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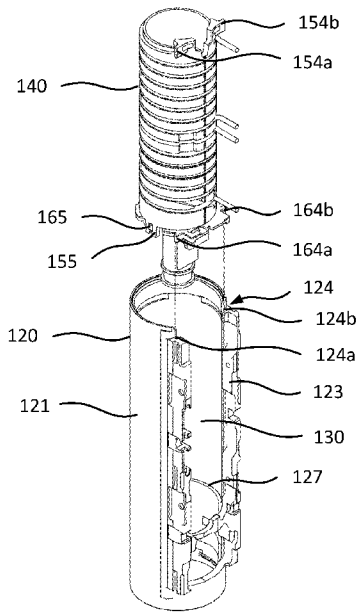

Fig. 7

(57) Abstract: An aerosol provision device (100) for generating an aerosol from aerosol-generating material is described. The device comprises a housing (120) and a heating assembly (140). The heating assembly comprises a heating chamber (142) arranged to receive at least a portion of an article comprising aerosol generating material, an inductor coil (144) encircling at least part of the heating chamber, and a coil support (150) on which at least a portion of the inductor coil is positioned. The coil support comprises a locating feature (154) which engages with the housing to locate the heating assembly in position within the housing.

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AEROSOL PROVISION DEVICE

Technical Field

The present invention relates to an aerosol provision device. The present invention also relates to an aerosol provision system comprising an aerosol provision device and an article comprising aerosol generating material.

Background

Smoking articles such as cigarettes, cigars and the like burn tobacco during use to create tobacco smoke. Attempts have been made to provide alternatives to these articles that burn tobacco by creating products that release compounds without burning. Examples of such products are heating devices which release compounds by heating, but not burning, the material. The material may be for example tobacco or other non-tobacco products, which may or may not contain nicotine.

Summary

In accordance with some embodiments described herein, there is provided an aerosol provision device for generating an aerosol from aerosol-generating material comprising a housing and a heating assembly, the heating assembly comprising: a heating chamber arranged to receive at least a portion of an article comprising aerosol generating material, an inductor coil encircling at least part of the heating chamber, and a coil support on which at least a portion of the inductor coil is positioned, wherein the coil support comprises a locating feature which engages with the housing to locate the heating assembly in position within the housing.

The locating feature may project outwardly from the coil support. The housing may comprise a receiving feature arranged to engage with the locating feature. The receiving feature on the housing may comprise at least one of a channel and groove. The receiving feature may extend axially in a direction from a first end to a second end of the housing.

The locating feature may comprise a protrusion or a tab. The locating feature may comprise a first protrusion and a second protrusion. The first protrusion may be radially offset from the second protrusion.

The receiving feature may comprise a first receiving element arranged to engage with the first protrusion, and a second receiving element arranged to engage with the second protrusion.

The housing may comprise an axially extending aperture, and the first and second receiving elements may be on opposing sides of the axially extending aperture. The housing may be a first housing and the device may comprise a second housing mounted with the first housing. The second housing may cover the axially extending aperture. The device may comprise a second housing mount in which the second housing mount defines the receiving feature. The second housing mount may be attached to the first housing and arranged to attach the first housing to the second housing.

Each locating feature may have a corresponding receiving feature in the housing to receive and locate the coil support within the housing.

The heating assembly may comprise an end support. The end support may be arranged to at least partially support the heating element. The end support may be arranged to at least partially support the coil support.

The device may comprise a connecting configuration arranged to connect the coil support and the end support. The connecting configuration may rotatably align the coil support and the end support. The connecting configuration may be arranged to restrict axial separation of the coil support and the end support. The connecting configuration may comprise at least one of a clip, latch, fastener or hook. The connecting configuration may attach to an attachment feature on the end support. The attachment feature may comprise a protrusion or hook.

The end support may be at least one of at and proximal to a second end of the coil support.

The locating feature may be at least one of at and proximal to a first end of the coil support. The locating feature may comprise a first locating feature, and the end support may comprise a second locating feature. The first and second locating features may be in axial alignment. The first and second locating features may be axially offset.

The receiving feature may be arranged to engage with the second locating feature. The first locating feature may restrict relative rotation between the housing and the coil support. The second locating feature may restrict relative rotation between the

housing and the end support. The receiving feature may allow for axial movement of the coil support and the end support within the housing during assembly.

The end support may comprise an engagement feature arranged to engage with the housing. The engagement feature may comprise a clip, latch, fastener or hook.

The housing may comprise a retention feature arranged to engage with the engagement feature. The retention feature may comprise a projection or indentation onto or into which the engagement feature attaches. The engagement feature may restrict axial movement of the end support relative to the housing. The housing may comprise a positioning feature that contacts the end support when the end support is fully inserted into the housing.

In accordance with some embodiments described herein, there is provided an aerosol provision device for generating an aerosol from aerosol-generating material comprising a housing and a heating assembly, the heating assembly comprising: a heating chamber arranged to receive at least a portion of an article comprising aerosol generating material, an inductor coil encircling at least part of the heating chamber, and a coil support on which at least a portion of the inductor coil is positioned, wherein the coil support comprises a locating feature which engages with the housing to locate the heating assembly in position within the housing.

In accordance with some embodiments described herein, there is provided an aerosol provision system comprising the aerosol provision device described above and an article comprising aerosol-generating material.

In accordance with some embodiments described herein, there is provided a method of manufacturing an aerosol provision device for generating an aerosol from aerosol-generating material, comprising: assembling a heating assembly comprising a heating chamber arranged to receive at least a portion of an article comprising aerosol generating material, an inductor coil encircling at least part of the heating chamber, and a coil support on which at least a portion of the inductor coil is positioned; the method comprising engaging a locating feature on the coil support with a receiving feature on the housing to locate the coil support and the housing, and inserting the heating assembly into the housing in an axial direction.

The method may comprise attaching a coil support to an end support. The locating feature may be a first locating feature, the may method comprising engaging a second locating feature on the end support with the receiving feature on the housing

to locate the end support and the housing. The method may comprise engaging an engagement feature with the housing to prevent axial movement. The method may comprise inserting the heating assembly into the housing until the end support contacts a positioning feature on the housing.

Brief Description of the Drawings

Embodiments of the invention will now be described, by way of example only, with reference to accompanying drawings, in which:

Figure 1 shows a perspective view of an aerosol provision device with a housing shown in partial cutaway;

Figure 2 shows an exploded perspective view of the aerosol provision device of Figure 1;

Figures 3a and 3b show perspective views of a coil support of the aerosol provision device of Figure 1;

Figure 4 shows an exploded perspective view of a heating assembly including the coil support and an end support of the aerosol provision device of Figure 1;

Figure 5a shows a side view of the heating assembly of the aerosol provision device of Figure 1;

Figure 5b shows a section view of the heating assembly of Figure 5b along the line X-X;

Figure 6 shows a perspective view of the heating assembly of the aerosol provision device of Figure 1;

Figure 7 shows a perspective view of the heating assembly and housing of the aerosol provision device of Figure 1;

Figure 8 shows a top view of the heating assembly and housing of the aerosol provision device of Figure 1;

Figure 9a shows a section view of the heating assembly and housing of the aerosol provision device of Figure 1; and

Figure 9b shows a detail view AA of the heating assembly and housing of Figure 9a.

Detailed Description

As used herein, the term “aerosol-generating material” is a material that is capable of generating aerosol, for example when heated, irradiated or energized in any other way. Aerosol-generating material may, for example, be in the form of a solid,

liquid or gel which may or may not contain an active substance and/or flavourants. Aerosol-generating material may include any plant based material, such as tobacco-containing material and may, for example, include one or more of tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes. Aerosol-generating material also may include other, non-tobacco, products, which, depending on the product, may or may not contain nicotine. Aerosol-generating material may for example be in the form of a solid, a liquid, a gel, a wax or the like. Aerosol-generating material may for example also be a combination or a blend of materials. Aerosol-generating material may also be known as “smokable material”.

The aerosol-generating material may comprise a binder and an aerosol former. Optionally, an active and/or filler may also be present. Optionally, a solvent, such as water, is also present and one or more other components of the aerosol-generating material may or may not be soluble in the solvent. In some embodiments, the aerosol-generating material is substantially free from botanical material. In some embodiments, the aerosol-generating material is substantially tobacco free.

The aerosol-generating material may comprise or be an “amorphous solid”. The amorphous solid may be a “monolithic solid”. In some embodiments, the amorphous solid may be a dried gel. The amorphous solid is a solid material that may retain some fluid, such as liquid, within it. In some embodiments, the aerosol-generating material may, for example, comprise from about 50wt%, 60wt% or 70wt% of amorphous solid, to about 90wt%, 95wt% or 100wt% of amorphous solid.

The aerosol-generating material may comprise an aerosol-generating film. The aerosol-generating film may comprise or be a sheet, which may optionally be shredded to form a shredded sheet. The aerosol-generating sheet or shredded sheet may be substantially tobacco free.

According to the present disclosure, a “non-combustible” aerosol provision system is one where a constituent aerosol-generating material of the aerosol provision system (or component thereof) is not combusted or burned in order to facilitate delivery of at least one substance to a user.

In some embodiments, the delivery system is a non-combustible aerosol provision system, such as a powered non-combustible aerosol provision system.

In some embodiments, the non-combustible aerosol provision system is an electronic cigarette, also known as a vaping device or electronic nicotine delivery

system (END), although it is noted that the presence of nicotine in the aerosol-generating material is not a requirement.

In some embodiments, the non-combustible aerosol provision system is an aerosol-generating material heating system, also known as a heat-not-burn system. An example of such a system is a tobacco heating system.

In some embodiments, the non-combustible aerosol provision system is a hybrid system to generate aerosol using a combination of aerosol-generating materials, one or a plurality of which may be heated. Each of the aerosol-generating materials may be, for example, in the form of a solid, liquid or gel and may or may not contain nicotine. In some embodiments, the hybrid system comprises a liquid or gel aerosol-generating material and a solid aerosol-generating material. The solid aerosol-generating material may comprise, for example, tobacco or a non-tobacco product.

Typically, the non-combustible aerosol provision system may comprise a non-combustible aerosol provision device and a consumable for use with the non-combustible aerosol provision device.

In some embodiments, the disclosure relates to consumables comprising aerosol-generating material and configured to be used with non-combustible aerosol provision devices. These consumables are sometimes referred to as articles throughout the disclosure.

In some embodiments, the non-combustible aerosol provision system, such as a non-combustible aerosol provision device thereof, may comprise a power source and a controller. The power source may, for example, be an electric power source or an exothermic power source. In some embodiments, the exothermic power source comprises a carbon substrate which may be energised so as to distribute power in the form of heat to an aerosol-generating material or to a heat transfer material in proximity to the exothermic power source.

In some embodiments, the non-combustible aerosol provision system may comprise an area for receiving the consumable, an aerosol generator, an aerosol generation area, a housing, a mouthpiece, a filter and/or an aerosol-modifying agent.

In some embodiments, the consumable for use with the non-combustible aerosol provision device may comprise aerosol-generating material, an aerosol-generating material storage area, an aerosol-generating material transfer component,

an aerosol generator, an aerosol generation area, a housing, a wrapper, a filter, a mouthpiece, and/or an aerosol-modifying agent.

An aerosol generating device can receive an article comprising aerosol generating material for heating. An "article" in this context is a component that includes or contains in use the aerosol generating material, which is heated to volatilise the aerosol generating material, and optionally other components in use. A user may insert the article into the aerosol generating device before it is heated to produce an aerosol, which the user subsequently inhales. The article may be, for example, of a predetermined or specific size that is configured to be placed within a heating chamber of the device which is sized to receive the article.

Figure 1 shows an aerosol provision device 100 for generating aerosol from an aerosol generating material. The device 100 may be used to heat a replaceable article (not shown) comprising the aerosol generating material, to generate aerosol or other inhalable medium which is inhaled by a user of the device 100.

The device 100 comprises a body 104. The body 104 comprises a housing 120. In Figure 1, the housing 120 is shown in partial cutaway. The housing 120 surrounds and houses various components of the device 100. An article aperture 115 is formed in one end of the body 104, through which the article may be inserted for heating by an aerosol generator 102 (refer to Figure 2). In use, the article may be fully or partially inserted into the aerosol generator 102 where it may be heated by one or more components of the aerosol generator 102. The aerosol generator 102 comprises a heating assembly. The article and the device 100 together form an aerosol provision system 101.

The housing 120 comprises a first housing 121 and a second housing 122. The first housing 121 is attached to the second housing 122.

The device 100 may also include a user-operable control element 106, such as a button or switch, which operates the device 100 when pressed. For example, a user may turn on the device by operating the switch.

The body 104 has end surfaces of the device 100. The end of the device 100 closest to the article aperture 115 may be known as the proximal end (or mouth end) 114 of the device 100 because, in use, it is closest to the mouth of the user. In use, a user inserts an article into the aperture 115, operates the aerosol generator 102 to begin heating the aerosol generating material, and draws on the aerosol generated in

the device 100. This causes the aerosol to flow through the device 100 along a flow path towards the proximal end 114 of the device 100.

The other end of the device furthest away from the aperture 115 may be known as the distal end 116 of the device 100 because, in use, it is the end furthest away from the mouth of the user. As a user draws on the aerosol generated in the device, the aerosol flows in a direction towards the proximal end 114 of the device 100. The terms proximal and distal as applied to features of the device 100 will be described by reference to the relative positioning of such features with respect to each other in a proximal-distal direction along the longitudinal axis 112.

As used herein, one-piece component refers to a component of the device 100 which is not separable into two or more components following assembly of the device 100. Integrally formed relates to two or more features that are formed into a one-piece component during a manufacturing stage of the component.

Figure 2 shows a perspective view of the heating assembly 140 and the housing 120 in axial alignment before assembly. The heating assembly 140 defines a longitudinal axis 112. The heating assembly 140 defines a heating chamber 142. The article is received in the heating chamber 142 to be heated by the heating assembly 140. The aerosol generator 102 is received by the first housing 121. The heating chamber 142 is inserted axially into the first housing 121.

The device 100 comprises a first housing 121 and a second housing 122. The first housing 121 houses the heating assembly 140. The second housing 122 houses a power source and at least one electronics module. The first and second housing 121, 122 are fixedly mounted.

The power source is housed within the second housing 122. The power source may be, for example, a battery, such as a rechargeable battery or a non-rechargeable battery. Examples of suitable batteries include, for example, a lithium battery (such as a lithium-ion battery), a nickel battery (such as a nickel–cadmium battery), and an alkaline battery. The battery is electrically coupled to the aerosol generator 102 to supply electrical power when required and under control of a controller to heat the aerosol generating material.

The electronics module may comprise, for example, a printed circuit board (PCB). The PCB may support at least one controller, such as a processor, and memory. The PCB may also comprise one or more electrical tracks to electrically

connect together various electronic components of the device 100. For example, the battery terminals may be electrically connected to the PCB so that power can be distributed throughout the device 100.

The heating assembly 140 comprises an induction-type heating system, including a magnetic field generator comprising an inductor coil assembly. The heating assembly 140 comprises a heating element. The heating element is also known as a susceptor.

A susceptor is a material that is heatable by penetration with a varying magnetic field, such as an alternating magnetic field. The susceptor may be an electrically-conductive material, so that penetration thereof with a varying magnetic field causes induction heating of the heating material. The heating material may be magnetic material, so that penetration thereof with a varying magnetic field causes magnetic hysteresis heating of the heating material. The susceptor may be both electrically-conductive and magnetic, so that the susceptor is heatable by both heating mechanisms. The device that is configured to generate the varying magnetic field is referred to as a magnetic field generator, herein.

The heating assembly 140, forming part of the aerosol generator 102, is an inductive heating assembly and comprises various components to heat the aerosol generating material of the article via an inductive heating process. Induction heating is a process of heating an electrically conducting object (such as a susceptor) by electromagnetic induction. An induction heating assembly may comprise an inductive element, for example, one or more inductor coils, and a device for passing a varying electric current, such as an alternating electric current, through the inductive element. The varying electric current in the inductive element produces a varying magnetic field. The varying magnetic field penetrates a susceptor suitably positioned with respect to the inductive element, and generates eddy currents inside the susceptor. The susceptor has electrical resistance to the eddy currents, and hence the flow of the eddy currents against this resistance causes the susceptor to be heated by Joule heating. In cases where the susceptor comprises ferromagnetic material such as iron, nickel or cobalt, heat may also be generated by magnetic hysteresis losses in the susceptor, i.e. by the varying orientation of magnetic dipoles in the magnetic material as a result of their alignment with the varying magnetic field. In inductive heating, as compared to heating by conduction for example, heat is generated inside the susceptor, allowing for rapid heating. Further, there need not be any physical contact between the inductive

heater and the susceptor, allowing for enhanced freedom in construction and application.

The heating element may be hollow and therefore define at least part of a receptacle within which aerosol generating material is received. For example, the article can be inserted into the heating element. The heating element is tubular, with a circular cross section. The heating element has a generally constant diameter along its axial length. In embodiments, the heating element protrudes in the receptacle. Other arrangements are anticipated.

The heating element is formed from an electrically conducting material suitable for heating by electromagnetic induction. The susceptor in the present example is formed from a carbon steel. It will be understood that other suitable materials may be used, for example a ferromagnetic material such as iron, nickel or cobalt. The heating element may be an elongate member protruding in the heating zone defined by the receptacle.

In other embodiments, the feature acting as the heating element may not be limited to being inductively heated. The feature, acting as a heating element, may therefore be heatable by electrical resistance. The aerosol generator 102 may therefore comprise electrical contacts for electrical connection with the apparatus for electrically activating the heating element by passing a flow of electrical energy through the heating element.

The heating assembly 140 comprises an inductor coil assembly 143 (shown in Figure 4) and an end support 160. The inductor coil assembly 143 includes an inductor coil 144. The inductor coil assembly 143 also comprises a coil support 150. Figures 3a and 3b show the coil support 150. Figure 4 shows the inductor coil assembly 143 and end support 160 in axial alignment before assembly. The inductor coil may comprise a first inductor coil and a second inductor coil. In embodiments, the number of inductor coils differs. In embodiments, a single inductor coil 144 is used. The coil support 150 is tubular. The coil support 150 comprises a guide for the coil 144. The guide 151 comprises a channel on an outer side of the coil support 150.

Figures 3a and 3b show the coil support 150. The coil support 150 comprises a first locating feature 154. The first locating feature 154 acts as a locating feature, and in embodiments the heating assembly the locating feature is a single locating feature. The first locating feature comprises a first locating protrusion 154a and a second locating protrusion 154b that project outwardly from the coil support 150. The locating

protrusions 154a, 154b extend tangentially from a tubular side wall 152 of the coil support 150. The locating protrusions 154a, 154b extend away from the coil support 150 in opposing directions from one another. The locating protrusions 154a, 154b extend along a plane that is tangential to the tubular side wall of the coil support 150. The locating protrusions 154a, 154b extend away from the coil support 150 and are received by a corresponding receiving feature 124 in the housing 120 (refer to Figure 7). The locating protrusions 154a, 154b are disposed at the proximal end 114 of the coil support 150. The locating protrusions 154a, 154b are formed as a one-piece component with the coil support 150. In embodiments, the locating protrusions 154a, 154b comprise tabs, and/or the first locating protrusion is radially offset from the second locating protrusion. The locating protrusions may be formed separately from the coil support. In embodiments the first locating feature may comprise a single locating protrusion.

A connecting configuration 155 is disposed at the distal end 116 of the coil support 150. The connecting configuration 155 comprises connecting clips 155a, 155b. The connecting clips 155a, 155b extend axially away from the coil support 150, at the distal end 116. The connecting clips 155a, 155b are diametrically opposed on the coil support 150. The connecting configuration is arranged to connect with a corresponding feature on the end support 150. The connecting clips 155a, 155b extend axially from the sidewall of the coil support 150. The connecting configuration is formed as a one-piece component with the coil support 150. In alternative embodiments, the connecting clips are not diametrically opposed on the coil support 150. The connecting configuration may comprise a latch, hook or fastener. The connecting configuration may be formed separately from the coil support 150. The number of clips, for example, may differ. In embodiments, the connecting configuration may comprise a single connecting clip.

Figure 4 shows the inductor coil assembly 143 and the end support 160 in axial alignment before assembly. The inductor coil assembly 143 comprises the coil 144 assembled onto the coil support 150. The inductor coil assembly 143 is placed in axial alignment with and engaged with the end support 160. The end support 160 comprises an attachment feature 165. The attachment feature 165 comprises attachment protrusions 165a, 165b. The attachment protrusions 165a, 165b extend, for example, radially away from a portion of the end support 160, to allow for attachment to the connecting configuration 155. The attachment protrusions 165a, 165b are formed integrally as with the end support 160. The attachment protrusions 165a, 165b are in

axial alignment with the connecting clips 155a, 155b. In embodiments, the attachment feature may extend axially from a portion of the end support 160 to connect with the connecting configuration 155. The attachment feature may comprise a protrusion or hook. The attachment protrusions may be formed separately from the end support 160. In embodiments, the attachment feature may comprise a single attachment protrusion. In embodiments, the attachment feature may comprise a corresponding single connecting configuration.

The end support 160 comprises a second locating feature 164. The second locating feature 164 comprises third and fourth locating protrusions 164a, 164b. The locating protrusions 164a, 164b project outwardly from the end support 160. The locating protrusions 164a, 164b extend along a plane tangential to the tubular side wall of the coil support 150, and on the same plane on which the first and second locating protrusions 154a, 154b extend. The third and fourth locating protrusions 164a, 164b extend away from the end support 160 and are received by a corresponding receiving feature 124 in the housing 120 (refer to Figure 7). In embodiments, the second locating feature may comprise a single locating protrusion. In embodiments the second locating feature is omitted.

Figures 5a, 5b and 6 show the assembled heating assembly 140 including the coil support 150, coil 144 and the end support 160. The end support 160 provides support for the heating element (not shown) and the inductor coil assembly 143. The connecting configuration 155 engages with the attachment feature 165 to restrict axial separation of the inductor coil assembly 143 and the end support 160. The connecting clips 155a, 155b snap around the attachment protrusions 165a, 165b. The connecting configuration 155 engages with the attachment feature 165 to restrict relative rotation of the inductor coil assembly 143 and the end support 160.

The end support 160 is attached at the distal end 116 of the coil support 150. The end support 160 comprises an engagement feature 166. The engagement feature 166 extends axially from a portion of the end support 160. The engagement feature 166 comprises a latch that extends axially in alignment with the side wall of the coil support 160. The latch 166 is arranged to engage with a corresponding retention feature 126 in the housing 120 (refer to Figures 9a and 9b). The latch 166 is resiliently deformable in a radial direction such that when the latch 166 is passed over the retention feature 126 in the housing 120 (refer to Figure 7), the latch is temporarily deformed before returning to its original position to engage with the retention feature

126. The engagement feature 166 is integrally formed with the end support 160. In alternative embodiments, the engagement feature comprises a clip, fastener or hook. The engagement feature 166 may be formed separately from the end support 160.

The inductor coil assembly 143 is attached to the end support 160 by means of the connecting configuration 155 and the attachment feature 165. The engagement of the connecting configuration 155 and the attachment feature 165 prevents relative axial movement and relative rotation between the inductor coil assembly 143 and the end support 160.

Figure 7 shows the heating assembly 140 in axial alignment with the first housing 121 before assembly of the heating assembly 140 into the first housing 121. In this embodiment, the housing 120 comprises a second housing mount 123 on the first housing. The second housing mount 123 attaches the first housing 121 to the second housing 122. The first housing 121 comprises an axially extending aperture 130. The second housing 122 covers the aperture 130. The aperture 130 allows for electrical connection between the components in the first and second housings 121, 122.

The housing 120 comprises a receiving feature 124. The receiving feature 124 extends axially along the length of the housing 120. The receiving feature 124 extends axially from the distal end 116 to the proximal end 114 of the housing 120. The receiving feature 124 comprises a first groove 124a, acting as a first receiving element, and a second groove 124b, acting as a second receiving element. The first and second grooves 124a, 124b are on opposing sides of the housing aperture 130. The grooves 124a, 124b are located in the second housing mount 123. The receiving feature 124 engages with the first locating feature 154 on the coil support 150 and the second locating feature 164 on the end support. The grooves 124a, 124b receive the locating protrusions 154a, 154b, 164a, 164b. The locating protrusions 154a, 154b, 164a, 164b are in planar alignment with one another.

The receiving feature 124 on the housing 120 allows for the coil support to be inserted in and mounted directly on the housing 120. This removes the need for additional components or attachment features, such as an intermediate attachment component on which the coil support is mounted. This reduces the amount of material required for manufacture of the device. The assembly of the device is also simplified, by reducing the number of assembly steps. A compact device may be provided.

The first locating protrusion 154a and the third locating protrusion 164a are in axial alignment with one another. The second locating protrusion 154b and the fourth locating protrusion 164b are in axial alignment with one another. The first groove 124a receives both the first locating protrusion 154a and the third locating protrusion 164a. The second groove 124b receives both the second locating protrusion 154b and the fourth locating protrusion 164b. In embodiments, the first and second receiving elements comprise a channel. The first locating feature and second locating feature may not be in planar alignment. The receiving feature may comprise a plurality of receiving features. The receiving feature may be on or in the first housing 121.

A positioning feature 127 is located on the inner surface of the housing 121. The positioning feature 127 limits insertion of the heating assembly 140 into the first housing 121. The positioning feature 127 comprises a protrusion on the inner face of the first housing 121. The positioning feature 127 is arranged to contact a portion of the end support 160 to limit axial insertion past the point of contact between the positioning feature 127 and the portion of the end support. In embodiments, the positioning feature extends continuously around the inner face of the coil support. The positioning feature may comprise a protrusion, rib, step or tab protruding axially inward from the inner face of the coil support 150.

Figure 8 shows a top view of the heating assembly within the first housing 121. The first locating protrusion 154a is received by the groove 124a and the second locating protrusion 154b is received by the groove 124b. The second housing mount 123 comprises the grooves 154a, 154b. The first and third locating protrusions 154a, 164a are in axial alignment with one another to be axially received by the groove 124a. The second and fourth locating protrusions 154b, 164b are in axial alignment with one another to be axially received by the groove 124b. The heating assembly 140 is assembled into the first housing 121 by axially aligning and inserting the third and fourth locating protrusions 164a, 164b into the corresponding grooves 124a, 124b.

The heating assembly is axially inserted into the first housing 121 also resulting in the first and second locating protrusions 154a, 154b being inserted into the grooves 124a, 124b. The heating assembly 140 is inserted at a proximal end 114 of the first housing 121. The grooves 124a, 124b allow for relative axial movement of the heating assembly 140 and the first housing 121. The grooves 124a, 124b and locating protrusions 154a, 154b, 164a, 164b prevent relative rotation of the heating assembly 140 and the first housing 121.

Figure 9a and 9b shows a section view of the heating assembly 140 within the first housing 121, and a detail view of the engagement feature 166 and positioning feature 127 respectively. On insertion of the heating assembly 140 into the first housing 121, the shape of the retention feature 126 causes the resiliently deformable engagement feature, latch 166, to deform radially inwardly whilst passing the retention feature. Once the engagement feature 166 has travelled axially past the retention feature 126, the latch 166 snaps back to its original position to engage with the retention feature 126. The latch 166 engages with the retention feature 126 to prevent removal of the heating assembly 140 from the first housing 121 after insertion, i.e. removal of the heating assembly 140 out of the proximal end 114 of the first housing 121. The heating assembly 140 is prevented from being inserted too far into the first housing 121 by the positioning feature 127. The positioning feature 127 on the first housing 121 contacts a portion of the end support 160 to prevent further axial insertion of the heating assembly 140 once the latch 166 has been engaged with the retention feature 126. The positioning feature 127 prevents the end support 160 from contacting and damaging any components in the distal end 116 of the first housing 121. In alternative embodiments the retention feature comprises an indentation with which the engagement feature engages. The engagement feature 166 and the attachment of the coil support 150 to the end support 160 allow for fewer assembly steps, and therefore a more efficient assembly process. The heating assembly 140 is inserted directly into the housing 120 and attached directly to the retention feature 126 and the receiving feature 124. The number of steps in the assembly process is reduced, and no intermediate attachment feature is required between the heating assembly 140 and the housing 120. This helps provide a cost and material benefit during the manufacturing process.

The device is assembled following the subsequent steps:

1. Axially aligning the inductor coil assembly 143, comprising the coil support 150, with the end support 160, and engaging the connecting configuration 155 with the attachment feature 165. The connecting configuration 155 is on the distal end 116 of the coil support 150 is attached to the attachment feature 165 on the end support 160. The connecting configuration 155 and attachment feature 165 axially align and restrict relative axial and rotational movement of the coil support 150 and end support 160. Aligning the coil support 150 and end support 160 also brings into axial alignment the first locating feature 154 on the coil support 150 with the second locating feature 164 on the end support 160.

2. Axially aligning the heating assembly 140 with the housing 120, and engaging the second locating feature 164 with the receiving feature 124 on the housing 120.

3. Inserting the heating assembly 140 into the housing 120 in an axial direction. The second locating feature 164 remains engaged with the receiving feature 124, and the first locating feature 154 is brought into engagement with the receiving feature 124. The engagement of the first and second locating features 154, 164 prevent relative rotation of the heating assembly 140 and the housing 120 during assembly and in use. The first locating feature 154 prevents relative rotation of the coil support 150 and the housing 120. The second locating feature 164 prevents relative rotation of the end support 160 and the housing 120. The second locating feature 164 is engaged with the receiving feature 124 before the first locating feature 154 is engaged with the receiving feature 124. The engagement of the second locating feature 164 aligns the heating assembly 140 such that the first locating feature 154 is brought into axial alignment with the receiving feature 124.

4. Engaging the engagement feature 166 with the retention feature 126 and bringing the end support 160 into contact with the positioning feature 127. The engagement of the engagement feature 166 and retention feature 126 prevents axial separation of the housing 120 and the heating assembly 140. The interaction between the end support 160 and the positioning feature 127 prevents further insertion of the heating assembly 140 into the housing 120.

The alignment of the heating assembly 140 within the first housing 121 by the first and second locating features 154, 164 and the receiving feature aligns the engagement feature 166 with the retention feature 126, and the portion of the end support 160 with the positioning feature 127.

Relative rotation between the heating assembly 140 and the first housing 121 is restricted by the first and second locating features 154, 164 being located in the receiving feature 124. Relative rotation and axial separation of the coil support 150 and end support 160 is restricted by the attachment of the coil support 150 to the end support 160 by the connecting configuration 155 and the attachment feature 165. The heating assembly 140 is axially slid into the first housing 121 and therefore no axial movement between the heating assembly 140 and the housing 121 is restricted during assembly. Once assembled, the engagement feature 166 is engaged with the retention feature 126 to restrict axial separation of the heating assembly 140 and housing 121.

The heating assembly 140 is held in a fixed position within the housing 121 such that no axial separation or rotation can occur between the parts of the heating assembly 140 and the heating assembly 140 and the housing 121.

The direct attachment of the heating assembly 140 allows for a more efficient method of assembly of the device. No intermediate attachment component is required between the housing 120 and the heating assembly 140. This gives a material and cost saving during manufacture. In addition, the number of assembly steps is reduced by the absence of an intermediate attachment component.

The various embodiments described herein are presented only to assist in understanding and teaching the claimed features. These embodiments are provided as a representative sample of embodiments only, and are not exhaustive and/or exclusive. It is to be understood that advantages, embodiments, examples, functions, features, structures, and/or other aspects described herein are not to be considered limitations on the scope of the invention as defined by the claims or limitations on equivalents to the claims, and that other embodiments may be utilised and modifications may be made without departing from the scope of the claimed invention. Various embodiments of the invention may suitably comprise, consist of, or consist essentially of, appropriate combinations of the disclosed elements, components, features, parts, steps, means, etc, other than those specifically described herein. In addition, this disclosure may include other inventions not presently claimed, but which may be claimed in future.

CLAIMS

1. An aerosol provision device for generating an aerosol from aerosol-generating material comprising a housing and a heating assembly, the heating assembly comprising:

a heating chamber arranged to receive at least a portion of an article comprising aerosol generating material;

an inductor coil encircling at least part of the heating chamber, and

a coil support on which at least a portion of the inductor coil is positioned;

wherein the coil support comprises a locating feature which engages with the housing to locate the heating assembly in position within the housing.

2. The aerosol provision device of claim 1, wherein the locating feature projects outwardly from the coil support.

3. The aerosol provision device of claim 1 or 2, wherein the housing comprises a receiving feature arranged to engage with the locating feature.

4. The aerosol provision device of any of claims 1 to 3, wherein the receiving feature extends axially in a direction from a first end to a second end of the housing.

5. The aerosol provision device of any of claims 1 to 4, wherein the locating feature comprises a first protrusion and a second protrusion.

6. The aerosol provision device of claim 5, wherein the first protrusion is radially offset from the second protrusion.

7. The aerosol provision device of any of claims 3 to 6, wherein the receiving feature comprises a first receiving element arranged to engage with the first protrusion, and a second receiving element arranged to engage with the second protrusion.

8. The aerosol provision device of claim 7, wherein the housing comprises an axially extending aperture, and wherein the first and second receiving elements are on opposing sides of the axially extending aperture.

9. The aerosol provision device of any of claims 1 to 8, wherein the heating assembly comprises an end support.

10. The aerosol provision device of claim 9, wherein the locating feature comprises a first locating feature, and the end support comprises a second locating feature.

11. The aerosol provision device of claim 10, wherein the receiving feature is arranged to engage with the second locating feature.

12. The aerosol provision device of any of claims 9 to 11, wherein the end support comprises an engagement feature arranged to engage with the housing to restrict axial movement.

13. The aerosol provision device of any of claims 9 to 12, wherein the housing comprises a positioning feature that contacts the end support when the end support is fully inserted into the housing.

14. An aerosol provision device for generating an aerosol from aerosol-generating material comprising a housing and a heating assembly, the heating assembly comprising:

a heating chamber arranged to receive at least a portion of an article comprising aerosol generating material;

an inductor coil encircling at least part of the heating chamber, and

a coil support on which at least a portion of the inductor coil is positioned;

wherein the coil support comprises a locating feature which engages with the housing to locate the heating assembly in position within the housing.

15. An aerosol provision system comprising the aerosol provision device of claim 1; and an article comprising aerosol-generating material.

16. A method of manufacturing an aerosol provision device for generating an aerosol from aerosol-generating material, comprising:

assembling a heating assembly comprising:

a heating chamber arranged to receive at least a portion of an article comprising aerosol generating material;

an inductor coil encircling at least part of the heating chamber, and

a coil support on which at least a portion of the inductor coil is positioned;

the method comprising:

engaging a locating feature on the coil support with a receiving feature on the housing to locate the coil support and the housing;

and inserting the heating assembly into the housing in an axial direction.

17. The method of claim 16, comprising attaching a coil support to an end support.

18. The method of claim 17, wherein the locating feature is a first locating feature, the method comprising engaging a second locating feature on the end support with the receiving feature on the housing to locate the end support and the housing.

19. The method of any of claims 16 to 18, comprising engaging an engagement feature with the housing to prevent axial movement.

20. The method of any of claims 17 to 19, comprising inserting the heating assembly into the housing until the end support contacts a positioning feature on the housing.

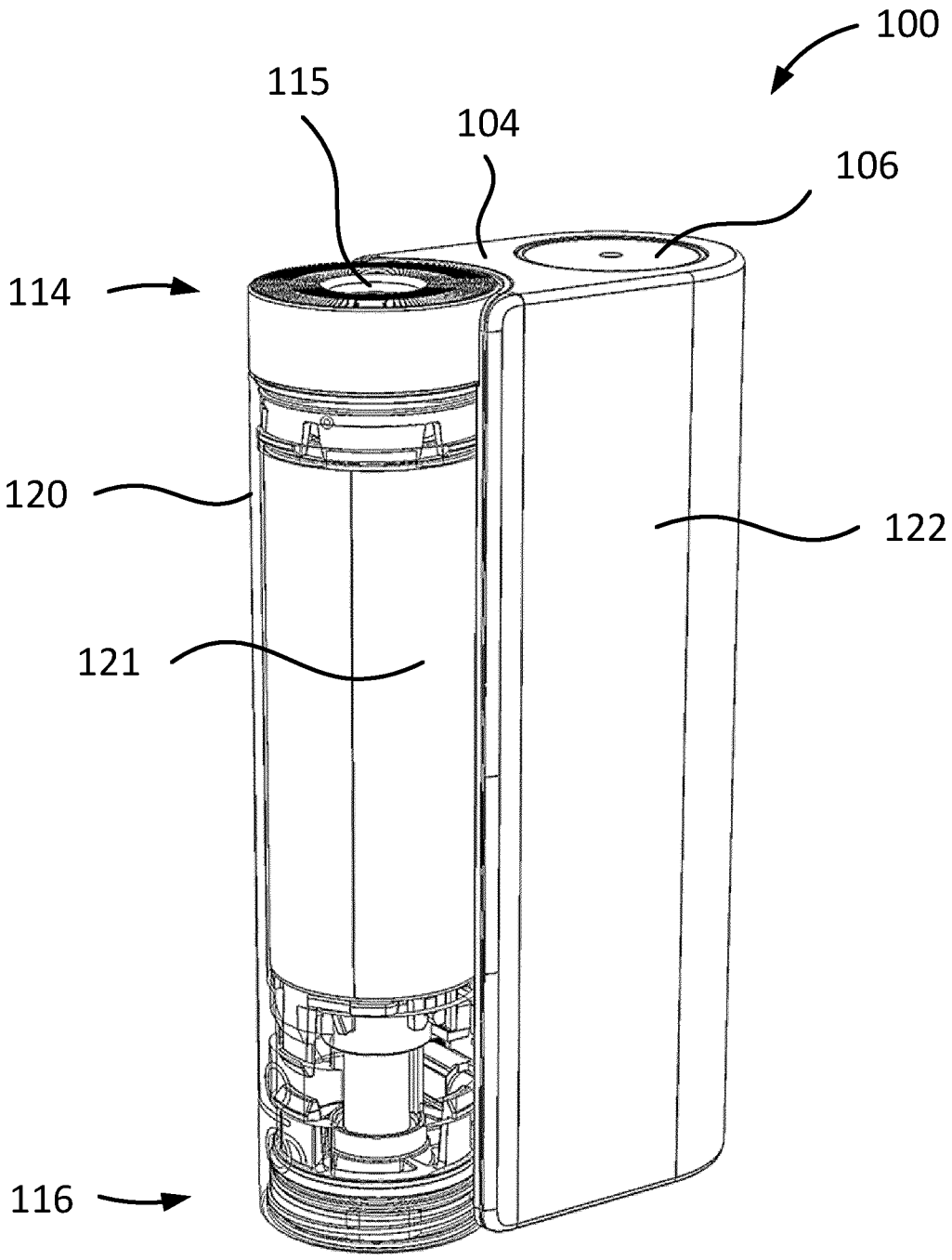


Fig. 1

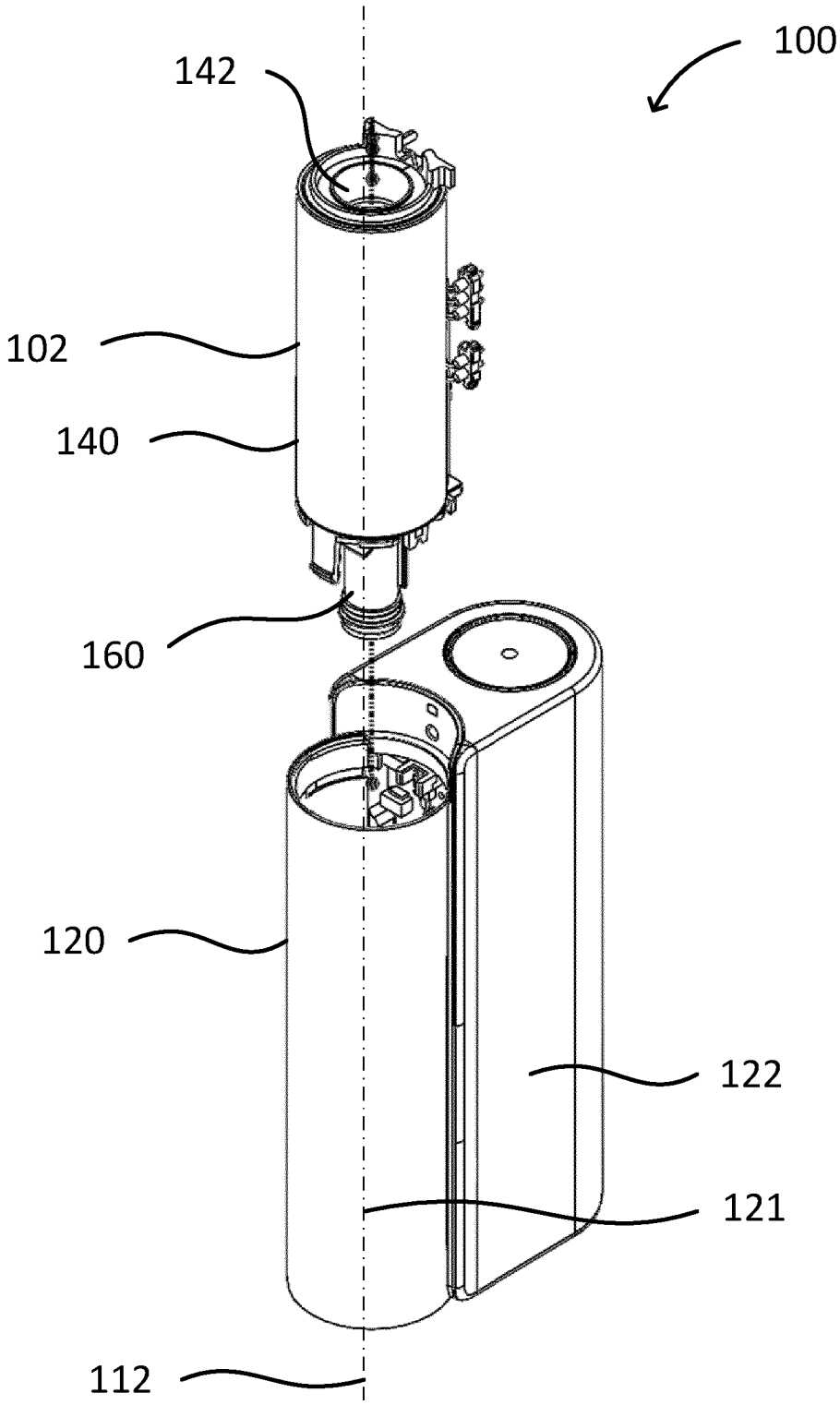


Fig. 2

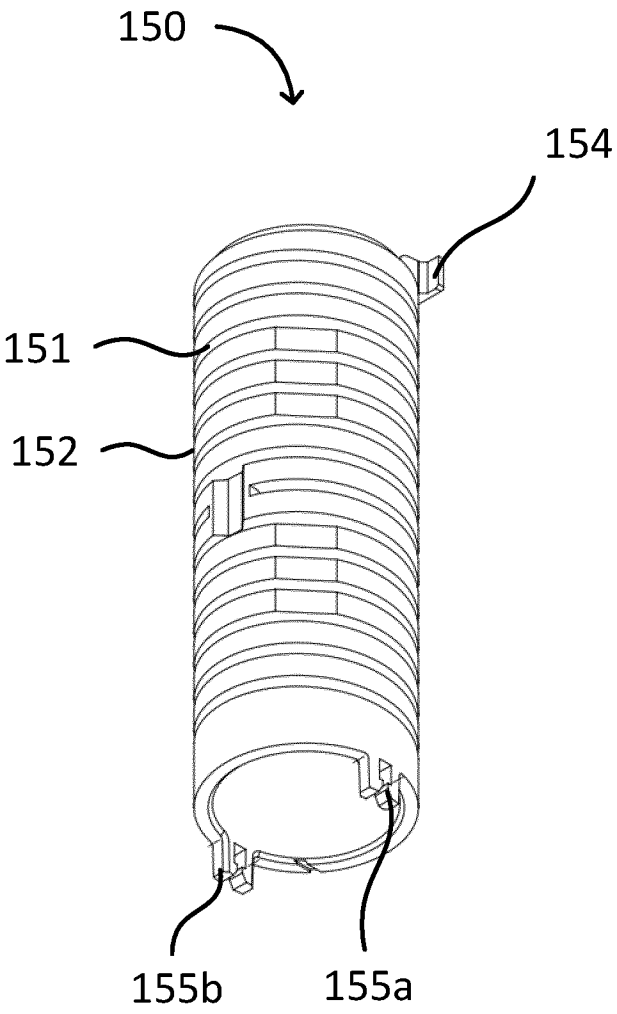


Fig. 3a

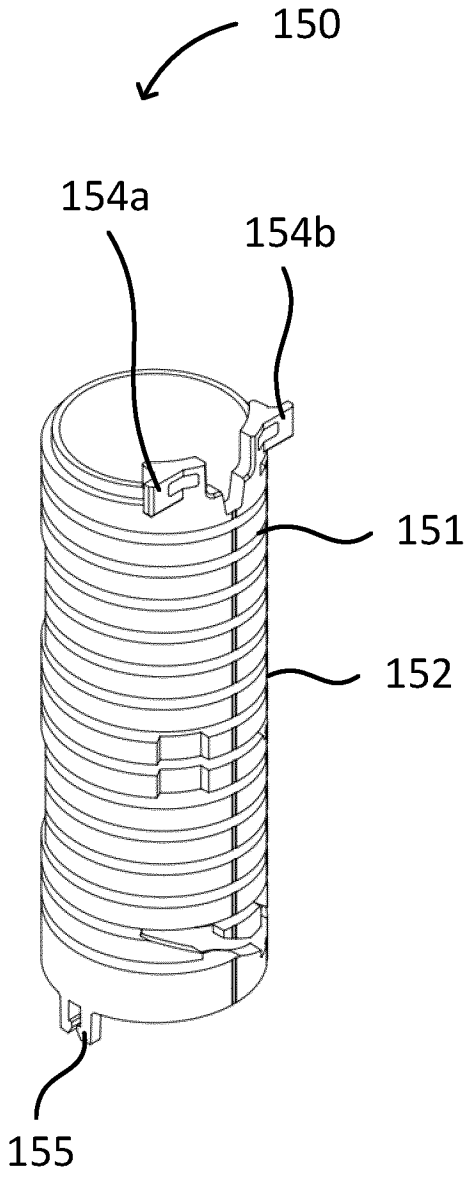


Fig. 3b

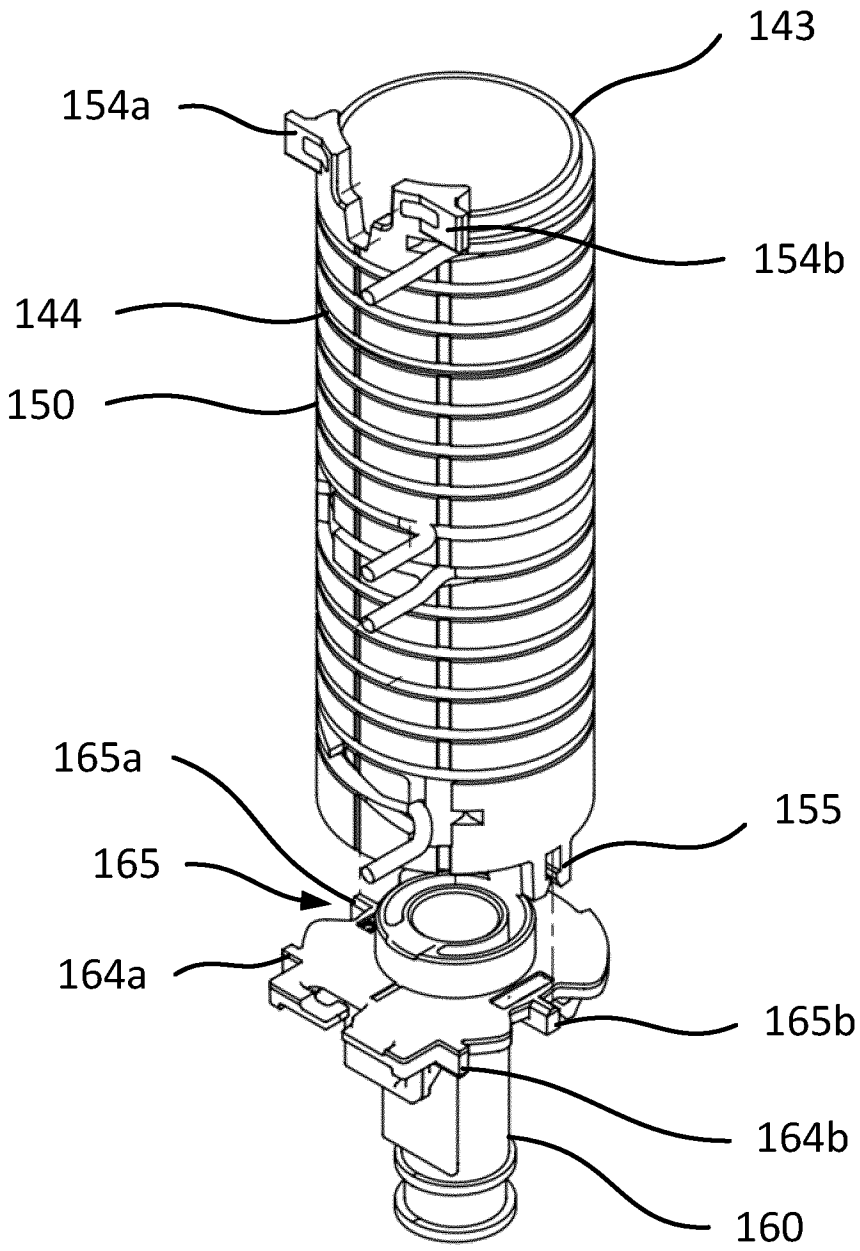


Fig. 4

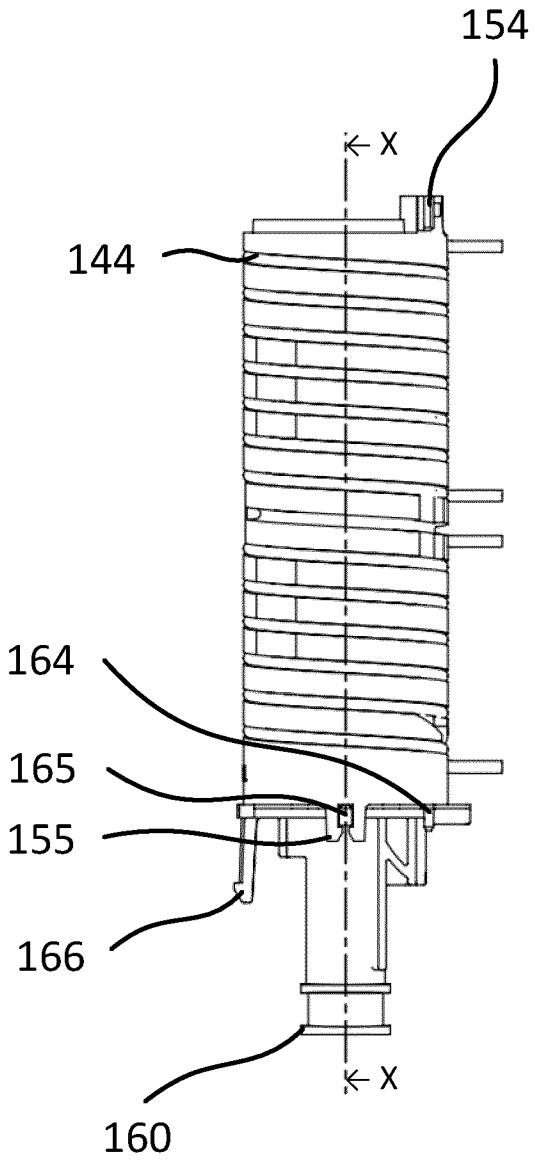


Fig. 5a

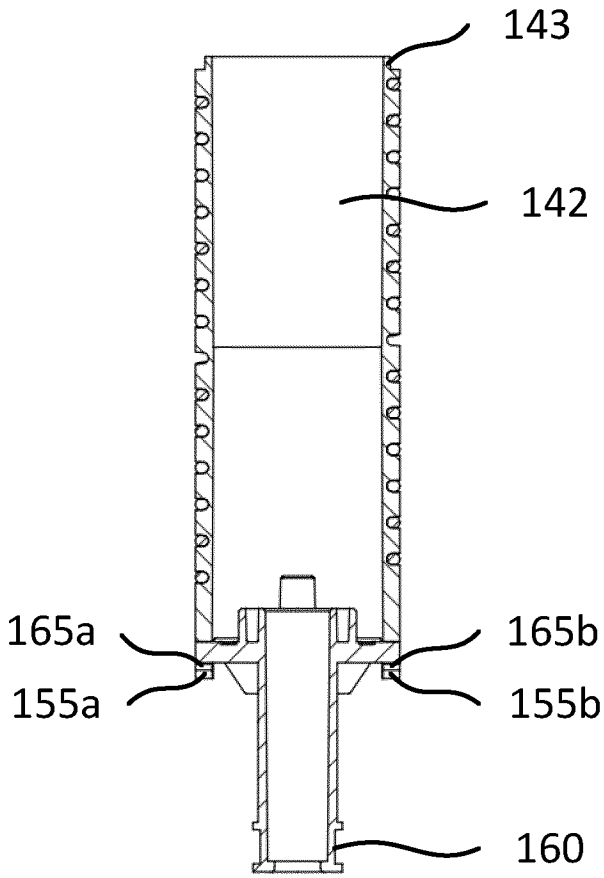


Fig. 5b

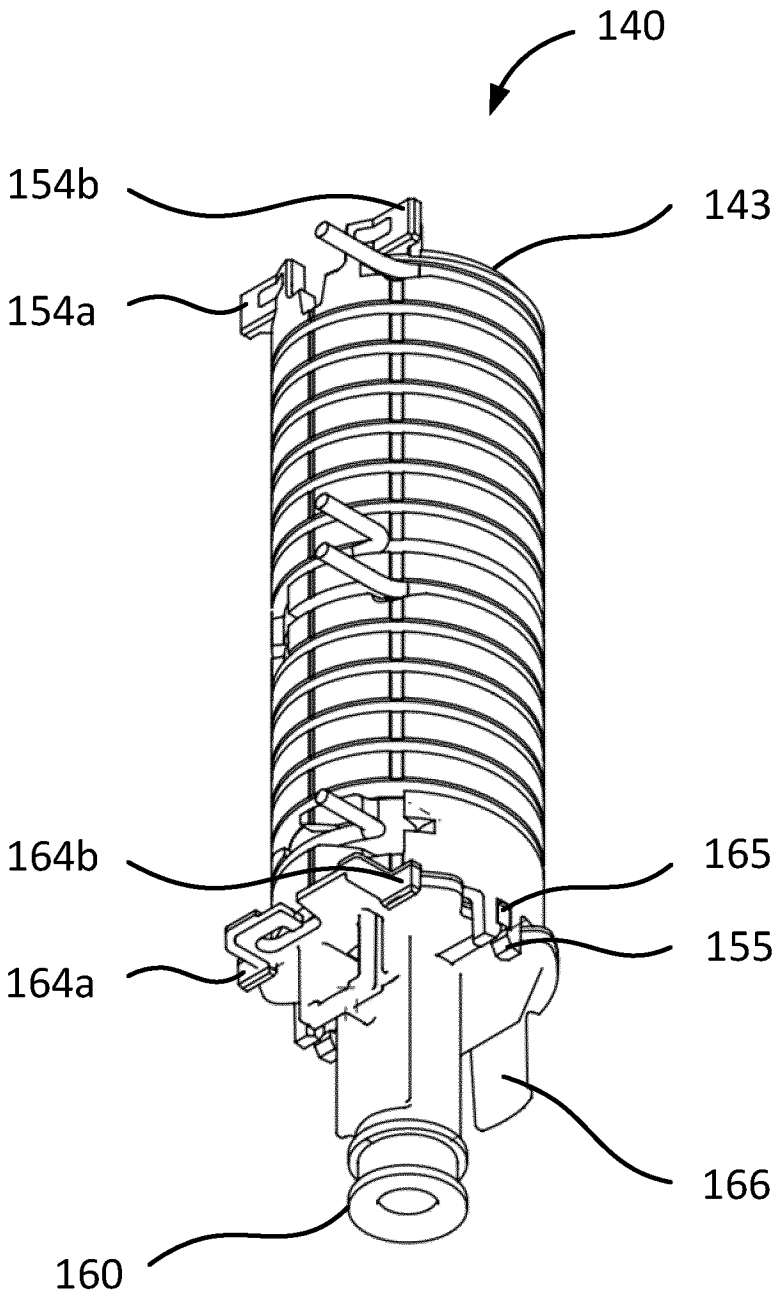
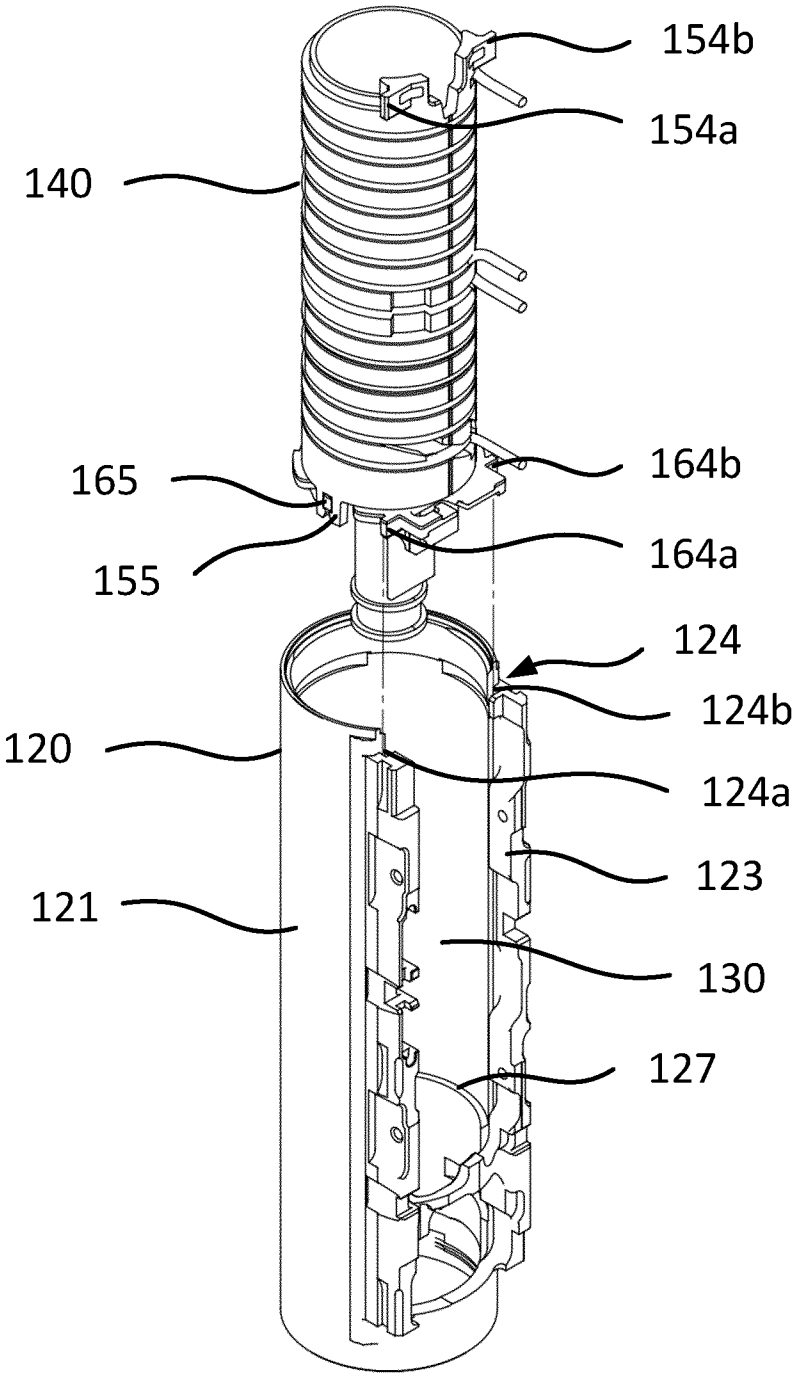


Fig. 6


154b
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155
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124a
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121
130
127

Fig. 7

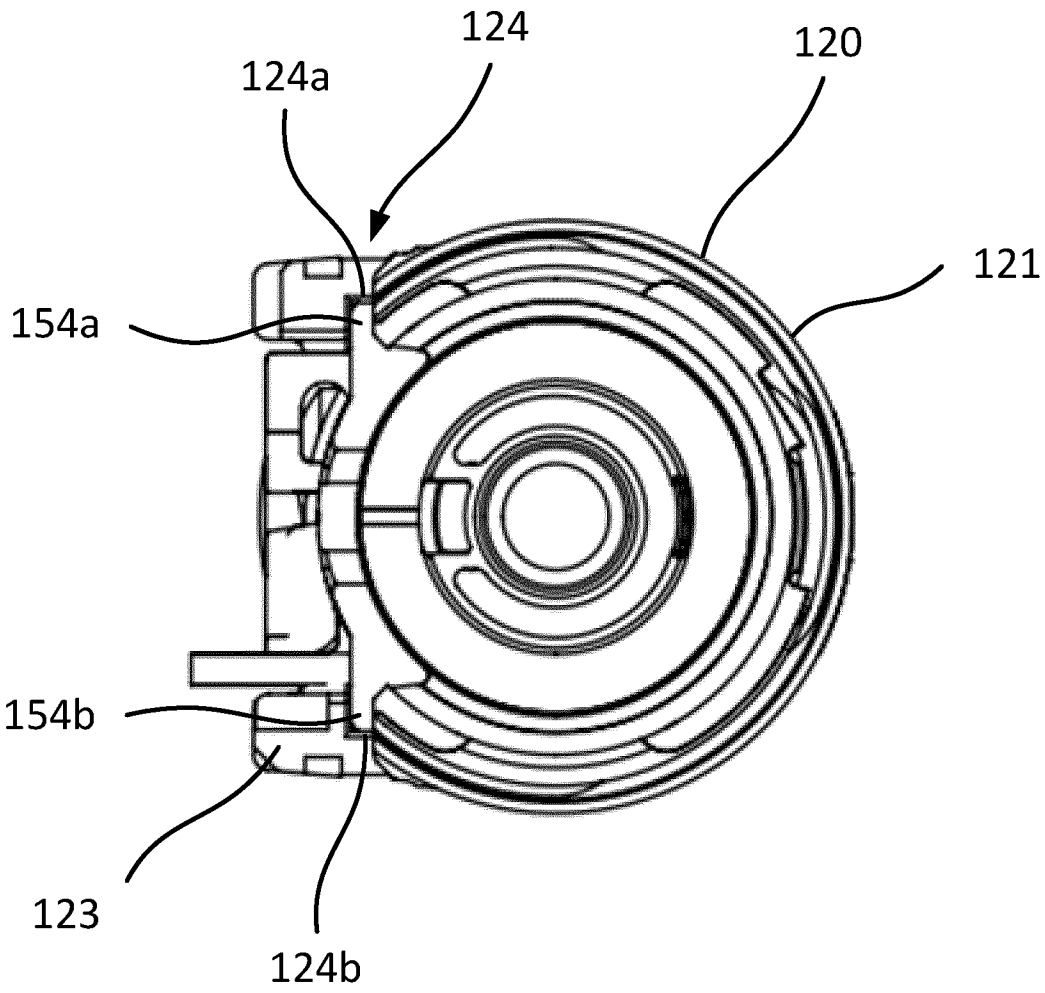

Fig. 8

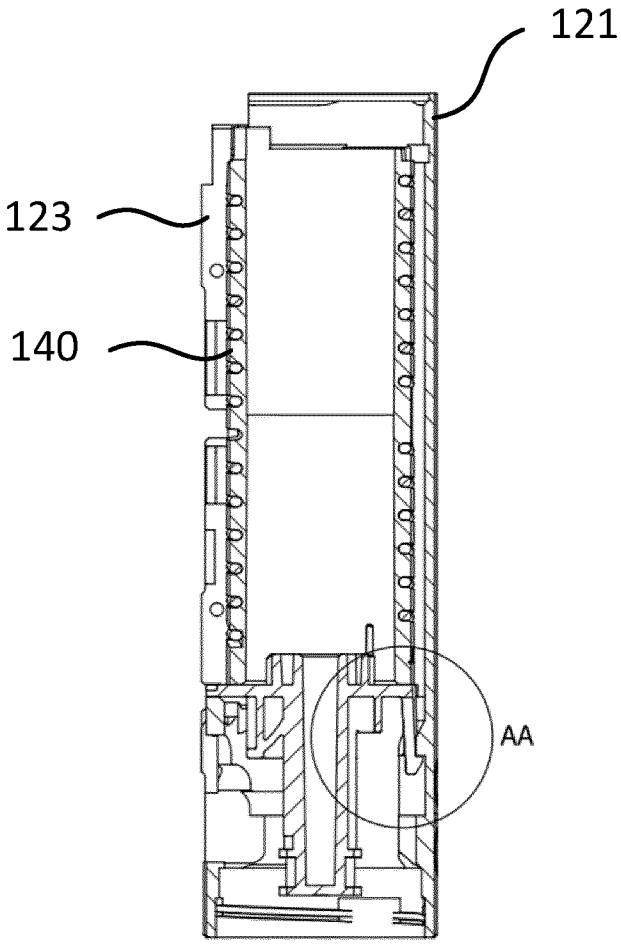

Fig. 9a

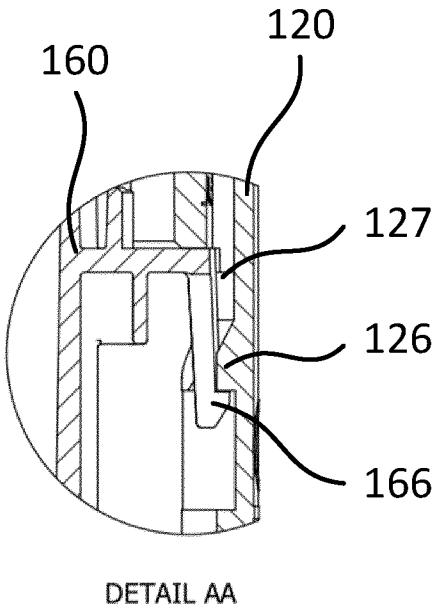

Fig. 9b

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2023/062046

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24F40/40 A24F40/465
ADD.

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

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)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2022/058361 A1 (NICOVENTURES TRADING LTD [GB]) 24 March 2022 (2022-03-24)	1-3, 5-17,19, 20
A	figures page 11, line 6 - line 17 page 14, line 9 - line 11 page 30, line 15 - page 35, line 11 page 32, line 28 - page 33, line 6 page 33, line 21 - page 34, line 10	4,18
A	US 2020/359701 A1 (LIU TUANFANG [CN]) 19 November 2020 (2020-11-19) figures	1-20

☐ 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
3 August 2023	14/08/2023

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kirchmayr, Katrin

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2023/062046

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2022058361 A1	24-03-2022	EP 4213657 A1	26-07-2023
		KR 20230053623 A	21-04-2023
		WO 2022058361 A1	24-03-2022
US 2020359701 A1	19-11-2020	DK 3738452 T3	19-04-2022
		EP 3738452 A1	18-11-2020
		ES 2910967 T3	17-05-2022
		PL 3738452 T3	09-05-2022
		PT 3738452 T	11-04-2022
		US 2020359701 A1	19-11-2020