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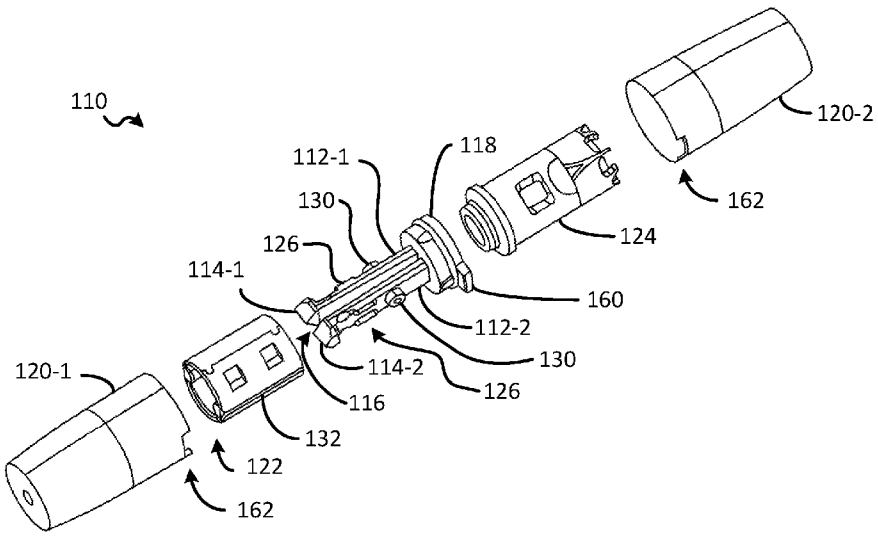
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Fig. 2



(57) Abstract: A tool for cleaning an aerosol-generating device having a heating chamber, the tool includes a first cleaning head, a second cleaning head, a tool base, a housing, and an opening tab. The first cleaning head extends along a longitudinal axis of the tool between a proximal end and a distal end. The second cleaning head is arranged back-to-back with the first cleaning head. The tool base is arranged between the first cleaning head and the second cleaning head. The housing includes a first cap and a second cap. The first cap is configured to engage with the tool base to house the first cleaning head. The second cap is configured to engage with the tool base to house the second cleaning head. The opening tab extends from the tool base and is configured to selectively disengage the first cap or the second cap from the tool base.

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CLEANING TOOL FOR AEROSOL-GENERATING DEVICE

The present disclosure relates to a cleaning tool for an aerosol-generating device. In particular, the invention relates to a cleaning tool for cleaning at least a heating chamber of an aerosol-generating device.

Aerosol-generating articles in which an aerosol-forming substrate for generating an inhalable aerosol is heated, rather than combusted, are known in the art. Typically in such heated aerosol-generating articles, an aerosol is generated by the transfer of heat from a heat source to a physically separate aerosol-forming substrate or material. The aerosol-forming substrate may be located within, around, or downstream of the heat source. During use, volatile compounds are released from the aerosol-forming substrate by heat transfer from the heat source and entrained in air drawn through the aerosol-generating article. As the released compounds cool, they condense to form an aerosol.

International patent publication WO 2013/102614 discloses an example of an electrically operated aerosol-generating device in which an aerosol-forming substrate of an aerosol-generating article is heated in direct contact with a heating blade to form an inhalable aerosol. The heating blade is in the form of a blade which extends from a bottom chamber wall of a heating chamber. The heating blade is inserted into an aerosol-forming substrate segment of an aerosol-generating article.

When an aerosol-forming substrate, such as a tobacco substrate, is heated, volatile compounds are released. Some of the volatile compounds and aerosol evolved by the heat from the heating blade may become deposited on the aerosol-generating device. In particular, such residue may become deposited on the bottom chamber wall of the heating chamber, whereas residue on the side walls of the heating chamber may be at least partially removed by the insertion and removal on the aerosol generating article. Particles of the aerosol-forming substrate itself may also become adhered to the heating blade, particularly if the heating blade is in direct contact with the aerosol-forming substrate. For example, when using the device described in WO2013/102614, a heating blade warms a tobacco substrate to temperatures between 200 to 350 degree Celsius, releasing volatile compounds, nicotine and glycerol that can form an aerosol. Residues and dust may nevertheless collect inside the heating chamber in the device after use of multiple aerosol-generating articles.

Residue and dust accumulation on the chamber bottom wall can block air flow passageways of the aerosol-generating device. Furthermore, the heating blade is susceptible to damage if improper tools or objects are used to clean the heating chamber.

According to an aspect of the present invention, there is provided a tool for cleaning an aerosol-generating device having a heating chamber. The tool may comprise a first cleaning head extending along a longitudinal axis of the tool between a proximal end and a distal end. The tool may comprise a second cleaning head arranged back-to-back with the first cleaning head. The tool may comprise a tool base arranged between the first cleaning head and the second cleaning head. The tool may comprise a housing. The housing may comprise a first cap configured to engage with the tool base to house the first cleaning head. The housing may comprise a second cap configured to engage with the tool base to house the second cleaning head. The tool may comprise an opening tab extending from the tool base and configured to selectively disengage the first cap or the second cap from the tool base based on a user interaction with the opening tab.

Cleaning tools may include two cleaning heads each serving to clean residue and dust from the cleaning chamber in different ways. Such cleaning heads may be arranged on opposite ends of the cleaning tool with separate caps configured to house each cleaning head. Selectively removing one cap or the other may be difficult when pulling on the caps simultaneously. The user may not have control over which cap is removed and the desired cap may not be the first one to disengage from a tool base of the tool. Accordingly, the user may be required to remove both caps to access the desired cleaning head.

Advantageously, the opening tab may allow the selective disengagement and removal of either the first cap or the second cap from the tool base. Additionally, the opening tab may allow the selective disengagement of the first cap or the second cap with a simple design that is easy to manufacture. Furthermore, the ability to selectively disengage the caps prevents situations where the cap on an undesired cleaning head is removed before the cap on the desired tool is removed.

The first cap and the second cap may each comprise a notch. The opening tab may extend through the notch of the first cap when the first cap is engaged with the tool base. The opening tab may extend through the notch of the second cap when the second cap is engaged with the tool base. The opening tab may be configured to protrude over an edge surface of the first cap when the first cap is engaged with the tool base. The opening tab may be configured to protrude over an edge surface of the second cap when the second cap is engaged with the tool base.

The opening tab may comprise a first surface arranged perpendicular to the longitudinal axis of the tool. The opening tab may comprise a second surface arranged perpendicular to the longitudinal axis of the tool and opposite the first surface. The opening tab may be configured to disengage the first cap from the tool base when pressure is applied to the second surface. The

opening tab may be configured to disengage the second cap from the tool base when pressure is applied to the first surface.

The first cap may be configured to engage with the tool base via a snap fit connection. The second cap may be configured to engage with the tool base via a snap fit connection. The first cap may include snap fit retention features configured to engage with snap fit retention features of the tool base. The second cap may include snap fit retention features configured to engage with snap fit retention features of the tool base. Snap fit retention features may include one or more ridges, protrusions, recesses, channels, or clips. The snap fit retention retentions features may be configured to resist engagement or disengagement until a snap fit retention force is met or exceeded. When the snap fit retention force is met or exceeded the retention features may be configured to flex until the caps are engaged or disengaged from the tool base.

The first cap and the second cap may be formed from any suitable material. For example, the first cap and the second cap may be formed from a metallic material, a plastic material, or a metallic material and a plastic material.

The opening tab may be configured to elastically flex within a range in response to pressure exerted on opening tab in a direction parallel to the longitudinal axis of the tool. The range of the flex may be configured to allow the opening tab to exert pressure on the first cap or the second cap sufficient to disengage the first cap or the second cap from the tool base. The force sufficient to disengage the first cap or the second cap may be the snap fit retention force.

The second cleaning head may be detachable from the tool base. The second cleaning head may be couplable to the tool base via a snap fit connection. The tool base may be configured to couple to an accessory in place of the second cleaning head. The accessory may be configured to couple to the tool base via a snap fit connection.

The first cleaning head may comprise a first elongate member extending from the tool base. The first elongate member may comprise a first distal end distal from the tool base. The first cleaning head may comprise a second elongate member extending from the tool base. The second elongate member may comprise a second distal end distal from the tool base. A slot may be defined between the first elongate member and the second elongate member.

Preferably, reciprocating movement of the at least one of the first distal end of the first elongate member and the second distal end of the second elongate member, within the heating chamber, may be configured to scrape the bottom chamber wall. As used herein the term “reciprocating movement”, in the context of one or both of a first distal end of a first elongate member and a second distal end of a second elongate member within a heating chamber having a heating blade extending into the heating chamber, refers to an angular movement that is generally parallel to the plane the heating blade is in. The angular movement may be initiated by

moving the tool base in a direction parallel to the heating blade and the slot. In response, the first elongate member and the second elongate member may move in a direction opposite the movement of the tool base causing one or both of the first distal end and the second distal end to scrape the chamber bottom wall in a pivoting motion.

The tool may comprise a tubular member surrounding at least a portion of the first elongate member and the second elongate member. The tubular member may comprise a first semi-cylindrical shell and a second semi-cylindrical shell. The first semi-cylindrical shell and second semi-cylindrical shell may be configured to couple to one another to form a tube. The tubular member may comprise one or more channels on an outer surface of the tubular member. The one or more channels may extend parallel to a longitudinal axis of the tubular member. The one or more channels may be configured to receive a rib of the heating chamber.

The tubular member may comprise one or more tubular member protrusions on an inner surface of the tubular member. Each of the one or more tubular member protrusions may be configured to engage a corresponding one of the one or more elongate member protrusions located on an outer surface of the first elongate member or the second elongate member. Each of the one or more tubular member protrusions may define a convex shape extending toward a longitudinal axis of the tubular member.

The tubular member, or a portion of the tubular member, may have an outer shape and dimension similar to an inner shape and dimension of the heating chamber into which the tubular member may be inserted. Having such a similar shape and dimension may facilitate insertion of the tubular member into the heating chamber. Having such a similar shape and dimension may facilitate alignment of the tubular member with the heating chamber. Proper alignment of the tubular member with the heating chamber may result in proper alignment of the slot defined between the first elongate member and the second elongate members with the heating blade if the device has a heating blade.

The tubular member may define an outer circumference with at least one channel configured to receive a rib of the heating chamber. Engagement of the rib with the channel may prevent axial rotation of the first elongate member and the second elongate member within the heating chamber. Preventing axial rotation may advantageously prevent the heating blade from being broken off. The at least one channel may be flared at a receiving end. Providing at least one channel with a flared receiving end may advantageously facilitate alignment of the tool and insertion of the tool into the heating chamber

The one or more elongate member protrusions may be rounded elongate member protrusions. The one or more elongate member protrusions may comprise a first pair of elongate member protrusions connected to each other by a first base and extending from the first elongate

member. The elongate member protrusions of the first pair of elongate member protrusions may be spaced apart by a first gap located adjacent to the base and between the elongate member protrusions of the first pair of elongate member protrusions. The one or more elongate member protrusions may comprise a second pair of elongate member protrusions connected to each other by a second base and extending from the second elongate member. The elongate member protrusions of the second pair of elongate member protrusions may be spaced apart by a second gap located adjacent to the second base and between the elongate member protrusions of the second pair of elongate member protrusions.

The tool may include a pivot member arranged between the base and both the first distal end of the first elongate member and the second distal end of the second elongate member. The pivot member may be configured to allow pivoting the first elongate member and the second elongate member in a preferred direction transverse to the extension of the first elongate member. The pivot member may be configured to limit pivoting the first elongate member and the second elongate member in a non-preferred direction. The non-preferred direction may include any direction that includes a component orthogonal to the preferred direction. Preferably, the pivot member is configured to prevent movement of the first elongate member and the second elongate member within the heating chamber that may damage the heating blade if the tool is used to clean a device having a heating blade extending into a heating chamber.

The pivot member may define one or more extensions extending from an outer surface of at least one of the first elongate member and the second elongate member. The one or more extensions may be cylindrical extensions. Preferably, the pivot member may define two cylindrical extensions. One of the two extensions may extend from an outer surface the first elongate member and the second extension may extend from an outer surface of the second elongate member. The outer surface of the first elongate member may face away from the slot. The outer surface of the second elongate member may face away from the slot. The tubular member may include one or more receptacles each configured to receive a extension. The one or more receptacles may define a hollow cylinder with at least one open face. The one or more receptacles and the extensions may be configured to cooperate to allow the first elongate member and the second elongate member to be pivoted in the preferred direction. The one or more receptacles and the extensions may be configured to cooperate to prevent the first elongate member and the second elongate member from being pivoted in the non-preferred direction

The pivot member, or a portion of the pivot member, may define an outer perimeter having one or more channels configured to receive a rib of the heating chamber as the pivot member is inserted into the heating chamber. When the rib is received in the channel, axial rotation within the heating chamber of the first elongate member and the second elongate member may be

limited. The one or more channels may be flared at a receiving end. Providing one or more channels with a flared receiving end may advantageously facilitate alignment of the tool and insertion of the tool into the heating chamber.

The pivot member, or a portion of the pivot member, may have an outer shape and dimension similar to an inner shape and dimension of the heating chamber into which the pivot member may be inserted. Having such a similar shape and dimension may facilitate insertion of the pivot member into the heating chamber. Having such a similar shape and dimension may facilitate alignment of the pivot member with the heating chamber. Proper alignment of the pivot member with the hating chamber may result in proper alignment of the slot defined between the first elongate member and the second elongate member with the heating blade if the device has a heating blade.

The pivot member may comprise an elliptical member defining an outer circumference with at least one channel configured to receive a rib of the heating chamber. Engagement of the rib with the channel may prevent axial rotation of the first elongate member and the second elongate member within the heating chamber. The elliptical member may comprise a disk or a cylinder. The elliptical member may be in the shape of an ellipse. The shape of an ellipse may include a circular shape. The at least one channel may be flared at a receiving end. Providing at least one channel with a flared receiving end may advantageously facilitate alignment of the tool and insertion of the tool into the heating chamber.

The pivot member may be integrally formed with the tool base, the first elongate member, and the second elongate member. The pivot member may be firmly coupled between the base and both the first distal end and the second distal end. The pivot member may be formed from any suitable material. For example, the pivot material may be formed from a metallic material, a plastic material, or a combination of a metallic material and a plastic material.

The elongate members may be configured to pivot between a neutral position to a first pivoted position in the preferred direction or between a neutral position and a second pivoted position in the preferred direction. The first pivoted position and the second pivoted position may be on opposite sides of the neutral position along the preferred direction. Pivoting of the elongate members may be initiated by a reciprocating motion.

The one or more tubular member protrusions of the tubular member may comprise a first tubular member protrusion configured to engage the first pair of elongate member protrusions and a second tubular member protrusion configured to engage the second pair of elongate member protrusions. An apex of the first tubular member protrusion may be located in the first gap when the elongate members are in the neutral position. An apex of the second tubular member protrusion may also be located in the second gap in the neutral position. The apex of the

first tubular member protrusion may be configured to engage one of the elongate member protrusions of the first pair of elongate member protrusions when the first elongate member is in the first or second position. The apex of the second tubular member protrusion may be configured to engage one of the second pair of elongate member protrusions when the second elongate member is in the first or second position.

The tool may include bristles extending from the first elongate member, the second elongate member or both of the first elongate member and the second elongate member. The bristles may advantageously increase the effective cleaning area of the tool. Preferably, the bristles are sufficiently stiff to clean a surface of the heating chamber but are not sufficiently stiff to cause damage to a heating blade extending into the heating chamber. The bristles will preferably contact a surface and deflect from the surface of the heating chamber or heating blade when the tool is being used to clean the heating chamber.

The bristles may extend radially outward from one or both of the first elongate member and the second elongate member. Bristles extending radially outward may advantageously clean inner circumferential surfaces of the heating chamber.

The bristles may be formed from any suitable material. For example, the bristles may be formed from metallic filament, plastic filaments, or filaments comprising a metallic material and a plastic material.

The tool base, the first elongate member, and the second elongate member may be integrally formed. The first elongate member and the second elongate member may be coupled to the tool base. The tool base, the first elongate member, and the second elongate member may be formed from any suitable material. For example, one or more of the tool base, the first elongate member, and the second elongate member may be formed from a metallic material, a plastic material, or a combination of a metallic material and a plastic material.

The first elongate member may include a first flat surface facing the slot and the second elongate member may include a second flat surface facing the slot, the first flat surface extending through a first plane and the second flat surface extending through a second plane, wherein the first plane and the second plane are parallel planes and the first flat surface and second flat surface extend parallel to one another. Providing a tool having a first elongate members and a second elongate members with such flat inner surfaces may prevent the first elongate member and second elongate member from damaging the heating blade when the chamber bottom wall is scraped with the tool. Such an arrangement of flat inner surfaces of the first elongate member and the second elongate member may be particularly useful in preventing damage if the tool is configured to prevent axial rotation when the chamber bottom wall is being scraped. For example,

axial rotation may be inhibited by providing a channel along an outer perimeter of a pivot element, where the channel is configured to receive a rib of the heating chamber.

At least one of the first elongate member and the second elongate member may include one or more ridges on a surface facing the slot. The one or more ridges may be configured to collapse at a threshold level of torque or flexion. The one or more ridges may be formed of elastically deformable material. The one or more ridges may advantageously clean a surface of the heating blade while the bottom chamber wall is being scraped or cleaned. Furthermore, ridges configured to collapse or ridges formed of elastically deformable material may provide additional protection against damage to the heating blade.

The tool base may include a handle. The handle may extend in a direction away from the first distal end of the first elongate member. For example, the handle may extend away from the first distal end of the first elongate member along a longitudinal axis of the tool. The handle may be interchangeable with the second cleaning head. The handle may couple to the tool base with a snap fit connection.

One or both of the first distal end and second distal end may have a tapered shape. For example, one or both of the first distal end and the second distal end may be narrower than a portion one or both of the first distal end and second distal end closest to the tool base. The tapered shape may facilitate scraping the chamber bottom wall.

The tool may include a cleaning cap. The cleaning cap may be configured to couple with the aerosol-generating device. The tool may be configured such that one or both of the first elongate member and the second elongate member contact the bottom wall when the cleaning cap is coupled with the aerosol-generating device. At least a portion of the cleaning cap may be configured to receive a portion of the aerosol-generating device when the first elongate member and second elongate members are received in the heating chamber of the aerosol-generating device.

The cleaning cap may be formed from any suitable material. For example, the cleaning cap may be formed from a metallic material, a plastic material, or a metallic material and a plastic material.

The tool may comprise a rod that effectively couples the first elongate member and the second elongate member to the cleaning cap. The rod may allow reciprocating movement of the first elongate member and the second elongate member. The rod may prevent axial rotation of the first elongate member and the second elongate member. For example, the rod may effectively couple the first elongate member and second elongate member to the cleaning cap such that the first elongate member and second elongate member may pivot about the rod. Providing the tool with a cleaning cap and a rod may advantageously provide controlled and consisting cleaning of

the chamber bottom wall near the heating blade. The cleaning cap and rod may also inhibit damage to a heating blade, if the device includes a heating blade extending into the heating chamber, because the cleaning cap and rod may inhibit axial rotation of the first elongate member and the second elongate member. If the device includes a heating blade, the cleaning cap, or another element of the tool, preferably comprises a feature configured to mate with a corresponding feature of the aerosol generating device to facilitate proper alignment of first elongate member and second elongate member relative to the heating blade.

The rod may be formed from any suitable material. For example, the rod may be formed from a metallic material, a plastic material, or a metallic material and a plastic material.

When the second cleaning head is inserted into the heating chamber towards the bottom wall, the distal end of the first elongate member extends away from the bottom wall. Preferably, the second cleaning head is configured to clean areas of the bottom surface of the heating chamber that the first distal end of the first elongate member and the second distal end of the second elongate member may not reach. The second cleaning head may include scraping surfaces for cleaning the bottom surface of the heating chamber. A tool with a cleaning head opposing the first distal end of the first elongate member and the second distal end of the second elongate member may advantageously be used to better clean the heating chamber than a tool without the cleaning head.

Preferably, the first elongate member and a second elongate member are moveable laterally to adjust the width of the slot at the distal end of the tool during a cleaning action. For example, the first elongate member and the second elongate member may be moved to decrease the slot width at the distal end of the tool during insertion of the tool into the heating chamber after the heating blade is received in the slot. Further, for example, the first elongate and may be moved to decrease the width of the slot at the distal end of the tool as the first elongate member and the second elongate member are pivoted from the neutral position to the first or second pivoted positions. Such lateral adjustment of the width of the slot may allow the first elongate member and second elongate member to be inserted in the heating chamber over a heating blade without damaging the blade during insertion. Thus, the tool can easily accommodate the heating blade during insertion and be moved into place to scrape or clean the bottom chamber wall near the heating blade after insertion.

The elongate members may include tapered sides. Tapered sides may advantageously allow a heating blade to more easily pass between the elongate members providing additional protection against damage to the heating blade during the reciprocating motion. The distal ends of the elongate member may be tapered. Tapered distal ends may allow the heating blade to

more easily pass between the distal ends during insertion of the tool into a heating chamber providing additional protection against damage to the heating blade.

A system may comprise an aerosol-generating device and the tool for cleaning the aerosol-generating device. The aerosol-generating device may comprise a heating chamber and a heating blade with a substantially rectangular cross section extending into the heating chamber from a bottom chamber wall of a heating chamber.

Advantageously, a system including the cleaning tool provided with the first elongate member and the second elongate member defining a slot therebetween allows the tool to scrape or clean the chamber bottom wall of the aerosol-generating device near the base of the heating blade. Preferably, the use of the tool to clean the heating chamber does not damage the heating blade. The tool may also serve to clean the heating blade.

According to another aspect of the present invention, there is provided a method for opening a housing of a tool for cleaning an aerosol-generating device, the method comprising applying pressure to an opening tab extending from a tool base of the tool to selectively remove a first cap or a second cap of the housing to expose one of a first cleaning head or a second cleaning head. The method may comprise flexing the opening tab in response to the pressure applied to the first surface or the second surface. The method may comprise moving the opening tab in response to the pressure applied to the first surface or the second surface. The method may comprise exerting pressure on an edge surface of the first cap or the second cap in response to the pressure applied on the first surface or the second surface. The method may comprise overcoming a snap fit retention force of the first cap or the second cap with the opening tab. Advantageously, exerting pressure on the opening tab allows the first cap or the second cap to be selectively removed.

The invention is defined in the claims. However, below there is provided a non-exhaustive list of non-limiting examples. Any one or more of the features of these examples may be combined with any one or more features of another example, embodiment, or aspect described herein.

Example Ex1: A tool for cleaning an aerosol-generating device having a heating chamber, the tool comprising: a first cleaning head extending along a longitudinal axis of the tool between a proximal end and a distal end; a second cleaning head arranged back-to-back with the first cleaning head; a tool base arranged between the first cleaning head and the second cleaning head; a housing comprising: a first cap configured to engage with the tool base to house the first cleaning head; and a second cap configured to engage with the tool base to house the second cleaning head; and an opening tab extending from the tool base and configured to selectively disengage the first cap or the second cap from the tool base based on a user interaction with the opening tab.

Example Ex2: The tool of example Ex1, wherein: the first cap and the second cap each comprise a notch; and the opening tab extends through the notch of the first cap when the first cap is engaged with the tool base and through the notch of the second cap when the second cap is engaged with the tool base.

Example Ex3: The tool of any one of the preceding examples, wherein the opening tab is configured to protrude over an edge surface of the first cap when the first cap is engaged with the tool base and to protrude over an edge surface of the second cap when the second cap is engaged with the tool base.

Example Ex4: The tool of any one of the preceding examples, wherein the opening tab comprises: a first surface arranged perpendicular to the longitudinal axis of the tool; and a second surface arranged perpendicular to the longitudinal axis of the tool and opposite the first surface, wherein the opening tab is configured to: disengage the first cap from the tool base when pressure is applied to the second surface, and disengage second cap from the tool base when pressure is applied to the first surface.

Example Ex5: The tool of any one of the preceding examples, wherein the first cap and the second cap are configured to engage with the tool base via a snap fit connection.

Example Ex6: The tool of any one of the preceding examples, wherein the opening tab is configured to elastically flex within a range in response to pressure exerted on opening tab in a direction parallel to the longitudinal axis of the tool, the range of the flex configured to allow the opening tab to exert pressure on the first cap or the second cap sufficient to disengage the first cap or the second cap from the tool base.

Example Ex7: The tool of any one of the preceding examples, wherein the second cleaning head is detachable from the tool base.

Example Ex8: The tool of any one of the preceding examples, wherein the second cleaning head is couplable to the tool base via a snap fit connection.

Example Ex9: The tool of any one of the preceding examples, wherein the first cleaning head comprises: a first elongate member extending from the tool base, the first elongate member comprising a first distal end distal from the tool base; and a second elongate member extending from the tool base, the second elongate member comprising a second distal end distal from the tool base, wherein a slot is defined between the first elongate member and the second elongate member.

Example Ex10: The tool of example Ex9, further comprising a tubular member surrounding at least a portion of the first elongate member and the second elongate member.

Example Ex11: The tool of example Ex10, wherein the tubular member further comprises: a first semi-cylindrical shell; and a second semi-cylindrical shell, wherein the first semi-cylindrical shell and second semi-cylindrical shells are configured to couple to one another to form a tube.

Example Ex12: The tool of any one of examples Ex9 to Ex11, wherein the first cleaning head further comprises one or more pivot members arranged between the tool base and both the first distal end of the first elongate member and the second distal end of the second elongate member, wherein the one or more pivot members is configured to allow pivoting the first elongate member and the second elongate member in a preferred direction transverse to the extension of the first elongate member and wherein the one or more pivot members is configured to limit pivoting the first elongate member and the second elongate member in a non-preferred direction.

Example Ex13: The tool according to example Ex12, wherein the one or more pivot members comprises an elliptical member defining an outer circumference with a channel configured to engage with a rib of the heating chamber to prevent axial rotation of the first elongate member and the second elongate member within the heating chamber.

Example Ex14: The tool according to example Ex13, wherein the elliptical member comprises a disk or a cylinder.

Example Ex15: The tool according to any one of the preceding examples, wherein the second cleaning head comprises one or more scraping surfaces.

Example Ex16: A system comprising: an aerosol-generating device comprising a heating chamber and a heating blade with a substantially rectangular cross section extending into the heating chamber from a bottom chamber wall of a heating chamber; and a tool for cleaning the aerosol-generating device according to any one of the preceding examples.

Examples will now be further described with reference to the figures in which:

Fig. 1 shows a system including a tool for cleaning an aerosol-generating device;

Fig. 2 shows an exploded view of the tool of Fig. 1;

Fig. 3 shows a side view of the tool of Fig. 1 with caps of the tool engaged with a tool base of the tool;

Fig. 4 shows an isometric view of the tool of Fig. 1 without one of the caps engaged with the tool base and another of the caps disengaged from the tool base;

Fig. 5 shows another side view of the tool of Fig. 1 with the caps engaged with the tool base;

Fig. 6 shows another side view of the tool of Fig. 1 with pressure exerted on a first surface of an opening tab of the tool to disengage one of the caps;

Fig. 7 shows an isometric cross-sectional view of the tool of Fig. 1 with pressure exerted on a second surface of the opening tab to disengage another one of the caps;

Fig. 8 shows another side view of the tool of Fig. 1 without the caps;

Fig. 9 shows an isometric view of a tubular member of the tool of Fig. 1 with semi-cylindrical shells of the tubular member separated from one another; and

Fig. 10 a modification of the tool wherein the tool includes an elliptical pivot member.

Figs. 1–4 show a tool 110 for cleaning an aerosol-generating device. Fig. 1 shows system 100 including aerosol-generating device 102 and the tool 110. Fig. 2 shows the tool 110 in an exploded view. Fig. 3 shows a side view of the tool 110 with caps 120 engaged to a tool base 118 of the tool 110. Fig. 4 shows the tool 110 with cap 120-1 disengaged from the tool base 118.

The aerosol-generating device 102 includes a heating chamber 104, a heating blade 106, a chamber bottom wall 108, and a rib 109. The heating chamber 104 defines a cavity in the aerosol-generating device 102. The chamber bottom wall 108 is an inner surface of the heating chamber 104. The heating blade 106 extends from the chamber bottom wall 108 into the heating chamber 104. As shown, the heating blade 106 is a blade.

The tool 110 includes a tool base 118, a first elongate member 112-1, a second elongate member 112-2 (referred to collectively as elongate members 112), a first cap 120-1, a second cap 120-2 (referred to collectively as caps 120), a tubular member 122, and an accessory 124, elongate member protrusions 126, and pivot member 130. The elongate members 112 extend from the tool base 118. The first elongate member 112-1 includes a first distal end 114-1 distal from the tool base 118 and the second elongate member 112-2 includes a second distal end 114-2 (referred to collectively as distal ends 114) distal from the tool base 118. A slot 116 is defined between the elongate members 112.

The elongate members 112 are configured to be received in the heating chamber 104 such that the heating blade 106 is received in the slot 116. Additionally, the distal ends 114 extend to the bottom chamber wall 108 such that a reciprocating movement of the distal ends within the heating chamber scrapes the bottom chamber wall. In particular, the reciprocating movement may cause the distal ends 114 scrape the bottom chamber wall adjacent to a base of the heating blade 106. The distal ends 114 may comprise a scraping edge configured to scrape the chamber bottom wall 108. The distal ends 114 may comprise a roughened edge configured to scrape the chamber bottom wall 108.

The elongate members 112 define a slot 116 between them. The open or distal ends 114 of the elongate members 112 are configured to flex in response to pressure exerted on the elongate members 112 in the direction of the slot 116. Such flexure reduces the width of the slot 116 allowing the elongate members 112 to move closer, when compared to the unreduced width of the slot, to the heating blade 106 during a cleaning action. Accordingly, the elongate members 112 can clean the chamber bottom wall 108 near the heating blade 106. Additionally, reducing

the width of the slot 116 during a cleaning action may allow the elongate members 112 to clean the heating blade 106.

The elongate member protrusions 126 are coupled to the elongate members 112. The elongate member protrusions 126 are configured to cause the first elongate member 112-1 and the second elongate member 112-2 to move towards one another to reduce a width of the slot 116 when a cleaning action is applied to the tool 110. The cleaning action may include pivoting the elongate members 112 in the preferred direction. As shown, a pair of elongate member protrusions 126 located on an outer surface of each of the elongate members 112 are spaced apart by a gap 128.

The tubular member 122 surrounds the elongate members 112. The tubular member 122 is shaped to be received in the heating chamber 104. The tubular member 122 may have an outer diameter that corresponds to an inner diameter of the heating chamber. The tubular member 122 includes a channel 132 configured to receive the rib 109. The tubular member 122 cooperates with the rib 109 and the pivot member 130 to prevent axial rotation of the tool 110 when inserted into the heating chamber 104.

As shown, the pivot member 130 includes two cylindrical extensions that extend from surfaces of the elongate members 112 that face away from the slot 116. The cylindrical extensions of the pivot member 130 are received in receptacles 146 (shown in Fig. 9) of the tubular member 122. The pivot member 130 is configured to allow pivoting of the elongate members 112 in a preferred direction transverse to the extension of the elongate members as indicated by arrow 139 depicted in Fig. 8. The pivot member 130 is also configured to limit pivoting the elongate members 112 in a non-preferred direction. The pivot member 130 cooperates with receptacle 146 (shown in Fig. 9) of the tubular member 122 to allow the elongate members 112 to pivot in the preferred direction while also limiting or preventing the elongate members 112 from pivoting in non-preferred directions or rotating axially.

The accessory 124 is detachable from the tool base 118. The accessory 124 may couple to the tool base 118 with a snap fit connection. As shown, the accessory 124 is a cleaning head for cleaning the heating chamber 104. Additional accessories that may couple to the tool base 118 include a handle or another cleaning head. The accessory 124 may be operable to pivot the elongate members 112 in the preferred direction.

The caps 120 engage or couple to the tool base 118 to form a housing for the tool 110. The caps 120 may couple to the tool base 118 with a snap fit connection. The first cap 120-1 is configured to receive and house the elongate members 112 and the tubular member 122. The second cap 120-2 is configured to receive and house the accessory 124. Each of the caps includes a notch 162. The notches 162 are configured to allow the opening tab 160 to extend

through the notches 162 when the caps 120 are engaged with the tool base 118. Pressure on either side of the opening tab 160 may cause the opening tab 160 to flex and exert pressure on an edge surface 164 (shown in Fig. 4) of one of the caps 120. Accordingly, a user can selectively remove one or both of the caps 120 using the opening tab 160.

The opening tab 160 extends radially outward from the tool base 118. The opening tab 160 is configured to extend through notches 162 of the caps 120 making the opening tab 160 accessible when the caps are engaged with the tool base.

Figs. 5–7 show a cap removal process for the tool 110. Fig. 5 shows the tool 110 with the caps engaged with the tool base 118. Fig. 6 shows the opening tab 160 being used to disengage the second cap 120-2. Fig. 7 shows the opening tab 160 being used to disengage the first cap 120-1.

The opening tab 160 includes a first surface 166 arranged perpendicular to a longitudinal axis of the tool 110 and a second surface 168 also arranged perpendicular to the longitudinal axis of the tool 110. The first surface 166 is arranged opposite the second surface 168. The opening tab 160 is configured to disengage the second cap 120-2 from the tool base 118 when pressure is applied to the first surface 166 as shown in Fig. 6. When pressure is applied to the first surface 166, the opening tab 160 flexes or moves in the direction of the second cap 120-2 and presses against the edge surface 164 of the second cap 120-2. The pressure exerted by the opening tab 160 on the second cap 120-2 may be sufficient to overcome snap fit retention features that engage or couple the second cap 120-2 to the tool base 118.

The opening tab 160 is configured to disengage the first cap 120-1 from the tool base 118 when pressure is applied to the second surface 168 as shown in Fig. 7. When pressure is applied the second surface 168, the opening tab 160 flexes or moves in the direction of the first cap 120-1 and presses against the edge surface 164 of the first cap 120-1. The pressure exerted by the opening tab on the first cap 120-1 may be sufficient to overcome snap fit retention features that engage or couple the first cap 120-1 to the tool base 118.

Fig. 8 shows a side view of the tool 110 without the caps 120. Fig. 9 shows the tubular member 122 in an open state. The tubular member 122 includes a first semi-cylindrical shell 122-1 and a second semi-cylindrical shell 122-2. The first semi-cylindrical shell 122-1 and the second semi-cylindrical shell are substantially identical. The first semi-cylindrical shell 122-1 and the second semi-cylindrical shell 122-2 are configured to couple to one another to form a tube. The first semi-cylindrical shell 122-1 and the second semi-cylindrical shell 122-2 include clips 142 and clip receptacles 144 configured to receive and releasably retain the clips 142. Accordingly, the first semi-cylindrical shell 122-1 and the second semi-cylindrical shell 122-2 can couple to one another in a snap fit configuration.

Each of the first semi-cylindrical shell 122-1 and the second semi-cylindrical shell 122-2 includes a tubular member protrusion 138 and a receptacle 146. Each of the tubular member protrusions 138 extends from an edge of one of the first semi-cylindrical shell 122-1 or the second semi-cylindrical shell 122-2 to the receptacle 146. The apex 140 of each of the tubular member protrusions 138 extends parallel to a longitudinal axis of the assembled tubular member 122. Each of the receptacles 146 extends from an inner surface 136 of one of the first semi-cylindrical shell 122-1 or the second semi-cylindrical shell 122-2. Each of the receptacles 146 defines a hollow cylinder with an open end configured to receive one of the cylindrical extensions of the pivot member 130. The receptacles 146 cooperate with the cylindrical extensions to allow the elongate members 112 to pivot in the preferred direction indicated by arrow 139 (shown in Fig. 8) while limiting or preventing axial rotation of the elongate members 112 and preventing pivoting of the elongate members 112 in a non-preferred direction.

Fig. 10 shows a tool 310 that includes an elliptical pivot member 156. The elongate member protrusions 126 of the tool and 310 are configured to engage the inner side wall 107 of the heating chamber 104 of the aerosol-generating device 102. The tool 310 includes an elliptical pivot member 156 but does not include a tubular member. The elliptical pivot member 156 defines an outer circumference with at least one channel 158 configured to receive the rib 109 of the heating chamber 104. Engagement of the rib 109 with the channel 158 may prevent axial rotation of the elongate members 112 within the heating chamber 104. The elliptical pivot member 156 may comprise a disk or a cylinder. Providing at least one channel 158 may advantageously facilitate alignment of the tool and insertion of the tool into the heating chamber 104.

For the purpose of the present description and of the appended claims, except where otherwise indicated, all numbers expressing amounts, quantities, percentages, and so forth, are to be understood as being modified in all instances by the term "about". Also, all ranges include the maximum and minimum points disclosed and include any intermediate ranges therein, which may or may not be specifically enumerated herein. In this context, therefore, a number A is understood as A ± 10 percent of A. Within this context, a number A may be considered to include numerical values that are within general standard error for the measurement of the property that the number A modifies. The number A, in some instances as used in the appended claims, may deviate by the percentages enumerated above provided that the amount by which A deviates does not materially affect the basic and novel characteristic(s) of the claimed invention. Also, all ranges include the maximum and minimum points disclosed and include any intermediate ranges therein, which may or may not be specifically enumerated herein.

CLAIMS

1. A tool for cleaning an aerosol-generating device having a heating chamber, the tool comprising:
   a first cleaning head extending along a longitudinal axis of the tool between a proximal end and a distal end;
   a second cleaning head arranged back-to-back with the first cleaning head;
   a tool base arranged between the first cleaning head and the second cleaning head;
   a housing comprising:
      a first cap configured to engage with the tool base to house the first cleaning head; and
      a second cap configured to engage with the tool base to house the second cleaning head; and
   an opening tab extending from the tool base and configured to selectively disengage the first cap or the second cap from the tool base based on a user interaction with the opening tab.

2. The tool of claim 1, wherein:
   the first cap and the second cap each comprise a notch; and
   the opening tab extends through the notch of the first cap when the first cap is engaged with the tool base and through the notch of the second cap when the second cap is engaged with the tool base.

3. The tool of any one of the preceding claims, wherein the opening tab is configured to protrude over an edge surface of the first cap when the first cap is engaged with the tool base and to protrude over an edge surface of the second cap when the second cap is engaged with the tool base.

4. The tool of any one of the preceding claims, wherein the opening tab comprises:
   a first surface arranged perpendicular to the longitudinal axis of the tool; and
   a second surface arranged perpendicular to the longitudinal axis of the tool and opposite the first surface,
   wherein the opening tab is configured to:

disengage the first cap from the tool base when pressure is applied to the second surface, and

disengage second cap from the tool base when pressure is applied to the first surface.

5. The tool of any one of the preceding claims, wherein the first cap and the second cap are configured to engage with the tool base via a snap fit connection.

6. The tool of any one of the preceding claims, wherein the opening tab is configured to elastically flex within a range in response to pressure exerted on opening tab in a direction parallel to the longitudinal axis of the tool, the range of the flex configured to allow the opening tab to exert pressure on the first cap or the second cap sufficient to disengage the first cap or the second cap from the tool base.

7. The tool of any one of the preceding claims, wherein the second cleaning head is detachable from the tool base.

8. The tool of any one of the preceding claims, wherein the first cleaning head comprises:

a first elongate member extending from the tool base, the first elongate member comprising a first distal end distal from the tool base; and

a second elongate member extending from the tool base, the second elongate member comprising a second distal end distal from the tool base,

wherein a slot is defined between the first elongate member and the second elongate member.

9. The tool of claim 8, further comprising a tubular member surrounding at least a portion of the first elongate member and second elongate member.

10. The tool of claim 9, wherein the tubular member further comprises:

a first semi-cylindrical shell; and

a second semi-cylindrical shell,

wherein the first semi-cylindrical and the second semi-cylindrical shell are configured to couple to one another to form a tube.

11. The tool of any one of claims 8 to 10, wherein the first cleaning head further comprises one or more pivot members arranged between the tool base and both the first distal end of the first elongate member and the second distal end of the second elongate member, wherein the one or more pivot members is configured to allow pivoting the first elongate member and the second elongate member in a preferred direction transverse to the extension of the first elongate member and wherein the one or more pivot members is configured to limit pivoting the first elongate member and the second elongate member in a non-preferred direction.

12. The tool according to claim 11, wherein the one or more pivot members comprises an elliptical member defining an outer circumference with a channel configured to engage with a rib of the heating chamber to prevent axial rotation of the first elongate member and the second elongate member within the heating chamber.

13. The tool according to claim 12, wherein the elliptical member comprises a disk or a cylinder.

14. The tool according to any one of the preceding claims, wherein the second cleaning head comprises one or more scraping surfaces.

15. A system comprising:

an aerosol-generating device comprising a heating chamber and a heating blade with a substantially rectangular cross section extending into the heating chamber from a bottom chamber wall of a heating chamber; and

a tool for cleaning the aerosol-generating device according to any one of the preceding claims.

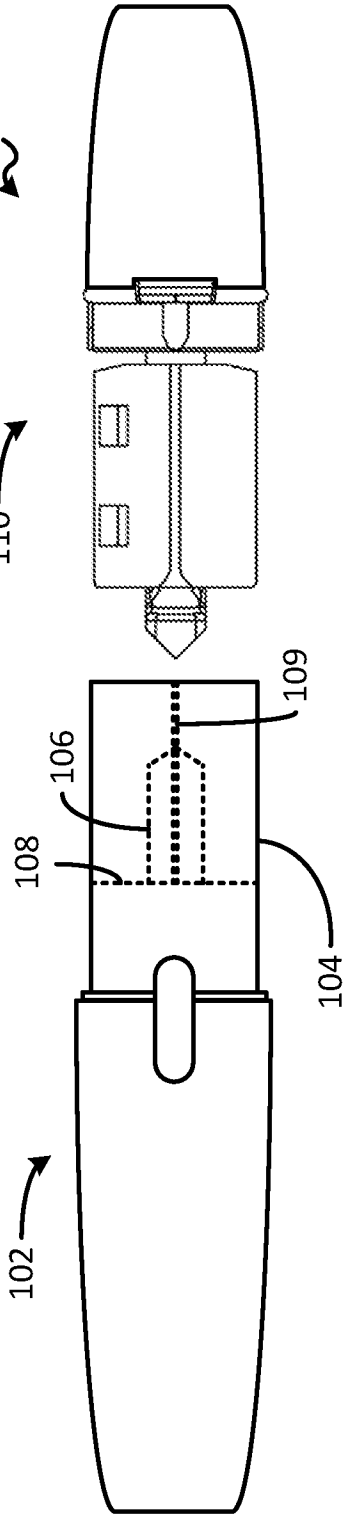

100
110
102
104
106
108
109

Fig. 1

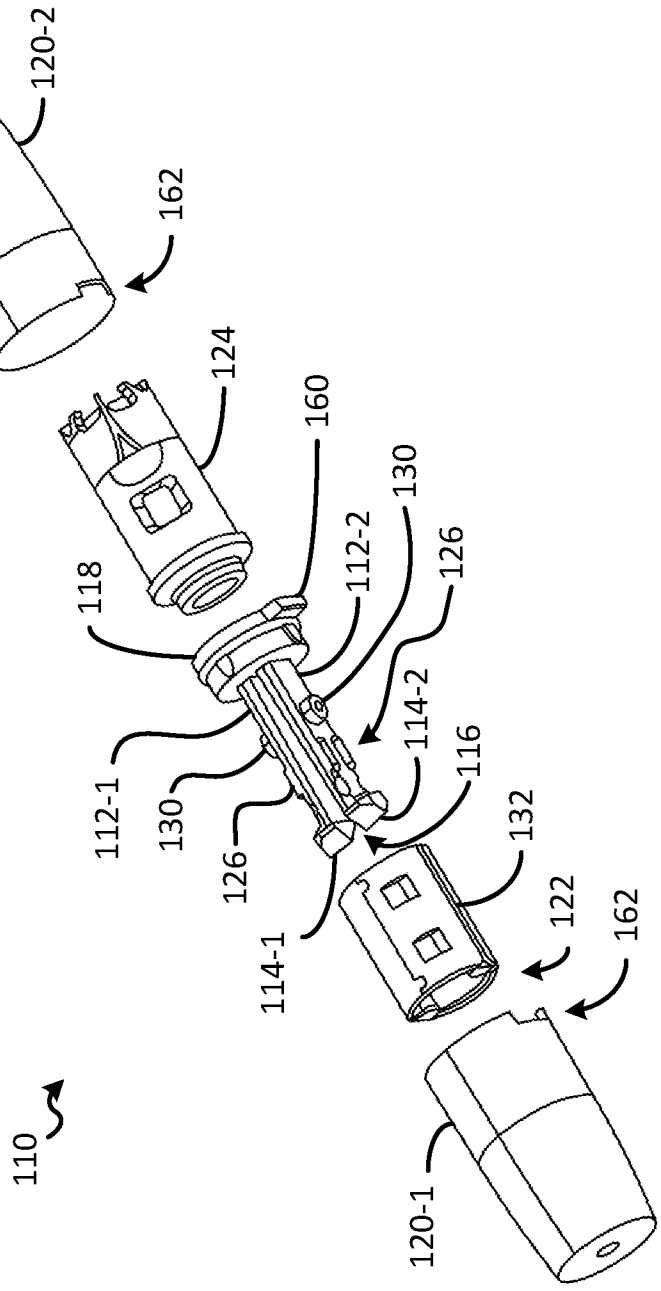

120-2
162
124
160
118
112-2
130
126
114-2
116
112-1
130
126
132
114-1
122
162
110
120-1

Fig. 2

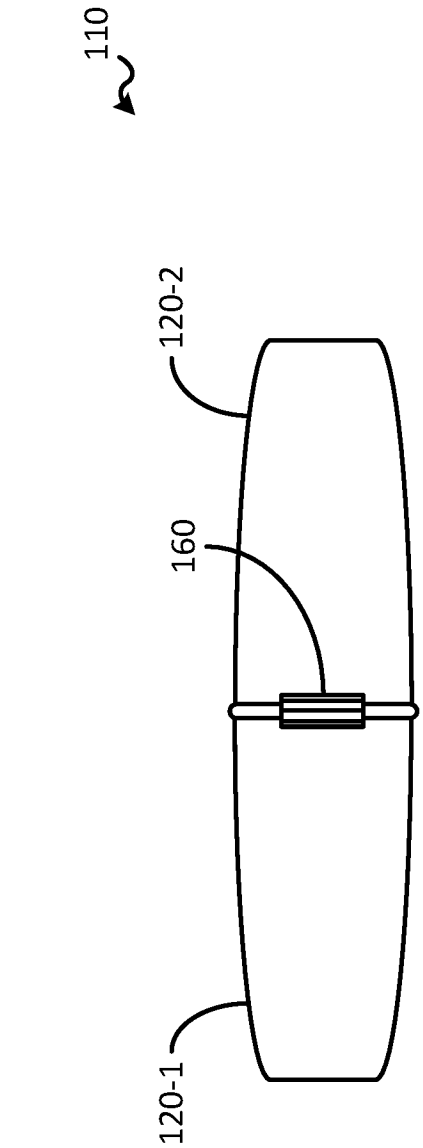


Fig. 3

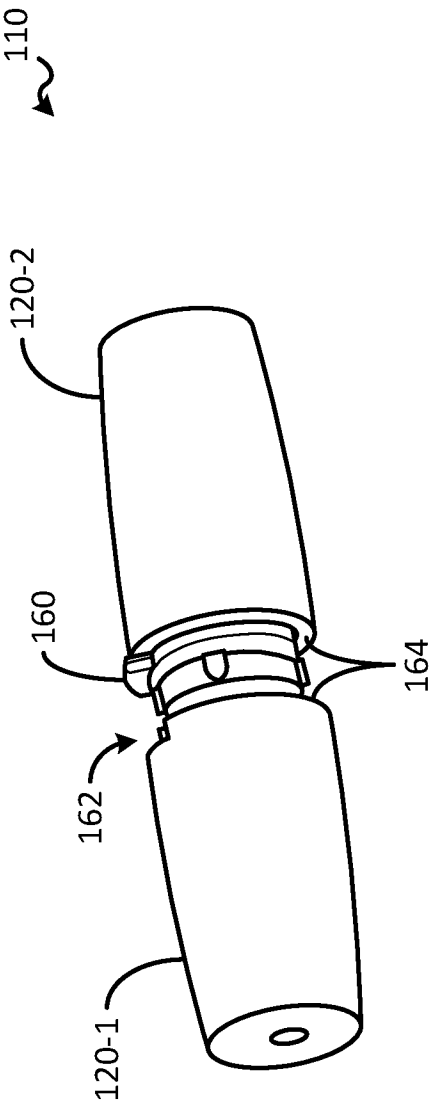


Fig. 4

Fig. 5

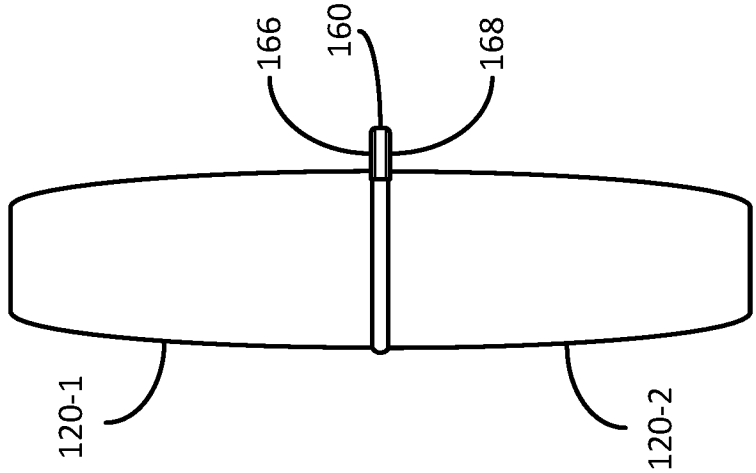


Fig. 6

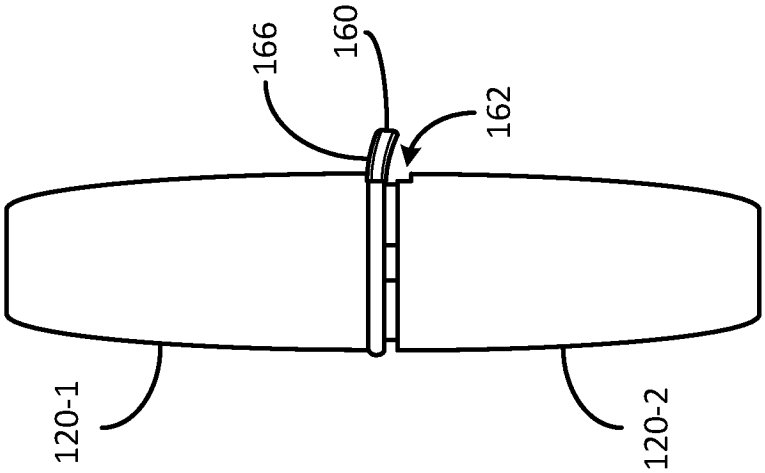


Fig. 7

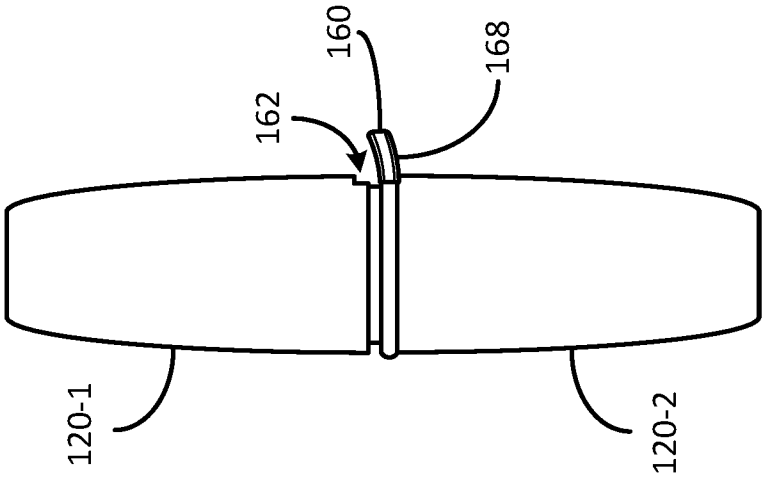


Fig. 8

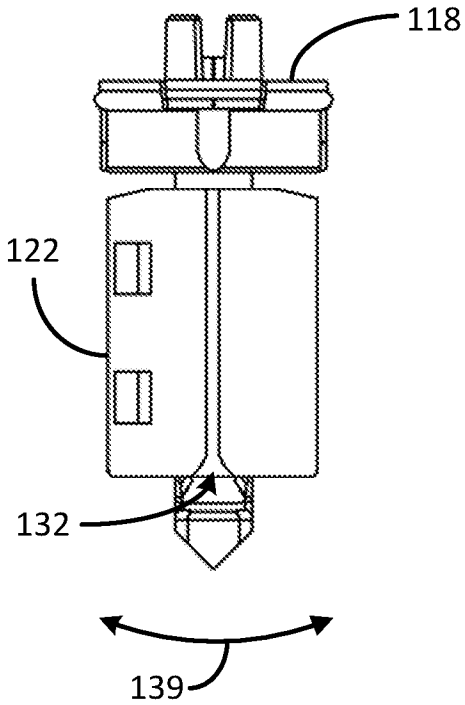

118
122
132
139

Fig. 9

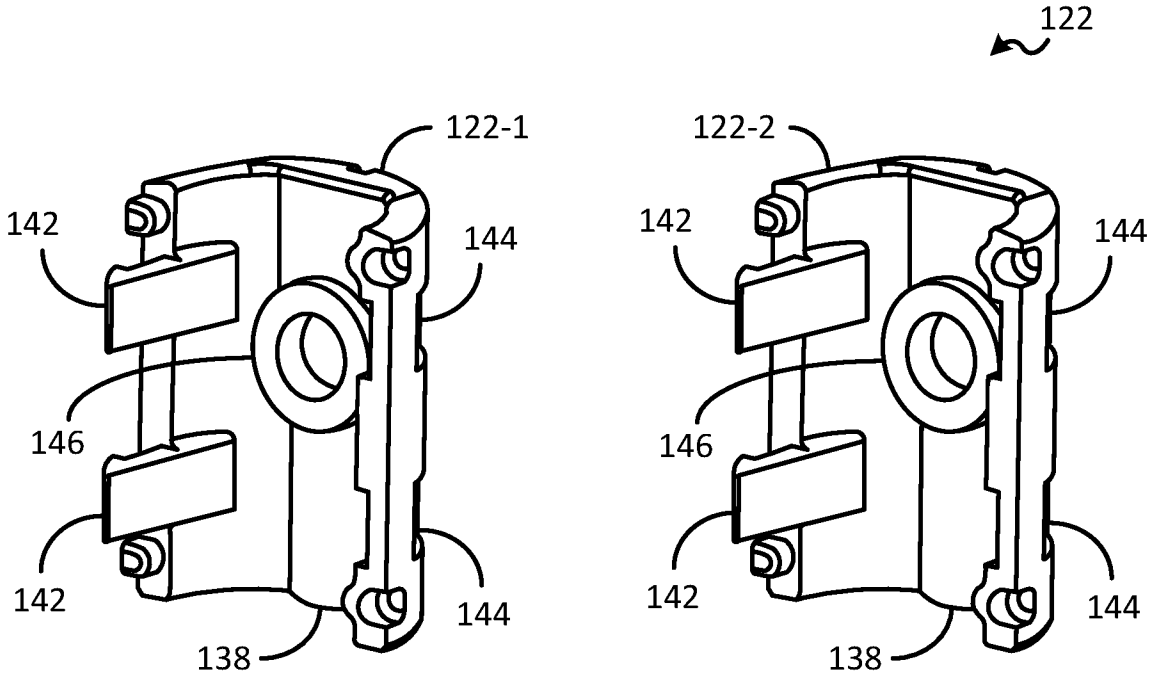
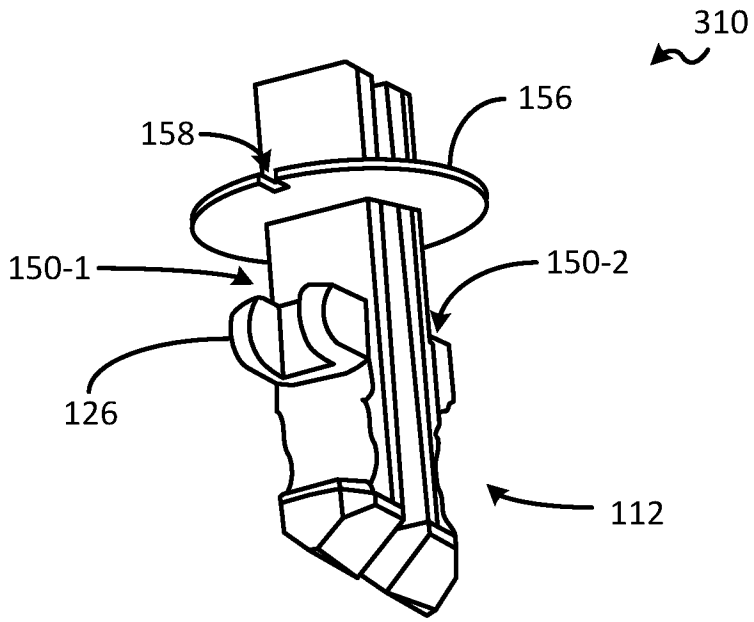

122
122-1
142
144
146
142
144
138
122-2
142
144
146
142
144
138

Fig. 10



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2022/059837

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24F40/85
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.
A	WO 2020/193177 A1 (NERUDIA LTD [GB]) 1 October 2020 (2020-10-01) figure 10 paragraphs [0336] - [0338]	1-15
A	WO 2021/053120 A1 (PHILIP MORRIS PRODUCTS SA [CH]) 25 March 2021 (2021-03-25) pages 11-16 figures 1-8	1-15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"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
19 January 2023	30/01/2023

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	de la Loma, Andrés

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2022/059837

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