

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(10) International Publication Number

WO 2015/040173 A1

(43) International Publication Date
26 March 2015 (26.03.2015)

WIPO | PCT

(51) International Patent Classification:
B29C 65/00 (2006.01) B29C 65/36 (2006.01)

(21) International Application Number:
PCT/EP2014/070024

(22) International Filing Date:
19 September 2014 (19.09.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
1351092-0 20 September 2013 (20.09.2013) SE

(71) Applicant: TETRA LAVAL HOLDINGS & FINANCE S.A. [CH/CH]; 70, Avenue Général-Guisan, CH-1009 Pully (CH).

(72) Inventors: PALMQVIST, Patrik; Fullriggaregatan 32, S-234 42 Lomma (SE). SHOKRI, Ebi; Tingsvägen 30, S-187 36 Täby (SE).

(74) Agent: ASSOCIATION "TETRA PAK - ATTORNEYS SE"; AB Tetra Pak, Patent Department, Ruben Rausings gata, S-221 86 Lund (SE).

(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, 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, 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, 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:

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

(54) Title: SEALING BAND FOR A FILLING MACHINE

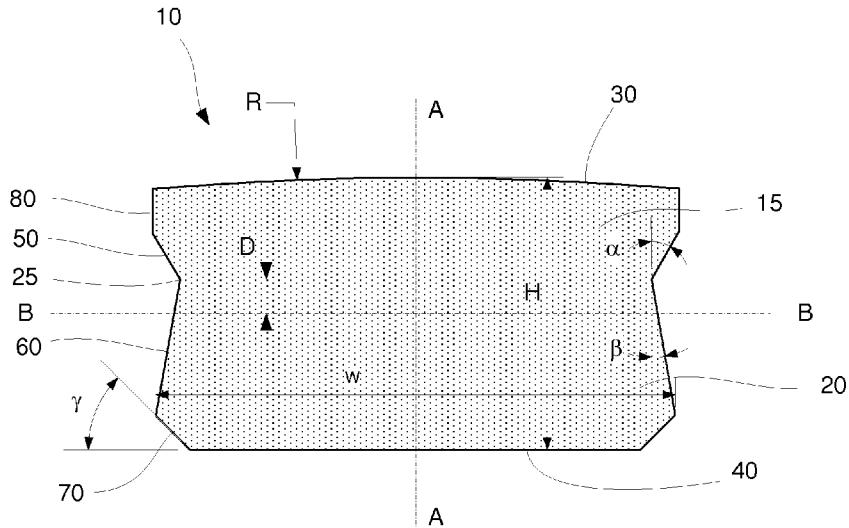


Fig. 1

(57) Abstract: The present invention relates to a sealing band (10) for a sealing jaw arrangement 100, 200, comprising a contact surface (30) and an opposite bottom surface (40), a first portion (15) adjacent to the contact surface (30) and a second portion (20) adjacent to the bottom surface (40). The portions (15, 20) are separated by a waist (25), and said sealing band (10) is symmetrical along a first axis (A-A) that extends perpendicularly from a middle of the bottom surface (40), and the waist (25) between the first portion (15) and the second portion (20) is located closer to the contact surface (30) than to the bottom surface (40). The invention also relates to a counter jaw (100) for holding the sealing band (10), and to a sealing jaw arrangement comprising such a counter jaw (100) and a heating jaw (200).

WO 2015/040173 A1

SEALING BAND FOR A FILLING MACHINE

Field of the Invention

The invention relates to a sealing band for a sealing jaw arrangement, and in particular to a resilient sealing band for use in a sealing jaw arrangement in packaging machines.

Background

Sealing bands are often used in sealing jaw arrangements in a counter jaw of a packaging machine, for providing a smooth and even counter pressure against e.g. a heating jaw. The exact shape of the sealing band, or sealing dolly, is important since it affects the quality of the sealings. If the sealings are not of good quality, liquid food packages may leak and the sterility of the packages may be jeopardised. The sealing band is a spare part that is replaced often at regular intervals. It is hence desirable that this exchange is easy yet facilitates that the sealing band is installed correctly.

Summary of the Invention

In a first aspect, the invention provides a sealing band for a sealing jaw arrangement, comprising a contact surface and an opposite bottom surface, a first portion adjacent to the contact surface and a second portion adjacent to the bottom surface, said portions being separated by a waist of a narrower cross-section, said sealing band being symmetrical along a first axis that extends perpendicularly from a middle of the bottom surface, and wherein the waist between the first portion and the second portion is located closer to the contact surface than to the bottom surface. Additional aspects are given by the dependent claims.

The invention also provides a counter jaw being adapted to accommodate a sealing band according to the main claim. In a yet further aspect, the invention provides a sealing jaw arrangement comprising a counter jaw and a heating jaw, utilising the sealing band.

Brief description of the drawings

The invention will be further described with reference to a specific embodiment, as shown in the drawings in which:

Fig. 1 shows a sectional view of a sealing,

Fig. 2 shows a perspective view of a sealing band of the invention, and

Fig. 3 shows a cross-sectional view of a heating jaw and a counter jaw in which the sealing band is intended to be mounted.

Detailed description of the invention

The present invention will now be described in detail, with references to the drawings. In Fig. 1, a sealing band 10 is shown in cross-section. The sealing band 10 comprises a first portion 15, being at the top in Fig. 1, and a second portion 20, being at the bottom in Fig. 1. The two portions meet at a waist 25, being formed by first angled walls 50 and second angled walls 60, one of each on either side of a centre line A-A. The waist 25 hence has a narrower cross-section, compared to the immediate surrounding sections of the first portion 15 and the second portion 20. A contact surface 30 is in use facing a heating jaw 200, see Fig. 3. The contact surface 30 has a curved shape, as seen in cross-section, with a constant radius R of approx. 50 mm. A bottom surface 40 opposite the contact surface 30 is substantially flat, and will in use be facing a counter jaw 100 in which it is mounted. Chamfers 70 are provided at the corners between the

bottom surface 40 and the second angled walls 60, at an angle γ of about 45 degrees from the bottom surface 40. Top walls 80 are arranged between the first angled walls 50 and the contact surface 30, which walls 80 are parallel with a first symmetry axis A-A, which extends perpendicularly from the middle of the bottom surface 40. A second line B-B is shown midway between the top of the contact surface 30 and the bottom surface 40. The waist 25 is located a certain distance D above this line B-B, making the sealing band 10 distinctly asymmetric around line B-B. The asymmetry should be great enough to clearly show if the sealing band is mounted upside down. It has been found that the ratio between D and the overall height of the sealing band, H, should be between 0.1 and 0.15, or between 0.12 and 0.13. The waist 25 should not be too narrow, in comparison with the greatest width W of the second portion 20, and the ratio should be between 0.88 and 0.92 or between 0.89 and 0.91.

The angle α between the first angled walls 50 and the symmetry line A-A is about 30 degrees, and the first angled walls 50 are angled out from the waist 25, in the direction of the contact surface 30. The angle β between the second angled walls 60 and the symmetry line A-A is about 10 degrees, and the second angled walls 60 are angled out from the waist, in the direction of the bottom surface 40.

The sealing band 10 is shown in a perspective view in Fig. 2, and it can be seen that the cross-section is the same throughout the band. This means that the sealing band e.g. can be manufactured through extrusion, using a nozzle having an inner contour substantially corresponding with the outer contour of the sealing band 10 as seen in Fig. 1. However, it is also possible to manufacture the sealing band through moulding or grinding. The sealing band 10 can also be

provided with discrete indentations 300, e.g. dimples, on at least a part of the contact surface 30.

Typical height of the sealing band is typically around 4 mm, and the width is about 7.7 mm. The length of the sealing band varies with the dimensions of the package to seal but is typically around 270–300 mm.

In Fig. 3, a counter jaw 100 and a heating jaw 200 are shown in a rest position, in a cross-sectional view. The counter jaw 100 comprises a groove 110 which is provided with a matching shape to the sealing band 10. The groove 110 has a restriction which is intended to fit the waist 25 of the sealing band 10, such that it snaps into place securely. The heating jaw 200 comprises a first heating band 210, which protrudes outside the surface of the heating jaw 200, and a second heating band 220, which is arranged below the surface of the heating jaw 200. These heating bands 210, 220 are typically conductors that are intended to induce a current in aluminium foil that is normally present in the packaging material to be heat-sealed.

Since the sealing band 10 is symmetric around line A-A, the sealing band can be mounted in two orientations, without affecting the sealing performance. Since the sealing band however is asymmetric around line B-B, it is most difficult to mount the sealing band upside down. This ensures that the sealing band 10 is mounted in the intended orientation, and the sealing performance is not jeopardised.

During operation, the packaging material is placed between the counter jaw 100 and the heating jaw 200, and the jaws 100, 200 are pressed together. A current is driven through the heating bands 210, 220, which bands are connected in series, and a current is induced in the aluminium foil of the packaging material. This current heats the aluminium foil, which in turn heats the surrounding plastic material

until it melts. The pressure from the jaws 100, 200 fuses the plastic, and the sealing is completed when the material cools down. A cooling circuit is often provided in the heating jaw, for speeding up this process.

Even though the waist 25 is described as defined by two pairs of angled walls 50, 60, the waist 25 may be a similar narrow area being defined between the first portion 15 and the second portion 20, where the adjoining walls instead are smoothly curved.

The sealing band 10 may be made of a resilient material, such as rubber or a rubber-like polymeric material, or a combination thereof. It would also be possible to use a harder material, having the same external shape, but which was provided with flexing contact surface, and lateral surfaces, e.g. by having an internal hollow space. Also foamed materials are possible, e.g. foamed polymeric or rubber-like materials. One suitable material is polyurethane, having a hardness of 93 ± 2 Shore A and a compression set $\leq 30\%$.

Whilst the invention has been described with reference to a specific embodiment, it will be appreciated that various modifications are possible within the scope of the invention. All features described in connection with any aspect of the invention can be used with any other aspect of the invention.

In this specification, unless expressly otherwise indicated, the word 'or' is used in the sense of an operator that returns a true value when either or both of the stated conditions is met, as opposed to the operator 'exclusive or' which requires that only one of the conditions is met. The word 'comprising' is used in the sense of 'including' rather than in to mean 'consisting of'. All prior teachings acknowledged above are hereby incorporated by reference. No acknowledgement of any prior published document herein should be taken to be an admission or representation that the

teaching thereof was common general knowledge in Australia or elsewhere at the date hereof.

Claims

1. A sealing band (10) for a sealing jaw arrangement (100, 200), comprising a contact surface (30) and an opposite bottom surface (40), a first portion (15) adjacent to the contact surface (30) and a second portion (20) adjacent to the bottom surface (40), said portions being separated by a waist (25) of a locally narrower cross-section, said sealing band (10) being symmetrical along a first axis (A-A) that extends perpendicularly from a middle of the bottom surface (40), and wherein the waist (25) between the first portion (15) and the second portion (20) is located closer to the contact surface (30) than to the bottom surface (40).
2. The sealing band (10) according to claim 1, wherein a radius (R) of a cross-section of the contact surface (30) is between 40 and 60 mm, said contact surface (30) being convex.
3. The sealing band (10) according to claim 1 or 2, wherein first angled walls (50) and second angled walls (60) are arranged on either side of the waist (25), and wherein the first angled walls (50) are angled outwards in the direction of the contact surface (30).
4. The sealing band (10) according to claim 3, wherein an angle (a) of the first angled walls (50) is 30 degrees in relation to the symmetry axis (A-A).
5. The sealing band (10) according to any previous claim, wherein an angle (b) of the second angled walls (60) is 10 degrees in relation to the symmetry axis (A-A).

6. The sealing band (10) according to any previous claim, wherein the contact surface (30) at least partly is provided with discrete indentations (300), or dimples.

7. The sealing band according to any previous claim, wherein the asymmetry of the sealing band (10), calculated as D/H , where D is the distance between the waist (25) and a line (B-B), which line is parallel to the bottom surface (40) and is located midway between the top of the contact surface (30) and the bottom surface (40), and H is the overall height of the sealing band, measured from the top of the contact surface (30) to the bottom surface (40), is between 0.10 and 0.15, or is between 0.12 and 0.13.

8. The sealing band (10) according to any previous claim, wherein a relationship between the width of the waist (25) and a maximum width (W) of the second portion (20) is between 0.88 and 0.92, or is between 0.89 and 0.91.

9. Sealing band (10) according to any previous claim, wherein the band (10) is made of rubber or a rubber-like polymeric material, or a foamed polymer, or a more rigid polymeric material having flexing contact wall (30), or polyurethane.

10. Counter jaw (100) being provided with a groove (110) that is configured for a sealing band (10) according to any previous claim.

11. Sealing jaw arrangement, comprising a counter jaw (100) according to claim 10, and a heating jaw (200).

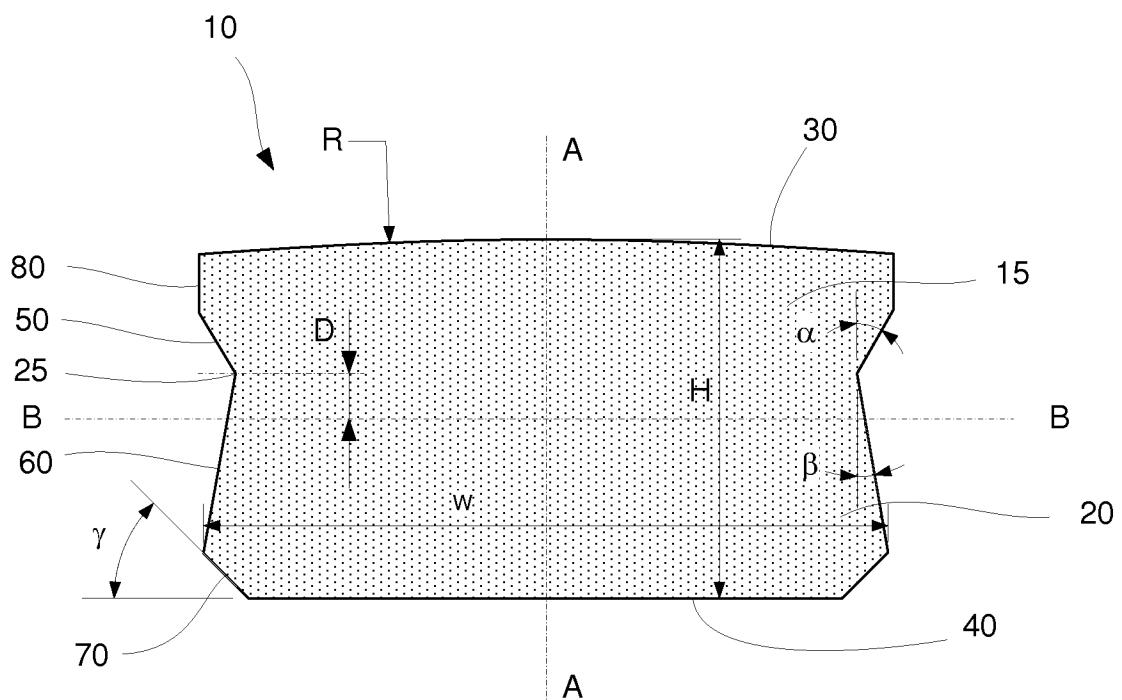


Fig. 1

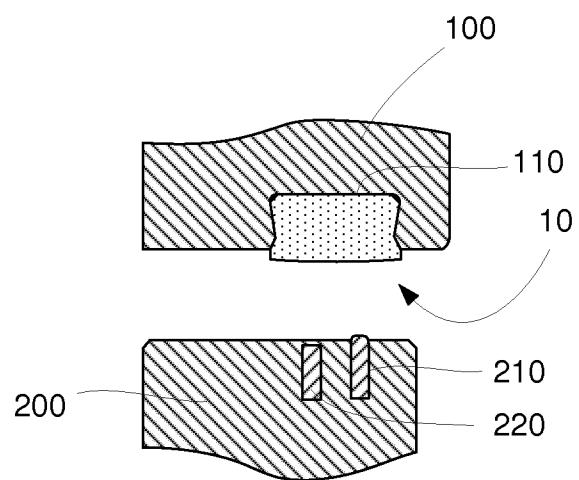
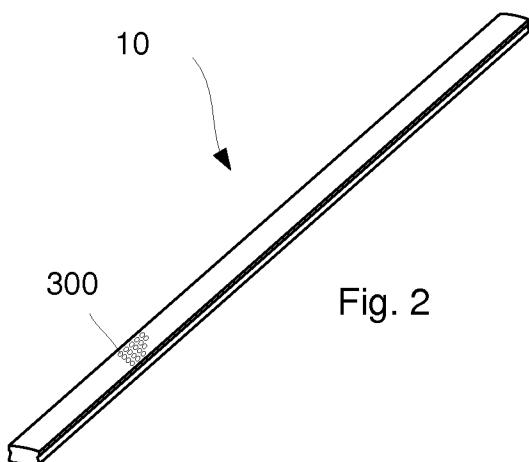


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/070024

A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C65/00
ADD. B29C65/36

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)
B29C

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 083 042 A2 (SKINETTA PAC SYST KIENER GMBH [DE]) 14 March 2001 (2001-03-14) figure 6f paragraph [0057] -----	1-11
X	EP 1 205 294 A2 (ARKMOUNT SYSTEMS INC [CA]) 15 May 2002 (2002-05-15) figure 7 -----	1,3,9-11
X	EP 1 452 451 A1 (TETRA LAVAL HOLDINGS & FINANCE [CH]) 1 September 2004 (2004-09-01) figure 1 -----	1,3,9-11
X	EP 0 979 723 A2 (SHIKOKU KAKOKI CO LTD [JP]) 16 February 2000 (2000-02-16) figure 4 ----- -/-	1,3,9-11

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
"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)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 November 2014	21/11/2014
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 Taillandier, Sylvain

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/070024

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 829 426 A2 (SHIKOKU KAKOKI CO LTD [JP] SHIKOKU KAKOKI CO LTD) 18 March 1998 (1998-03-18) figure 4 ----- JP H10 101007 A (SHIKOKU KAKOKI CO LTD) 21 April 1998 (1998-04-21) figure 7 -----	1,3,9-11
X		1,3,9-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2014/070024

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
EP 1083042	A2	14-03-2001	AT 299432 T DE 19943492 A1 EP 1083042 A2 US 6543202 B1		15-07-2005 15-03-2001 14-03-2001 08-04-2003
EP 1205294	A2	15-05-2002	CA 2361980 A1 EP 1205294 A2 US 2002139084 A1		13-05-2002 15-05-2002 03-10-2002
EP 1452451	A1	01-09-2004	AT 506260 T AU 2002354175 A1 CN 1617815 A EP 1452451 A1 ES 2360606 T3 JP 4007803 B2 JP 2003170915 A KR 20040071170 A US 2005241277 A1 WO 03047978 A1		15-05-2011 17-06-2003 18-05-2005 01-09-2004 07-06-2011 14-11-2007 17-06-2003 11-08-2004 03-11-2005 12-06-2003
EP 0979723	A2	16-02-2000	AT 298280 T DE 69925885 D1 DE 69925885 T2 DK 0979723 T3 EP 0979723 A2 HK 1025540 A1 JP 4326043 B2 JP 2000053110 A US 6294046 B1		15-07-2005 28-07-2005 11-05-2006 10-10-2005 16-02-2000 02-09-2005 02-09-2009 22-02-2000 25-09-2001
EP 0829426	A2	18-03-1998	CN 1176916 A DE 69708799 D1 DE 69708799 T2 DK 0829426 T3 EP 0829426 A2 JP 3857363 B2 JP H1086915 A US 5992131 A		25-03-1998 17-01-2002 23-05-2002 25-02-2002 18-03-1998 13-12-2006 07-04-1998 30-11-1999
JP H10101007	A	21-04-1998	NONE		