



Office de la Propriété

Intellectuelle
du Canada

Un organisme
d'Industrie Canada

Canadian
Intellectual Property
Office

An agency of
Industry Canada

CA 2428978 C 2010/08/03

(11)(21) **2 428 978**

(12) **BREVET CANADIEN
CANADIAN PATENT**

(13) **C**

(86) Date de dépôt PCT/PCT Filing Date: 2001/11/15
(87) Date publication PCT/PCT Publication Date: 2002/05/30
(45) Date de délivrance/Issue Date: 2010/08/03
(85) Entrée phase nationale/National Entry: 2003/05/15
(86) N° demande PCT/PCT Application No.: NL 2001/000831
(87) N° publication PCT/PCT Publication No.: 2002/042186
(30) Priorité/Priority: 2000/11/23 (EP00204175.4)

(51) Cl.Int./Int.Cl. *B65G 47/76* (2006.01)

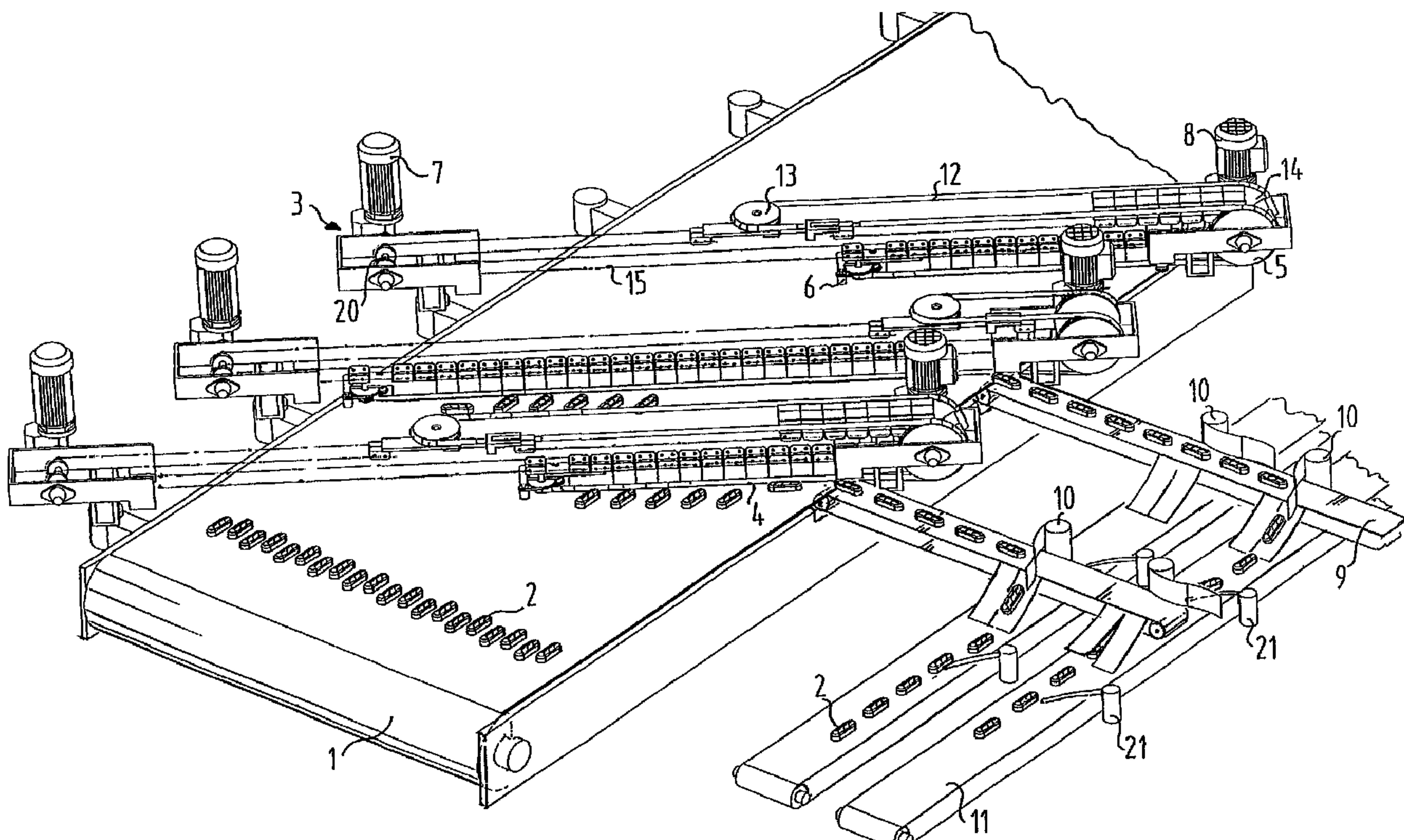
(72) **Inventeurs/Inventors:**
LIEMPD, VAN ALBERTUS CORNELIS HENDRIKUS,
NL;
ELZEN, VAN DEN MARINUS JOHANNES HENRICUS,
NL;
DAMEN, PIETER FRANCISCUS KAREL, NL

(73) **Propriétaire/Owner:**
MARS, INCORPORATED, US

(74) **Agent:** SEABY & ASSOCIATES

(54) Titre : TRANSPORTEUR ET PROCEDE DE TRANSPORT DE PRODUITS

(54) Title: CONVEYOR AND METHOD FOR CONVEYING PRODUCTS



(57) Abrégé/Abstract:

A conveyor for conveying products (2), comprising a conveyor belt (1) and a moving endless guiding element (12) which includes a straight portion (4) extending between two guide wheels (5, 6), which straight portion (4) is capable of guiding products (2) that are present on the conveyor belt in lateral direction towards and over the edge of the conveyor belt, wherein the distance between the two guide wheels is adjustable.

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

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
30 May 2002 (30.05.2002)

PCT

(10) International Publication Number
WO 02/42186 A1(51) International Patent Classification⁷: **B65G 47/76**B.V., Taylorweg 5, P.O. Box 31, NL-5466 BB VEGHEL (NL). **DAMEN, Pieter, Franciscus, Karel** [NL/NL]; c/o MARS B.V., Taylorweg 5, P.O. Box 31, NL-5466 BB VEGHEL (NL).

(21) International Application Number: PCT/NL01/00831

(74) Agent: **VERNOUT, Robert**; Arnold & Siedsma, Sweelinkplein 1, NL-2517 GK THE HAGUE (NL).(22) International Filing Date:
15 November 2001 (15.11.2001)

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DE (utility model), DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(25) Filing Language: English

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(26) Publication Language: English

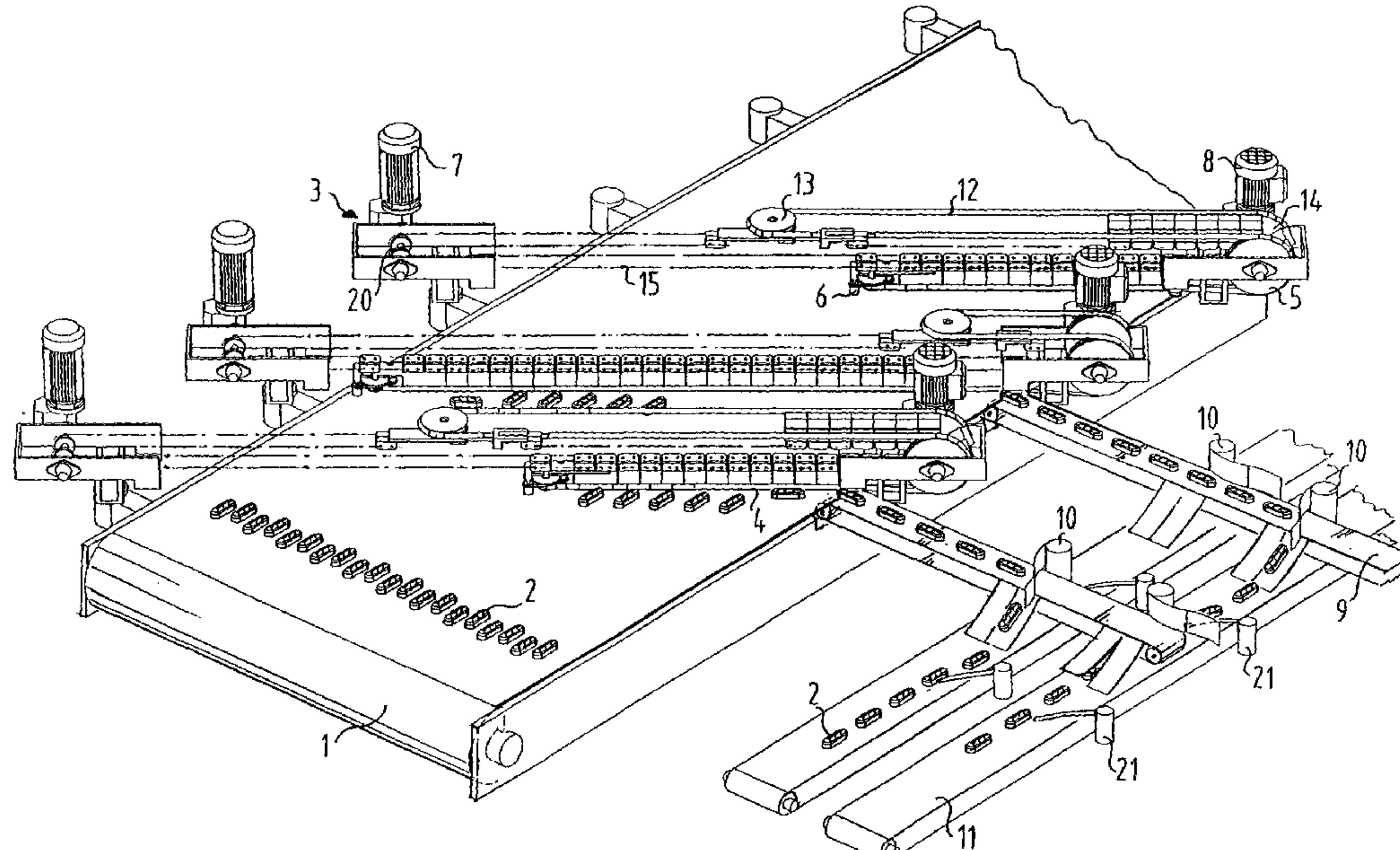
(30) Priority Data:
00204175.4 23 November 2000 (23.11.2000) EP(71) Applicant (for all designated States except US): **MARS B.V.** [NL/NL]; Taylorweg 5, NL-5466 AE VEGHEL (NL).

[Continued on next page]

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LIEMPD, VAN, Albertus, Cornelis, Hendrikus** [NL/NL]; c/o Taylorweg, P.O. Box 31, NL-5460 BB VEGHEL (NL). **ELZEN, VAN DEN, Marinus, Johannes, Henricus** [NL/NL]; c/o Mars

(54) Title: CONVEYOR AND METHOD FOR CONVEYING PRODUCTS



WO 02/42186 A1

(57) Abstract: A conveyor for conveying products (2), comprising a conveyor belt (1) and a moving endless guiding element (12) which includes a straight portion (4) extending between two guide wheels (5, 6), which straight portion (4) is capable of guiding products (2) that are present on the conveyor belt in lateral direction towards and over the edge of the conveyor belt, wherein the distance between the two guide wheels is adjustable.

WO 02/42186 A1



Published:

- *with international search report*
- *entirely in electronic form (except for this front page) and available upon request from the International Bureau*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CONVEYOR AND METHOD FOR CONVEYING PRODUCTS

5

The invention relates to a conveyor for conveying products, comprising a conveyor belt and a moving endless guiding element which includes a straight portion extending between two guide wheels, which 10 straight portion is capable of guiding products that are present on the conveyor belt in lateral direction towards and over the edge of the conveyor belt.

Such a conveyor is known, it is used for dividing a flow 15 of products on the conveyor belt into several subflows.

The guiding device of this known conveyor essentially comprises two guide wheels, over which an endless rope is tensioned. One of the two guide wheels is driven by a motor, so that the rope guides the products towards the 20 edge of the conveyor belt at a specific velocity.

Furthermore, one of the two guide wheels of the guiding device is disposed an adjustable distance away from the edge above the conveyor belt, whereby the guiding device extends to beside conveyor belt. By varying the distance 25 from the conveyor belt it is possible to adjust the amount of products that is guided by the guiding device of the conveyor belt. Since the angle of the direction of transport of the guiding device with respect to the direction of transport of the conveyor belt has an 30 optimum in relation to the movement of the product, it is preferred to maintain a constant value for said angle. With the known conveyor the adjustment of the amount of products to be guided off the conveyor belt is effected by moving the guiding device along its own 35 longitudinal axis, therefore. The drawback of this is, however, that in the extreme position, in which hardly any products are guided off the conveyor belt, if at all, the guiding device extends laterally from the

conveyor belt over a width that corresponds to the width of the conveyor belt. As a result, the conveyor takes up a great deal of space.

5 The object of the invention is to provide an inexpensive, simple, efficient and/or reliable conveyor of the kind referred to in the introduction, which takes up little space.

10 In order to accomplish that objective, the distance between the two guide wheels is adjustable. As a result, the straight portion of the guiding element, which extends between the guide wheels and which guides the products off the conveyor belt, has a variable length, 15 which makes it possible to lead the portion of the guiding element that is not being used for guiding products off the conveyor belt in another direction, in such a manner that the guiding element no longer extends as far laterally as described above.

20 Preferably, a first guide wheel is disposed at a fixed location beside, and preferably near the edge of the conveyor belt, seen from above. The second guide wheel is preferably disposed at an adjustable location above 25 the conveyor belt. The location of the second guide wheel thereby determines the amount of products that are guided off the conveyor belt.

30 Preferably, the larger part of the guiding element is positioned above the conveyor belt, irrespective of the adjusted distance between the guide wheels. As a result, the guiding element hardly projects outside the conveyor belt so that a the most compact conveyor possible is obtained. In one preferred embodiment this is 35 accomplished by leading back the non-guiding portion of the guiding element to a position above the guiding portion thereof. Alternatively, said portion can also be

led back to a position beside said guiding portion.

The guiding element is preferably tensioned over at least two fixed guide wheels and two adjustable guide wheels. The two adjustable guide wheels are preferably interconnected by a cable which is passed over at least one adjusting wheel. In one specific embodiment the cable is an endless cable, which is passed over the adjusting wheel on the one hand and a freely rotating wheel near the fixed guiding wheels on the other hand. The term cable must be given a wide interpretation in this context, it also comprises a chain, a wire or a belt, for example. The adjusting wheel is preferably driven by a motor, in particular a positioning motor, so that the aforesaid distance between the two guide wheels, and consequently the amount of products being guided off the conveyor belt, can be set accurately and quickly.

Preferably, the adjustable guide wheels are essentially positioned between the fixed guide wheels on the one hand and the adjusting wheel on the other hand. Thus a compact, elongated guiding element having a fixed length equal to the distance between the fixed guide wheels and the adjusting wheel is obtained.

The invention is especially advantageous when several guiding elements extend above the conveyor belt so as to divide the flow of products to be conveyed into several subflows. The distance from the former adjustable guide wheel to the aforesaid edge of the conveyor belt is increased in small steps, seen in downstream direction, so that a new (adjustable) part of the products is guided off the conveyor belt with each respective distance.

The invention furthermore relates to a method for

conveying products, wherein a straight portion of a moving endless guiding element, which extends between two guide wheels, guides products that are present on a conveyor belt in lateral direction towards and over the 5 edge of said conveyor belt, and wherein the distance between the two guide wheels is adjusted for the purpose of regulating the amount of products being guided towards and over the edge of the conveyor belt.

10 The invention will now be explained in more detail by means of an exemplary embodiment as shown in the figures, wherein:

15 Figure 1 is a perspective view of a conveyor; and

Figure 2 is a perspective view of a detail of the conveyor of Figure 1.

Referring to Figure 1 a conveyor for conveying products 20 comprises a moving endless conveyor belt 1, on which the products, in this case candies 2 to be packaged, are supplied in bulk, whereby the candies are distributed more or less at random over the width of the conveyor belt. In order to divide said bulk flow into several 25 small flows, so that they can be fed to a packaging apparatus in a suitable manner, the conveyor furthermore comprises a number of guiding devices 3. Said guiding devices 3 are disposed in mutually parallel relationship, at an angle of about 50° to the direction 30 of movement of the conveyor belt and parallel to the plane of the conveyor belt. Each guiding device 3 comprises a moving endless rope 12, a straight guiding portion 4 of which extends between a fixed guide wheel 5, which is disposed at a fixed location beside the 35 conveyor belt, and a linearly movable and adjustable guide wheel 6. As will be explained in more detail yet, the adjustment of the position of the guide wheel 6

takes place by means of a positioning motor 7.

Guiding portion 4 is disposed at a height above conveyor belt 1 that is smaller than the height of candies 2, so 5 that the candies cannot move under said guiding portion and run against said guiding portion 4. The candies 2 can move under the portion of the guiding device 3 where guiding portion 4 does not extend. The endless rope 12 is driven by means of fixed guide wheel 5, which is 10 connected to an electric motor 8, at a speed which has a component in the direction of the movement of conveyor belt 1 which is approximately equal to the speed of that conveyor belt 1, wherein guiding portion 4 moves at an angle towards the side of conveyor belt 1, so that the 15 candies 2 that run against the guiding portion 4 are deflected in lateral direction over the edge of the conveyor belt 1. The exact speed of endless rope 12 is adjustable depending on the volume of candies 2 that has to be taken off.

20 The manner of dividing the bulk flow of candies 2 into several small flows is determined by the positions of guide wheels 6. Generally the distance between the movable guide wheels 6 and the fixed guide wheels 5 is 25 increased in small steps, seen in downstream direction. The volume of a deflected flow is thereby determined by the incremental lateral distance between two successive movable guide wheels 6.

30 After the candies 2 have been guided over the edge of conveyor belt 1, they are transported in lateral direction by second conveyor belts 9. Present above conveyor belts 9 are rotatable guide elements 10 as shown in Figure 2, which ensure that the candies 2 are 35 guided to a selected third conveyor belt 11.

Figure 1 and 2 show the manner in which rope 12, part of

which forms guiding portion 4, is tensioned and moved. Rope 12 is passed over four guide wheels, viz. the movable guide wheel 6, fixed guide wheel 5, a second movable guide wheel 13 and a second fixed guide wheel 14, which is driven by an electric motor 8. The two movable guide wheels 6, 13 are furthermore connected to two endless chains 15, which are passed on the one hand over chain wheels 16, which are disposed co-axially with the fixed guide wheels 5, 14, and on the other hand over adjusting chain wheels 20, which are driven by the positioning motor 7, in such a manner that the distance between the fixed guide wheel 5 and the movable guide wheel 6 can be adjusted by the positioning motor 7.

15 Pusher elements 17 are present on chains 15, along the length where also rope 12 extends, a pushing portion of which is positioned behind and near rope 12 in order to prevent rope 12, and in particular the guiding portion 4 thereof, being pushed inwards by the candies 4, which 20 might happen in particular when the distance between the fixed guide wheel 5 and the movable guide wheel 6 is large. The rotatable shaft 18 that pushes against the guiding portion 4 of rope 12 makes it possible for rope 12 to be deflected outwards near guide wheels 5 and 14, 25 since otherwise the pusher elements 17 would not be able to move between the guide wheels 5 and 14.

Furthermore a rotatable shaft 19 having a relatively small radius is disposed near movable guide wheel 6, 30 which shaft ensures that the end of guiding portion 4 is sharply defined, resulting in a well defined separation of the flow of candies 2 into several subflows. The shaft 19 is driven by a string 22 which is passed over guide wheel 6.

35

The present invention has been described above by means of a preferred embodiment. Many embodiments and variants

will be apparent to those skilled in the art, however, and consequently the scope of the present invention shall not be limited by the details of the above description.

CLAIMS:

1. A conveyor for conveying products (2), comprising a conveyor belt (1) and a moving endless guiding element (12) which includes a straight portion (4) extending between two guide wheels (5,6), which straight portion (4) is capable of guiding products (2) present on the conveyor belt (1) in a lateral direction towards and over the edge of the conveyor belt (1), wherein the distance between the two guide wheels (5,6) is adjustable, a first one (5) of said two guide wheels being disposed beside the conveyor belt (1) as seen from above, and the second (6) of said guide wheels being disposed above the conveyor belt (1), and the location of said second guide wheel (6) being adjustable between the two edges of the conveyor belt as seen from above.
2. A conveyor according to claim 1, characterized in that said first guide wheel (5) is disposed at a fixed location beside the conveyor belt (1) as seen from above.
3. A conveyor according to claim 1 or 2, characterized in that most of the guiding element (12) is positioned above the conveyor belt (1), irrespective of the distance between the guide wheels (5,6).
4. A conveyor according to claim 1, 2 or 3, characterized in that said guiding element (12) is tensioned over at least two fixed guide wheels (5,14) and two adjustable guide wheels (6,13).
5. A conveyor according to claim 4, characterized in that the two adjustable guide wheels (6, 13) are interconnected by a cable (15) which is passed over at least one adjusting wheel (20).
6. A conveyor according to claim 5, characterized in that the adjusting wheel (20) is driven by a motor (7).

7. A conveyor according to claim 5 or 6, characterized in that the adjustable guide wheels (6, 13) are positioned between the fixed guide wheels (5, 14) and the adjusting wheel (20).
8. A conveyor according to any one of claims 1 to 7, characterized in that at least one guide wheel (14) is driven by a motor (8).
9. A conveyor according to any one of claims 1 to 8, including several guiding elements (12) above the conveyor belt (1) to divide the flow of products (2) being conveyed into several subflows.
10. A method for conveying products (2), wherein products on a conveyor belt (1) are guided in a lateral direction towards and over an edge of the conveyor belt (1) by a straight portion (4) of a moving endless guiding element (12), which extends between two guide wheels (5, 6), and wherein the distance between the two guide wheels (5, 6) is adjusted for the purpose of regulating the amount of products (2) being guided towards and over the edge of the conveyor belt (1), a first one (5) of said two guide wheels being disposed beside the conveyor belt (1) at a laterally fixed location as seen from above, and the second (6) of said guide wheels being disposed above the conveyor belt (1) and being movable between the two edges of the conveyor belt (1) as seen from above.

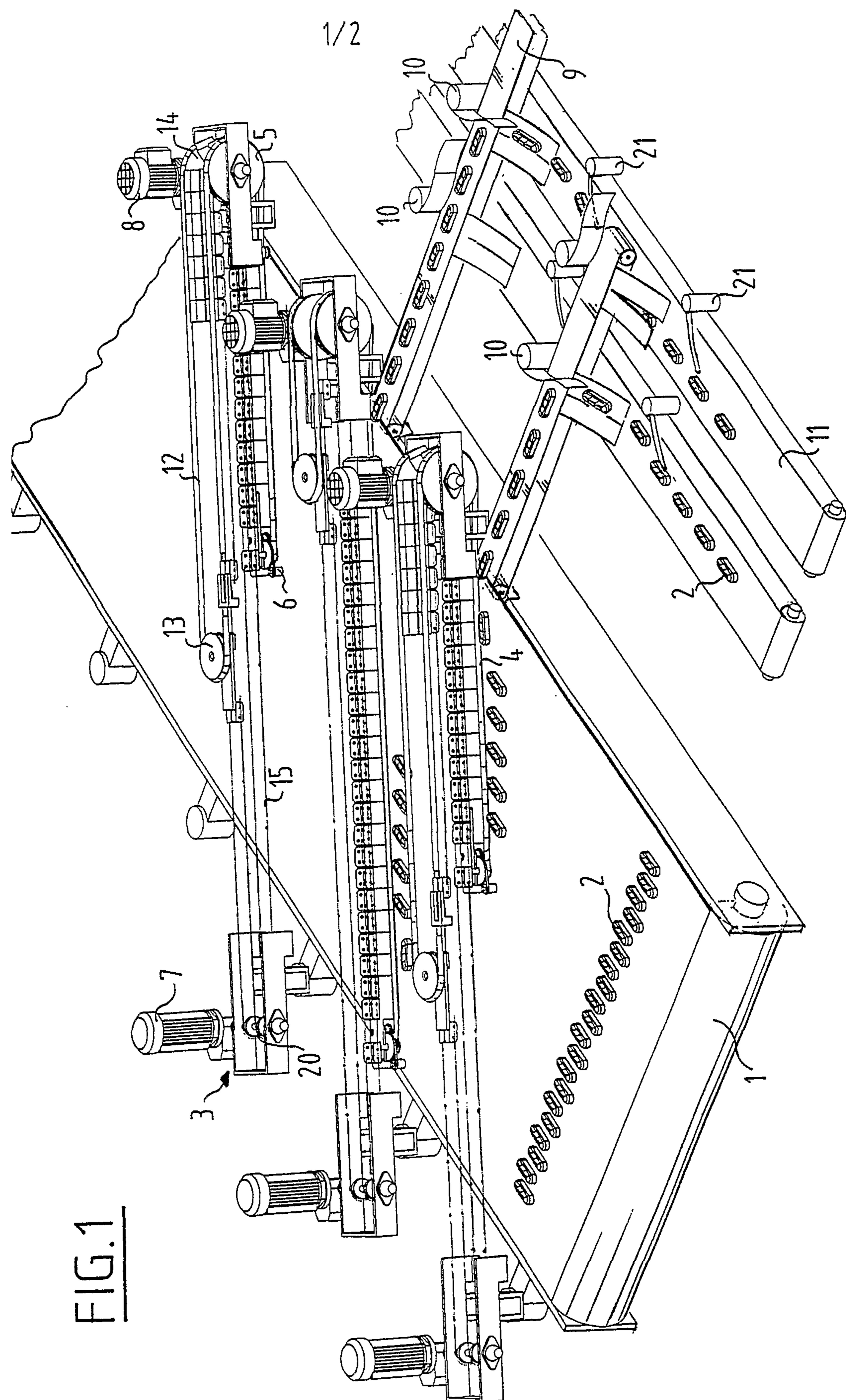


FIG. 2