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(54) Apparatus and method for treating clumped material

(57) The present invention relates to an apparatus for treating clumped material, in particular tobacco, comprising a conveying means to convey the clumped material towards a separating means to break down the size of the clusters of the clumped material.

The conveying means comprises at least one rotating element, which is adapted such that clusters of clumped material below a predefined size fall through the rotating element. The other clusters of the clumped material are transported by the at least one rotating element to the separating means. The invention further relates to a method for treating clumped material and a tobacco product.

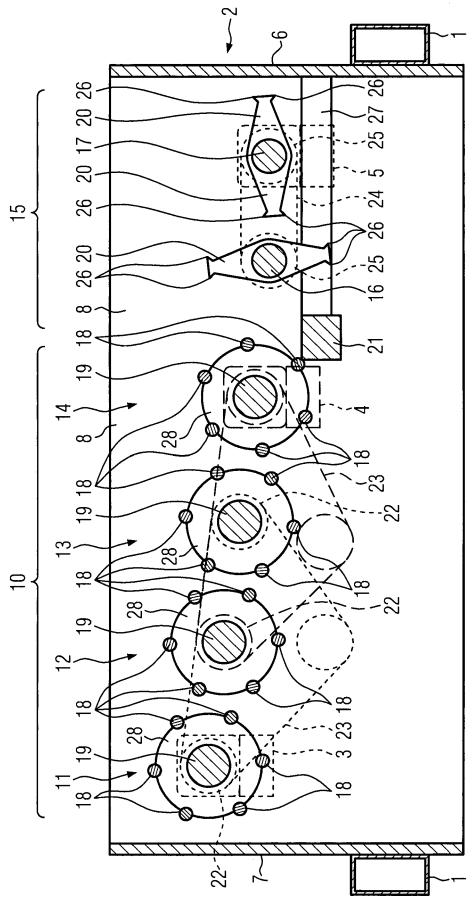

FIG. 1

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Description

[0001] The invention relates to an apparatus for treating clumped material comprising a separating means for separating the clumped up material into smaller clump sizes. The invention further relates to a method for treating clumped material, and a tobacco product manufactured with the apparatus or the method according to the invention.

[0002] It is known that tobacco that has been impregnated with carbon dioxide at high pressure can form clumped tobacco material or clusters. In the prior art, it is known to break up such clumped tobacco material before further processing. The clumped tobacco clusters are usually subject to separation and broken up into smaller clusters prior to subjecting the material to heat for expanding the tobacco. To reduce the size of the clumped tobacco clusters, it is known to arrange rotating bars with protruding pins above a grill, such that the protruding pins crush and force the clumped tobacco material through the grill.

[0003] However, in the prior art the apparatus for the treating clumped tobacco material can subject the clusters of clumped tobacco material to high tearing, pressing, or other moving forces, such that the apparatus degrades the clumped tobacco material. This is even true for clumped tobacco material which may already have an acceptable size. The tearing and other forces have an undesirable impact on the quality of the final tobacco, in particular on the quality of the tobacco cut filler use for making cigarettes that is processed by dry ice expansion and further used in a cigarette-making machine.

[0004] It is the object of the invention to provide an apparatus and method for treating clumped material, in particular dry ice tobacco material or clusters, while reducing unnecessary degradation of the material. Alternatively, the apparatus may be used for treating food products, in particular starch containing food products, such as rice or corn, which can be expanded and may, therefore, be subjected to dry ice in substantially the same manner as tobacco. Another object of the apparatus is treating clumped material before expansion.

[0005] The invention provides an apparatus for treating clumped material, in particular tobacco, the apparatus comprising: a conveying means to convey the clumped material towards a separating means to break down the size of the clusters of the clumped material; wherein the conveying means comprises at least one rotating element, which is adapted such that clusters of clumped material below a predefined size fall through the rotating element; while the other clusters of the clumped material are transported by the at least one rotating element to the separating means.

[0006] Products that have been treated with carbon dioxide at low temperatures, and usually at high pressures prior to expansion, are known as dry ice products. In particular, these products may form clumped material, such as dry ice tobacco or other clumped food product material. These products have distinct characteristics because the dry ice material at least partially adheres to each other by means of solid carbon dioxide such that clusters of varying sizes are formed. In the case of tobacco, carbon dioxide is impregnated into the tobacco at low temperatures and high pressures which creates dry ice tobacco material or clusters. Preferably, the tobacco is cut filler tobacco or small cut tobacco. However, other food products, in particular starch containing food products such as rice or corn which may be expanded, may also be subjected to carbon dioxide at low temperatures and high pressure which also results in dry ice material or clusters.

[0007] Prior to any heat application to the clumped tobacco material, one or more rotation elements enable the transport of the clumped material. This allows the clumped material to be transported to the separating means and allows clumped material of an appropriate size to proceed through the apparatus virtually untouched. Further, the one or more rotation elements also break down clumps, which are loosely connected, due to the relative movement of the clumps with respect to each other and with respect to the rotating element. In particular, the clusters of the clumped material are transported on the at least one rotating element to the separating means. Preferably, the conveying means comprises 2, 3, 4, 5, or 6 rotating elements.

[0008] In one embodiment, the at least one rotating element comprises eccentrically arranged bars. In particular, the rotating element further comprises a central bar. The distance in between the individual bars defines the maximum size of clusters, which are adapted to fall through the rotating element instead of being conveyed thereon. In case more than one rotating element is provided, they are arranged relatively close to each other, such that no large clusters of clumped material can fall through the conveying means in between two rotating elements.

[0009] Preferably, all eccentrically arranged bars are arranged at the same radial distance from the rotation axis of the rotating element. The central bar is preferably arranged concentrically with and in the direction of the rotation axis of the rotating element. The diameter of the rotating element, in particular as specified by the eccentrically arranged bars, and the distance in between the bars and the number of bars placed on the rotating element can be adapted to the specific parameters of the clumped material. Thus, the maximum diameter of the clusters of the clumped material can be limited or influenced, according to the specification with respect to the clumped material of the downstream process, in particular the expansion process.

[0010] In the case where several rotating elements are provided, each of the rotating elements may have the same design, while it is also possible that differently sized or differently arranged bars are provided on each of the rotating elements. In particular, the bars of the most upstream-arranged rotating element may be arranged at a

larger radius than the bars of a more downstream-arranged rotating element. This allows initially larger clusters to fall through the rotating elements, while more downstream, only smaller clusters fall through the rotating element. This may increase the throughput of the apparatus.

[0011] Preferably, the bars of the rotating element extend in the axial direction of the rotating element. This allows that along the axial direction of the rotating element, the clumped material is treated in the same way, as the rotating element does not change its geometry considerably in the axial direction.

[0012] In one embodiment, several bars of the rotating element are provided at the same radius and are equidistantly distributed, preferably circumferentially equidistantly distributed. This allows that only clusters below a predefined size fall through the rotating element.

[0013] Preferably, the bars are provided on at least two radially extending plates. In some embodiments, more than two radially extending plates may be provided. The plates may, in particular, be arranged equidistantly in the axial direction. The blades may be substantially round, the outer circumference being arranged concentrically with the rotation axis of the rotating elements. The bars are, in particular, provided at the outer circumference of the plates. In particular, the plates comprise walls or openings through which the bars extend and in which the bars are mounted.

[0014] In particular, the central axis of the rotating element may be longer than the bars. Thus, the central axis allows mounting of the rotating element on both end sides.

[0015] Preferably, at least two sets of rotating elements are provided, wherein the first set comprises at least one rotating element, and the second set comprises at least one rotating element, wherein the rotating elements of the different sets are arranged alternatingly in the downstream direction, and wherein each set comprises a different driving means.

[0016] In some embodiments, the driving means may drive all rotating elements in the same direction, namely in the downstream direction, that is towards the separating means, such that the clumped material is transported relatively quickly towards the separating means.

[0017] In other embodiments, the different sets of rotating elements may also be driven in opposing directions, such that the material is conveyed slower towards the separating means and remains longer on the rotating elements. This enables that more of the clumped material falls through the rotating elements and less is crushed in the separating means, which enables a gentler processing of the clumped material. In particular, the set of rotating elements rotating towards the separating means may rotate at a higher speed than the other set of rotating elements, which rotates away from the separating means. The difference of the rotating speeds defines the average conveying speed of the clumped material towards the separating means. The rotation of a rotating element towards the separating means implies that its upper side is moving towards the separating means, as the clumped material is transported on the upper side of the at least one rotating element.

[0018] Preferably, the rotating elements are arranged substantially parallel to each other. Thus, the small gap in between the rotating elements is as small as necessary.

[0019] In particular, the first set comprises at least a first and a third rotating element, and the second set comprises at least a second and a fourth rotating element, wherein the first, second, third, and fourth rotating elements are arranged sequentially.

[0020] In one embodiment, several subsequentially arranged rotating elements are arranged at declining heights towards the separating means. Thus, in the downstream direction, the rotating elements are arranged at declining heights, such that the conveying of the material by the conveying means is supported by gravity in the downstream direction towards the separating means. In particular, the rotating elements are arranged in a plane, which is declined towards the separating means. Several subsequentially arranged rotating elements relate to at least two subsequentially arranged rotating elements.

[0021] Preferably, the separating means comprises a rotating bar with several radially protruding separating elements and an assigned grill, the separating elements being adapted to move through the grill, such that the clusters of the clumped material are broken up in between the separating elements and the grill. In particular, the grill bars are aligned with the extension of the separating elements. Preferably, the grill is parallel to the rotation axis of the rotating bar. The separating elements may be pins or blades. The pins or blades of the separating elements are in particular fixed on the central rotating bar forming the rotation axis of the separating elements. The rotating elements of the conveying means and the at least one rotating bar of the separating means have substantially parallel rotating axes in preferred embodiments. Alternatively, the separating means may be a crushing means, such as a mill.

[0022] Preferably, the separating means comprises two rotating bars, which are adapted to be driven such that they rotate towards each other. The separating means may also comprise several sets of two rotating bars that are adapted to be driven, such that they rotate towards each other.

[0023] In particular, the separating elements are blade-shaped and comprise at least one protrusion extending in the circumferential direction. The protrusion is in particular provided at the side of the blade in the rotating direction. The protrusion enables to better engage the clusters of clumped material and to force them through the grill. In particular, protrusions may be provided at both sides of the blades, such that the rotation direction of the rotating bars of the separating means can be reversed. In particular, the protrusions are provided at the radially

outer end of the blade-shaped separating elements, wherein the protrusions are in particular protruding substantially in the circumferential direction. The protrusions may have a pointed tip.

[0024] Preferably, a beam is provided in between the conveying means and the separating means, to prevent that the clumped material falls through the gap in between the conveying means and the separating means. In particular, the beam is provided at a lower position than the rotating axes of the rotating elements of the conveying means and the rotating bars of the separating means.

[0025] The invention further provides a method for treating clumped material, in particular tobacco, comprising the steps of: first conveying the clumped material on at least one rotating element, wherein clusters of clumped material below a predefined size are falling through the at least one rotating element; and transporting at the same time the other clusters of the clumped material, which are mainly above a predetermined size on the at least one rotating element to a separating means, wherein the clusters are treated in the separating means to reduce their size. In particular, the clusters are broken up in the separating means, which are preferably crushing means.

[0026] The clumped material processed by the method corresponds to the clumped material which has been described with respect to the inventive apparatus. Thus, the clumped material is in particular dry ice tobacco clusters.

[0027] Preferably, the method comprises the preceding step of treating the material with liquid carbon dioxide under high pressure. The high pressure is in particular a pressure of 28 to 30 bars above atmospheric pressure. Thus, at this high pressure level the carbon dioxide is liquid.

[0028] The method comprises, in some embodiments, the subsequent step of subjecting the clusters of reduced size to heat. The clusters of reduced size are those clusters which have been broken up by the separating means or which were below a predefined size during the conveying of the clumped material on the at least one rotating element, and fell through the at least one rotating element. The step of subjecting the clusters of reduced size to heat is in particular carried out in an expansion tower, wherein the clusters are fed into the expansion tower through a rotary air lock. Hot processed gas flows through the expansion tower in preferred embodiments.

[0029] The expansion process involves quickly heating the clumped material, such that the starch gelatinizes, softens and becomes pliable while the pressure inside the material is increased by a rapid expansion of the carbon dioxide or water comprised therein, such that the starch forms a crispy foam. The expansion of the tobacco is similar to the expansion of other food products, for example, popcorn made out of corn, or puffed rice, and mainly requires a starch-containing product, such as tobacco. Expanded tobacco may have improved properties with respect to its filling volume in smoking articles.

[0030] The invention further provides a tobacco product, which is manufactured with the apparatus or the method according to the invention. The tobacco product may be expanded tobacco and may be used as cut filler tobacco, but also in or for roll your own tobacco, make your own tobacco, volume tobacco, cigarettes, cigars, or tobacco containing elements for smoking devices. These smoking devices may in particular provide a smoking experience by only heating the tobacco product comprised therein but not burning it.

[0031] The invention will now be further described by means of an exemplary embodiment as shown in the following figure:

Figure 1 shows a cross section of the embodiment of the apparatus according to the invention in a side view.

[0032] In Figure 1, an embodiment of the apparatus according to the invention is shown in a perspective view, wherein the apparatus comprises a base structure 1, on which an inner frame 2 and first, second and third driving means 3, 4, 5 are provided. The driving means 3, 4, 5 are in particular electric driving means with attached transmissions in the form of the gear boxes. The inner frame 2 comprises a front wall 6, a back wall 7, a left wall 8, and a right wall, wherein the left wall 8 and right wall extend between the front wall 6 and back wall 7, respectively. The inner frame 2 is open on its upper side. The first, second and third driving means 3, 4, 5 are arranged outside the inner frame 2 next to the right wall.

[0033] The apparatus according to the invention is in particular used as a clump breaker in a process of expanding dry ice tobacco. Tobacco is subjected to liquid carbon dioxide impregnation under a pressure of between 28 to 30 bars above atmospheric pressure in an impregnated vessel, which is preferably arranged above the inner frame 2 of the apparatus according to the invention. At the end of the liquid impregnation cycle and after depressurization of the carbon dioxide gas to atmospheric condition, the tobacco and solid carbon dioxide form a solid block which is discharged from the impregnator vessel by opening a bottom lid thereof. Then the tobacco falls into the inner frame 2 of the apparatus according to the invention. The block of tobacco and solid carbon dioxide is required to be broken up into smaller pieces prior to further processing. This is done by the apparatus as shown in Figure 1.

[0034] In the inner frame 2 a conveying means 10 is arranged, comprising four rotating elements 11, 12, 13, 14. The apparatus is adapted such that the clumped dry ice tobacco falls in particular on the conveying means 10 in the inner frame 2, and more in particular only on the conveying means 10 in the inner frame 2. Next to the conveying means 10 in downstream direction in the inner frame 2, that is in the direction towards the front wall 6, a separating means 15 is provided. The separating means 15 comprises a first rotating bar 16 and a second

rotating bar 17. The rotating elements 11, 12, 13 and 14 and the rotating bars 16, 17 are arranged adjacent to each other, such that they substantially fill the whole inner frame 2. Thus, any clusters of clumped material will be subjected to the conveying means 10 or separating means 15. In particular, the apparatus according to the embodiment comprises four rotating elements 11, 12, 13, 14 in the form of cylindrical rollers made of bars 18, 19 with wide openings between the bars 18, 19. The rotating elements 11, 12, 13, 14 comprise a central bar 19 and several eccentrically arranged bars 18, in particular six eccentrically arranged bars 18. The central bar 19 has in particular a greater diameter than the eccentrically arranged bars 18. The bars 18 of each rotating element 11, 12, 13, 14 are mounted in or on at least two parallel discs 28, which are provided concentrically with the central bar 19 and spaced apart from each other in the axial direction of the central bar 19. Preferably, one disc 28 is provided at each axial end of the central bar 19. Where more than two discs 28 are provided on each central bar 19, the additional discs 28 are provided in between the discs 28 at the axial ends of the central bar 19 to provide further support for the bars 18. The advantage of this open design of the rotating elements 11, 12, 13, 14 is that it allows smaller clusters of clumped material to fall through the rotating elements 11, 12, 13, 14 without further treating, while bigger clusters of clumped material will be retained on the rotating elements 11, 12, 13, 14 and conveyed on the rotating elements 11, 12, 13, 14 until they are broken up to smaller clusters, or transported to the separating means 15 where they are broken up to smaller clusters.

[0035] The first and the third rotating elements 11, 13 of the conveying means 10 form a first set, while the second and fourth rotating elements 12, 14 form a second set. The first set is driven by the first driving means 3 in the form of a motor drive, and the second set is driven by the second driving means 4 in the form of a motor drive. In particular, the first driving means is adapted such that the first and third rotating elements 11, 13 rotate in the same direction. The second and fourth rotating elements 12, 14 rotate in the same direction, as they are driven by a common driving means 4 as well. The driving means 3, 4 may comprise variable speed drives. In particular, in one mode of operation, all rotating elements 11, 12, 13, 14 can be driven in one direction to quickly convey those clusters of clumped materials, which do not fall through the rotating elements 11, 12, 13, 14 to the separating means 15. However, as the first and second driving means 3, 4 are independently driven, the first set of rotating elements 11, 13 and the second set of rotating elements 12, 14 may also be rotated in opposite directions. Furthermore, the speed of the first and second set of rotating elements may be independently adjusted. Thus, the conveyance speed of the clusters of clumped material on the conveying means 10 can be adjusted.

[0036] By means of their rotation, the rotating elements 11, 12, 13, 14 will gently break up the more loose clusters of dry ice tobacco into smaller clusters and allow smaller clusters or loose tobacco to pass through the opening in between the bars 18, 19. In this way the tobacco strands and particle size will not be subject to significant degradation and, thus, tobacco with longer strands is preserved and less tobacco fines are generated. However, those clusters of clumped material, which are not broken up to be small enough to pass through the bars 18, 19 until the end of the conveying means 10 are subjected to the separating means 15, wherein they are reliably separated in clusters of acceptable size.

[0037] In particular, the arrangement of the rotating elements 11, 12, 13, 14 is such that all rotating elements 11, 12, 13, 14 are arranged in an incline, such that the first rotating element 11 is at a highest point and the separating means 15 are at a lower or lowest position. This facilitates the movement of the clusters of clumped material from the conveying means 10 to the separating means 15. The separating means 15 is in particular made of rotating bars 16, 17 which comprise several radially protruding separating elements in the form of blades 20. Many blades 20 are arranged each on the rotating bars 16, 17 respectively. The many parallel blades 20 are mounted in regular intervals on the bar 16, 17. In particular, more than 5 blades are arranged on each bar 16, 17, more preferably more than 10 blades. The bars 16, 17 are driven by the third driving means 5 in the form of a motor drive which rotates the first and second rotating bars 16, 17 towards each other. Preferably, a beam 21 is provided in the gap between the last rotating element 14 in the downstream direction and the first rotating bar 16 of the separating means 15 in the downstream direction. This prevents that larger clusters of clumped material fall through this gap.

[0038] In particular, the central bars 19 of the rotating elements 11, 12, 13, 14 are mounted in the left wall 8 and right wall. Preferably, the central bars 19 protrude at least at one side through one of the left wall 8 or right wall. In particular, in the present embodiment the central bars 19 of the first set of rotating elements 11, 13 protrude through the right wall and the central bars 19 of the second set of rotating elements 12, 14 protrude at the opposite side of the inner frame 2 through left wall. On the protruding ends of the central bars 19 pulleys or gear wheels 22 are arranged. The gear wheels 22 are in particular driven by a belt 23, in particular a toothed belt, which is connected to the respective driving means 3. The second driving means 4 is directly connected to the protruding end of the central bar 19 of the rotating element 14 of the second set of rotating elements, while the other end of the central bar 19 of the rotating element 14 is provided with a gear wheel 22 which transfers the rotation to the belt 23, which is connected to the gear wheel 22 of the central bar 19 of the other rotating element 12 of the second set of rotating elements.

[0039] The third driving means 5 drives gear wheels 25 via a belt 24, in particular a toothed belt. The gear wheels are connected to ends of the first and second

rotating bars 16, 17, wherein these ends protrude through either the left wall 8 or right wall. Thus, the rotating bars 16, 17 of the separating means 15 are driven. The blades 20 of the separating means 15 comprise in particular protrusions 26 which extend substantially in the circumferential direction at the radially outermost end of the blades 20. The protrusions 26 enable that the blades reliably engage the cluster of clumped material.

[0040] Furthermore, the separating means 15 comprises a grill 27 with several thin vertically arranged plates extending parallel to the blades 20, wherein the grill 27 is fixed stationary in the inner frame 2. The plates of the grill 27 are aligned with the blades 20 such that each of the blades 20 provided on one bar 16,17 pass through the grill 27 in between two adjacent plates of the grill 27 with every rotation of the rotating bars 16, 17 of the separating means 15. Thus, the clusters of clumped material are separated in between the blades 20 and the plates of the grill 27. Thus, according to the embodiment, loose tobacco and small clusters of clumped tobacco from the impregnator vessel will pass through the first four rotating elements 11, 12, 13, 14 of the conveying means 10 with minimal treating and, thus, preserve long tobacco strands. Bigger and more solid clusters of clumped tobacco will be broken up by the action of the rotating elements 11, 12, 13, 14 if possible. Otherwise, the clusters will be conveyed down to the separating means 15, where big and solid clusters of clumped tobacco will be broken up.

[0041] Thus, clumps of tobacco are broken up into smaller pieces prior to expansion. The expansion comprises in particular feeding the smaller pieces through a rotary airlock into an expansion tower for hot process gas, where the tobacco is expanded. The invention enables an improved quality of the tobacco after expansion by reducing degradation and allows longer tobacco strand length with better filling power after the expansion.

[0042] According to an embodiment of the method of the invention, dry ice tobacco is subjected from an impregnation vessel wherein it is impregnated with carbon dioxide to at least one rotating element, in particular to a set of rotating elements 11, 12, 13, 14 forming a conveying means 10, wherein clusters of the clumped tobacco below a predefined size fall through the at least one rotating element 11, 12, 13, 14. This is due to the fact that the rotating element 11, 12, 13, 14 in particular comprises a central bar 19 and several eccentrically arranged bars 18, such that a pathway for the tobacco clusters below a certain size is created. The other clusters of the clumped tobacco which are mainly above a predetermined size are conveyed on the conveying means 10, that is on the several subsequentially arranged rotating elements 11, 12, 13, 14, wherein during this conveying, the more loosely connected tobacco clusters are broken up and fall through the rotating elements 11, 12, 13, 14. However, those tobacco clusters, which are more solidly connected are transported until they reach a separating means 15, wherein the clusters are broken up to reduce their size. After these method steps, the tobacco clusters are all reduced below the maximum acceptable size, wherein the tobacco has not been significantly degraded. The tobacco is then conveyed to a heating element, wherein it is subjected to a rapid increase of temperature such that the tobacco expands.

Claims

1. Apparatus for treating clumped material, in particular tobacco, comprising:

   a conveying means to convey the clumped material towards a separating means to break down the size of the clusters of the clumped material, wherein the conveying means comprises at least one rotating element, which is adapted such that clusters of clumped material below a predefined size fall through the rotating element, wherein the other clusters of the clumped material are transported by the at least one rotating element to the separating means.

2. Apparatus according to claim 1, wherein the at least one rotating element comprises eccentrically arranged bars.

3. Apparatus according to claim 2, wherein the bars extend in the axial direction of the rotating element.

4. Apparatus according to claim 2 or 3, wherein several bars of the rotating element are provided at the same radius and are equidistantly distributed.

5. Apparatus according to any one of the claims 2 to 4, wherein the bars are provided on at least two radially extending plates.

6. Apparatus according to any one of the preceding claims, wherein at least two sets of rotating elements are provided,
   wherein the first set comprises at least one rotating element, and the second set comprises at least one rotating element,
   wherein the rotating elements of the different sets are arranged alternatingly, and wherein each set comprises a different driving means.

7. Apparatus according to any one of the preceding claims, wherein several subsequentially arranged rotating elements are arranged at declining heights towards to the separating means.

8. Apparatus according to any one of the preceding claims, wherein the separating means comprises a rotating bar with several radially protruding separating elements and an assigned grill, the separating

elements being adapted to move through the grill, such that the clusters of the clumped material are broken up in between the separating elements and the grill.

9. Apparatus according to claim 8, wherein the separating means comprises two rotating bars, which are adapted to be driven such that they rotate towards each other.

10. Apparatus according to claim 8 or 9, wherein the separating elements are blade-shaped and comprise at least one protrusion in the circumferential direction.

11. Apparatus according to any one of the preceding claims, wherein a beam is provided in between the conveying means and the separating means, to prevent that clumped material falls through the gap in between the conveying means and the separating means.

12. Method for treating clumped material, in particular tobacco, comprising the steps of:

- conveying the clumped material on at least one rotating element, wherein clusters of clumped material below a predefined size are falling through the at least one rotating element,
- transporting the other clusters of the clumped material, which are mainly above a predetermined size on the at least one rotating element to a separating means, and
- treating the clusters in the separating means to reduce their size.

13. Method according to claim 12, comprising the preceding step of treating the material with liquid carbon dioxide under high pressure.

14. Method according to claim 12 or 13, comprising the subsequent step of subjecting the clusters of reduced size to heat.

15. Tobacco product, manufactured with the apparatus or the method according to one of preceding claims.

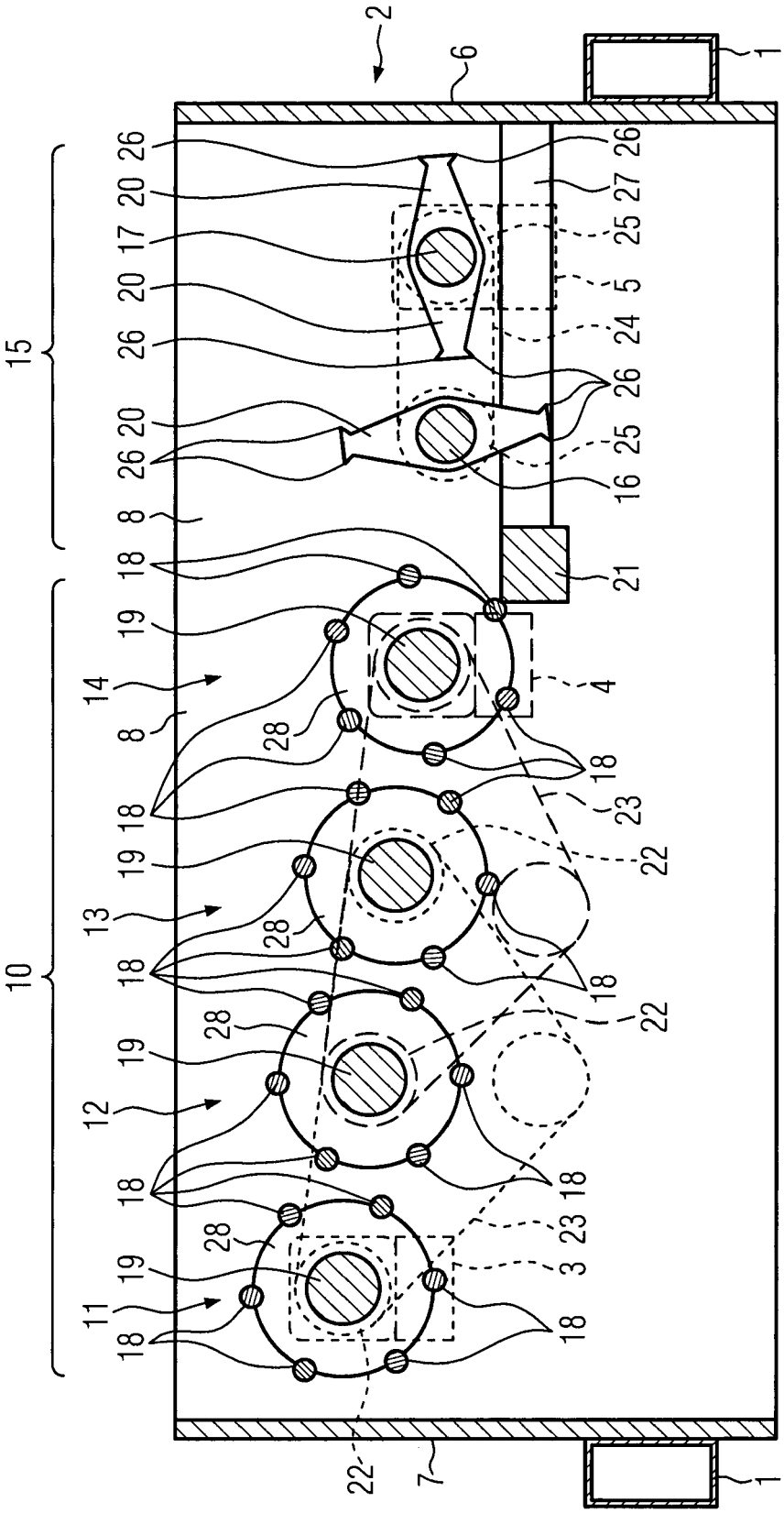

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 13 00 5283

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A24B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 April 2014	MacCormick, Duncan

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 00 5283

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