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(71) Applicant: **Future Technology Co., Ltd.**
Izumi-shi, Kagoshima-ken 899-0501 (JP)

(72) Inventor: **Watanabe, Ryuji**
Tokyo (JP)

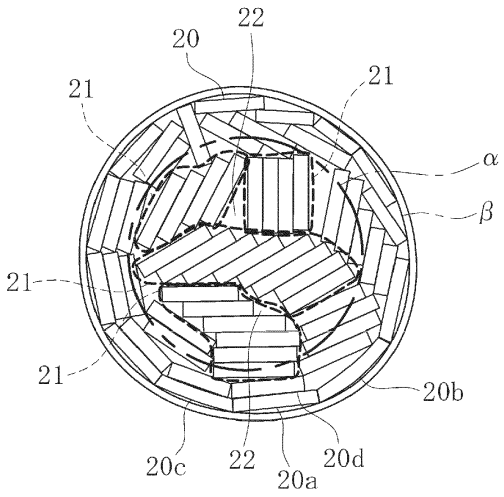
(74) Representative: **Markfort, Iris-Anne Lucie**
Lorenz & Kollegen
Patentanwälte Partnerschaftsgesellschaft mbB
Alte Ulmer Straße 2
89522 Heidenheim (DE)

(54) **TOBACCO FILLER ASSEMBLY AND ELECTRONIC CIGARETTE CARTRIDGE**

(57) A tobacco filler assembly and an electronic cigarette cartridge, which improve the fluidity of the air flow inside the tobacco filler assembly while securing a certain filling rate or more for the tobacco filler assembly as a whole and not allow a tobacco filler to easily drop out, are provided.

A tobacco filler assembly is obtained by accumulating long tobacco fillers 20 in a bundle and whose outer peripheral portion is wound with a sheet-shaped package 25, in which each tobacco filler 20 is formed such that a dimension in a long side direction is longer than a dimension in a short side direction in a cross section orthogonal to a length direction, and a long side direction of a tobacco filler 20 of an outermost peripheral portion in contact with the package 25 is directed in a direction approximately along a circumferential direction or the long side direction of the tobacco filler is directed in a direction other than the direction approximately along the circumferential direction, and the number of tobacco fillers 20 whose long side directions are directed in the direction approximately along the circumferential direction is larger than the number of tobacco fillers 20 whose long side directions are directed in the direction other than the direction approximately along the circumferential direction.

Fig.5



EP 4 378 326 A2

Description

Technical Field

[0001] The present invention relates to a tobacco filler assembly obtained by accumulating long tobacco fillers formed of a tobacco plant or a non-tobacco plant in a bundle and an electronic cigarette cartridge having the same.

Background Art

[0002] In recent years, in order to match a tendency to quit smoking, an electric cigarette product for enjoying tobacco by heating an electronic cigarette cartridge containing a tobacco component without using a flame so as to inhale a vaporized tobacco component is beginning to spread. As a manufacturing method of a tobacco filler filing the electric cigarette cartridge, there is a method of powdering a tobacco leaf, making the powdered tobacco leaf into an aqueous slurry, forming the aqueous slurry into a sheet, adding oil or glycerin to the sheet, and drying the sheet (refer to Patent Literature 1).

[0003] In addition, there is disclosed an article which is smoked by inserting an electronic cigarette cartridge having a tobacco filler assembly, in which a tobacco filler is accumulated, at an end portion so as to heat the electronic cigarette cartridge (refer to Patent Literature 2). In an electronic cigarette, a heating body having an electronic cigarette body is inserted into a tobacco filler assembly, and thus, the tobacco filler is heated.

Citation List

Patent Literature

[0004]

Patent Literature 1: JP 2010-520764 A
Patent Literature 2: JP 2015-519915 A

Summary of Invention

Technical Problem

[0005] Filling of a tobacco filler is performed at a certain filling rate or more in order to sufficiently generate an inhalation component including an aerosol by heating. Meanwhile, if the filling rate of the tobacco filler increases, when a heating body provided in an electronic cigarette body is inserted into a tobacco filler assembly, a resistance increases, and the insertion is difficult. Moreover, if the filling rate of the tobacco filler is too high, fluidity of an air flow inside the tobacco filler assembly decreases, and thus, it difficult for a user to inhale. In addition, since an amount of the air flow which can be inhaled at one time decreases, the number of smoke inhalations per cigarette increases, and there is a possibility that the number of proper smoke inhalations is exceeded. For this reason, it is required to improve the fluidity of the air flow inside the tobacco filler assembly while securing a certain filling rate or more for the tobacco filler assembly as a whole.

[0006] In addition, in the tobacco filler assembly, when handling of the user is performed such as when the electronic cigarette cartridge is inserted into the electronic cigarette body or when the electronic cigarette cartridge is extracted from the electronic cigarette body after the smoking is finished, there is a possibility that a portion of the tobacco filler falls. Accordingly, an inside of the electronic cigarette body may be soiled, and thus, there is a possibility that a failure of the electronic cigarette body occurs. Therefore, it is required to fill the tobacco filler assembly with the tobacco filler such that the tobacco filler does not easily drop out.

[0007] The present invention is made in consideration of the above-described problems, and an object thereof is to provide a tobacco filler assembly and an electronic cigarette cartridge which improve the fluidity of the air flow inside the tobacco filler assembly while securing a certain filling rate or more for the tobacco filler assembly as a whole, are easily inserted into the electronic cigarette body, and does not allow the tobacco filler to easily drop out.

Solution to Problem

[0008] In order to achieve the object, according to an invention of Claim 1, there is provided a tobacco filler assembly which is obtained by accumulating long tobacco fillers in a bundle and whose outer peripheral portion is wound with a sheet-shaped package, in which each tobacco filler is formed such that a dimension in a long side direction is longer than a dimension in a short side direction in a cross section orthogonal to a length direction, and a long side direction

of a tobacco filler of an outermost peripheral portion in contact with the package is directed in a direction approximately along a circumferential direction or the long side direction of the tobacco filler is directed in a direction other than the direction approximately along the circumferential direction, and the number of tobacco fillers whose long side directions are directed in the direction approximately along the circumferential direction is larger than the number of tobacco fillers whose long side directions are directed in the direction other than the direction approximately along the circumferential direction.

[0009] According to the invention of Claim 1, a filling rate of the tobacco fillers in the outer peripheral portion is high, a filling rate of the tobacco fillers in a center portion is relatively low, and thus, it is possible to insert a heating unit of an electronic cigarette body into the tobacco filler assembly while securing an amount of the tobacco fillers. In addition, it is possible to improve a fluidity of an air flow in the tobacco filler assembly. Moreover, the tobacco fillers in the outer peripheral portion form a rigid structure, and thus, it is possible to allow the tobacco filler not to easily drop out when the electronic cigarette cartridge is handled.

[0010] In addition, in the tobacco filler assembly according to an invention of Claim 2, when a central-side region and an outer peripheral-side region are equally divided by an area in a cross section orthogonal to a length direction of the bundle of the tobacco fillers, a porosity of the central-side region is higher than that of the outer peripheral-side region.

[0011] According to the invention of Claim 2, the heating unit of the electronic cigarette body is easily inserted into the tobacco filler assembly, and it is possible to improve the fluidity of the air flow.

[0012] Moreover, in the tobacco filler assembly according to an invention of Claim 3, in the tobacco filler which is in contact with an inner peripheral side of the tobacco filler of the outermost peripheral portion in contact with the package, the number of tobacco fillers whose long side directions are directed in the direction approximately along the circumferential direction is larger than the number of tobacco fillers whose long side directions are directed in the direction other than the direction approximately along the circumferential direction.

[0013] According to the invention of Claim 3, the long side direction of the tobacco filler, which is positioned on a second turn from the outermost periphery, is also approximately along the circumferential direction. Therefore, it is possible to increase the filling rate in the outer peripheral portion, and it is possible to further strengthen the structure of the tobacco filler to suppress dropping out of the tobacco filler while sufficiently securing the amount of the tobacco fillers.

[0014] Moreover, in the tobacco filler assembly according to an invention of Claim 4, a surface in the long side direction of the tobacco filler is in contact with a surface in a long side direction of an adjacent tobacco filler or is in contact with a surface in a short side direction of the adjacent tobacco filler, and the number of the tobacco fillers whose surfaces in the long side direction are in contact with the surfaces in the long side directions of the adjacent tobacco fillers is larger than the number of the tobacco fillers whose surfaces in the long side direction are in contact with the surfaces in the short side directions of the adjacent tobacco fillers.

[0015] According to the invention of Claim 4, a filler group in which the tobacco fillers overlap each other on the long sides is formed, and thus, a void portion can be formed between the filler groups.

[0016] In addition, in the tobacco filler assembly according to an invention of Claim 5, the tobacco filler is formed of a non-tobacco plant.

[0017] According to the invention of Claim 5, by not using tobacco as the tobacco filler, it is possible to form an electronic cigarette cartridge which can be enjoyed even when one has quit smoking.

[0018] Moreover, according to an invention of Claim 6, there is provided an electronic cigarette cartridge including: the above-described tobacco filler assembly; a support member which is adjacent to the tobacco filler of the tobacco filler assembly in a length direction and through which an air flow along the length direction passes; and a mouthpiece.

[0019] According to the invention of Claim 6, the air flowing through the void portion of the tobacco filler assembly smoothly flows to the mouthpiece via the support member, and thus, a user can inhale an appropriate amount of air.

[0020] In addition, in the electronic cigarette cartridge according to an invention of Claim 7, the support member has a support portion in at least an outermost peripheral portion, and the support portion is adjacent to the tobacco filler of the outermost peripheral portion, which is in contact with the package, in the length direction.

[0021] According to the invention of Claim 7, the support portion and the tobacco filler of the outermost peripheral portion are in contact with each other and are approximately along the circumferential direction, and thus, the tobacco filler of the outermost peripheral portion forming a rigid structure is supported by the support member in the length direction, and when the heating unit is inserted or the like, it is possible to prevent the tobacco filler from collapsing and dropping out.

Advantageous Effects of Invention

[0022] According to the tobacco filler assembly of the present invention, a filling rate in an outer peripheral portion is high, and the filling rate for the tobacco filler assembly as a whole can increase. Accordingly, it is possible to sufficiently generate aerosol and improve a fluidity in a center portion, air easily flows, and thus, it is possible to appropriately set an amount of air flow and the number of inhalation in an electronic cigarette cartridge. In addition, a porosity of the center

portion is high, and thus, an insertion to the electronic cigarette body can be easily realized. In addition, a rigid structure is formed by tobacco fillers along a circumferential direction in the outer periphery portion, and thus, it can be made difficult for the tobacco filler to drop out.

Brief Description of Drawings

[0023]

Fig. 1 is a sectional view of an electronic cigarette cartridge having a tobacco filler assembly in the present embodiment.
Fig. 2 is a sectional view showing a usage form of the electronic cigarette cartridge.
Fig. 3 is a side view (Fig. 3(a)) of a tobacco filler and a front view (Fig. 3(b)) of the tobacco filler.
Fig. 4 is a front view of the tobacco filler assembly.
Fig. 5 is a front view of another tobacco filler assembly.
Fig. 6 is a front view showing a process of winding the tobacco filler with a package.
Fig. 7 is a front view of a support member.

Description of Embodiments

[0024] An embodiment of the present invention will be described in detail with reference to the drawings. Fig. 1 is a sectional view of an electronic cigarette cartridge 1 having a tobacco filler assembly 10 in the present embodiment. As shown in Fig. 1, in the electronic cigarette cartridge 1, an approximately cylindrical tobacco filler assembly 10 filled with a plurality of tobacco fillers 20, a cylindrical support member 12, and a mouthpiece 14 serving as an inhalation opening are arranged in a length direction and are wound with a sheet-shaped packaging member 16 to be integrally formed.

[0025] The long tobacco fillers 20 are bundled in the length direction and are wound with a sheet-shaped package 25, and thus, the tobacco filler assembly 10 is formed to have an approximately cylindrical shape. The tobacco filler 20 is formed of a non-tobacco plant. The details of the tobacco filler 20 will be described later.

[0026] The support member 12 has a channel section 30 at a center portion thereof such that an air flow including an aerosol generated in the tobacco filler assembly 10 flows to the mouthpiece 14. The support member 12 has a peripheral edge section 31 around the channel section 30 and can support an inner peripheral side of the packaging member 16. The mouthpiece 14 is a sponge-like porous body and is formed in a cylindrical shape.

[0027] In the present embodiment, the electronic cigarette cartridge 1 is formed to have a diameter of 6.5 to 7.5 mm and a length of 40 to 49 mm. In addition, the tobacco filler assembly 10 has a length of 11 to 13 mm. However, the electronic cigarette cartridge 1 and the tobacco filler assembly 10 may have dimensions other than these.

[0028] Fig. 2 is a sectional view showing a usage form of the electronic cigarette cartridge 1. The electronic cigarette cartridge 1 is used by being mounted on an electronic cigarette body 2. The electronic cigarette body 2 has an insertion section 51 into which the electronic cigarette cartridge 1 is inserted. The insertion section 51 includes a needle-shaped or blade-shaped heating unit 50 to be inserted into the tobacco filler 20 of the inserted electronic cigarette cartridge 1. The heating unit 50 can generate the aerosol from the tobacco filler 20 by generating heat in a state of being inserted into the tobacco filler 20. In this state, the user inhales from the mouthpiece 14, and thus, can inhale the air flow including the aerosol.

[0029] In Fig. 3, a side view (Fig. 3(a)) of the tobacco filler 20 and a front view (Fig. 3(b)) of the tobacco filler 20 are shown. As described above, the tobacco filler 20 is formed in a long shape. In addition, the tobacco filler 20 is formed such that a dimension a in a long side direction is longer than a dimension b in the short side direction in a cross section orthogonal to a length direction. That is, the tobacco filler 20 has a noodle-shaped form which is a long and approximately rectangular parallelepiped shape.

[0030] The tobacco filler 20 is formed by mixing a dried and crushed non-tobacco plant with an aerosol former for generating the aerosol, a microcrystalline cellulose, an additive for adding a flavor, a preservative, an adhesive, a thickener, or the like so as to form a sheet shape, and thereafter, cutting the sheet such that the sheet has a predetermined width and length.

[0031] The non-tobacco plant which forms the tobacco filler 20 is not particularly limited as long as it is a plant other than tobacco. For example, as a use site of the plant, various sites such as a root (sone (stalk)), a tuberous tuber (including potatoes, a bulb, or the like), a stem, a tuber, a skin (including stem bark, bark, or the like), a leaf, a flower (including a petal, a stamen, a pistil, or the like), and a trunk and a branch of a tree can be used.

[0032] For example, there are an onion, a higanbana, a tulip, a hyacinth, a garlic, a raccoon, and a lily as the stalk, there are a crocus, a gladiolus, a freesia, an iris, a taro, and a konjac as the bulb, there are a konjac, a cyclamen, an anemone, a begonia, a chorogi, a potato, and an apios (as corm) as the tuber, there are a canna, a lotus (renkon), and a ginger as a rhizome, there are a dahlia, a sweet potato, a cassava, and a Jerusalem artichoke as a tuberous root,

there is a dioscorea (yams such as a yam, a Japanese yam, or a Chinese yam) as a rhizophore, and others include a turnip, a burdock, a carrot, a Japanese radish, and a kudzu-vine. As a stem, there are an asparagus, a bamboo shoot, an udo, a Japanese radish, and a yacon.

[0033] The above-mentioned potatoes or plants listed below contain carbohydrates and are preferably used as a material of at least a portion of the tobacco filler 20. For example, as a starch, there are corn starch (corn), potato starch (potato), sweet potato starch (sweet potato), tapioca starch (tapioca), and the like, and there are examples of use as thickeners, stabilizers and the like. The starch can improve an acid resistance, a heat resistance, a shear resistance, or the like by crosslinking, can improve storage stability, gelatinization promotion, or the like by esterification and etherification, and can improve transparency, film properties, storage stability, or the like by oxidation.

[0034] It is possible to obtain tamarind seed gum, guar gum, locust bean gum from a plant seed, to obtain arabic gum and karaya gum from sap, to obtain pectin from a fruit, and to obtain cellulose, konjak mannan mainly composed of agarose, and soybean polysaccharide from other plants. Further, it can be used after being denatured like cationized guar gum.

[0035] From seaweed, carrageenan classified into three types of kappa carrageenan, iota carrageenan, and lambda carrageenan, agar, and alginic acid can be obtained, and these are also used as a carrageenan metal salt or a salt such as sodium alginate.

[0036] For example, as plants used as herbs and spices, a gardenia nut,, a citrus leaf,, a Japanese ginger, a mugwort, a wasabi, an ajwain seed, anise, alfalfa, echinacea, a shallot, estragon, an everlasting flower, an elder, an allspice, an oris root, an oregano, an orange peel, an orange flower, an orange leaf, a cayenne chili pepper, a chamomile german, a chamomile roman, a cardamon, a curry leaf, a garlic, a catnip, a caraway, a caraway seed, a sweet osmanthus, a cumin, a cumin seed, a clove, a green cardamon, a green pepper, a cornflower, a saffron, a cedar, a cinnamon, jasmine, juniper berries, jolokia, ginger, a star anise, a spearmint, a smack, a sage, a savory, a celery, a celery seed, a turmeric (curcuma longa), a thyme, a tamarind, a tarragon, a chervil, chives, a dill, a dill seed, a tomato (dried tomato), a tonka bean, a dried phakchi, a nutmeg, a hibiscus, a habanero chili, a jalapeno, bird's eye, a basil, a vanilla, a phakchi (coriander), a parsley, a paprika, a hyssop, piments des pellet, a pink pepper, a fenugreek seed, a fennel, a brown mustard, a black cardamon, a black cumin, a black pepper, a vetiver, a pennyroyal, a peppermint (men-tha), a horseradish, a white pepper, a white mustard, a poppy seed, a porcini, a marjoram, an mustard seed, a mele-gueta, a marigold, a malva flower, a mace, a yarrow flower, an eucalyptus, lavender, licorice, linden, red clover, red pepper, lemon grass, lemon verbena, lemon balm, lemon peel, rose, rosebuds (purple), rose hip, rose petal, rosemary, rose red, laurel (bay leaf), long pepper, sesame (raw sesame, roasted sesame), golden chili pepper, sichuan pepper (hoajao), mitaka, zanthoxylum fruit, cayenne pepper, yuzu, and the like can be used. In addition, a mixture of various plants used as mixed spices (for example, five-spice powder, garam masala, ras el hanout, bari guru, chicken curry masala, tandoori masala, quatre epice, and herbes de provence), potpourri, or the like can be used.

[0037] In addition, for example, it is possible to use peaches, blueberries, lemons, oranges, apples, bananas, pineapples, mangoes, grapes, kumquats, melons, plums, almonds, cacao, coffee, peanuts, sunflowers, olives, walnuts, and other edible fruits (flesh portion) such as nuts and seeds.

[0038] In addition, teas can be used. Teas differ not only in the plant which becomes tea, but even in the same plant, they become different teas depending on a processing method. Specifically, examples of tea include Japanese tea, black tea, angelica keiskei tea, sweet tea, five-leaf ginseng tea, aloe tea, ginkgo leaf tea, oolong tea, turmeric tea, quercus salicina tea, acanthopanax senticosus tea, Chinese plantain tea, alehoof tea, persimmon leaf tea, chamomile tea, chamomile tea, chamaecrista nomame tea, quince tea, chrysanthemum tea, gymnema tea, guava tea, Chinese matrimony vine tea, soft leaf tea, black bean tea, geranium thunbergii tea, brown rice tea, burdock tea, comfrey tea, sea tangle tea, cherry blossom tea, saffron tea, shiitake tea, red shiso tea, jasmine tea, ginger tea, field horsetail tea, Japanese sweet flag tea, swertia japonica tea, buckwheat tea, Japanese angelica tree tea, dandelion tea, sweet tea, saururus chinensis tea, eucommia tea, sword bean tea, Japanese red elder tea, ligustrum japonicum tea, adlay tea, herbal tea, loquat leaf tea, puer tea, safflower tea, pine needle tea, mate tea, barley tea, acer maximowiczianum tea, mugwort tea, eucalyptus tea, momordica grosvenorii tea, rooibos tea, bitter melon tea, and the like. For these teas, tea leaves after drinking may be used. If the tea leaves are used, it is possible to effectively reuse expensive tea or the like.

[0039] As examples of other plants, sea lettuce, green laver, sargassum horneri, pyropia tenera, arame, lichens (rock laver), campylaephora hypnaeoides, gracilaria vermiculophylla, saccharina sculpera, ecklonia cava kjellman, rhizoid, caulerpa lentillifera, ecklonia kurome, kelp, pyropia yezoensis, dulse, pyropia kurogii, ecklonia stolonifera, gelidium, saccharina gyrata, arthrothamnus ruprecht, nori, petalonia binghamiae, hijiki, monostroma nitidum, undaria undarioides, sea staghorn, ulva intestinalis, saccharina japonica, mekabu, nemacystus decipiens, wakame, and the like can also be used.

[0040] In addition, other than brown rice, Indica rice (inthan type, continental type, or long-grain rice), oryza glaberrima (african rice), oryza sativa (asian rice), javanica rice (java type, tropical island type, or large grain rice), japonica type (Japanese rice, temperate island type, or short grain rice), and NERICA (interspecific hybrid between asian rice and african rice) can be also used, and can be also used as powder or rice bran.

[0041] In addition, other than barley, foxtail millet, oats (cultivated species of oat and common wild oat), barley, common wild oat, common millet, kodra (kodo millet), wheat, finger millet, teff, pearl millet, naked barley (a variety of barley), Job's tears (which is not seeds, but is fruits), barnyard millet, fonio, manchurian wild rice, glutinous rice barley, sorghum (great millet, kaoliang, or sorghum), corn, rye can be also used.

[0042] In addition, as legumes, other than black bean, red bean, locust bean, kidney bean, pea, pigeon pea, cluster bean, grass pea, black gram, cowpea, winged bean, kersting's groundnut, broad bean, soy bean, ricebean, jackbean, tamarind, tepary bean, sword bean, velvet bean, bambara-bean, chickpea, hyacinth bean, runner bean, horse gram, black gram, lima bean, peanut, mung bean, lupin, lentil, and lentil almond can be also used.

[0043] In addition, other than buckwheat, amaranth (amaranthus or amaranthus caudatus), quinoa, tartary buckwheat can be also used.

[0044] In addition, as mushrooms, other than shiitake, pine mushroom, gomphus floccosus, beech mushroom, rhizopogon rubescens, common mushroom, and field mushroom can be also used.

[0045] In addition, it is possible to use sugar cane (draff of molasses may be used), sugar beet (beet), Japanese cypress, pine, Japan cedar, Japanese cypress, camellia, stems and branches of trees with aroma such as sandalwood, and barks, leaves, and roots thereof. Ferns, mosses, or the like can also be used as non-tobacco plants. Further, as the plants, for example, by-products, pomace (sake lees, pomace of grape (consisting of skin, seeds, fruit axis, or the like of grape)), or the like when producing fermented liquor such as sake or wine can be used. Furthermore, various plants described above may be mixed and used. Of course, plants other than those listed here can also be used.

[0046] In addition, those known as traditional Chinese medicine are also preferably used. Examples of the above include: Indigo plants, rubia argyi, japanese mallotus, gambir, benzoin, clematis root, artemisia capillaris flower, fennel, turmeric, japanese apricot, linderae radix, quercus salicina, bearberry leaf, rose fruit, corydalis tuber, isodon japonicus, membranous milk-vetch, scutellaria baicalensi, polygonatum rhizome, phellodendron bark, coptis rhizome, pruni cortex, hypericum erectum, polygala root, japanese pagoda tree, allium macrostemon, prunella spike, myrobalan, chinese knotweed, curcuma zedoaria, common cuckoo, pueraria, german chamomile, trichosanthes root, trichosanthes seed, processed ginger, liquorice, coltsfoot flower, artemisia leaf, balloon flower, hovenia dulcis, poncirus trifoliata, immature orange, chrysanthemum flower, citrus peel, notopterygium, apricot kernel, kumquat, lonicera flower, alehoof, lycium chinense, lycii folium, shrubby sophora, walnut, chinaberry, lindera umbellata, dianthus chinensis, schizonepeta spike, cinnamon bark, cassia seed, pharbitis seed, scrophularia root, koi, safflower, mimosa, dalbergia odorifera T. Chen, glycine max, elsholtzia herb, red ginseng, cyperi rhizoma, nonglutinous rice, silver magnolia, nothosmyrnium root, acanthopanax, achyranthes, medicinal evodia, asiatic knotweed, lappa fruit, maximowiczia chinensis, bupleurum, asaroum, saffron, serrate nanocnide, crataegus fruit, gardenia jasminoides, asiatic cornelian cherry, sophora tonkinensis gapnep., zizyphus spinosi, chinese pepper, sparganium stoloniferum buchanan-hamilton, chinese dioscorea, fox glove, tatarian aster, lycium root, lithospermum, perilla frutescens L. britton var. acuta (thunb.) kudo, perilla frutescens britton var. acuta kudo, tribulus terrestris linné, diospyros kaki L, kochiae fructus, peony, hedge parsley, codonopsis lanceolata (Siebold & Zucc.) Trautv., plantago seed, plantain, amomum fruit, heartleaf houttuynia, ginger, hemp palm, palm leaf, cimicifuga heracleifolia KOM., wheat, calamus, magnolia, ligustrum japonicum, fraxinus rhynchophylla hance, malted rice, large-leaf gentian, cassia obtusifolia, zanthoxylum simulans, bambusa textilis mcClure, acorus gramineus, granati cortex(KHP, JP), dendrobium nobile lindley, cnidium officinale makino, anthriscus sylvestris, nuphar japonicum de candole, elecampane, williams elder, amomum tsao-ko crevost et lemaire, gleditsiae spina, loranthus parasticus merr., xanthium strumarium linné, atractylodes lancea de candlle, thuja orientalis linné, dipsacus asperoides, cortex mori radicis, caesalpinia sappan linne, perilla frutescens var. acuta, Gleditsia sinensis Lamark, rhubarb root, zizyphus jujuba, arecae pericarpium, sagittaria trifolia L., Chinese red sage, bamboo culm, Japanese ginseng, bamboo leaf, anemarrhena rhizome, sanguisorba officinali, clove, uncariae uncis cum ramulus, citrus unshiu peel, arisaema, gastrodia, asparagus cochinchinensis, benincasa seed, Korean angelica root, castor-oil plant, sugar ginseng, rush, persicae semen, aurantii pericarpium, dodder seed, horsechestnut, eucommia bark, aralia, trichosanthes cucumeroides, cistanche tubulosa, nutmeg, honeysuckle, ginseng, fritillaria ussuriensis, malt, biota seed, hyacinth bean, liriope rhizome, psoralea corylifolia L., mint, dried guava slice, pinellia, agkistrodon skin, isatidis radix, herbal scutellaria barbata, lily root, angelica dahurica root, oldenlandiae herba, stemona japonica root, atractylodes ovata, areca nut, sinomenium acutum, imperata rhizome, saposhnikovia divaricata, typha angustifolia, dandelion root, paeonia suffruticosa bark, ephedra sinica, cannabis fructus, vitex rotundifolia, pine resin, akebiae caulis, Japnese quince, saussurea costus, myrrh, equisetum hyemale, leopard flower, apinia oxyphylla, Chinese knotweed, siraitia grosvenorii, orchid, longan, gentian, alpiniae officinari rhizoma, ganoderma lucidum, forsythia, glechoma herb, nelumbo seed, and pragmitis rhizome.

[0047] In addition, as extracts of the non-tobacco plant exemplified above, so-called extracts can also be used. Examples of a form of the extract include liquid, syrup, powder, granules, solution, or the like.

[0048] As the aerosol former to be added to the tobacco filler 20, glycerin, propylene glycol, sorbitol, triethylene glycol, lactic acid, diacetin (glycerin diacetate), triacetin (glycerin triacetate), triethylene glycol diacetate, triethyl citrate, isopropyl myristate, methyl stearate, dimethyl dodecanedionate, dimethyl tetradecane dianoate, or the like can be used, but glycerin and propylene glycol are particularly preferably used. These are used in an amount of 1% by mass to 80% by

mass with respect to the tobacco filler 20, and particularly preferably, 10% by mass to 40% by mass.

[0049] A flavor additive which adds flavor as needed is also preferably used. For example, the flavor additive may be an extract of cocoa, coffee, black tea, or the like.

[0050] In addition, if necessary, a preservative for food may be added, and for example, sorbic acid, potassium sorbate, benzoic acid, sodium benzoate or the like may be added.

[0051] As binders, thickeners, or the like, gums such as guar gum, xanthan gum, gum arabic, or locust bean gum, for example, cellulose binders such as hydroxypropyl cellulose, carboxymethylcellulose, hydroxyethylcellulose, methylcellulose and ethylcellulose, polysaccharides such as starch, organic acids such as alginic acid, sodium alginate, sodium carboxymethylcellulose, carrageenan, conjugate bases of organic acids such as agar and pectin, and combinations thereof are also used.

[0052] For example, microcrystalline cellulose is obtained by partially depolymerizing α-cellulose obtained from pulp of a fibrous plant with an acid, and is obtained by removing a soluble portion from the cellulose and crystallizing an insoluble portion.

[0053] After various investigations, the followings were found for the tobacco filler 20 containing the non-tobacco plant, the aerosol former, and microcrystalline cellulose. When the tobacco filler 20 is placed under dry conditions, the microcrystals of the cellulose maintain a structure of the filler even when the filler formed of the non-tobacco plant and the aerosol former is lost of water, and a structural change such as volume contraction is suppressed. Such an effect is obtained by using the microcrystalline cellulose.

[0054] The microcrystalline cellulose may be in the form of powder or may be dispersed in a solvent such as water and then charged as a suspension. In this case, a high-speed stirrer, a high pressure homogenizer, or the like can be used to disperse the solvent.

[0055] An amount of addition of the microcrystalline cellulose is generally 1% or more and 15% or less of the content in the tobacco filler 20. Preferably, the amount of addition is 3% or more and 12% or less, and more preferably, 5% or more and 10% or less.

[0056] The addition of the microcrystalline cellulose is effective to improve the formability, improve workability at the time of kneading with a roll mill, and particularly, is effective to suppress shrinkage and a volume change of the tobacco filler 20, and is effective to control the quality of the electronic cigarette cartridge 1 and homogenization of usability.

[0057] An average particle size of the microcrystalline cellulose used in the present invention is preferably 30 um to 200 μm, more preferably 50 um to 150 μm, and still more preferably 70 um to 120 μm.

[0058] When the average particle size of the microcrystalline cellulose is 30 um or more, the effect of suppressing shrinkage of the tobacco filler 20 is excellent, and when the average particle diameter is 150 um or less, in addition to the effect of suppressing the shrinkage, moldability can be improved.

[0059] The average particle size of the microcrystalline cellulose is determined by a sieving method. The average particle size can be obtained by a method described in JIS K 0069:1992. In addition, for example, the average particle size means a diameter corresponding to 50% of a massby performing an integration of a mass from a larger one of a mesh size for a test result by a plurality of sieves. Furthermore, preferably, a sieved residue with a mesh size of 250 um is 8% by mass or less, and a sieved residue with a mesh size of 75 um is 45% by mass or more.

[0060] When the sieved residue with the mesh size of 250 um is 8% by mass or less, the sieved microcrystalline cellulose has an effect of suppressing the shrinkage of the tobacco filler 20. When the sieved residue of the mesh size of 75 um is 45% by mass or more, the formability of the tobacco filler 20 can be improved.

[0061] Preferably, a mass average molecular weight (Mw) of the microcrystalline cellulose is 10,000 or more and 200,000 or less. More preferably, the mass average molecular weight is 10,000 or more and 100,000 or less. When the mass average molecular weight is 10,000 or more, the effect of suppressing the shrinkage of the tobacco filler 20 is excellent, and when the mass average molecular weight is 100,000 or less, the formability can be made excellent in addition to the effect of suppressing the shrinkage. Most preferably, the mass average molecular weight is 20,000 or more and 60,000 or less. A molecular weight of the cellulose can be measured by gel permeation chromatography (GPC). For example, a measurement method as described in JP H6-109715 A is adopted, and polyethylene glycol or the like is appropriately used as a standard material.

[0062] A manufacturing process of the tobacco filler 20 will be described. The manufacturing process of the tobacco filler 20 includes a drying/crushing process of drying and crushing the non-tobacco plant as a main raw material and performing weighing or the like, a preparation process of performing a pretreatment, weighing, or the like on other raw materials, a mixing process of mixing the raw materials to form a composition, and a filler forming process of forming the composition.

[0063] In the drying/crushing process, in order to use a use site (for example, leaves, seeds, dried fruits, stems, barks, roots, or the like) of the non-tobacco plant which is the main raw material, as a composition, the use site is processed to a predetermined crushed material. In this case, it is preferable to adjust an amount of water which is convenient for absorbing or supporting the aerosol former, water, and other components to be added later. In the drying, preferably, the temperature is 60°C or more and 80°C or less. Within this range, it is easy to reach a desired amount of water while

avoiding dissipation of a required flavor component. If the temperature is 65°C or more, the desired amount of water can be more easily reached, and if the temperature is 75°C or less, the necessary dissipation of the flavor component can be further prevented.

[0064] Preferably, the amount of water after drying and crushing is 5% by mass or less. By so doing, a slurry is easily formed in a later process. More preferably, the amount of water is 3% by mass or less. In addition, when the amount of water is 0.1% by mass or more, it is possible to maintain a good compatibility with water or the like. Furthermore, the drying/crushing process can include a sieving process for sieving the crushed material, and thus, the crushed material can be adjusted to a desired particle size and introduced into the mixing process.

[0065] In the preparation process, it is possible to prepare a raw material necessary to create the tobacco filler 20. The above-mentioned microcrystalline cellulose is weighed in the preparation process and is introduced into the mixing process.

[0066] In the mixing process, a normal mixer can be used. For example, preferably, a form in which the raw material in a mixing tank is mixed while applying a shear force to the raw material by a stirring blade is used.

[0067] In the filler forming process, a composition in which various raw materials are mixed is formed into a thin sheet and then cut to form the a tobacco filler 20. In the present embodiment, a three-roll mill is prepared to form the thin sheet. If the three-roll mill is used, preferably, it is possible to obtain a sheet having a desired thickness by a doctor blade while performing kneading, dispersion, or the like by compression due to being pushed between narrow rolls and shearing due to a roll speed difference. In addition, it is possible to perform the preparation using a press roller or a presser.

[0068] In the filler forming process, other means may be used, such as allowing the composition to pass through an orifice by pressure to perform the forming. In addition, in the filler forming process, if necessary, the non-tobacco plant, the aerosol former the binder, the thickener, the flavor additive, the preservative may be further added, or water may be added.

[0069] In the present embodiment, it is preferable to use water which is sterilized or water from which microorganisms are removed, and it is preferable to use pure water obtained by a reverse osmosis membrane, ion exchange, or the like.

[0070] Preferably, a thickness of the sheet obtained by the filler forming process is in the range of 0.1 mm to 1.0 mm, and more preferably, in the range of 0.1 mm to 0.5 mm. The obtained sheet is cut by a cutter, a rotary blade type rotary cutter or the like so as to have a predetermined width.

[0071] In the present embodiment, cutting of the sheet having a thickness of 0.3 mm will be described as an example. First, for example, the formed sheet is cut into a rectangle of 150 mm in length and 240 mm in width. The rectangular sheet is supplied to the rotary cutter and cut into a shape of 1.5 mm in length and 240 mm in width so as to obtain a cut sheet. Thereby, the dimension a in the long side direction of the tobacco filler 20 is 1.5 mm, and the dimension b in the short side direction thereof is 0.3 mm. 50 cut sheets are wound with the package 25 to prepare a roll having an outer diameter of about 6.9 mm. This roll is cut to have a length of 12.0 mm by a cutter, and thus, it is possible to obtain the tobacco filler assembly 10. A mass of this tobacco filler assembly 10 is 0.29 g. Assuming that a ratio of a volume of the tobacco filler 20 to a volume of the tobacco filler assembly 10 is a volume filling rate, the volume filling rate of the tobacco filler assembly 10 of the present embodiment is about 0.60. In addition, a density of the tobacco filler assembly 10 is 1.07 g/cm^3.

[0072] Accordingly, in the tobacco filler assembly 10, the tobacco fillers 20 each having a long noodle shape are accumulated in a bundle in the length direction.

[0073] A disposition state of the tobacco filler 20 in the tobacco filler assembly 10 will be described in detail. Fig. 4 is a front view of the tobacco filler assembly 10. Fig. 4 shows a typical arrangement example of the tobacco filler 20. In the tobacco filler assembly 10, the tobacco filler 20 is in close contact with the package 25 or other tobacco fillers 20.

[0074] In the tobacco fillers 20, the long side direction of the tobacco filler 20 of an outermost peripheral portion in contact with the package 25 is directed in a direction approximately along the circumferential direction. In the tobacco filler 20a of Fig. 4, the entire one side of long sides thereof is in contact with the package 25. In addition, in the tobacco filler 20a, both short sides are in contact with adjacent tobacco fillers 20b and 20c in a circumferential direction, respectively. A long side of each of the tobacco fillers 20b and 20c is in contact with the package 25. Similarly, in all the tobacco fillers 20 positioned on the outermost peripheral portion, each long side direction is directed in the direction approximately along the circumferential direction, and the tobacco fillers 20 are in contact with each other on short sides thereof. Accordingly, a filling rate of the tobacco fillers 20 is high at the outermost peripheral portion, the tobacco fillers 20 are in contact with each other in the circumferential direction, and thus, positions thereof are not easily shifted.

[0075] Among the tobacco fillers 20, in many of the tobacco fillers 20 in contact with the inner peripheral sides of the tobacco fillers 20 positioned the outermost peripheral portion, each long side direction is directed in the direction approximately along the circumferential direction. In Fig. 4, in the tobacco filler 20d, one side on the outer peripheral side of the long sides is in contact with the tobacco filler 20a of the outermost peripheral portion, and the long side direction is approximately along the circumferential direction. Like the tobacco fillers 20e, long side directions of some tobacco fillers 20e are along a radial direction. However, in the tobacco fillers 20 which are in contact with the inner peripheral side of the tobacco filler 20 of the outermost peripheral portion, the number of the tobacco fillers 20 whose long side

directions are approximately along the circumferential direction is larger than the number of the tobacco fillers 20 whose long side directions are along a direction other than the circumferential direction. Accordingly, the filling rate of the tobacco fillers 20 is high even in a region close to the outermost peripheral portion, and the positions of the tobacco fillers 20 are not easily shifted.

[0076] In the tobacco filler 20, the surface in the long side direction thereof is in contact with a surface in a long side direction of an adjacent tobacco filler 20, or the surface of the long side direction is in contact with the short side direction of the adjacent tobacco filler 20. As described above, in the outer peripheral portion, the surface of the long side direction of the tobacco filler 20 is often in contact with the short side direction of the adjacent tobacco filler 20. However, as a whole, in most cases, the surface of the long side direction is in contact with the surface in the long side direction of the adjacent tobacco filler 20. For this reason, in a central portion of the tobacco filler assembly 10, most of the tobacco fillers 20 form filler groups 21 in which the surfaces in the long side direction are in contact with each other.

[0077] A plurality of filler groups 21 are formed in the tobacco filler assembly 10, and in each filler group 21, a long side of each tobacco filler 20 is in contact with a long side of an adjacent tobacco filler 20. The tobacco fillers 20 in the filler group 21 are in contact with each other on the long sides, and thus, do not have many gaps, but void portions 22 are likely formed between the filler groups 21. As described above, since the tobacco filler 20 is disposed approximately along the circumferential direction in the outer peripheral portion of the tobacco filler assembly 10, the void portion 22 is not easily formed. However, in the central portion of the tobacco filler assembly 10, the void portion 22 is easily formed between the filler groups 21. In a cross section orthogonal to the length direction of the tobacco filler assembly 10, a porosity of a central region α, which is a central-side region obtained by equally dividing an area in the radial direction, is higher than a porosity of an outer peripheral region β, which is an outer peripheral-side region.

[0078] Since the tobacco filler 20 has the long side direction and the short side direction in the cross section orthogonal to the length direction, the arrangement along the circumferential direction of the tobacco filler 20 in the outermost peripheral portion and the arrangement having the filler groups 21 and the void portions 22 of the tobacco fillers 20 in the central portion are easily compatible with each other.

[0079] Since the porosity of the central region α is high, the heating unit 50 of the electronic cigarette body 2 is easily inserted into the tobacco filler assembly 10. In addition, the air flow including the aerosol generated by heating with the heating unit 50 can easily flow into the tobacco filler assembly 10. Meanwhile, the outer peripheral region β has a low porosity, and thus, the filling rate in the entire tobacco filler assembly 10 can increase, and a sufficient amount of aerosol can be generated.

[0080] Moreover, the filling rate in the outer peripheral region β is high, and thus, the tobacco filler assembly 10 can hold the tobacco filler 20 to be structurally strong. For this reason, it is possible to decrease dropping out of the tobacco filler 20 at the time of handling of the user.

[0081] The arrangement of the tobacco fillers 20 is changed every time the tobacco fillers 20 are wound with the package 25, and thus, the arrangement will be different for each one. Fig. 5 is a front view of another tobacco filler assembly 10. As shown in Fig. 5, in the tobacco fillers 20 which are arranged in an outermost peripheral portion, some tobacco fillers 20 may be directed in a direction other than a circumferential direction. However, also in this case, in the outermost peripheral portion, the number of the tobacco fillers 20 whose long side directions are directed in the direction approximately along the circumferential direction is larger than the number of the tobacco fillers 20 whose long side directions are directed in the direction other than the direction approximately along the circumferential direction, and thus, it is possible to obtain effects similar to those in the case of Fig. 4. This is similarly applied to the tobacco fillers 20 which are in contact with the inner peripheral sides of the tobacco fillers 20 of the outermost peripheral portion. Moreover, an arrangement of the tobacco fillers 20 disposed on a center side of the tobacco fillers which are in contact with the inner peripheral sides is different from that of Fig. 4. However, the tobacco filler assembly 10 of Fig. 5 is similar to that of Fig. 4 in that most of the tobacco fillers 20 form the filler groups 21 and the void portions 22 are formed between the filler groups 21. Accordingly, in the aspect of Fig. 5, the porosity of the center region α is relatively higher than the porosity of the outer peripheral region β.

[0082] If the user inhales in a state where the tobacco filler assembly 10 is heated by the heating unit 50, the air flow including the aerosol flows to the mouthpiece 14 side. As described above, the porosity of the central region α is higher than that of the outer peripheral region β, and thus, the air flows toward the length direction while being collected from the outer peripheral side to the central side. In this case, a large amount of aerosol is generated from the outer peripheral portion having a high filling rate, and thus, the aerosol can flow smoothly.

[0083] Fig. 6 is a front view showing a process of winding the tobacco filler 20 with the package 25. As shown in Fig. 6(a), when the tobacco fillers 20 are wound, first, the tobacco fillers 20 are placed on the package 25. The package 25 is placed on opening/closing portions 41 provided on a pedestal 40. The opening/closing portions 41 can move in a direction separated from each other. In this case, it is desirable that the long side of each tobacco filler 20 is placed to be in contact with the package 25 as much as possible.

[0084] Next, as shown in Fig. 6(b), the opening/closing portions 41 move so as to be separated from each other to form a recess 42 in which the package 25 drops, the tobacco fillers 20 are wrapped with the package 25 dropped in the

recess 42, and finally, as shown in Fig. 6(c), the package 25 is closed to form the tobacco filler assembly 10. In the process in which the wrapping is performed by the package 25, by adjusting a speed or the like, most of tobacco fillers 20 of the outermost peripheral portion can be arranged approximately along the circumferential direction. In addition, by adjusting a force by which the tobacco fillers 20 are pushed into an inside of the package 25 until the tobacco fillers 20 are wrapped with the package 25 and the package 25 is closed, the porosity in the central region α can be within an appropriate range.

[0085] In the arrangement of the tobacco fillers 20 described so far, a cross-sectional shape of each tobacco filler 20 formed in a long noodle shape is an approximately rectangular shape having the long side direction and the short side direction, and most of the tobacco fillers 20 of the outermost peripheral portion and the tobacco fillers 20 adjacent thereto are disposed approximately along the circumferential direction. The present applicant changed the shapes and arrangement of the tobacco fillers 20, and experimentally confirmed the amount of aerosol which can be sucked by one inhalation and the number of possible inhalations. Conditions and results are as shown in Table 1. Condition 1 is that the cross-sectional shape of each tobacco filler 20 is a square shape (0.60 $\pm$ 0.10 mm in length, 0.60 $\pm$ 0.10 mm in width). Each of Conditions 2 to 6 is that the cross-sectional shape of each tobacco filler 20 is a rectangular shape (1.50 $\pm$ 0.10 mm in length and 0.28 $\pm$ 0.02 mm in width). Condition 2 is an aspect of the present embodiment.

[Table 1]

Condition	Cross-sectional shape	Arrangement	Amount of aerosol	Number of possible inhalations
1	Square shape	Random	Small	Appropriate range
2	Rectangular shape	Outer peripheral portion: along circumferential direction Center portion: porosity is high	Appropriate range	Appropriate range
3	Rectangular shape	Outer peripheral portion: along circumferential direction Center portion: porosity is higher	Appropriate range	Appropriate range
4	Rectangular shape	Outer peripheral portion: porosity is high Center portion: porosity is low	Small	Much
5	Rectangular shape	Arrangement along circumferential direction as possible as whole	Appropriate range	Appropriate range
6	Rectangular shape	Arrangement along radial direction as possible as whole	Small	Small

[0086] Conditions 2, 3, and 5 are preferable from the viewpoint of the amount of aerosol and the number of possible inhalations. Further, easiness of inserting the heating unit 50 of the electronic cigarette body 2 into the tobacco filler 20 is good under Conditions 2 and 3.

[0087] The aspect of the arrangement of the tobacco fillers 20 under Conditions 2 to 6 differs depending on the arrangement of the tobacco fillers 20 before winding with the package 25 and a manner of winding the tobacco fillers 20 with the package 25. In Condition 2 which is the aspect of the present embodiment, the tobacco fillers 20 are wound easiest, and then, Conditions 3 and 5 are in states in which tobacco fillers 20 are easily wound. In Conditions 4 and 6, the tobacco fillers 20 are not easily wound. Therefore, from the viewpoint of easiness of manufacture, Conditions 2, 3 and 5 are preferable, and particularly Condition 2 is more preferable.

[0088] In Condition 1 in which the cross-sectional shape of each tobacco filler 20 is a square shape, the shapes of the tobacco fillers 20 are not easily formed as described above, and as compared to the case where the cross-sectional shape is a rectangular shape, each tobacco filler 20 easily drops out. In addition, an amount of air flow generated at the time of heating is small.

[0089] From the above, Condition 2 which is the aspect of the present embodiment can be mentioned to be the most preferable form from both the viewpoint of the easiness of the manufacture and the viewpoints of the amount of air flow and the number of possible inhalations.

[0090] Fig. 7 is a front view of the support member 12. As shown in Fig. 7(a), in the present embodiment, the support member 12 has an approximately circular shape in a front view, and the channel section 30 for circulating an air flow is formed in the central portion thereof. A periphery of the channel section 30 is the peripheral edge section 31 in contact with the packaging member 16 on an outer peripheral surface and in contact with the tobacco fillers 20 at an end surface.

[0091] The support member 12 may have other shapes. As shown in Fig. 7(b), the support member 12 may have four

peripheral edge sections 34 protruding in the radial direction from a central portion, and channel sections 35 which are formed between the peripheral edge sections 34. Further, as shown in Fig. 7(c), a channel section 37 may be formed on a center side of a peripheral edge section 38, and the channel section 37 may have a shape divided into two by a partition portion 39. In any case, the peripheral edge section of the support member 12 can be in contact with the packaging member 16 on the outer peripheral surface, and can be in contact with the tobacco filler 20 at the end surface in the length direction.

[0092] As mentioned above, the embodiment of the present invention is described. However, application of the present invention is not restricted to this embodiment, and the present invention can be variously applied within a range of a technical idea. For example, in the present embodiment, only the support member 12 is provided between the tobacco filler assembly 10 and the mouthpiece 14. However, a cooling member may be provided between the support member 12 and the mouthpiece 14. Further, the dimension a of the long side and the dimension b of the short side in the cross section of the tobacco filler 20 are not limited to the above-described example, and can be set to any dimension and ratio.

Reference Signs List

[0093]

1 electronic cigarette cartridge
2 electronic cigarette body
10 tobacco filler assembly
12 support member
14 mouthpiece
16 packaging member
20 tobacco filler
21 filler group
22 void portion
25 package
30 channel section
31 peripheral edge section
50 heating unit
51 insertion section

Claims

1. A tobacco filler assembly generating an inhalation component in an electronic cigarette cartridge and providing a void portion between tobacco fillers in which longmaterial tobacco fillers are bundled and generated between the tobacco fillers as a passage for the inhalation component,

wherein, when the direction which coincides with a longitudinal direction, a direction of a long side in a cross section orthogonal to the longitudinal direction, and a direction of a short side in a cross section orthogonal to the longitudinal direction, of the electronic cigarette cartridge of the tobacco filler, is a longitudinal direction, a long side direction, and a short side direction; each dimension of the longitudinal direction, the long side direction, and the short side direction, of the tobacco filler, is a longitudinal dimension, a long side dimension, and a short side dimension; and a side whose each dimension is the longitudinal dimension and the long side dimension, the longitudinal dimension and the short side dimension, and, the long side dimension and the short side dimension, is a long side, a short side, and an end side,
a group of tobacco fillers connected plurally by adjoining the long sides is a filler group, and the tobacco filler assembly has a plurality of filler groups which are distinguished from each other due to the difference of long side directions from adjacent other filler groups, and
the void portion between tobacco fillers has;

a shifted void portion between fillers which is generated between the filler group and the other filler group due to a shift of a long side direction between the tobacco fillers adjacent each other in any filler group of the plurality of filler groups; or
a misdirected void portion between filler groups which is generated between the filler group and the other filler group due to a misdirection of the long side direction.

2. The tobacco filler assembly according to claim 1, wherein the tobacco filler is formed of a non-tobacco plant.

3. The tobacco filler assembly according to claim 1 or 2, wherein an outer peripheral portion of a bundle of the tobacco fillers is wound with a sheet-shaped package and the package has an outer diameter of 6.5 to 7.5 mm.

4. The tobacco filler assembly according to any one of claims 1 to 3, wherein the tobacco filler has a long side dimension of 11 to 13 mm.

5. The electronic cigarette cartridge comprising the tobacco filler assembly according to any one of claims 1 to 4.

6. The electronic cigarette cartridge according to claim 5, wherein the longitudinal direction has a length of 40 to 49 mm.

Fig.1

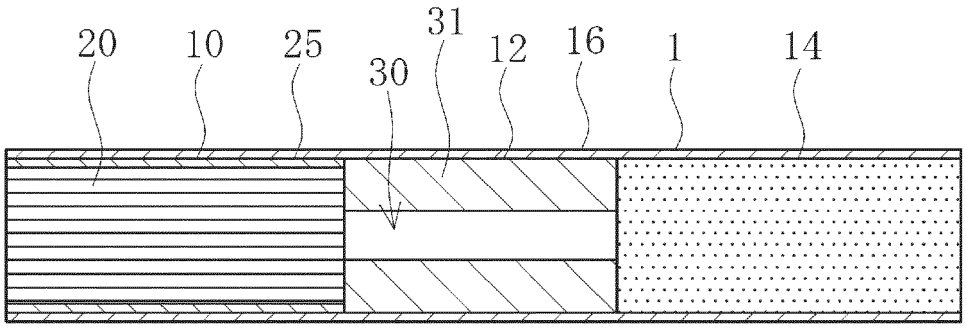


Fig.2

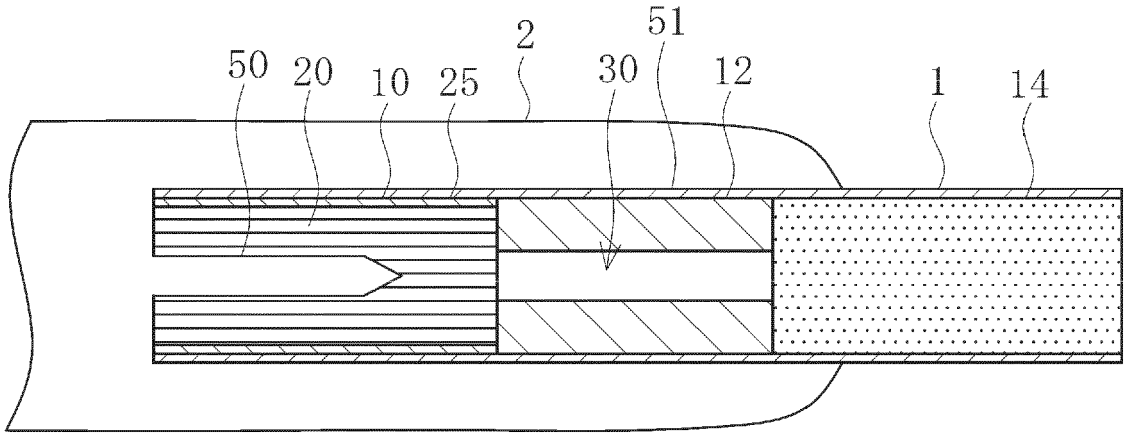


Fig.3

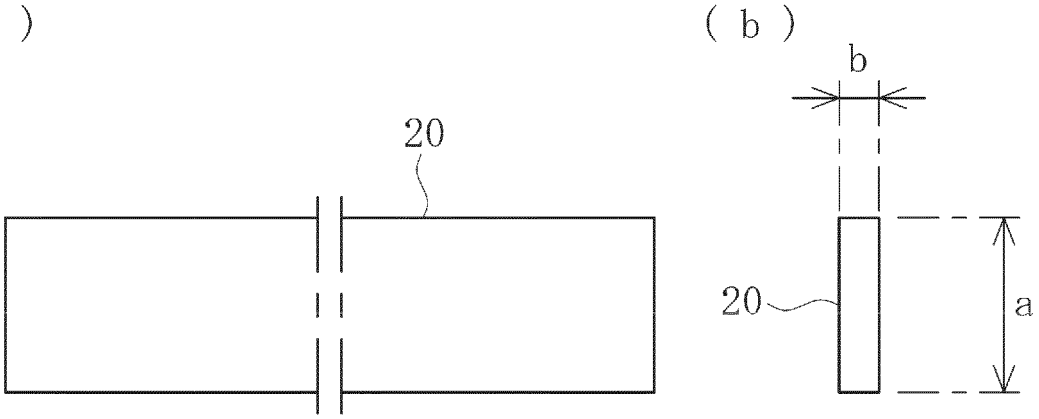


Fig.4

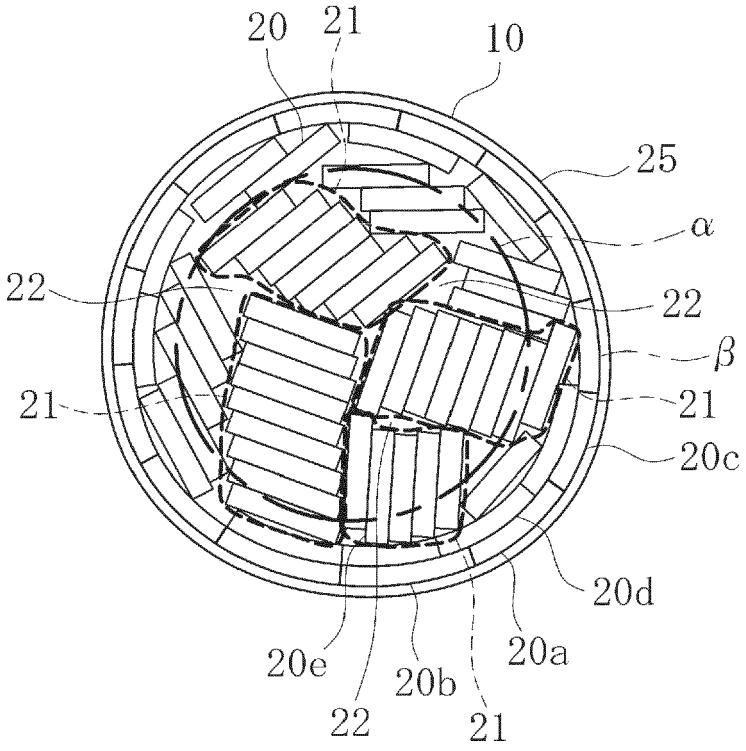


Fig.5

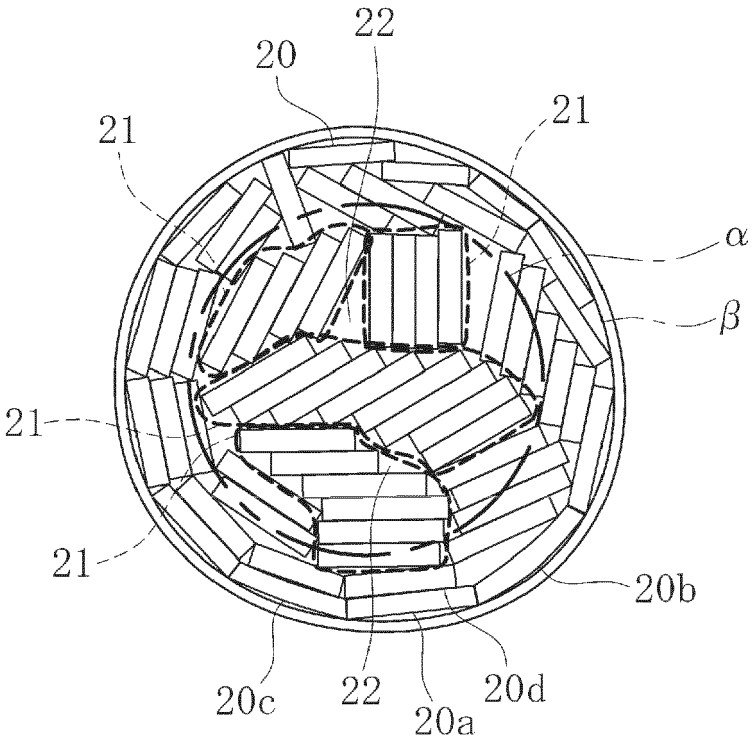
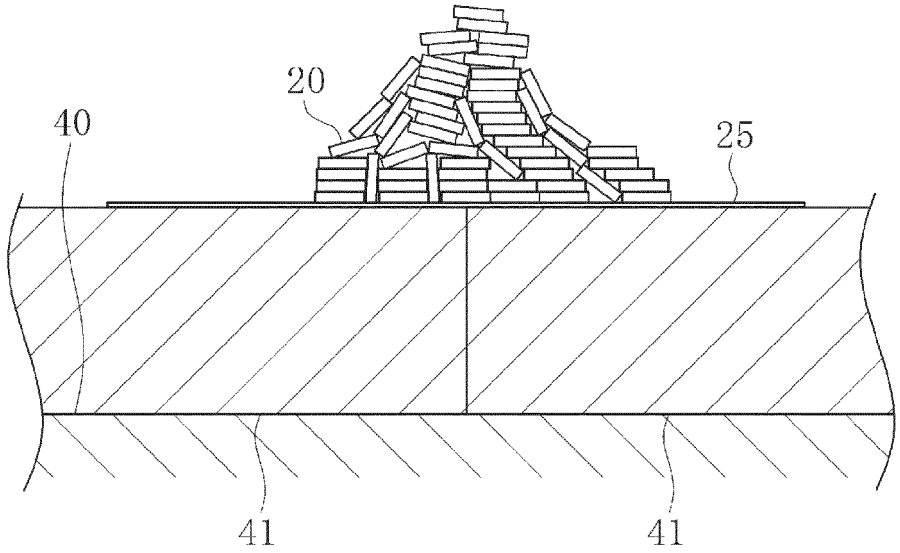


Fig.6

(a)



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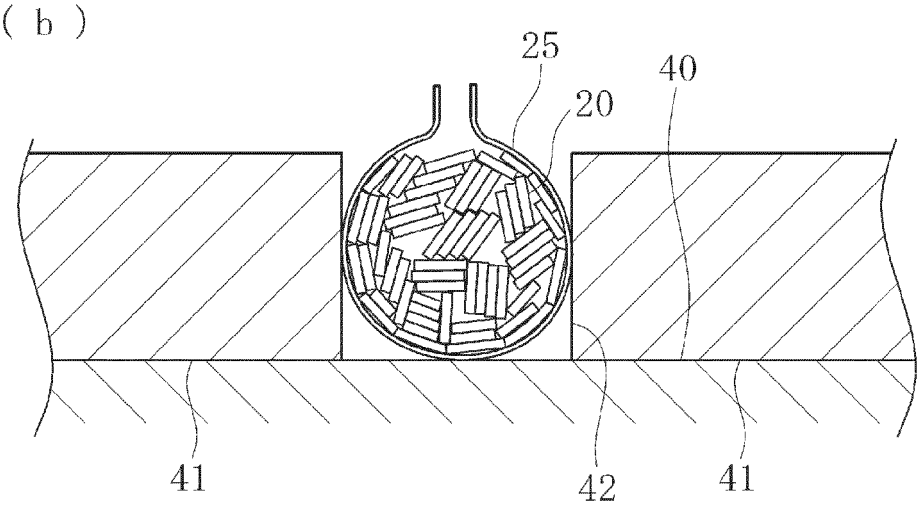


(c)

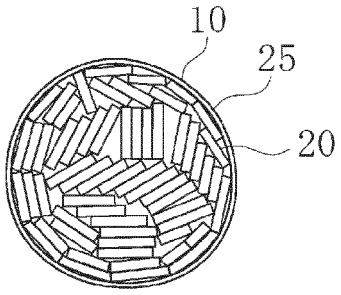
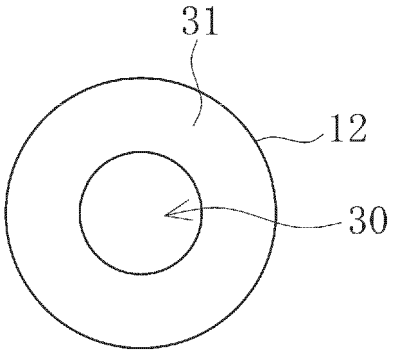


Fig.7

(a)



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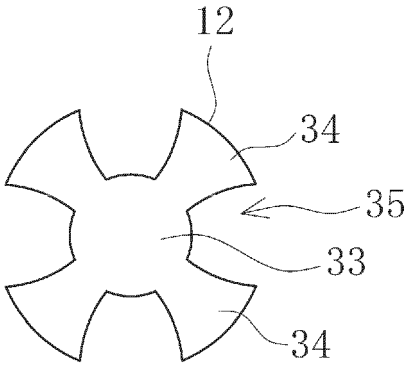

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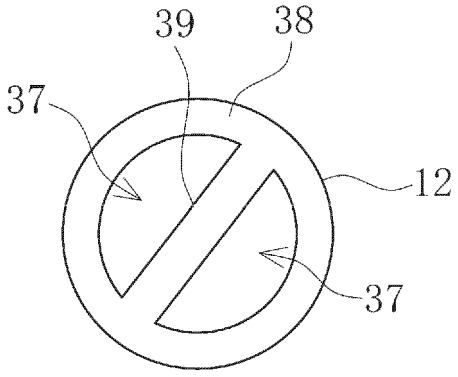

REFERENCES CITED IN THE DESCRIPTION

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