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(54) **CONTAINER FOR SMOKELESS ARTICLE**

(57) The present disclosure relates to a container (20) for an oral nicotine delivery product (10). The container comprises a first sensor (30) configured to measure a first parameter, and a control device configured to determine a quantity of oral nicotine delivery product in the container based on the first parameter. The container also comprises a feedback element (34) configured to provide feedback directly to a user based on the determined quantity of oral nicotine delivery product in the container.

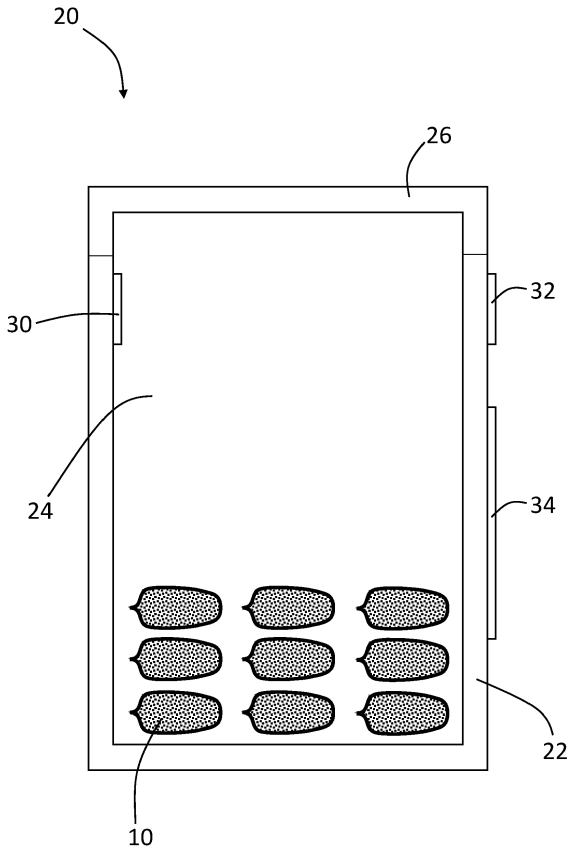

FIG 2

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Description

Field of the Disclosure

[0001] The present disclosure relates to a container for a smokeless article. In particular, the disclosure relates to a container for an oral nicotine delivery product.

Background

[0002] Smoking is generally considered to expose a smoker to potentially harmful substances. It is generally thought that the majority of the potentially harmful substances are formed by the heat generated during burning (combustion) of the article. There is interest in so-called heat not burn products, which heat a tobacco or similar substrate at a lower temperature than a conventional cigarette. These products are usually described as less harmful than conventional cigarettes. Both conventional cigarettes and heat not burn products are visible during use and produce smoke or vapour.

[0003] As a result of these considerations and because of consumer preferences, it is desirable to find and improve alternative substance delivery routes that continue to meet user expectations. Smokeless articles are a suitable alternative because they do not require heating for substance delivery to the user. Instead, smokeless articles rely on saliva to extract one or more soluble elements, typically nicotine and/or flavours, from tobacco contained within the smokeless article.

[0004] Conventional smokeless articles have a saliva permeable pouch housing a content. The content is generally in the form of tobacco, said tobacco containing a soluble element, typically nicotine. Such a product may be referred to as portion snus. It is typically provided as prepackaged (traditionally moist) powder in small teabag-like pouches. Each pouch is a single portion or unit. This moistened product may be referred to as original snus.

[0005] Smokeless articles are placed in the mouth where saliva extracts the soluble element from the tobacco contained within. Typically, the smokeless article is placed in the oral cavity, sublingually or in the oral vestibule (between the teeth and lips/cheeks). The user may assist extraction by oral manipulation, such as by chewing and/or sucking or pressing on the outside of the mouth to squeeze the pouch.

[0006] The resulting saliva, which contains extracts including the soluble element, subsequently contacts a mucous membrane in the mouth, or at another point of the gastrointestinal tract, to deliver the soluble element across the membrane and into the bloodstream. The soluble element is then transported by the bloodstream to the site of action. For example, nicotine is delivered to the brain where it acts upon acetylcholine receptors.

[0007] The above described extraction and delivery process continues until the soluble element is depleted from the smokeless article. The smokeless article must then be removed from the mouth and disposed of.

[0008] An example smokeless tobacco contained in the smokeless article is snuff. Snuff is made from ground or pulverised tobacco leaves, and is available in dry form or wet (moist) form. Moist snuff may be referred to as snus. Two common varieties of snus are Scandinavian snus and American snus. Both varieties of snus are available in a loose form, but are often contained within a saliva permeable pouch, as described above.

[0009] Typically, production of snus is achieved by grinding a blend of leaf tobaccos to specified particle sizes. The ground tobacco is then mixed with water and sodium chloride in closed process blenders. The mixture is subjected to a heat treatment, involving temperatures up to 80 - 100 °C, for several hours to pasteurize the snus. Thereafter, the snus is cooled and other ingredients may be added. Snus is typically manufactured to meet the GothiaTek® standard, as detailed in "Swedish snus and the GothiaTek® standard" (2005), Rutqvist, et al.

[0010] The World Health Organisation states that smokeless articles are considerably less hazardous than cigarettes. Action on Smoking and Health considers smokeless articles to be about one hundred times less harmful than cigarettes. Smokeless articles are therefore thought to provide a healthier alternative for smokers.

[0011] There is a need for an improved design of containers for smokeless articles to enhance the user experience and improve the quality of the smokeless article.

[0012] The present disclosure has been devised in the light of the above considerations.

Summary of the Disclosure

[0013] At its most general, the present disclosure relates to a container for a smokeless article, and specifically a container for an oral nicotine delivery product (e.g. snus articles).

[0014] According to a first aspect, there is provided a container for an oral nicotine delivery product comprising:

a first sensor configured to measure a first parameter;

a control device configured to determine a quantity of oral nicotine delivery product in the container based on the first parameter; and

a feedback element configured to provide feedback directly to a user based on the determined quantity of oral nicotine delivery product in the container.

[0015] In this way, the remaining quantity of oral nicotine delivery product remaining in the container, which can affect a user's experience of the product, can be monitored. Furthermore, the feedback element can provide feedback to the user which can indicate the user's own demand, and therefore inform the user of their oral nicotine delivery product use habits.

[0016] Optional features will now be set out. These are applicable singly or in any combination with any aspect.

[0017] The oral nicotine delivery product may be a plurality of smokeless articles, such as snus articles, for example.

[0018] The feedback element may be configured to provide feedback to a user indicating the quantity of oral nicotine delivery product remaining in the container.

[0019] The feedback element may be configured to provide a first feedback indication to the user when the determined quantity of oral nicotine delivery product in the container is below a predetermined threshold. For example, the first feedback indication may indicate to the user that the container is (nearly) empty.

[0020] The container may be a refillable container. Thus, the container is more sustainable than single-use containers, as it is not disposed of after the oral nicotine delivery product has been used.

[0021] In these embodiments, when the feedback element provides the first feedback indication indicating that the container is (nearly) empty, the user can be informed that they need to refill the container with oral nicotine delivery product in order to continue use. This can improve user convenience.

[0022] The container may comprise a second sensor configured to measure a second parameter indicative of an environmental condition. Thus, an environmental condition, which can also affect a user's experience of the product, can be monitored.

[0023] The feedback element may be configured to provide feedback to the user based on the measurement of the second parameter. In this way, additional feedback can be provided to the user which indicates an environmental condition of and/or an environmental condition surrounding the container.

[0024] The environmental condition may be a temperature, such as an environmental temperature of the ambient air surrounding (e.g. outside) the container, and/or a temperature inside the container. Alternatively/additionally, the environmental condition may be a humidity, such as an environmental humidity of the ambient air surrounding (e.g. outside) the container, and/or a humidity inside the container.

[0025] The second sensor may comprise a temperature sensor, such as a thermometer. Alternatively/additionally, the second sensor may comprise a humidity sensor, such as a hygrometer.

[0026] The feedback element may be configured to provide a second feedback indication to the user when the second parameter does not meet a predetermined criteria. The predetermined criteria may be a predetermined range of the second parameter which indicates an acceptable range of the second parameter for using the oral nicotine delivery product. For example, the predetermined criterion may be a temperature and/or humidity range at which the oral nicotine delivery product performs with an acceptable quality. Outside of this range, the oral nicotine delivery product may perform with an unacceptable, or diminished, quality. Thus, where the measured temperature/humidity is outside of this range, the second feedback indication may advise the user that the oral nicotine delivery product will have diminished performance in the present environmental condition, or may advise the user not to use the oral nicotine delivery product at all.

[0027] The control device may be configured to control the feedback element to provide the feedback based on the measurements of the first and second sensors.

[0028] The container may comprise a memory device operatively connected to the control device. The memory device may include volatile and/or non-volatile memory. The memory device may include instructions which, when implemented, cause the control device to perform certain tasks or steps of a method. The memory device may be configured to store the measurements of the first and second parameters measured by the first and second sensors respectively.

[0029] The first parameter may be a detection of opening and/or closing of the container (e.g. a transfer between the container being closed to open, and/or open to closed). Thus, the first sensor may be configured to detect opening and/or closing of the container. The control device may then be configured to determine the number of times that the container is opened (e.g. by a counter), and then determine the quantity of oral nicotine delivery product in the container based on the number of times that the container is opened.

[0030] For example, the control device may be configured to determine the number of snus articles remaining in the container based on the number of snus articles originally in the container, and the determination of the number of times that the container is opened.

[0031] The feedback may be visual feedback (and the first and second feedback indications may be visual feedback indications). In these embodiments, the feedback element may comprise a display device, such as an electronic visual display, e.g. an LCD display, or an LED display. Alternatively, the feedback element may comprise one or more LEDs.

[0032] Additionally/alternatively, the feedback may be audio feedback. In these embodiments, the feedback device may comprise a speaker.

[0033] The first feedback indication may differ from the second feedback indication. Thus, the user is able to differentiate between a situation in which the environmental conditions are sub-optimal for using the oral nicotine delivery product, and a situation in which the container is (nearly) empty.

[0034] It is to be understood that the feedback element of the container provides the feedback directly to the user e.g. by displaying text on a display device on the container.

[0035] The container may comprise a container housing configured to contain the oral nicotine delivery product. The first and/or second sensor may be positioned inside (e.g. on an internal surface of) the container housing (e.g. to measure the temperature inside the container). Alternatively the first and/or second sensor may be

positioned on an external surface of the container housing (e.g. to measure the environmental temperature external to and therefore outside of the container).

[0036] The feedback element may be positioned on an external surface of the container housing.

[0037] In some embodiments, the container may further comprise a communications interface, and the container may be configured to communicate with an external computing device, such as a mobile device, via the communications interface. Specifically, the container may be configured to communicate with an application installed on a mobile device via the communications interface. The communications interface may be a wireless interface. Communication may be, for example, over a short-range wireless network such as Bluetooth ™ or Bluetooth Low Energy (BLE). Other wireless communication networks may be used such as cellular network (e.g. 3G, 4G or 5G) or a WiFi network.

[0038] In some embodiments, the control device may be configured to instruct the external computing device, via the communications interface, to provide feedback to the user based on the determined quantity of oral nicotine delivery product, and/or the measurement of the second parameter. In this way, the user may also be notified via the external computing device that the container is (nearly) empty, and/or that the environmental conditions are sub-optimal for using the oral nicotine delivery product. For example, the control device of the container may instruct an application installed on a mobile device to notify the user via the application that the container is (nearly) empty when the quantity of oral nicotine delivery product in the container, as determined by the control device, is less than the predetermined threshold.

[0039] According to a second aspect, there is provided a system for managing a container for an oral nicotine delivery product, the system comprising:

the container of the first aspect; and
an external computing device,
wherein, upon receipt of the instructions to provide feedback to the user from the container, the external computing device is configured to provide feedback to the user based on the determined quantity of nicotine delivery product and/or the measurement of the second parameter.

[0040] The external computing device may comprise, for example, a mobile phone, a smart phone, a tablet or a laptop.

[0041] According to a third aspect, there is provided a system, the system comprising:

the container of the first aspect; and
a plurality of smokeless articles contained in the container.

[0042] The smokeless articles may comprise oral nicotine delivery product, such as snus articles, for example.

[0043] Each smokeless article may comprise one or more substances. At least one of the substances includes nicotine. The or each substance may be completely enclosed by a pouch. The pouch may be sealed to ensure that the one or more substances of the pouch do not scatter inside the mouth.

[0044] The smokeless article preferably may have a mass of about 0.1 g to 5.0 g, such as about 0.5 g to about 4.0 g or about 1.0 g to about 3.0 g. The smokeless article may have a length of about 30 mm, such as about 28 mm or 26 mm, a width of about 12 mm, such as about 10 mm or 8 mm, and a depth of about 5 mm, such as about 4 mm or 3 mm.

[0045] The smokeless article may have an active lifetime of about 20 minutes to about 60 minutes, such as about 25 minutes to 50 minutes or about 30 minutes to about 45 minutes, after being placed in the mouth. As used herein, the term "active lifetime" is intended to refer to the amount of time after being placed in the mouth that the smokeless article provides the user with a perceptible taste and/or physiological experience. For example, for an article containing an active ingredient such as nicotine or other pharmacologically active ingredient the active lifetime may be defined as the in use period of time in which 90%wt of the available pharmacologically active is released. In other words, the active lifetime may be the duration of time from insertion into the oral cavity for 90%wt of the total amount of nicotine pharmacologically active ingredient that is capable of being released during normal use to dissolve into the user's saliva and /or enter the user's bloodstream. It will therefore be appreciated that the active lifetime of a product may vary from user to user and for a user based on oral conditions, in particular extent of salivation. Nonetheless, the skilled person is able to mimic oral conditions to determine the active lifetime in one instance, which can be used as a comparison or analysis point.

[0046] The pouch may be formed from one or more materials. The pouch material may be formed from fiber, paper, cloth and fabric. The pouch material may be formed from one or more polymeric materials. The polymeric material may be selected from one or more of hydroxypropyl cellulose (HPC), hydroxypropyl methylcellulose (HPMC), polyvinyl alcohol (PVOH), polyvinylpyrrolidone (PVP), polyethylene oxide (PEO) hydroxyethyl cellulose (HEC), polyethylene glycol (PEG), pullulan, sodium alginate, xanthan gum, tragancanth gum, guar gum, acacia gum, arabic gum, polyacrylic acid, maltodextrin, methylmethacrylate copolymer, carboxyvinyl copolymers, starch and gelatin.

[0047] The pouch may be completely insoluble in saliva, or may be soluble in saliva. As used herein, the term "saliva" is intended to refer to the liquid substance formed in the mouth of animals, such as humans, that includes water, electrolytes and enzymes. Other components of saliva may include mucus, white blood cells, epithelial cells and/or antimicrobial agents. As used herein, the term "saliva-soluble" is intended to refer to compounds,

ingredients, or any other substances which can dissolve in saliva present in the oral cavity of the user at physiological temperature. Such substances may include, for example, nicotine and/or flavours. In some cases a standard commercially available artificial saliva may be used to test saliva solubility. Alternatively, "saliva-soluble" may equate to "water-soluble" and refer to compounds, ingredients, or any other substances which can dissolve in water present in the oral cavity of the user at physiological temperature.

[0048] Suitable insoluble pouch materials include, but are not limited to, fiber, paper, water-insoluble polymers, cloth and fabric. Suitable soluble pouch materials include, but are not limited to, water-soluble polymers such as polyethylene oxide (PEO), hydroxypropyl cellulose (HPC) and hydroxypropyl methylcellulose (HPMC).

[0049] The pouch may be formed by, for example, folding a single sheet on itself or bringing two or more sheets together and sealing the edges. The edges may initially be partially sealed to provide an open pouch in which the one or more substances may be placed before completely sealing the pouch closed. The sheets may be the same thickness or different thicknesses.

[0050] The pouch may be porous. Preferably, at least 50% of the pores have a diameter of 50 μm to 200 μm, such as 100 μm to 175 μm or 125 μm or 150 μm. at least 50% of the pores have a diameter of at least 100 μm. For example, at least 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95% or 100% of the pores have such diameters.

[0051] The pouch may be coloured or include markings, such as brand logos and text, to improve user perception. The pouch may be partially or completely coloured by a colourant.

[0052] The or each substance may individually be a biologically/pharmacologically active compound, pH stabilisers or adjusters, humectants, flavourants, fillers, preservatives, aqueous/non-aqueous solvents and binders. The or each substance may be provided for more than one purpose.

[0053] The one or more substances preferably occupies substantially all of the internal volume of the pouch. The one or more substances may occupy 80%, 85%, 90%, 95% or 100% of the internal volume of the pouch. The one or more substances may comprise a solid material to provide physical integrity, such as an organic material (e.g. plant material) or an inorganic material. Such solid materials may naturally or inherently contain one or more biologically/pharmacologically active compounds and/or additives.

[0054] In addition to nicotine, each smokeless article may include biologically/pharmacologically active compounds include the group consisting of: cocaine, caffeine, opiates and opioids, cathine and cathinone, kavalactones, mysticin, beta-carboline alkaloids, salvinorin A together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing. Biologically/pharmacologically active compounds may also have additive properties.

[0055] The form of nicotine in each smokeless article may be selected from the group consisting of nicotine salts, nicotine base, stabilized nicotine and mixtures thereof. For example, the smokeless article may include at least one nicotine salt selected from the group consisting of nicotine hydrochloride, nicotine dihydrochloride, nicotine monotartrate, nicotine bitartrate, nicotine bitartrate dihydrate, nicotine sulfate, nicotine zinc chloride monohydrate, nicotine salicylate and mixtures thereof. pH stabilisers or adjusters may be provided to adjust the user experience and/or modify the bioavailability of a pharmacologically active compound. For instance, under acidic conditions, nicotine is protonated and does not readily cross mucous membranes. Examples of suitable pH stabilisers include ammonia, ammonium carbonate, sodium carbonate and calcium carbonate. The overall pH of the smokeless article is preferably pH 7 to pH 9, such as pH 7.25 to pH 8.75 or pH 7.5 to pH 8.5.

[0056] The overall pH of a smokeless article may be determined by, for example, (i) placing the smokeless article in 10 mL of distilled water (ii) agitating the mixture for at least 5 minutes and (iii) measuring the pH of the solution with a pH probe.

[0057] Fillers may be provided to increase the volume of the smokeless article (e.g. by increasing the volume contained within the pouch and to strengthen the contents of the pouch). Suitable fillers include calcium carbonate, calcium phosphate, corn starch, grains, lactose, polysaccharides (e.g. maltodextrin), polyols, sugars (e.g. dextrose, manitol, xylitol, sorbitol), natural fibres (e.g. non-tobacco fibres), microcrystalline cellulose, cellulose and cellulose derivatives (e.g. finely divided cellulose), lignocellulose fibres (e.g. wood fibres), jute fibres and combinations thereof. In some cases, the filler content is 5 to 10 wt% of the smokeless article e.g. around 6 to 9 wt%.

[0058] Flavourants may be provided in the smokeless article in solid or liquid form. Suitable flavourants include coffee, eucalyptus, menthol, liquorice, peppermint, spearmint, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and tobacco flavour. The flavourant may be evenly dispersed throughout the smokeless article or may be provided in isolated locations and/or varying concentrations throughout the smokeless article. As used herein, the term "flavourant" denotes a compound having a desirable taste, aroma or both.

[0059] Humectants may be provided in the smokeless article to control moisture content thereby preventing the smokeless article from drying out during storage and reducing the amount of saliva wetting required before the user experience begins. Suitable humectants include polyhydric alcohols (e.g. propylene glycol (PG), triethylene glycol, 1,2-butane diol and vegetable glycerine (VG)) and their esters (e.g. glycerol mono-, di-or tri-acetate).

[0060] The humectant may have a lower limit of at least 1 % by weight of smokeless article such as at least 2

wt%, such as at least 5 wt%, such as at least 10 wt%, such as at least 20 wt%, such as at least 30 wt%, or such as least 40 wt%.

[0061] The humectant may have an upper limit of at most 50% by weight of the smokeless article such as at most 40 wt%, such as at most 30 wt%, or such as at most 20 wt%, such as at most 10 wt %, such as at most 5 wt %, such as at most 2 wt%.

[0062] Preferably, the amount of humectant is 1 to 40 wt% of the smokeless article such as 2 to 20 wt% or 5 to 10 wt%.

[0063] Preferably, the smokeless article has an overall amount of water of between 5 and 50 wt% based on the weight of the smokeless article such as between 10 to 20 wt% or 40 to 50 wt%.

[0064] Smokeless articles having a total moisture content of 10% or less are generally considered to be 'dry'. Smokeless articles having a total moisture content of 40% or more are generally considered to be 'wet'.

[0065] Sweeteners may be provided in the smokeless article to modify the user taste perception and, in particular, overcome bitter flavours that result from other substances. Suitable sweeteners include honey, sugar, brown sugar, glucose, fructose, sucrose, aspartame, xylitol, maltitol, saccharin sodium, glycyrrhizin tripotassium liquorice, jujube or a mixture thereof. The amount of sweetener is in some cases 1 to 20 % by weight of smokeless article, such as 2 to 15 wt% or 5 to 10 wt%.

[0066] Stabilisers may be provided in the smokeless article to prevent decomposition or degradation over time during storage by, for example, retarding oxidation or unwanted biological activity. Stabilisers may be selected from the group consisting of antioxidants including vitamin E, such as tocopherole, ascorbic acid, sodium pyrosulfite, butylhydroxytoluene, butylated hydroxyanisole, edetic acid and salts thereof; and preservatives including citric acid, tartaric acid, lactic acid, malic acid, acetic acid, benzoic acid, sorbic acid and salts thereof.

[0067] The smokeless article may comprise binders. Suitable binders include starches and/or cellulosic binders such as methyl cellulose, ethyl cellulose, hydroxypropyl cellulose, hydroxyethyl cellulose and carboxymethyl cellulose, gums such as xanthan, guar, arabic and/or locust bean gum, organic acids and their salts such as alginic acid (sodium alginate), agar and pectins. The binder content may be 5 to 10 wt% of the smokeless article e.g. around 6 to 9 wt% or 7 to 8 wt%.

[0068] Colourants may be provided in the smokeless article to modify the user impression of the smokeless article. Colourants include whitening agents. Colourants may be selected from one or more of common colourants such as curcumin (E100), turmeric (E100(ii)), riboflavin (E101), riboflavin-5'-phosphate (E101(ii)), tartrazine (E102), quinoline yellow (E104), riboflavin-5-sodium phosphate (E106), yellow 2G (E107), sunset yellow FCF (E110), carmine, cochineal (E120), azorubine (E122), amaranth (E123), ponceau 4R (E124), erythrosine (E127), red 2G (E128), allura red AC (E129), patent blue V (E131), indigotine (E132), brilliant blue FCF (E133), chlorophylls (E140), copper complexes of chlorophyll (E141), green S (E142), caramel (E150a-d), brilliant black BN (E151), carbon (E153), brown FK (E154), brown HT (E155), alfa-, beta- and gamma- carotene (E160a), annatto, bixin, norbixin (E160b), bell pepper (Paprika) extract (E160c), lycopene (E160d), beta-apo-8'-carotenal (E160e), ethyl ester of beta-apo-8'-carotenic acid (E160f), flavoxanthin (E161a), lutein (E161b), cryptoxanthin (E161c), rubixanthin (E161d), violaxanthin (E161e), rhodoxanthin (E161f), canthaxanthin (E161g), citranaxanthin (E161h), beetroot extract (E162), anthocyanins (E163), calcium carbonate (E170), titanium dioxide (E171), iron oxides (E172), aluminium (E173), silver (E174), gold (E175), lithol rubine BK (E180), tannins (E181). The amount of colourant may be up to about 3% by weight of the smokeless article, such as about 0.5% to about 2.5% or about 1% to about 2%.

[0069] The one or more substance may comprise plant material, which may be provided for physical integrity and may function as a natural source of substances such as, for example, biologically/pharmacologically active compounds, flavourants, pH stabilisers etc. The plant material may comprise least one plant material selected from the list including *Amaranthus dubius, Arctostaphylos uva-ursi* (Bearberry), *Argemone mexicana*, *Amica*, *Artemisia vulgaris*, Yellow Tees, *Galea zacatechichi*, *Canavalia maritima* (Baybean), *Cecropia mexicana* (Guamura), *Cestrum noctumum, Cynoglossum virginianum* (wild comfrey), *Cytisus scoparius*, *Damiana*, *Entada rheedii*, *Eschscholzia califomica* (California Poppy), *Fittonia albivenis*, *Hippobroma longiflora*, *Humulus japonica* (Japanese Hops), *Humulus lupulus* (Hops), *Lactuca virosa* (Lettuce Opium), *Laggera alata*, *Leonotis leonurus*, *Leonurus cardiaca* (Motherwort), *Leonurus sibiricus* (Honeyweed), *Lobelia cardinalis*, *Lobelia inflata* (Indiantobacco), *Lobelia siphilitica*, *Nepeta cataria* (Catnip), *Nicotiana species* (Tobacco), *Nymphaea alba* (White Lily), *Nymphaea caerulea* (Blue Lily), Opium poppy, *Passiflora incamata* (Passionflower), *Pedicularis densiflora* (Indian Warrior), *Pedicularis groenlandica* (Elephant's Head), *Salvia divinorum*, *Salvia dorrii* (Tobacco Sage), Salvia species (Sage), *Scutellaria galericulata*, *Scutellaria lateriflora*, *Scutellaria nana*, *Scutellaria* species (Skullcap), *Sida acuta* (Wireweed), *Sida rhombifolia*, *Silene capensis*, *Syzygium aromaticum* (Clove), *Tagetes lucida* (Mexican Tarragon), *Tarchonanthus camphoratus*, *Tumera diffusa* (Damiana), *Verbascum* (Mullein), *Zamia latifolia* (Maconha Brava) together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing.

[0070] In some embodiments, the plant material may be tobacco. Any type of tobacco may be used. This includes, but is not limited to, flue-cured tobacco, burley tobacco, Maryland Tobacco, dark-air cured tobacco, oriental tobacco, dark-fired tobacco, perique tobacco and rustica tobacco. This also includes blends of the above mentioned tobaccos.

[0071] Any suitable parts of the tobacco plant may be used. This includes leaves, stems, roots, bark, seeds and flowers.

[0072] The tobacco may comprise one or more of leaf tobacco, stem tobacco, tobacco powder, tobacco dust, tobacco derivatives, expanded tobacco, homogenised tobacco, shredded tobacco, extruded tobacco, cut rag tobacco and/or reconstituted tobacco (e.g. slurry recon or paper recon).

[0073] The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided. For example, the system for managing a container for an oral nicotine delivery product of the second aspect may further comprise a plurality of smokeless articles (e.g. a plurality of snus articles) contained in the container.

[0074] The skilled person will appreciate that except where mutually exclusive, a feature or parameter described in relation to any one of the above aspects may be applied to any other aspect. Furthermore, except where mutually exclusive, any feature or parameter described herein may be applied to any aspect and/or combined with any other feature or parameter described herein.

Summary of the Figures

[0075] 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 reference to the accompanying figures, in which:

Figure 1 shows an example smokeless article that may be contained in a container;

Figure 2 shows a cross-sectional view of a container containing a plurality of the smokeless articles as shown in Figure 1;

Figure 3 shows a schematic view of a container for an oral nicotine delivery product; and

Figure 4 shows a schematic view of a system for managing a container for an oral nicotine delivery product.

Detailed Description of the Figures

[0076] Figure 1 shows an oral nicotine delivery product, and specifically a smokeless article 10 having a pouch 12 containing contents (i.e. one or more substances containing nicotine) 14. The pouch 12 is substantially rectangular, is formed from a single sheet of material and is substantially filled by the contents 14. The pouch 12 has a seal 16 along each of the three edges where the inner face of the single sheet meets itself to seal the contents 14 in the pouch 12.

[0077] Figure 2 shows a cross-sectional view of a container 20 for an oral nicotine delivery product. The container 20 comprises a container housing 22 defining a cavity 24. A plurality of smokeless articles 10 (e.g. snus articles) are contained by the container housing 22 in the cavity 24. The container 20 is refillable and comprises a lid 26 so that the smokeless articles 10 can be removed from the container 20 for use, and so that the container 20 can be refilled once all of the smokeless articles 10 have been used.

[0078] The container 20 comprises a first sensor 30 and a second sensor 32. The first sensor 30 is configured to detect the lid 26 opening, and thus implicitly the removal and use of a smokeless article 10. The second sensor 32 is a temperature sensor configured to measure the environmental temperature of the ambient air surrounding the container.

[0079] The container 20 also comprises a display device 34 configured to display visual feedback to the user, based on the measurements of the first and second sensors 30, 32. Specifically, the display device 34 may be configured to display the environmental temperature measured by the second sensor 32. Furthermore, if the environmental temperature falls outside of a predetermined temperature range, the display device 34 may be configured to display a warning to the user that the smokeless articles 10 within the container 20 may be impaired due to extreme temperature. The predetermined temperature range is the temperature range over which the smokeless articles 10 may perform at an acceptable quality, and may be between 0°C and 40°C, or 10°C and 25°C, for example. Thus, when the environmental temperature exceeds 25°C, or falls below 10°C, the user is warned that the experience of using a smokeless article 10 may be impaired.

[0080] In alternative embodiments, the second sensor 32 may measure environmental humidity instead of, or in addition to, the environmental temperature. The display device 34 may be configured to display the environmental humidity measured by the second sensor 32 and/or a warning if the environmental humidity falls outside of a predetermined range (which may be, for example 30-80%).

[0081] In some embodiments, the display device 34 may not display the current temperature/humidity, but may display a warning if the measured temperature and/or humidity falls outside of the predetermined range.

[0082] The display device 34 is also configured to display a warning to the user when the container 20 is empty (i.e. all of the smoking articles 10 have been used) and/or when the container 20 is nearly empty (e.g. only 3, for example, smokeless articles remain in the container 20. The container 20 is configured to determine when it is (nearly) empty based on the measurements of the first sensor 30. This is described in further detail below with reference to Figure 3. Optionally, the display device 34 may also display a number of smoking articles 10 remain-

ing in the container 20.

[0083] In Figure 2, the first sensor 30 is positioned inside the container housing 22 in the cavity 24, and the second sensor 32 is positioned on an outer surface of the container housing 22. In other embodiments, the first sensor 30 may be positioned on the outer surface of the container housing 22, and the second sensor may be positioned in the cavity 24. Alternatively, both sensors 30, 32 could be positioned in the cavity, or on the outer surface of the container housing 22.

[0084] Figure 3 illustrates a schematic view of the container 20 with the first and second sensors 30, 32, and the display 34. The container 20 also comprises a control device 36, a memory 38 and a wireless communications interface 40. The sensors 30, 32, display device 34, memory 38 and wireless communications interface 40 are operatively and communicatively connected, and controlled by, the control device 36.

[0085] The memory device 38 is configured to store the measurements from the first and second sensors 30, 32. The control device is configured to control the display device 34 to display feedback, such as the warnings described above, based on the measurements of the first and second sensors 30, 32.

[0086] The control device 36 is configured to count the number of times that the container 20 is opened based on the measurements from the first sensor 30. The number of times that the container 20 is opened is stored in the memory device 38. Also stored in the memory device is the original number of smokeless articles 10 stored in the container 20. The control device 36 can therefore determine the number of smokeless articles 10 remaining in the container 20 based on the original number of smokeless articles 10 and the number of times that the container 20 is opened. This is because the number of times the container 20 is opened is considered to correspond to the number of smokeless articles 10 removed from the container 20.

[0087] The control device 36 is also configured to control the display device 34 to display a warning when the number of smokeless articles 10 remaining in the container falls below a predetermined threshold (e.g. 3 smokeless articles), based on the determined number of smokeless articles 10 remaining in the container 20.

[0088] The wireless communications interface 40 is configured to communicate with an external computing device 50, as shown in Figure 4.

[0089] The external computing device 50 is a mobile device, with an application 52 stored thereon. The mobile device 50 also comprises a wireless communications interface 54, and the mobile device 50 and container 20 are configured to communicate data stored in the memory device 38 via the wireless communications interfaces 40, 54 and a wireless communication network 56 (e.g. BLE, or 5G).

[0090] The control device 36 of the container 20 is configured to instruct, via the wireless network 56, the application 52 installed on the mobile device 50 to display feedback to the user on the mobile device 50, based on the data stored in the memory device 38 of the container 20. Then, the mobile device 50 may display warnings of extreme temperature or humidity, as measured by the second sensor 32, or warnings that the number of smoking articles 10 remaining in the container 20 is running low, and therefore that the container 20 needs to be replenished. In this way, the user is provided with feedback regarding both environmental conditions of the container 20, and the remaining quantity of smokeless 10 remaining in the container, by both the display device 34 on the container 20 itself, and on a connected mobile device 50. Thus, the user experience can be improved.

[0091] 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.

[0092] 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 scope of the invention.

[0093] 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.

[0094] Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

[0095] 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.

[0096] 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%.

[0097] 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 container for an oral nicotine delivery product comprising:

   a first sensor configured to measure a first parameter;
   a control device configured to determine a quantity of oral nicotine delivery product in the container based on the first parameter; and
   a feedback element configured to provide feedback directly to a user based on the determined quantity of oral nicotine delivery product in the container.

2. The container of claim 1, wherein the feedback element is configured to provide a first feedback indication to the user when the determined quantity of oral nicotine delivery product in the container is below a predetermined threshold.

3. The container of claim 2, wherein the first feedback indication indicates to the user that the container is empty.

4. The container of any preceding claim, further comprising a second sensor configured to measure a second parameter indicative of an environmental condition, wherein the feedback element is configured to provide feedback to the user based on the measurement of the second parameter.

5. The container of claim 4, wherein the feedback element is configured to provide a second feedback indication to the user when the second parameter does not meet a predetermined criteria.

6. The container of claim 4 or claim 5, wherein the environmental condition is a temperature and/or a humidity.

7. The container of any preceding claim, wherein the first sensor is configured to detect opening of the container.

8. The container of claim 7, wherein the control device is configured to determine the number of times that the container is opened, and determine the quantity of oral nicotine delivery product in the container based on the determination of the number of times that the container is opened.

9. The container of any preceding claim, wherein the feedback element comprises a display device.

10. The container of any preceding claim, wherein the container comprises a container housing configured to contain the oral nicotine delivery product, and the first sensor is positioned inside the container housing.

11. The container of any preceding claim, wherein the container comprises a container housing configured to contain the oral nicotine delivery product, and the first sensor is positioned on an external surface of the container housing.

12. The container of any preceding claim, further comprising a communications interface, wherein the container is configured to communicate with an external computer device via the communications interface.

13. The container of claim 12, wherein the control device is configured to instruct the external computing device, via the communications interface, to provide feedback to the user based on the determined quantity of nicotine delivery product.

14. A system for managing a container for an oral nicotine delivery product, the system comprising:

   the container of claim 13; and
   an external computing device,
   wherein, upon receipt of the instructions to provide feedback to the user from the container, the external computing device is configured to provide feedback to the user based on the determined quantity of nicotine delivery product.

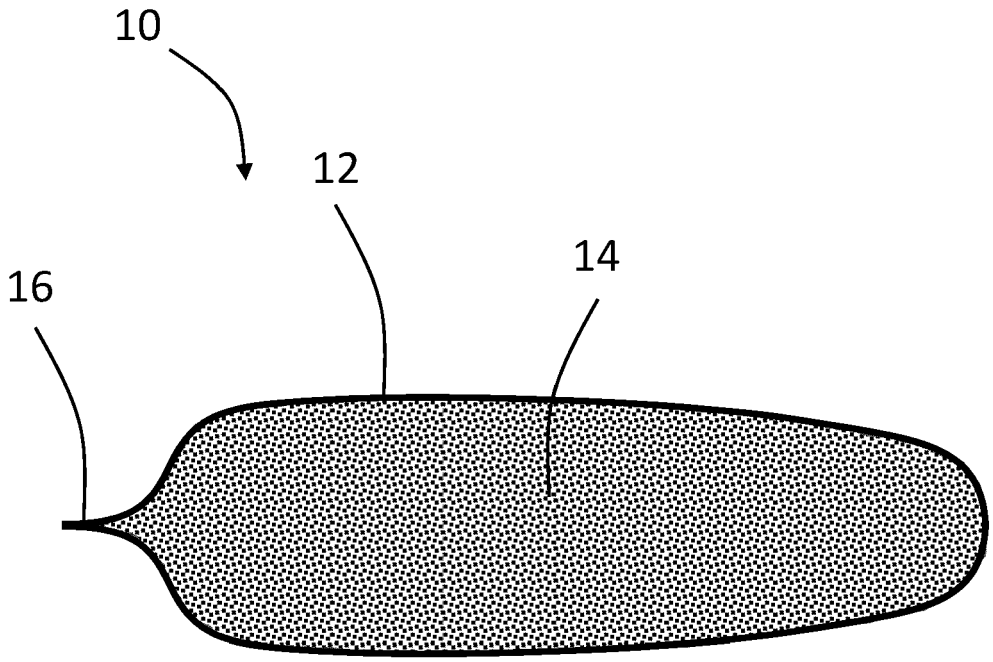

FIG 1

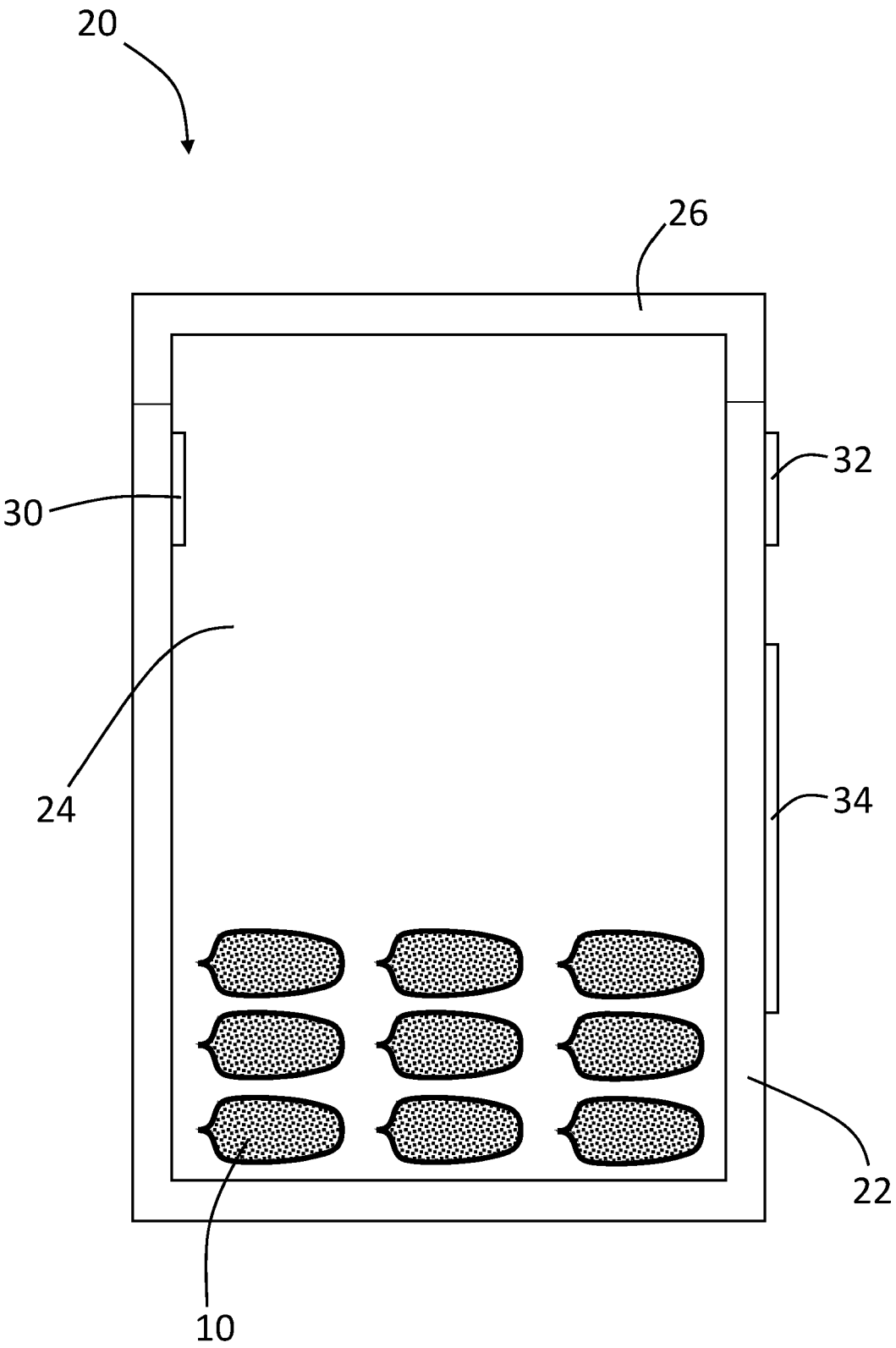

FIG 2

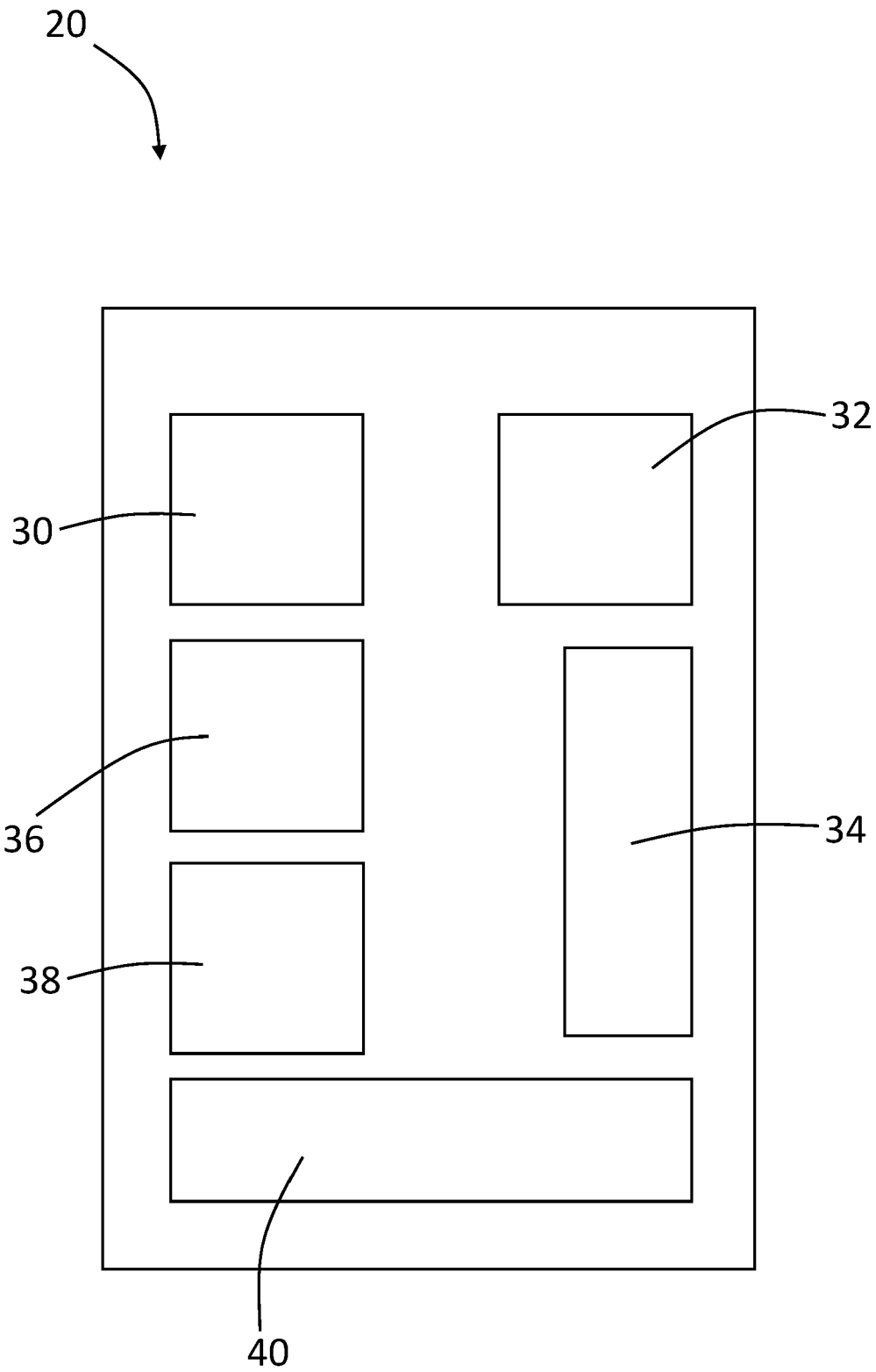

FIG 3

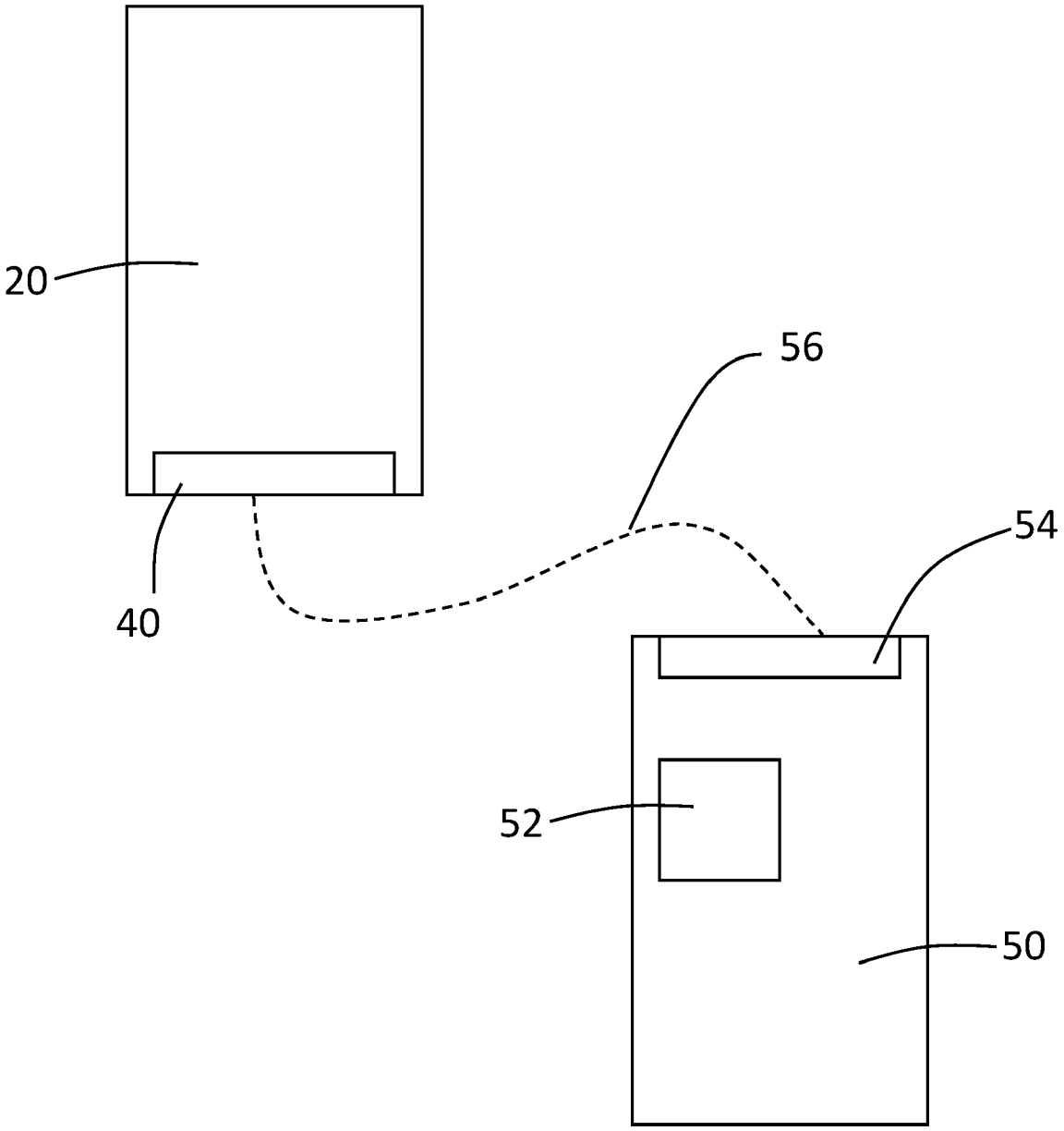

FIG 4

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 6485

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 July 2020	Koob, Michael

CATEGORY OF CITED DOCUMENTS

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