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(71) Applicant: **JT INTERNATIONAL SA** [CH/CH]; 8, Rue Kazem-Radjavi, 1202 Geneva (CH).

(72) Inventor: **ZOMINY, Claude**; 14, Place de l'E´glise, 74350 Copponex (FR).

(74) Agent: **APPLEYARD LEES IP LLP**; 15 Clare Road, Halifax Yorkshire HX1 2HY (GB).

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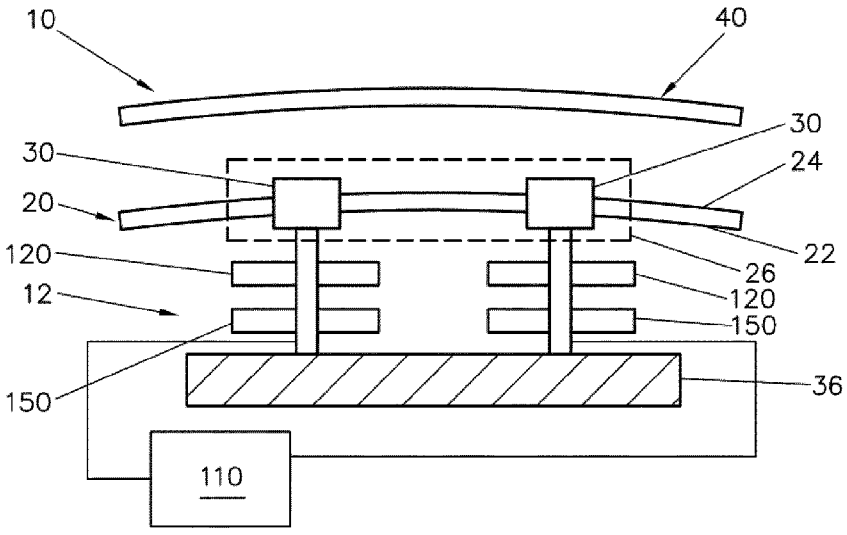

Fig. 1

(57) Abstract: According to the present disclosure there is provided an assembly for covering one or more components of an aerosol generation device, the assembly comprising: a cover defining: an internal cover side arrangeable to face the one or more components; and an external cover side wherein the cover comprises a removable cover region or is a removeable cover, the assembly further comprising: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts being accessible at the external cover side such that an electrical connection can be formed with the battery cell for at least partially discharging the battery cell without removing, or prior to removal of, the removable cover region or removable cover.

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Assembly, aerosol generation device, and method

The present disclosure relates to an assembly for covering one or more components of an aerosol generation device. The present disclosure also relates to an aerosol generation device comprising an assembly. The present disclosure also relates to a method of using an assembly of an aerosol generation device.

Background

Battery cell recycling is a recycling activity that aims to reduce the number of battery cells being disposed alongside regular household waste. Battery cells contain heavy metals and toxic chemicals and disposing of them by the same process as regular household waste has raised concerns over soil contamination and water pollution. Furthermore, battery cell recycling can help to prevent a future shortage of battery cell materials and to enable a sustainable life cycle of these technologies.

An aerosol generation device is configured to heat an aerosol substrate to generate aerosol for inhalation. An aerosol generation device includes a power supply in the form of a battery cell. The battery cell provides power for operation of the aerosol generation device, and for example may provide the necessary power to generate aerosol.

Battery cells incorporated in aerosol generation devices are currently not readily recyclable. This is often due to difficulties in accessing the battery cell. Furthermore, existing techniques do not allow for access to the battery cell in a safe manner. Dangers associated with extraction of the battery cell include electrical, chemical, and thermal dangers, and their potential interactions.

Furthermore, existing aerosol generating devices do not provide means for accessing internal components in a safe and controlled manner, for servicing, maintenance, replacement, and/or recycling.

It is an object of the invention to overcome at least some of the above referenced problems, or problems referenced elsewhere.

Summary

According to the present disclosure there is provided an assembly for covering one or more components of an aerosol generation device, an aerosol generation device comprising the assembly, and a method of using an assembly of an aerosol generation device, including the features as set out in the claims.

According to a first aspect of the present invention, there is provided an assembly for covering one or more components of an aerosol generation device, the assembly comprising: a cover defining: an internal cover side arrangeable to face one or more components; and an external cover side, wherein the cover comprises a removable cover region or is a removable cover, the assembly further comprising: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are accessible at the external cover side such that an electrical connection can be formed with the battery cell for at least partially discharging the battery cell without removing, or prior to removal of, the removable cover region or removable cover..

By such a construction, an electrical connection can be formed with the battery cell via the one or more contacts at the external cover side. This enables battery cell discharging without exposure to, or handling of, a charged battery cell by a disassembler (i.e., the person performing disassembly of the aerosol generation device, who may otherwise be referred to as an “operator”). Safety of the disassembly process and recycling process is thus improved. Furthermore, the cover provides a level of protection to the disassembler if the battery cell were to explode or disintegrate, for example during a discharging process. Subsequent to discharging, the cover, or a region of the cover, may be removed, which it is then safe to do as the battery cell has been discharged. Furthermore, in at least one example, such a construction facilitates direct connection of the one or more contacts with the battery cell (e.g., not via a PCB of the aerosol generation device) which may enhance reusability of the components of the aerosol generation device.

The discharge circuit may be configured to enable discharging of the battery cell. The discharge circuit may comprise the battery cell, connection elements, and contacts. Other components may be provided, such as one or more PCBs or protection elements (e.g., fuses). However, these components do not form part of a charging circuit. The discharge circuit may passively or actively manage the discharge of the battery cell.

The discharge circuit may bypass or avoid use of one or more components of the aerosol generation device, for example one or more components of a charging circuit.

It will be appreciated that the one or more contacts may be distinct from charging contacts of the aerosol generation device. Examples of conventional aerosol generation devices comprise contacts for a charging circuit, and components that are implemented to manage the charging of a battery cell. However, the one or more contacts are not charging contacts, and are instead contacts specifically utilised for discharging the battery cell. That is, the one or more contacts may be separate or distinct from those used for charging the battery cell. Similarly, as discussed further herein, the one or more contacts may be separate or distinct from contacts used for conventional use of the battery cell to provide operational power (i.e., that required or demanded by device operation) to a device.

The contacts may be referred to as discharging contacts, or discharge contacts. The contacts may be configured such that they do not facilitate charging of the battery cell and may also be configured such that they do not facilitate provision of operational power to a connected device.

In one example, the cover comprises a destructible cover region, or is a destructible cover. In one example, the cover comprises a dissolvable cover region, or is a dissolvable cover. Dissolving is an example of destructing the cover region or cover.

In this way, it is possible to readily access the battery cell at the appropriate or required time. This may be when the battery cell is discharged. The amount of time required for the destruction process to complete can be calibrated. Additionally, this facilitates a single step process comprising discharging and accessing the battery cell by destructing the cover region or cover. In an example, application of an electrically conductive solvent to the cover region to destruct the cover region may simultaneously discharge the battery cell via the contacts. In this way, when the battery cell is accessible by virtue of the destruction of the cover region, the battery cell is safe to handle as it is discharged.

The one or more components of the aerosol generation device may be non-destructible components. That is, unlike the destructible cover region, or destructible cover, which is deliberately configured to be destructed, the one or more components are not

deliberately configured to be destructed. The one or more components may destruct at a significantly lesser rate, or not at all, under the same conditions to which the destructible cover region or destructible cover is exposed. For example, the one or more components may not dissolve or be destructed in a solvent, whilst the destructible cover or cover region will dissolve or be destructed in the same solvent. Specifically, the battery cell may be one example of a non-destructible component. Other non-destructible components may include one or more contacts and/or connection elements.

In one example, the destructible cover region or destructible cover is destructible in a water-based solution or in a salt-water solution. In one example, the water-based solution is water, or water with the addition of one or more additives. In one example, the salt is one or more of NaCl, Na_2S, $MgSO_4$, Na_2SO_4, $FeSO_4$, and $ZnSO_4$.

Water-based solutions and salt-water solutions are safe to handle by disassemblers. Furthermore, such salt-water solutions provide for discharging (and potentially rapid discharging) of the battery cell through contact of the salt-water solution with the one or more contacts. The discharging and disassembly process can thus be performed safely, quickly, and may enable the disassembly process to be performed without manipulation or handling of a charged battery cell.

In one example, the destructible cover region or destructible cover is formed of a homogeneous material and/or a fibrous material.

Homogeneous materials may include polylactic acid (PLA), Polyvinyl alcohol (PVA), and/or biopolymers or biodegradable polymers. Such materials may be used to form envelopes by 3D printing. Fibrous materials may include fibre glass, linen, hemp, jute. Such fibrous materials may be recycled materials and/or recyclable materials. Fibrous materials may be bonded, linked, or formed into an envelope using a bonding agent.

In some other examples, the destructible cover region or destructible cover is formed by layered materials or structured materials (e.g., materials with grid-like patterns, which may be regular or irregular).

In one example, the one or more components comprises the battery cell. In one example, the assembly comprises the battery cell.

In one example, the cover or cover region is removably mountable to a part of an aerosol generation device.

Such a construction enables access to the one or more components of the aerosol generation device. As above, this may be at a time at which it is (or is known to the disassembler to be) safe due to a discharged state of the battery cell. As discharging of the battery cell can take place via the one or more contacts prior to removal of the cover, the access to the battery cell is safe and controlled. An exemplary method described herein may comprise discharging the battery cell via the contacts, and, subsequent to discharging the battery cell, removing the cover. An intermediate step may comprise receiving, providing, and/or generating an indication that the battery cell has been discharged. An indication may be provided by an indicating means (i.e. an indicator), for example a display assembly. The indicating means, or display assembly, may comprise one or more LEDs, fuze arrangements (e.g., resettable or non-resettable fuzes), or the like. The method may be a method of disassembling an aerosol generation device.

In one example, the part of the aerosol generation device is a casing.

A robust construction is thus provided. The casing may be a non-destructible casing. For example, the casing and cover may be formed from different materials, such that whilst the cover may be destructed, the casing remains intact. Recyclability and reuse of the casing of the aerosol generation device is thereby achieved. This is highly advantageous in ensuring recyclability and reusability of the aerosol generation device, reducing the generation of waste, reducing cost to the consumer, and ensuring customer satisfaction.

In one example, the one or more contacts are provided by a fixture. The fixture may otherwise be referred to as a fastener. In one example, the fixture is a screw. The fixture may be an electrically conductive member.

In this way, electrical connection to the battery cell is facilitated. Furthermore, robustness in construction of the aerosol generation device is provided.

In one example, the one or more contacts are configured to be directly electrically connected with the battery cell.

Direct electrical connection may mean that electrical connection is formed without intermediate componentry, such as one or more printed circuit boards (PCBs). That is, the point of electrical connection may not be, for example, a charging point or connection of the aerosol generating device, which provide charging power to the battery cell via a PCB of the aerosol generating device. Instead, the electrical connection is direct to the battery cell, thus bypassing any PCBs of the aerosol generation device.

The direct electrical connection may be provided by connection elements in direct contact or connection with the battery cell. The connection may be made via the one or more contacts which are in direct electrical connection with the battery cell. The direct electrical connection may mean that the connection is via a discharge circuit which is configured to enable discharging of the battery cell.

According to a second aspect of the present invention, there is provided an aerosol generation device comprising an assembly according to the first aspect of the present invention.

In this way, an aerosol generation device is provided having an advantageous assembly for covering one or more components of the aerosol generation device, simplifying and enabling safe disassembly, recycling and replacement of components of the aerosol generation device.

In one example, the aerosol generation device may comprise a battery module comprising: one or more battery module components; and a destructible envelope provided about the one or more battery module components.

Advantageously, the envelope provides a protective outer to the one or more battery module components, which improves safety in handling of the battery module. Furthermore, this may simplify the provision of access to the one or more battery components, for servicing, maintenance, and/or recycling. The destructible envelope is particularly advantageous where the battery module comprises a battery cell. During a recycling process, the destruction of the destructible envelope enables access to the

one or more battery module components for disassembly, and where the battery module comprises or receives a battery cell, for discharging of the battery cell. Advantageously, this facilitates safe and straightforward extraction and removal of a battery cell from a battery module.

Subsequent to destruction of a destructible cover or destructible cover region, the destructible envelope may be destructed to access the one or more battery module components, such as a battery cell.

According to a third aspect of the present invention, there is provided a method of using an assembly for covering one or more components of an aerosol generation device, the assembly comprising: a cover defining: an internal cover side arrangeable to face one or more components; and an external cover side, wherein the cover comprises a removable cover region or is a removable cover, the assembly further comprising: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are accessible at the external cover side such that an electrical connection can be formed with the battery cell for at least partially discharging the battery cell without removing, or prior to removal of, the removable cover region or removable cover, the method comprising: forming an electrical connection with the battery cell by accessing the one or more contacts at the external cover side.

In this way, the battery cell may be discharged due to the electrical connection formed with the battery cell by access to the contacts at the external cover side. Thus, the battery cell remains covered, and the disassembler protected, during or throughout discharging. This protects the disassembler from risk of explosion or disintegration of the battery cell. Furthermore, the method improves the disassembly, dismantling and recycling process.

In one example, the method comprises forming an electrical connection to discharge the battery cell.

Safety of the disassembly process, and the recycling process, is thus improved as the disassembler need only handle a discharged battery cell.

In one example, the method comprises forming the electrical connection with the battery cell by accessing the one or more contacts of the discharge circuit at the external cover side without removing, or prior to removal of, the cover.

Disassembler safety is thus ensured, as the cover provides a level of protection to the disassembler in the event of explosion or disintegration of the battery cell, e.g., of the charged battery cell. Furthermore, when the battery cell is fully discharged there is no possibility for the battery cell to initiate a thermal runaway process, this will prevent any risk of explosion, disintegration and/or fire of the battery.

In one example, the method comprises removing the removable cover region or removable cover subsequent to at least partially discharging the battery cell.

In this way, the battery cell can be readily accessed once the battery cell is at least partially discharged, and thus presents a reduced risk to the disassembler at that time. Battery cell replacement is thus facilitated. The method may further comprise removing the battery cell, and may also further comprise replacing the battery cell with a replacement battery cell.

In one example, the method comprises generating an indication of a discharge state of the battery cell prior to removal of the removable cover region or removable cover.

In this way, it may be indicated to the disassembler that the battery cell is in a safe and suitable state, or condition, to be accessed by removal of the cover region or cover. Safety is thereby improved. The disassembler may interpret the indication of the discharge state to understand that it is safe to access, or reveal, the battery cell by said removal of the cover region or cover.

In one example, the method comprises forming the electrical connection with the battery cell by accessing the one or more contacts of the discharge circuit at the external cover side; and at least partially discharging the battery cell.

Advantageously, disassembler safety is thus improved.

In one example, the cover comprises a destructible cover region, or is a destructible cover, the method comprising destructing the destructible cover region or destructible cover.

In this way, it is possible to readily access the battery cell at the appropriate or required time. This may be when the battery cell is discharged. The amount of time required for the destruction process to complete can be calibrated. Additionally, this facilitates a single step process comprising discharging and accessing the battery cell by destructing the cover region or cover. In an example, application of an electrically conductive solvent to the cover region to destruct the cover region may simultaneously discharge the battery cell via the contacts. In this way, when the battery cell is accessible by virtue of the destruction of the cover region, the battery cell is safe to handle as it is discharged.

In one example, the method comprises discharging the battery cell by forming an electrical connection with the battery cell by accessing the one or more contacts at the external cover side; and destructing the destructible cover region or destructible cover subsequent to at least partially discharging the battery cell. That is, in one example, the method comprises destructing the destructible cover region or destructible cover subsequent to at least partially discharging the battery cell.

Advantageously, disassembler safety is thus improved.

In one example, the cover comprises a removable cover region or is a removeable cover, the method comprising: discharging the battery cell by forming an electrical connection with the battery cell by accessing the one or more contacts at the external cover side; and removing the cover region or cover subsequent to at least partially discharging the battery cell. That is, in one example, the method comprises removing the removable cover region or removable cover subsequent to at least partially discharging the battery cell.

In this way, disassembler safety is thus improved. Furthermore, in this way, a more robust construction may be provided. The cover may be removed, or may be removable, without destruction of the cover. That is, in an example, the cover may be removed from attachment in the assembly. In other words, the cover being “removable” may mean that the cover may be removed, or be removable, without destruction of the

cover (e.g., may be removability connected or mounted to the aerosol generation device, by screws or other releasable fixtures) or with destruction of the cover which facilitate removal of the cover as described in detail herein.

According to a fourth aspect of the present invention, there is provided an assembly for covering one or more components of an aerosol generation device, the assembly comprising: a cover defining: an internal cover side arrangeable to face one or more components; and an external cover side, wherein the cover comprises at least a destructible cover region being destructible to allow access to one or more components at the internal cover side.

In this way, the cover provides a level of protection during a process of disassembling and recycling of components of the aerosol generation device. Despite this, the cover is readily removable by virtue of being destructible, in order to facilitate disassembly and recycling of the battery cell and/or other components. Furthermore, in some examples, removal of the cover region and discharging of the battery cell may be performable in a single step, without handling of electrical components by the disassembler.

The one or more components of the aerosol generation device may be non-destructible components. That is, unlike the destructible cover region, or destructible cover, which is deliberately configured to be destructed, the one or more components are not deliberately configured to be destructed. The one or more components may destruct at a significantly lesser rate, or not at all, under the same conditions to which the destructible cover region or destructible cover is exposed. For example, the one or more components may not dissolve or be destructed in a solvent, whilst the destructible cover or cover region will dissolve or be destructed in the same solvent. Specifically, a battery cell may be one example of a non-destructible component. Other non-destructible components may include one or more contacts and/or connection elements.

In one example, the cover is a destructible cover.

Advantageously, in this way, the whole cover may be destructible to allow or gain access to the one or more components at the internal cover side.

In one example, the cover comprises a dissolvable cover region being dissolvable to allow access to one or more components at the internal cover side. That is, the destructible cover region may be a dissolvable cover region.

Advantageously, this may facilitate removal of the cover. Furthermore, discharging and access to the internal components of the aerosol generation device may be achieved in a single step.

In one example, the destructible cover region or destructible cover is destructible in a water-based solution or in a salt-water solution. In one example, the water-based solution is water, or water with the addition of one or more additives. In one example, the salt is one or more of NaCl, Na_2S, $MgSO_4$, Na_2SO_4, $FeSO_4$, and $ZnSO_4$.

Water-based solutions and salt-water solutions are safe to handle by disassemblers. Furthermore, such salt-water solutions provide for discharging (and potentially rapid discharging) of the battery cell through contact of the salt-water solution with the one or more contacts. The discharging and disassembly process can thus be performed safely, quickly, and may enable the disassembly process to be performed without manipulation or handling of a charged battery cell.

In one example, the destructible cover region or destructible cover is formed of a homogeneous material and/or a fibrous material.

Homogeneous materials may include polylactic acid (PLA), Polyvinyl alcohol (PVA), and/or biopolymers or biodegradable polymers. Such materials may be used to form envelopes by 3D printing. Fibrous materials may include fibre glass, linen, hemp, jute. Such fibrous materials may be recycled materials and/or recyclable materials. Fibrous materials may be bonded, linked, or formed into an envelope using a bonding agent.

In some other examples, the destructible cover region or destructible cover is formed by layered materials or structured materials (e.g., materials with grid-like patterns, which may be regular or irregular).

In one example, the one or more components comprise one or more battery module components. In one example, the one or more battery module components comprise a battery cell, fuse and/or IC protection module.

In this way, access to the one or more battery module components of the aerosol generation device is prevented until it is safe to do so. For example, this may be at a time at which the battery cell is discharged, thus protecting the disassembler from electrical shock or explosion or disintegration of the battery cell. Despite this, the battery module components can be readily accessed at an appropriate time by removal of the cover region.

In one example, the assembly further comprises: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are provided at the internal cover side and are inaccessible at the external cover side.

In this way, the disassembler is prevented or restricted from access to the one or more components, and electrical circuitry, until the disassembly process is begun to remove a cover region. Advantageously, once the cover region is removed, it may be possible to discharge a battery cell by forming an electrical connection with the battery cell by the contacts.

The discharge circuit may be configured to enable discharging of the battery cell. The discharge circuit may comprise the battery cell, connection elements, and contacts. Other components may be provided, such as one or more PCBs or protection elements (e.g., fuses). However, these components do not form part of a charging circuit. The discharge circuit may passively or actively manage the discharge of the battery cell. The discharge circuit may bypass or avoid use of one or more components of the aerosol generation device, for example one or more components of a charging circuit.

It will be appreciated that the one or more contacts may be distinct from charging contacts of the aerosol generation device. Examples of conventional aerosol generation devices comprise contacts for a charging circuit, and components that are implemented to manage the charging of a battery cell. However, the one or more contacts are not charging contacts, and are instead contacts specifically utilised for discharging the battery cell.

In one example, the one or more contacts are provided by a fixture. The fixture may otherwise be referred to as a fastener. In one example, the fixture is a screw. The fixture may be an electrically conductive member.

In this way, electrical connection to the battery cell is facilitated. Furthermore, robustness in construction of the aerosol generation device is provided.

In one example, the one or more contacts are configured to be directly electrically connected with the battery cell.

Direct electrical connection may mean that electrical connection is formed without intermediate componentry, such as one or more printed circuit boards (PCBs). That is, the point of electrical connection may not be, for example, a charging point or connection of the aerosol generating device, which provide charging power to the battery cell via a PCB of the aerosol generating device. Instead, the electrical connection is direct to the battery cell, thus bypassing any PCBs of the aerosol generation device.

The direct electrical connection may be provided by connection elements in direct contact or connection with the battery cell. The connection may be made via the one or more contacts which are in direct electrical connection with the battery cell. The direct electrical connection may mean that the connection is via a discharge circuit which is configured to enable discharging of the battery cell.

According to a fifth aspect of the present invention, there is provided an aerosol generation device comprising the assembly according to the fourth aspect of the present invention.

In this way, an aerosol generation device is provided having an advantageous assembly for covering one or more components of the aerosol generation device, simplifying and enabling safe disassembly, recycling and replacement of components of the aerosol generation device.

In one example, the aerosol generation device may comprise a battery module comprising: one or more battery module components; and a destructible envelope provided about the one or more battery module components.

Advantageously, the envelope provides a protective outer to the one or more battery module components, which improves safety in handling of the battery module. Furthermore, this may simplify the provision of access to the one or more battery components, for servicing, maintenance, and/or recycling. The destructible envelope is particularly advantageous where the battery module comprises a battery cell. During a recycling process, the destruction of the destructible envelope enables access to the one or more battery module components for disassembly, and where the battery module comprises or receives a battery cell, for discharging of the battery cell. Advantageously, this facilitates safe and straightforward extraction and removal of a battery cell from a battery module.

Subsequent to destruction of a destructible cover or destructible cover region, the destructible envelope may be destructed to access the one or more battery module components, such as a battery cell.

According to a sixth aspect of the present invention, there is provided a method of using an assembly of an aerosol generation device, the assembly comprising: a cover defining: an internal cover side arrangeable to face one or more components; and an external cover side, wherein the cover comprises at least a destructible cover region being destructible to allow access to the one or more components at the internal cover side, wherein the method comprises: destructing at least the destructible cover region to access the one or more components at the internal cover side.

In this way, the cover provides a level of protection during a process of disassembling and recycling of components of the aerosol generation device. Despite this, the cover is readily removable by destructing the cover region, in order to facilitate disassembly and recycling of the battery cell and/or other components. Furthermore, in some examples, destructing the cover region and discharging of the battery cell may be performable in a single step, without handling of electrical components by the disassembler. Such a method advantageously facilitates removal of the battery cell for recycling and waste management.

In one example, the destructible cover region may be a dissolvable cover region. The cover region may be dissolvable to allow access to one or more components at the internal cover side. That is, in an example, the destructible cover region is a dissolvable

cover region. In one example, destructing the destructible cover region may comprise dissolving a dissolvable cover region.

In one example, the assembly further comprises: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are provided at the internal cover side and are inaccessible at the external cover side, the method comprising: forming an electrical connection with the battery cell by accessing the one or more contacts at the internal cover side subsequent to destructing at least the destructible cover region.

In this way, access to the contacts is prevented or inhibited until the destructible cover region is destructed. Safety is thus improved.

In one example, the method further comprises at least partially discharging the battery cell.

In this way, the battery cell can be discharged at an appropriate time. Disassembler safety and, more generally, user safety is thus improved.

Features of any one of the aspects of the present invention defined above may be combined with features of any other one of the aspects of the present invention, as desired or as appropriate.

Brief Description of the Drawings

Examples of the present disclosure will now be described with reference to the accompanying drawings.

Figure 1 shows a side view cross section of an assembly;
Figure 2 shows a plan view cross section of an assembly;
Figure 3 shows an aerosol generation device;
Figure 4 shows general methodology principles;
Figure 5 shows a side view cross section of an assembly;
Figure 6 shows an aerosol generation device;
Figure 7 shows general methodology principles; and

Figure 8 shows an aerosol generation device.

Detailed Description

As used herein, the term “aerosol precursor material”, “vapour precursor material” or “vaporizable material” are used synonymously and may refer to a material and/or composition, which may for example comprise nicotine or tobacco and a vaporising agent. The aerosol precursor material is configured to release an aerosol when heated or otherwise mechanically stimulated (such as by vibrations). Tobacco may take the form of various materials such as shredded tobacco, granulated tobacco, tobacco leaf and/or reconstituted tobacco. Nicotine may be in the form of nicotine salts. Suitable vaporising agents include: a polyol such as sorbitol, glycerol, and glycols like propylene glycol or triethylene glycol; a non-polyol such as monohydric alcohols, acids such as lactic acid, glycerol derivatives, esters such as triacetin, triethylene glycol diacetate, triethyl citrate, glycerin or vegetable glycerin. In some examples, the aerosol precursor material is substantially a liquid that holds or comprises one or more solid particles, such as tobacco. An aerosol generation device is configured to aerosolise an aerosol precursor material without combustion in order to facilitate delivery of an aerosol to a user. Furthermore, and as is common in the technical field, the terms “vapour” and “aerosol”, and related terms such as “vaporize”, “volatilize” and “aerosolise”, may generally be used interchangeably.

As used herein, the term “aerosol generation device” is synonymous with “aerosol generating device” or “device” may include a device configured to heat an aerosol precursor material and deliver an aerosol to a user. The device may be portable. “Portable” may refer to the device being for use when held by a user. The device may be adapted to generate a variable amount of aerosol, which can be controlled by a user input.

As used herein, the term “aerosol” may include a suspension of vaporizable material as one or more of: solid particles; liquid droplets; gas. Said suspension may be in a gas including air. Aerosol herein may generally refer to/include a vapour. Aerosol may include one or more components of the vaporizable material.

Referring to Figure 1, an assembly 10 is shown. The assembly 10 is for covering one or more components 12 of an aerosol generation device 100. The assembly 10

comprises a cover 20. The cover 20 defines an internal cover side 22 arrangeable to face the one or more components 12. Here, "internal" is a relative term, for example indicating that this side of the cover faces toward internal components, etc. The cover 20 also defines an external cover side 24. Here, "external" is a relative term, for example indicating that this side of the cover faces away from internal components, etc, and is opposite to the internal side. In other words, "external" does not necessarily mean that the cover is on the very outside of the overall device. For example, another cover or object could actually be located on or partially or completely cover that external side. The skilled person will appreciate this intended meaning of the terms "internal" and "external". It will be appreciated that the external cover side 24 may be accessible to a user at a time when the internal cover side 22 is inaccessible, for example when the assembly 10 is assembled or in an assembled state or configuration. The assembly 10 further comprises one or more contacts 30. The one or more contacts 30 are configured to be electrically connected to a battery cell 110. In other words, the one or more contacts 30 are electrically connectable to a battery cell 110. The one or more contacts 30 form part of a discharge circuit for discharging the battery cell 110. The one or more contacts 30 are accessible at the external cover side 24 such that an electrical connection can be formed, or is formable, with the battery cell 110.

As the one or more contacts 30 are accessible at the external cover side 24, an electrical connection can be formed with the battery cell 110 without, or prior to, removal or destruction of the cover 20. The disassembler (i.e., the person performing disassembly of the aerosol generation device, who may otherwise be referred to as an "operator") is thereby protected from exposure to the battery cell 110 until an appropriate or desired time. This enables the discharging of the battery cell 110 via the one or more contacts (and discharging circuit), without exposing the disassembler to a charged battery cell 110. Once the battery cell 110 is discharged, the disassembler may then remove or destruct the cover 20 in order to access the battery cell 110 for removal, recycling and/or replacement.

As will be described in further detail below, the cover 20 comprises a removable cover region or is a removable cover. Removability may be facilitated by a releasable connection arrangement connecting the cover 20 at the aerosol generation device 100, or additionally or alternatively facilitated by a destructible cover region or cover. Advantageously, by the cover 20 comprising a removable cover region or removable cover, the battery cell 110 can be readily accessed at an appropriate time, which may

be subsequent to at least partial discharge of the battery cell 110. Replacement of the battery cell 110 is thereby enabled, with improvement in disassembler safety as the battery cell 110 can be protected by the cover region or cover until a time when the battery cell 110 is at least partially discharged. The electrical connection with the battery cell 110 described above is for at least partially discharging the battery cell 110 without removing, or prior to removal of, the cover 20 or a region thereof.

The discharge circuit may be configured to enable discharging of the battery cell. The discharge circuit may comprise the battery cell 110, connection elements 120, and contacts 30. Other components may be provided, such as one or more PCBs or protection elements (e.g., fuses). However, these components do not form part of a charging circuit. The discharge circuit may passively or actively manage the discharge of the battery cell 110. The discharge circuit may bypass or avoid use of one or more components of the aerosol generation device 100, for example one or more components of a charging circuit.

It will be appreciated that the one or more contacts 30 may be distinct from charging contacts of the aerosol generation device 100. Examples of conventional aerosol generation devices comprise contacts for a charging circuit, and components that are implemented to manage the charging of a battery cell. However, the one or more contacts 30 are not charging contacts, and are instead contacts specifically utilised for discharging the battery cell.

The cover 20 may be in the form of a sheet or layer. As discussed above, the internal cover side 22 may otherwise be referred to as an inward, or inwardly, facing side or surface of the cover 20. The external cover side 24 may otherwise be referred to as an outward, or outwardly, facing side or surface of the cover 20. That is, the internal cover side 22 faces toward internal components of the aerosol generation device 100 whereas the external cover side 24 is the opposite side of the cover 20. The internal cover side 22 is (e.g. typically) not accessible to the disassembler prior to its removal or destruction. The external cover side 24 is accessible to the disassembler prior to removal or destruction of the cover 20. In this way, the one or more contacts 30, which are at the external cover side 24, are accessible prior to removal or destruction of the cover 20.

The one or more contacts 30 may be elongate. The one or more contacts 30 may comprise a contacting portion, which may be a portion configured to be contacted to form an electrical connection with the battery cell for discharging. In the example illustrated in Figure 1, the one or more contacts (or an elongate portion thereof) extend through the cover 20. The one or more contacts may extend through apertures provided in the cover 20, or be embedded in the cover 20. The one or more contacts 30 may project or extend from the external cover side 24. This facilitates access to the one or more contacts 30 at the external cover side 24. In another example, the one or more contacts 30 may extend around the cover 20. For example, the one or more contacts 30 (or an elongate portion thereof) may extend through a frame to emerge or be accessible at the external cover side 24. Both configurations enable access to the one or more contacts 30 at the external cover side 24.

The cover 20 may be a first cover. A second cover 40 may be provided. The second cover 40 may be a part of a casing of the aerosol generation device 100. The second cover 40 may be an outermost casing or housing of the aerosol generation device 100. The second cover 40 may be handled by the user of the aerosol generation device 100 during normal use. The first cover 20 may be an inner cover and the second cover 40 may be an outer cover, as had been discussed above. The second cover 40 may provide a casing or outer housing of the aerosol generation device 100. Removal of the second cover 40 provides access to the one or more contacts 30 beneath. The second cover 40 may configured to be removed during servicing, maintenance, disassembly or recycling. The second cover 40 may not be destructible.

Referring to Figure 2, the assembly 10 of Figure 1 is shown in plan view, with the first cover 20 and second cover 40 absent. A pair of connection elements 120 provide an electrical connection from the battery cell 110 to the one or more contacts 30. In other examples, the contacts 30 may provide a direct connection to the battery cell 110 (i.e., without intermediate componentry, such as connection elements 120). The connection elements 120 may each be an electrical connection element, such as a wire or other conductor for carrying electrical current.

The one or more contacts 30 may comprise a positive electrical contact and a negative electrical contact. That is, a first one of the one or more contacts 30 may be in electrical connection with a positive terminal of the battery cell 110 and a second one of the one

or more contacts 30 may be in electrical connection with a negative terminal of the battery cell 110.

The assembly 10 further comprises a first printed circuit board (PCB) 130 and a second PCB 140. One of both of the first PCB 130 and second PCB 140 comprise tabs 150. The tabs 150 are arranged to connect to the connection element 120 such that electrical power is providable from the battery cell 110 to one or both of the first PCB 130 and second PCB 140.

In an example, the cover 20 comprises a destructible cover region 26. That is, a region 26 (which may otherwise be referred to as a part or portion of the cover 20) may be destructible. In another example, the cover 20 is a destructible cover. That is, the entire cover 20 may be destructible.

In this way, destruction of the cover 20 or cover region 26 provides access to the internal components (at the internal cover side 22) for servicing, disassembly and/or recycling. Destruction of the cover 20 or cover region 26 may provide a window, aperture, or means of access to the internal components of the aerosol generation device 100, in particular, access to the battery cell 110. Further detail on the destructible nature of the cover 20 or cover region 26 is provided below. As detailed below, the cover 20 or cover region 26 may be formed from a destructible material. The cover 20 or cover region 26 may be formed from a biodegradable material.

The cover 20 may further comprise a plurality of cover portions. The cover portions may be caps, or capping members. The caps may be provided on, over, or around the one or more contacts 30. That is, in an example, each of the one or more contacts may be provided with a cap. The caps may be removable (e.g., removably mounted to the contacts 30 or to another part of the cover 20 or cover portion 26) or destructible in order to access the one or more contacts to form an electrical connection therewith. Advantageously, the caps may protect the disassembler from contacting (e.g., touching) the one or more contacts which are in electrical connection with the battery cell 110. The caps may be configured to be removed prior to forming the electrical connection with the battery cell 110 to perform discharging. The caps may be destructible prior to forming the electrical connection with the battery cell 110 to perform discharging. In an example, the caps may be formed from a material which is configured to destruct prior to the cover 20 or cover portion 26 covering the one or more

components, such that discharging can be performed prior to exposure to the battery cell 110 due to destruction of the cover 20 or cover portion 26.

Throughout this specification the term “destructible” is used to refer to the nature of the cover 20 or cover region 26 (introduced above with reference to Figures 1 and 2), and to the nature of the cover 60 or cover region 66 (described below with reference to Figure 5). The term “destructible” is used to refer to a cover 20, 60 or cover region 26, 66 which is configured (e.g., deliberately configured) to be at least partially destructible, for example to lose or degrade one or more of its mechanical properties or its mechanical integrity (for example hardness or mechanical strength) by appropriate processing. Processing might typically include the application of heat or a liquid, such as a water-based solution or a solvent, to the cover 20, 60 or cover region 26, 66. This configuration (e.g., deliberate configuration) may be achieved by the choice of material or materials used to form the destructible cover 20, 60 or cover region 26, 66. However, and as above, the influence of the heat or liquid does not necessarily cause the complete destruction of the cover 20, 60 or cover region 26, 66. Instead, the cover 20, 60 or cover region 26, 66 may be formed of a destructible material such that the application of heat or a solvent degrades the mechanical properties or integrity of the material. For example, the cover 20, 60 or cover region 26, 66 may soften or weaken, such that it is more easily or readily cut, teared, sheared or broken. That is, the mechanical properties or integrity may be degraded such that it is easier to cut, tear, shear or break the cover 20, 60 or cover region 26, 66 (i.e., in general, easier to access the internal cover side 22, 62), compared with a time prior to processing (e.g., the application of heat or solvent).

In a highly advantageous example, the destructible cover 20, 60 or destructible cover region 26, 66 is a dissolvable cover 20, 60 or dissolvable cover region 26, 66. The cover 20, 60 or cover region 26, 66 may be dissolvable in a water-based solution or in a solvent, or due to application of a water or solvent to the cover 20, 60 or cover region 26, 66. As with the discussion of the term “destructible”, the cover 20, 60 or cover region 26, 66 may completely or partially dissolve. Partial dissolution may mean that a constituent part of the cover 20, 60 or cover region 26, 66 is dissolved, allowing that part to be more easily removed or manipulated, or for a remaining part of the cover 20, 60 or cover region 26, 66 to be removed, for example peeled away. Dissolving the cover 20, 60 or cover region 26, 66 may comprise immersing the aerosol generation device 100 or a part thereof in water or in a solvent.

In an example, the cover 20, 60 or cover region 26, 66 may be formed of fibres (such as natural fibres or glass fibres) and a bonding agent used to bond the fibres to form a cover 20, 60 or cover region 26, 66 having a strong mechanical resistance. The bonding agent may be dissolvable, thereby degrading the mechanical properties of the material. The fibres may then be pierced, peeled away, or otherwise removed. Access to components of the aerosol generation device 100 is thereby facilitated.

The destruction of the cover 20, 60 or cover region 26, 66 may occur at room temperature, for example in a solvent at room temperature. Alternatively, the destruction of the cover 20, 60 or cover region 26, 66 may occur by application of heat or a solvent at a temperature of between 50°C and 90°C, and preferably between 70°C and 90°C.

In a particularly advantageous example, the battery cell 110 may be discharged prior to destruction of the cover 20 or cover region 26. In this way, when the cover 20 or cover region 26 is destructed, only a discharged battery cell 110 is exposed. This is highly advantageous in improving safety of servicing, maintenance and recycling. In this way, the disassembler need not handle a charged battery cell.

In one example, the aerosol generation device 110 or a part thereof may have an electrically conductive solvent applied to it. In particular, the cover 20 or cover region 26 and contacts 30 may have an electrically conductive solvent applied to it. The electrically conductive solvent may be a salt-water solution. Application of the electrically conductive solvent to the one or more contacts 30 causes the battery cell 110 to discharge through the electrically conductive solvent.

Furthermore, application of the electrically conductive solvent to the destructible cover 20 or cover region 26 causes destruction of the cover 20 or cover region 26. The destructible cover 20 or cover region 26 may be of a certain thickness, or made of a suitable material, such that destruction of the cover 20 or cover region 26 occurs subsequent to the discharging of the battery cell 110. This improves safety, as the battery cell 110 will be discharged when it is exposed following destruction of the cover 20 or cover region 26.

Furthermore, by a construction of one or more contacts 30 accessible at the external cover side 24, and the cover 20 or cover region 26 being dissolvable, the discharging of the battery cell 110 and destruction of the cover 20 or cover region 26 may be performed in a single step, without handling by the disassembler. The disassembler need only apply an electrically conductive solvent to the contacts 30 and cover 20 or cover region 26 to cause discharging of the battery cell 110 and dissolving of the cover 20 or cover region 26.

It will be appreciated that in some examples the cover 20 or cover region 26 may not be destructible. In this case, the battery cell 110 is still dischargeable via the one or more contacts 30. However, application of solvent to the cover 20 or cover region 26 may not cause destruction of the cover 20 or cover region 26. In this way, more robust materials may be used. Furthermore, such a construction may be cheaper to manufacture. Subsequent to discharging of the battery cell 110, the cover 20 or cover region 26 may be removed. The cover 20 or cover region 26 may be removably or releasably mounted in the assembly 10. In this way, safety is improved, as the disassembler can discharge the battery cell 110 prior to removal of the cover 20 or cover region 26 which provides a level of protection to the disassembler.

The cover 20 or cover region 26 may be destructed by using a water-based solution or using a salt-water solution. The salt in the salt-water solution may be one or more of sodium chloride (NaCl), sodium sulfide (Na_2S), magnesium sulfate ($MgSO_4$), sodium sulfate (Na_2SO_4), iron sulfate ($FeSO_4$), and zinc sulfate ($ZnSO_4$).

The cover 20 or cover region 26 may be formed from a homogeneous material. Examples of such materials include polylactic acid (PLA), polyvinyl alcohol (PVA), or a biopolymer or biodegradable polymer.

The cover 20 or cover region 26 may additionally or alternatively be formed from a fibrous material. Examples of such materials include glass fibres, linen fibres, hemp fibres, jute fibres, or the like. A fibrous material may comprise fibres and a bonding agent. The bonding agent may link, join, or bond the fibres to form the fibrous material.

In the description herein, the one or more components may comprise the battery cell 110. That is, the internal cover side 22 may be arrangeable to face the battery cell 110. In an example, the assembly 10 may comprise the battery cell 110.

In an example, the one or more components 12 comprises the battery cell 110. The one or more components 12 may comprise one or more battery module components. The one or more battery components may be a battery cell (e.g., battery cell 110 as described above), a fuse, or an integrated circuit (IC) protection module.

A battery module (not shown) may comprise the one or more components 12. The battery module may comprise the battery cell 110. The battery module may be configured to receive or house the battery cell 110. In some examples, the battery module need not comprise the battery cell 110. The battery module may be removable, for example removable connection to, or in, the aerosol generation device 100. Advantageously, this may simplify servicing, maintenance, replacement, and/or recycling of components of the battery module. The battery module may be providable or locatable in, and removable from, the aerosol generation device 100. The battery module may comprise a housing, or housing portion, which when the battery module is provided in the aerosol generation device 100 closes, or completes, a portion of a housing or the aerosol generation device 100.

The cover 20 or cover region 26 is removably mountable to a part of the aerosol generation device 100.

In this way, the cover 20 or cover 26 can be removed from an arrangement in which it is mounted or attached in the aerosol generation device 100 to gain access to components thereof, in particular to gain access to the battery cell 110. This is highly advantageous in facilitating recycling of the battery cell 110. However, as above, the disassembler may discharge the battery cell 110 prior to removal of the cover 20 or cover region 26, improving safety and control of the recycling process.

The part of the aerosol generation device 100 may be a casing or a frame.

In this way, a robust assembly 10 is provided. The casing or frame may house components of the aerosol generation device 100.

In an example, the one or more contacts 30 are provided by a fixture (e.g., a fastener). In the example illustrated in Figures 1 and 2, the fixture is a screw. The fixture may be

an electrically conductive member. For example, the fixture may be formed from metal. The fixture may engage a frame or frame portion (indicated in Figures 1 and 2 at 36).

In this way, manufacture of the assembly 10 may be simplified. The battery cell 110 may be discharged by forming an electrical connection with the fixture or fixtures. The electrical connection may be formed using an electrically conductive solvent, or a discharge kit or accessory, as described above.

In an example, the one or more contacts 30 are configured to be directly electrically connected with the battery cell 110.

Direct electrical connection may mean that electrical connection is formed without intermediate componentry, such as one or more printed circuit boards (PCBs). That is, the point of electrical connection may not be, for example, a charging point or connection of the aerosol generating device 100, which provide charging power to the battery cell via a PCB of the aerosol generating device. Instead, the electrical connection is direct to the battery cell 110, thus bypassing any PCBs of the aerosol generation device 100.

The direct electrical connection may be provided by connection elements 120 in direct contact or connection with the battery cell 110. The connection may be made via the one or more contacts 30 which are in direct electrical connection with the battery cell 110. The direct electrical connection may mean that the connection is via a discharge circuit which is configured to enable discharging of the battery cell 110.

Referring to Figure 3, an aerosol generation device 100 is schematically shown. The aerosol generation device 100 comprises an assembly 10 as described above.

Referring to Figure 4, a method of using an assembly for covering one or more components of an aerosol generation device is shown. The assembly comprises a cover defining: an internal cover side arrangeable to face one or more components; and an external cover side, wherein the cover comprises a removable cover region or is a removable cover. The assembly further comprises: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are accessible at the external cover side such that an electrical connection can

be formed with the battery cell for at least partially discharging the battery cell without removing, or prior to removal of, the removable cover region or removable cover. Step S410 comprises forming an electrical connection with the battery cell by accessing the one or more contacts at the external cover side without removing, or prior to removal of, the removable cover region or removable cover.

Such a method is highly advantageous in facilitating discharging of the battery cell via the discharge circuit whilst ensuring the disassembler is protected from the battery cell. Once the battery cell has been at least partially discharged, the disassembler may then readily access the battery cell by the removable cover region or removable cover, for removal and replacement or the battery cell. Battery recycling and replacement is thereby facilitated, whilst improving disassembler safety.

In an example, optional step S420 comprises forming the electrical connection with the battery cell by accessing the one or more contacts of the discharge circuit at the external cover side without removing, or prior to removal of, the cover.

In an example, optional step S430 comprises forming the electrical connection with the battery cell by accessing the one or more contacts of the discharge circuit at the external cover side, and optional step S440 comprises at least partially discharging the battery cell.

In an example, the cover comprises a destructible cover region, or is a destructible cover, and optional step S450 comprises destructing the destructible cover region or destructible cover.

In an example, optional Step S460 comprises destructing the destructible cover region or destructible cover subsequent to at least partially discharging the battery cell.

In an example, the cover comprises a removable cover region or is a removable cover and optional step S470 comprises removing the removable cover region or removable cover subsequent to at least partially discharging the battery cell.

In this way, the battery cell can be accessed for recycling and replacement, whilst disassembler safety is improved due to the battery cell remaining covered during the discharging.

A further optional method step comprises generating an indication of a discharge state of the battery cell prior to removal of the removable cover region or removable cover. The indication may be provided by an indicating means (i.e. an indicator), such as a display assembly.

In this way, when an indication is provided that the battery cell is discharged (e.g., partially, or fully), the disassembler can understand that it is safe to access the battery cell by removal of the removable cover region or removable cover. Safety is thereby improved. Conversely, if an indication is provided that the battery cell is not sufficiently discharged, or is still charged, the disassembler can understand that it is not safe to remove the removable cover region or removable cover.

In one example, the method described above may be incorporated in a method of disassembly of an aerosol generation device. The method may comprise at least partially discharging a battery cell using the one or more contacts forming part of the discharge circuit. The method may comprise the aerosol generation device generating or providing an indication that the battery cell is at least partially discharged. The method may comprise removing the removable cover region or removable cover subsequent to the at least partially discharging the battery cell.

The description which follows relates to a further embodiment of the present invention. It will be appreciated from the description which follows that many of the features will be understood from the description of the assembly 10. Indeed, many of the features will be interchangeable with those of the assembly 10 described above. Features of the assembly 10 described above may be incorporated into the description which follows, as will be apparent to the skilled person.

A key distinction of the further embodiment relative to that of the embodiment described above is that one or more contacts are not accessible at the external cover side. That is, in the further embodiment, there are no contacts provided at the external cover side for forming an electrical connection with the battery cell. Instead, a cover is provided which is destructible to allow access to one or more components at the internal cover side. The term “destructible” is as defined and explained above.

Referring to Figure 5, an assembly 50 is shown. The assembly 50 is for covering one or more components 52 of an aerosol generation device 100. The assembly 50

comprises a cover 60. The cover 60 defines an internal cover side 62 arrangeable to face the one or more components 52. The cover 60 also defines an external cover side 64.

The cover 60 comprises at least a destructible cover region 66. That is, at least a region, or area, of the cover 60 is destructible. The destructible cover region 66 is destructible to allow access to the one or more components 52 at the internal cover side 62.

In this way, the cover 60 provides a level of protection to a disassembler during disassembly of the aerosol generation device 100, and/or during maintenance, servicing and/or recycling of the aerosol generation device 100. The one or more components 52 are thus not accessible until the cover region 66 is destructed. Distinct from the assembly 10 described above, contacts are not accessible at the external cover side 64. This may improve safety by preventing access to the contacts until the cover 60 or cover region 66 is destructed. Furthermore, this may simplify construction of the assembly 50.

In an example, the cover 60 is a destructible cover. That is, the entire cover 60 may be destructible.

The cover 60 or cover region 66 may be destructed by using a salt-water solution. The salt in the salt-water solution may be one or more of sodium chloride (NaCl), sodium sulfide (Na_2S), magnesium sulfate ($MgSO_4$), sodium sulfate (Na_2SO_4), iron sulfate ($FeSO_4$), and zinc sulfate ($ZnSO_4$).

The cover 60 or cover region 66 may be formed from a homogeneous material. Examples of such materials include polylactic acid (PLA), polyvinyl alcohol (PVA), or a biopolymer or biodegradable polymer.

The cover 60 or cover region 66 may additionally or alternatively be formed from a fibrous material. Examples of such materials include glass fibres, linen fibres, hemp fibres, jute fibres, or the like. A fibrous material may comprise fibres and a bonding agent. The bonding agent may link, join, or bond the fibres to form the fibrous material.

In an example, the one or more components 52 comprises the battery cell 110. The one or more components 52 may comprise one or more battery module components. The

one or more battery components may be a battery cell (e.g., battery cell 110 as described above), a fuse, or an integrated circuit (IC) protection module.

A battery module (not shown) may comprise the one or more components 52. The battery module may comprise the battery cell 110. The battery module may be configured to receive or house the battery cell 110. In some examples, the battery module need not comprise the battery cell 110. The battery module may be removable, for example removable connection to, or in, the aerosol generation device 100. Advantageously, this may simplify servicing, maintenance, replacement, and/or recycling of components of the battery module. The battery module may be providable or locatable in, and removable from, the aerosol generation device 100. The battery module may comprise a housing, or housing portion, which when the battery module is provided in the aerosol generation device 100 closes, or completes, a portion of a housing or the aerosol generation device 100.

In an example, the assembly 50 further comprises one or more contacts 80. The contacts 80 are configured to be electrically connected to a battery cell 110. The one or more contacts 80 form part of a discharge circuit for discharging the battery cell 110 (the discharge circuit being as described above in relation to the assembly 10). The one or more contacts 80 are provided at the internal cover side 62 and are inaccessible at the external cover side 64. This is distinct from the embodiment of the assembly 10 described above, wherein the one or more contacts 30 are accessible at the external cover side 24. Other features of the one or more contacts 80 will be understood from the description of the assembly 10 provided above.

The one or more contacts 80 may be elongate. The one or more contacts 80 may comprise a contacting portion, which may be a portion configured to be contacted to form an electrical connection with the battery cell for discharging. In the example illustrated in Figure 5, the one or more contacts 80 do not extend through the cover 60. In this way, the one or more contacts 80 are not accessible at the external cover side 24.

The cover 60 may be a first cover. A second cover 70 may be provided. The second cover 70 may be a part of a casing of the aerosol generation device 100. The second cover 70 may be an outermost casing or housing of the aerosol generation device 100. The second cover 70 may be handled by the user of the aerosol generation device 100

during normal use. The first cover 60 may be an inner cover and the second cover 70 may be an outer cover. The second cover 70 may provide a casing or outer housing of the aerosol generation device 100. Removal of the second cover 70 provides access to the first cover 60 beneath. Removal of the second cover 70 may provide access to the first cover 60 beneath for destruction thereof. The second cover 70 may configured to be removed during servicing, maintenance, disassembly or recycling. The second cover 70 may not be destructible.

The one or more contacts 80 may comprise a positive electrical contact and a negative electrical contact. That is, a first one of the one or more contacts 80 may be in electrical connection with a positive terminal of the battery cell 110 and a second one of the one or more contacts 80 may be in electrical connection with a negative terminal of the battery cell 110.

The assembly 50 further comprises a first printed circuit board (PCB) 130 and a second PCB 140. One of both of the first PCB 130 and second PCB 140 comprise tabs 150. The tabs 150 are arranged to connect to the connection element 120 such that electrical power is providable from the battery cell 110 to one or both of the first PCB 130 and second PCB 140.

In an example, the one or more contacts 80 are provided by a fixture. In the example illustrated in Figures 5, the fixture is a screw. The fixture may be an electrically conductive member. For example, the fixture may be formed from metal. The fixture may engage a frame or frame portion (indicated in Figures 5 at 56).

In this way, manufacture of the assembly 10 may be simplified. The battery cell 110 may be discharged by forming an electrical connection with the fixture or fixtures. The electrical connection may be formed using an electrically conductive solvent, or a discharge kit or accessory, as described above.

In an example, the one or more contacts 80 are configured to be directly electrically connected with the battery cell 110. Direct electrical connection will be understood from the description provided above in relation to the assembly 10.

Referring to Figure 6, an aerosol generation device 100 is schematically shown. The aerosol generation device 100 comprises an assembly 50 as described above.

Referring to Figure 7, a method of using an assembly of an aerosol generation device is shown. The assembly comprises a cover defining: an internal cover side arrangeable to face one or more components; and an external cover side. The cover comprises at least a destructible cover region being destructible to allow access to the one or more components at the internal cover side. Step S710 comprises destructing the destructible cover region to access the one or more components at the internal cover side.

In an example, the assembly 50 further comprises one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are provided at the internal cover side and are inaccessible at the external cover side. Optional Step S720 comprises forming an electrical connection with the battery cell by accessing the one or more contacts at the internal cover side subsequent to destructing at least the destructible cover region.

In an example, optional Step S730 comprises at least partially discharging the battery cell.

In all embodiments described above, destructible or removable covers 20, 60 or cover regions 26, 66 are described. It may be desired to replace the cover 20, 60 or cover region 26, 66 subsequent to removal or destruction thereof. In particular, in some instances, the cover 20, 60 or cover region 26, 66 may not be reusable. A mould may be provided, or providable, for forming a cover or cover region to be replaced, installed or mounted in the assembly 10, 50. In particular, the mould may be used to form a replacement destructible cover 20, 60 or cover region 26, 66 and installed in the assembly 10, 50 after a process of servicing, maintenance or recycling of components of the aerosol generation device 100 (such as removal and replacement of the battery cell 110 with another component, for example a new battery cell 110). The method may comprise forming a cover or cover region, that is, forming a new cover or cover region. The method may comprise installing the formed cover or cover region in the assembly 10, 50. The formed cover or cover region may be a destructible cover or cover region.

The description provided herein relates primarily to destructible covers 20, 60 or cover regions 26, 66. However, in related and synergistic examples, a destructible envelope

may be provided in a battery module and/or in the aerosol generation device 100. This applies to all embodiments described herein.

In a related and synergistic example, a battery module for an aerosol generation device may comprise: one or more battery module components; and a destructible envelope provided about the one or more battery module components.

Advantageously, the envelope provides a protective outer to the one or more battery module components, which improves safety in handling of the battery module. Furthermore, this may simplify the provision of access to the one or more battery components, for servicing, maintenance, and/or recycling. As described in detail below, the destructible envelope is particularly advantageous where the battery module comprises a battery cell. During a recycling process, the destruction of the destructible envelope enables access to the one or more battery module components for disassembly, and where the battery module comprises or receives a battery cell, for discharging of the battery cell. Advantageously, this facilitates safe and straightforward extraction and removal of a battery cell from a battery module.

The assembly 10, 50 may be provided toward the exterior of the aerosol generation device 100, in particular toward the exterior of the device 100 relative to the destructible envelope. The assembly may cover the one or more battery module components. The internal cover side may be arrangeable to face the one or more battery module components having the destructible envelope provided thereabout. Destruction of the cover may facilitate access to, and thereby destruction of, the destructible envelope provided about the one or more battery module components. Furthermore, in some examples, removal of the cover or cover region and discharging of the battery cell may be performable in a single step, without handling of electrical components by the disassembler.

In this way, the cover may be destructed and a component of the battery module (specifically the battery cell) discharged, followed by destruction of the destructible envelope. This may be performed in a single step, for example by immersing the aerosol generation device 100 in an appropriate solution.

Figure 8 shows a schematic cross-sectional view of an aerosol generation device 100.

The aerosol generation device 100 may incorporate either assembly 10, 50, and any or all parts thereof.

The aerosol generation device 100 is suitable for receiving a consumable 1002 therein. For example, the aerosol generation device 100 may include a chamber 1004 in which the consumable 1002 is received.

The invention is not limited to the specific aerosol generation device 100 or consumable 1002 described herein. That is, the description of the aerosol generation device 100 and consumable 1002 is provided for illustrative purposes only. The skilled person will appreciate that alternative constructions of aerosol generation devices and consumables will be compatible with the present invention.

A consumable 1002 comprises an aerosol substrate. The term aerosol substrate is a label used to mean a medium that generates an aerosol or vapour when heated. Aerosol substrate might be interpreted as an aerosol precursor. In one example, aerosol substrate is synonymous with smokable material, aerosol generation substrate and aerosol generation medium. Aerosol substrate includes materials that provide volatilized components upon heating, typically in the form of vapor or an aerosol. Aerosol substrate may be a non-tobacco-containing material or a tobacco-containing material. Aerosol substrate may, for example, include one or more of tobacco per se, tobacco derivatives, expanded tobacco, reconstituted tobacco, tobacco extract, homogenized tobacco or tobacco substitutes. Aerosol substrate also may include other, non-tobacco, products, which, depending on the product, may or may not contain nicotine. Aerosol substrate may comprise one or more humectants, such as glycerol or propylene glycol.

The aerosol generation device 100 may comprise one or more heaters 1006 configured to provide heat to the consumable 1002, in use.

In one example, the consumable 1002 contains a liquid and the one or more heaters comprises a heating element, such as a coil, a ceramic heater, a flat resistive heater, a mesh heater, a MEMS heater, or the like, configured to aerosolise the liquid for inhalation. A liquid delivery element or mechanism, such as a porous material, a capillary system, and/or valve, may transfer the liquid to the heating element, in use. In some examples, the aerosolised liquid may pass through a solid substrate within the

aerosol generation device 100. In other examples, the consumable 1002 may comprise a solid aerosol substrate.

In one example, the aerosol generation device 100 comprises a nebulizing engine, such as a vibrating mesh, to generate an aerosol from a liquid with or without heating thereof.

The aerosol generation device 100 may comprise a mouthpiece 1012 through which a user draws on the aerosol generation device 100 to inhale generated aerosol. The mouthpiece 1012 includes a vent or channel 1014 that is connected to a region close to the consumable 1002 for passage of any generated aerosol from the consumable 1002, during use. For example, the channel 1014 may extend between an opening in the mouthpiece 1012 and the chamber 1004 in which the consumable 1002 is at least partially receivable. The mouthpiece 1012 is arranged such it may be received in a user's mouth in use. In other examples, a mouthpiece 1012 is not required and a portion of the consumable 1002 may protrude from the aerosol generation device 100. In this example, protruded portion of the consumable 1002 may work as mouthpiece.

The aerosol generation device 100 may comprise a control unit 1008 (or control circuitry) for electronic management of the device. The control unit 1008 may include a PCB or the like (not shown). The control unit 1008 is configured to control the one or more heaters 1006.

The aerosol generation device 100 may comprise an activation input sensor 1018. The activation input sensor 1018 may be a button, a touchpad, or the like for sensing a user's input, such as a tap or swipe. In other examples, the activation input sensor 1018 comprises a consumable sensor configured to detect if a consumable 1002 has been inserted into the aerosol generation device 100. For example, the input sensor 1018 may comprise an authenticity detector that is configured to detect if an authentic consumable 1002 has been inserted into the aerosol generation device 100. Additionally, or alternatively, the user input may also comprise an inhalation action by a user.

The aerosol generation device 100 may comprise a puff sensor 1020 (otherwise known as an inhalation sensor). The puff sensor 1020 is configured to detect an inhalation action (or puff) by a user on the aerosol generation device 100. In one example, the puff sensor 1020 comprises a microphone or a flow sensor configured to an airflow

within the chamber 1004 and/or an airflow channel extending from the chamber 1004 through the mouthpiece 1012 to an inhalation outlet thereof, the airflow being associated with a user's inhalation action. In other examples, the puff sensor 1020 is configured to detect a change in pressure indicative of a beginning of an inhalation action on the aerosol generation device 100 by the user. In this case, the puff sensor 1020 may be located anywhere on the aerosol device 100 in which there would be a change in pressure due to an inhalation action of the user. In one example, the puff sensor 1020 is located in the channel 1014 between the chamber 1004 and the mouthpiece 1012 of the aerosol generation device 100. The puff sensor 1020 may also detect the end of an inhalation action by the user. For example, the puff sensor 1020 may be configured to detect a further change in pressure due to the end of an inhalation action of a user.

The aerosol generation device 100 may include one or more temperature sensors 1022 configured to directly or indirectly measure the temperature of the consumable 1002 in the aerosol generation device 100. The one or more temperature sensors 1022 may comprise a temperature sensor, such as a thermocouple or thermistor, configured to be located within or adjacent to the consumable 1002 when it is received in the aerosol generation device 100. For example, the one or more temperature sensors 1022 may be located within the chamber 1004 of the aerosol generation device 100. In other examples, the temperature of the consumable 1002 may be indirectly measured by the use of thermal imaging sensors. In further other example, the heater 1006 itself works as a temperature sensor if the heater 1006 has PTC (Positive Temperature Coefficient) or NTC (Negative Temperature Coefficient) characteristic.

The aerosol generation device 100 may include a power supply 1050 such as a battery cell. The power supply 1050 may be the battery cell 110 described above. The power supply 1050 may comprise, or be, a battery module 10. The power supply may provide the aerosol generation device 100 with electrical energy providing a voltage in the range of 3 V and 18 V, preferably in the range of 3 V and 4.2 V. In a preferred embodiment the voltage source (which may be the battery cell 110) is a lithium-ion secondary battery delivering a value of 3.7 V. Such a voltage source is particularly advantageous for a modern aerosol generation device in view of rechargeability, high energy density and large capacity. The power supply 1050 may provide power for operation of the aerosol generation device 100, for example the necessary power to generate aerosol. In an example, the power supply 1050 may provide power to one or more heaters 1006.

As above, the assembly 10, 50 (not shown in Figure 8) may be provided for covering one or more components 12, 52 of the aerosol generation device 100. The assembly 10, 50 comprises a cover 20, 60 defining an internal cover side 22, 62 arrangeable to face the one or more components 12, 52; and an external cover side 24, 64. Where the assembly 10 is incorporated in the aerosol generation device 100, the assembly 10 comprises one or more contacts 30 electrically connectable to the power supply 1050, such as the battery cell 110. The one or more contacts 30 are accessible at the external cover side 24 such that an electrical connection can be formed with the power supply 1050. Where the assembly 50 is incorporated in the aerosol generation device 100, the cover 60 comprises at least a destructible cover region 66 being destructible to allow access to the one or more components 52 at the internal cover side 62.

The aerosol generation device 100 may comprise a controller 1030. The controller 1030 is connected to the control unit 1008. The controller 1030 is configured to receive data from the control unit 1008. In particular, the controller 1030 is configured to receive data from the control unit 1008 relating to various sensors/inputs (such as the activation input sensor 1018, puff sensor 1020 and/or temperature sensor 1022) of the aerosol generation device 100.

The controller 1030 and the control unit 1008 may be integral with each other. In one example, a single component performs the function of the control unit 1008 and controller 1030. In other examples, the control unit 1008 and the controller 1030 are distinct components.

The aerosol generation device 100 may comprise a USB port 1052 (e.g., a USB receiving port). The USB port may provide connection to the controller 1030.

It will be appreciated that the invention that has been described and defined above may allow the related apparatus and methods to drive, comply with, or more easily comply with, legal and regulatory requirements, guidelines and standards. In particular, this might be in relation to one or more of apparatus (e.g. battery or related device) inspection, indication/status, recycling, reuse, repair, replacement, and maintenance, whether by an end user or service provider.

Referring generally to the description herein, further detail is hereby provided in relation to terms used above and features described in the present disclosure, or to further terms relevant to the present disclosure:

- A “battery” may mean any device delivering electrical energy generated by direct conversion of chemical energy, having internal or external storage, and consisting of one or more non-rechargeable or rechargeable battery cells or modules thereof, and includes a battery that has been subject to preparation for re-use, preparation for repurposing, repurposing or remanufacturing;

- A “battery module” may mean one or more battery module components (e.g., any set of one or more battery cells and/or one or more other components, as described above) that are connected together or encapsulated within an outer casing, housing, surround, envelope, wrapping, or the like, to protect the cells against internal impact, and which is meant to be used either alone or in combination with other modules. In some examples, a “battery module” within the context of this specification may otherwise be known as a “battery pack”;

- A “battery cell” may mean the basic functional unit in a battery, composed of electrodes, electrolyte, container, terminals, and, if applicable, separators, and containing the active materials the reaction of which generates electrical energy;

- An “active material” means a material which reacts chemically to produce electric energy when the battery cell discharges or to store electric energy when the battery is being charged.

Although preferred embodiments have been shown and described, it will be appreciated by those skilled in the art that various changes and modifications might be made without departing from the scope of the invention, as defined in the appended claims and as described herein.

Examples of the invention, or examples related to the invention, may be further or alternatively defined or described as follows:

1. An assembly for covering one or more components of an aerosol generation device, the assembly comprising:

a cover defining:

an internal cover side arrangeable to face one or more components; and

an external cover side,

wherein the cover comprises at least a destructible cover region being destructible to allow access to the one or more components at the internal cover side.

2. The assembly according to example 1, wherein the cover is a destructible cover.

3. The assembly according to either of example 1 or example 2, wherein the destructible cover region or destructible cover is destructible in a water-based solution or in a salt-water solution, wherein the salt is one or more of NaCl, Na2S, MgSO4, Na2SO4, FeSO4, and ZnSO4.

4. The assembly according to any one of the preceding examples, wherein the destructible cover region or destructible cover is formed from a homogeneous material and/or a fibrous material.

5. The assembly according to any one of the preceding examples, wherein the one or more components comprise one or more battery module components, such as a battery cell, a fuse and/or an IC protection module.

6. The assembly according to any one of the preceding examples, wherein the assembly further comprises:

one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are provided at the internal cover side and are inaccessible at the external cover side.

7. The assembly according to example 6, wherein the one or more contacts are provided by a fixture, such as a screw.

8. The assembly according to either of example 6 or example 7, wherein the one or more contacts are configured to be directly electrically connected with the battery cell

9. An aerosol generation device comprising the assembly according to any one of the preceding examples.

10. A method of using an assembly of an aerosol generation device, the assembly comprising:

a cover defining:

an internal cover side arrangeable to face one or more components; and

an external cover side,

wherein the cover comprises at least a destructible cover region being destructible to allow access to the one or more components at the internal cover side,

wherein the method comprises:

destructing at least the destructible cover region to access the one or more components at the internal cover side.

11. The method according to example 10, wherein the assembly further comprises: one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are provided at the internal cover side and are inaccessible at the external cover side, the method comprising:

forming an electrical connection with the battery cell by accessing the one or more contacts at the internal cover side subsequent to destructing at least the destructible cover region.

12. The method according to example 11, further comprising:

at least partially discharging the battery cell.

CLAIMS

1. An assembly for covering one or more components of an aerosol generation device, the assembly comprising:

a cover defining:

an internal cover side arrangeable to face the one or more components; and

an external cover side,

wherein the cover comprises a removable cover region or is a removeable cover,

the assembly further comprising:

one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are accessible at the external cover side such that an electrical connection can be formed with the battery cell for at least partially discharging the battery cell without removing, or prior to removal of, the removable cover region or removable cover.

2. The assembly according to claim 1, wherein the cover comprises a destructible cover region, or is a destructible cover.

3. The assembly according to claim 2, wherein the destructible cover region or destructible cover is destructible in a water-based solution or in a salt-water solution, optionally wherein the salt is one or more of NaCl, Na2S, MgSO4, Na2SO4, FeSO4, and ZnSO4.

4. The assembly according to claim 2 or claim 3 wherein the destructible cover region or destructible cover is formed from a homogeneous material and/or a fibrous material.

5. The assembly according to any one of the preceding claims, wherein the one or more components comprises the battery cell.

6. The assembly according to any one of the preceding claims, wherein the cover or cover region is removably mountable to a part of the aerosol generation device.

7. The assembly according to claim 6, wherein the part of the aerosol generation device is a casing.

8. The assembly according to any one of the preceding claims, wherein the one or more contacts are configured to be directly electrically connected with the battery cell

9. An aerosol generation device comprising an assembly according to any one of the preceding claims.

10. A method of using an assembly for covering one or more components of an aerosol generation device, the assembly comprising:

a cover defining:

an internal cover side arrangeable to face one or more components; and

an external cover side,

wherein the cover comprises a removable cover region or is a removable cover,

the assembly further comprising:

one or more contacts configured to be electrically connected to a battery cell, wherein the one or more contacts form part of a discharge circuit for discharging the battery cell, and wherein the one or more contacts are accessible at the external cover side such that an electrical connection can be formed with the battery cell for at least partially discharging the battery cell without removing, or prior to removal of, the removable cover region or removable cover,

the method comprising:

forming an electrical connection with the battery cell by accessing the one or more contacts at the external cover side without removing, or prior to removal of, the removable cover region or removable cover.

11. The method according to either of claim 10, wherein the method comprises:

forming the electrical connection with the battery cell by accessing the one or more contacts of the discharge circuit at the external cover side; and

at least partially discharging the battery cell.

12. The method according to claim 11, wherein the method comprises:

removing the removable cover region or removable cover subsequent to at least partially discharging the battery cell.

13. The method according to claim 12, wherein the method comprises:

generating an indication of a discharge state of the battery cell prior to removal of the removable cover region or removable cover.

14. The method according to any one of claim 10 to 13, wherein the cover comprises a destructible cover region, or is a destructible cover, the method comprising:

destructing the destructible cover region or destructible cover.

15. The method according to claim 14 when dependent on claim 11, wherein the method comprises:

destructing the destructible cover region or destructible cover subsequent to at least partially discharging the battery cell.

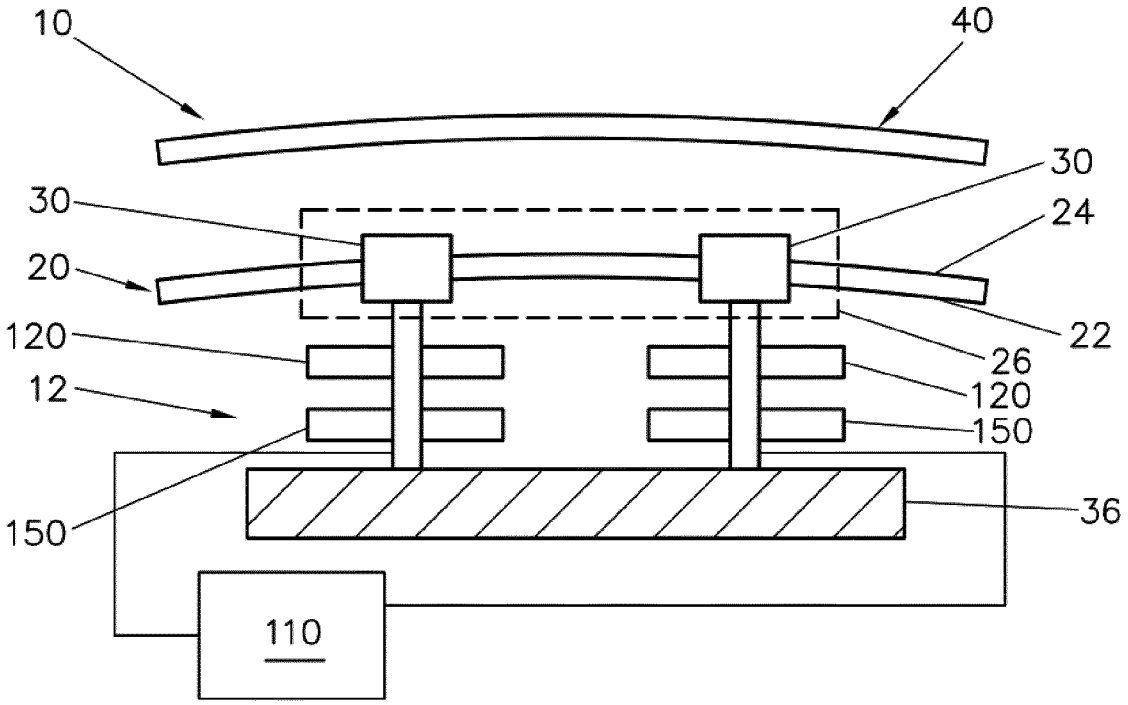
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Fig. 1

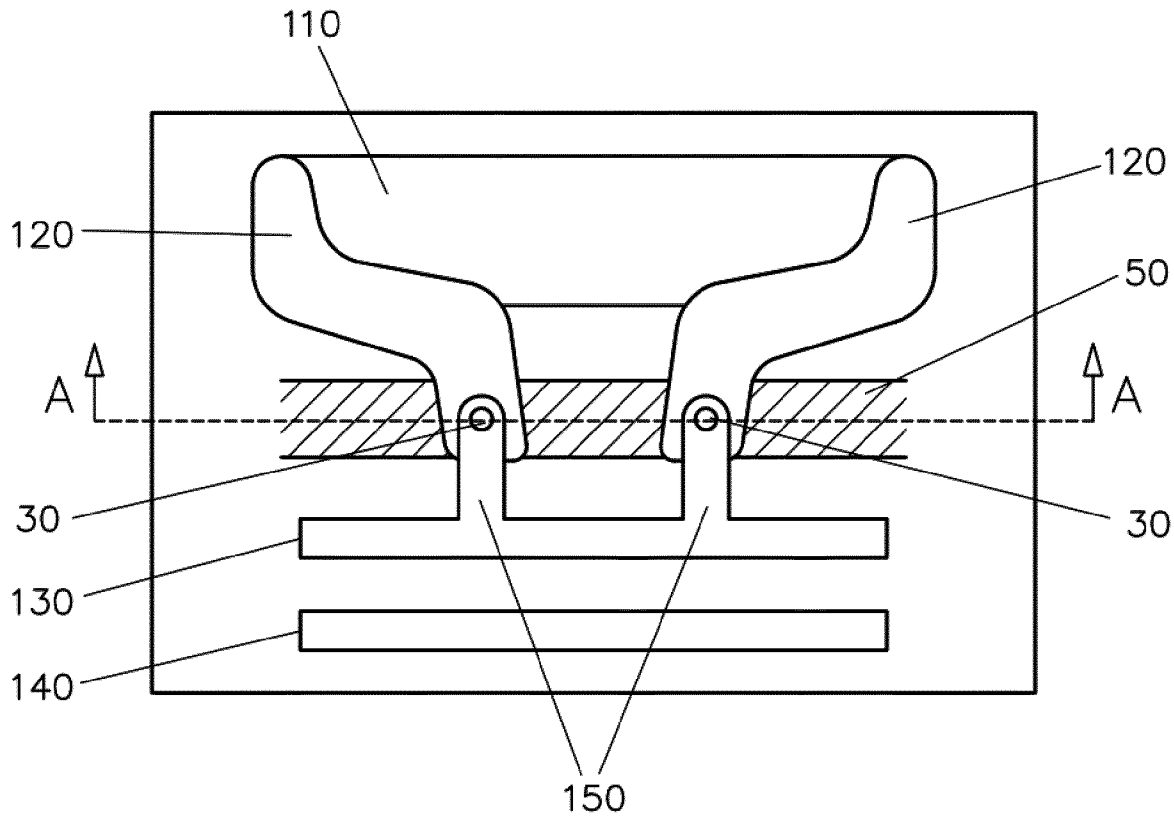
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Fig. 2

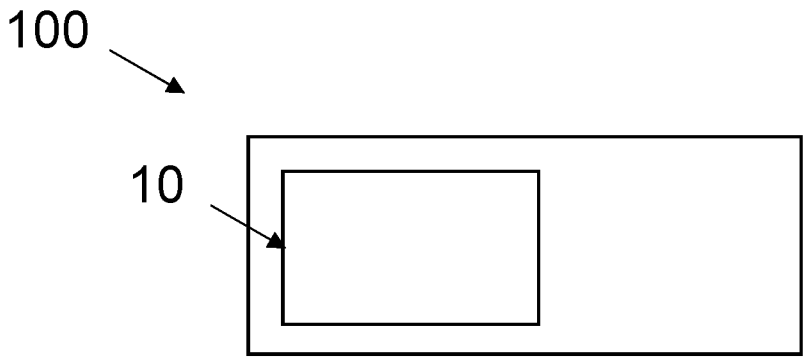

Fig. 3

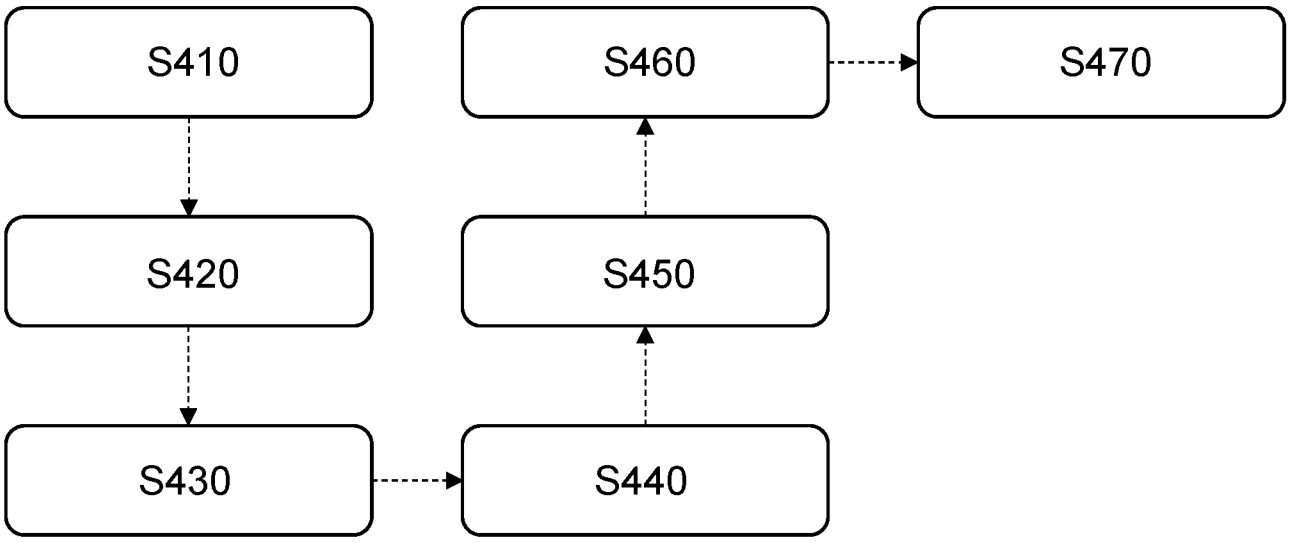

Fig. 4

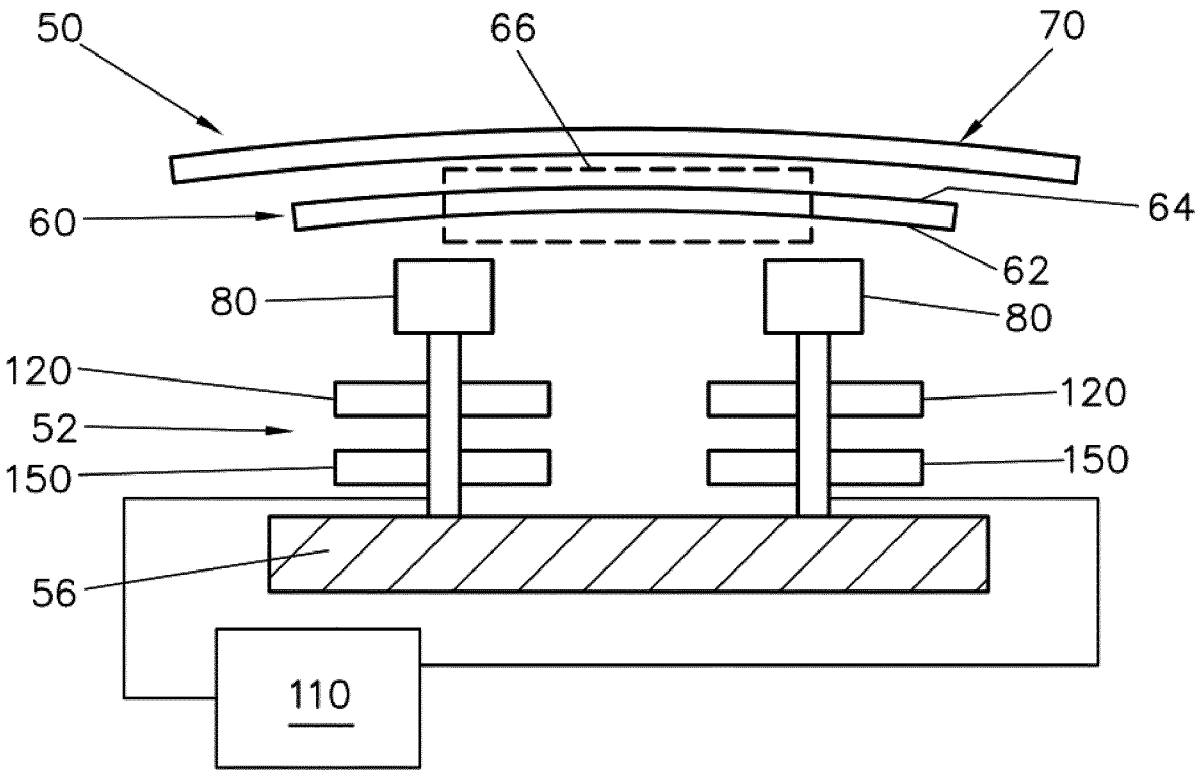

Fig. 5

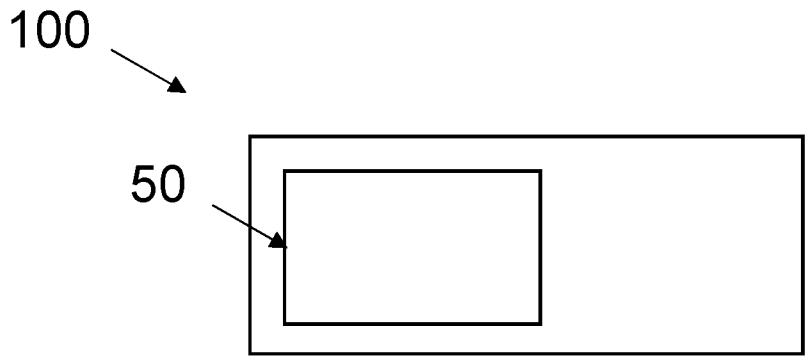

Fig. 6

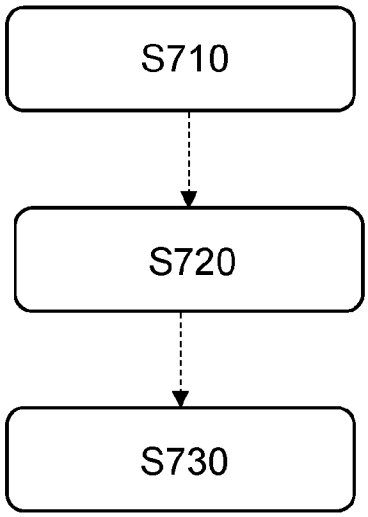
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Fig. 7

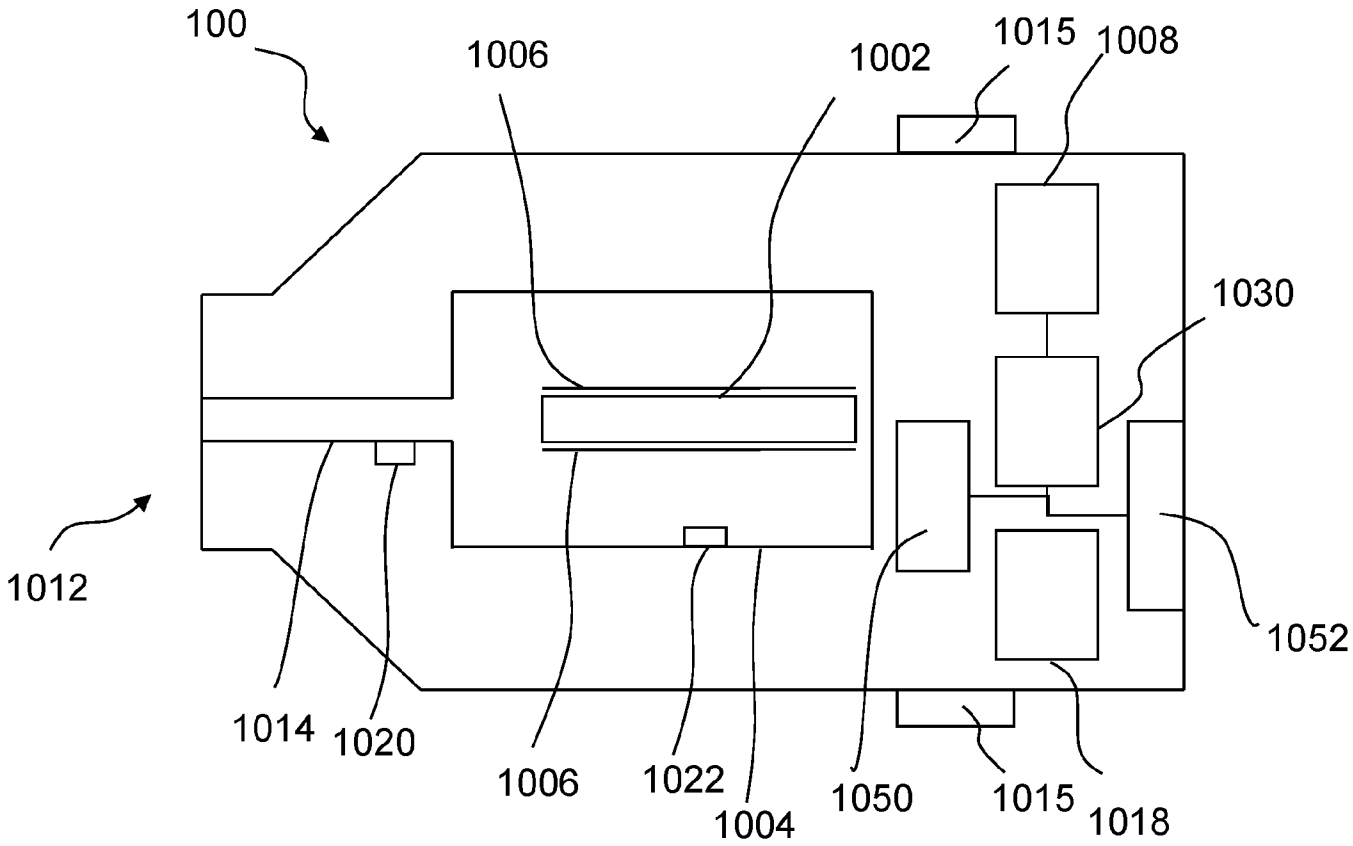
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Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/058261

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01M6/52 A24F40/40 H01M10/54 H01M50/138 H01M50/202
H01M50/227 H01M50/236 H01M50/278 H01M50/572
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)
H01M 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.
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X	DE 10 2012 013977 A1 (LI TEC BATTERY GMBH [DE]) 16 January 2014 (2014-01-16) paragraphs [0143] - [0147]; figures 1a, 1b	1,2,4-8, 10-15
X	DE 10 2010 037656 A1 (BMZ BATTERIEN MONTAGE ZENTRUM GMBH [DE]) 22 March 2012 (2012-03-22) paragraphs [0019] - [0021]; figure 1	1,2,4-8, 10-12,15
X	EP 0 255 631 A1 (FEIN C & E) 10 February 1988 (1988-02-10) page 2	1,2,4-8, 10-12,15

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[X] Further documents are listed in the continuation of Box C.
[X] 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
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"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
16 May 2024	24/05/2024

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	Brune, Markus

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/058261

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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International application No
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