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(54) Title: A PROCESS FOR PRODUCING TOBACCO PRODUCTS

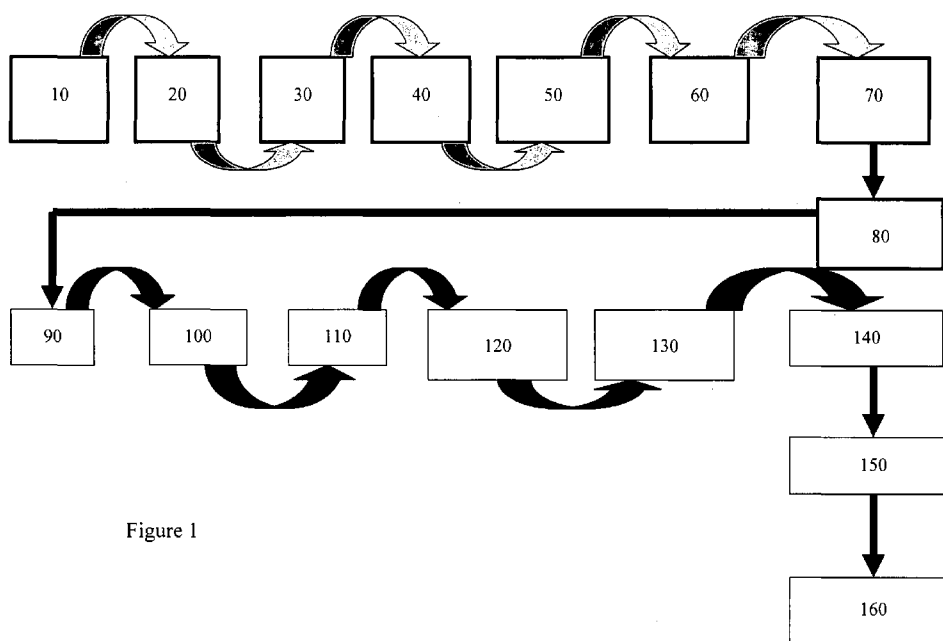


Figure 1

(57) Abstract: A process for producing a tobacco product from tobacco lamina and tobacco stem, the process including the steps of: flattening the tobacco stem to break down the cellular structure of the tobacco stem; combining the flattened tobacco stem with the tobacco lamina; and, cutting the combined flattened tobacco stem and tobacco lamina to produce the tobacco product.

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A PROCESS FOR PRODUCING TOBACCO PRODUCTS

The present invention relates to a process for producing a tobacco product, and in particular, to a process for producing a roll your own (RYO) tobacco product.

5

Background of the Invention

Typical roll your own (RYO) tobacco products are produced using the lamina portion of harvested tobacco leaves which provides the physical characteristics required once the tobacco is cut such that the resulting shag has the desirable consistency for roll your own tobacco products.

Tobacco stems are a bi-product of the harvested tobacco leaves that have been used as a filler material in tailor made tobacco cigarette products where the tobacco stem is cut producing the filler material and then recombined with the cut lamina portion which is then used to produce the tailor made cigarette. As the tobacco stem is far cheaper than the tobacco lamina, the use of the tobacco lamina for the production of cigarettes reduces the overall production cost of the cigarettes.

On characteristic of tobacco stem is that it has a lower amount of nicotine and tar compared to the lamina portion of the tobacco leaf. Accordingly, it is possible to produce a tobacco product with less of these harmful bi-products if more of the tobacco stem is used in place of the tobacco lamina to produce the tobacco product.

However, it is difficult to combine the tobacco stem with tobacco lamina in order to produce a suitable tobacco product that has the necessary physical characteristics to be used as a roll your own tobacco product. The tobacco stems are significantly harder than the tobacco laminar and not able to be cut to provide a shag with the right physical characteristics for the roll your own tobacco product. Some attempts have been made, however the inability of the cut stem particles to matt with the lamina and become evenly distributed throughout the product causes the cut stem particles to simply separate from the

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lamina shag and fall to the bottom of the tobacco pouch where they can't be used to make the roll your own cigarettes.

Accordingly, the present invention seeks to provide a process whereby a proportion of tobacco stem may be incorporated with tobacco lamina and used to produce a roll your own tobacco product.

Summary of the Invention

- 10 According to one aspect, the present invention provides a process for producing a tobacco product from tobacco lamina and tobacco stem, the process including the steps of:
- a. flattening the tobacco stem to break down the cellular structure of the tobacco stem;
 - b. combining the flattened tobacco stem with the tobacco lamina; and,
 - 15 c. cutting the combined flattened tobacco stem and tobacco lamina to produce the tobacco product.

In one form the tobacco product is a roll your own tobacco product.

- 20 According to a preferred form the cellular structure of the tobacco stem is broken down after step a. to an extent that the tobacco stem loses rigidity.

According to a preferred form, the tobacco stem is preconditioned prior to step a. wherein the preconditioning of the stem increases the moisture content and softens the tobacco stem. In a preferred form, the preconditioning of the stem includes contacting the stem with steam and/or liquid water. In a more preferred form the stem is contacted with steam at a temperature of between 100 °C and 150 °C, and more preferably between 101 °C and 115 °C.

- 30 In a further preferred form, the preconditioning step further includes a bulking step whereby the tobacco stem is allowed to rest after being contacted with steam and/or liquid

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water to allow further moisture to absorb into the tobacco stem increasing the overall moisture content of the tobacco stem. In a preferred form the tobacco is allowed to rest for a period of between 4 hours and 4 days.

- 5 According to one form, the step a. includes a two step rolling process. In a preferred form, the two step rolling process includes:
- a first rolling step, wherein the tobacco stem is passed through a set of rollers with a 0.3 to 1.0mm gap between the rollers, and preferably a 0.4 to 0.7mm gap; and,
 - 10 • a second rolling step wherein the tobacco stem is passed through a set of rollers with a 0.1 to 0.6mm gap between the rollers, and preferably a 0.1 to 0.4mm gap.

Brief description of the figures

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The present invention will become better understood from the following detailed description of a preferred but non-limiting embodiment thereof, described in connection with the accompanying figures, wherein:

- 20 Figure 1 is a process diagram detailing various stages in the flattening step of the tobacco stem of a preferred embodiment according to the present invention; and

Figure 2 is a process diagram detailing the various stages in the combining and cutting steps of a preferred embodiment according to one aspect of the present invention.

25

Detailed Description of the Invention, Figures and Preferred Embodiments

- According to one embodiment of the present invention the tobacco stem may be optionally preconditioned to increase the moisture content of the stems. In a preferred form the stem
- 30 is contacted with steam at a temperature of between 100 °C and 150 °C, and more preferably between 101 °C and 115 °C.

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After this the tobacco stem is flattened in order to break down the cellular structure of the tobacco stem to a point where the tobacco stem becomes quite pliable and flat, which is not dissimilar to the structure of the lamina portion of the tobacco leaf. This flattened tobacco stem can then be recombined with a tobacco lamina and subsequently cut to provide a shag that is suitable for use in tobacco roll your own products. If flattened and combined with the lamina prior to cutting to produce the shag, the resulting tobacco stem particles stay within the shag product as they are quite similar in structure and physicality and don't fall to the bottom the tobacco pouch or container. The overall proportion of tobacco stem incorporated in the final roll your own shag product may be up to 20% wt without significant appearance or structural difference from a customer's perspective of the product.

Preferably a proportion of 10% wt to 15% wt of the tobacco stem appears in the final roll your own tobacco product after being mixed with the lamina.

The flattening process wherein the tobacco stems have their cellular structure broken down to a sufficient level may be undertaken in any suitable manner. In a preferred form of the present invention, the tobacco stems are conditioned to increase their moisture content after which they pass through two roller steps. The first roller step flattens the tobacco stem between two rollers with a gap of approximately 0.3 to 1.0mm gap between the rollers, and preferably a 0.4 to 0.7mm gap, and the second rolling step flattens the tobacco between two further rollers with a 0.1 to 0.6mm gap, and preferably a 0.1 to 0.4mm gap between the rollers. After these two rolling stages, the tobacco stems are sufficiently flattened wherein their cellular structures have been broken down such that the stems have lost their rigidity and are substantially similar in nature to the lamina portion of the tobacco leaf.

Once the tobacco stem is flattened and takes on similar physical properties to the lamina portion of the leaf, it can be combined with the tobacco lamina with the resulting mixture being subsequently cut providing a shag with the suitable characteristics required for a roll

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your own tobacco product.

Referring to figure 1 there is shown a detailed process flow diagram of the various stages of a preferred embodiment of the present invention.

5

Referring to figure 1 at process step 10 cartons of whole tobacco stem are loaded onto a loading station where they are automatically conveyed to a tipper 20 which empties the stem into a feeder 30. The whole tobacco stem is fed from the feeder 30 through a metering tube which controls the delivery of product into a double vibratory sieve 40. The
10 sieve 40 removes both very large objects and very fine stem for discarding. Belt conveyors then transport the product tobacco stem to the vibratory conveyors leading to the foreign body detector also at 40.

After passing from the foreign body detector 40, the tobacco stem passes to an air lift
15 which captures and pneumatically conveys the whole stem product to a weight conveyor. From there the stem moves to the add moist tunnel 70 where the stem is conditioned by contact with water and/or steam to increase the stem's overall moisture content, after which the stem moves to whole stem bins 80 before proceeding to the flattening process stages. Here the stem may remain in the bins, or bulked, for a period of between 4 hours and 4
20 days. This has the effect of increasing the moisture content of the stems as the water and/or steam contacted with the stem just prior has more time to absorb into the stem.

Whole conditioned tobacco stem is discharged from the whole stem bins 80 onto the bin discharge belt conveyor 100. Stem is sent via a metering tube 110 to a weigh conveyor
25 before entering the conditioning heat tunnel 120 which increases the moisture content of the stem again by contacting the tobacco stem with steam at 1.2 – 2 kPa. The tobacco stem is then conveyed to a first flattening step 130 where the tobacco stem is passed through two rollers designed to flatten the moist stem to between 0.4 mm to 0.7 mm.

30 The flattened tobacco stem is then conveyed from 140 to a second flattening step 150 where the stem is passed through two further rollers designed to flatten the moist tobacco

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stem to between 0.1 mm to 0.4 mm. The flattening of the tobacco stem breaks down the cellular structure of the tobacco stem where the stem loses its rigidity and becomes significantly malleable.

- 5 The flattened tobacco stem is then filled into tubs 160 where it is stored until combined with bright and dark lamina.

Referring to figure 2 bright lamina and/or dark lamina is conditioned and deposited as a feed stock at process steps 2 and 3. The conditioning stage for both types of lamina
10 increases the moisture content of the lamina feed stock.

The flattened tobacco stem feed stock 160 is then combined at a proportion of 15% stem to 85% lamina with the conditioned lamina 2 and 3 and then enters the casing cylinder 200 via a small vibrating conveyor. Casing is applied to the lamina and flattened tobacco stem
15 combination in the casing cylinder 200 at temperatures between 70 and 80°C. Water is added to the tobacco via steam atomising nozzles at the entry and exit of the cylinder which increases the moisture content of the lamina and flattened tobacco stem combination.

- 20 The lamina and flattened tobacco stem combination exits the casing cylinder 200 onto a belt conveyor to one of two blending bins, each of which has the capacity to hold one operation worth of the lamina and flattened tobacco stem combination.

A foreign body detector 220 sorts and rejects foreign bodies present in the product e.g.
25 plastics, non tobacco leaves, strings, paper, insects, etc. The detection is via a low power laser which is capable of determining subtle differences in colour and texture of non tobacco product.

Good product consisting of the lamina and flattened tobacco stem combination is
30 transported away via belt conveyors leading to a vibratory conveyor which delivers the product to foreign matter detector can and then to the cutting and conditioning area of the

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process.

The lamina and flattened tobacco stem combination then enters a feeder bin 230. From here it is conveyed via an s-elevating conveyor and through a metering tube to regulate the
5 lamina and flattened tobacco stem combination before entering the cutter. The lamina and flattened tobacco stem combination is then fed to one of two cutters 240 where it is cut at rate of typically between 38 cpi and 80 cpi. Cut tobacco is then sent to a feeder bin. From here it is conveyed via an s-elevator, through a metering tube to a weigh conveyor before entering the drying cylinder 260.

10

The Cylindrical gas fired drying unit 260 reduces the cut tobacco moisture content to the desired value. The required process gas temperature in the dryer at tobacco inlet point is achieved by modulating the burner firing rate. After being discharged from the dryer the tobacco is passed under a NDC moisture meter which is used to monitor the drying
15 process.

The cut tobacco product exiting the dryer 260 passes over a vibrating filter conveyor that separates the fine particles from the good product. Certain blends of RYO tobacco are then passed through a top flavouring cylinder 280 which adds distinctive flavours to suit the
20 final product requirements. A second belt conveyor 270 allows the product not requiring flavouring to bypass the top flavouring cylinder and proceed directly to the loading room.

Tobacco enters the loading room via a belt conveyor where it is discharged into rectangular plastic skips 290. These skips 290 are conveyed to one of two robotic arms that
25 automatically stack them onto storage trolleys. These trolleys are then manually wheeled to a humidity controlled storage room, where they are stored before being packaged as RYO tobacco products.

Although several embodiments have been described in detail, it should be understood that
30 various changes, substitutions, and alterations can be made herein by one ordinarily skilled in the art without departing from the spirit or scope of the present invention.

The Claims:

1. A process for producing a tobacco product from tobacco lamina and tobacco stem,
the process including the steps of:
 - 5 a. flattening the tobacco stem to break down the cellular structure of the tobacco stem;
 - b. combining the flattened tobacco stem with the tobacco lamina; and,
 - c. cutting the combined flattened tobacco stem and tobacco lamina to produce the tobacco product.
- 10 2. A process according to claim 1 wherein the tobacco product is a roll your own tobacco product.
3. A process according to claim 1 or claim 2 wherein the cellular structure of the tobacco stem is broken down during step a. whereby the tobacco stem loses rigidity.
- 15 4. A process according to any one of claims 1 to 3 wherein the tobacco stem is subjected to a preconditioning step prior to step a. wherein the preconditioning step increases the moisture content of the tobacco stem.
- 20 5. A process according to claim 4 wherein the preconditioning step includes an initial step of contacting the tobacco stem with steam and/or liquid water followed by an optional bulking step wherein the tobacco stem is allowed to rest prior to step a.
- 25 6. A process according to claim 5 wherein the initial preconditioning step includes contacting the tobacco stem with steam at a temperature of between 100 °C and 150 °C, and preferably between 101 °C and 115 °C.
- 30 7. A process according to claim 5 or 6 wherein the tobacco stem is allowed to rest during the bulking step for between 1 hour and 4 days prior to step a., and

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preferably for at least 4 hours.

- 5
8. A process according to any one of claims 4 to 7 wherein the preconditioning step increases the moisture content of the tobacco stem to between 15 to 35% wt and preferably at least 20% wt.
9. A process according to any one of claims 1 to 8 wherein the flattening of the tobacco stem in step a. includes a two step rolling process.
- 10
10. A process according to claim 9 wherein the two step rolling process includes a first rolling step wherein the tobacco stem is passed through a set of two rollers with a 0.3 mm to 1.0 mm gap between the rollers.
- 15
11. A process according to claim 9 wherein the two step rolling process includes a first rolling step wherein the tobacco stem is passed through a set of two rollers with a 0.4 mm to 0.7 mm gap between the rollers.
- 20
12. A process according to any one of claims 9 to 11 wherein the two step rolling process includes a second rolling step wherein the tobacco stem is passed through a set of two rollers with a 0.1 to 0.6mm gap between the rollers.
13. A process according to any one of claims 9 to 11 wherein the two step rolling process includes a second rolling step wherein the tobacco stem is passed through a set of two rollers with a 0.1 mm to 0.4 mm gap between the rollers.

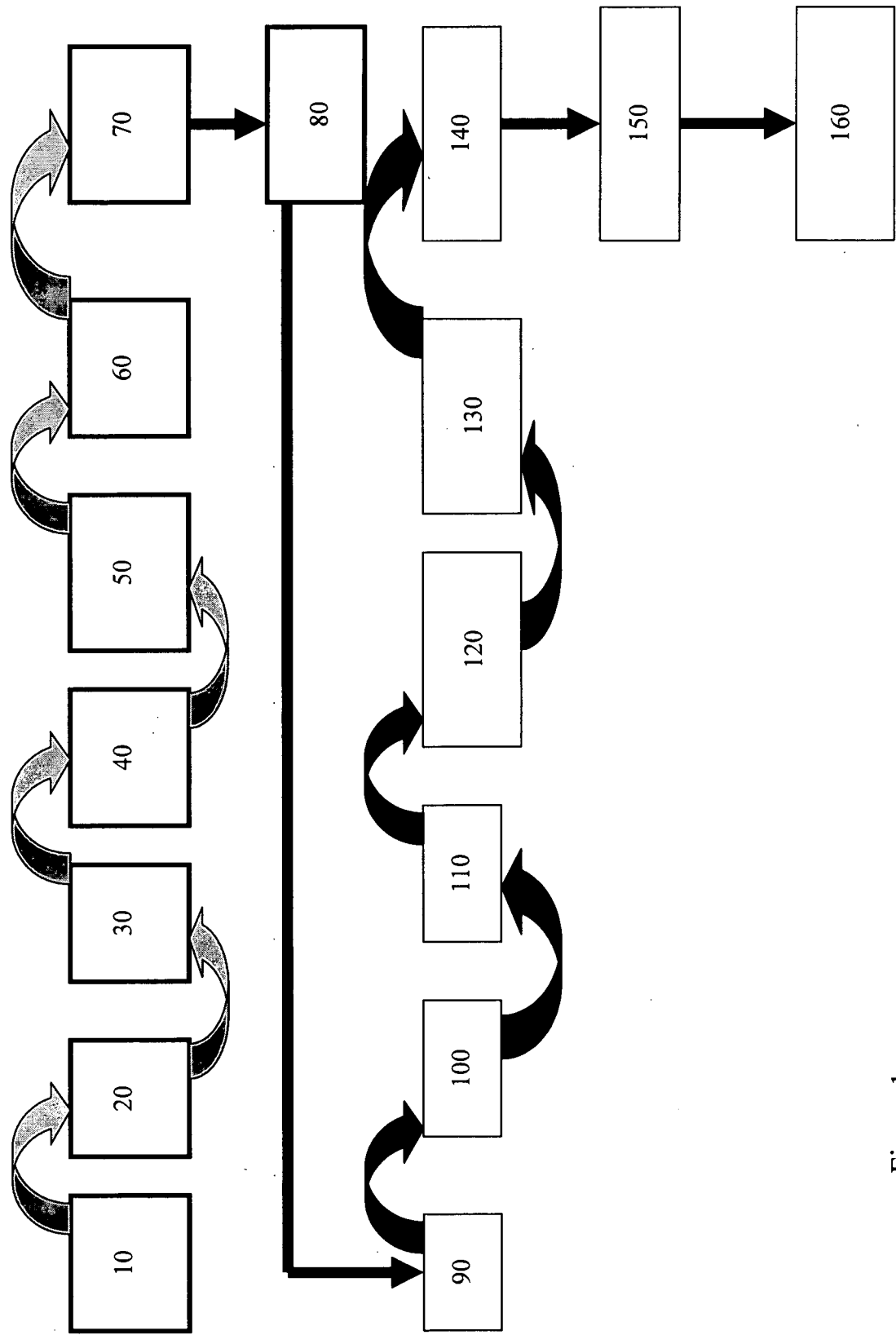


Figure 1

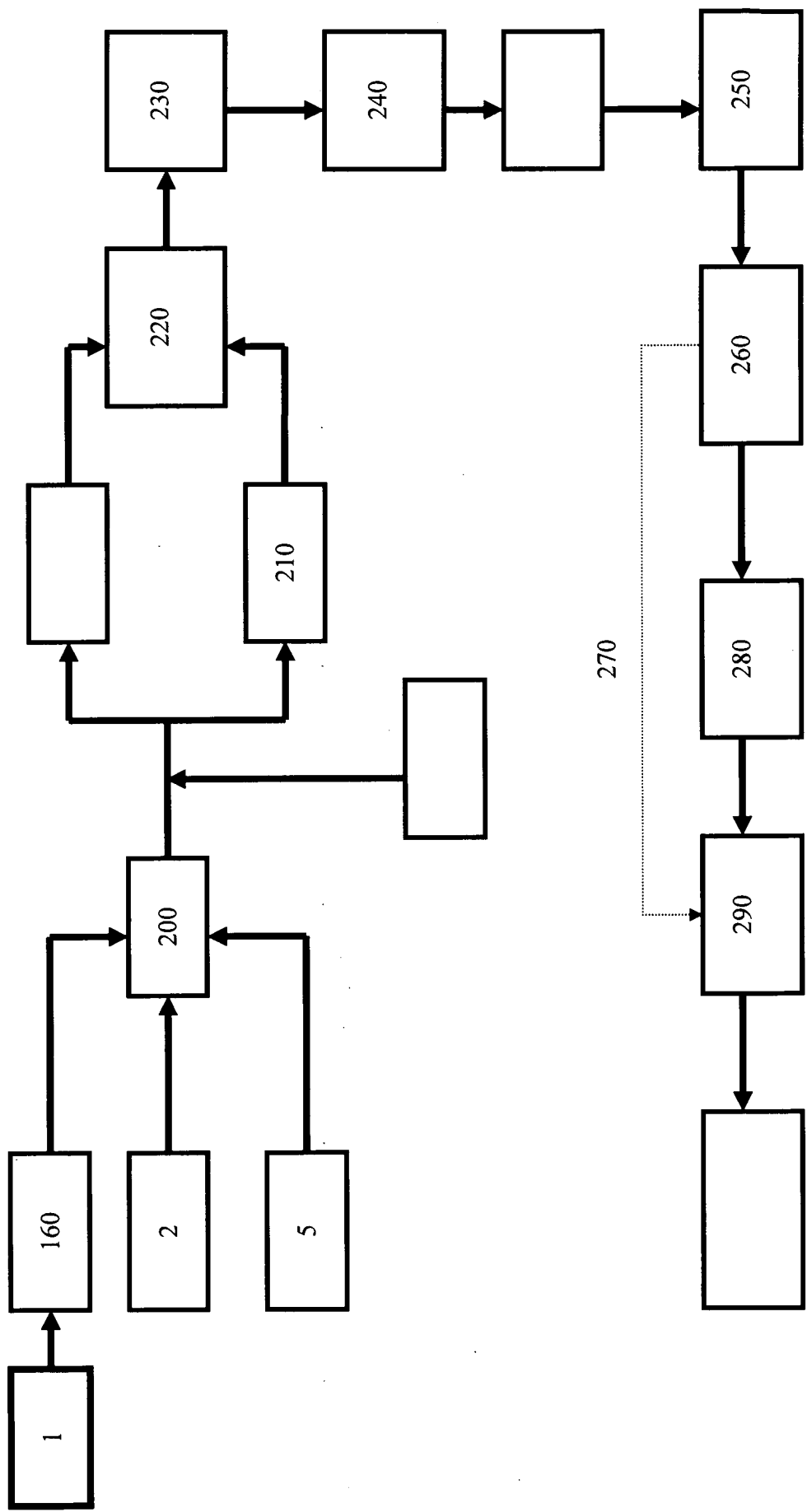


Figure 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2008/001552

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A24B 5/08 (2006.01) *A24B 5/14* (2006.01) *A24B 3/04* (2006.01) *A24B 3/12* (2006.01)
A24B 5/16 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

REFER TO ELECTRONIC DATABASE CONSULTED BELOW.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI and EPODOC

Class: A24B1/ic or A24B3/ic or A24B5/ic or A24B7/ic or A24B9/ic

Terms: Tobacco or shag or weed or snuff) w3 (stem or stalk? or branch+ or shoot? or rib

Terms: Rest or break+ or ease+ or intermission+ or lull+ or lie+ or lay+ or settl+ or stand+ or sit+ or relax+

A24B AND (STEM+ OR STALK+) AND (FLAT+ OR ROLL+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y1	US 6568401 A (SALMON et al.) 27 May 2003 see column 2, lines 37 – 40, 44 – 48, column 3, line 21 – 26; column 2, lines 45 – 48; column 2, lines 33 – 67 As above	1 – 5, 8, 9 – 13 9 – 13
X	US 4300579 A (ULRICH) 17 November 1981 see column 2, line 67 – column 3, line 9, column 4, lines 16 – 17, lines 26 – 31; column 2, lines 60 – 62;	1 – 5, 8
Y	As above	9 – 13

☒ Further documents are listed in the continuation of Box C☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
19 December 2008

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2008/001552

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4211243 A (OHNO et al.) 8 July 1980	1 - 5, 8
Y	see column 2, lines 57 - 58, lines 64 - 68; column 2, lines 57 - 57; As above	9 - 13
X	US 3690328 A (QUARENGHI) 12 September 1972	1 - 8
Y	see column 2, lines 29-52, lines 65-67; column 2, lines 37-41; column 2, lines 63-64; As above	9 - 13
X	US 3411514 A (HIND et al.) 19 November 1968	1 - 5, 7
Y	see column 1, lines 27-50, column 2, line 67-column 3, line 2; see column 2, lines 67-70; As above	9 - 13
X	US 3219042 A (MOLINS) 23 November 1965	1 - 5, 8
Y	see column 1, lines 29 - 48; column 1, lines 35 - 37, column 2, lines 46 - 48 As above	9 - 13
X	CA 971068 A (PHILIP MORRIS INC.) 15 July 1975	1-5,6-7,8
Y	see page 3, lines 3 - 6, lines 17 - 19, page 3, line 23 - page 4, line 10, page 7, line 14; page 3, lines 1 - 4, 25, page 7, line 2, page 8, line 14; page 5, line 19; As above	9 - 13
X	GB 1089361 A (MOLINS) 1 November 1967	1 - 5
Y	see page 2, lines 42 - 57, lines 61 - 64, lines 107 - 115, page 3, lines 20 - 25; As above	9 - 13
X	US 4787402 A (LEONARD) 29 November 1988	1 - 5, 8
Y1	see column 1, line 60 - column 2, line 21, column 2, lines 40 - 44, column 6, lines 30 - 59, column 7, lines 11 - 27; column 1, line 58 - column 2, line 21, column 4, line 21 - column 5, line 27, column 8, line 41 - column 10, line 2, examples 1 - 5.	9 - 13
<i>Note: Any one of Y1 documents can be combined with any one of Y documents</i>		

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2008/001552

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	6568401	AU	27174/99	BR	9907207	CN	1288355
		EP	0931464	EP	1056362	PL	341902
		WO	9937173	ZA	9900433		
US	4300579	AU	57017/80	BR	8002087	CA	1123699
		DE	2913823	GB	2048645		
US	4211243	JP	53104797				
US	3690328	NONE					
US	3411514	NONE					
US	3219042	DE	1432585	GB	951485		
CA	971068	NONE					
GB	1089361	FR	1423182				
US	4787402	BR	8700331	CA	1260350	CN	87100133
		EP	0233046	ES	2004076	JP	62181768
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.							
END OF ANNEX							