



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.08.2023 Bulletin 2023/32

(51) International Patent Classification (IPC):
A24C 5/14 (2006.01) **A24C 5/18** (2006.01)
A24D 1/20 (2020.01) **A24C 5/01** (2020.01)

(21) Application number: **23154334.9**

(52) Cooperative Patent Classification (CPC):
A24C 5/14; A24C 5/01; A24C 5/1828; A24D 1/20

(22) Date of filing: **19.09.2018**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **WOODMAN, Tom**
London, WC2R 3LA (GB)
• **ENGLAND, William**
London, WC2R 3LA (GB)

(74) Representative: **Brown, Alexander Edward et al**
Venner Shipley LLP
200 Aldersgate
London EC1A 4HD (GB)

(30) Priority: **22.09.2017 GB 201715380**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
18783370.2 / 3 684 201

Remarks:
This application was filed on 31.01.2023 as a divisional application to the application mentioned under INID code 62.

(71) Applicant: **Nicoventures Trading Limited**
London WC2R 3LA (GB)

(54) **AEROSOL-GENERATING MATERIAL ROD SEGMENT**

(57) An apparatus (100) for producing aerosol-generating material rod segments (126), the apparatus (100) comprising:
a first cutter (106) arranged to cut a sheet of aerosol-generating material (104) longitudinally to produce a plurality of aerosol-generating material strands (112); a gatherer (114) arranged to gather the strands (112) together to

form an aerosol-generating material rod (120) in which each of the plurality of aerosol-generating material strands (112) is substantially non-coiled; and a second cutter (124) arranged to cut the aerosol-generating material rod (120) into segments (126) to produce said aerosol-generating material rod segments (126).

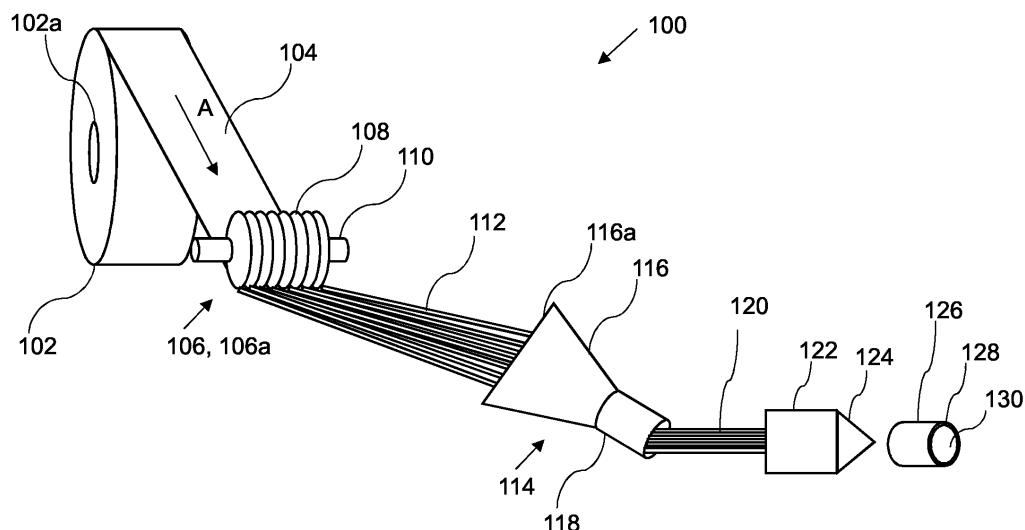


Fig. 1

Description

Technical Field

[0001] The present invention relates to a process and apparatus for producing aerosol-generating material rod segments.

Background

[0002] In a known process of manufacturing cigarettes, tobacco leaves are shredded into short fine strips, also referred to as cut rag tobacco. The shredded tobacco is then dispersed over a continuous web of cigarette paper. A machine, also known as a cigarette maker, folds the paper around the shredded tobacco to form a continuous rod. The rod is cut into segments of desired length. A filter is added to each tobacco rod segment to produce the cigarette.

[0003] Smoking articles such as cigarettes, cigars and the like burn tobacco during use to create tobacco smoke. Attempts have been made to provide alternatives to these articles by creating products that release compounds from tobacco or other materials without combusting. Examples of such products are so-called "heat not burn" products or tobacco heating devices or products or aerosol-generating devices or products, which release compounds by heating, but not burning, material, such as tobacco.

Summary

[0004] According to a first aspect of the present invention, there is provided a process of producing aerosol-generating material rod segments, comprising: cutting a sheet of aerosol-generating material longitudinally to produce a plurality of aerosol-generating material strands; gathering the strands together to form an aerosol-generating material rod in which each of the plurality of aerosol-generating material strands is substantially non-coiled; and cutting the aerosol-generating material rod into segments to produce said aerosol-generating material rod segments.

[0005] The gathering may comprise: gathering the strands together to form the aerosol-generating material rod in which the plurality of aerosol-generating material strands are substantially parallel to one another.

[0006] The gathering may comprise: gathering the strands together to form the aerosol-generating material rod in which each of the aerosol-generating material strands is substantially straight.

[0007] The sheet of aerosol-generating material may be a tobacco sheet.

[0008] The tobacco sheet may be a reconstituted tobacco sheet.

[0009] The sheet of aerosol-generating material may comprise glycerol.

[0010] The sheet of aerosol-generating material may

have a substantially constant mass per unit length.

[0011] The process may comprise: providing the sheet of aerosol-generating material from a bobbin of aerosol-generating material sheet.

[0012] The process may comprise: providing a mother reel of aerosol-generating material sheet; and slitting the mother reel to produce the bobbin.

[0013] The process may comprise: selecting a mass per unit length for the aerosol-generating material rod segments; determining, based on a mass per unit area of the sheet of aerosol-generating material, and based on the selected mass per unit length for the aerosol-generating material rod segments, a bobbin width; and slitting the mother reel to produce a bobbin having the determined bobbin width.

[0014] The process may comprise: selecting a strand number and/or a strand width for the aerosol-generating material rod segments; and determining, based on the selected strand number and/or strand width, a cut number and/or a cut spacing; and the cutting the sheet of aerosol-generating material may comprise cutting the sheet of aerosol-generating material with the determined cut number and/or cut spacing.

[0015] The process may comprise: feeding the sheet of aerosol-generating material in a sheet feed direction; and the cutting the sheet of aerosol-generating material may comprises cutting the sheet of aerosol-generating material substantially parallel to the sheet feed direction.

[0016] The gathering may comprise: gathering each of the strands towards an axis that lies in a plane, the plane including the feed direction and being perpendicular to a plane defined by the plurality of strands before they are gathered.

[0017] The gathering may comprise: gathering each of the strands towards an axis that lies centrally of the plurality of strands.

[0018] The gathering may comprise: gathering each of the strands substantially transversely to form the rod.

[0019] The gathering may comprise: feeding the strands through a funnel to gather the strands.

[0020] The process may comprise, before said cutting the sheet of aerosol-generating material: feeding the sheet of aerosol-generating material through the funnel to form an aerosol-generating material rod of non-cut tobacco sheet.

[0021] Each of the plurality of strands may have a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

[0022] The process may comprise: wrapping the aerosol-generating material rod in a wrapping material.

[0023] The wrapping material may be or comprise one or both of paper and aluminium foil.

[0024] The aerosol-generating material rod segments may each have an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm.

[0025] The aerosol-generating material rod segments may be consumables for an aerosol-generating device.

[0026] According to a second aspect of the present invention, there is provided apparatus for producing aerosol-generating material rod segments, the apparatus comprising: a first cutter arranged to cut a sheet of aerosol-generating material longitudinally to produce a plurality of aerosol-generating material strands; a gatherer arranged to gather the strands together to form an aerosol-generating material rod in which each of the plurality of aerosol-generating material strands is substantially non-coiled; and a second cutter arranged to cut the aerosol-generating material rod into segments to produce said aerosol-generating material rod segments.

[0027] The gatherer may be arranged to gather the strands together to form the aerosol-generating material rod in which the plurality of aerosol-generating material strands are substantially parallel to one another.

[0028] The gatherer may be arranged to gather the strands together to form the aerosol-generating material rod in which each of the aerosol-generating material strands is substantially straight.

[0029] The apparatus may be arranged to provide the sheet of aerosol-generating material from a bobbin of aerosol-generating material sheet.

[0030] The first cutter may be adjustable so as to adjust the number and/or width of the strands.

[0031] The first cutter may be adjustable to either cut said sheet of aerosol-generating material to produce said plurality of aerosol-generating material strands or to not cut said sheet of aerosol-generating material.

[0032] The apparatus may be arranged to feed the sheet of aerosol-generating material to the first cutter in a sheet feed direction; and the first cutter may be arranged to cut the sheet of aerosol-generating material substantially parallel to the sheet feed direction.

[0033] The gatherer may be arranged to gather each of the strands towards an axis that lies in a first plane, the first plane including the feed direction and being perpendicular to a second plane defined by the plurality of strands before they are gathered.

[0034] The gatherer may be arranged to gather each of the strands towards an axis that lies centrally of the plurality of strands.

[0035] The gatherer may be arranged to gather each of the strands substantially transversely to form the rod.

[0036] The gatherer may comprise a funnel.

[0037] The first cutter may be arranged to cut the sheet of aerosol-generating material longitudinally so as to produce the plurality of aerosol-generating material strands each having a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

[0038] The apparatus may comprise a wrapper arranged to wrap the aerosol-generating material rod in a wrapping material.

[0039] The wrapping material may be or comprise one or both of paper and aluminium foil.

[0040] The apparatus may be arranged to produce aerosol-generating material rod segments having an outer diameter substantially in the range 5.4 mm to 7.8 mm, or

substantially in the range 6.7 mm to 7.8 mm.

[0041] The aerosol-generating material rod segments may be consumables for an aerosol-generating device.

[0042] According to a third aspect of the present invention, there is provided a product comprising an aerosol-generating material rod, wherein the aerosol-generating material rod is formed of a plurality of longitudinal strands of aerosol-generating material, wherein each of the plurality of longitudinal strands of aerosol-generating material is substantially non-coiled.

[0043] The plurality of strands may be substantially parallel to one another.

[0044] Each of the plurality of strands may be substantially straight.

[0045] Each of the plurality of strands may have a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

[0046] One or more of the strands may be or comprise tobacco.

[0047] One or more of the strands may be or comprise reconstituted tobacco.

[0048] One or more of the strands may comprise glycerol.

[0049] The product may comprise a wrapping material wrapped around the aerosol-generating material rod.

[0050] The wrapping material may be or comprises one or both of paper and aluminium foil.

[0051] The product may have an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm.

[0052] The product may be a consumable for an aerosol-generating device.

[0053] The process of producing aerosol-generating rod segments may comprise a process for producing heat-not-burn device consumables, wherein the heat-not-burn device consumables comprise aerosol-generating rod segments.

[0054] The apparatus for producing aerosol-generating material rod segments may comprise an apparatus for producing heat-not-burn device consumables wherein the heat-not-burn device consumables comprise aerosol-generating material rod segments.

[0055] The product comprising an aerosol-generating material rod may comprise a heat-not-burn device consumable comprising an aerosol-generating material rod.

[0056] Further features and advantages of the invention will become apparent from the following description of preferred embodiments of the invention, given by way of example only, which is made with reference to the accompanying drawings.

Brief Description of the Drawings

[0057]

Figure 1 illustrates schematically a perspective view of an apparatus for producing tobacco rod segments, according to a first example;

Figure 2 illustrates schematically a side view of an apparatus for producing tobacco rod segments, according to a second example;

Figure 3 illustrates schematically a perspective view of a mother reel of tobacco sheet, according to an example;

Figure 4 illustrates schematically a flow diagram of a process of producing tobacco rod segments, according to an example; and

Figures 5a and 5b illustrate schematically insertion of a blade heater into a tobacco rod segment, according to an example.

Detailed Description

[0058] Referring to Figure 1, in broad overview, an example apparatus 100 for producing tobacco rod segments 126 comprises a first cutter 106, a gatherer 114, and a second cutter 124. The first cutter 106 is arranged to cut a tobacco sheet 104 longitudinally to produce a plurality of tobacco strands 112. The gatherer 114 is arranged to gather the strands 112 together to form a tobacco rod 120 in which each of the plurality of tobacco strands 112 is substantially non-coiled. The second cutter 124 is arranged to cut the tobacco rod 120 into segments to produce tobacco rod segments 126.

[0059] As is explained in more detail below, the gatherer 114 being arranged to gather the strands 112 together to form a tobacco rod 120 in which each of the plurality of tobacco strands 112 is substantially non-coiled allows for the production of a number of tobacco rod segments 126 into which a blade type heater of an aerosol generating device may be readily inserted (see e.g. Figures 5a and 5b), in use, and which facilitates transport of volatile materials therethrough thereby reducing losses of volatile materials when the tobacco rod segment 126 is heated.

[0060] Returning to Figure 1, the first cutter 106 is arranged to cut the tobacco sheet 104.

[0061] The tobacco sheet 104 may be a sheet or web of reconstituted tobacco. Reconstituted tobacco sheets may be produced, for example, by a paper making process, band casting or extrusion. For example, the reconstituted tobacco sheet may be paper reconstituted tobacco. Paper reconstituted tobacco refers to tobacco material formed by a process in which tobacco feedstock is extracted with a solvent to afford an extract of solubles and a residue comprising fibrous material, and then the extract (usually after concentration, and optionally after further processing) is recombined with fibrous material from the residue (usually after refining of the fibrous material, and optionally with the addition of a portion of non-tobacco fibres) by deposition of the extract onto the fibrous material. The process of recombination resembles the process for making paper. The feedstock may comprise or consist of one or more of tobacco strips, tobacco stems, and/or whole leaf tobacco. Scraps, fines and winnowings may alternatively or additionally be employed in

the feedstock. It will be appreciated that reconstituted tobacco sheet 104 formed by any process may be used. **[0062]** The reconstituted tobacco sheet 104 is malleable.

[0063] The tobacco sheet 104 may be provided from a bobbin 102 of tobacco sheet 104. The bobbin 102 comprises a spindle 102a around which continuous tobacco sheet 104 is wound. The bobbin 102 is arranged to rotate to feed the tobacco sheet 104 from the bobbin 102 to the first cutter 106 along a sheet feed direction (arrow A). In some examples, the apparatus 100 may be arranged to drive the bobbin 102 to rotate. In other examples, the bobbin 102 may be free to rotate, and the tobacco sheet 104 being pulled from the bobbin 102 by a downstream component of the apparatus, for example a roller or drive belt (not shown in Figure 1) may cause the bobbin to rotate.

[0064] The tobacco sheet 104 may comprise glycerol. For example, the reconstituted tobacco sheet 104 may be impregnated or otherwise formed with glycerol. When heated, the glycerol may be volatilised to form an aerosol, which may enhance user experience of an aerosol-generating device, or any suitable "heat not burn" device, with which the tobacco rod segment 126 may be used.

[0065] The tobacco sheet 104 is of known dimensions. For example, the width and thickness of the tobacco sheet 104 fed from the bobbin 102 may be constant and known. For example, the tobacco sheet 104 may be of a given and constant mass per unit length. This may ensure that the tobacco rod segments 126 produced are of consistent weight per unit length. Using a tobacco sheet 104 of known (and constant) dimensions therefore allows weight control of the resulting tobacco rod segments 126 without the need for weighing systems for weighing the tobacco rod 120 or tobacco rod segments 126.

[0066] The first cutter 106 is arranged to cut the tobacco sheet 104 longitudinally to produce a plurality of tobacco strands 112. The tobacco strands 112 produced are elongate. The first cutter 106 comprises a cutter array 106a. The cutter array 106a comprises a plurality of circular discs 108 arranged along an axle 110. The discs 108 each have sharpened edges. The axle 110 is arranged substantially perpendicularly to the sheet feed direction (arrow A), and each disc 108 is arranged such that the cutting edge of the disc 108 runs substantially parallel to the sheet feed direction (arrow A). Each disc 108 is arranged to cut the tobacco sheet 104 longitudinally i.e. to cut the tobacco sheet 104 along its length, as the tobacco sheet 104 is fed through the first cutter 106. For example, the cutter array 106a may cut the tobacco sheet 104 against a support surface (not shown) arranged on an opposite side of the tobacco sheet 104 to the cutter array 106a. The plurality of discs 108 act to cut the tobacco sheet 104 into a plurality of substantially parallel elongate tobacco strands 112.

[0067] The number of tobacco strands 112 produced depends on the number of cutting discs 108 the cutter array 106a comprises. For example, a cutter array 106a

comprising eight cutting discs 108 will produce a total of nine tobacco strands. In general, a cutter array 106a comprising n cutting discs 108 will produce n+1 tobacco strands 112.

[0068] The strand width of the tobacco strands 112 depends on the spacing between consecutive ones of the cutting discs 108. The discs 108 are equally spaced along the length of the axle 110, and along the width of the tobacco sheet 104, so that each of the elongate tobacco strands 112 is of substantially equal width. This arrangement may help to ensure consistency of the tobacco rod segments 126 produced. The cutter array 106a may be arranged such that each of the plurality of elongate tobacco strands 112 has a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm. This would correspond, for example, to the cutting discs 108 being spaced apart by substantially 0.25 mm to 3 mm, or substantially 0.5 mm to 1.5 mm, respectively.

[0069] The first cutter 106 may be adjustable so as to adjust the number and/or width of the strands 112 into which the tobacco sheet 104 is cut. For example, the cutting discs 108 may be adjustable on the axle 110 to adjust the number of discs 108 on the axle and/or to adjust the spacing between each disc 108 along the axle 110. As another example, the cutter array 106a may be replaceable by another cutter array 106a having a different number of discs 108 and/or different spacing between the discs 108. This allows flexibility in the number and/or width of the strands 112 in the tobacco rod segments 126 produced, and hence flexibility in the characteristics of those tobacco rod segments 126.

[0070] The gatherer 114 is arranged to gather the plurality of tobacco strands 112 together to form a tobacco rod 120. The gatherer 114 is a funnel 114. The funnel 114 comprises a funnel portion 116 and a stem portion 118. The funnel portion 116 and the stem portion 118 are circular in cross-section, and are coaxial. The funnel 114 is symmetric about its axis. The funnel portion 116 narrows from a relatively wide mouth 116a to the relatively narrow stem portion 118. The tobacco strands 112 travel through the funnel 114 from the funnel portion 116 to the stem portion 118. As the tobacco strands 112 travel through the funnel 114, the narrowing diameter of the funnel portion 116 gathers the strands 112 together to form the tobacco rod 120.

[0071] The funnel 114 is aligned with and positioned centrally of the plurality of tobacco strands 112. The funnel 114 therefore gathers each of the strands 112 substantially transversely to form the rod 120. Specifically, the funnel 114 gathers each of the strands 112 towards an axis that lies centrally of the plurality of strands 112. The funnel 114 being aligned with the tobacco strands 112 in this way may allow the strands 112 to be gathered evenly and centrally of the funnel 114.

[0072] The funnel 114 is aligned with and positioned centrally of the tobacco sheet 104. Specifically, the axis towards which the strands 112 are gathered by the funnel

114 lies in a first plane, the first plane including the feed direction (arrow A) and being perpendicular to a second plane defined by the plurality of strands 112 before they are gathered. This alignment may help ensure an even tension across the plurality of strands 112 as they are gathered by the funnel 114.

[0073] The funnel 114 applies substantially transverse forces to the strands 112 as they pass through the funnel 114, which transverse forces are directed substantially centrally of the plurality of strands 112. The tobacco strands 112 are not coiled as they are gathered, i.e. remain substantially non-coiled as they are gathered (i.e. during the gathering), i.e. as they pass through the funnel 114. For example, the tobacco strands 112 are not twisted, spiralled, rolled or intertwined relative to one another as they are gathered, for example they do not form a twisted or spiralled or helical structure or shape as they are gathered. The funnel 114 therefore gathers the strands 112 together to form the tobacco rod 120 in which each of the plurality of tobacco strands 112 are substantially non-coiled. The tobacco strands 112 remain substantially parallel to one another as they are gathered, i.e. as they pass through the funnel 114. The funnel 114 therefore gathers the strands 112 together to form the tobacco rod 120 in which the plurality of tobacco strands 112 are substantially parallel to one another. The tobacco strands 112 are not substantially bent, corrugated, crimped or deformed or the like as they are gathered, and remain substantially straight as they are gathered, i.e. as they pass through the funnel 114. The funnel 114 therefore gathers the strands 112 together to form the tobacco rod 120 in which each of the plurality of tobacco strands 112 is substantially straight.

[0074] The apparatus 100 comprises a wrapper 122 arranged to wrap the tobacco rod 120 in a wrapping material 128. The wrapper 122 may be, for example, the same as or similar to the wrapper 222 described below with reference to Figure 2. In brief, the wrapper 122 wraps a continuous sheet of wrapping material 128 around a circumference of the continuous tobacco rod 120, and applies adhesive to the wrapping material 128 to seal the wrapping material 128 in place around the rod 120. The wrapping material may be or comprise, for example, one or both of paper and aluminium foil. For example, the wrapping material may be a laminate of aluminium foil and paper. This laminate may help prevent ignition of the tobacco rod segment 126, which may be useful for example where the tobacco rod segment 126 is for use as a consumable in a "heat not burn" device, or a tobacco heating product device, or an aerosol-generating device.

[0075] The outer diameter of the tobacco rod 120 once wrapped may depend, for example, on the mass per unit length of the tobacco sheet 104 used, the thickness and width of the tobacco sheet 104 used, the level of compression in the garniture during rod forming, and/or for example properties of the wrapper 122 and/or wrapping material 128 used. The outer diameter of the wrapped tobacco rod 120 may be constant during a given opera-

tional cycle of the apparatus 100. The outer diameter may be substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm, for example.

[0076] The second cutter 124 is arranged to cut the tobacco rod 120 (for example after it has been wrapped in wrapping material 128 by the wrapper 122) into segments 126 to produce the tobacco rod segments 126. The second cutter 124 cuts through the tobacco rod 120 transversely, so as to produce lengths of tobacco rod 120 (i.e. the tobacco rod segments 126. The second cutter 124 may comprise, for example, a blade (not shown) whose cutting surface (not shown) is arranged perpendicularly to the length of the tobacco rod 120, and is controllable to slice through the tobacco rod 120. The tobacco sheet 104, tobacco strands 112, and tobacco rod 120 may progress through the apparatus 100 at a constant rate. The second cutter 124 may be arranged to cut through the continuous tobacco rod 120 at regular intervals of time, thereby to produce tobacco rod segments 126 of equal length. The tobacco rod segments 126 may have, for example, a length in the range of 12 mm to 60 mm. For example, the tobacco rod segments 126 may be 12 mm in length, or may be 42 mm in length, or may be 60 mm in length. Other lengths may be obtained, for example, by changing the interval between consecutive cuts.

[0077] In use, the first cutter 106 cuts the tobacco sheet 104 longitudinally to produce the plurality of tobacco strands 112. The gatherer 114 gathers the strands 112 together to form the tobacco rod 120 in which each of the plurality of tobacco strands 112 is substantially non-coiled, for example substantially straight. The second cutter 124 cuts the tobacco rod 120 into segments to produce the tobacco rod segments 126.

[0078] The apparatus 100 thereby produces tobacco rod segments 126 each comprising a tobacco rod 130 formed of a plurality of longitudinal strands of tobacco (not shown), i.e. strands of tobacco extending along a direction of the length of the tobacco rod 130, wherein each of the plurality of longitudinal strands (not shown) are substantially non-coiled.

[0079] The first cutter 106 may be adjustable to either cut the tobacco sheet 104 into a plurality of strands 112, or to not cut the tobacco sheet 104 at all. In use, when the apparatus 100 is first used for a given tobacco sheet 104, the first cutter 106 may be adjusted so as to not cut the tobacco sheet 104 into the plurality of strands 112. The non-cut tobacco sheet 104 may then be fed through the funnel 114 to form a tobacco rod (not shown) of non-cut tobacco sheet 104, and the resulting rod (not shown) of non-cut tobacco sheet 104 may be fed through the wrapper 122 and the second cutter 124 to form segments (not shown) of the rod (not shown) of non-cut tobacco sheet 104. Once the formation of the rod (not shown) of non-cut tobacco sheet 104 is stable, for example, once a few segments (not shown) of the rod (not shown) of non-cut tobacco sheet 104 have been produced, the first cutter 106 may be adjusted to cut the tobacco sheet 104

into a plurality of strands 112 as described above, thereby to produce tobacco rod segments 126 each comprising a tobacco rod 130 formed of a plurality of strands of tobacco 112 wherein each of the plurality of strands 112 are substantially non-coiled. The few segments (not shown) of the rod (not shown) of non-cut tobacco sheet 104 produced before the tobacco rod segments 126 comprising a plurality of strands of tobacco 112 are produced, may be discarded. This may allow for simpler and more consistent setup of the apparatus 100 on installation or replacement of tobacco sheet 104, for example a bobbin 102 of tobacco sheet 104.

[0080] Referring now to Figure 2, there is illustrated schematically an apparatus 200 for producing tobacco rod segments 226 according to another example. Components of the apparatus 200 illustrated in Figure 2 that are the same or similar to the components already described with reference to Figure 1 will not be described again in detail, but are given the same reference signs to as in Figure 1 except increased by 100.

[0081] The apparatus 200 comprises a first cutter 206, a gatherer 214, and a second cutter 224. The first cutter 206 is arranged to cut a tobacco sheet 204 longitudinally to produce a plurality of tobacco strands 212. The gatherer 214 is arranged to gather the strands 212 together to form a tobacco rod 220 in which each of the plurality of tobacco strands 212 is substantially non-coiled, for example substantially straight. The second cutter 224 is arranged to cut the tobacco rod 220 into segments 226 to produce the tobacco rod segments 226.

[0082] The apparatus 200 comprises a bobbin 202 of tobacco sheet 204. The tobacco sheet 204 is fed towards the first cutter 226 from the bobbin 202 of tobacco sheet 204.

[0083] The apparatus 200 comprises a tensioning arrangement 205 comprising a plurality (in this example four) tension rollers 205a, 205b, 205c, 205d. The tobacco sheet 104 is fed from the bobbin 202 over the tension rollers 205a, 205b, 205c, 205d, before being fed to the first cutter 206 in a sheet feed direction (arrow A). This may help ensure that the tobacco sheet 204 has sufficient tension, for example longitudinal tension, to be cut effectively by the first cutter 206. This may also help to smooth out the tobacco sheet 104, for example to remove any creases that may be in the tobacco sheet 104.

[0084] The first cutter 206 comprises two cutting arrays 206a, 206b arranged to contact opposite major surfaces of the tobacco sheet 204. Each cutting array 206a, 206b may be the same or similar to the cutting array 106a described above with reference to Figure 1. The cutting arrays 206a, 206b are arranged to press towards one another against the tobacco sheet, thereby to cut the tobacco sheet 204 longitudinally into a plurality of tobacco strands 112 (the plurality of tobacco strands 112 are distributed along a plane running into the page of Figure 2). For example, the cutting arrays 206a, 206b may be offset from one another in a direction perpendicular to the feed direction of the tobacco sheet (i.e. offset in a

direction running into the page of Figure 2).

[0085] The gatherer 214 comprises a funnel 214 comprising a funnel portion 216 and a stem portion 218. The axis of the funnel 114 lies centrally of the plurality of tobacco strands 112 and lies in the plane along which the plurality of tobacco strands is distributed. The plurality of tobacco strands 112 are gathered together as they travel through funnel 214, to form a tobacco rod 220.

[0086] The apparatus 200 comprises a wrapper 222 arranged to wrap the tobacco rod 220 in a wrapping material 228. The wrapper 222 may be or comprise for example, a rod maker as known in the art, for example a KDF (kinetic fluxion media) filter rod maker to control the orientation and tension wrapping material 228.

[0087] The wrapper 222 comprises a drive belt 246, a wrapper material bobbin 252, a garniture 240, an adhesive section 242, and a heater section 244.

[0088] The drive belt 246 is a continuous strip of flexible material looped around and supported by two rollers 248a, 248b. The drive belt 246 is held taut between the rollers 248a, 248b so as to define a generally flat upper drive belt surface 246a. The rollers 248a, 248b are arranged to rotate about their respective axes, so that the drive belt surface 246a may translate between the two rollers 248a, 248b. One or both of the rollers 248a, 248b is driven to rotate (clockwise in the sense of Figure 2) about its axis, so as to cause the upper drive belt surface 246a to translate (from left to right in the sense of Figure 2).

[0089] The wrapping material bobbin 252 supplies a continuous sheet or web of wrapping material 228 to the upper drive belt surface 246a. The wrapping material 228 may be fed onto the upper drive belt surface 246a by the friction of the moving upper drive belt surface 246a against the sheet of wrapping material 228. Accordingly, the sheet of wrapping material 228 travels on top of the upper drive belt surface 246a (from left to right in the sense of Figure 2). The tobacco rod 220 is fed onto the sheet of wrapping material 228 on the upper drive belt surface 246a. Friction between the moving wrapping material 228 and the tobacco rod 220 may at least in part cause the tobacco rod 220 to be fed onto the wrapping material 228 and so to move with the wrapping material 228. Alternatively or additionally, the tobacco rod 220 may be fed onto the moving wrapping material 228 by other means, such as one or more feed rollers or the like. In either case, the tobacco rod 220 is fed onto the wrapping material 228 so that the tobacco rod 220 moves with (i.e. at the same rate as) the wrapping material 228, which in turn moves with (i.e. at the same rate as) the upper drive belt surface 246a.

[0090] The garniture 240, as is known per se, folds the wrapping material 228 around the tobacco rod 220 as they move through the garniture 240. The garniture 240 wraps the wrapping material 228 around the circumference of the tobacco rod 220. The garniture wraps the wrapping material 228 around the tobacco rod 220 over slightly more than the circumference of the tobacco rod

120 so that there is a portion where the wrapping material 228 overlaps with itself (not shown).

[0091] The adhesive section 242 applies adhesive to the wrapping material 228 so as to secure the wrapping material 228 in place around the tobacco rod 220. Specifically, the adhesive section 242 applies adhesive to the portion where the wrapping material 228 overlaps with itself, so as to secure the wrapping material 228 to itself around the tobacco rod 220.

[0092] The heater section 244 heats the tobacco rod 220 so as to assist the drying and/or curing of the adhesive. This helps to ensure the adhesive is sufficiently dry/cured before the tobacco rod is cut into tobacco rod segments 226.

[0093] The second cutter 224 is arranged to cut the tobacco rod 220 into segments to produce the tobacco rod segments 226. The second cutter 224 may be the same or similar to the second cutter 124 described above with reference to Figure 1.

[0094] In use, the first cutter 206 cuts the tobacco sheet 204 longitudinally to produce the plurality of tobacco strands 212. The gatherer 214 gathers the strands 212 together to form the tobacco rod 220 in which each of the plurality of tobacco strands 212 is substantially non-coiled. The second cutter 224 cuts the tobacco rod 220 into segments to produce the tobacco rod segments 226.

[0095] The apparatus 200 thereby produces tobacco rod segments 226 each comprising a tobacco rod 230 formed of a plurality of longitudinal strands of tobacco (not shown), i.e. strands of tobacco extending along a direction of the length of the tobacco rod 230, wherein each of the plurality of longitudinal strands (not shown) are substantially non-coiled, for example substantially straight.

[0096] Similarly to as described with reference to the apparatus 100 of Figure 1, the first cutter 206 of the apparatus 200 of Figure 2 may be adjustable to either cut the tobacco sheet 104 into a plurality of longitudinal stands 112, or to not cut the tobacco sheet 104 at all. As described above, this may allow for simpler and more consistent setup of the apparatus 200 on installation or replacement of tobacco sheet 204, for example a bobbin 202 of tobacco sheet 204.

[0097] As mentioned above, in some examples the tobacco sheet 104, 204 is provided from a bobbin 102, 202 of tobacco sheet 104, 204.

[0098] Referring to Figure 3, a bobbin 302a of tobacco sheet 304, which may for example used as the bobbin 102, 202 as described above with reference to Figures 1 and 2, may be provided from a mother reel 370 of tobacco sheet 304. The mother reel 370 may be slit transversely (see dashed line 372) to produce the bobbin 302a of tobacco sheet 304.

[0099] The mother reel 307 may be slit so as to produce a bobbin 302a having a certain width W. This provides that the tobacco sheet 304 of the bobbin 302a has a certain mass per unit length, and hence that the tobacco rod segments (not shown in Figure 3) produced have a

certain mass per unit length. Accordingly, at the beginning of a manufacturing process, a desired mass per unit length of the tobacco rod segments (not shown in Figure 3) may be selected. A bobbin width *W* may then be determined based on the selected mass per unit length for the tobacco rod segment (not shown), and based on the known mass per unit area of the tobacco sheet 304 of the mother reel 370. For example, the mass per unit area (also referred to as grammage) of the tobacco sheet 304 may be 100 g/m². The mother reel 370 may then be slit to produce a bobbin 302a having the determined bobbin width *W*. The bobbin 302a may then be used, for example in the apparatus 100, 200 described above with reference to Figures 1 and 2, to produce tobacco rod segments (not shown in Figure 3) having the desired mass per unit length. The mother reel 370 may be slit a number of times to produce bobbins 302b, 302c, 302d, 302e as desired, for example with the same or different bobbin widths *W*. This may allow convenient and inexpensive control over the mass per unit length of the tobacco rod segments (not shown in Figure 3) produced.

[0100] Figure 4 illustrates schematically a flow diagram of a process of producing tobacco rod segments 126, 226 according to an example. For example, the process may be performed using the apparatus 100, 200 described above with reference to Figures 1 and 2, respectively. Reference signs used in Figures 1 and 2 are therefore also used in the below as appropriate.

[0101] In step S402, the process comprises cutting a tobacco sheet 104, 204 longitudinally to produce a plurality of tobacco strands 112, 212.

[0102] The tobacco sheet 104, 204 may have a substantially constant mass per unit length, may be a reconstituted tobacco sheet and/or may comprise glycerol.

[0103] The process may comprise, prior to step S402, providing the tobacco sheet 104, 204 from a bobbin 102, 202 of tobacco sheet 104, 204. This may comprise providing a mother reel 307 of tobacco sheet 104, 204, 304, and slitting the mother reel to produce the bobbin 102, 202, 302a. This in itself may comprise selecting a mass per unit length for the tobacco rod segments 126, 226, determining, based on a mass per unit area of the tobacco sheet 104, 204, 304, and based on the selected mass per unit length for the tobacco rod segments, a bobbin width *W*, and slitting the mother reel 307 to produce a bobbin 102, 202, 302a having the determined bobbin width *W*.

[0104] The process may comprise, prior to step S402, feeding the tobacco sheet 104, 204, in a sheet feed direction *A*. The cutting the tobacco sheet 104, 204, 304 in S402 may then comprise cutting the tobacco sheet 104, 204, 304 substantially parallel to the sheet feed direction *A*.

[0105] Step S402 may comprise cutting the tobacco sheet 104, 204 with a determined cut number and/or cut spacing. The cut number and/or cut spacing may be determined by selecting a strand 112, 212 number and/or a strand 112, 212 width for the tobacco rod segments

126, 226, and determining, based on the selected strand number and/or strand width, the cut number and/or a cut spacing. Each of the plurality of strands may have a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

[0106] In step S404, the process comprises gathering the strands 112, 212 together to form a tobacco rod 112, 212 in which each of the plurality of tobacco strands 112, 212 is substantially non-coiled. Step S404 may comprise gathering the strands 112, 212 together to form the tobacco rod 120, 220 in which the plurality of tobacco strands 112, 212 are substantially parallel to one another and/or are each substantially straight. Step S204 may comprise gathering each of the elongate strands 112, 212 substantially transversely, towards an axis that lies centrally of the plurality of strands 112, 212, to form the rod 120. The axis towards which the strands 112, 212 are gathered may lie in a plane, the plane including the feed direction *A* and being perpendicular to a plane defined by the plurality of strands 112, 212 before they are gathered. Step S204 may comprise feeding the strands 112, 212 through a funnel 114, 214 to gather the strands 112, 212.

[0107] The process may comprise, before said cutting the tobacco sheet 104, 204 in step S402 is applied, feeding the tobacco sheet 104, 204 through the funnel 114, 214 to form a tobacco rod (not shown) of non-cut tobacco sheet 114, 214.

[0108] In step S406, the process comprises cutting the tobacco rod 120 (of tobacco strands 112, 212) into segments to produce said tobacco rod segments 126, 226.

[0109] The process may comprise, prior to step S406, wrapping the tobacco rod 120, 220 in a wrapping material 128, 228. The wrapping material 128, 228 may be or comprise one or both of paper and aluminium foil. For example, the wrapping material 128, 228 may be a laminate of paper and aluminium foil. The tobacco rod segments 126, 226 (being wrapped) may each have an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm. The tobacco rod segments 126, 226 may be consumables for an aerosol generating device.

[0110] Figure 5a illustrates schematically a tobacco rod segment 526 according to an example being placed on a blade heater 580 of an aerosol-generating device (not shown). Specifically, Figure 5a illustrates the tobacco rod segment 526 before being installed over the blade heater 580, and Figure 5b illustrates the tobacco rod segment 526 after it has been installed over the blade heater 580.

[0111] The tobacco rod segment 526 may be, for example, the same or similar to the tobacco rod segment 126, 226 described above with reference to Figures 1 and 2, respectively. The tobacco rod segment 526 may be produced, for example, by the apparatus 100, 200 described above with respect to Figures 1 and 2, respectively and/or by the process described above with respect to Figure 4.

[0112] Referring to Figures 5a and 5b, the tobacco rod segment 526 comprises a tobacco rod 530 formed of a plurality of longitudinal strands 512 of tobacco, i.e. a plurality of strands 512 of tobacco extending in a direction of a length of the tobacco rod 530, wherein each of the plurality of longitudinal strands 512 are substantially non-coiled. The plurality of strands 512 are substantially parallel to one another, substantially straight, and each extend along substantially the entire length of the tobacco rod segment 526. The tobacco rod segment 526 comprises a wrapping material 528 wrapped around the tobacco rod 530.

[0113] The blade heater 580 can take the form of an elongate cuboid that is significantly thinner than it is wide or long. The width of the blade heater 580 is less than the outer diameter of the tobacco rod segment 526. The blade heater 538 may comprise a resistive heater (not shown) powered by a battery (not shown) of a hand-held aerosol generating device (not shown) and which is controllable by a user to heat up. In some examples, the blade heater 580 may have a pointed end (not shown) so as to facilitate insertion of the blade heater into the tobacco rod segment 526.

[0114] The blade heater 580 may be inserted into the tobacco rod segment 526 (arrow B in Figure 5a), or equally the tobacco rod segment 526 may be pushed over the blade heater 580, so that the blade heater 580 extends longitudinally into the tobacco rod segment 526 (as shown in Figure 5b).

[0115] The plurality of longitudinal strands 512 of the tobacco rod segment 526 being substantially non-coiled allow the blade heater 580 to be easily inserted into the tobacco rod segment 526. This is because the non-coiled longitudinal strands 512 present relatively little resistance to longitudinal insertion of the blade heater 580. This may provide for convenient installation or replacement of the tobacco rod segment 528 onto the blade heater 580, which tobacco rod segment 526 may be a consumable of the overall aerosol generating device (not shown). This may reduce damage to the tobacco rod segment 526 on insertion of the blade heater 580, and allow for more consistent and correct placement of the tobacco rod segment 526 relative to the blade heater 580. This may be contrasted, for example, with a hypothetical tobacco rod segment comprising longitudinal strands that are coiled, for example arranged in a helical structure: in this case insertion of the blade heater would be restricted by strands crossing the insertion path, and the blade heater may deform and compress portions of the tobacco, which may lead to relatively difficult and inconsistent placement of the hypothetical tobacco rod segment, and may result in an increased risk of damaging the hypothetical tobacco rod segment.

[0116] The plurality of longitudinal strands 512 of the tobacco rod segment 526 being parallel to one another and/or straight similarly allows the blade heater 580 to be easily inserted into the tobacco rod segment 526. In this case, the axis of insertion of the blade heater 580 is

parallel to the axis of each of the longitudinal strands 512, and only a small surface area of tobacco is presented to the leading edge of the blade heater 580 as it is inserted. Similarly to as mentioned above, this may provide for convenient installation or replacement of the tobacco rod segment 526 and/or reduce damage to the tobacco rod segment 526, and/or provide for more consistent and correct placement of the tobacco rod segment 526 relative to the blade heater 580. This may be contrasted, for example, with a hypothetical tobacco rod segment comprising randomly oriented shreds of cut rag tobacco, or comprising crimped or corrugated sheets of tobacco: in this case insertion of a blade heater may deform and compress portions of the cut rag tobacco or edges of the crimped or corrugated sheets of tobacco, which may lead to relatively difficult and inconsistent placement of the hypothetical tobacco rod segment, and may result in an increased risk of damaging the hypothetical tobacco rod segment.

[0117] Once the tobacco rod segment 526 is inserted over the blade heater 580 of the overall aerosol generating device (not shown), the blade heater 580 may be controlled to heat up (for example via resistive heating internal of the blade heater 580), and thereby to heat, but not burn, the tobacco strands 512. This may release constituents, for example volatile constituents, from the tobacco strands 512. As mentioned above, the tobacco strands 512 may comprise glycerol, which may be volatilised when heated by the blade heater 580 to form an aerosol.

[0118] The plurality of substantially non-coiled longitudinal strands 512 of the tobacco rod segment 526 establish a corresponding plurality of substantially non-coiled longitudinal pathways 513 through the tobacco rod segment 526, in between the plurality of longitudinal strands 512. These pathways 513 facilitate the transport of volatile materials released from the tobacco strands 512 on heating (for example volatile constituents of the tobacco itself or volatilised glycerol or both) through the tobacco rod segment 526. This may reduce the losses of such materials as they pass through the tobacco rod segment 526, for example the relatively short and uninterrupted pathways 513 may reduce occurrences of condensation of the volatile materials back onto portions of the tobacco rod segment 526. This may be contrasted for example, with a hypothetical tobacco rod segment comprising randomly oriented shreds of cut rag tobacco (such as in standard cigarettes), in which the path length for volatilised materials to exit the hypothetical tobacco rod is relatively long. This may also be contrasted with a hypothetical tobacco rod segment comprising a plurality of coiled longitudinal strands, in which the path length for volatilised materials to exit the hypothetical tobacco rod is also relatively long.

[0119] As mentioned above, the wrapping material 528 may, for example, be or comprise one or both of paper and aluminium foil, for example a laminate of paper and aluminium foil. The laminate of paper and aluminium foil

may be useful to prevent the tobacco rod segment 526 from being ignited by the blade heater 580.

[0120] Each of the plurality of strands 512 may have a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm. The tobacco rod segment 526 may have an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm. This may allow the use of a relatively large blade heater 580, hence increasing the heating surface area of the blade heater 580, hence increasing the rate at which the tobacco may be heated and/or the amount of tobacco that may be heated by the blade heater 580.

[0121] The above examples are to be understood as illustrative examples of the invention.

[0122] For example, although in the above examples the tobacco sheet 104, 204, 304 is described as being a sheet of reconstituted tobacco, this need not necessarily be the case, and in other examples, the tobacco sheet 104, 204, 304 may be made of other materials. The tobacco sheet 104 may or may not comprise glycerol, and may comprise other materials, such as additives or enhancers, alternatively or additionally to glycerol.

[0123] Although in some of the above examples the tobacco sheet 104, 204, 304 is described as being provided from a bobbin 102, 202, 302, this need not necessarily be the case and may for example be supplied from another device or source (not shown), said device or source not necessarily forming part of the apparatus 100, 200.

[0124] Although in the above examples the first cutter 106, 206 is described as comprising an array of circular discs 108, this need not necessarily be the case and in other examples the first cutter 106, 206 may be any suitable cutter or cutting means to cut the tobacco sheet 104 longitudinally to form a plurality of tobacco strands 112, 212.

[0125] Although in the above examples the gatherer 114, 214 was described as a funnel 114, 214 having a circular cross-section, this need not necessarily be the case, and in other examples the gatherer 114, 214 may take different forms. For example, the gatherer 114, 214 may be or comprise a so-called stuffer jet (not shown) arranged to feed and gather the plurality of strands 112, 212 by using air pressure. As another example, the funnel 114, 214 need not be circular in cross section, and may, for example, have another cross-section such as rectangular or square. Indeed, the gatherer may be any suitable means for gathering the strands 112, 212 together to form a tobacco rod 120, 220 in which each of the plurality of tobacco strands 112, 212 is substantially non-coiled.

[0126] Although in the above examples the apparatus 100, 200 comprises a wrapper 122, 222 arranged to wrap the tobacco rod 120, 220 in a wrapping material 128, 228, before the tobacco rod is cut by the second cutter 124 into segments 126, 226 to produce the tobacco rod segments 126, 226, this need not necessarily be the case and in other examples the apparatus 100, 200 may not

comprise a wrapper 122, 222, and the (nonwrapped) tobacco rod 120, 220 may be cut by the second cutter 124, 224 into segments 126, 226 to produce the tobacco rod segments 126, 226. In this example, the tobacco rod segments 126, 226 produced need not necessarily comprise wrapping material 128, 228.

[0127] It will be appreciated that Figures 1 and 2 illustrate schematically examples of an apparatus for producing tobacco rod segments 126, 226 according to an example, and that in other examples, the apparatus 100, 200 may include additional (or fewer) components, for example one or more feed rollers for feeding the tobacco sheet 104 204 and/or plurality of strands 112, 212, one or more tension rollers for tensioning the tobacco sheet 104 204 and/or plurality of strands 112, 212, and/or one or more drive belts for conveying the tobacco sheet 104, 204 and/or the plurality of strands 112, 212 and/or the tobacco rod 120, 220 and/or the segments of tobacco rod 120, 220.

[0128] Although in the above examples the tobacco strands 112, 212 are described as being straight and parallel to one another, this need not necessarily be the case, and in other examples the tobacco strands 112, 212 may not be substantially straight and/or may not be substantially parallel to one another. For example, the tobacco strands 112, 212 may undergo processing so as to comprise a longitudinal wave or corrugation or zig-zag shape or the like, or indeed the tobacco sheet 104 may inherently comprise a longitudinal wave or corrugation or zig-zag shape or the like or be processed so as to have such a shape or configuration. Indeed, the tobacco rod segment 126, 226, may comprise any tobacco rod 130, 530 formed of a plurality of longitudinal strands of tobacco 112, 212, wherein each of the plurality of longitudinal strands 112, 212 are substantially non-coiled.

[0129] Although in the above examples the tobacco rod segments 126, 226, 526 are described as being produced by the apparatus 100, 200 and/or by the process as described with reference to Figure 3, this need not necessarily be the case and in other examples any suitable method or apparatus for producing a tobacco rod segment 126, 226, 526 comprising a tobacco rod 130, 530 formed of a plurality of longitudinal strands of tobacco 112, 212, 512 wherein each of the plurality of longitudinal strands 112, 212, 512 are substantially non-coiled, may be used.

[0130] Although in some of the above examples the tobacco rod segment 126, 226, 526 is described as being a consumable for a "heat-not-burn" device or the like comprising a blade heater 580, this need not necessarily be the case, and in other examples the tobacco rod segment 126, 226, 526 may be used in other devices and/or for other purposes. For example, the tobacco rod segment 126, 226, 526 may be a consumable of any aerosol generating device, for example tobacco heating products or devices not necessarily comprising a blade heater 580.

[0131] Although in the above examples the tobacco sheet 102, 204, 304 is described as being or comprising

tobacco, for example reconstituted tobacco, this need not necessarily be the case and in other examples the sheet 104, 204, 304 may be or comprise a sheet of any aerosol-generating material. The aerosol-generating material may be a material which when heated, for example by the blade heater 580 of an overall aerosol generating device, produces an aerosol. For example, the sheet of aerosol-generating material 104, 204, 304 may be or comprise a flavour substrate. The flavour substrate 104, 204, 304 may comprise flavour, such as tobacco flavour or other flavour and/or may comprise glycerol or other additives or enhancers alternatively or additionally to glycerol. The flavour substrate, with or without glycerol or other additives, may be heated to produce an aerosol.

[0132] It may be noted that, in general, an aerosol is a colloid of fine solid particles or liquid droplets, in air or another gas, where a colloid is a substance in which microscopically dispersed insoluble particles are suspended throughout another substance. On the other hand, a vapour is a substance in the gas phase at a temperature lower than its critical temperature, which means that for example the vapour can be condensed to a liquid by increasing its pressure without reducing the temperature. It is to be understood that as used herein the term aerosol includes aerosol and/or vapour.

[0133] It will be appreciated that in some examples, aerosol-generating material rod segments 126, 226, 526 may be made from a sheet of aerosol-generating material 102, 204, 304, as described above for a sheet of reconstituted tobacco 102, 204, 304, for example by cutting the sheet of aerosol-generating material 102, 204, 304 longitudinally to produce a plurality of aerosol-generating material strands 112, 212, 512; gathering the strands 112, 212, 512 together to form an aerosol-generating material rod 130, 530 in which each of the plurality of aerosol-generating material strands 112, 212, 512 is substantially non-coiled; and cutting the aerosol-generating material rod 130, 530 into segments 126, 226, 526 to produce the aerosol-generating material rod segments 126, 226, 526.

[0134] Similarly, it will be appreciated that a product may comprise a rod 130, 530 of aerosol-generating material, wherein the rod 130, 530 of aerosol-generating material is formed of a plurality of longitudinal strands 112, 212, 512 of aerosol-generating material, wherein each of the plurality of longitudinal strands 112, 212, 512 of aerosol-generating material is substantially non-coiled.

[0135] It is to be understood that any feature described in relation to any one example may be used alone, or in combination with other features described, and may also be used in combination with one or more features of any other of the examples, or any combination of any other of the other examples. Furthermore, equivalents and modifications not described above may also be employed without departing from the scope of the invention, which is defined in the accompanying claims.

[0136] The following clauses form part of the disclosure:

1. A process of producing aerosol-generating material rod segments, comprising:

cutting a sheet of aerosol-generating material longitudinally to produce a plurality of aerosol-generating material strands;
gathering the strands together to form an aerosol-generating material rod in which each of the plurality of aerosol-generating material strands is substantially non-coiled; and
cutting the aerosol-generating material rod into segments to produce said aerosol-generating material rod segments.

2. The process according to clause 1, wherein the gathering comprises:

gathering the strands together to form the aerosol-generating material rod in which the plurality of aerosol-generating material strands are substantially parallel to one another.

3. The process according to clause 1 of clause 2, wherein the gathering comprises:

gathering the strands together to form the aerosol-generating material rod in which each of the aerosol-generating material strands is substantially straight.

4. The process according to any one of clause 1 to clause 3, wherein the sheet of aerosol-generating material is a tobacco sheet.

5. The process according to clause 4, wherein the tobacco sheet is a reconstituted tobacco sheet.

6. The process according to any one of the preceding clauses, wherein the sheet of aerosol-generating material comprises glycerol.

7. The process according to any one of the preceding clauses, wherein the sheet of aerosol-generating material has a substantially constant mass per unit length.

8. The process according to any one of the preceding clauses, the process comprising:

providing the sheet of aerosol-generating material from a bobbin of aerosol-generating material sheet.

9. The process according to clause 8, the process comprising:

providing a mother reel of aerosol-generating material sheet; and
slitting the mother reel to produce the bobbin.

10. The process according to clause 9, the process comprises:

selecting a mass per unit length for the aerosol-generating material rod segments;
determining, based on a mass per unit area of the sheet of aerosol-generating material, and based on the selected mass per unit length for the aerosol-generating material rod segments, a bobbin width; and
slitting the mother reel to produce a bobbin having the determined bobbin width.

11. The process according to any one of the preceding clauses, the process comprising:

selecting a strand number and/or a strand width for the aerosol-generating material rod segments; and
determining, based on the selected strand number and/or strand width, a cut number and/or a cut spacing;

wherein said cutting the sheet of aerosol-generating material comprises:

cutting the sheet of aerosol-generating material with the determined cut number and/or cut spacing.

12. The process according to any one of the preceding clauses, the process comprising:

feeding the sheet of aerosol-generating material in a sheet feed direction;

wherein said cutting the sheet of aerosol-generating material comprises:

cutting the sheet of aerosol-generating material substantially parallel to the sheet feed direction.

13. The process according to clause 12, wherein the gathering comprises:

gathering each of the strands towards an axis that lies in a plane, the plane including the feed direction and being perpendicular to a plane defined by the plurality of strands before they are gathered.

14. The process according to any one of the preceding clauses, wherein the gathering comprises:

gathering each of the strands towards an axis that lies centrally of the plurality of strands.

15. The process according to any one of the preceding clauses, wherein the gathering comprises:

gathering each of the strands substantially transversely to form the rod.

16. The process according to any one of the preceding clauses, wherein the gathering comprises:

feeding the strands through a funnel to gather the strands.

17. The process according to clause 16, the process comprising, before said cutting the sheet of aerosol-generating material:

feeding the sheet of aerosol-generating material through the funnel to form an aerosol-generating material rod of non-cut tobacco sheet.

18. The process according to any one of the preceding clauses, wherein each of the plurality of strands have a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

19. The process according to any preceding clause, the process comprising:

wrapping the aerosol-generating material rod in a wrapping material.

20. The process according to clause 19, wherein the wrapping material is or comprises one or both of paper and aluminium foil.

21. The process according to clause 19 or clause 20, wherein the aerosol-generating material rod segments each have an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm.

22. The process according to any one of clause 19 to clause 21, wherein the aerosol-generating material rod segments are consumables for an aerosol-generating device.

23. Apparatus for producing aerosol-generating material rod segments, the apparatus comprising:

a first cutter arranged to cut a sheet of aerosol-generating material longitudinally to produce a plurality of aerosol-generating material strands;
a gatherer arranged to gather the strands together to form an aerosol-generating material rod in which each of the plurality of aerosol-generating material strands is substantially non-coiled; and

a second cutter arranged to cut the aerosol-generating material rod into segments to produce said aerosol-generating material rod segments.

24. The apparatus according to clause 23, wherein the gatherer is arranged to gather the strands together to form the aerosol-generating material rod in which the plurality of aerosol-generating material strands are substantially parallel to one another.

25. The apparatus according to clause 23 or clause 24, wherein the gatherer is arranged to gather the

strands together to form the aerosol-generating material rod in which each of the aerosol-generating material strands is substantially straight.

26. The apparatus according to any one of clause 23 to clause 25, wherein the apparatus is arranged to provide the sheet of aerosol-generating material from a bobbin of aerosol-generating material sheet. 5

27. The apparatus according to any one of clause 23 to clause 26, wherein the first cutter is adjustable so as to adjust the number and/or width of the strands. 10

28. The apparatus according to any one of clause 23 to clause 27, wherein the first cutter is adjustable to either cut said sheet of aerosol-generating material to produce said plurality of aerosol-generating material strands or to not cut said sheet of aerosol-generating material. 15 20

29. The apparatus according to any one of clause 23 to clause 28, wherein the apparatus is arranged to feed the sheet of aerosol-generating material to the first cutter in a sheet feed direction; wherein the first cutter is arranged to cut the sheet of aerosol-generating material substantially parallel to the sheet feed direction. 25

30. The apparatus according to clause 29, wherein the gatherer is arranged to gather each of the strands towards an axis that lies in a first plane, the first plane including the feed direction and being perpendicular to a second plane defined by the plurality of strands before they are gathered. 30 35

31. The apparatus according to any one of clause 23 to clause 30, wherein the gatherer is arranged to gather each of the strands towards an axis that lies centrally of the plurality of strands. 40

32. The apparatus according to any one of clause 23 to clause 31, wherein the gatherer is arranged to gather each of the strands substantially transversely to form the rod. 45

33. The apparatus according to any one of clause 23 to clause 32, wherein the gatherer comprises a funnel. 50

34. The apparatus according to any one of clause 23 to clause 33, wherein the first cutter is arranged to cut the sheet of aerosol-generating material longitudinally so as to produce the plurality of aerosol-generating material strands each having a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm. 55

35. The apparatus according to any one of clause 23 to clause 34, wherein the apparatus comprises a wrapper arranged to wrap the aerosol-generating material rod in a wrapping material.

36. The apparatus according to clause 35, wherein the wrapping material is or comprises one or both of paper and aluminium foil.

37. The apparatus according to clause 35 or clause 36, wherein the apparatus is arranged to produce aerosol-generating material rod segments having an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm.

38. The apparatus according to any one of clause 23 to clause 37, wherein the aerosol-generating material rod segments are consumables for an aerosol-generating device.

39. A product comprising an aerosol-generating material rod, wherein the aerosol-generating material rod is formed of a plurality of longitudinal strands of aerosol-generating material, wherein each of the plurality of longitudinal strands of aerosol-generating material is substantially non-coiled.

40. The product according to clause 39, wherein the plurality of strands are substantially parallel to one another.

41. The product according to clause 39 or clause 40, wherein each of the plurality of strands is substantially straight.

42. The product according to any one of clause 39 to clause 41, wherein each of the plurality of strands has a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

43. The product according to any one of clause 39 to clause 42, wherein one or more of the strands is or comprises tobacco.

44. The product according to clause 43, wherein one or more of the strands is or comprises reconstituted tobacco.

45. The product according to any one of clause 39 to clause 44, wherein one or more of the strands comprises glycerol.

46. The product according to any one of clause 39 to clause 45, wherein the product comprises a wrapping material wrapped around the aerosol-generating material rod.

47. The product according to clause 46, wherein the wrapping material is or comprises one or both of paper and aluminium foil.

48. The product according to clause 46 or clause 47, wherein the product has an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm.

49. The product according to any one of clause 39 to clause 48, wherein the product is a consumable for an aerosol-generating device.

50. The process of any of clauses 1 - 22 may comprise a process for producing heat-not-burn device consumables.

51. The apparatus of any of clauses 23 - 38 may comprise an apparatus for producing heat-not-burn device consumables.

52. The product of any of clauses 39 - 49 may comprise a heat-not-burn device consumable.

Claims

1. An apparatus for producing aerosol-generating material rod segments, the apparatus comprising:

a first cutter arranged to cut a sheet of aerosol-generating material longitudinally to produce a plurality of aerosol-generating material strands; a gatherer arranged to gather the strands together to form an aerosol-generating material rod in which each of the plurality of aerosol-generating material strands is substantially non-coiled; and a second cutter arranged to cut the aerosol-generating material rod into segments to produce said aerosol-generating material rod segments.

2. The apparatus according to claim 2, wherein the gatherer is arranged to gather the strands together to form the aerosol-generating material rod in which the plurality of aerosol-generating material strands are substantially parallel to one another.

3. The apparatus according to claim 1 or claim 2, wherein the gatherer is arranged to gather the strands together to form the aerosol-generating material rod in which each of the aerosol-generating material strands is substantially straight.

4. The apparatus according to any one of claims 1 to claim 3, wherein the apparatus is arranged to provide the sheet of aerosol-generating material from a bobbin of aerosol-generating material sheet.

5. The apparatus according to any one of claims 1 to claim 4, wherein the first cutter is adjustable so as to adjust the number and/or width of the strands.

6. The apparatus according to any one of claims 1 to claim 5, wherein the first cutter is adjustable to either cut said sheet of aerosol-generating material to produce said plurality of aerosol-generating material strands or to not cut said sheet of aerosol-generating material.

7. The apparatus according to any one of claims 1 to claim 6, wherein the apparatus is arranged to feed the sheet of aerosol-generating material to the first cutter in a sheet feed direction; wherein the first cutter is arranged to cut the sheet of aerosol-generating material substantially parallel to the sheet feed direction.

8. The apparatus according to claim 7, wherein the gatherer is arranged to gather each of the strands towards an axis that lies in a first plane, the first plane including the feed direction and being perpendicular to a second plane defined by the plurality of strands before they are gathered.

9. The apparatus according to any one of claims 1 to claim 8, wherein the gatherer is arranged to gather each of the strands towards an axis that lies centrally of the plurality of strands.

10. The apparatus according to any one of claims 1 to claim 9, wherein the gatherer is arranged to gather each of the strands substantially transversely to form the rod.

11. The apparatus according to any one of claims 1 to claim 10, wherein the gatherer comprises a funnel.

12. The apparatus according to any one of claims 1 to claim 11, wherein the first cutter is arranged to cut the sheet of aerosol-generating material longitudinally so as to produce the plurality of aerosol-generating material strands each having a width substantially in the range 0.25 mm to 3 mm, or substantially in the range 0.5 mm to 1.5 mm.

13. The apparatus according to any one of claims 1 to claim 12, wherein the apparatus comprises a wrapper arranged to wrap the aerosol-generating material rod in a wrapping material.

14. The apparatus according to claim 13, wherein the wrapping material is or comprises one or both of paper and aluminium foil.

15. The apparatus according to claim 13 or claim 14, wherein the apparatus is arranged to produce aero-

sol-generating material rod segments having an outer diameter substantially in the range 5.4 mm to 7.8 mm, or substantially in the range 6.7 mm to 7.8 mm.

5

10

15

20

25

30

35

40

45

50

55

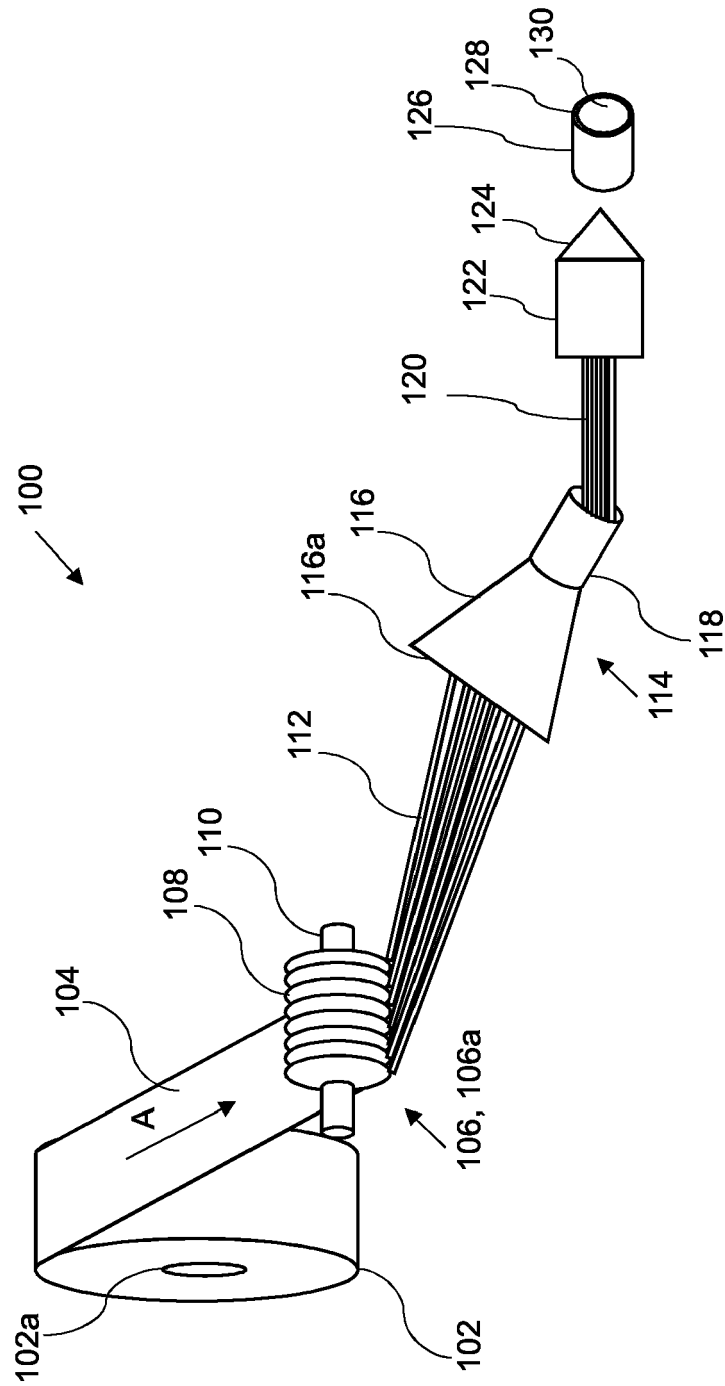


Fig. 1

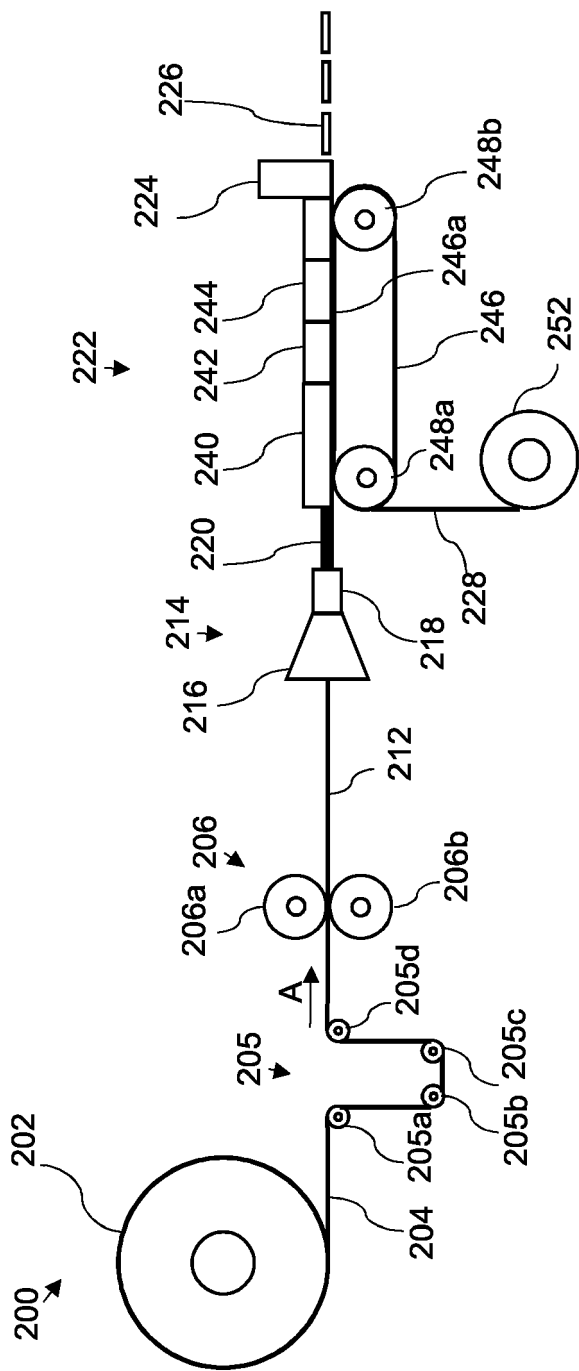


Fig. 2

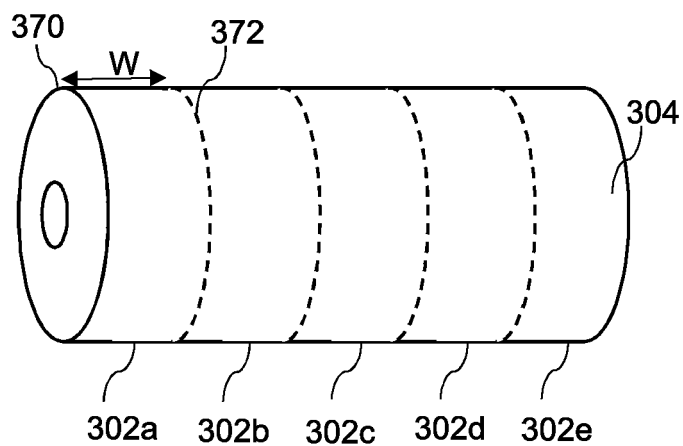


Fig. 3

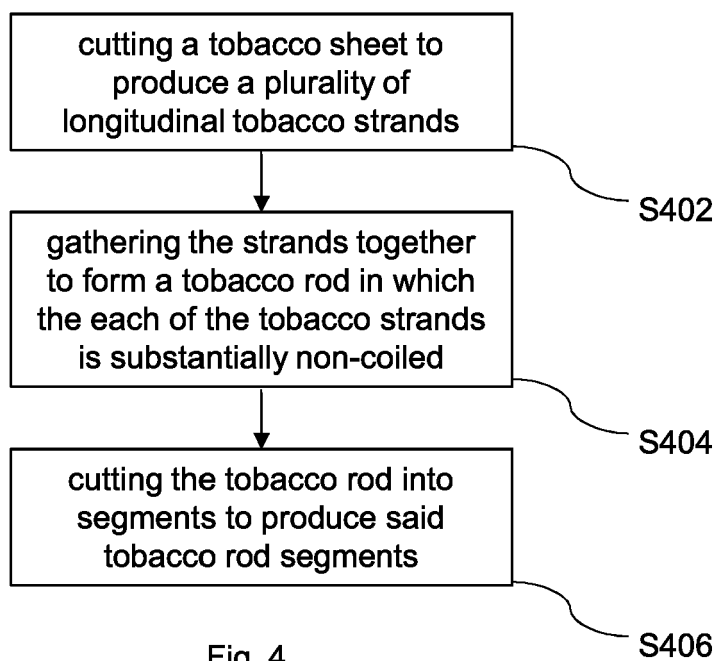


Fig. 4

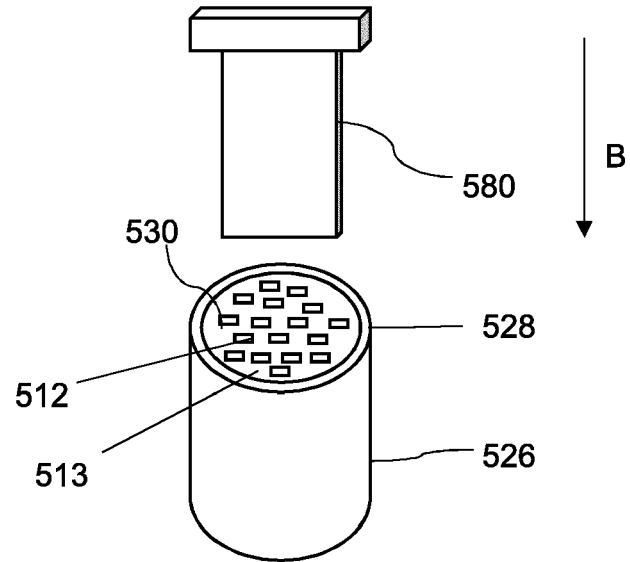


Fig. 5a

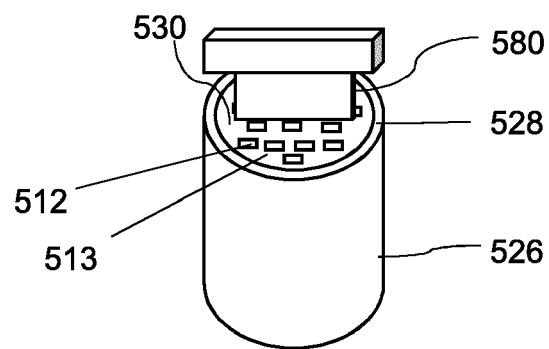


Fig. 5b



EUROPEAN SEARCH REPORT

Application Number

EP 23 15 4334

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 246 107 A2 (REYNOLDS TOBACCO CO R [US]) 19 November 1987 (1987-11-19) * column 5, line 56 - column 6, line 12; figure 1 * * column 2, lines 47-51 * * column 3 - columns 63-64 * * column 4, lines 15-25 * * column 4, line 51 - column 5, line 4 * * column 5, lines 18-31, 51-55 * * column 6, lines 37-41 * * column 7, lines 26-51, 62-65 * * column 8, lines 29-34 * * column 10, lines 34-38 * -----	1-15	INV. A24C5/14 A24C5/18 A24D1/20 A24C5/01
X	US 5 025 814 A (RAKER MARK L [US]) 25 June 1991 (1991-06-25) * column 2, line 40 - column 3, line 11; figures 1, 9 * * column 12, line 57 - column 13, line 5 * -----	1	
X	GB 1 234 786 A (GALLAHER LTD [IE]) 9 June 1971 (1971-06-09) * page 1, lines 67-88; figures 1-3 * -----	1-4, 11, 13-15	TECHNICAL FIELDS SEARCHED (IPC) A24C A24D
A	US 4 047 536 A (ASFOUR EMIL S) 13 September 1977 (1977-09-13) * column 2, lines 40-61; figures 1, 4, 11 * * column 3, lines 21-34 * -----	9	
The present search report has been drawn up for all claims			

1

EPO FORM 1503 03:82 (P04C01)

Place of search

Munich

Date of completion of the search

28 June 2023

Examiner

Schwarzer, Bernd

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 23 15 4334

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-06-2023

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 0246107	A2	19-11-1987	AU	7269887 A		19-11-1987
			BR	8702470 A		23-02-1988
			CA	1280946 C		05-03-1991
			CN	87103233 A		25-11-1987
			EP	0246107 A2		19-11-1987
			JP	S62272962 A		27-11-1987
			MY	101648 A		31-12-1991
			PH	24844 A		30-10-1990
			US	4889143 A		26-12-1989

US 5025814	A	25-06-1991	NONE			

GB 1234786	A	09-06-1971	BE	729014 A		27-08-1969
			DE	1906695 A1		06-11-1969
			FR	2002756 A1		31-10-1969
			GB	1234786 A		09-06-1971
			NL	6902884 A		01-09-1969

US 4047536	A	13-09-1977	DE	2526850 A1		08-01-1976
			FR	2275160 A1		16-01-1976
			GB	1509018 A		26-04-1978
			IT	1045184 B		10-05-1980
			JP	S521999 B2		19-01-1977
			JP	S5112999 A		31-01-1976
			NL	7507320 A		23-12-1975
			US	4047536 A		13-09-1977

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82