(19) Europäisches Patentamt
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Office européen des brevets

(11) **EP 2 669 224 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.12.2013 Bulletin 2013/49

(51) Int Cl.:
B65H 18/02 *(2006.01)* ***B65H 19/22*** *(2006.01)*
B65H 19/30 *(2006.01)*

(21) Application number: **12169784.1**

(22) Date of filing: **29.05.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) Method and device in a winder for webs, in particular feeding new cores to a winder.

(57) The invention relates to a method in a winder for winding fiber webs, particularly for winding longitudinally slitted paper and board webs into partial web rolls (20A, 20B) around cores (26A, 26B), in which method the partial web rolls (20A, 20B) are wound in winding stations on one or two winding rolls (10A, 10B) by a nip between the winding roll (10A, 10B) and the partial web roll be wound (20A, 20B). In the method the new cores (25A, 25B) are transferred to the winding stations of the winder on feeding beams (11 A, 11 B) supported by support guides (12A, 12B) such that the cores (25A, 25B) are supported stationary on two fixed support points during movement of the feeding beams (11 A, 11 B). The invention also relates to a device in a winder for winding fiber webs, particularly for winding longitudinally slitted paper and board webs into partial web rolls (20A, 20B) around cores (26A, 26B), which winder comprises one or two winding rolls (10A, 10B), which device comprises an arrangement (11 A, 11 B) for feeding cores (25A, 25B) into winding stations located on each winding roll (10A, 10B), which winding stations comprise winding heads (13A, 13B) for supporting the ends of the cores (26A, 26B) during winding. The arrangement for feeding new cores (25A, 25B) to the winding stations comprises feeding beams (11A, 11 B) with support guide (12A, 12B) for supporting the cores (25A, 25B) stationary on two fixed support points during movement of the feeding beams (11 A, 11 B).

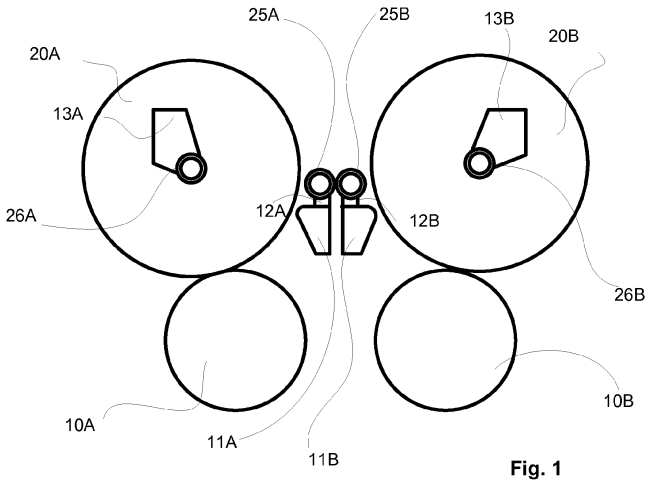

Fig. 1

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Description

[0001] The invention relates to a method in a winder for winding fiber webs, particularly for winding longitudinally slitted paper and board webs into partial web rolls, in which method the partial web rolls are wound in winding stations for winding partial web rolls by a nip between a winding roll and the partial web roll being formed.

[0002] The invention also relates to a device in a winder for winding fiber webs, particularly for winding longitudinally slitted paper and board webs into partial web rolls, in which device comprises winding stations for winding the partial web rolls, which winding stations are formed in connection with one or two winding rolls.

[0003] It is known that a fiber web, e.g. paper, is manufactured in machines which together constitute a paper-manufacturing line which can be hundreds of metres long. Modern paper machines can produce over 450,000 tons of paper per year. The speed of the paper machine can exceed 2,000 m/min and the width of the paper web can be more than 11 metres.

[0004] In paper-manufacturing lines, the manufacture of paper takes place as a continuous process. A paper web completing in the paper machine is reeled by a reel-up around a reeling shaft i.e. a reel spool into a parent roll the diameter of which can be more than 5 metres and the weight more than 160 tons. The purpose of reeling is to modify the paper web manufactured as planar to a more easily processable form. On the reel-up located in the main machine line, the continuous process of the paper machine breaks for the first time and shifts into periodic operation.

[0005] The web of parent roll produced in paper manufacture is full-width and even more than 100 km long so it must be slit into partial webs with suitable width and length for the customers of the paper mill and wound around cores into so-called customer rolls before delivering them from the paper mill. This slitting and winding up of the web takes place as known in an appropriate separate machine i.e. a slitter-winder.

[0006] On the slitter-winder, the parent roll is unwound, the wide web is slit on the slitting section into several narrower partial webs which are wound up on the winding section around winding cores, such as spools, into customer rolls. When the customer rolls are completed, the slitter-winder is stopped and the wound rolls i.e. the so-called set is removed from the machine. Then, the process is continued with the winding of a new set. These steps are repeated periodically until paper runs out of the parent roll, whereby a parent roll change is performed and the operation starts again as the unwinding of a new parent roll.

[0007] Slitter-winders employ winding devices of different types depending on, inter alia, on the type of the fiber web being wound. On slitter-winders of the multi-station winder type, the web is guided from the unwinding via guide rolls to the slitting section where the web is slit into partial webs which are further guided to the winding roll/rolls on the winding stations into customer rolls to be wound up onto cores. Adjacent partial webs are wound up on different sides of the winding roll / on different winding rolls. Multistation winders have one to three winding rolls and in them each partial web is wound to a partial web roll in winding stations. During winding a winding nip is formed between the winding roll and the partial web roll to be wound.

[0008] In US patent 4,749,140 is disclosed a prior art winding machine for the simultaneous, shaftless winding the strips of a web slit lengthwise in two winding beds. The machine has three support rollers generally arranged next to each other, and the web strips are alternately run into the winding beds. A winding frame with a core guide is associated with each edge of the wound rolls, which core guides have core grips. A transport device positioned above the middle of the three support rolls co-operates with an insertion assembly to transfer new paper cores into the respective winding beds. Alignment of all paper cores in unbroken sequence on the transport device ensures transfer of the paper cores of the proper width to the correct location. Each winding frame has an insertion device on either side of a separating plane defined by consecutive wound rolls. The insertion devices transport new paper cores to appropriate core grips for transfer to the winding bed. In this prior art arrangement the transport device consist of one support surface on which the cores are consecutively located and from which the arm-like core guides with gripping members pick the cores.

[0009] In US patent 4,909,454 is disclosed a prior art apparatus for inserting a winding sleeve in a winding machine which includes at least one supporting roll, at least two adjustable winder support pieces with spindles positioned opposite each other for receiving the winding sleeve and at least one sleeve gripper pivotable between a sleeve receiving position and a sleeve delivery position alignable axially with the spindles. In this prior art arrangement the sleeve gripper can be mounted on a guide crosspiece above the supporting roll or alternatively pivotally and telescopably on a press roller mount or other crosspiece on the side of the supporting roll. Thus in this prior art arrangement the sleeve grippers move together with the winder support pieces with spindles.

[0010] In US patent 4508283 is disclosed a prior art three-roll type winding machine for simultaneously winding strips, which are offset relative to each other and have been slit lengthwise from a web, onto at least two rolls, three support rollers are provided mounted with their longitudinal axes generally parallel in the machine frame, wherein each pair of adjacent supporting rollers are arranged next to each other such that the winding bed, into which a web strip is supplied from below, extends above the common plane through the center axes of the adjacent supporting rollers. Inserting devices are also provided for placing new core tubes into their respective winding beds. The inserting device comprises a sliding carriage which is movable along the axial length of the ejection

beam when the ejection beam is at its rest position. The sliding carriage is loaded with new core tubes when it has been moved out of the winding machine. The insertion device further comprises clamping shoes for holding the core tubes in correct position on the sliding carriage. When the ejection beam is at its working position the core tubes are supplied on guides to the respective holding assemblies and gripped by the clamping heads. The guides are extendable upwardly toward the insertion devices allowing the new core tubes to roll obliquely downwardly to the clamping heads.

[0011] The above type core feeding arrangements according to prior art are rather complicated requiring separate core grippers for each winding station, means for core supporting and positioning and also requiring actuators for moving different part components of the arrangements.

[0012] In EP patent 0324709 is disclosed a prior art roll-cutting machine with one support roll and with automatic feed of coil casings, which coil casings are inserted as a set from the side onto two feed beams located above support roller. Sequential coil casings are braced against different feed beams so that coil casings are laterally offset, but still overlap in cross-section. Feed beams with coil casings are pivoted to the side over the support roller until coils casings are picked up by clamping pins of support arms and brought into contact with the support roll at the beginning of winding. This prior art arrangement comprises two pivotable beams that are moved to side by actuators. In this prior art arrangement the separation of the one after the other abutting overlapping cores might cause problems, especially when feeding cores with greater diameters. In this arrangement also means are needed to secure that the cores stay on the feed beams during transfer.

[0013] An object of the invention is to create a device and a method in a winder for winding fiber webs where the problems and disadvantages of prior art arrangements for core feeding, especially relating to core pick-up, need of actuators, separation of the cores, positioning of the cores and securing the cores during feed movement, have been eliminated or at least minimized.

[0014] To achieve the above-mentioned objects and those which come out later, the method according to the invention is mainly characterised by what is presented in the characterising part of claim 1. The device according to the invention is mainly characterised by what is presented in the characterising part of claim 5.

[0015] According to the invention in the method in a winder for winding of partial webs the partial webs are wound in a multistation type winder which comprises one or two winding rolls, in the method the new cores for winding of the next set of partial web rolls are transferred to the winding stations of the winder on feeding beams supported by support guides such that the cores are supported stationary on two fixed support points during movement of the feeding beams. Thus each core is supported stationary on the support guide on the steady support during the movement and the support points of the core are also fixed during the movement and no actuators are needed.

[0016] Advantageously in the invention the cores are moved by substantially linear movement of the feeding beams supporting the cores on its support guide. By substantially linear movement in this description and in the claims are meant a movement comprising at least one mainly linear movement.

[0017] The support guide for cores with different diameters is advantageously a U-shaped guide, a V-shaped guide, a half-pipe guide or a guide with corresponding form such that cores with different diameters are supported steadily on it with two or more stationary support points and positioning center line of the core to desired position for pick-up by the winding head.

[0018] Thus in the invention no pivotal movements are needed, which provides for simple and reliable feeding of cores for winding.

[0019] According to the invention the device in a winder for winding of partial webs in a multistation type winder, which comprises one or two winding rolls, device comprises an arrangement for feeding cores, onto which the partial webs are wound, into winding stations. The arrangement for feeding cores comprises feeding beams with support guide for supporting the cores, which feeding beams are movable in substantially linear movement from the core loading position to the core pick-up position, in which the winding head of each winding station picks the cores for beginning of the winding of the partial fiber webs around the cores. Thus in the invention no pivotal movements are needed, which provides for simple and cost-effective construction of the arrangement for feeding cores into a multistation winder with one or two winding rolls. The support guide for cores ensures the supporting of the cores during their transfer from core loading position to the core pick-up position and thus no clamping mechanisms are needed in the arrangement.

[0020] According to an advantageous feature of the invention the feeding beams are constructed of simple beamlike iron, steel, composite or metal bar to which the support guide is easily arrangeable.

[0021] According to advantageous aspect of the invention the winder comprises an arrangement for feeding cores, which arrangement feeds the cores into the space between the winding stations. The arrangement comprises feeding beams for supporting cores which beams have a support guide for the cores. The beams are moved next to the winding stations for delivering the cores to the winding stations and the winding heads of the winding stations pick the cores directly from the beams. The cores are loaded onto the support guides of the feeding beams and into the winder by a separate core in-feeding system (not shown) and the cores are moved by substantially linear movement to the pick-up position next to the winding stations for moving the cores to the grip of winding heads. In the pick-up position the winding heads of the winding stations pick the cores.

[0022] By the invention an arrangement and a method for core feeding in a winder has achieved, in which the construction of the arrangement and thus the feeding method are simple and the need of different part components and actuators is minimized. By the invention cores with different diameters can securely and easily be fed and transferred into correct position for picking up to the winding station. Also no position securing element is needed for the possible adhesive on the core since the core rests securely on its support guide during feeding.

[0023] Next, the invention will be described in more detail with reference to the figures of the enclosed drawing, to the details of which the invention is intended by no means to be narrowly limited.

[0024] Figures 1 - 4 schematically show an advantageous example of the invention in a winder with two winding rolls.

[0025] Figures 5A - 5C schematically show some examples of the support guide for the cores.

[0026] In the figures by same reference signs are referred to corresponding parts and part combinations.

[0027] In the example of figures 1 - 3 is shown a winder for winding of partial webs which comprises two winding rolls 10A, 10B. The partial webs are wound around cores 26A, 26B onto partial web rolls 20A, 20B via a winding nip formed between the winding roll 10A; 10B and the partial web rolls 20A; 20B at winding stations that are located successively in the axial direction of the partial web rolls 20A; 20B on each winding roll 10A, 10B respectively. The partial web rolls 20A; 20B are supported at ends of the cores 26A, 26B by winding heads 13A, 13B. The winder comprises a core in-feeding system (not shown) and feeding beams 11A, 11B for feeding the new cores 25A, 25B into the winder and near the winding stations during winding of previous set of partial web rolls 20A, 20B as shown in figure 1. The feeding beams 11A, 11B are provided with support guides 12A, 12B for supporting the cores 25A, 25B during feeding movements.

[0028] The cores 25A, 25B are transferred to the winding stations by substantially linear movement of the feeding beams 11A, 11B supporting the cores 25A, 25B on its support guide 12A, 12B.

[0029] The arrangement for feeding cores 25A, 25B comprises feeding beams 11A, 11B with support guide 12A, 12B for supporting the cores 25A, 25B, which feeding beams 11A, 11B are also movable in substantially linear movement in the winder to the core pick-up position, in which the winding head 13A, 13B of each winding station picks the cores 25A, 25B for beginning of the winding of the partial fiber webs around the new cores 25A, 25B, as shown in figure 2.

[0030] The feeding beams 11A, 11B are constructed for example of simple beamlike iron, steel, composite or metal bar on which the support guide 12A, 12B is easily arrangeable, for example as shown in the examples of the figures 5A - 5C. The cores 25A, 25B are placed on the support guides 12A, 12B successively.

[0031] In figure 1 the feeding beams 11A, 11B have been loaded with new cores 25A, 25B during winding of the partial web rolls 20A, 20B around the previous cores 26A, 26B. The partial web rolls 20A, 20B have just reached their end diameter and the finished partial web rolls 20A, 20B are removed from the winding stations. The feeding beams 11A, 11B with the new cores 25A, 25B are in the winder near the winding stations to be moved to the pick-up position.

[0032] In figure 2 the feeding beams with the cores have been moved next to the winding stations to the pick-up position from the loading position, in which position cores are fed into the winder, as indicated by dashed line, and the winding heads 13A, 13B of the winding stations pick up the new cores 25A, 25B directly from the beams 11A, 11B.

[0033] In figure 3 the winding heads 13A, 13B have picked the cores 25A, 25B and the feeding beams 11A, 11B are moved back to loading position for loading of next set of cores 25A, 25B to be fed to the winder.

[0034] In figure 4 the winding of the partial web rolls are to be begun and the winding heads 13A, 13B have moved the cores 25A, 25B to the winding positions in winding stations. The feeding beams 11A, 11B are in loading position to be loaded with new cores.

[0035] In figures 5A - 5C examples of support guides 12A, 12B are shown schematically. In figure 5A V-shaped support guides 12A, 12B are shown. In figure 5B U-shaped support guides 12A, 12B are shown and in figure 5C half-pipe support guides are shown. The support guides are formed such that cores with different diameters are supported stationary and steadily on it with two or more fixed support points and positioning the center line of the core to desired position for pick-up by the winding head.

[0036] Above the invention has been described referring to one advantageous example of the figures. Many modifications and variations are possible.

Claims

1. Method in a winder for winding fiber webs, particularly for winding longitudinally slitted paper and board webs into partial web rolls (20A, 20B) around cores (26A, 26B), in which method the partial web rolls (20A, 20B) are wound in winding stations on one or two winding rolls (10A, 10B) by a nip between the winding roll (10A, 10B) and the partial web roll be wound (20A, 20B), **characterized in, that** in the method the new cores (25A, 25B) are transferred to the winding stations of the winder on feeding beams (11A, 11B) supported by support guides (12A, 12B) such that the cores (25A, 25B) are supported stationary on two fixed support points during movement of the feeding beams (11A, 11B).

2. Method according to claim 1, **characterized in**, the cores (25A, 25B) are moved to the pick-up position

of the winding positions by substantially linear movement of the feeding beams (11A, 11B) supporting the cores on its support guides (12A, 12B).

3. Method according to claim 1, **characterized in, that** the feeding beams (11A, 11B) for supporting cores (25A, 25B) are moved next to the winding stations for pick-up of the cores (25A, 25B) to the winding stations by linear movement and winding heads (13A, 13B) of the winding stations pick the cores (25A, 25B) directly from the feeding beams(11A, 11B).

4. Method according to claim 1, **characterized in, that** the method is applicable for feeding cores with different diameters.

5. Device in a winder for winding fiber webs, particularly for winding longitudinally slitted paper and board webs into partial web rolls (20A, 20B) around cores (26A, 26B), which winder comprises one or two winding rolls (10A, 10B), which device comprises an arrangement (11A, 11B) for feeding cores (25A, 25B) into winding stations located on each winding roll (10A, 10B), which winding stations comprise winding heads (13A, 13B) for supporting the ends of the cores (26A, 26B) during winding, **characterized in, that** the arrangement for feeding new cores (25A, 25B) to the winding stations comprises feeding beams (11A, 11B) with support guide (12A, 12B) for supporting the cores (25A, 25B) stationary on two fixed support points during movement of the feeding beams (11A, 11B).

6. Device according to claim 5, **characterized in, that** feeding beams (11A, 11B) are movable in substantially linear movement to the core pick-up position.

7. Device according to claim 5, **characterized in, that** the winding head (13A, 13B) of each winding station comprises means for picking the cores (25A, 25B) directly from the feeding beams (11A, 11B) for beginning of the winding of the partial fiber webs around the new cores (25A, 25B).

8. Device according to claim 5, **characterized in, that** the feeding beams (11A, 11B) are constructed of simple beamlike iron, steel, composite or metal bar on which the support guide is arranged.

9. Device according to claim 5, **characterized in, that** the support guides (12A, 12B) of the device are applicable for cores of different diameters.

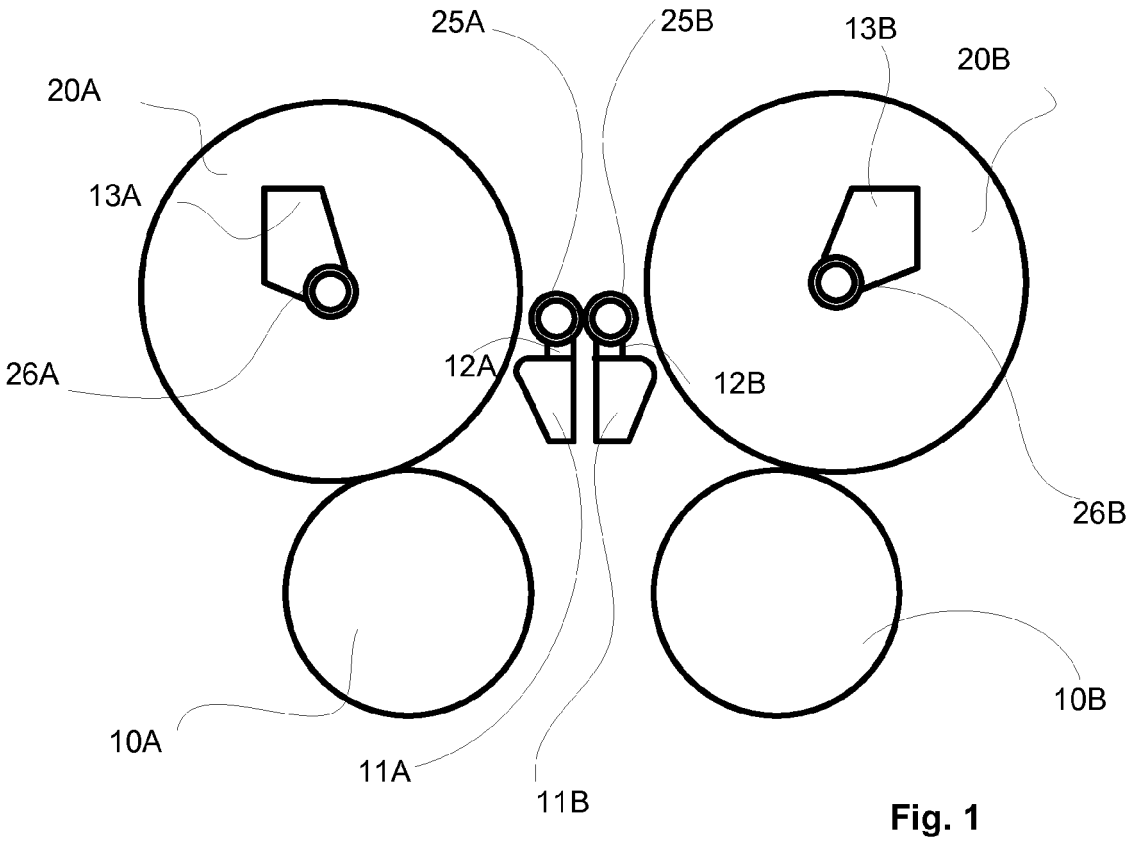
25A
25B
13B
20B
20A
13A
26A
12A
12B
26B
10B
10A
11A
11B

Fig. 1

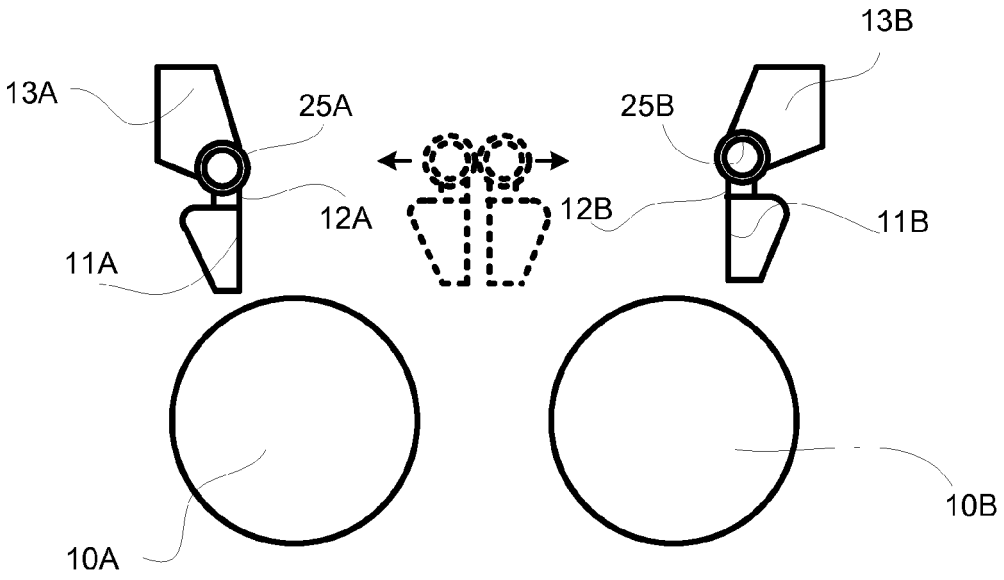
13B
13A
25A
25B
12A
12B
11B
11A
10B
10A

Fig. 2

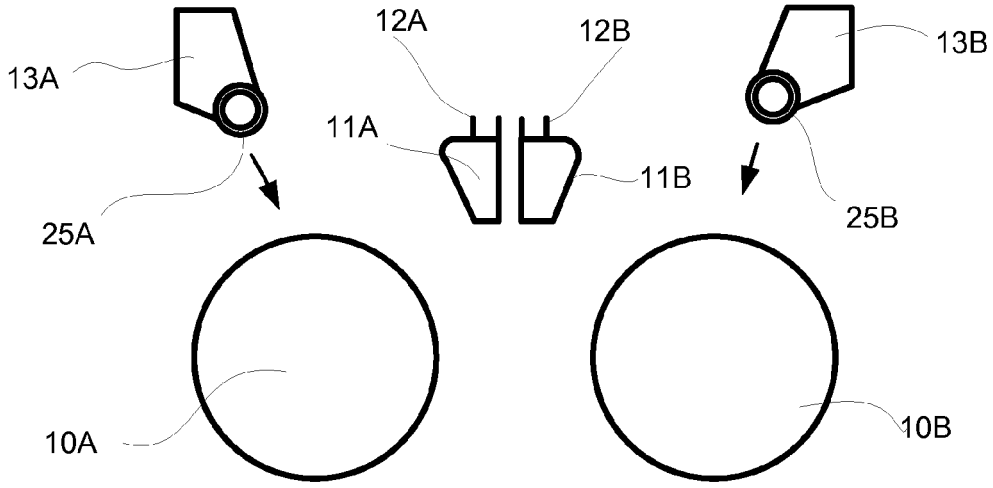
12A
12B
13A
13B
11A
11B
25A
25B
10A
10B

Fig. 3

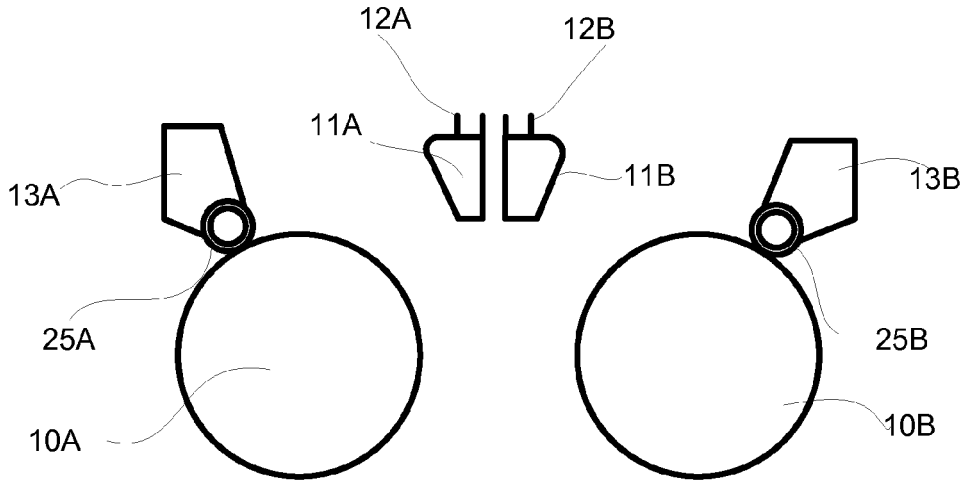
12A
12B
11A
11B
13A
13B
25A
25B
10A
10B

Fig. 4

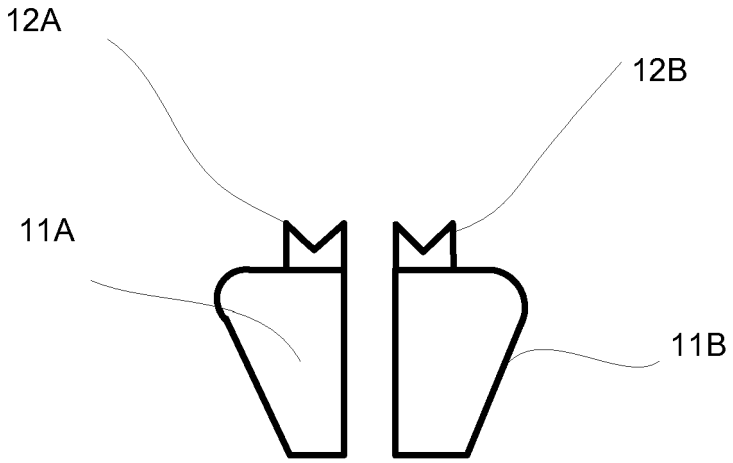

Fig. 5A

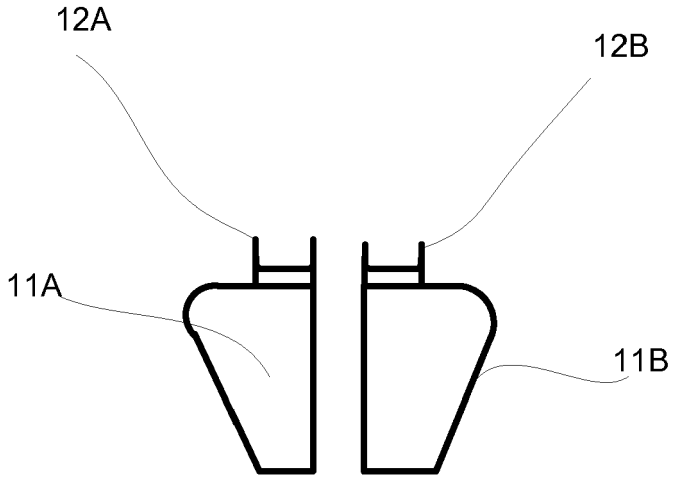

Fig. 5B

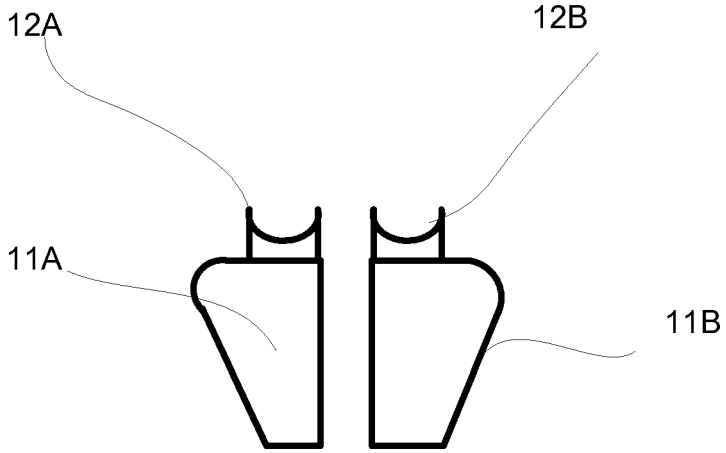

Fig. 5C

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EUROPEAN SEARCH REPORT

Application Number
EP 12 16 9784

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 356 087 A (SMITH PHILIP W [US] ET AL) 18 October 1994 (1994-10-18) * abstract; figures 1-16 * * column 5, line 62 - column 9, line 5 * * the whole document * -----	1-9	INV. B65H18/02 B65H19/22 B65H19/30
A	US 4 485 979 A (DROPCZYNSKI HARTMUT [DE]) 4 December 1984 (1984-12-04) * abstract; figures 1-5 * * the whole document * -----	1-9	

TECHNICAL FIELDS SEARCHED (IPC)
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 October 2012	Piekarski, Adam

CATEGORY OF CITED DOCUMENTS

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1

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REFERENCES CITED IN THE DESCRIPTION

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