



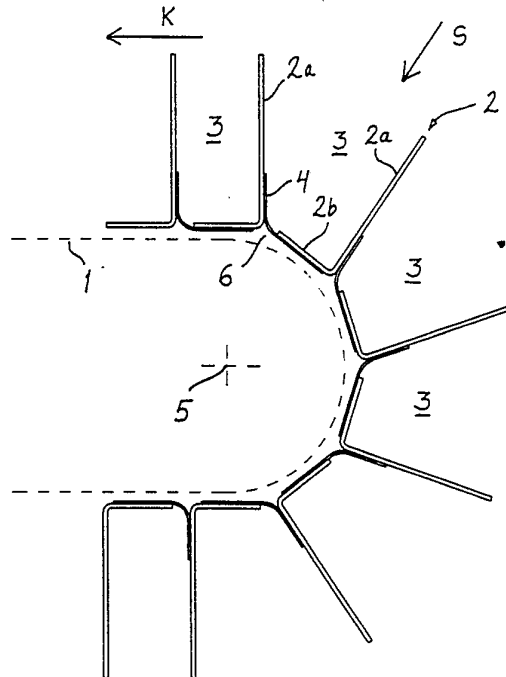
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/FI90/00258 (22) International Filing Date: 30 October 1990 (30.10.90) (30) Priority data: 895323 9 November 1989 (09.11.89) FI (71) Applicant (for all designated States except US): OY JOPAM-AC AB [FI/FI]; Valtatie 2, SF-30100 Forssa (FI). (72) Inventor; and (75) Inventor/Applicant (for US only) : VIRTANEN, Pekka [FI/FI]; SF-25360 Pertteli (FI). (74) Agent: HAKOLA, Unto; Tampereen Patenttitoimisto Oy, Kanslerinkatu 6, SF-33720 Tampere (FI).</p>	<p>(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE, DE (Utility model), DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GR, GR (European patent), HU, IT (European patent), JP (Utility model), KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p> <p>Published <i>With international search report.</i></p>	

(54) Title: CONVEYOR WITH COMPARTMENTS INTERCONNECTED BY FLEXIBLE SEALING MEMBERS

(57) Abstract

Conveyor, especially for packaging machines, comprises an endless conveyor support (1), such as belt, supporting separate compartments (3) for conveying objects, being placed one after the other in the travelling direction, the compartments (3) being formed between the successive partitions (2a) in a manner such that recesses or gaps (6) are present between compartment bottoms (2b) and partitions (2a). In the compartments (3) there is a flexible sealing member between the bottom (2b) and the partition (2a), the underside of said member located adjacent to said partition lying in the compartment against the surface of said partition (2a) covering at the same time said recess or gap (6).



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Conveyor with compartments interconnected by flexible
sealing members

The invention relates to a conveyor described in the preamble portion of claim 1, designed especially for packaging machines.

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In the conveyor of the described type objects, such as packages to be packed, are conveyed in compartments arranged on top of an endless belt loop. This kind of belt loop comprises generally two rolles, which guide the conveyer travel. The rotational axes of such rollers are substantially horizontal and in the same plane, and the compartments advance within the section between the rolles above said plane along a straight path in one direction, and within the opposite section below said plane they will return back. In such conveyors, the feeding of the objects to be conveyed takes place generally at a reversing point on the roller before the above-mentioned straight superior section, along which the objects advance forward in the compartments forward on top of the belt to a point where they are removed from the belt for e.g. packaging purposes. Especially when flat objects are fed and conveyed there may arise problems owing to the fact that the form of the compartments will change.

20 The compartments are as a rule constituted of plates bent to the shape of a L and fastened on top of the conveyor belt. This may lead to clamping of a sealed edge, present at the bottom of e.g. a flat bag, between the bottom of such plate and the outer surface of the preceding plate facing the compartment. The problem is especially difficult at the point where these parts move relatively to each other, for example, when the conveyor makes the turn at said reversing point. This kind of problem is manifested by e.g.

30 German Offenlegungsschrift no. 2,730,805 showing the purpose of reducing said gap by shaping the plates in a special way. However, the gap always exists and creates the problem, even if it is made as small as

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possible. Moreover, the reduction of the gap may effect other operations of the conveyor.

5 Another problem originating from this technique and associated with reduction of the gap mentioned above has become evident in course of manufacturing of a conveyor. The plates must in this case be spaced very accurately in respect of each other so as to avoid the presence of too wide gaps in one hand and on the
10 other hand the positioning of the plates too closely to each other, which may result to their mutual contact and even to malfunction of the entire conveyor. This problem is also clearly manifested by said German Offenlegungsschrift no. 2,730,805.

15 The aim of the invention is to eliminate the above-mentioned drawbacks and to provide a conveyor having a reliable operation and which can also be easily assembled to such a conveyor. For realizing this
20 object the conveyor according to the invention is mainly characterized by what is disclosed in the characterizing portion of the claim 1. According to the invention, a flexible sealing member is provided in the compartments between the bottom of a compartment
25 and the partition bounding the compartment, and the underside of said member located adjacent to said partition is lying against the surface of the partition. Two important advantages are obtained by this arrangement:

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- The sealing members cover the gaps formed between the partitions and the bottoms without preventing the deformation of the compartments and the relative movements of the partitions and the bottoms.
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- The partitions can be placed one after the other using wider manufacturing tolerances, and to be

on the safe side, the above-mentioned gaps can be even made wider than usually.

5 The invention will be described more closely in the following description with the reference to the appended drawing showing the conveyor in accordance with the invention as seen from the side at the reversing point of the conveyor.

10 The conveyor is intended for packaging machines, for example for machines of the type described in a previous patent application no. 890,672 by the Applicant. The conveyor comprises an endless conveyor support 1, such as a belt provided for travel along a path which is in the form of a loop, for example. On 15 top of the conveyor support 1 are disposed compartments 3 one after the other in the travelling direction of the support. The compartments are separated by relatively stiff partitions 2a having a predetermined width in the direction extending transversely to the 20 travelling direction of the support. The partitions extend outwardly from the support 1. The conveyor support 1 is guided by rollers (the axis of one of the rollers is denoted by reference numeral 5) and within the area between the rollers the compartments 25 3 travel on top of the support in one direction and return back on the lower side. The objects are usually fed into the compartments 3 at the reversing point on the roller where the conveyor support travels along a circular path, the feeding point being denoted 30 by arrow S.

35 As it is apparent from the drawing, the compartments 3 are formed of plates having the shape of a L placed on top of the conveyor support. The plates have suitable stiffness and they can be e.g. metal plates. The vertical parts of said plates form the above-mentioned partitions 2a and the horizontal parts

positioned in the same direction from the bottoms 2b of the compartments. Each compartment 3 is bounded in the direction opposite to the travelling direction of the conveyor (arrow K) by the vertical part 2a of a plate, towards the conveyor support 1 by the horizontal part 2b of the same plate forming the bottom, and in the travelling direction of the conveyor by the vertical part 2a of the adjacent plate, said part acting at the same time as a partition 2a separating said compartment from the adjacent compartment in the travelling direction. According to the invention, in each compartment there is provided between the bottom 2b of the compartment 3 and the partition 2a standing between the compartment and the adjacent compartment 3 a flexible thin band-like sealing member 4, the underside of which facing the adjacent compartment lies against the surface of the partition 2a. The underside of the sealing member shall mean in this context the surface of the sealing member being on the opposite side with regard to its upper surface facing the compartment 3. The undersides of the sealing members 4 are pressed in each compartment within a wide area against the surfaces of the partitions 2a and their end edges being in contact with these partition surfaces are free to move in the vertical direction of the partitions as the shape of the compartment 3 is changing on the guiding roller at the reversing point of the conveyor support. The sealing members 4 cover the gaps 6 between the forward edge of the horizontal part 2b and the plate 2 bounding the adjacent compartment. These gaps would otherwise be exposed.

In the practice the sealing members are mounted in their places by attaching them between the horizontal parts 2b and the conveyor support 1 and they extend in each compartment 3 from below the forward edge of said part 2b towards the partition 2a bounding the adjacent compartment and are pressed against the

surface thereof. The sealing members 4 have approximately the same width as the part 2b in the transverse direction with regard to the travelling direction of the conveyor, and they act in a sort of way as flexible extension of the part 2b, directed towards the travelling direction of the conveyor. Any kind of flexible band-like material can be used as a sealing member, on the condition that it is stiff enough on one hand in order to retain good contact with the surface of the partition 2a, but on the other hand can yield to the deformations of the compartments 3. The surfaces of the sealing members 4 coming in contact with the partitions 2a must also be of a material which allows them to slide easily in the vertical direction of the partitions.

The sealing members can also be attached onto the upper surfaces of the parts 2b, in which case they cover the bottom of the compartment 3, the gap 6, as well as the adjacent partition 2a. The function of the sealing members is similar in this event. It is also possible that the end edges of the sealing members adjacent to the partitions 2a are extended as far as to the upper edges of the partitions. It is also possible to use the alternative of covering the interior surfaces of the entire compartment 3 with a single flexible sealing member 4. On the other hand, the invention works well also by using only a short sealing member of a sufficient length in order to cover the gap.

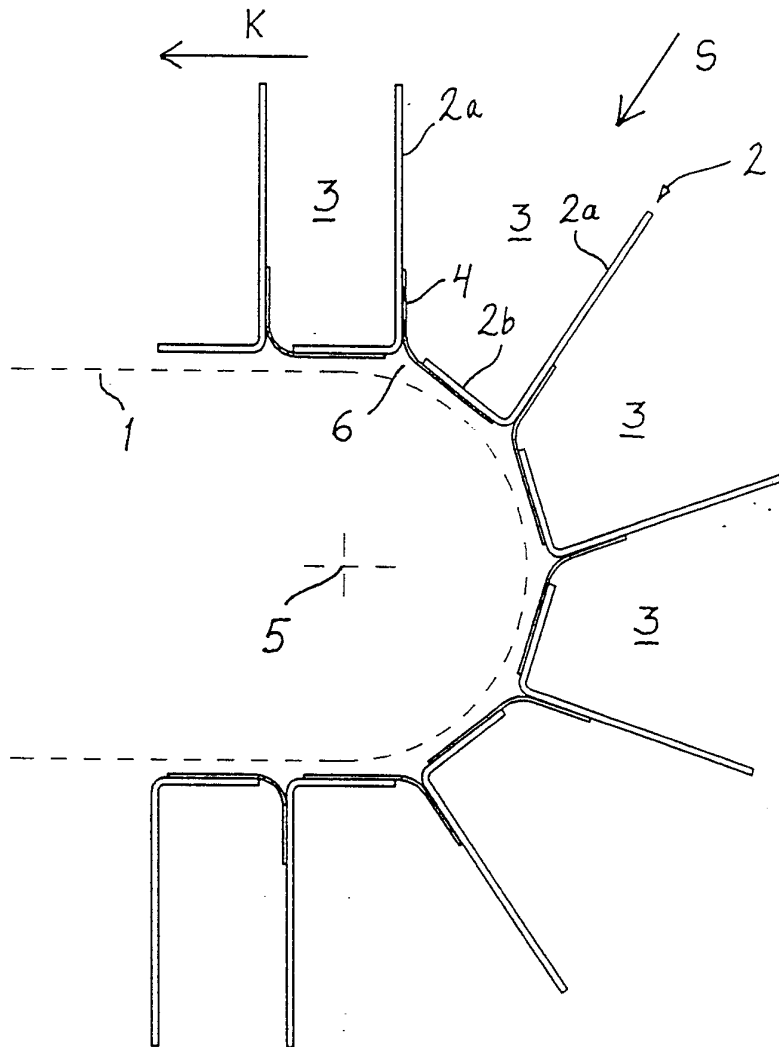
The invention is not restricted only to a conveyor described hereinabove, but it can be modified within the scope of the invention defined by the claims. The shape of the compartments may vary. The sealing members can be used according to the invention in all compartment or box conveyors having gaps exposed between the compartment bottoms and partitions.

Claims

1. Conveyor, especially for packaging machines,
5 comprising an endless conveyor support (1), such as belt, supporting separate compartments (3) for conveying objects, being placed one after the other in the travelling direction, the compartments (3) being formed between the successive partitions (2a) in a
10 manner such that recesses or gaps (6) are present between compartment bottoms (2b) and partitions (2a), **characterized** in that in the compartments (3) there is a flexible sealing member between the bottom (2b) and the partition (2a), the underside of said member located adjacent to said partition lying in the
15 compartment against the surface of said partition (2a) covering at the same time said recess or gap (6).
2. Conveyor according to claim 1, **characterized**
20 in that the underside of the sealing member is pressed against the surface of the partition (2a) in a manner such that it is free to move in the vertical direction thereof during the deformation of the space bounded by the bottom (2b) and the partition (2a).
25
3. Conveyor according to claim 1 or 2, **characterized** in that in the compartment (3) the shape of the space bounded by a partition (2a) opposite to the partition (2a) comprising the sealing member (4), and
30 by the bottom (2b) of the compartment, is constant in a manner known per se during the travel of the conveyor.
4. Conveyor according to claim 3, **characterized**
35 in that the compartments (3) are formed in a manner known per se between plates (2) disposed on top of the conveyor support one after the other and having the shape of a L, the vertical legs of L forming

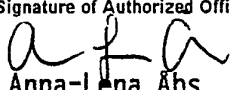
said partitions (2a) and the horizontal legs (2b) forming said bottoms, the sealing member (4) being placed in a compartment (3) to lie in the area between the horizontal leg (2b) and a vertical leg (2a) of the adjacent plate (2) separate from said horizontal leg.

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5. Conveyor according to claim 4, characterized in that the sealing member (4) is attached, with its end edge opposite to the end edge on the partition (2a), between the horizontal leg (2b) and the conveyor support (1).



INTERNATIONAL SEARCH REPORT

International Application No PCT/FI 90/00258

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: B 65 B 35/26, B 65 G 17/32		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC5	B 65 B; B 65 G	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸		
SE,DK,FI,NO classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US, A, 2753979 (C.E. BLACKMAN ET AL) 10 July 1956, see column 2, line 62 - line 72; column 3, line 1 - line 3 --	1-3
X	Derwent's abstract, No. 86-317 306/48, SU 1 221 090, publ. week 8648 (GORYACHKIN AGRICENG) --	1-3
A	DE, B, 1274967 (HEINRICH KOPPERS GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG) 8 August 1968, see the whole document --	1-5
A	DE, A1, 2730805 (LINGENFELDER, OTTMAR) 23 May 1979, document cited by applicant --	1-5
<p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
18th February 1991	1991 -02- 19	
International Searching Authority	Signature of Authorized Officer	
SWEDISH PATENT OFFICE	 Anna-Lena Åhs	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	WO, A1, 9009315 (JOMET OY) 23 August 1990, document cited by applicant -- -----	1-5

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/FI 90/00258**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on **91-01-31**
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 2753979	56-07-10	NONE	

DE-B- 1274967	68-08-08	NONE	

DE-A1- 2730805	79-05-23	AT-B- 372346	83-09-26
		BE-A- 868831	78-11-03
		CH-A- 632202	82-09-30
		FR-A-B- 2396690	79-02-02
		GB-A- 1595689	81-08-12
		JP-A- 54040790	79-03-30
		LU-A- 79934	78-12-07
		US-A- 4250688	81-02-17

WO-A1- 9009315	90-08-23	NONE	