(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 474 666 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.07.2012 Bulletin 2012/28

(51) Int Cl.:
D21F 7/04 *(2006.01)* ***D21B 1/34*** *(2006.01)*

(21) Application number: **11170631.3**

(22) Date of filing: **21.06.2011**

(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) Arrangement for a fiber web production line

(57) The present invention relates to an arrangement in connection with a fiber web production line, in particular in connection with a finishing device of a fiber web production line, which arrangement comprises a pulper opening (12) through which fiber web is directed to a pulper chute (14) on which the fiber web to a pulper vat (16) via a pulper chute (14), and at least one chute water shower (13) for providing chute water in connection with the fiber web sliding on the pulper chute (14). The arrangement further comprises at least one chute water removal opening (15) in the pulper chute (14) for removing chute water from the pulper chute, a chute water container (17) for collecting removed chute water and piping (19) for recycling chute water from the chute water container (17) to the chute water shower (13).

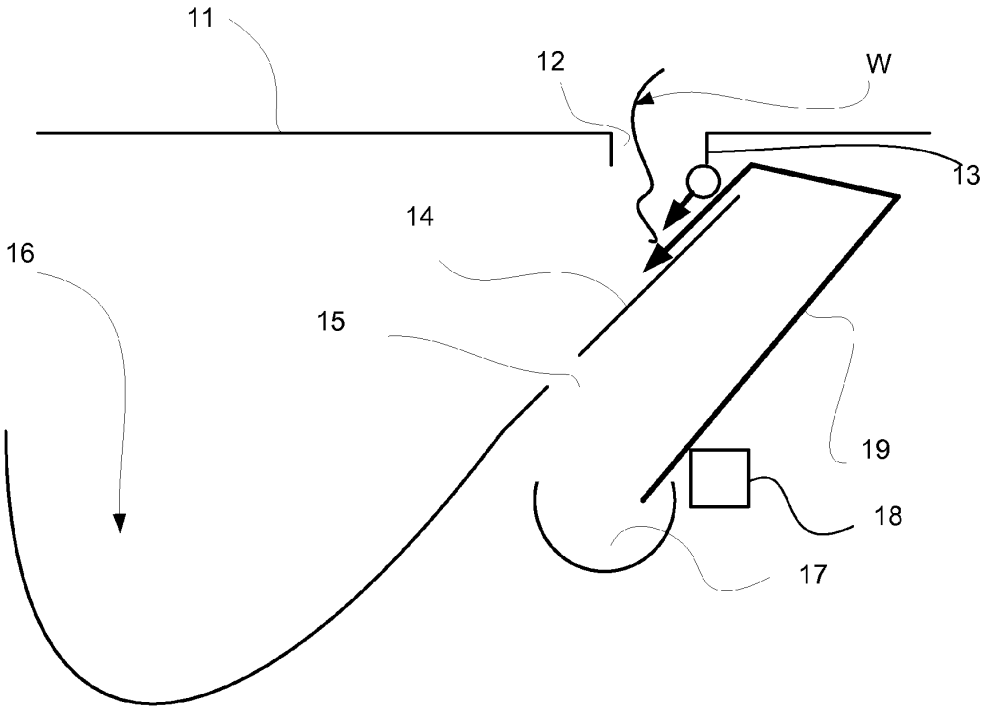

Fig. 1

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Description

[0001] The invention relates to an arrangement in connection with a fiber web production line according to the preamble of claim 1.

[0002] As known from the prior art, fiber web such as paper and board webs 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 fiber web 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. 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.

[0004] As known from the prior art in fiber web production lines typically comprise an assembly formed by a number of apparatuses arranged consecutively in the production line. A typical production and treatment line comprises a head box, a wire section and a press section as well as a subsequent drying section and a reel-up. The production and treatment line can further comprise finishing devices, for example a calender and/ or a coater. The production and treatment line also comprises typically at least one slitter-winder for forming customer rolls as well as a roll packaging apparatus.

[0005] In connection with the fiber web production lines situations exists in which the fiber web in the process is not used in the further processing and the fiber web must temporarily be directed off the process into a pulper that collects the waste paper. Usually several pulpers are located in connection with the production line underneath the main machine hall level. Situations, in which the fiber web, are temporarily directed in to a pulper comprise web breaks, threading, grade changes, removing waste paper from waste reels to empty reeling shafts for next use, edge cutting etc.

[0006] In EP publication 1386998 B1 is disclosed a device for recovery paper production waste in paper mills relating particularly to tissue paper production in which the pulper device comprises a container for collecting waste paper having an inlet opening for said waste, at least one pressurized water nozzle which produces a jet of water which intercepts the waste which falls into said container and a first pump which removes the water and the waste from said container.

[0007] In EP publication 0964099 A2 is disclosed a method in a reel-up in a grade change situation in which the continuous web entering the reel-up is passed to form broke past the reeling process at the same time when the grade change of the paper web is being changed and according one feature of this prior art method the continuous web entering the reel-up during the grade change is passed into a pulper located in connection with the reel-up. According to example of figure 1 of the publication the pulper comprises chute water showers, follower water showers and possible other water showers, air vents and a discharge pump arranged to pump broke pulp from the pulper e.g. to a stock handling system.

[0008] In JP publication 11334950 A is disclosed a paper making line provided with a reel-up with a spoilage processing pulper and arrangement for removing waste paper from waste reels to empty reeling shafts for next use.

[0009] In FI patent application 991225 is disclosed a device for threading a paper web in which the paper web is at least partly fitted to be guided temporarily off the actual paper production process, particularly into a pulper in which means for producing a force effect to the paper web to be guided into the pulper are provided. These means are for example based on effect of a fluid substance i.e. a gaseous or liquid substance.

[0010] One disadvantage with the prior art arrangements is that consumption of water is great and thus the waste - water mixture in the pulper is diluted and then in the further recovery treatment means and time needed for removing water are needed.

[0011] In the process ample water amounts promote defiberization of the fiber and thus it is problematic to reduce the consumption of water.

[0012] In prior art arrangements the inclination angle of the pulper chute is limited and needs to be 45 degrees or over in order to achieve good travel of the fiber web to the pulper. Increasing the amount of chute water the inclination of the chute can be lower. There exist trend to decrease number of pulpers in connection with a fiber web machine for example designing a common pulper for the drying section and the reel-up of a fiber web machine. This is limited by the inclination angle of the pulper chute. If the inclination angle of the inclination of the pulper chute could be designed lower, for example a common pulper for the drying section and the reel-up could be designed even when a finishing device for example a soft calender is located in between the drying section and the reel-up. An object of the present invention is to provide for an improved arrangement to eliminate or at least minimize the above problems and disadvantages.

[0013] 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.

[0014] The arrangement in connection with a fiber web production line, in particular in connection with a finishing device of a fiber web production line, comprises a pulper opening through which fiber web is directed to a pulper chute on which the fiber web to a pulper vat via a pulper chute, and at least one chute water shower for providing chute water in connection with the fiber web sliding on the pulper chute. According to the invention the arrangement further comprises at least one chute water removal opening in the pulper chute for removing chute water from the pulper chute, a chute water container for collecting removed chute water and piping for recycling chute water from the chute water container to the chute water shower

[0015] According to one advantageous feature the arrangement the chute water removal opening is formed as at least one slot extending substantially over the whole width of the pulper chute.

[0016] According to one advantageous feature in the arrangement the chute water removal opening is formed as several perforations located next to each other in width direction substantially over the whole width of the pulper chute. During the threading over the end of the web slot/slots/perforation/perforations can be pressurized to ensure the threading over.

[0017] According to one advantageous feature the arrangement further comprises a pump for recycling the chute water in the piping.

[0018] According to one advantageous feature the arrangement further comprises suction means in connection with the chute water removal opening for enhancing the removal of the chute water from the fiber web.

[0019] According to one advantageous feature the arrangement the chute water removal opening is located near the end of the pulper chute before the pulper vat.

[0020] According to one advantageous feature in the arrangement the inclination angle of the pulper chute is 35 degrees or less. By this the pulper can be common for example for the drying section and the reel-up and a finishing device in between them. Also the basement height can be lower than in accordance with prior art arrangements or the imbedding of the pulper vat can be avoided or minimized.

[0021] The present invention is very suitable in connection with all repulpable fiber webs.

[0022] The present invention is very suitable to be used in connection with pulpers of finishing devices of a fiber web production line but it can be used in connection with other pulper locations of a fiber web machine as well where waste fiber web is handled.

[0023] 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 illustration of an arrangement according to one example of the invention.

Figure 2 is a schematic layout illustration of an arrangement according to one example of the invention in connection with two finishing devices.

[0024] In the following description and figures same reference signs designate for similar components unless otherwise mentioned and it should be understood that the examples are susceptible of modification in order to adapt to different usages and conditions within the frames of the invention.

[0025] In the schematic example of the invention of figure 1 the machine hall floor 11 has a pulper opening 12 through which the fiber web W is directed to the pulper vat 16. Near the pulper opening 12 a chute water shower 13 is located for providing for the chute water and for assisting in guiding the fiber web W to the pulper vat 16. The chute water shower 13 extends substantially over the whole width of the pulper chute 14 or several chute water showers can be provided next to each other in width direction. In connection with the arrangement other showers for example follower showers can be used. The fiber web falls onto a pulper chute 14 and slides down to the pulper vat 16 with chute water. The pulper chute 14 comprises a chute water removal opening 15 near the point where the fiber web falls to the pulper vat 16. The chute water removal opening 15 made as at least one slot or several perforations that extend substantially on the whole width of the pulper chute 14. Through the opening 15 chute water is flown into a chute water collecting container 17. From the chute water collecting container 17 the chute water is recycled back to the chute water shower 13. A pump 18 is provided for recycling the chute water via recycling piping 19. In connection with the chute water removal opening 15 a suction device can be provided to enhance the chute water removal. Also control means for controlling the chute water recycling process can be provided.

[0026] In figure 2 a schematic layout example of using one example of the invention in connection with two finishing devices is show. In this layout example the pulper vat 16 is located below the machine level and acts as a pulper for a reel-up 20 and an unwinder 30. Storage for empty reeling shafts is denoted by reference numeral 25. As shown in the figure two pulper chutes 14 provide for sliding down the fiber web and each is provided with the chute water shower 13 and corresponding chute water removal opening 15 and chute water container 17. In the figure in connection with each container 17 a pump 18 is provided but the arrangement can also be provided with one pump that is connected to the recycling piping 19 (figure 1) and pumps for both containers 17. The inclination angle A of the pulper chute is advantageously 35 degrees or less.

[0027] 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 connection with a fiber web production line, in particular in connection with a finishing device of a fiber web production line, which arrangement comprises a pulper opening (12) through which fiber web is directed to a pulper chute (14) on which the fiber web to a pulper vat (16) via a pulper chute (14), and at least one chute water shower (13) for providing chute water in connection with the fiber web sliding on the pulper chute (14), **characterized in, that** the arrangement further comprises at least one chute water removal opening (15) in the pulper chute (14) for removing chute water from the pulper chute, a chute water container (17) for collecting removed chute water and piping (19) for recycling chute water from the chute water container (17) to the chute water shower (13).

2. An arrangement according to claim 1, **characterized in, that** in the arrangement the chute water removal opening (15) is formed as at least one slot extending substantially over the whole width of the pulper chute (14).

3. An arrangement according to claim 1, **characterized in, that** the arrangement the chute water removal opening (15) is formed as several perforations located next to each other in width direction substantially over the whole width of the pulper chute (14).

4. An arrangement according to claim 1, **characterized in, that** the arrangement further comprises a pump (18) for recycling the chute water in the piping (19).

5. An arrangement according to claim 1, **characterized in, that** the arrangement further comprises suction means in connection with the chute water removal opening (15) for enhancing the removal of the chute water from the fiber web.

6. An arrangement according to claim 1, **characterized in, that** in the arrangement the chute water removal opening (15) is located near the end of the pulper chute before the pulper vat (16).

7. An arrangement according to claim 1, **characterized in, that** in the arrangement the inclination angle of the pulper chute is 35 degrees or less.

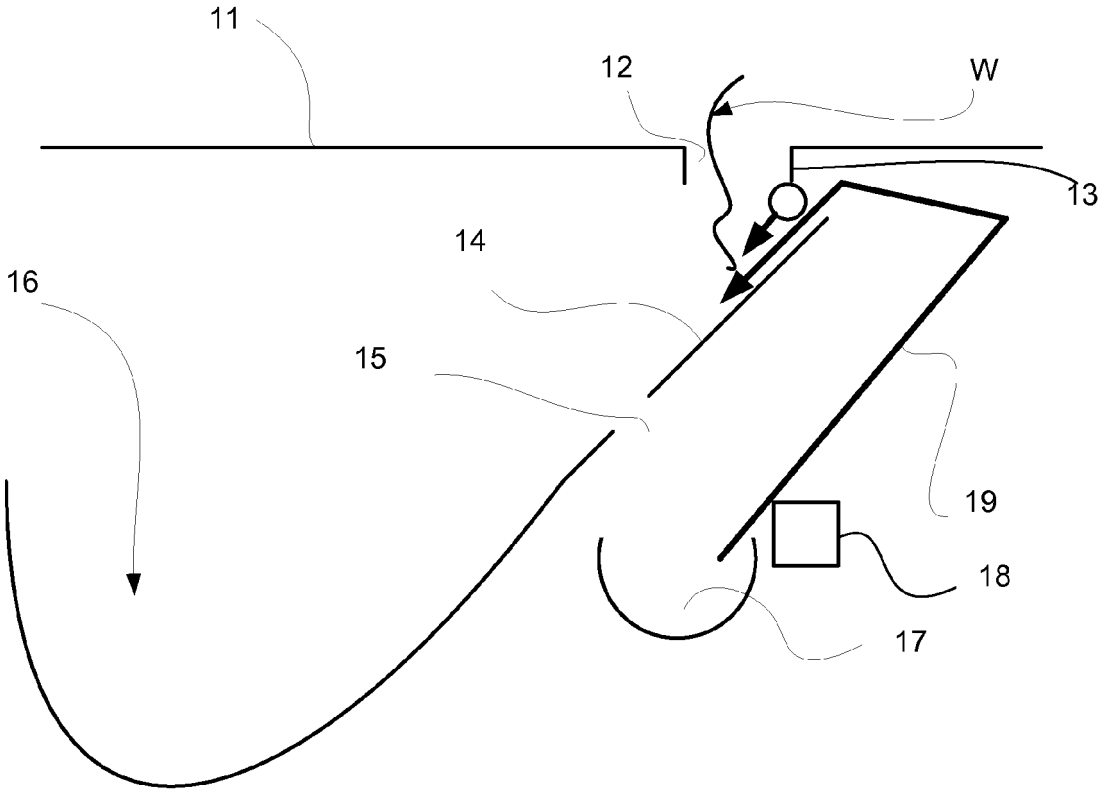

Fig. 1

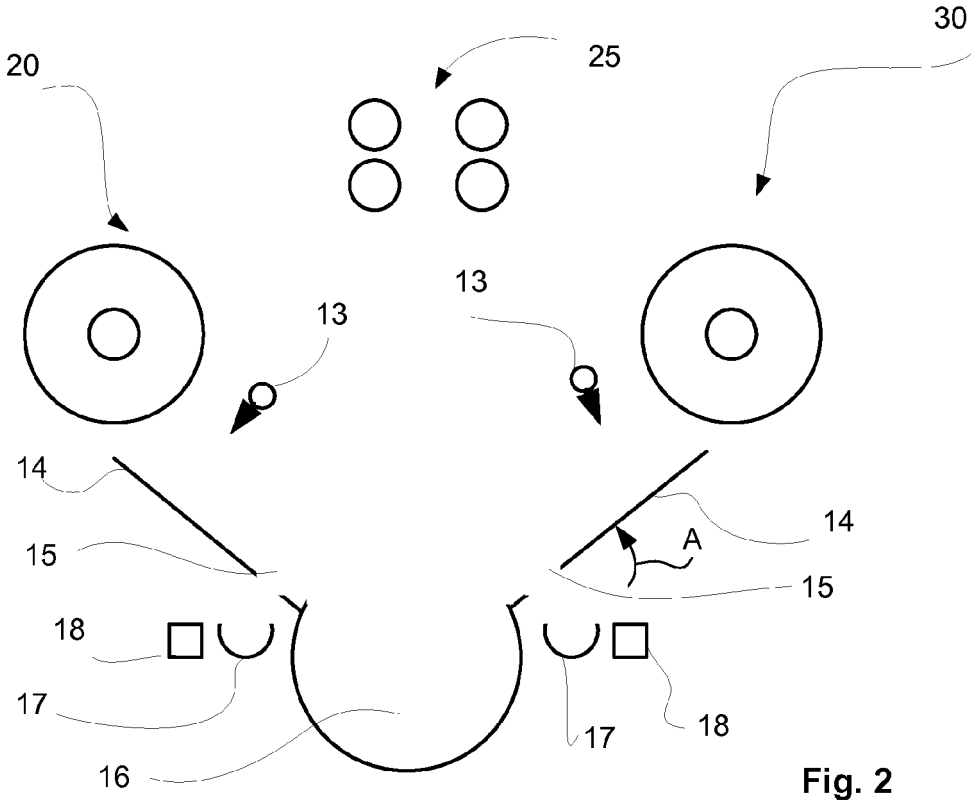

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 11 17 0631

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	DE 10 2009 000365 A1 (VOITH PATENT GMBH [DE]) 29 July 2010 (2010-07-29) * paragraphs [0003] - [0013]; figure 2 * -----	1,7	INV. D21F7/04 D21B1/34

TECHNICAL FIELDS SEARCHED (IPC)

D21F
D21B
D21G
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 July 2011	Maisonnier, Claire

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
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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
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& : member of the same patent family, corresponding document

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 17 0631

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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14-07-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102009000365 A1	29-07-2010	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- EP 0964099 A2 **[0007]**
- JP 11334950 A **[0008]**
- FI 991225 **[0009]**