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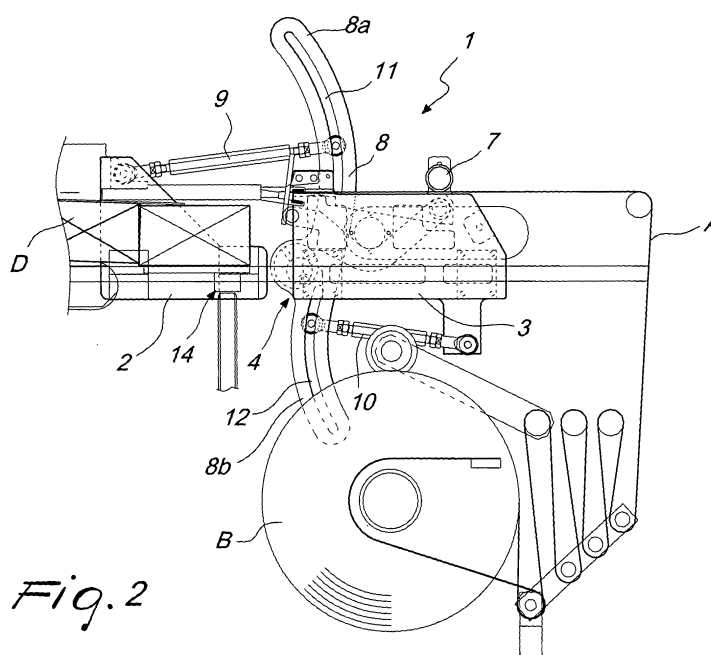
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(54) **Assembly for unwinding and cutting a film, particularly for packaging machines and the like**

(57) An assembly for unwinding and cutting a film, particularly for packaging machines and the like, which comprises at least one unit (2) for controlled grip of the end flap of at least one film (A) and at least one unit (3) for cutting the film (A), the at least one grip unit (2) and the at least one cutting unit (3) being guided so that they can move with respect to each other, each along a respective predefined adjustable stroke, by way of provided movement and adjustment elements (4), from a substantially adjacent configuration, in which clamping means (5) of the grip unit (2) lock the end flap of the film (A), so as to unwind it from the respective reel (B) in the subsequent step for mutual movement away from the cutting

unit (3), to a spaced configuration, in which the grip unit (2) and the cutting unit (3) are at the maximum mutual distance, which is preset by the adjustment, and cutting means (6) of the cutting unit (3) cut the unwound film (A) of the predefined length, the cutting unit (3) comprising means (7) for unidirectionally stopping the film (A) which are adapted to retain it only in the unwinding direction, so as to unwind it during the step for mutual approach toward the grip unit (2), in order to allow the edge of the film (A) to be clamped by the grip unit (2) in the subsequent substantially adjacent configuration, the assembly (1) being adapted to unwind continuously the film (A) and to cut it into portions of predefined adjustable length.



Description

[0001] The present invention relates to an assembly for unwinding and cutting a film, particularly for packaging machines and the like.

[0002] Assemblies for unwinding and cutting a film, particularly for packaging machines, are known which take a film from a respective reel to cut it into portions which are suitable for the packaging of cases, boxes or others. These assemblies generally comprise a movable grip unit, which unwinds the film for a length equal to its stroke, and cutting elements, which cut the film in order to obtain the portion of the desired size.

[0003] However, in some known types of machine the unwinding of the film occurs with an intermittent motion, with consequent losses in terms of final production times; these machines further require additional components which allow control of the correct unwinding of the film. Although unwinding and cutting assemblies for packaging machines which allow continuous unwinding of the film have been devised, they do not however allow to vary easily and quickly the dimensions of the cut portions of film, so as to adapt them to the different formats of the cases to be packaged, with obvious disadvantages in terms of time and costs. Further, they have to be provided with additional traction elements in order to position the provided portions on the cases to be packaged, to then send them to subsequent stations for packaging them.

[0004] The aim of the present invention is to solve the above-mentioned drawbacks, by providing an assembly for unwinding and cutting a film, particularly for packaging machines and the like, which allows to unwind the film continuously from the reel and to cut it into portions of predefined adjustable length simply and rapidly, with gains in economic terms and in terms of production times.

[0005] Within this aim, an object of the present invention is to provide an assembly for unwinding and cutting a film, particularly for packaging machines and the like, which does not require additional traction means to position the provided portions on the cases to be packaged.

[0006] Another object of the invention is to provide an assembly for unwinding and cutting a film, particularly for packaging machines and the like, which by way of its particular constructive characteristics is capable of giving the greatest assurances of reliability and safety in use.

[0007] Another object of the present invention is to provide an assembly for unwinding and cutting a film which is simple, relatively easy to provide in practice, safe in use, effective in operation, and further competitive from an economic standpoint.

[0008] This aim and these and other objects, which will become better apparent hereinafter, are achieved by an assembly for unwinding and cutting a film, particularly for packaging machines and the like, characterized in that it comprises at least one unit for controlled grip of the end flap of at least one film and at least one film cutting unit, said at least one grip unit and said at least one cutting unit being guided so that they can move with respect to

each other, each along a respective predefined adjustable stroke, by way of provided movement and adjustment elements, from a substantially adjacent configuration, in which clamping means of said grip unit lock the end flap of the film, so as to unwind it from the respective reel in the subsequent step for mutual movement away from said cutting unit, to a spaced configuration, in which said grip unit and said cutting unit are at the maximum mutual distance, which is preset by the adjustment, and cutting means of said cutting unit cut the unwound film of the predefined length, said cutting unit comprising means for unidirectionally stopping the film which are adapted to retain it only in the unwinding direction, so as to unwind it during the step for mutual approach toward said grip unit, in order to allow the edge of the film to be clamped by said grip unit in said subsequent substantially adjacent configuration, said assembly being adapted to unwind continuously the film and to cut it into portions of predefined adjustable length.

[0009] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a film unwinding and cutting assembly, particularly for packaging machines and the like, according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic side view of a film unwinding and cutting assembly, according to the invention, associated with a packaging machine;

Figure 2 is a schematic detail side view of an assembly according to the invention;

Figure 3 is a schematic side view of a grip unit and a cutting unit of the assembly, according to the invention, in a spaced configuration and arranged according to the minimum adjustable stroke;

Figure 4 is a schematic side view of a grip unit and a cutting unit of the assembly, according to the invention, in a substantially adjacent configuration and arranged according to the minimum adjustable stroke;

Figure 5 is a schematic side view of a grip unit and a cutting unit of the assembly, according to the invention, in a spaced configuration and arranged according to the maximum adjustable stroke;

Figure 6 is a schematic side view of a grip unit and a cutting unit of the assembly, according to the invention, in a substantially adjacent configuration and arranged according to the maximum adjustable stroke;

Figure 7 is a schematic top view of an assembly according to the invention, associated with a packaging machine;

Figure 8 is a schematic detail side view of a second embodiment of the assembly according to the invention.

[0010] With reference to the figures, the reference nu-

meral 1 generally designates an assembly for unwinding and cutting a film, particularly for packaging machines and the like, according to the invention.

[0011] The assembly 1 comprises at least one unit 2 for controlled grip of the end flap of at least one film A and at least one unit for cutting the film A, which are guided so as to move with respect to each other, each for a respective adjustable predefined stroke, by way of provided movement and adjustment elements 4, from a substantially adjacent configuration, in which clamping means 5 of the grip unit 2 lock the end flap of the film A, so as to unwind it from a respective reel B in the subsequent step for mutual spacing from a cutting unit 3, to a spaced configuration, in which the grip unit 2 and the cutting unit 3 are at the maximum mutual distance, which is preset by the adjustment, and cutting means 6 of the cutting unit 3 cut the unwound film A of the predefined length.

[0012] The cutting unit 3 comprises means 7 for unidirectionally stopping the film A, which are adapted to retain it only in the unwinding direction, so as to unwind it in the step for mutual approach to the grip unit 2 in order to allow the clamping of the edge of the film A by the grip unit 2 in the subsequent substantially adjacent configuration; advantageously, the assembly 1 is adapted to continuously unwind the film A and cut it into portions of predefined adjustable length.

[0013] Conveniently, the movement and adjustment elements 4 comprise at least one arm 8 which can rotate about an axis which lies transversely thereto and passes through a substantially central portion thereof. The end of a first rod 9 is selectively pivotable along a first portion 8a of the arm 8 and is rotatably associated by the other end with the grip unit 2, and the end of a second rod 10, which is rotatably associated by the other end with the cutting unit 3, can be pivoted selectively along a second portion 8b of such arm. Effectively, the selective pivoting of the first rod 9 along the respective first portion 8a allows to adjust the stroke of the grip unit 2 and the selective pivoting of the second rod 10 along the respective second portion 8b allows to adjust the stroke of the cutting unit 3.

[0014] In greater detail, the first portion 8a of the arm 8 is curved and is affected by a respective first curved slot 11, in which it is possible to pivot selectively the end of the first rod 9, which is adjustable in length, and the second portion 8b is curved and is affected by a second curved slot 12, in which it is possible to pivot selectively the end of the second rod 10, which is adjustable in length.

[0015] The clamping means 5 of the grip unit 2 comprise at least one clamp and comprise preferably two clamps which are adapted to close on the end flap of the film A in the cited substantially adjacent configuration for the grip unit 2 and the cutting unit 3, so as to allow its unwinding in the subsequent mutual spacing step, and are adapted to open in the cited spaced configuration for the grip unit 2 and the cutting unit 3, so as to release the cut portion of film A of the predefined length.

[0016] The cutting means 6 of the cutting unit 3 comprise at least one cutter 6a, which is actuated so as to move from a position in which it is separated with respect to the film A, in such spaced configuration for the grip unit 2 and the cutting unit 3, to a cutting position, in such substantially adjacent configuration for the grip unit 2 and the cutting unit 3.

[0017] In an alternative embodiment (shown in Figure 6), the cutting means 6 of the cutting unit 3 comprise a roller 6b, which can rotate selectively and is provided with at least one peripheral blade 6c. The blade 6c is separated from the film A in such spaced configuration for the grip unit 2 and the cutting unit 3, and is arranged in the position for cutting the film A in the corresponding substantially adjacent configuration for the grip unit 2 and the cutting unit 3.

[0018] The roller 6b can comprise a distribution of peripheral blades 6c, in which case the blades 6c are separated from the film A in the spaced configuration for the grip unit 2 and the cutting unit 3, and at least one of the blades 6c is arranged in a position for cutting the film A in the corresponding substantially adjacent configuration for the grip unit 2 and the cutting unit 3.

[0019] Positively, the rule of motion of the cutting means 6 is substantially synchronous with respect to the rule of motion of the arm 8, which by rotating allows the mutual spacing and approach of the grip unit 2 and of the cutting unit 3.

[0020] The arm 8 and the cutting means 6 are connected, by way of suitable motion transmission elements, to a single motor drive apparatus. Such motion transmission elements further comprise a double cardan shaft 13 which controls the actuation of the cutter 6a for cutting the film A.

[0021] Conveniently, the unidirectional stopping means 7 of the cutting unit 3 comprise at least one wheel which abuts against the film A, arranged on a respective supporting surface which is formed on the cutting unit 2: the wheel 7 is locked against rotation only in the direction of approach of the cutting unit 3 toward the grip unit 2, so as to retain the film A locked on the respective supporting surface only in the unwinding direction, and so as to rotate on the film A and allow its unwinding in the step for spacing the cutting unit 3 from the grip unit 2.

[0022] The grip unit 2 and the cutting unit 3 are actuated so that they can move on respective guides which are rigidly coupled to a supporting frame of a packaging machine C, and the grip unit 2 is adapted to release the cut portion of the film A of the preset size on a respective case D to be packaged, which is fed in a corresponding station 14 for lifting the case D.

[0023] In practical operation, the end flap of the film A wound on the reel B is initially gripped by the clamps 5 of the grip unit 2 when such grip unit is in a configuration which is adjacent to the cutting unit 3. The rotation of the arm 8 produces the mutual spacing of the grip unit 2 and of the cutting unit 3, and the film A, retained by the clamps 5, is unwound by the preset length, advantageously de-

terminated by the adjustment of the strokes of the grip unit 2 and of the cutting unit 3, which is allowed by the selective pivoting of the end of the first rod 9 along the respective first curved slot 11 of the arm 8 and by the selective pivoting of an end of the second rod 10 along the respective second curved slot 12 of the arm 8.

[0024] Once the grip unit 2 and the cutting unit 3 have reached such spaced configuration, the cutting means 3 (the cutter 6a or, in such second embodiment, the blade 6c of the roller 6b) automatically cut the film A, providing a portion of predefined length, and the clamps 5 release the flap of the film A.

[0025] In this manner, the portion is released directly above the case D, which is fed from a magazine to the provided lifting station 14 of the packaging machine C, to be then sent to subsequent stations for folding and wrapping the film, so as to adequately package the case D.

[0026] The film A can be cut to different predefined dimensions, depending on the respective dimensions of the cases D to be packaged, by acting with great simplicity and speed on the components of the assembly, particularly on the movement and adjustment elements 4.

[0027] In practice it has been found that the invention fully achieves the intended aim and objects, since the assembly 1 for unwinding and cutting a film, particularly for packaging machines and the like, allows to unwind continuously the film A and to cut it into portions of predefined adjustable length, by way of the simple and quick adjustment of the respective strokes of the grip unit 2 and of the cutting unit 3, as described above.

[0028] Further, the assembly 1 allows to position the provided portion of film A directly on the case D which is fed into the machine C, so as to send it into the subsequent packaging stations, without requiring additional traction means provided in assemblies of the traditional type.

[0029] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent ones.

[0030] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0031] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0032] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements and to the state of the art without thereby abandoning the scope of the protection of the appended claims.

[0033] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increas-

ing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An assembly for unwinding and cutting a film, particularly for packaging machines and the like, **characterized in that** it comprises at least one unit (2) for controlled grip of the end flap of at least one film (A) and at least one unit (3) for cutting the film (A), said at least one grip unit (2) and said at least one cutting unit (3) being guided so that they can move with respect to each other, each along a respective predefined adjustable stroke, by way of provided movement and adjustment elements (4), from a substantially adjacent configuration, in which clamping means (5) of said grip unit (2) lock the end flap of the film (A), so as to unwind it from the respective reel (B) in the subsequent step for mutual movement away from said cutting unit (3), to a spaced configuration, in which said grip unit (2) and said cutting unit (3) are at the maximum mutual distance, which is preset by the adjustment, and cutting means (6) of said cutting unit (3) cut the unwound film (A) of the predefined length, said cutting unit (3) comprising means (7) for unidirectionally stopping the film (A) which are adapted to retain it only in the unwinding direction, so as to unwind it during the step for mutual approach toward said grip unit (2), in order to allow the edge of the film (A) to be clamped by said grip unit (2) in said subsequent substantially adjacent configuration, said assembly (1) being adapted to unwind continuously the film (A) and to cut it into portions of predefined adjustable length.
2. The assembly according to claim 1, **characterized in that** said movement and adjustment elements (4) comprise at least one arm (8) which can rotate about an axis which is transverse thereto and passes through a substantially central portion thereof, the end of a first rod (9) being selectively pivotable along a first portion (8a) of said arm (8) and being associated rotatably at the other end with said grip unit (2), the end of a second rod (10) being selectively pivotable along a second portion (8b) of said arm (8) and being associated rotatably at the other end with said cutting unit (3), the selective pivoting of said first rod (9) along said respective first portion (8a) allowing adjustment of the stroke of said grip unit (2), and the selective pivoting of said second rod (10) along said respective second portion (8b) allowing the adjustment of the stroke of said cutting unit (3).
3. The assembly according to claim 2, **characterized in that** said first portion (8a) is affected by at least

one respective first curved slot (11), in which the end of said first rod (9) can be pivoted selectively, and said second portion (8b) is affected by at least one second curved slot (12), in which the end of said second rod (10) can be pivoted selectively.

4. The assembly according to one or more of the preceding claims, **characterized in that** said clamping means (5) of said grip unit (2) comprise at least one clamp which is adapted to close on the end flap of the film (A) in said substantially adjacent configuration for said grip unit (2) and said cutting unit (3), so as to allow its unwinding in the subsequent mutual spacing step, and is adapted to open in said spaced configuration for said grip unit (2) and said cutting unit (3), so as to release the cut portion of film (A) of the predefined length.
5. The assembly according to one or more of the preceding claims, **characterized in that** said cutting means (6) of said cutting unit (3) comprise at least one cutter (6a), which is actuated so that it can move from a position which is separate with respect to the film (A), in said spaced configuration for said grip unit (2) and said cutting unit (3), to a cutting position, in said substantially adjacent configuration for said grip unit (2) and said cutting unit (3).
6. The assembly according to one or more of the preceding claims, **characterized in that** said cutting means (6) of said cutting unit (3) comprise at least one roller (3b) which can rotate selectively and is provided with at least one peripheral blade (6c), said blade (6c) being separated from the film (A) in said spaced configuration for said grip unit (2) and said cutting unit (3), and at least said blade (6c) being arranged in a position for cutting the film (A) in said corresponding substantially adjacent configuration for said grip unit (2) and said cutting unit (3).
7. The assembly according to claim 6, **characterized in that** said roller comprises a distribution of peripheral blades (6c), said blades (6c) being separated from the film (A) in said spaced configuration, and at least one of said blades (6c) being arranged in a position for cutting the film (A) in said corresponding substantially adjacent configuration.
8. The assembly according to one or more of the preceding claims, **characterized in that** the rule of motion of said cutting means (6) is substantially synchronous with respect to the rule of motion of said arm (8).
9. The assembly according to one or more of the preceding claims, **characterized in that** said unidirectional stopping means (7) of said cutting unit (3) comprise at least one wheel which abuts against the film

(A) and is arranged on a respective contact surface formed on said cutting unit (3), said wheel (7) being locked against rotation only in the direction of approach of said cutting unit (2) toward said grip unit (3), so as to retain the film (A) locked on the respective contact surface only in the unwinding direction, and so as to rotate on the film (A) and allow its unwinding in the step for spacing of said cutting unit (3) from said grip unit (2).

10. The assembly according to one or more of the preceding claims, **characterized in that** said arm (8) and said cutting means (6) are connected, by way of suitable motion transmission elements, to a single motor drive apparatus.
11. The assembly according to one or more of the preceding claims, **characterized in that** said grip unit (2) and said cutting unit (3) are actuated so as to move on respective guides which are rigidly coupled to a supporting frame of a packaging machine (C).
12. The assembly according to one or more of the preceding claims, **characterized in that** said grip unit (2) is adapted to release the portion of cut film (A) of the preset size directly onto a respective case (D) to be packaged, which is fed in a corresponding lifting station (14) for said case (D).

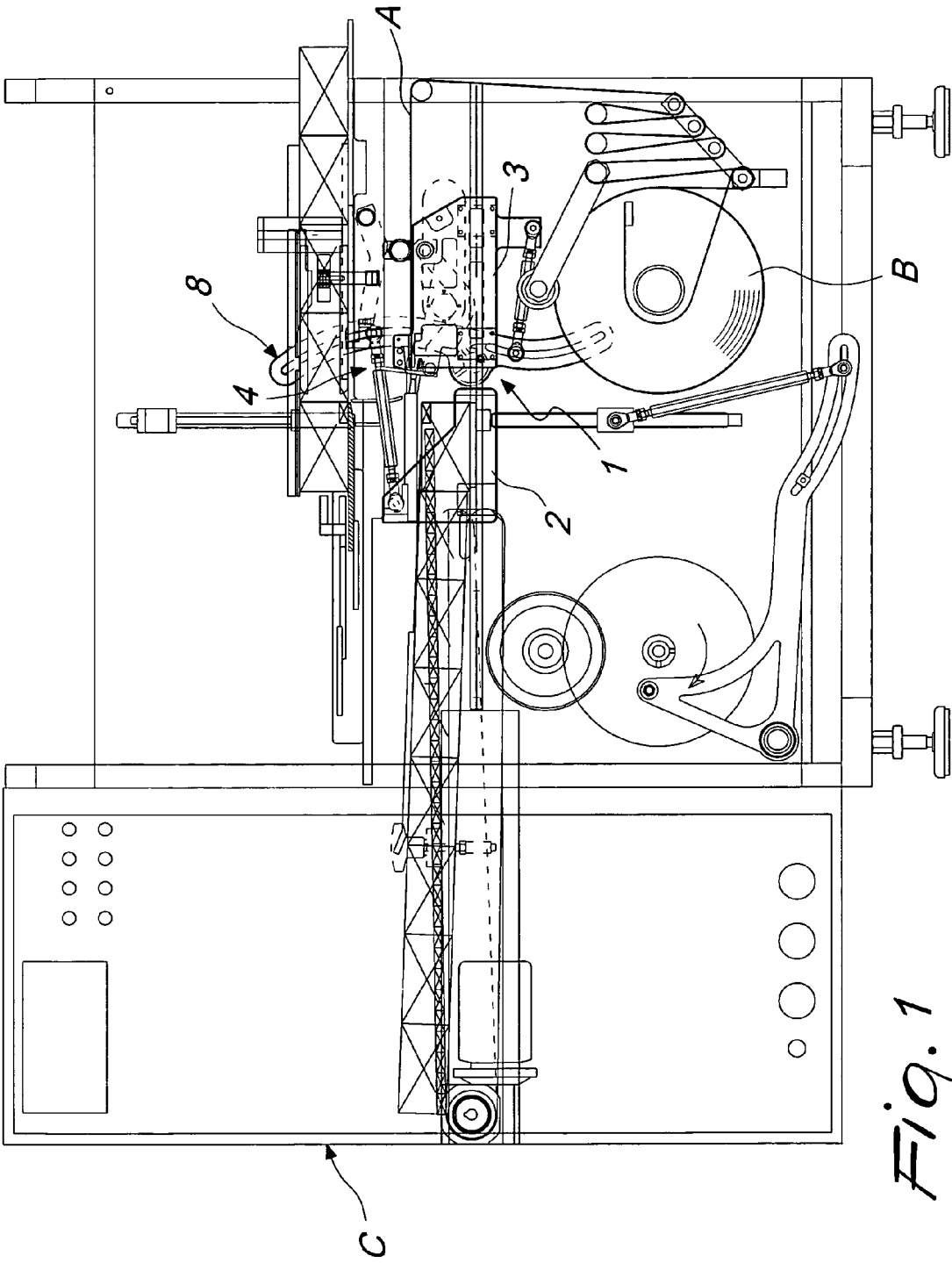


Fig. 1

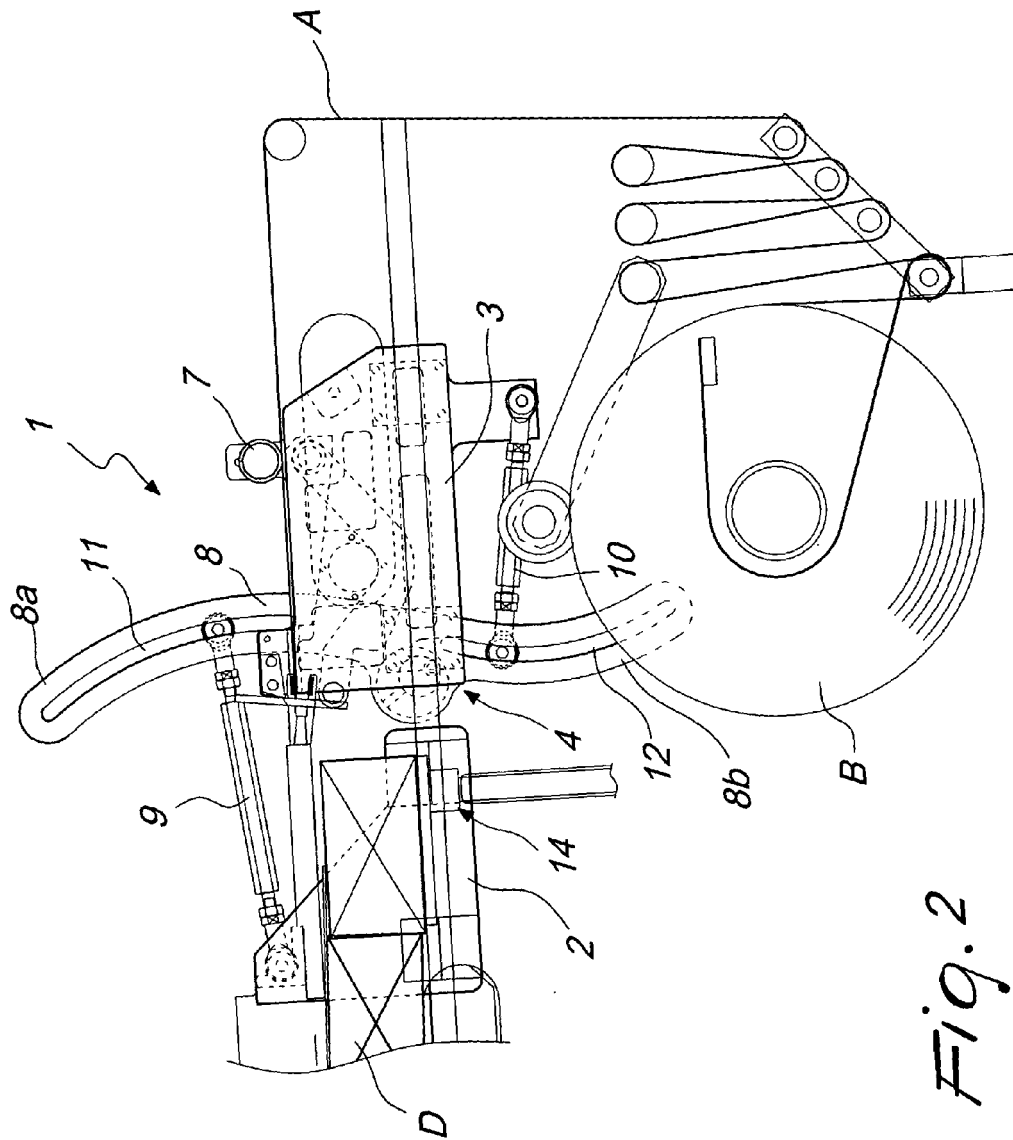
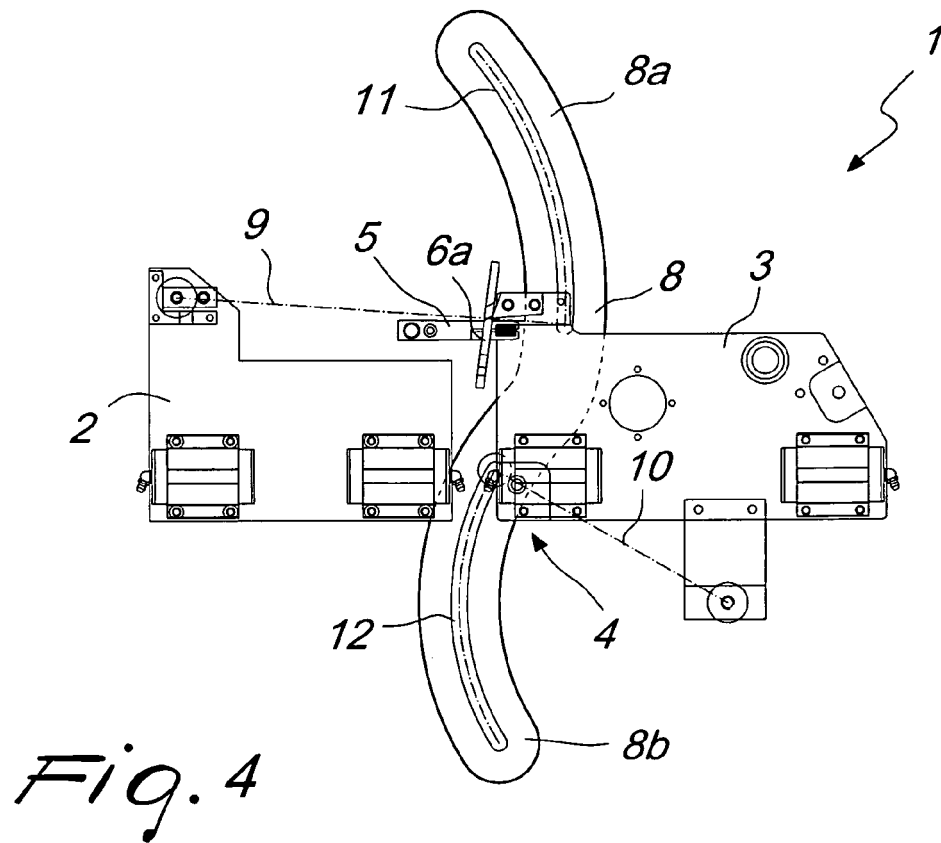
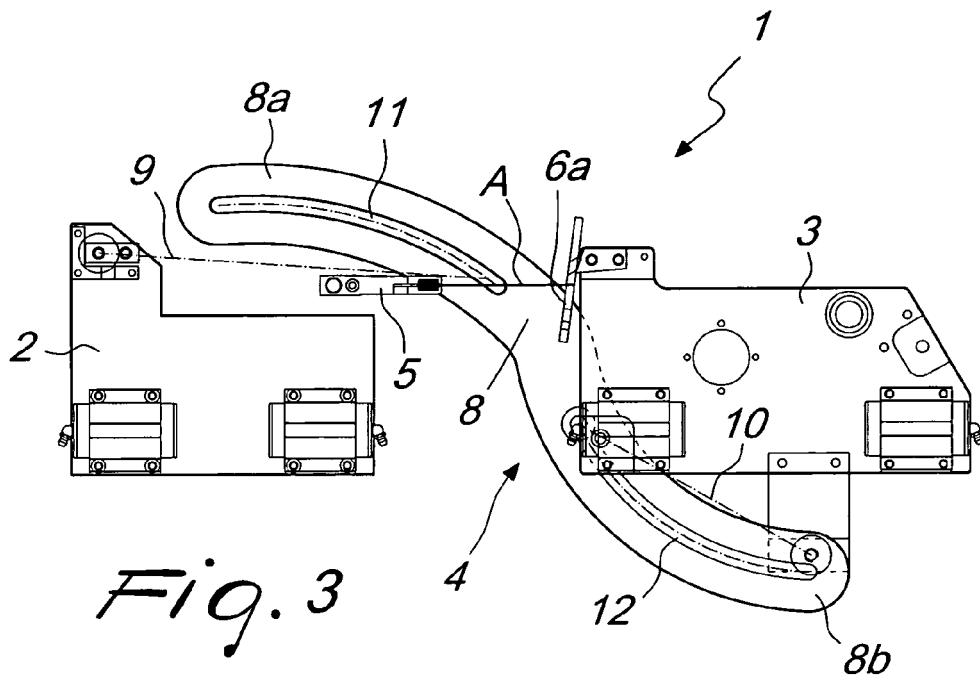
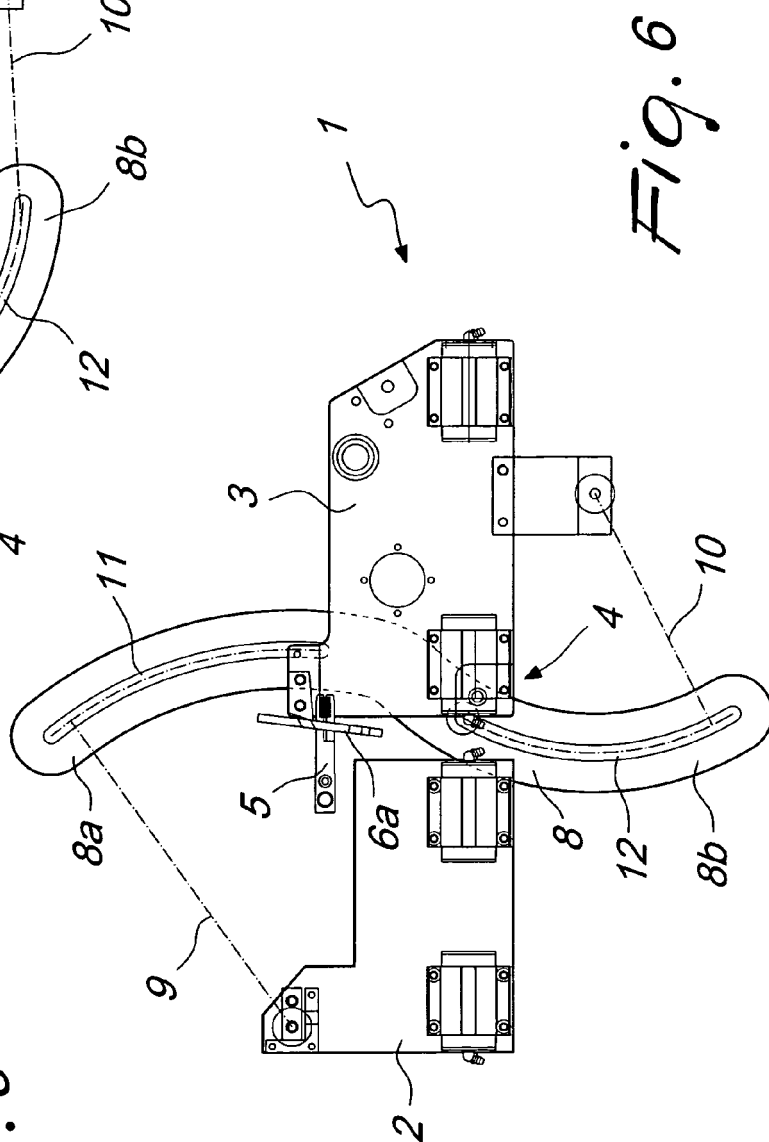
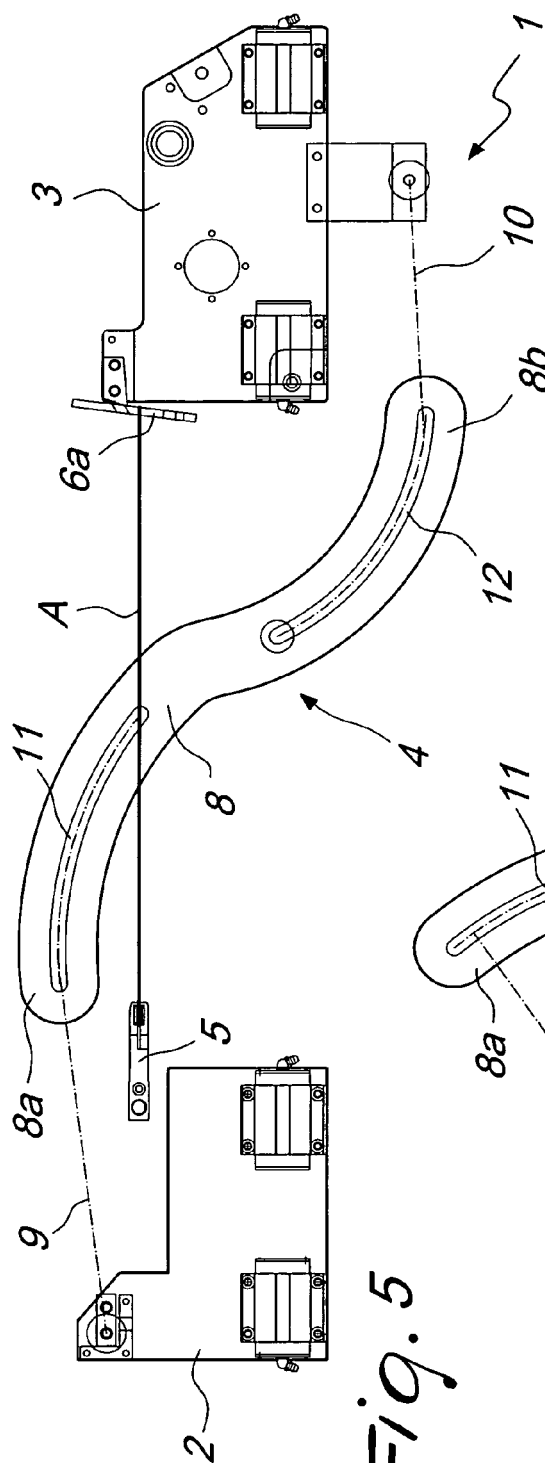
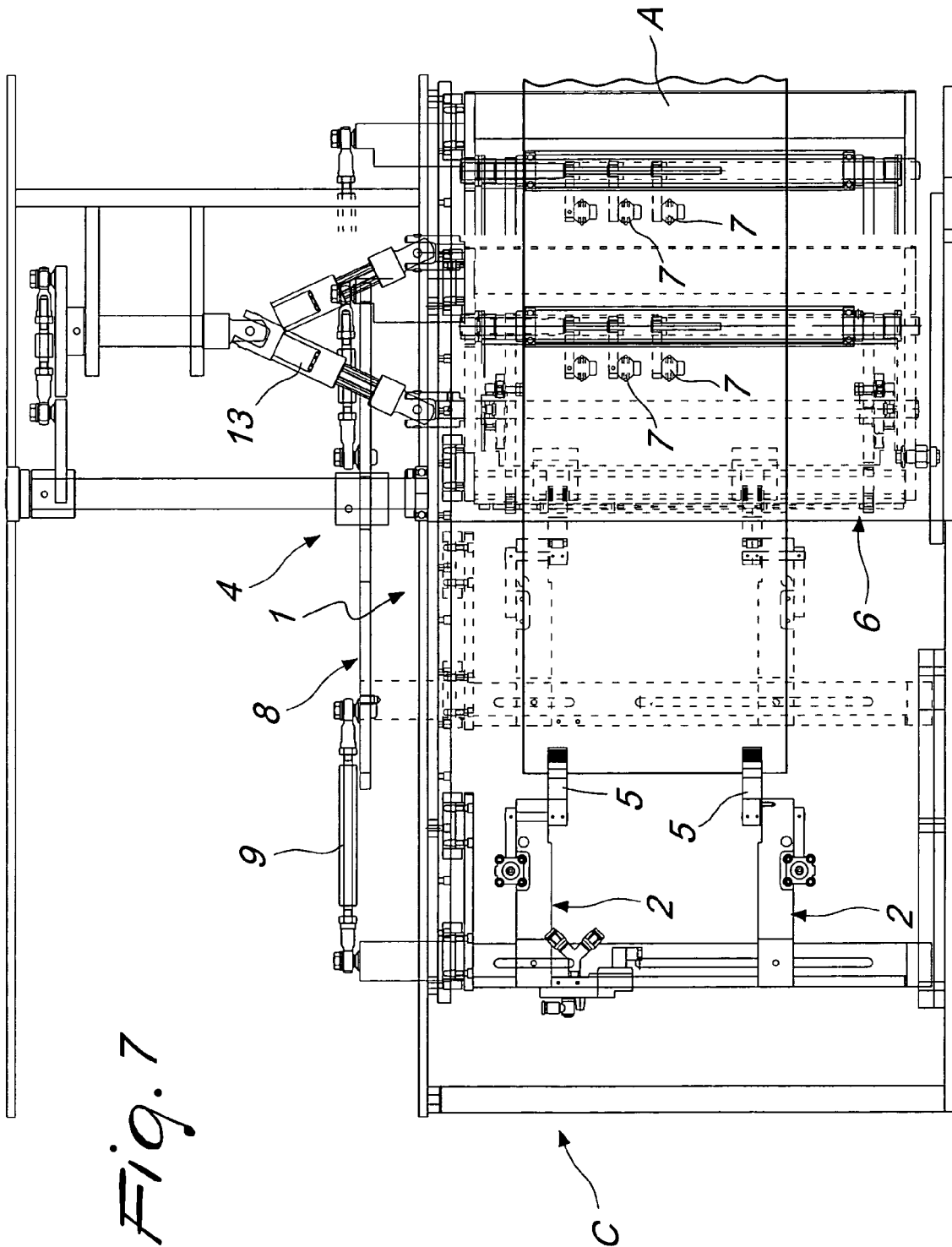


Fig. 2







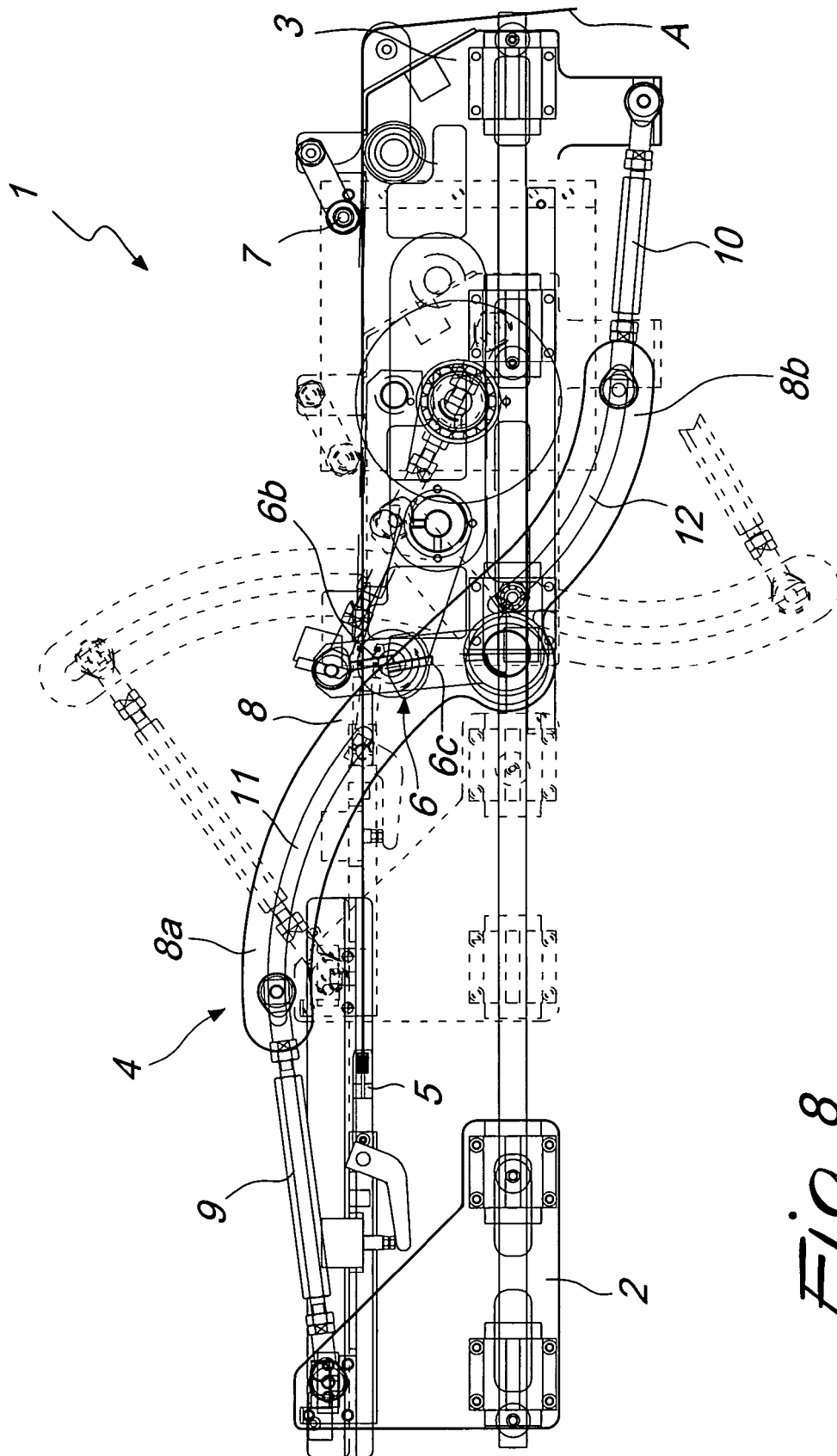


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5283

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2006/085197 A (SUOLAHTI YRJOE [FI]) 17 August 2006 (2006-08-17) * paragraphs [0002] - [0015]; figures 1,2,1a-1e *	1	INV. B65H20/18 B65B61/06
A	US 4 422 357 A (LARSEN MOGENS D [DK]) 27 December 1983 (1983-12-27) * column 1, line 55 - column 5, line 11; figures *	1	
A	GB 700 420 A (FORGROVE MACHINERY CO. LTD.) 2 December 1953 (1953-12-02) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65H B65B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 October 2008	Examiner Raven, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 42 5283

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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31-10-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006085197	A	17-08-2006	AT 396111 T	15-06-2008
			AU 2006213560 A1	17-08-2006
			CA 2601016 A1	17-08-2006
			CN 101137543 A	05-03-2008
			EP 1851114 A1	07-11-2007
			KR 20070102540 A	18-10-2007
			US 2008202071 A1	28-08-2008

US 4422357	A	27-12-1983	DE 3069029 D1	27-09-1984
			DK 434679 A	16-04-1981
			WO 8100999 A1	16-04-1981
			EP 0037412 A1	14-10-1981

GB 700420	A	02-12-1953	NONE	
