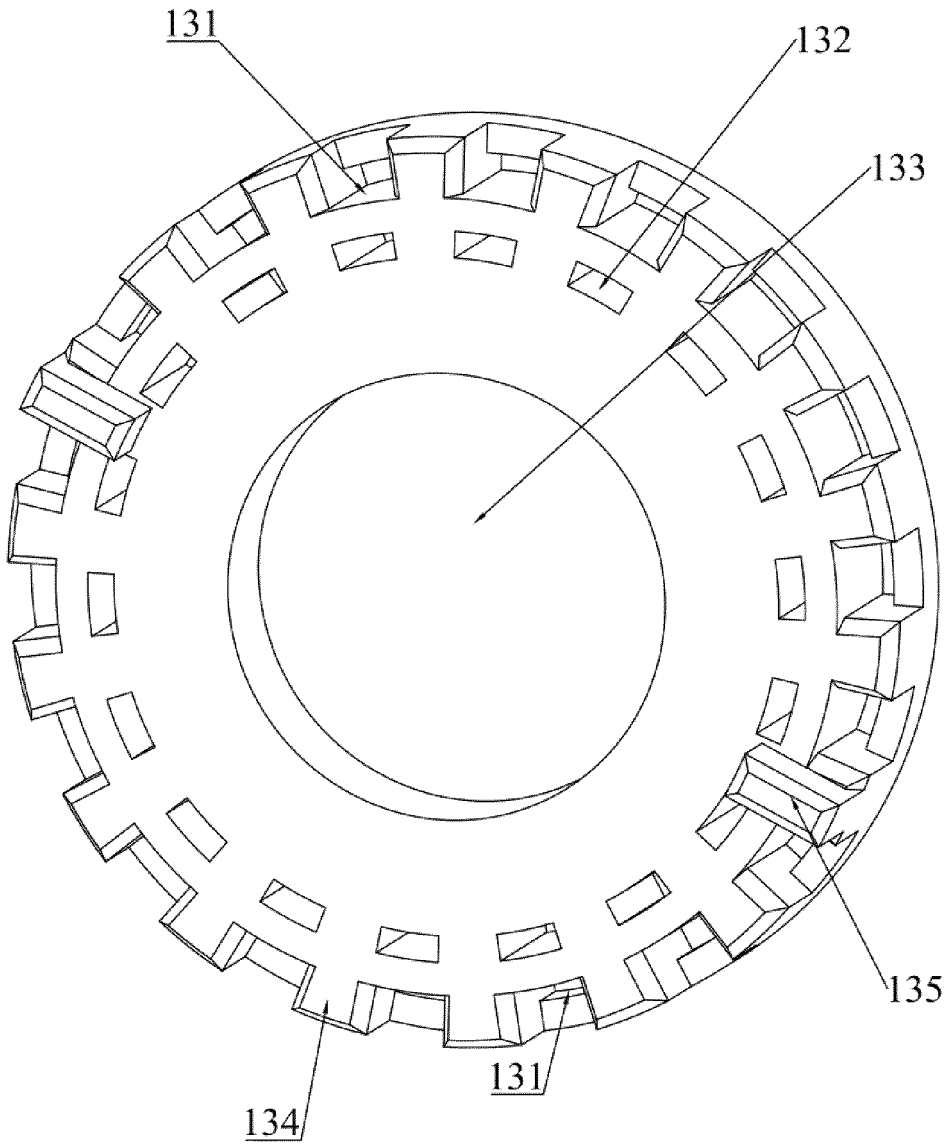

FIG. 11

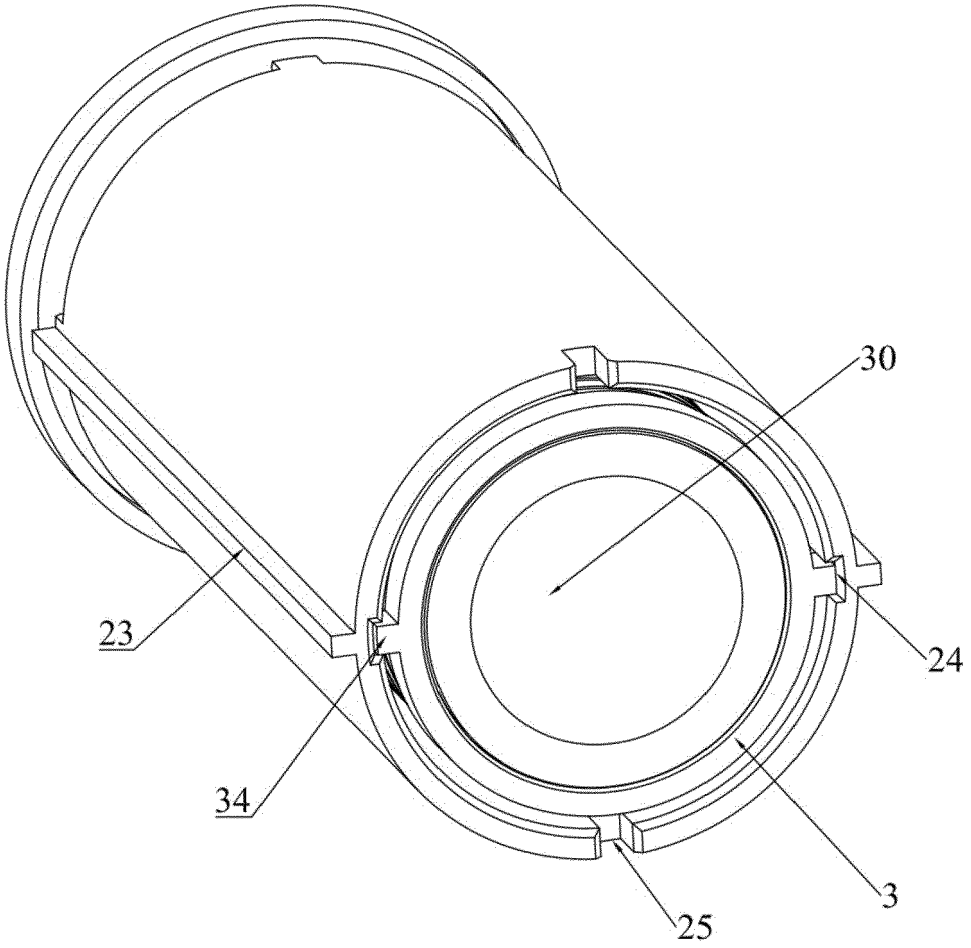

FIG. 12

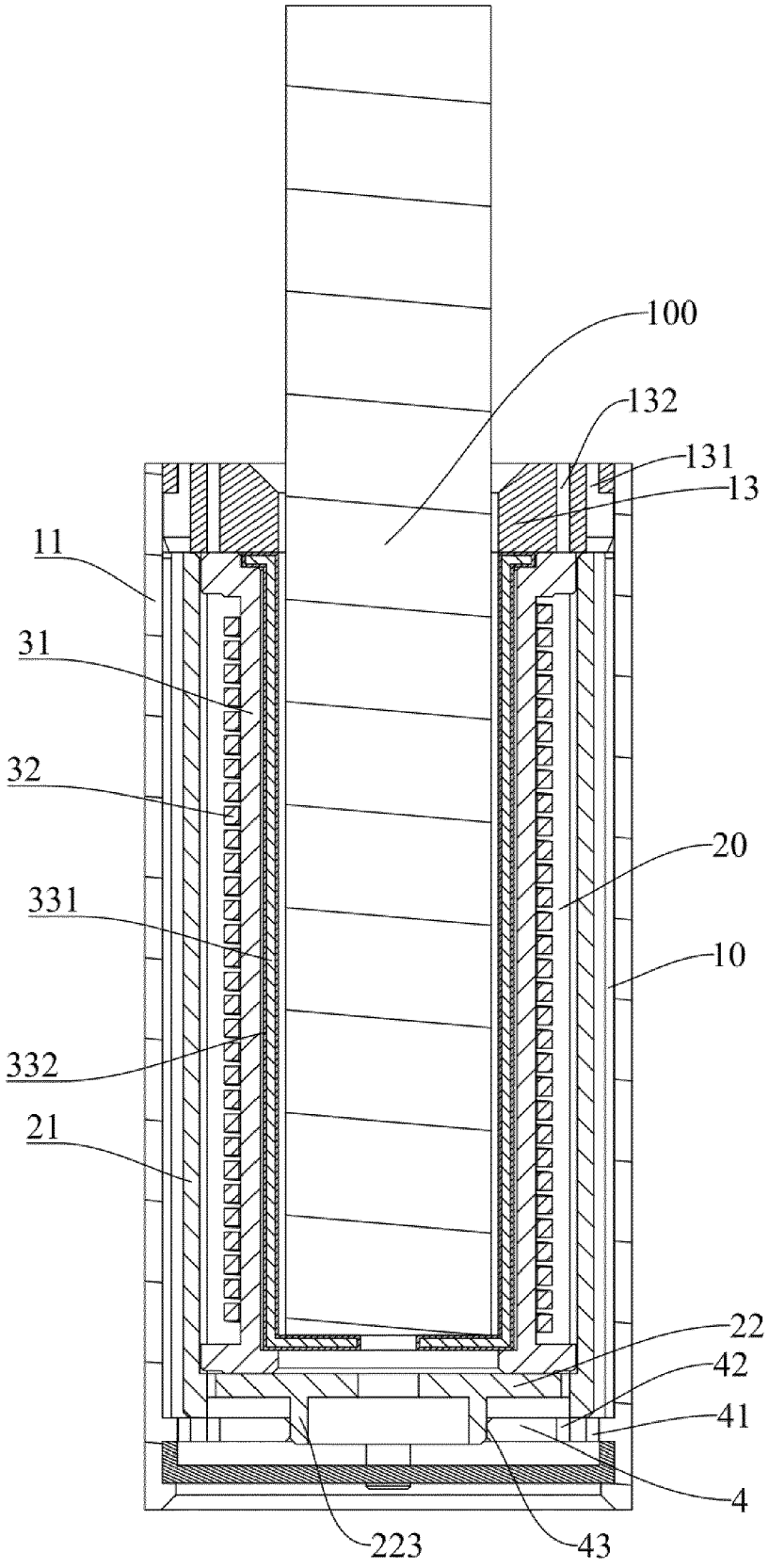

FIG. 13

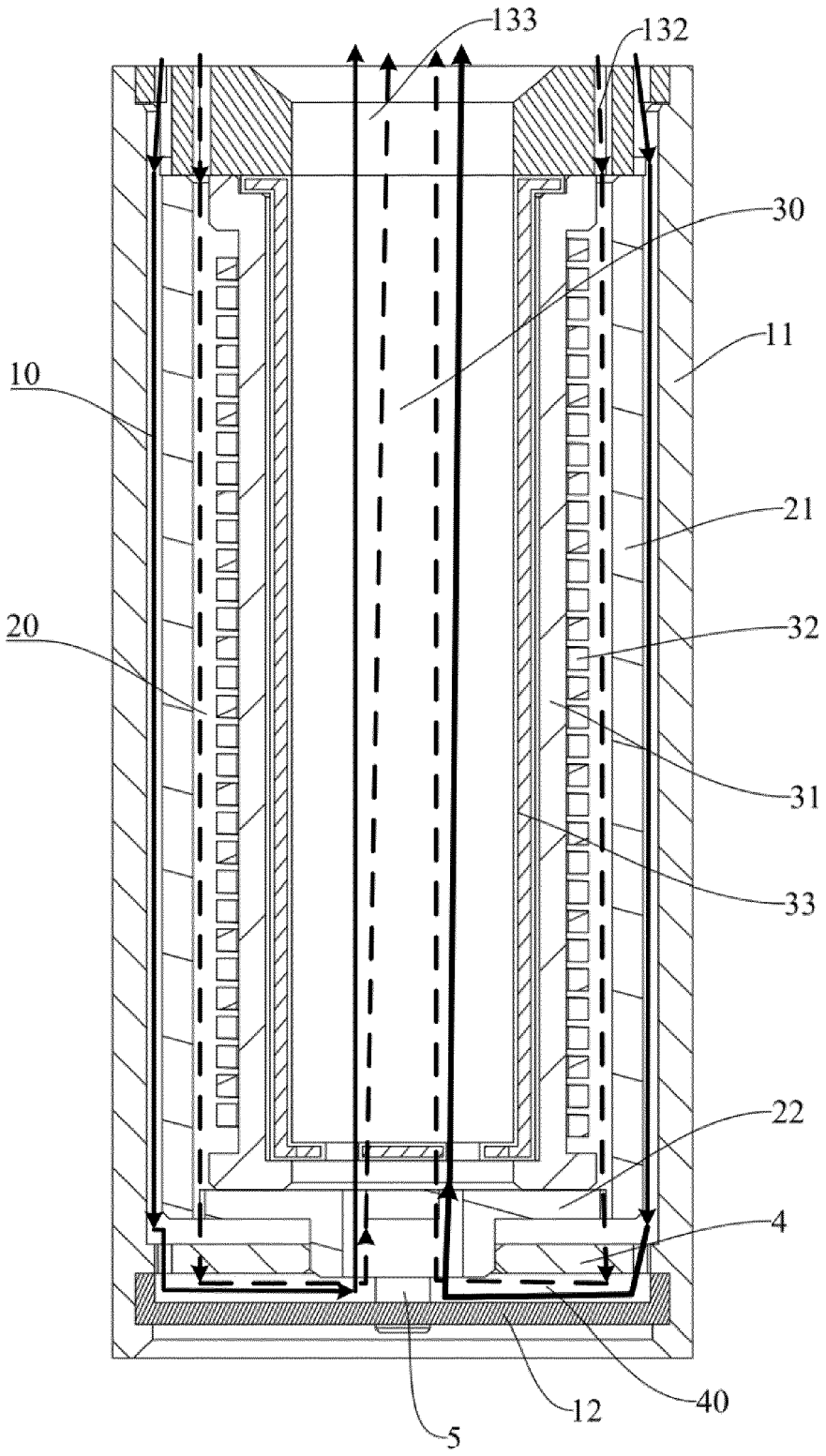

FIG. 14

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EUROPEAN SEARCH REPORT

Application Number
EP 23 18 8212

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A	WO 2019/072131 A1 (SHENZHEN RUXIANGJU TECH DEVELOPMENT LIMITED COMPANY [CN] ET AL.) 18 April 2019 (2019-04-18) * paragraphs [0042] - [0044]; figure 2 *	1-10	

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A24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 July 2024	Kramer, Ellen

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23-07-2024

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