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(54) **FLAVOUR DELIVERY ARTICLE**

(57) A flavour delivery article for use with a smoking substitute apparatus and method of delivering flavour to a user of a smoking substitute apparatus (101), the flavour delivery article (200) being insertable into a user's

mouth and comprising a flavourant, wherein the flavour delivery article is configured to release flavourant upon contacting an aerosol generated by the smoking substitute apparatus.

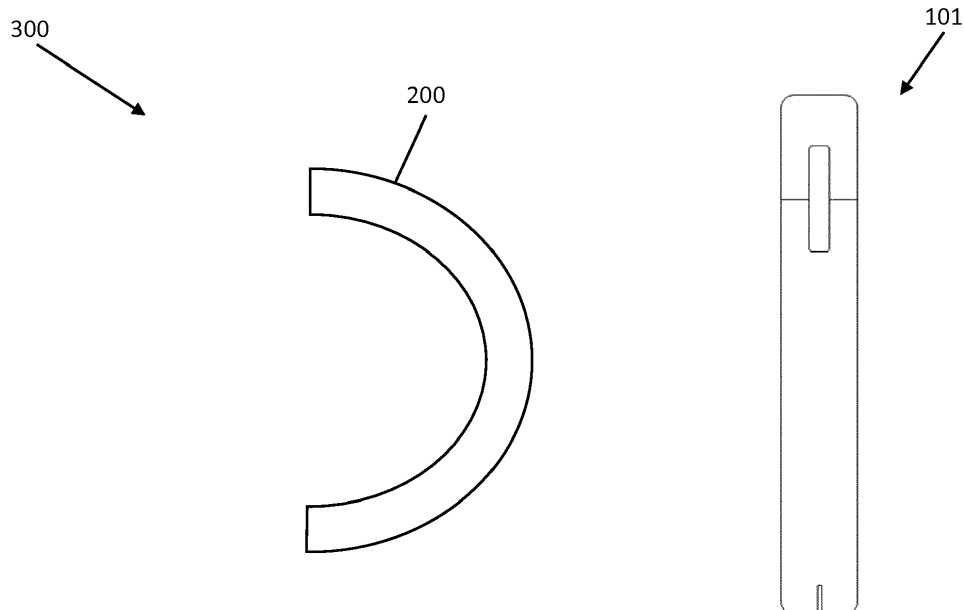


FIG 3

Description

Field of the Invention

[0001] The present invention relates to a flavour delivery article for use with a smoking substitute apparatus. In particular, the flavour delivery article is configured to deliver flavour to a user when the user uses the smoking substitute apparatus.

Background

[0002] The smoking of tobacco is generally considered to expose a smoker to potentially harmful substances. It is generally thought that a significant amount of the potentially harmful substances are generated through the heat caused by the burning and/or combustion of the tobacco and the constituents of the burnt tobacco in the tobacco smoke itself.

[0003] Combustion of organic material such as tobacco is known to produce tar and other potentially harmful byproducts. There have been proposed various smoking substitute systems in order to avoid the smoking of tobacco.

[0004] Such smoking substitute systems can form part of nicotine replacement therapies aimed at people who wish to stop smoking and overcome a dependence on nicotine.

[0005] Smoking substitute systems include electronic systems that permit a user to simulate the act of smoking by producing an aerosol (also referred to as a "vapour") that is drawn into the lungs through the mouth (inhaled) and then exhaled. The inhaled aerosol typically bears nicotine and/or a flavourant without, or with fewer of, the odour and health risks associated with traditional smoking.

[0006] In general, smoking substitute systems are intended to provide a substitute for the rituals of smoking, whilst providing the user with a similar experience and satisfaction to those experienced with traditional smoking and with combustible tobacco products.

[0007] The popularity and use of smoking substitute systems has grown rapidly in the past few years. Although originally marketed as an aid to assist habitual smokers wishing to quit tobacco smoking, consumers are increasingly viewing smoking substitute systems as desirable lifestyle accessories. There are a number of different categories of smoking substitute systems, each utilising a different smoking substitute approach.

[0008] One approach is the so-called "vaping" approach, in which a vaporisable liquid, typically referred to (and referred to herein) as "e-liquid", is heated by a heating device (referred to herein as an electronic cigarette or "e-cigarette" device) to produce an aerosol vapour which is inhaled by a user. The e-liquid typically includes a base liquid as well as nicotine and/or a flavourant. The resulting vapour therefore also typically contains nicotine and/or a flavourant. The base liquid

may include propylene glycol and/or vegetable glycerine.

[0009] A typical e-cigarette device includes a mouthpiece, a power source (typically a battery), a tank for containing e-liquid, as well as a heating device. In use, electrical energy is supplied from the power source to the heating device, which heats the e-liquid to produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

[0010] E-cigarettes can be configured in a variety of ways. For example, there are "closed system" vaping smoking substitute systems, which typically have a sealed tank and heating element. The tank is prefilled with e-liquid and is not intended to be refilled by an end user. One subset of closed system vaping smoking substitute systems include a main body which includes the power source, wherein the main body is configured to be physically and electrically coupled to a consumable including the tank and the heating element. In this way, when the tank of a consumable has been emptied, that consumable is disposed of. The main body can be reused by connecting it to a new, replacement, consumable. Another subset of closed system vaping smoking substitute systems are completely disposable, and intended for one-use only.

[0011] There are also "open system" vaping smoking substitute systems which typically have a tank that is configured to be refilled by a user. In this way the entire device can be used multiple times.

[0012] An example vaping smoking substitute system is the myblu™ e-cigarette. The myblu™ e-cigarette is a closed system which includes a main body and a consumable. The main body and consumable are physically and electrically coupled together by pushing the consumable into the main body. The main body includes a rechargeable battery. The consumable includes a mouthpiece, a sealed tank which contains e-liquid, as well as a heater, which for this device is a heating filament coiled around a portion of a wick. The wick is partially immersed in the e-liquid, and conveys e-liquid from the tank to the heating filament. The device is activated when a micro-processor on board the main body detects a user inhaling through the mouthpiece. When the device is activated, electrical energy is supplied from the power source to the heating device, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0013] For a smoking substitute device it is desirable to deliver nicotine into the user's lungs, where it can be absorbed into the bloodstream. As explained above, in the so-called "vaping" approach, e-liquid is heated by a heating device to produce an aerosol vapour which is inhaled by a user. Many e-cigarettes also deliver flavour to the user to enhance the experience. In such e-cigarettes, flavour compounds are contained in the e-liquid that is heated. However, toxicology restrictions are placed on the amount of flavour that can be contained in the e-liquid, and this can result in some e-liquid flavours delivering a weak and underwhelming taste sensation to

consumers in the pursuit of safety. Further, there is a view that providing a flavourant as part of the e-liquid, such that the flavourant is vaporised with the e-liquid, may be disadvantageous.

[0014] There may be a need for improved design of smoking substitute systems, in particular in regards to the delivery of flavour to a user.

[0015] The present disclosure has been devised in the light of the above considerations.

Summary of the Invention

[0016] At its most general, the present invention relates to a flavour delivery article for use with smoking substitute apparatus, and which is configured to deliver flavourant to the user when the user uses the smoking substitute apparatus. In this manner, flavour may be provided to the user when the smoking substitute apparatus delivers an aerosol to the user. This may enhance the flavour experienced by the user when using the smoking substitute apparatus. This may improve versatility of flavour delivery to the user, as the flavour delivery article may be used to enhance the flavour of the aerosol without having to make any changes to the smoking substitute apparatus or an e-liquid used in the aerosol delivery device.

[0017] Additionally, by providing flavour separately from smoking substitute apparatus, flavouring need not be provided in an e-liquid of the smoking substitute apparatus. Thus, different mechanisms are used to provide the aerosol and flavour to the user, which may be advantageous (e.g. as a flavourant does not need to be heated in the aerosol delivery device to provide flavour to the user). More generally, delivering flavouring that is separate to the e-liquid may provide more versatility in how the flavouring can be delivered to the user.

[0018] According to a first aspect there is provided a flavour delivery article for use with a smoking substitute apparatus, the flavour delivery article being insertable into a user's mouth and comprising a flavourant, wherein the flavour delivery article is configured to release flavourant upon contacting an aerosol generated by the smoking substitute apparatus.

[0019] The flavour delivery article may be suitable for insertion into a user's mouth, e.g. it may be shaped so that a user may place it in their mouth and retain it there during use. For example, the flavour delivery article may be shaped as a capsule, tab, gum shield, etc. For example, the flavour delivery article may be shaped so that it may be received under the user's tongue, between the user's gum and lip, or inside the user's cheek. In this manner the user may comfortably retain the flavour delivery article in their mouth for a period of use of the article.

[0020] The flavour delivery article is configured to release flavourant upon contacting an aerosol generated by the smoking substitute apparatus. In this manner, the flavour delivery article may deliver flavourant to the user in response to use of the smoking substitute apparatus,

e.g. it may be activated by the user inhaling aerosol generated by the smoking substitute apparatus. The flavourant released by the flavour delivery article may serve to enhance a flavour of the aerosol from smoking substitute apparatus. Thus, when using an smoking substitute apparatus, a user may choose to enhance the flavour of the aerosol delivered by the device by inserting the flavour delivery article into their mouth.

[0021] The flavour delivery article may be configured to release flavourant for a predetermined number of uses of the smoking substitute apparatus, e.g. for a predetermined number of inhalations ("puffs"), such as 10-20 inhalations.

[0022] The flavour delivery article may include a body which carries the flavourant. The flavourant may be provided on an outer surface of the body, and/or embedded within the body.

[0023] The term "flavourant" is used to describe a compound or combination of compounds that provide flavour and/or aroma. For example, the flavourant may be configured to interact with a sensory receptor of a user (such as an olfactory or taste receptor). The flavourant may include one or more volatile substances.

[0024] The flavourant may be provided in solid or liquid form. The flavourant may be natural or synthetic. For example, the flavourant may include menthol, liquorice, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and tobacco flavour. The flavourant may be evenly dispersed or may be provided in isolated locations and/or varying concentrations.

[0025] Flavourant may be included in the flavour delivery article using any suitable method. For example, the flavourant may be sprayed or coated onto the flavour delivery article. The flavourant may, for example, be a flavoured varnish on a surface of the flavour delivery article. The flavourant may be injected into the flavour delivery article. Alternatively or additionally, the flavourant may be incorporated into a material which is used to form the flavour delivery article.

[0026] At least a part of the flavourant may be disposed on an outer surface of the flavour delivery article. In this manner, the flavourant may come in direct contact with the user's mouth (e.g. tongue), so that it may produce a flavour sensation when the flavourant is activated. For example, the flavourant may be provided as a coating on the outer surface of the flavour delivery article.

[0027] The flavour delivery article may include a flavourant that is contained in a body of the flavour delivery article. In such a case, when the user inhales aerosol from the flavour delivery device, flavourant contained in the body of the flavour delivery article may be released into the user's mouth. As an example, the body may form a matrix in which the flavourant is held. The body may include a porous structure in which the flavourant is contained. In some examples, the body may include one or more cavities in which flavourant is contained. In another example, the flavourant may be incorporated into a ma-

terial forming the body. In some embodiments, flavourant may be both contained within the body of the flavour delivery article and on an outer surface of the body of the flavour delivery article. The same or different activation mechanisms may be used for releasing flavourant on the outer surface and contained within the body.

[0028] The flavour delivery article may include a barrier arranged to cover the flavourant, the barrier being configured to disintegrate upon contacting the aerosol generated by the smoking substitute device to release the flavourant. In this manner, when the user inhales an aerosol, the aerosol may cause the barrier to disintegrate so that flavourant is released into the user's mouth. Prior to the user inhaling the aerosol, the barrier covers the flavourant to prevent the flavourant from being released into the user's mouth. In this manner, flavourant may not be delivered to the user until they inhale an aerosol from the smoking substitute apparatus. The barrier may serve to encapsulate the flavourant, so that the flavourant does not come into contact with the user's mouth prior to disintegration of the barrier.

[0029] The flavourant may be provided as a first layer on a surface of the flavour delivery article, and the barrier may be provided as a second layer covering the first layer. In this manner, when the barrier disintegrates due to presence of the aerosol, the underlying layer of flavourant may be exposed, so that it comes into contact with the user's mouth. As a result, the layer of flavourant may produce a flavour in the user's mouth. In this configuration, prior to use, the layer of flavourant may be encapsulated between a surface of the flavour delivery article and the barrier. This may prevent the flavourant from coming into contact with the user's mouth prior to disintegration of the barrier.

[0030] In some embodiments, the barrier may be in the form of a microcapsule containing flavourant. Then, when aerosol contacts the microcapsule, the microcapsule may disintegrate to release the flavourant contained therein. A plurality of such microcapsules containing flavourant may be provided, e.g. a surface of the flavour delivery article may be coated with a plurality of microcapsules containing flavourant, where the microcapsules are arranged to disintegrate upon contacting the aerosol.

[0031] The barrier may include a hydrogel composite containing a compound which is arranged to break down upon contacting the aerosol generated by the smoking substitute device. In this manner, when the aerosol comes into contact with the barrier, the compound in the hydrogel composite may break down, which may cause the barrier to disintegrate. For example, the compound may be arranged to break down in response to a chemical which is present in the aerosol, and/or due to a change in a chemical or physical property of the user's mouth induced by the presence of the aerosol.

[0032] In some embodiments, the compound may be Chitosan. Chitosan is substantially stable around pH 7.5. Thus, when the flavour delivery article having a barrier made of a hydrogel composite containing Chitosan is in-

serted into the user's mouth, the Chitosan, and hence the barrier, may be stable and retain its integrity for a period of time so that flavourant is not released. When the user inhales an aerosol having a more alkaline pH (e.g. an aerosol produced from an e-liquid having a pH around 7.8), the change in pH in the user's mouth may cause the Chitosan, and hence the barrier, to rapidly break down and release the flavourant contained within.

[0033] As an example, the microcapsules may include an outer membrane made of a hydrogel material containing Chitosan.

[0034] Any of the following compounds may also break down upon contacting the aerosol, and so may be included in the hydrogel composite forming the barrier (instead of, or in addition to, Chitosan): Hyaluronic Acid, Dextran, Poly-Acrylamide, Polyacrylic Acid, Guar Gum Succinate, Kappa-Carrageenan, Poly(vinyl Alcohol).

[0035] The flavourant may be a freeze-dried flavourant. In this manner, the flavourant may be activated by moisture in the user's mouth. Thus, the flavourant may not produce a flavour until it reaches the user's mouth.

[0036] The flavour delivery article may be a gum shield. This may enable a user to conveniently and comfortably wear the flavour delivery article. This may reduce obstruction in the user's mouth caused by presence of the flavour delivery article. A gum shield may, in some cases, also be referred to as a mouth guard. Herein, a gum shield may refer to a device that is wearable between a user's gum and lip, either on the upper jaw or the lower jaw. The gum shield may also be arranged to cover a user's teeth. In some cases, the gum shield may be shaped to fit a particular user (e.g. based on a mould of the user's mouth), to ensure a good fit of the gum shield in the user's mouth and improve wearing comfort. The gum shield may be made of a plastic or polymer, and flavourant may be added to the gum shield during manufacture.

[0037] According to a second aspect of the invention, there is provided a smoking substitute kit comprising: a flavour delivery article according to the first aspect of the invention, and a smoking substitute apparatus for generating an aerosol; wherein the flavour delivery article is configured to release the flavourant upon contacting aerosol generated by the smoking substitute apparatus.

[0038] The smoking substitute apparatus may be in the form of a consumable. The consumable may be configured for engagement with a main body (i.e. so as to form a closed smoking substitute system). For example, the consumable may comprise components of the system that are disposable, and the main body may comprise non-disposable or non-consumable components (e.g. power supply, controller, sensor, etc.) that facilitate the delivery of aerosol by the consumable. In such an embodiment, the aerosol former (e.g. e-liquid) may be replenished by replacing a used consumable with an unused consumable.

[0039] Alternatively, the smoking substitute apparatus may be a non-consumable apparatus (e.g. that is in the form of an open smoking substitute system). In such em-

bodiments an aerosol former (e.g. e-liquid) of the system may be replenished by re-filling e.g. a reservoir of the smoking substitute apparatus with the aerosol former (rather than replacing a consumable component of the apparatus).

[0040] In light of this, it should be appreciated that some of the features described herein as being part of the smoking substitute apparatus may alternatively form part of a main body for engagement with the smoking substitute apparatus (i.e. when the smoking substitute apparatus is in the form of a consumable).

[0041] Where the smoking substitute apparatus is in the form of a consumable, the main body and the consumable may be configured to be physically coupled together. For example, the consumable may be at least partially received in a recess of the main body, such that there is an interference fit between the main body and the consumable. Alternatively, the main body and the consumable may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

[0042] Thus, the smoking substitute apparatus may comprise one or more engagement portions for engaging with a main body. In this way, one end of the smoking substitute apparatus may be coupled with the main body, whilst an opposing end of the smoking substitute apparatus may define a mouthpiece of the smoking substitute system.

[0043] The smoking substitute apparatus may comprise a reservoir configured to store an aerosol former, such as an e-liquid. The e-liquid may, for example, comprise a base liquid and e.g. nicotine. The base liquid may include propylene glycol and/or vegetable glycerine. The e-liquid may be flavourless. That is, the e-liquid may not contain any flavourants and may consist solely of a base liquid of propylene glycol and/or vegetable glycerine and nicotine.

[0044] The reservoir may be in the form of a tank. At least a portion of the tank may be translucent. For example, the tank may comprise a window to allow a user to visually assess the quantity of e-liquid in the tank. A housing of the smoking substitute apparatus may comprise a corresponding aperture (or slot) or window that may be aligned with a translucent portion (e.g. window) of the tank. The reservoir may be referred to as a "clearomizer" if it includes a window, or a "cartomizer" if it does not.

[0045] The smoking substitute apparatus may comprise a passage for fluid flow therethrough. The passage may extend through (at least a portion of) the smoking substitute apparatus, between openings that may define an inlet and an outlet of the passage. The outlet may be at a mouthpiece of the smoking substitute apparatus. In this respect, a user may draw fluid (e.g. air) into and through the passage by inhaling at the outlet (i.e. using the mouthpiece). The passage may be at least partially defined by the tank. The tank may substantially (or fully) define the passage. In this respect, the tank may surround the passage.

[0046] The smoking substitute apparatus may com-

prise an aerosol-generator. The aerosol generator may comprise a wick. The aerosol generator may further comprise a heater. The wick may comprise a porous material. A portion of the wick may be exposed to fluid flow in the passage. The wick may also comprise one or more portions in contact with liquid stored in the reservoir. For example, opposing ends of the wick may protrude into the reservoir and a central portion (between the ends) may extend across the passage so as to be exposed to fluid flow in the passage. Thus, fluid may be drawn (e.g. by capillary action) along the wick, from the reservoir to the exposed portion of the wick.

[0047] The heater may comprise a heating element, which may be in the form of a filament wound about the wick (e.g. the filament may extend helically about the wick). The filament may be wound about the exposed portion of the wick. The heating element may be electrically connected (or connectable) to a power source. Thus, in operation, the power source may supply electricity to (i.e. apply a voltage across) the heating element so as to heat the heating element. This may cause liquid stored in the wick (i.e. drawn from the tank) to be heated so as to form a vapour and become entrained in fluid flowing through the passage. This vapour may subsequently cool to form an aerosol in the passage.

[0048] The smoking substitute apparatus (or main body engaged with the smoking substitute apparatus) may comprise a power source. The power source may be electrically connected (or connectable) to a heater of the smoking substitute apparatus (e.g. when engaged with the main body). The power source may be a battery (e.g. a rechargeable battery). A connector in the form of e.g. a USB port may be provided for recharging this battery.

[0049] When the smoking substitute apparatus is in the form of a consumable, the smoking substitute apparatus may comprise an electrical interface for interfacing with a corresponding electrical interface of the main body. One or both of the electrical interfaces may include one or more electrical contacts. Thus, when the main body is engaged with the consumable, the electrical interface may be configured to transfer electrical power from the power source to a heater of the consumable.

[0050] The electrical interface may also be used to identify the smoking substitute apparatus (in the form of a consumable) from a list of known types. For example, the consumable may have a certain concentration of nicotine and the electrical interface may be used to identify this. The electrical interface may additionally or alternatively be used to identify when a consumable is connected to the main body.

[0051] Again, where the smoking substitute apparatus is in the form of a consumable, the main body may comprise an interface, which may, for example, be in the form of an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e.g. a type) of a consumable engaged with the main body. In this respect, the consumable may include any one or

more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the interface.

[0052] The smoking substitute apparatus or main body may comprise a controller, which may include a micro-processor. The controller may be configured to control the supply of power from the power source to the heater of the smoking substitute apparatus (e.g. via the electrical contacts). A memory may be provided and may be operatively connected to the controller. The memory may include non-volatile memory. The memory may include instructions which, when implemented, cause the controller to perform certain tasks or steps of a method.

[0053] The main body or smoking substitute apparatus may comprise a wireless interface, which may be configured to communicate wirelessly with another device, for example a mobile device, e.g. via Bluetooth®. To this end, the wireless interface could include a Bluetooth® antenna. Other wireless communication interfaces, e.g. WiFi®, are also possible. The wireless interface may also be configured to communicate wirelessly with a remote server.

[0054] A puff sensor may be provided that is configured to detect a puff (i.e. inhalation from a user). The puff sensor may be operatively connected to the controller so as to be able to provide a signal to the controller that is indicative of a puff state (i.e. puffing or not puffing). The puff sensor may, for example, be in the form of a pressure sensor or an acoustic sensor. That is, the controller may control power supply to the heater of the consumable in response to a puff detection by the sensor. The control may be in the form of activation of the heater in response to a detected puff. That is, the smoking substitute apparatus may be configured to be activated when a puff is detected by the puff sensor. When the smoking substitute apparatus is in the form of a consumable, the puff sensor may form part of the consumable or the main body.

[0055] According to a third aspect of the invention, there is provided a method of delivering flavour to a user of a smoking substitute apparatus, the method comprising: inserting a flavour delivery article according to the first aspect of the invention into the user's mouth; and inhaling, by the user, an aerosol generated by a smoking substitute apparatus; wherein the flavour delivery article is configured to release flavourant upon contacting the aerosol generated by the smoking substitute apparatus. The method of the third aspect of the invention may be used with the flavour delivery article of the first aspect of the invention and/or with the smoking substitute kit of the second aspect of the invention.

[0056] The flavour delivery article may release flavourant into the user's mouth, in response to the user inhaling the aerosol from the smoking substitute apparatus. Thus, with the method of the third aspect of the invention, flavour may be delivered to the user of the smoking substitute apparatus via flavourant from the flavour delivery article.

[0057] According to a fourth aspect of the invention,

there is provided a method of making a flavour delivery article for use with a smoking substitute apparatus, the method comprising: forming the flavour delivery article; and applying a flavourant to the flavour delivery article; wherein the flavourant is arranged to be released upon contacting an aerosol generated by the smoking substitute apparatus.

[0058] Forming the flavour delivery device may include forming a body of the flavour delivery article, e.g. using moulding and/or 3D printing techniques.

[0059] Applying the flavourant to the flavour delivery article may include coating or spraying the flavourant onto the body of the flavour delivery article. In this manner, the flavourant may be deposited on an outer surface of the body of the flavour delivery article. The flavourant may, for example, be in a liquid, gel, or paste form when it is applied to the body of the flavour delivery article.

[0060] In some cases, applying the flavourant to the flavour delivery article may include injecting the flavourant into the body of the flavour delivery device. In this manner, it may be possible to provide a flavour delivery article where the flavourant is contained within the body of the flavour delivery article. For example, the body may be formed with cavities or a porous structure therein, which can receive flavourant. The flavourant may, for example, be in a liquid, gel, or paste form when it is injected into the body of the flavour delivery article.

[0061] Applying the flavourant to the flavour delivery article may include: applying a layer of flavourant to a surface of the flavour delivery article; and forming a barrier over the layer of flavourant, wherein the barrier is configured to disintegrate upon contacting the aerosol generated by the smoking substitute device.

[0062] Applying the flavourant to the flavour delivery article may include: forming a microcapsule containing the flavourant, wherein the microcapsule is configured to disintegrate upon contacting the aerosol generated by the smoking substitute device; and applying the microcapsule to a surface of the flavour delivery article.

[0063] For example, as discussed above in relation to the first aspect of the invention, the barrier and/or microcapsule may be made of a hydrogel composite containing a compound that is arranged to break down upon contacting the aerosol.

[0064] Where the flavourant is a freeze-dried flavourant, the flavourant may be freeze-dried before it is applied to the flavour delivery article.

[0065] The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

Summary of the Figures

[0066] So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with ref-

erence to the accompanying figures, in which:

Figure 1A is a front view of a smoking substitute system that may be part of a smoking substitute kit according to an embodiment of the invention, where the smoking substitute system is in an engaged position;

Figure 1B is a front view of the smoking substitute system of Figure 1A in a disengaged position;

Figure 1C is a section view of a smoking substitute apparatus of the smoking substitute system of Figure 1A;

Figure 2 is a schematic diagram of a flavour delivery article according to an embodiment of the invention;

Figure 3 is a schematic diagram of a smoking substitute kit according to an embodiment of the invention; and

Figure 4 is a schematic cross-sectional view of a flavour microcapsule that may be used in a flavour delivery article according to an embodiment of the invention.

Detailed Description of the Invention

[0067] Aspects and embodiments of the present invention will now be discussed with reference to the accompanying figures. Further aspects and embodiments will be apparent to those skilled in the art. All documents mentioned in this text are incorporated herein by reference.

[0068] Figures 1A and 1B illustrate a smoking substitute system in the form of an e-cigarette system 101. The e-cigarette system 101 may form part of a smoking substitute kit according to an embodiment of the invention. The system 101 comprises an e-cigarette device defining a main body 102 of the system 101, and an smoking substitute apparatus in the form of an e-cigarette consumable (or "pod") 103. In the illustrated embodiment the consumable 103 (smoking substitute apparatus) is removable from the main body (e-cigarette device), so as to be a replaceable component of the system 101. In other words, the e-cigarette system 101 is a closed system. The consumable 103 is illustrated in more detail in Figure 1C.

[0069] As is apparent from Figures 1A and 1B, the consumable 103 is configured to engage the main body 102. Figure 1A shows the main body 102 and the consumable 103 in an engaged state, whilst Figure 1B shows the main body 102 and the consumable 103 in a disengaged state. When engaged, a portion of the consumable 103 is received in a cavity of the main body 102 and is retained in the engaged position by way of a snap-engagement mechanism. In other embodiments, the main body 102

and consumable 103 may be engaged by screwing one into (or onto) the other, through a bayonet fitting, or by way of an interference fit.

[0070] The system 101 is configured to vaporise an aerosol-former, which in the illustrated embodiment, is in the form of a nicotine-based e-liquid 104. The e-liquid 104 comprises nicotine and a base liquid including propylene glycol and/or vegetable glycerine. In the present embodiment, the e-liquid 104 is flavourless (and does not include any added flavourant). That is, if the e-liquid 104 were to be inhaled (i.e. in aerosol form) by a user, it would not have a particularly perceptible flavour or taste.

[0071] As is more apparent from Figure 1C, this e-liquid 104 is stored within a reservoir in the form of a tank 105 that forms part of the consumable 103. In the illustrated embodiment, the consumable 103 is a "single-use" consumable 103. That is, upon exhausting the e-liquid 104 in the tank 105, the intention is that the user disposes of the entire consumable 103. In other embodiments, the e-liquid (i.e. aerosol former) may be the only part of the system that is truly "single-use". That is, the tank may be refillable with e-liquid or the e-liquid may be stored in a non-consumable component of the system. For example, the e-liquid may be stored in a tank located in the main body or stored in another component that is itself not single-use (e.g. a refillable cartomizer).

[0072] The tank 105 surrounds, and thus defines a portion of, a passage 106 that extends between an inlet 107 and an outlet 108 at opposing ends of the consumable 103. In this respect, the passage comprises an upstream end at the end of the consumable 103 that engages with the main body 102, and a downstream end at an opposing end of the consumable 103 that comprises a mouthpiece 109 of the system 101. When the consumable 103 is engaged with the main body 102, a user can inhale (i.e. take a puff) via the mouthpiece 109 so as to draw air through the passage 106, and so as to form an airflow (indicated by arrows) in a direction from the inlet 107 to the outlet 108 of the passage 106. Although not illustrated, the passage 106 may be partially defined by a tube (e.g. a metal tube) extending through the consumable 103. The passage 106 is in fluid communication with a gap defined between the consumable 103 and the main body 102 (when engaged) such that air outside of the system 101 is drawn into the passage 106 (during an inhale).

[0073] The smoking substitute system 101 is configured to vaporise the e-liquid 104 for inhalation by a user. To provide this, the consumable 103 comprises a heater having of a porous wick 110 and a resistive heating element in the form of a heating filament 111 that is helically wound around a portion of the porous wick 110. The porous wick 110 extends across the passage 106 (i.e. transverse to a longitudinal axis of the passage 106) and opposing ends of the wick 110 extend into the tank 105 (so as to be submerged in the e-liquid 104). In this way, e-liquid 104 contained in the tank 105 is conveyed from the opposing ends of the porous wick 110 to a central portion

of the porous wick 110 so as to be exposed to the airflow in the passage 106 (i.e. caused by a user inhaling).

[0074] The helical filament 111 is wound about this exposed central portion of the porous wick 110 and is electrically connected to an electrical interface in the form of electrical contacts 112 mounted at the end of the consumable that is proximate the main body 102 (when engaged). When the consumable 103 is engaged with the main body 102, the electrical contacts 112 contact corresponding electrical contacts (not shown) of the main body 102. The main body electrical contacts are electrically connected to a power source (not shown) of the main body 102, such that (in the engaged position) the filament 111 is electrically connected to the power source. In this way, power can be supplied by the main body 102 to the filament 111 in order to heat the filament 111. This heat is transferred from the filament 111 to the porous wick 110 which causes e-liquid 104 conveyed by the porous wick 110 to increase in temperature to a point at which it vaporises. The vaporised e-liquid becomes entrained in the airflow and, between the vaporisation point at the filament 111 and the outlet 108 of the passage 106, condenses to form an aerosol. This aerosol is then inhaled, via the mouthpiece 109, by a user of the system 101.

[0075] The power source of the main body 102 may be in the form of a battery (e.g. a rechargeable battery). The main body 102 may comprise a connector in the form of e.g. a USB port for recharging this battery. The main body 102 may also comprise a controller that controls the supply of power from the power source to the main body electrical contacts (and thus to the filament 111). That, is the controller may be configured to control a voltage applied across the main body electrical contacts, and thus the voltage applied across the filament 111. In this way, the filament 111 may only be heated under certain conditions (e.g. during a puff and/or only when the system is in an active state). In this respect, the main body 102 may include a puff sensor (not shown) that is configured to detect a puff (i.e. inhalation). The puff sensor may be operatively connected to the controller so as to be able to provide a signal, to the controller, which is indicative of a puff state (i.e. puffing or not puffing). The puff sensor may, for example, be in the form of a pressure sensor or an acoustic sensor.

[0076] Although not shown, the main body 102 and consumable 103 may comprise a further interface which may, for example, be in the form of an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e.g. a type) of a consumable 103 engaged with the main body 102. In this respect, the consumable 103 may include any one or more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the interface.

[0077] Figure 2 illustrates a flavour delivery article of the invention, in the form of gum shield 200. The gum shield 200 is designed for use with a smoking substitute

apparatus (e.g. system 101). As shown in Figure 2, the gum shield 200 is configured for insertion into a user's mouth 202.

[0078] In one embodiment, the gum shield 200 is coated with a layer of flavourant, which is itself covered by a barrier layer. The barrier layer is configured to disintegrate when it comes into contact with an aerosol generated by the by the smoking substitute apparatus, so that the underlying flavourant layer is exposed. As a result, the flavourant layer may come into contact with the user's mouth (e.g. tongue), to produce a flavour in the user's mouth. In this manner, flavourant may be delivered by the gum shield 200 to the user, when the user inhales an aerosol into their mouth 202. The flavourant may be freeze-dried. In this manner the flavourant may be activated by moisture in the user's mouth, e.g. the flavourant may dissolve in the user's saliva to produce a flavour.

[0079] The gum shield 200 may be made of a plastic or polymer, e.g. using a moulding or 3D printing process. The flavourant layer and barrier layer may be coated onto the gum shield 200 during manufacture.

[0080] In an alternative embodiment, the gum shield 200 may be made of a porous material (e.g. a porous plastic), and flavourant may be contained in the porous material. The flavourant may be introduced into the porous material by injecting it into the porous material during manufacture of the gum shield 200. An outer surface of the gum shield 200 may be coated with a barrier layer that is arranged to disintegrate when it comes into contact with an aerosol generated by the by the smoking substitute apparatus. In this manner, when the gum shield 200 is inserted into the user's mouth and when the user inhales an aerosol from the smoking substitute apparatus, the barrier layer may disintegrate. As a result, flavourant contained in the porous material may be released into the user's mouth to produce a flavour. For example, flavourant contained in the porous material may be dissolved by the user's saliva.

[0081] The barrier layer for the gum shield may be made of a hydrogel composite which includes a compound that is arranged to break down upon contacting an aerosol from the smoking substitute system. Such a hydrogel composite is described below, in relation to the outer membrane 206 of microcapsule 202, shown in Figure 4. The hydrogel composite described below may be used to form the barrier layer of the gum shield 200.

[0082] Figure 3 illustrates a smoking substitute kit 300 according to an embodiment of the invention. The smoking substitute kit includes the e-cigarette system 101 described above in relation to Figures 1A-1C, and the gum shield 200 described above in relation to Figure 2. The gum shield 200 in configured to release flavourant when an aerosol generated by the system 101 comes into contact with the gum shield 200. In particular, the barrier layer of the gum shield 200 may be arranged to disintegrate when the aerosol comes into contact with the barrier layer, so that flavourant is released. In this manner, the gum shield 200 may produce a flavour in the user's mouth

during use of the system 101.

[0083] Fig. 4 shows a schematic cross-sectional view of a microcapsule 402 containing a flavourant 404. The microcapsule 402 is arranged to disintegrate upon contacting an aerosol generated by a smoking substitute system (e.g. system 101), to release the flavourant 404 contained therein. A plurality of such microcapsules 402 containing flavourant may be disposed in and/or on a flavour delivery article according to the invention (e.g. gum shield 200). For example, a plurality of microcapsules 402 may be disposed on an outer surface of a flavour delivery article of the invention. In this manner, when a user puts the flavour delivery article in their mouth and inhales an aerosol from a smoking substitute apparatus, the microcapsules may disintegrate to release flavourant into the user's mouth.

[0084] The microcapsule 402 includes an outer membrane 406 which encapsulates the flavourant 404. The outer membrane 406 is made of a hydrogel composite which contains Chitosan. Chitosan is substantially stable around pH 7.5. Thus, when the microcapsule 402 is placed in a user's mouth, the Chitosan, and hence the outer membrane 406, may be stable and retain its integrity for a period of time. In this manner, the flavourant 404 contained in the microcapsule 402 is not released and so does not produce a flavour in the user's mouth.

[0085] A nicotine-containing e-liquid may produce an aerosol which has a pH around 7.8. Thus, when a user inhales such an aerosol produced with such an e-liquid (e.g. using system 101), a pH in the user's mouth may increase above pH 7.5, which may cause rapid breakdown of the Chitosan in the outer membrane 406, resulting in disintegration of the microcapsule's outer membrane 406 and release of the flavourant 404.

[0086] The flavourant 404 in the microcapsule 402 may be in solid or liquid form. Preferably, the flavourant 404 may be a freeze-dried flavourant. In other words, during manufacture the flavourant 404 may have been freeze-dried to remove moisture from the flavourant 404. This may reduce the risk of flavourant 204 escaping from the microcapsule 402 prior to use. When the flavourant 404 is released from the microcapsule 402 due to disintegration of the outer membrane 406 in the user's mouth, the flavourant 404 may be activated by moisture in the user's mouth (e.g. the flavourant 404 may dissolve in the user's saliva), to produce a flavour in the user's mouth.

[0087] The outer membrane 406 may include Chitosan having a Deacetylation (DDT) of 75% - 99%. The hydrogel composite forming the outer membrane may, for example, include 0.1% w/w up to 20% w/w of Chitosan. The hydrogel composite may further include excipients such as Xanthan Gum, water, propylene glycol and/or vegetable glycerine.

[0088] Any of the following compounds may also break down upon contacting the aerosol, and so may be included in the hydrogel composite (instead of, or in addition to, Chitosan): Hyaluronic Acid, Dextran, Poly-Acrylamide, Polyacrylic Acid, Guar Gum Succinate, Kappa-

Carrageenan, Poly(vinyl Alcohol).

[0089] The microcapsule 402 may be manufactured by first freeze-drying a flavourant to remove any moisture from the flavourant and produce a flavourant cake. The flavourant cake may be moulded into a desired shape (e.g. a ball) using a mould. Chitosan, together with excipients forming the hydrogel may be then be mixed together to produce the hydrogel composite. The hydrogel composite may be layered in a mould, into which the flavourant cake is inserted. The hydrogel composite may then be rolled to form an outer membrane around the flavourant cake.

[0090] The features disclosed in the foregoing description, or in the following claims, or in the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for obtaining the disclosed results, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

[0091] While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the spirit and scope of the invention.

[0092] For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of these theoretical explanations.

[0093] Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

[0094] Throughout this specification, including the claims which follow, unless the context requires otherwise, the words "have", "comprise", and "include", and variations such as "having", "comprises", "comprising", and "including" will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0095] It must be noted that, as used in the specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by the use of the antecedent "about," it will be understood that the particular value forms another embodiment. The term "about" in relation to a numerical value is optional and means, for example, +/- 10%.

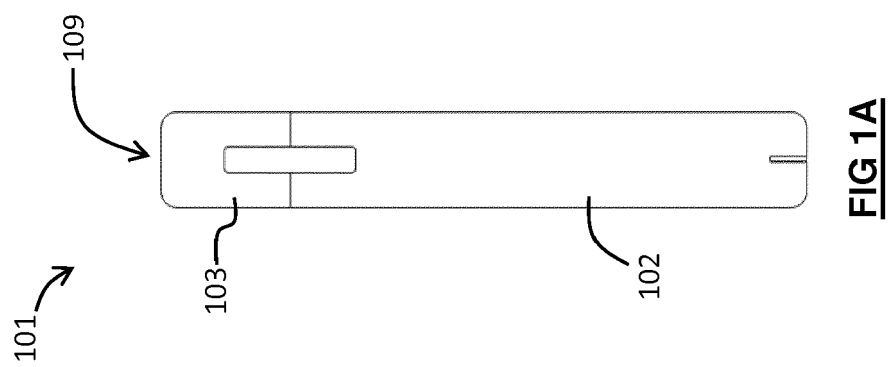
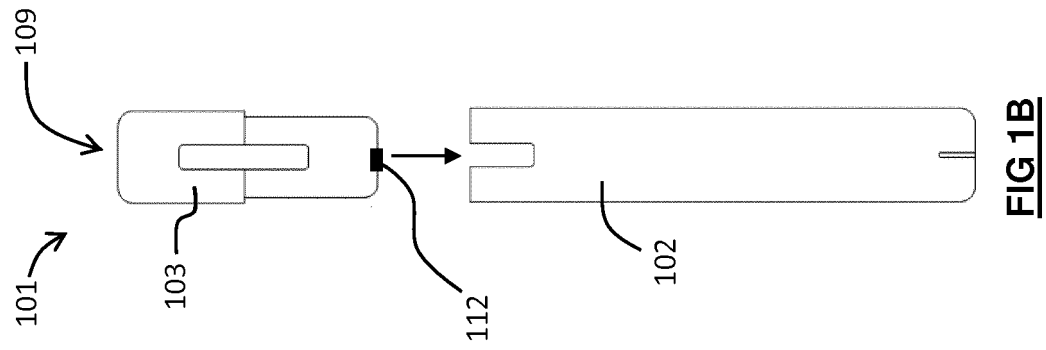
[0096] The words "preferred" and "preferably" are used herein refer to embodiments of the invention that may provide certain benefits under some circumstances. It is to be appreciated, however, that other embodiments may also be preferred under the same or different circumstances. The recitation of one or more preferred embodiments therefore does not mean or imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the disclosure, or from the scope of the claims.

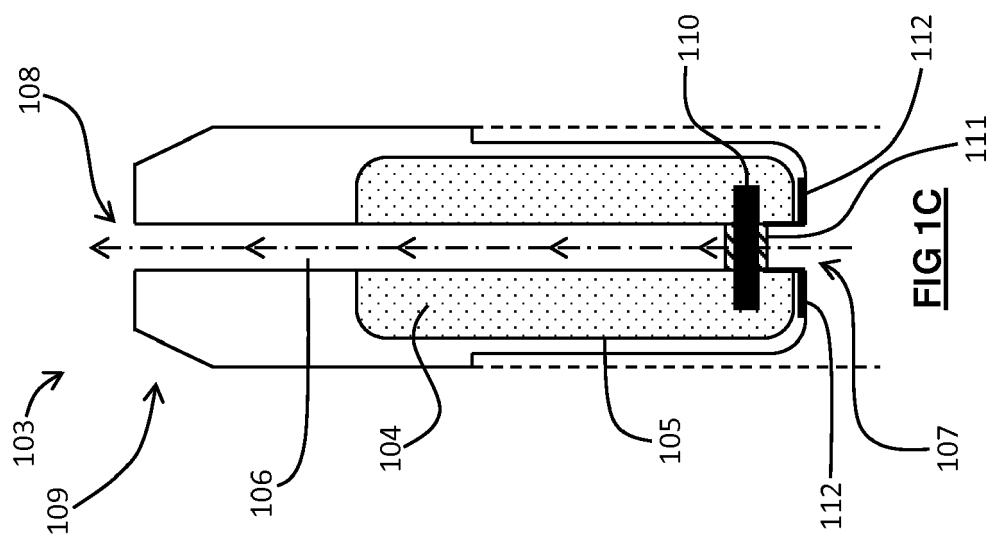
Claims

1. A flavour delivery article for use with a smoking substitute apparatus, the flavour delivery article being insertable into a user's mouth and comprising a flavourant, wherein the flavour delivery article is configured to release flavourant upon contacting an aerosol generated by the smoking substitute apparatus. 5
2. A flavour delivery article according to claim 1, further including a barrier arranged to cover the flavourant, the barrier being configured to disintegrate upon contacting the aerosol generated by the smoking substitute device to release the flavourant. 10
3. A flavour delivery article according to claim 2, wherein the flavourant is provided as a first layer on a surface of the flavour delivery article, and the barrier is provided as a second layer covering the first layer. 15
4. A flavour delivery article according to claim 2, wherein the barrier is in the form of a microcapsule containing flavourant. 20
5. A flavour delivery article according to one of claims 2 to 4, wherein the barrier includes a hydrogel composite containing a compound which is arranged to break down upon contacting the aerosol generated by the smoking substitute device. 25
6. A flavour delivery article according to claim 5, wherein the compound is Chitosan. 30
7. A flavour delivery article according to any preceding claim, wherein the flavourant is a freeze-dried flavourant. 35
8. A flavour delivery article according to any preceding claim, wherein the flavour delivery article is a gum shield. 40
9. A smoking substitute kit comprising: 45
 - a flavour delivery article according to any preceding claim; and
 - a smoking substitute apparatus for generating

an aerosol;
wherein the flavour delivery article is configured to release the flavourant upon contacting aerosol generated by the smoking substitute apparatus.

10. A method of delivering flavour to a user of a smoking substitute apparatus, the method comprising: 5
 - inserting a flavour delivery article according to one of claims 1 to 8 into the user's mouth; and
 - inhaling, by the user, an aerosol generated by a smoking substitute apparatus; 10
 - wherein the flavour delivery article is configured to release flavourant upon contacting the aerosol generated by the smoking substitute apparatus.
11. A method of making a flavour delivery article for use with a smoking substitute apparatus, the method comprising: 15
 - forming the flavour delivery article; and
 - applying a flavourant to the flavour delivery article; wherein the flavourant is arranged to be released upon contacting an aerosol generated by the smoking substitute apparatus. 20
12. A method according to claim 11, wherein applying the flavourant to the flavour delivery article includes: 25
 - applying a layer of flavourant to a surface of the flavour delivery article; and
 - forming a barrier over the layer of flavourant, wherein the barrier is configured to disintegrate upon contacting the aerosol generated by the smoking substitute device. 30
13. A method according to claim 11, wherein applying the flavourant to the flavour delivery article includes: 35
 - forming a microcapsule containing the flavourant, wherein the microcapsule is configured to disintegrate upon contacting the aerosol generated by the smoking substitute device; and
 - applying the microcapsule to a surface of the flavour delivery article. 40





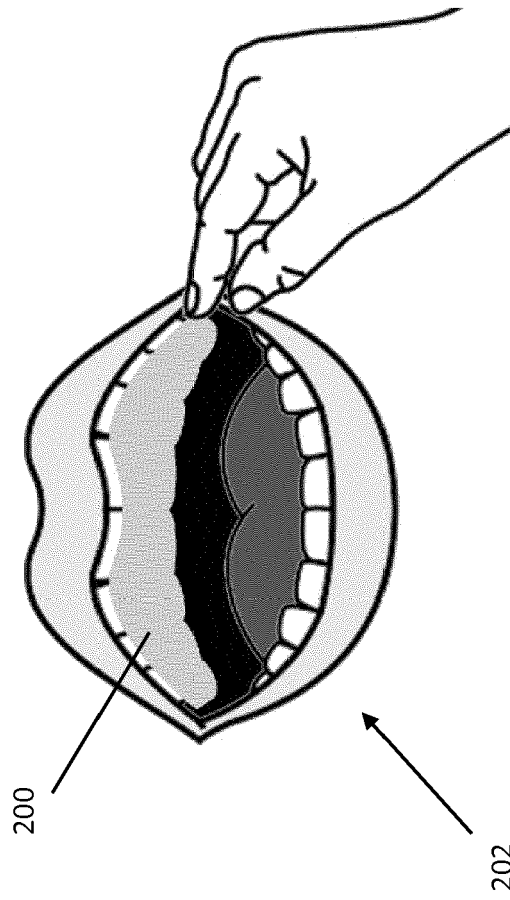


FIG 2

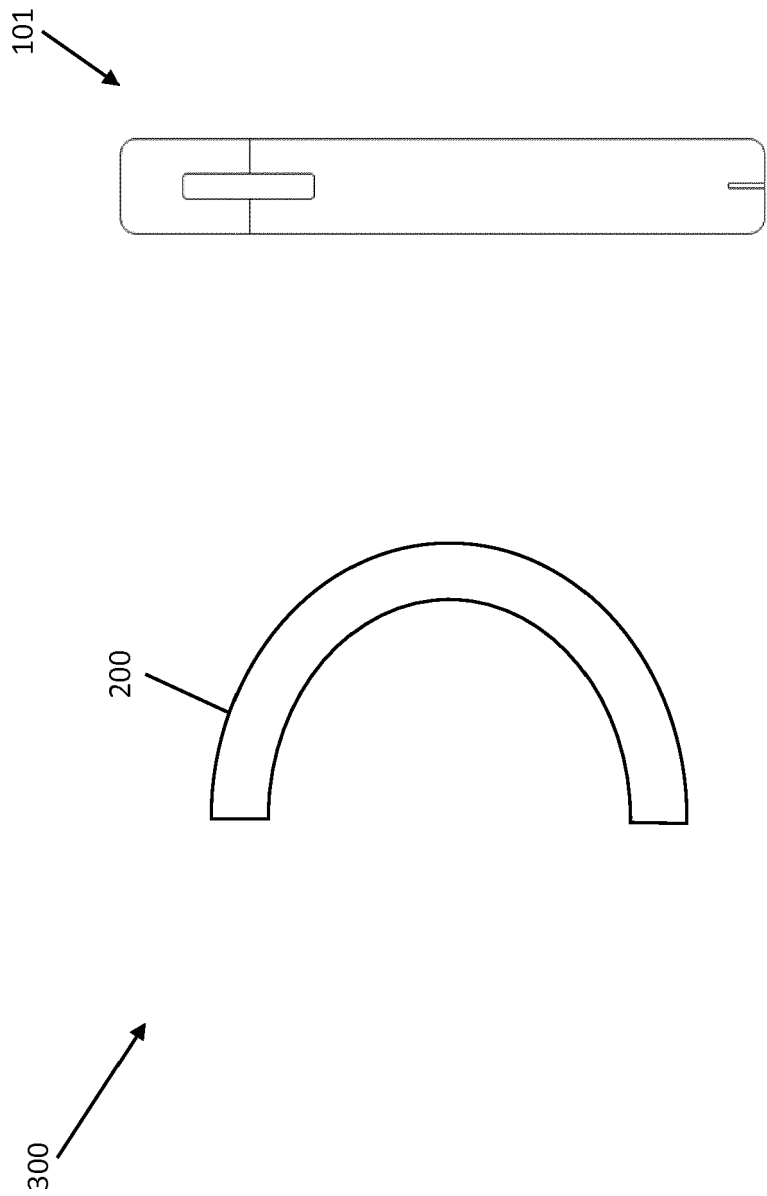


FIG 3

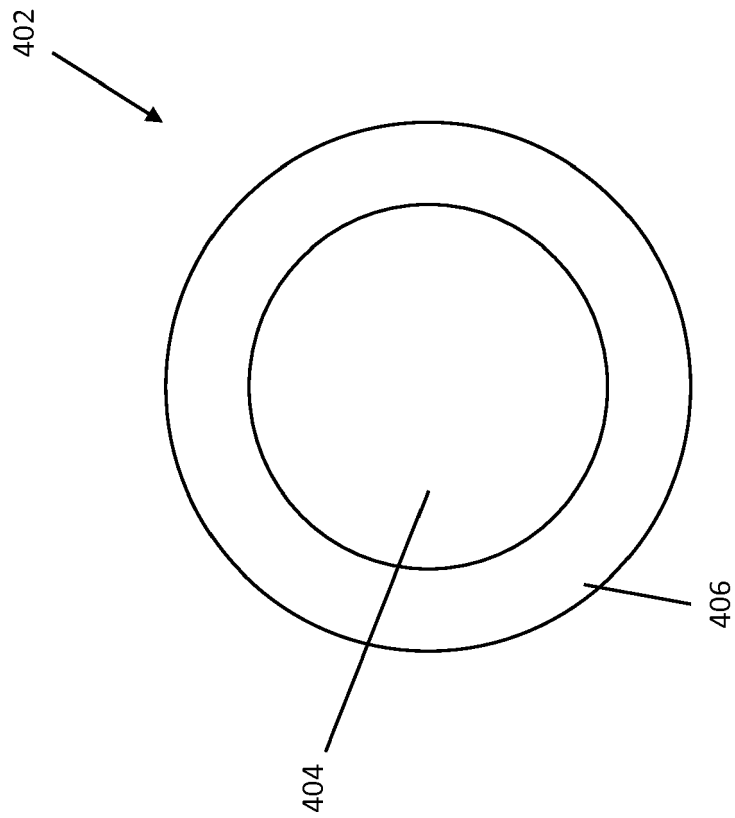


FIG 4



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Place of search The Hague		Date of completion of the search 30 July 2019	Examiner Leprêtre, François
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