



(51) International Patent Classification:

B31F 1/00 (2006.01) *B31F 1/28* (2006.01)
B31F 1/07 (2006.01) *B31F 1/30* (2006.01)
B31F 1/26 (2006.01)

(21) International Application Number:

PCT/EP2014/063617

(22) International Filing Date:

26 June 2014 (26.06.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1311638.9 28 June 2013 (28.06.2013) GB

(71) Applicant: **BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED** [GB/GB]; Globe House, 1 Water Street, London WC2R 3LA (GB).

(72) Inventors: **KALJURA, Karl**; c/o Globe House, 1 Water Street, London WC2R 3LA (GB). **HODGES, Paul**; c/o Globe House, 1 Water Street, London WC2R 3LA (GB). **SPENCER, Alfred Vincent**; c/o Globe House, 1 Water

Street, London WC2R 3LA (GB). **NEWELL, Darren**; c/o Globe House, 1 Water Street, London WC2R 3LA (GB).

(74) Agents: **BROWN, Alexander** et al.; Venner Shipley LLP, 200 Aldersgate, London EC1A 4HD (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, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, 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, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR CORRUGATING SHEET MATERIAL

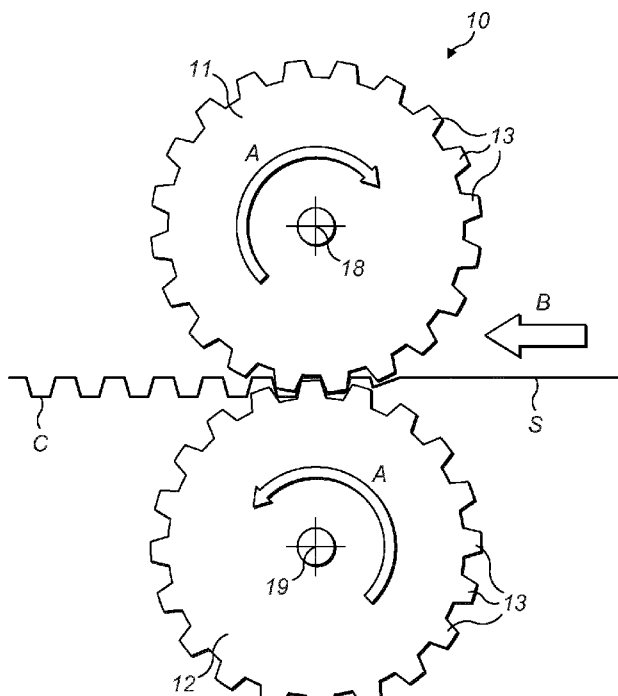


FIG. 1

(57) Abstract: Apparatus and Method for Corrugating Sheet Material An apparatus for corrugating a continuous sheet material. The apparatus comprises first and second members having toothed surfaces in meshing engagement such that a planar sheet material may be fed between the first and second surfaces and shaped into a corrugated configuration by, and corresponding to, the meshing teeth. The teeth on the first and second members each comprise a top face and opposing side faces, and edges where the side faces meet the top face. A method of corrugating a sheet material using such an apparatus is also provided.



EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, 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).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

26 February 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/063617

A. CLASSIFICATION OF SUBJECT MATTER

INV. B31F1/00 B31F1/07 B31F1/26 B31F1/28 B31F1/30
ADD.

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)
B31F

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 170 122 A (COWELL TIMOTHY A T [GB]) 9 October 1979 (1979-10-09) column 2, line 13 - line 49; figures 2, 4, 5	1,4,25
X	----- FR 2 310 815 A2 (BLANC JEAN MARIE [FR]) 10 December 1976 (1976-12-10)	1-4,25, 26
Y	claims 1, 3; figure 1 ----- -/-	7,8,12, 14, 18-20, 22,24, 29,36, 39,41



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

"E" earlier application or patent but published on or after the international filing date

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"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

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Date of the actual completion of the international search

23 December 2014

Date of mailing of the international search report

15/01/2015

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

Sundqvist, Stefan

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2014/063617

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 908 441 C (AKTEINGESELLSCHAFT DER MASCHIN) 5 April 1954 (1954-04-05)	1,4,7,8, 19,20, 24,25
A	page 2, line 42 - line 113; claim 1; figures 1-6	9
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X	US 2005/006816 A1 (DRUT HENRY [DE] ET AL) 13 January 2005 (2005-01-13) paragraphs [0045] - [0048], [0066], [0070], [0071], [0079]; figures 2b, 5	1,7-9, 20,25,31
A	US 2 429 482 A (GEORG MUNTERS CARL) 21 October 1947 (1947-10-21) column 6, line 6 - column 11; figures 2, 3	7,9,19, 20
X	US 2 193 052 A (HENRY ATWATER) 12 March 1940 (1940-03-12)	1,4,12, 14,17, 18,22, 24,25, 29,30, 34,36, 39,41
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X	GB 654 073 A (DRY CORRUGATING METHOD V AKSEL) 6 June 1951 (1951-06-06)	1,4,12, 15,16, 23-25, 37,40
	page 1, line 12 - line 28 page 2, line 59 - line 71; figures 1-3, 5	
X	US 3 712 101 A (BEMROSE C ET AL) 23 January 1973 (1973-01-23) column 2, line 17 - line 32; figure 2	1,4,12, 25
Y	US 6 311 754 B1 (MARSCHKE CARL R [US]) 6 November 2001 (2001-11-06)	12,14, 18,22, 24,29, 36,39,41
	column 5, line 36 - line 41; figure 1	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2014/063617

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.:
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:
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.:

1-4, 7-26, 29-41
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: 1-4, 25, 26

Corrugating with hexagonal cross-section (claims 2, 3 and 26 as dependent on claims 1 and 25, respectively; claim 4 being included not for forming the same invention but due to its lack of novelty in view of the cited documents).

2. claim: 5

Corrugating with a continuous belt (claim 5 as dependent on claim 1).

3. claims: 6, 27, 28

Corrugating with variable degree of meshing engagement (claim 6, 27 and 28 as dependent on claims 1 and 25, respectively).

4. claims: 7-11, 19, 20, 31-33

Corrugating with reduced friction (dependent claims 7-11, 20 and 31-33 as dependent on claims 1, 19 and 25, respectively; claim 19).

5. claims: 12, 13, 17, 18, 21, 24, 34-36, 38

Corrugating with use of steam or heat (dependent claims 12, 13, 17, 18, 24 and 34-36 as dependent on claims 1 and 25, respectively; claims 21, 23, 38).

6. claims: 14, 22, 29, 30, 39

Corrugating with use of vacuum means (dependent claim 14 (as dependent on claim 12), 29 and 30 as dependent on claims 1 and 25, respectively; claims 22, 39).

7. claims: 15, 16, 23, 37, 40, 41

Corrugating with localisation of fold lines (dependent claims 15, 16 (as dependent on claim 12), 37 and 41 as dependent on claims 1, 25 and 40, respectively; claims 23, 40).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2014/063617

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