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(54) **Arrangement in a slitter-winder for a fiber web machine**

(57) The present invention relates to an arrangement in a slitter-winder of a fiber web machine, which slitter-winder comprises an unwinder for unwinding a fiber web reel of substantially full-width web, a slitting section for cutting the full width fiber web into partial webs and a winding section for winding the partial webs into customer rolls (10), which arrangement comprises a transport area for moving the customer rolls (10) received from the winding section to the tail attaching area (30), in which an

adhesive applying device (35) is located. In the arrangement the distance (L) on the transport area (35) from the push off location of the customer rolls (10) from the winding section to the location on the tail attaching area (31) in which the tails of the customer rolls (10) are attached onto the surface of the customer rolls (10) is defined such that the tails of the web of those customer rolls whose diameter is substantially critical in view of the capacity of the slitter-winder, will be at the area of the operating area of the adhesive applying device (35).

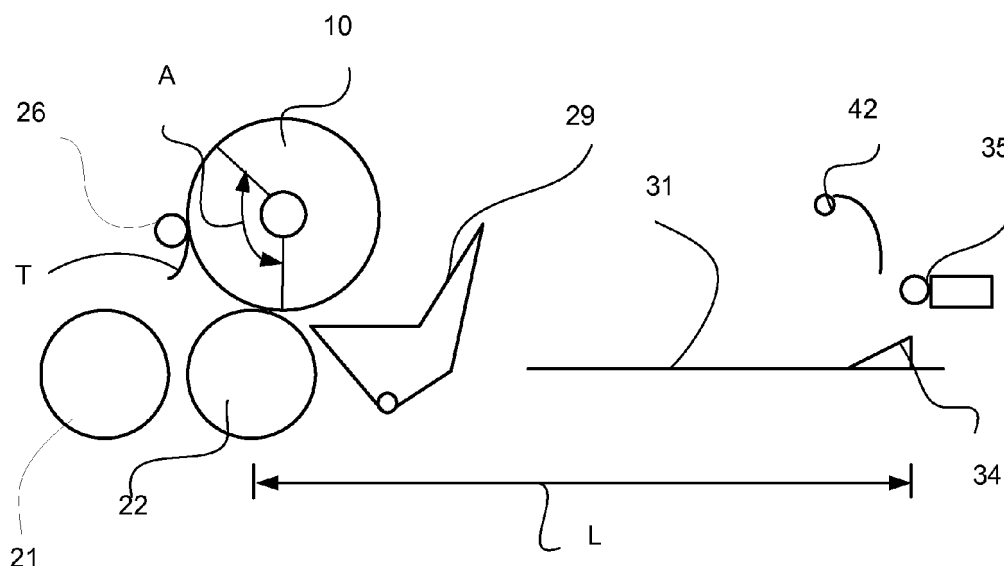


Fig. 2

Description

[0001] The invention relates to an arrangement in a slitter-winder of a fiber web machine according to the preamble of claim 1.

[0002] As known from the prior art, paper and board are manufactured in machines which together constitute a paper/board-manufacturing line which can be hundreds of meters long. Modern fiber web machines can produce more than 450 000 tons of paper a year. The speed of the machine can exceed 2000 m/min and the width of the fiber web can be more than 11 meters.

[0003] In manufacturing lines known from the prior art paper/board making takes place as continuous process. A fiber web completing in a machine is wound with a reel-up around a reeling shaft i.e. reel spool into a machine roll (a parent roll) the diameter of which can be more than 3,5 m and the weight more than 100 tons. The purpose of reeling is to modify the web manufactured as planar into a more easily processable form. In the reel-up the continuous process of the machine breaks for the first time and shifts into periodic operation. This periodicity is tried to be made with efficiency as good as possible in order to not to waste already done work in previous process steps.

[0004] The machine roll web produced in paper/board-making is full-width and even more than 100 km long so it must be slit into partial webs with suitable width and the partial webs are wound to partial rolls (customer rolls) with suitable length for the customers of the paper/board mill. The slitting and winding take place as known from prior art in an appropriate separate machine i.e. in a slitter-winder.

[0005] As known from the prior art, in the slitter-winder the machine 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 rolls i.e. the so-called set is removed from the machine after which the process is continued with the winding of a new set. These stages are repeated periodically until paper runs out of the machine roll, whereby the machine roll change is performed and the operation starts again as the winding of a new machine roll.

[0006] It is known from prior art that end of the partial web i.e. the web tail is attached to the surface of the completed customer roll by adhesive agent such as glue or tape before packaging. The tape or the glue is applied either in direction of the main direction of web travel or in cross direction of the main direction of web travel. According to some prior art arrangements the process step of attaching the web tail to the surface of the customer roll has been done in connection with the winding process by first rotating the rolls in the winder to correct position for tail attaching and then applying the adhesive agent and attaching the tail before moving the customer rolls to further processing such as packaging. This takes time

and thus lowers the capacity of the winder.

[0007] It is also known from prior art to provide in connection with the slitter-winder a separate device for attaching the web tails, by which device the tail of the web wound around the roll is attached to the surface of the customer roll. The attaching device is typically a heavy structure demanding means with support rolls for rotating the customer rolls, elements for receiving customer rolls from the winder and means for transferring the customer rolls further in the processing. The device also need frame structures and a moving beam structure into which the applying means for adhesive agent are mounted. The completed customer rolls with attached tails are finally moved to a conveyor for transferring them to packaging process.

[0008] In JP patent application 05296839 is disclosed a method for attaching a tail to a winding roll in which when the tail is to be attached to a winding roll mounted on two rotating rolls arranged in parallel at an interval, the winding roll is rotated while the tail is guided by a winding end drift preventing device, the tail is moved to the lower position between two nips and an adhesive is put to the winding roll. The winding roll is rotated and the tail is pressure-connected to the winding roll by the nip.

[0009] Even though prior art discloses devices for tail attaching in practice the most common way for tail attaching is to manually apply the adhesive for tail attaching.

[0010] An object of the present invention is to provide for an improved arrangement to eliminate or at least minimize the above problems.

[0011] In view of achieving the objects stated above and those that will come out later the arrangement in accordance with the invention in mainly characterized by what is presented in the characterizing part of claim 1.

[0012] The invention is based on the idea that the conveyor line for customer rolls is located optimally such that the tails of the web of those customer rolls whose diameter is substantially critical in view of the capacity of the slitter-winder, will be at the area of the operating area of the adhesive applying device. In cases of customer rolls with greater diameter the customer rolls will be rotated in winding section of the slitter-winder for example in two-drum winders between the pusher and the front carrier roll such that the tails are also at the operating area of the adhesive applying device. This does not limit the capacity of the slitter-winder markedly since when customer rolls with greater diameter are produced the capacity is also better. The rotating to correct position is also applicable for customer rolls with diameters smaller than critical diameter. The tails of these rolls can also be attached manually. Thus the invention provides for new method for tail attaching that does not limit the capacity unnecessarily but also provides the possibility of producing customer rolls of different diameters than the designed critical diameter.

[0013] According to an advantageous feature of the invention the adhesive applying device has operating ar-

ea that corresponds to tail attaching area of the customer rolls with critical diameters when the customer rolls are moved from the winding section to the tail attaching location in the conveyor line. The location of the conveyor line is optimized in respect of the critical diameters of customer rolls and of the location of the winding section. Those customer rolls that have diameters not on the critical area are rotated in the winding section advantageously in two-drum winders between the pusher and the front carrier roll and in center drive winders by the center drives such that the tail area is corrected by the needed distance for it to be in the operating area of the adhesive applying device when moved on to the conveyor line to the adhesive applying location.

[0014] According to an advantageous feature the adhesive applying device is located such that the customer rolls whose tail is to be attached are transferred in cross direction in respect of their movement direction from the winding section and the adhesive applying device is based on moving the customer rolls on a conveyor in the cross direction.

[0015] According to an advantageous feature the tail is attached in cross direction in respect of the main direction of web travel based on the movement of the conveyor line.

[0016] According to advantageous features the adhesive for attaching the tail is one-sided tape or double-sided tape or hot melt glue etc. For example the hot melt glue can be applied under the tail and by means of a tail lifting device the tail is pressed against the surface of the customer roll and for example the double-sided tape can be attached under the tail etc. In connection with attaching the double-sided tape the tape can be folded by a roll such that the tape roll needs not to be moved under the tail and thus the tail needs not to be lifted much, for example only about 50 mm lift is enough.

[0017] According to further advantageous features the adhesive applying is based on applying the tape over the tail or applying a band with adhesive over the tail, the adhesive agent is for example hot melt adhesive agent. This band could be a fiber web band that is received from the slitter-winder. This band can also have the codes and other detailed information of the customer roll.

[0018] The adhesive applying device is advantageously located in connection with the conveyor line such that it is inside the safety area of the slitter-winder.

[0019] According to an advantageous feature the conveyor line has also the means for separating the customer rolls.

[0020] Advantageously the winding section and/or the conveyor line has means for preventing the fall down of the tail during the movement from the winding section to the conveyor before tail attaching when the customer rolls are of a relative thin fiber web grade. Alternatively or in addition to the fall down preventing means the arrangement can comprise means for lifting up a possibly down fallen tail of the customer roll. Advantageously the means for preventing the fall down of the tail extend to

the adhesive applying device.

[0021] In some fiber web machines type of production is such that mainly customer rolls with a certain production diameter are produced and only occasionally customer rolls with diameter greater or smaller than the production diameter are produced. The present invention is very advantageous in connection of slitter-winders of fiber web machines with this production type. The tail attaching arrangement is provided such that the distance of the tail attaching device location from the delivery position of the slitter-winder is such that when the customer rolls reach the tail attaching device location the place of the tail on the surface of the customer roll is in the area of adhesive applying of the tail attaching device. Only those customer rolls that do not have the production diameter are rotated in the winder before delivery for locating the place of the tail on the surface of the customer roll to correspond the area of adhesive applying of the tail attaching device. The customer rolls are delivered thus from the slitter-winder such that the location of the tail on the surface of the customer roll is within a angle range, the angle being advantageously less than 200 degrees, very advantageously less than 120 degrees. By the arrangement according to the invention tail attaching of at least one customer roll of the set of customer rolls at time is carried out but also substantially the whole set of customer rolls can be provided with the tail attaching at the same time.

[0022] According to an advantageous feature of the invention the arrangement comprises stop means that stop the delivery movement of the customer roll at the tail attaching location. Suitable the stopper has means for damping the stop impact.

[0023] According to one further advantageous feature in connection with the invention the customer rolls to be rotated in the winding section are pushed of the winding section during rotation of the rolls such that the rotation movement moves the rolls on the receiving surface that is advantageously substantially horizontal to desired location. Utilization of this feature is advantageous also in connection with winding sections not having the other features of the arrangement according to present invention.

[0024] The arrangement according to the present invention is applicable in new builds of slitter-winders and also when modernizing slitter-winders.

[0025] In this description by adhesive agent is meant an agent that is capable of creating an attachment of tail to the surface of a roll of the produced fiber web grade. The adhesive agent is for example tape or glue. The tape is advantageously double-sided tape and located either in rotational direction of the customer roll or in cross direction to the rotational direction i.e. in axial direction of the customer rolls.

[0026] In the following the invention will be described in more detail with reference to the figures in the accompanying drawing, the invention being however not supposed to be in any way strictly confined to the details of

said illustration.

Figure 1 is a schematic layout illustration of an arrangement for attaching tail to a fiber web roll.

Figure 2 is a schematic side illustration of an arrangement for attaching tail to a fiber web roll.

[0027] In the figures same reference signs are used for same or respective components, part assemblies etc. unless otherwise stated.

[0028] In the schematic layout illustration of figure 1 the slitter-winder is marked by reference numeral 20. A slitter-winder 20 comprises an unwinder, a winding section and a slitting section between the unwinder and the winding section. In the unwinder full-width web is unwound from the machine reel onto which the web produced in the fiber web production line has been reeled in the reel-up of a fiber web machine. From the unwinder the unwound web is directed to the slitting section of the slitter-winder 20. In the slitting section the fiber web is slit length-wise into parallel partial webs which are wound in winding section to form partial web i.e. customer rolls 10. The slitting section has slitter blades arranged on beams. From the winding section of the slitter-winder the customer rolls 10 are moved by a pusher over to the transport area 31 of the customer rolls 10. The transport area may comprise an inclined plane on which the customer rolls roll over to the conveyor or corresponding means that move the rolls further to the tail attaching area 30. The tail attaching area 30 comprises means 32 for separating customer rolls 10 from each other before tail attaching and adhesive applying device 35. The conveyor line for customer rolls 10 is located optimally from the slitter-winder push off point such that the tails of the web of those customer rolls 10 whose diameter is critical in view of the capacity of the slitter-winder 20, will be at the area of the operating area of the adhesive applying device 35.

[0029] In figure 2 a customer roll 10 has just been completed in the slitter winder 20. In figure 2 the winding section of a slitter-winder 20 is shown. In this example the winding section is a two-drum winder that comprises two carrier rolls 21, 22 supported by which the rolls 10 are wound. The customer rolls 10 are pushed by a pusher 26 over to a transport device 29 that moves the customer rolls 10 to the transport area 31 which in this example is a horizontal plane. The rolls 10 roll over until they are stopped by a receiving beam 34. When the movement of the customer rolls 10 is stopped at the receiving beam, the tails of the customer rolls will be attached onto the surface of the rolls 10 by the adhesive applying device 35. For cases where there is a possibility of the tail falling off from the roll 10 there is provided a tail support device 42 that holds the tail on the surface of the roll until it is attached by the adhesive applying 35. The tail support device 42 extends to the working area of adhesive applying device. According to this embodiment of the invention the distance L between the winder's push off and

the receiving beam is such that the tail is in correct position for tail attachment in view that the distance is optimal from the slitter-winder push off point such that the tails of the web of those customer rolls 10 whose diameter is critical in view of the capacity of the slitter-winder 20, will be at the area of the operating area of the adhesive applying device 35. The customer rolls are delivered thus from the slitter-winder such that the location of the tail on the surface of the customer roll is within a angle range, the angle A being advantageously less than 200 degrees, very advantageously less than 120 degrees.

[0030] In examples of figures 1 and 2 in cases of customer rolls 10 with greater diameter than the critical, the customer rolls 10 will be rotated in winding section of the slitter-winder 20 between the pusher 26 and the front carrier roll 22 such that the tails are also at the operating area of the adhesive applying device 35. The rotating to correct position is also applicable for customer rolls 10 with diameters smaller than critical diameter. In center drive winder - type winders the rotation to the correct position is done in the winder by the center drives. The tails of these rolls without the critical diameter can also be attached manually.

[0031] Above the invention has been described with reference to some preferred exemplifying embodiments of the same only, and the invention is, however, by no means to be strictly confined to the details of said embodiments and many modifications and variations are possible.

Claims

1. Arrangement in a slitter-winder of a fiber web machine, which slitter-winder (20) comprises an unwinder for unwinding a fiber web reel of substantially full-width web, a slitting section for cutting the full width fiber web into partial webs and a winding section for winding the partial webs into customer rolls (10), which arrangement comprises a transport area for moving the customer rolls (10) received from the winding section to the tail attaching area (30), in which an adhesive applying device (35) is located, **characterized in, that** in the arrangement the distance (L) on the transport area (35) from the delivery location of the customer rolls (10) from the winding section to the location on the tail attaching area (31) in which the tails of the customer rolls (10) are attached onto the surface of the customer rolls (10) is defined such that the tails of the web of those customer rolls whose diameter is substantially critical in view of the capacity of the slitter-winder (20), will be at the area of the operating area of the adhesive applying device (35).
2. An arrangement according to claim 1, **characterized in, that** in the arrangement customer rolls (10) with greater or smaller diameter than the critical diameter

will be rotated in winding section of the slitter-winder (20) such that the tails of the customer rolls are at the operating area of the adhesive applying device (35).

3. An arrangement according to claim 1, **characterized in, that** the arrangement further comprises conveyor line and that the adhesive applying device (35) has operating area that corresponds to tail attaching area of the customer rolls (10) with critical diameters and that the conveyor line is optimized in respect of the critical diameters of customer rolls (10) and of the location of the winding section. 5 10
4. An arrangement according to claim 1, **characterized in, that** in the arrangement the conveyor line has also the means (32) for separating the customer rolls (10). 15
5. An arrangement according to claim 1, **characterized in, that** in the arrangement the winding section and/or the conveyor line has means (42) for preventing the fall down of the tail during the movement of the customer rolls (10) before tail attaching. 20 25
6. An arrangement according to claim 1, **characterized in, that** in the arrangement the customer rolls (10) are delivered from the slitter-winder (20) such that the location of the tail on the surface of the customer roll (10) is within a angle range, the angle being advantageously less than 200 degrees, very advantageously less than 120 degrees. 30
7. An arrangement according to claim 1, **characterized in, that** in the arrangement the tail is attached in cross direction in respect of the main direction of web travel. 35
8. An arrangement according to claim 1, **characterized in, that** in the arrangement the adhesive applying is based on applying the tape over the tail or applying a band with adhesive over the tail. 40
9. An arrangement according to claim 1, **characterized in, that** the arrangement comprises stop means (34) that stop the delivery movement of the customer roll (10) at the tail attaching location. 45
10. An arrangement according to claim 1, **characterized in, that** the arrangement comprises conveyor means in connection with the adhesive applying device for moving the customer rolls in cross direction. 50
11. An arrangement according to claim 1 and 5, **characterized in, that** in the arrangement means for preventing the fall down of the tail extend to working area of the adhesive applying device. 55

12. An arrangement according to claim 1 and 5, **characterized in, that** in the arrangement the adhesive applying device comprises means for folding double-sided tape for attachment of the tape under the tail.

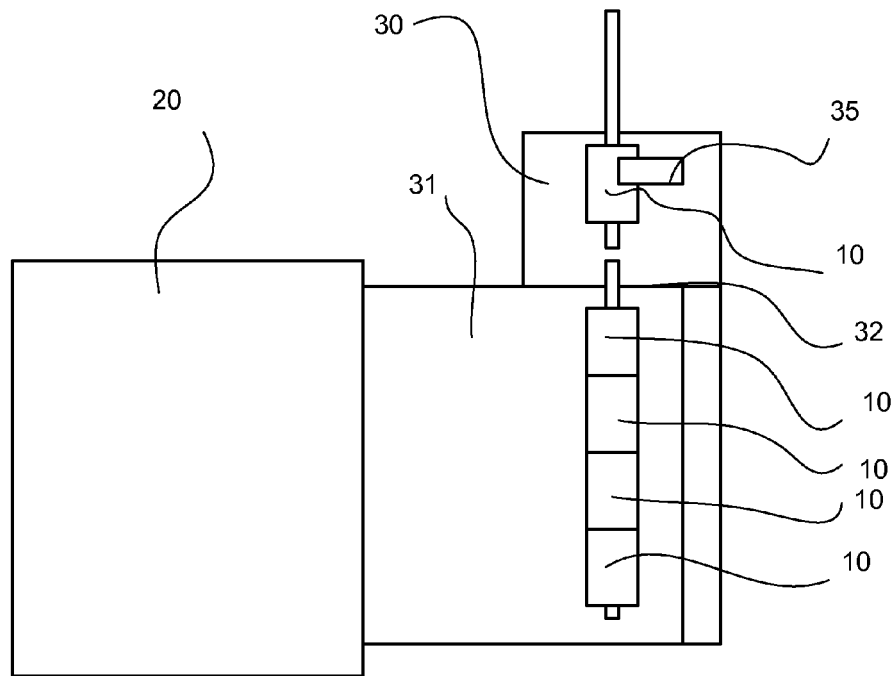


Fig. 1

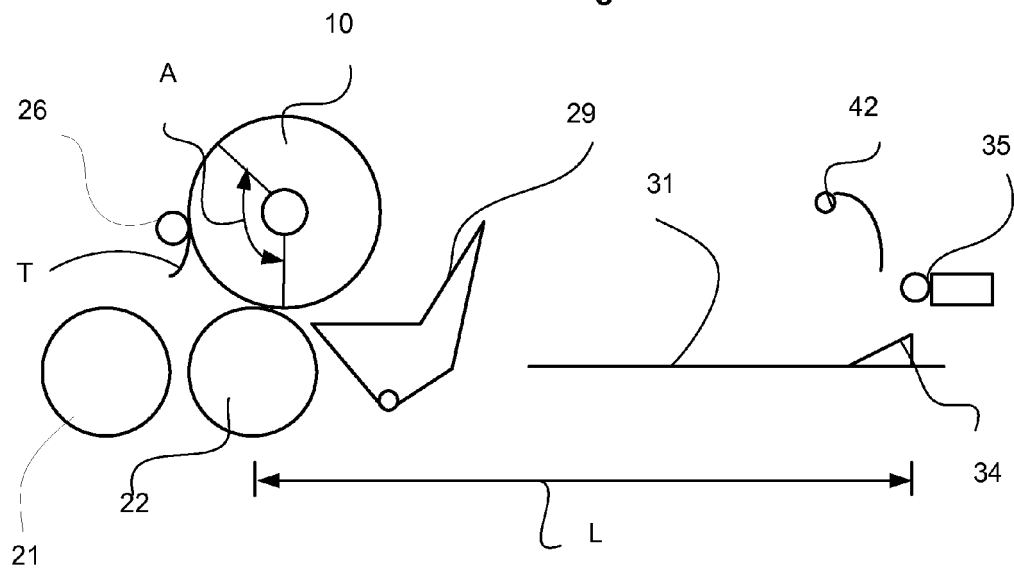


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 2688

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 November 2011	Examiner Cescutti, Gabriel
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
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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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