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- B26D 1/40* (2006.01)      *B26D 1/04* (2006.01)
- B26D 1/22* (2006.01)      *B26D 1/14* (2006.01)
- B26D 1/00* (2006.01)      *A24B 7/12* (2006.01)
- B26D 5/20* (2006.01)      *B26F 1/18* (2006.01)
- B26D 7/08* (2006.01)      *B65H 35/02* (2006.01)
- B26D 11/00* (2006.01)     *B65H 35/08* (2006.01)
- B26D 9/00* (2006.01)      *B65H 39/16* (2006.01)

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(71) Applicant: **NICOVENTURES TRADING LIMITED**  
[GB/GB]; Globe House, 1 Water Street, London WC2R 3LA (GB).

(72) Inventors: **JENKINS, Benjamin**; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **CHMIELEWSKI, Robert**; c/o International Tobacco Machinery Poland Sp. Z.o.o., ul. Stanikowskiego 2, 26-600 Radom (PL). **FRUZYNSKI, Wojciech**; c/o International Tobacco Machinery Poland Sp. Z.o.o., ul. Stanikowskiego 2, 26-600 Radom (PL).

(74) Agent: **HANCOX, Jonathan**; Venner Shipley LLP, Windsor House, 6-10 Mount Ephraim Road, Tunbridge Wells Kent TN1 1EE (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(54) Title: METHOD AND APPARATUS FOR SHREDDING A SHEET OF MATERIAL

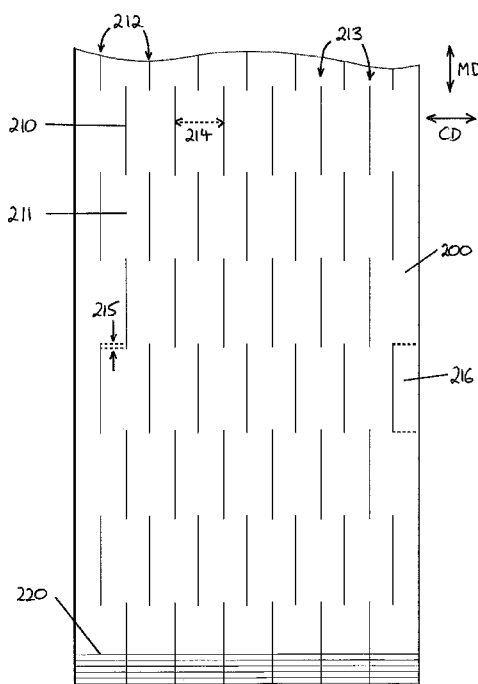


FIG. 3

(57) Abstract: A method and apparatus for shredding a sheet (200) of material are disclosed. The material may be employed as an aerosol generating material in a consumable for use in a non-combustible aerosol provision system. The method comprises the steps of perforating the sheet in a first direction with a plurality of parallel lines (212), (213) of perforations (210) to form a perforated sheet, the perforations of adjacent lines being offset from one another, and cutting the perforated sheet in a second direction to form individual strips of material. The first and second directions maybe orthogonal, for example machine direction and cross direction.



**(84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Published:**

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# INTERNATIONAL SEARCH REPORT

International application No <b>PCT/GB2023/050221</b>
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
INV. <b>B26F1/38</b>	<b>B26F1/20</b>	<b>B26D1/40</b>
<b>B26D1/22</b>	<b>B26D1/00</b>	<b>B26D5/20</b>
<b>B26D7/08</b>	<b>B26D11/00</b>	<b>B26D9/00</b>
<b>B26D1/04</b>	<b>B26D1/14</b>	<b>A24B7/12</b>
<b>A24B7/00</b>	<b>B26D1/18</b>	<b>B26F1/18</b>
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) <b>B26F B26D A24F A24B B25H B25F B65H</b>		
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) <b>EPO-Internal, WPI Data</b>		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
<b>X</b>	<b>US 2010/170970 A1 (ROMANOVICH DMITRY [US]) 8 July 2010 (2010-07-08)</b>	<b>1, 2, 4-11, 18, 19, 30, 32-40, 42</b>
<b>Y</b>	<b>paragraph [0008] - paragraph [0030];</b>	<b>16, 17</b>
<b>A</b>	<b>figures 1-3 paragraph [0036] - paragraph [0040]; figures 4a-4d</b>	<b>31, 41</b>
<b>X</b>	<b>----- CN 110 269 271 A (YUNNAN REASCEND TOBACCO TECH GROUP CO LTD) 24 September 2019 (2019-09-24)</b>	<b>1, 2, 4-11, 16, 18, 19, 30, 32-40, 42</b>
<b>Y</b>	<b>paragraph [0017] - paragraph [0027];</b>	<b>17</b>
<b>A</b>	<b>figures 1-5</b>	<b>31, 41</b>
	<b>----- -/--</b>	
<input checked="" type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/>
		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	Date of mailing of the international search report	
<b>28 August 2023</b>	<b>05/09/2023</b>	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  <b>Maier, Michael</b>	

**INTERNATIONAL SEARCH REPORT**

International application No <b>PCT/GB2023/050221</b>
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
<b>X</b>	<b>DE 15 32 091 A1 (FT PUBLIC DIT SERVICE D EXPL I) 12 August 1971 (1971-08-12)</b>	<b>1, 2, 4-8, 10, 11, 16, 18, 19, 30, 32-40, 42</b>
<b>Y</b>	<b>page 12 - page 13; figures 1-3</b>	<b>17</b>
<b>A</b>	<b>page 18 - page 19</b> -----	<b>31, 41</b>
<b>Y</b>	<b>WO 2021/152334 A1 (NICOVENTURES TRADING LTD [GB]) 5 August 2021 (2021-08-05) page 1 - page 31; claims 46, 49</b> -----	<b>16, 17</b>

# INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/GB2023/050221**

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: **44-49**  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
**see FURTHER INFORMATION sheet PCT/ISA/210**
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

**see additional sheet**

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:  
**1-3, 18-28, 33-42 (completely); 4-11, 16, 17, 30-32 (partially)**
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 2, 18, 19, 33-42 (completely); 4-11, 16, 17, 30-32 (partially)

1. A method of shredding a sheet of material comprising the steps of:  
perforating the sheet in a first direction with a plurality of parallel lines of perforations to form a perforated sheet, wherein the perforations of adjacent lines are offset from one another; and  
cutting the perforated sheet in a second direction to form individual strips of material.

18. Apparatus for shredding a sheet of material comprising:  
a perforator configured to perforate the sheet in a first direction with a plurality of parallel lines of perforations, wherein the perforations of adjacent lines are offset from one another; and  
a cutter configured to cut the perforated sheet in a second direction to form individual strips of material.

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2. claims: 3, 20-28 (completely); 4-11, 16, 17, 30-32 (partially)

3. The method of claim 1 or 2, wherein the sheet of material is supplied in a machine direction and wherein the first direction is the machine direction and the second direction is the cross direction.

20. The apparatus of claim 18 or 19, wherein the sheet of material is supplied in a machine direction and wherein the first direction is the machine direction and the second direction is the cross direction.

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3. claims: 12-14, 29 (completely); 16, 17 (partially)

12. The method of claim 10 or 11, wherein the length of each cut is greater than the length of each gap to provide an overlap between perforations of adjacent lines when viewed in the second direction.

29. The apparatus of claim 28, wherein the length of each blade is greater than the length of each gap to provide an overlap between perforations of adjacent lines when viewed in the second direction.

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4. claims: 15, 43 (completely); 16, 17 (partially)

15. The method of any of claims 1 to 14, wherein the sheet of material is a first sheet of material and the perforating step forms a first perforated sheet, further comprising the steps of:

separately perforating a second sheet of material in a first direction with a plurality of parallel lines of perforations

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

to form a second perforated sheet, wherein the perforations of adjacent lines are offset from one another;  
combining the first and second perforated sheets to form multiple layers of perforated sheets;  
and cutting the multiple layers of perforated sheets in a second direction to form individual strips of material.

43. The apparatus of any of claims 18 to 42, wherein the sheet of material is a first sheet of material and the perforator is a first perforator which forms a first perforated sheet, the apparatus further comprising:  
a second perforator configured to perforate a second sheet of material in a first direction with a plurality of parallel lines of perforations to form a second perforated sheet, wherein the perforations of adjacent lines are offset from one another,  
wherein the apparatus is configured to combine the first and second perforated sheets to form multiple layers of perforated sheets;  
and a cutter configured to cut the multiple layers of perforated sheets in a second direction to form individual strips of material.

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## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 44-49

Claims 44 to 49 are so unclear that no meaningful search could be carried out. Independent claim 44 specifies no features of the claimed article except that it comprises strips of material. Dependent claims 45 to 49 do not remedy this deficiency.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) PCT declaration be overcome.



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No <b>PCT/GB2023/050221</b>
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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
<b>US 2010170970</b>	<b>A1</b>	<b>08-07-2010</b>	<b>CN</b>	<b>101890391 A</b>	<b>24-11-2010</b>
			<b>US</b>	<b>2010170970 A1</b>	<b>08-07-2010</b>
-----					
<b>CN 110269271</b>	<b>A</b>	<b>24-09-2019</b>	<b>NONE</b>		
-----					
<b>DE 1532091</b>	<b>A1</b>	<b>12-08-1971</b>	<b>BE</b>	<b>686229 A</b>	<b>01-02-1967</b>
			<b>CH</b>	<b>472187 A</b>	<b>15-05-1969</b>
			<b>DE</b>	<b>1532091 A1</b>	<b>12-08-1971</b>
			<b>LU</b>	<b>51862 A1</b>	<b>31-10-1966</b>
			<b>NL</b>	<b>6612403 A</b>	<b>03-03-1967</b>
			<b>US</b>	<b>3769866 A</b>	<b>06-11-1973</b>
-----					
<b>WO 2021152334</b>	<b>A1</b>	<b>05-08-2021</b>	<b>AU</b>	<b>2021213960 A1</b>	<b>25-08-2022</b>
			<b>BR</b>	<b>112022015248 A2</b>	<b>11-10-2022</b>
			<b>CA</b>	<b>3164907 A1</b>	<b>05-08-2021</b>
			<b>CN</b>	<b>115666277 A</b>	<b>31-01-2023</b>
			<b>EP</b>	<b>4096443 A1</b>	<b>07-12-2022</b>
			<b>IL</b>	<b>294813 A</b>	<b>01-09-2022</b>
			<b>JP</b>	<b>2023511955 A</b>	<b>23-03-2023</b>
			<b>KR</b>	<b>20220130785 A</b>	<b>27-09-2022</b>
			<b>US</b>	<b>2023143930 A1</b>	<b>11-05-2023</b>
			<b>WO</b>	<b>2021152334 A1</b>	<b>05-08-2021</b>
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