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(54) **Arrangement in a fiber web production line and method in a fiber web production line**

(57) The invention relates to an arrangement in a fiber web production line comprising a nozzle pipe (10) of sizing / coating equipment (3, 4; 7; 9) for applying coating or sizing medium onto the fiber web (W). The nozzle pipe (10) with the sizing / coating equipment (3,4; 7; 9) is movable in cross-direction of the main running direction (S) of the fiber web (W) from operating position (figure 1A, 2, 3, 4, 5), in which it extends in cross-direction over the width of the fiber web (W), to the maintenance position at front (figures 1B and 1 C) or back side of the fiber web production line. The invention also relates to a method in a fiber web production line, in which the fiber web is coated or sized by coating or sizing medium applied by sizing / coating equipment comprising a nozzle pipe (10) The nozzle pipe (10) is movable such that it is moved in cross-direction of the main running direction of the fiber web (W) from operating position (figure 1A, 2, 3, 4, 5), in which it extends in cross-direction over the width of the fiber web (W), to the maintenance position at front (figures 1B and 1C) or back side of the fiber web production line.

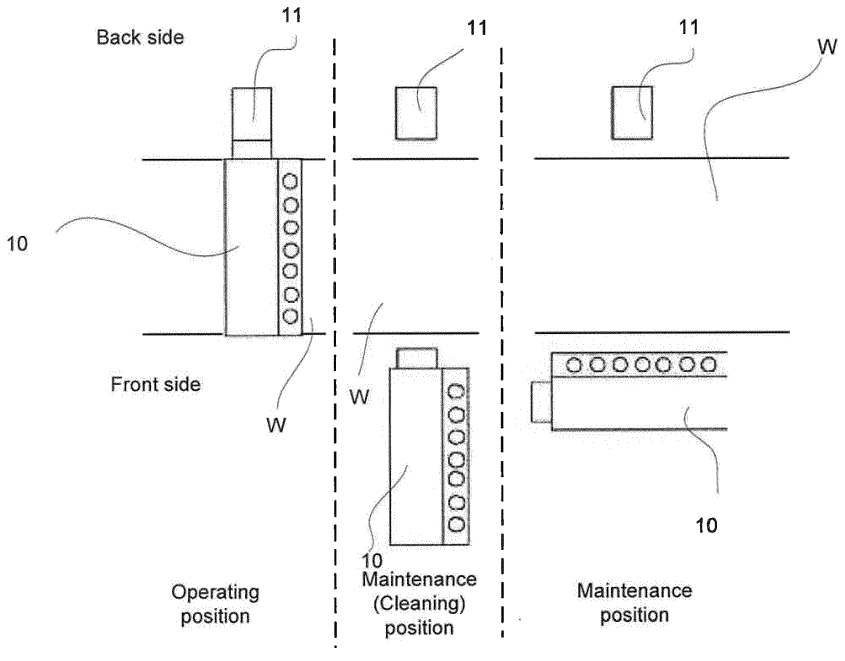


Fig. 1A Fig. 1B Fig. 1C

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Description

[0001] The invention relates to an arrangement of a fiber web production line and to a method in a fiber web production line. Especially the invention relates to an arrangement and to a method in a coating or sizing section of a fiber web production line, in which section the coating or sizing medium is applied on the fiber web by spray means. More especially the invention relates to an arrangement according to the preamble part of claim 1 and to a method according to the preamble part of claim 6.

[0002] As known from the prior art in fiber web producing processes typically comprise an assembly formed by a number of apparatuses arranged consecutively in the process 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 other devices and sections for finishing the fiber web, for example, a sizer, a calender, a coating section. The production and treatment line also comprises at least one winder for forming customer rolls as well as a roll packaging apparatus. In this description and the following claims by fiber webs are meant for example paper and board webs.

[0003] In production of fiber webs, for example of paper or board webs, sizing is used to alter the properties of a fiber web by adding sizing agents (sizing medium), for example glue chemicals. Sizing can be divided to internal sizing and surface sizing. In internal sizing the sizing agent is added to pulp in the wet end of the fiber web machine before forming. In surface sizing the sizing agent is added onto the surface of the fiber web at the dry end of the fiber web machine.

[0004] In production of fiber webs, for example of paper or board webs, coating, especially the surface of a fiber web is formed with a layer of coating paste (coating medium) at a coating station followed by drying. The formation of a coating paste can be divided in supplying the coating paste onto the web surface, which is called the application of the coating paste, as well as in the adjustment of final amount of coating paste.

[0005] The coating or the sizing of a fiber web typically utilizes a coating device - a coater - or a sizing device - a sizer, which together with for example drying devices following the coater/sizer form the coating / sizing section in a fiber web production line. In connection with the coaters and sizers different kinds of application technology for application of the coating or the sizing medium on the fiber web are employed in prior art arrangements, for example curtain technology or blade coating technology or rod coating technology or air brush coating technology or spray coating technology.

[0006] In WO publication 2006/058961 A1 is disclosed a method and arrangement for processing a paper or board web or similar fiber web. In this prior art method a processing mixture is spread on the surface of the web with spray nozzles. In WO publication 02/072953 is disclosed an assembly for treating a moving web of paper of board with web treatment substance which assembly comprises an application chamber located in at close vicinity of the moving web and facing the web and at least one linear nozzle array incorporating at least one nozzle for spraying the web treatment substance on the web. In FI utility model registration 9401 is disclosed a device for treating a fiber web, which comprises an application device, in particular a spraying device, for applying treatment substance on a moving fiber wed.

[0007] In EP patent publication 1696075 is disclosed a coating machine for applying coating medium directly on the surface of a paper, paperboard or other fiber web or indirectly on the surface of a transfer element, for example applicator roll, which transfers the coating medium onto the surface of the fiber web. The machine has an apparatus for pivoting and adjusting a functional unit, a hydraulic cylinder for pivoting the functional unit into an operating or readiness position and a service position. It is possible to set the operating or readiness position in the extended state of the hydraulic cylinder and the service position in the retracted state. One disadvantage in this kind of known arrangement is that maintenance and cleaning of the functional unit is difficult, especially during times when the web is running and it may also create a safety risk, especially if the machine is running due to the unsafe location of the functional unit in the service position.

[0008] In US patent publication 7029532 is disclosed a coating station which is intended for coating a web with a coating material. The station includes a load-bearing and cross-directional frame extending substantially across the entire width of the web and applicator elements supported to the frame. The frame is arranged by at least one cross component formed out of sheet metal into a box-type structure, the cross component extending substantially across the entire width of the web and the cross component is attached to the end components by its end parts. This station further comprises two nozzle units that have determined operating and maintenance positions. The maintenance position is located in machine direction further away from the web than the operating position. The nozzle unit in the maintenance position can also be serviced from the walkway even if the coating station is in use. One disadvantage of this known arrangement is that maintenance maybe complicated as the nozzle units even in the maintenance position are located above the machine and it is also disadvantageous that the nozzle pipe of the nozzle units cannot be replaced in this maintenance position. Also the walkways create further costs and in some cases there is no room for a safe location of a walkaway near the nozzle units.

[0009] As the nozzles or nozzle units of spray coating or sizing units are as known attached to pipes or corresponding frame parts that extend in cross direction over the width of the fiber web. The coating and sizing units can be located in different positions in the fiber web production line, for example at a belt-calender, or at a press

section, or at a drying section comprising drying cylinders, or at a wire section, in many cases the moving of the nozzle pipe from the operating position to the maintenance position for cleaning or for changing of the nozzles/nozzle units is difficult due to safety reasons or due to space problems.

[0010] An object of the invention is to create and arrangement in a fiber web production line and a method in a fiber web production line in which the disadvantages of known arrangements and methods relating to the moving of the nozzle pipe from the operating to the maintenance position are eliminated or at least minimized.

[0011] An object of the invention is to provide an arrangement in a fiber web production line and a method in a fiber web production line in which the maintenance of the nozzles/nozzle units is easy.

[0012] An further object of the invention is to provide an arrangement in a fiber web production line and a method in a fiber web production line in which no walkways are needed to reach the nozzle pipes in their maintenance position.

[0013] In order to achieve the above objects the arrangement according to the invention is mainly characterized by the features of claim 1 and the method according to the invention is mainly characterized by the features of claim 6.

[0014] According to an advantageous aspect of the invention the nozzle pipe of a coating or sizing device is movable in cross-direction of the main running direction of the fiber web from operating position, in which it extends in cross-direction over the width of the fiber web, to the maintenance position at front or back side of the fiber web production line.

[0015] The coating or sizing section of the fiber web production line comprises according to an advantageous aspect means for providing the movement of the nozzle pipe from the operating position to maintenance position. The means for providing the movement can be constructed of guides supported on the frame of the coating or sizing device and corresponding slide surfaces or wheels or air cushions or hydrostatic bearing or like on the nozzle pipe. Advantageously the arrangement also comprises a save-all for preventing droplets of coating or sizing medium to drop on the fiber web or on the floor.

[0016] In this description by terms front and back side of the fiber web production line is meant the areas outside the main production line area i.e. where the fiber web and the devices etc. needed for its production are located; the front side being the operating or tending side of the production line and the back side being the side where drives etc. equipment are mainly located. By term operating position is meant the position of the nozzle pipe in which the nozzles/nozzle units are applying coating or sizing medium onto the fiber web or are ready to apply i.e. the nozzle pipe is located over the fiber web extending in cross-direction in relation to the main running direction of the fiber web. By term maintenance position is meant the position of the nozzle pipe in which its nozzles/nozzle units are cleaned or replaced or other maintenance work is directed to the nozzle pipe, to its nozzles or nozzle units to its other equipment etc. The nozzle pipe may naturally be located at the maintenance position even no active maintenance work is directed to it when it is not needed for operation i.e. for applying coating or sizing medium onto the fiber web. The maintenance position comprises at least one position outside the production line area but it can also comprise more different positions for example for different kinds of maintenance work, for example a position for cleaning, a position for replacing or repairing of damaged or worn parts or components of the nozzle pipe or the nozzle pipe.

[0017] According to an advantageous feature of the invention the nozzle pipe of a coating or sizing device is movably located such that it is movable in cross-direction of the main running direction of the fiber web from operating position, in which it extends in cross-direction over the width of the fiber web, to the maintenance position advantageously at front side of the fiber web production line.

[0018] According to an advantageous feature of the invention the nozzle pipe of a coating or sizing device is movably located such that it is movable in cross-direction of the main running direction of the fiber web from operating position, in which it extends in cross-direction over the width of the fiber web, to the cleaning position at front side of the fiber web production line and turnable from the first maintenance position to the second maintenance position in which it extends in the main running direction of the fiber web and is located advantageously at the front side of the fiber web production line.

[0019] The arrangement comprises according to a further advantageous feature quick-release connections for the hoses of the application medium etc. for quick operations when moving the nozzle pipe from operating position to the maintenance position.

[0020] Advantageously the nozzle pipe is constructed of light weight material, for example of sheet metal, of plastic composite material, of carbon fiber composite material or of class fiber composite material such, that it is easy and light to move.

[0021] The arrangement may also comprise an actuator for providing the movements.

[0022] In the following the invention is explained in more detail with reference to the accompanying drawing in which

Figures 1A - 1C show some schematical examples of some advantageous positions of the nozzle pipe of a coating or sizing section of a fiber web production line.

Figures 2 - 5 show schematically some examples of advantageous examples of the invention.

[0023] In the figures the corresponding parts and part components of the arrangement are denoted by same

reference signs unless otherwise mentioned.

[0024] In figure 1A the nozzle pipe 10 is in its operating position over the fiber web W applying coating or sizing medium onto the web W. The nozzle pipe 10 is connected to the suction channel 11.

[0025] In figure 1B the nozzle pipe 10 has been moved in cross direction to the front side of the coating or sizing section to a maintenance position for cleaning and it has been disconnected from the suction channel 11.

[0026] In figure 1C the nozzle pipe 10 has been turned to a maintenance position so that it extends in the main running direction of the fiber web W for repair or maintenance work.

[0027] The nozzle pipe 10 of a coating or sizing device is movably located such that it is movable in cross-direction of the main running direction of the fiber web from operating position (figure 1A), in which it extends in cross-direction over the width of the fiber web W, to the maintenance position at front (figures 1B and 1C) or back side of the fiber web production line.

[0028] According to one aspect the nozzle pipe 10 of a coating or sizing device is movably located such that it is movable in cross-direction of the main running direction of the fiber web W from operating position (figure 1A), in which it extends in cross-direction over the width of the fiber web W, to the maintenance position at front side of the fiber web production line (figures 1B and 1C).

[0029] According to one aspect the nozzle pipe 10 of a coating or sizing device is movably located such that it is movable in cross-direction of the main running direction of the fiber web from operating position (figure 1A), in which it extends in cross-direction over the width of the fiber web W, to the first maintenance (cleaning) position at front side of the fiber web production line (figure 1B) and turnable from the first maintenance position (figure 1B) to the second maintenance position (figure1C) in which it extends in the main running direction of the fiber web W and is located at the front side of the fiber web production line.

[0030] In figure 2 is schematically shown an example in connection with a sizing arrangement located at wire section of a fiber web machine. In this example the fiber webs W are guided supported by wires to be attached to each other to form one fiber web to a transfer roll 8. The direction of travel of the fiber web is shown by arrow S, past the sizing / equipment 7, which apply the sizing agent between the fiber webs W to be attached at the transfer roll. The sizing equipment 7 comprise a nozzle pipe 10 as support element. The sizing equipment 7 with the nozzle pipe 10 is movable in cross-direction in relation to the travel direction of the fiber web W i.e. in width direction of the fiber web W. The sizing equipment 7 and the nozzle pipe 10 are attached to a support beam 15 to which a shaft 14 is rotatable attached, which shaft 14 is at its ends attached to slide elements 13 that are arranged movable in guide structure 12. Thus the sizing equipment 7 with its nozzle pipe 10 is movable from its operating position, shown in the figure, to maintenance position outside the operating area over the fiber web width by them moving along guide structure 12. Advantageously for example operating /tending side (front side) or drive side (back side) is further provided with turning means (not shown) for turning the nozzle pipe 10 with the sizing equipment 7 to be along the travel direction of the fiber web W at the side of the fiber web W, thus providing space savings.

[0031] In figure 3 is schematically shown an example in connection with a sizing arrangement of a fiber web machine. The fiber web W is guided in approach to the sizer, comprising sizing equipment 3, 4 located on both sides of the web W and size rolls 5, 6. After the sizing equipment 3, 4 of the sizer the web W is guided into the size nip of the sizer. The sizer comprises two size rolls 5, 6 between which the size nip is formed. Each of sizing equipment 3, 4 comprises nozzle pipe 10 that is movable in cross-direction in relation to the travel direction of the fiber web W i.e. in width direction of the fiber web W. Each sizing equipment 3, 4 with nozzle pipe 10 are attached by a pair of support element 16 to slide elements 17 that are arranged movable in a guide structure 12. In this example the guide structure 12 comprises two perpendicular arms and a slide element 17 in movable on each guide arm of each guide structure. Thus the sizing / coating equipment 3, 4 with nozzle pipe 10 is movable from operating position, shown in the figure, to maintenance position outside the operating area over the fiber web width by moving the nozzle pipe 10 along guide structure 12. Advantageously for example operating /tending side (front side) or drive side (back side) is further provided with turning means (not shown) for turning the nozzle pipe 10 with the sizing equipment 3, 4 along the travel direction of the fiber web W at the side of the fiber web W.

[0032] In figure 4 is schematically shown an example in connection with a sizing arrangement of a fiber web machine. The fiber web W is guided in approach to the sizer, comprising sizing equipment 3, 4 located on both sides of the web W and size rolls 5, 6. After the sizing equipment 3, 4 of the sizer the web W is guided into the size nip of the sizer. The sizer comprises two size rolls 5, 6 between which the size nip is formed. Each of sizing equipment 3, 4 comprises nozzle pipe 10 that is movable in cross-direction in relation to the travel direction of the fiber web W i.e. in width direction of the fiber web W. Each sizing equipment 3, 4 with nozzle pipe 10 are attached to a pair of support lugs 18 comprising a slide surface. The support lugs 18 are arranged movable on a guide structure 12. In this example the guide structure 12 comprises a guide shaft 12 located in a longitudinal hole with slide surface of corresponding support lug 18. Thus the sizing equipment 3, 4 with nozzle pipe 10 is movable from operating position, shown in the figure, to maintenance position outside the operating area over the fiber web width by movement along guide structure 12. Advantageously for example operating /tending side (front side) or drive side (back side) is further provided with turning means (not shown) for turning the nozzle

pipe 10 with the sizing equipment 3, 4 with nozzle pipe along the travel direction of the fiber web W at the side of the fiber web W.

[0033] In the example of figure 5 the sizing / coating equipment 9 are located within the nozzle pipe 10. The fiber web w to be sized or coated travels in travel direction S and is guided past the sizing / coating equipment 9 to be sized or coated. The nozzle pipe 10 is supported on a support beam 15 to which a shaft 14 is rotatably attached, which shaft 14 is at its ends attached to slide elements or wheels 13 that are arranged movable in guide structure or support structure 12. Thus the sizing / coating equipment 9 with its nozzle pipe 10 is movable from its operating position, shown in the figure, to maintenance position outside the operating area over the fiber web width by moving the nozzle pipe 10 along the guide or support structure 12. Advantageously for example operating /tending side (front side) or drive side (back side) is further provided with turning means (not shown) for turning the nozzle pipe 10 with the sizing / coating equipment 7 to be along the travel direction of the fiber web W.

[0034] The coating or sizing section of the fiber web production line comprises according to an advantageous aspect means for providing the movement of the nozzle pipe 10 from the operating position to maintenance position. The means for providing the movement can be constructed of guides 12 supported on the frame of the coating or sizing device and corresponding slide surfaces or wheels or like on the nozzle pipe 10 for the linear movement and of a pivot or like for the turning movement. The arrangement comprises according to a further advantageous feature quick-release connections for the hoses of the application medium etc. for quick operations when moving the nozzle pipe from operating position to the maintenance position. The arrangement may also comprise an actuator for providing the movements.

Claims

1. Arrangement in a fiber web production line comprising a nozzle pipe (10) of sizing / coating equipment (3,4; 7; 9) for applying coating or sizing medium onto the fiber web (W), **characterized in that** the nozzle pipe (10) with the sizing / coating equipment (3,4; 7; 9) is movable in cross-direction of the main running direction (S) of the fiber web (W) from operating position (figure 1A, 2, 3, 4, 5), in which it extends in cross-direction over the width of the fiber web (W), to the maintenance position at front (figures 1B and 1C) or back side of the fiber web production line.

2. Arrangement according to claim 1, **characterized in that** the arrangement comprises means for providing the movement of the nozzle pipe (10) from the operating position to maintenance position.

3. Arrangement according to claim 2, **characterized in that** the means for providing the movement are constructed of guide structure (12) of the coating or sizing device and of corresponding slide surfaces or wheels or like for movement of the nozzle pipe (10) with the sizing / coating equipment (3, 4; 7; 9).

4. Arrangement according to claim 1, **characterized in that** the arrangement also comprises a save-all for preventing droplets of coating or sizing medium to drop on the fiber web or on the floor.

5. Arrangement according to claim 1, **characterized in that** the arrangement comprises according to a further advantageous feature quick-release connections for the hoses of the application medium etc. for quick operations when moving the nozzle pipe from operating position to the maintenance position.

6. Method in a fiber web production line, in which the fiber web is coated or sized by coating or sizing medium applied by sizing / coating equipment comprising a nozzle pipe (10), **characterized in that** the nozzle pipe (10) is movable such that it is moved in cross-direction of the main running direction of the fiber web (W) from operating position (figure 1A, 2, 3, 4, 5), in which it extends in cross-direction over the width of the fiber web (W), to the maintenance position at front (figures 1B and 1C) or back side of the fiber web production line.

7. Method according to claim 6, **characterized in that** the nozzle pipe of a coating or sizing device is movably located such that it is movable in cross-direction of the main running direction of the fiber web from operating position, in which it extends in cross-direction over the width of the fiber web, to the cleaning position at front side of the fiber web production line and turnable from the first maintenance position to the second maintenance position in which it extends in the main running direction of the fiber web and is located at the front side of the fiber web production line.

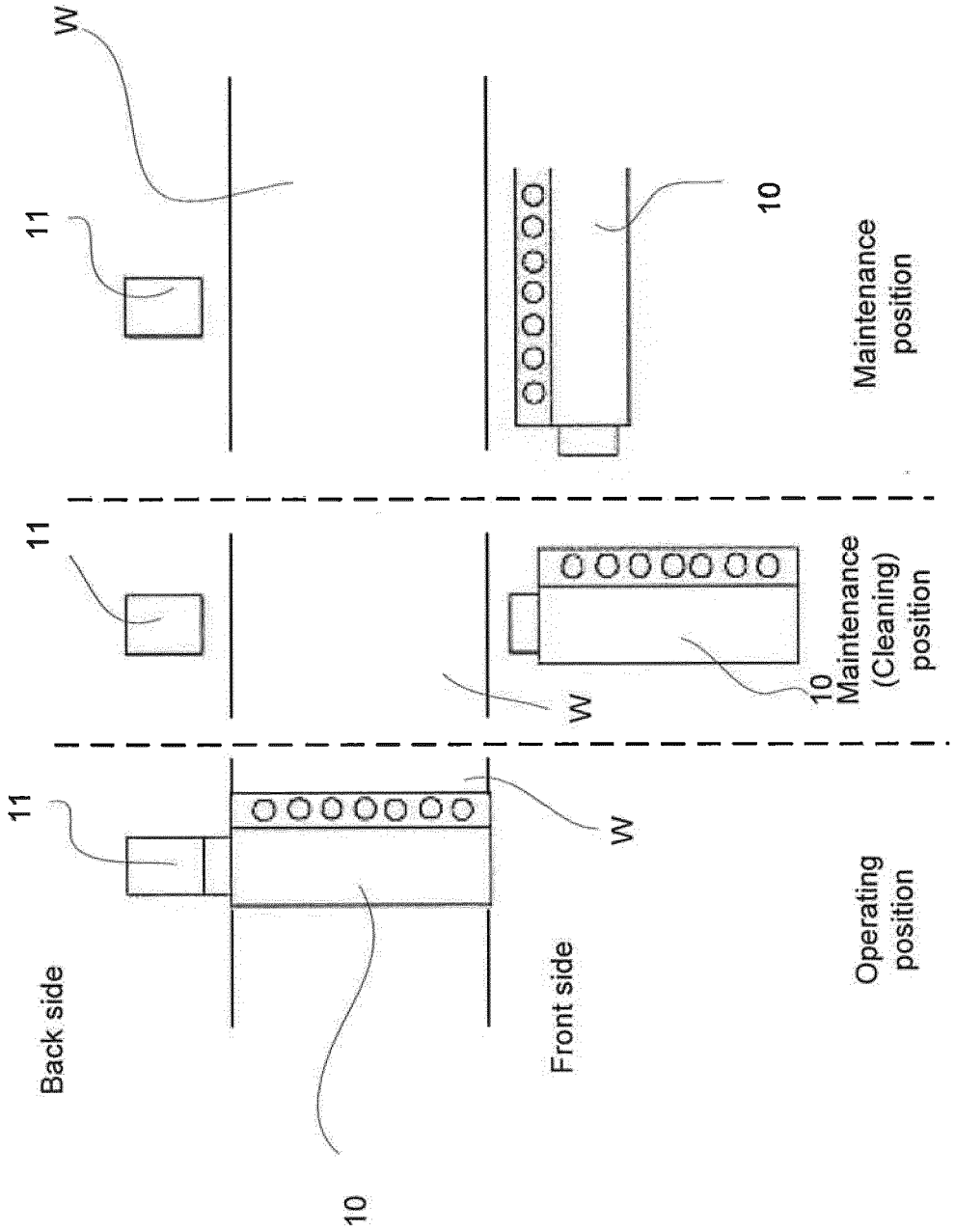


Fig. 1C

Fig. 1B

Fig. 1A

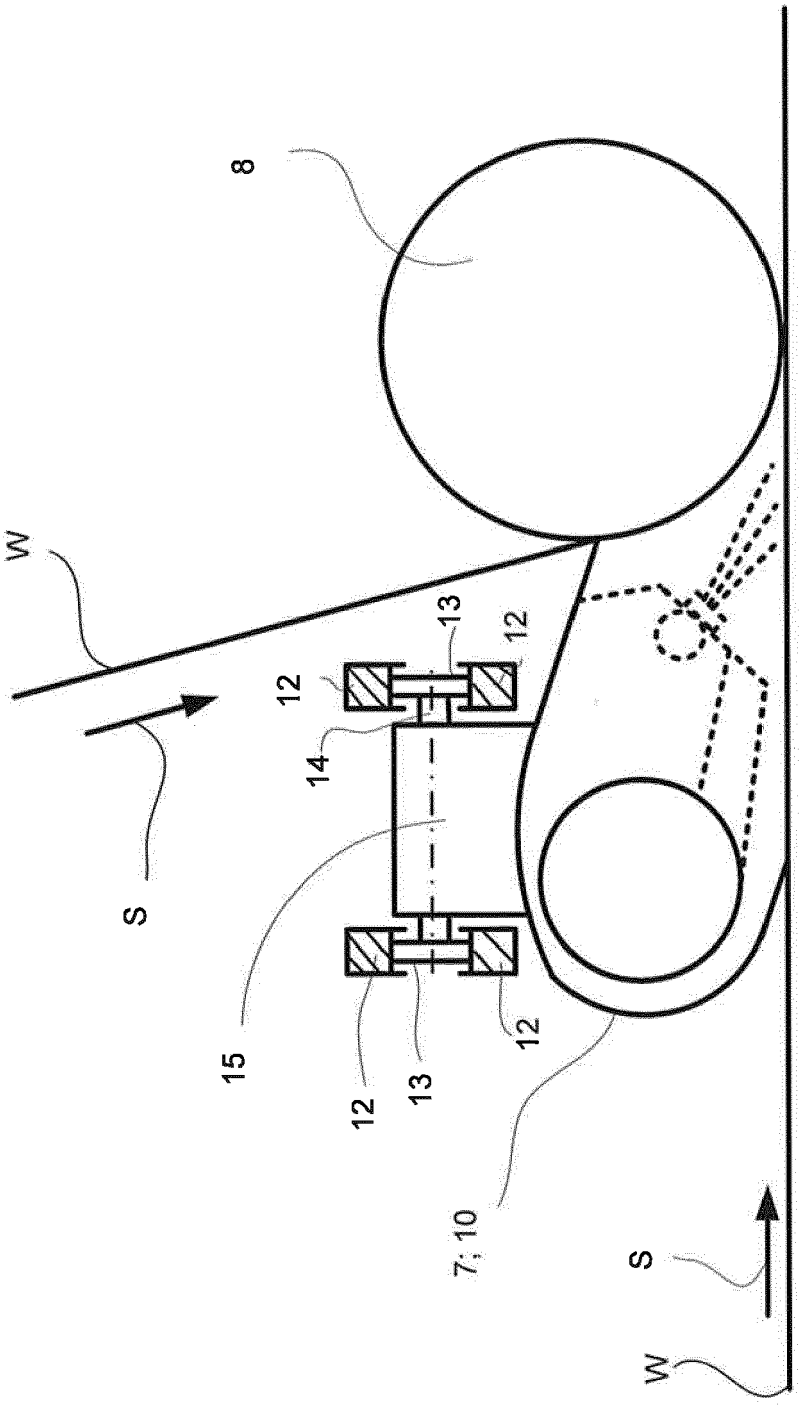


Fig. 2

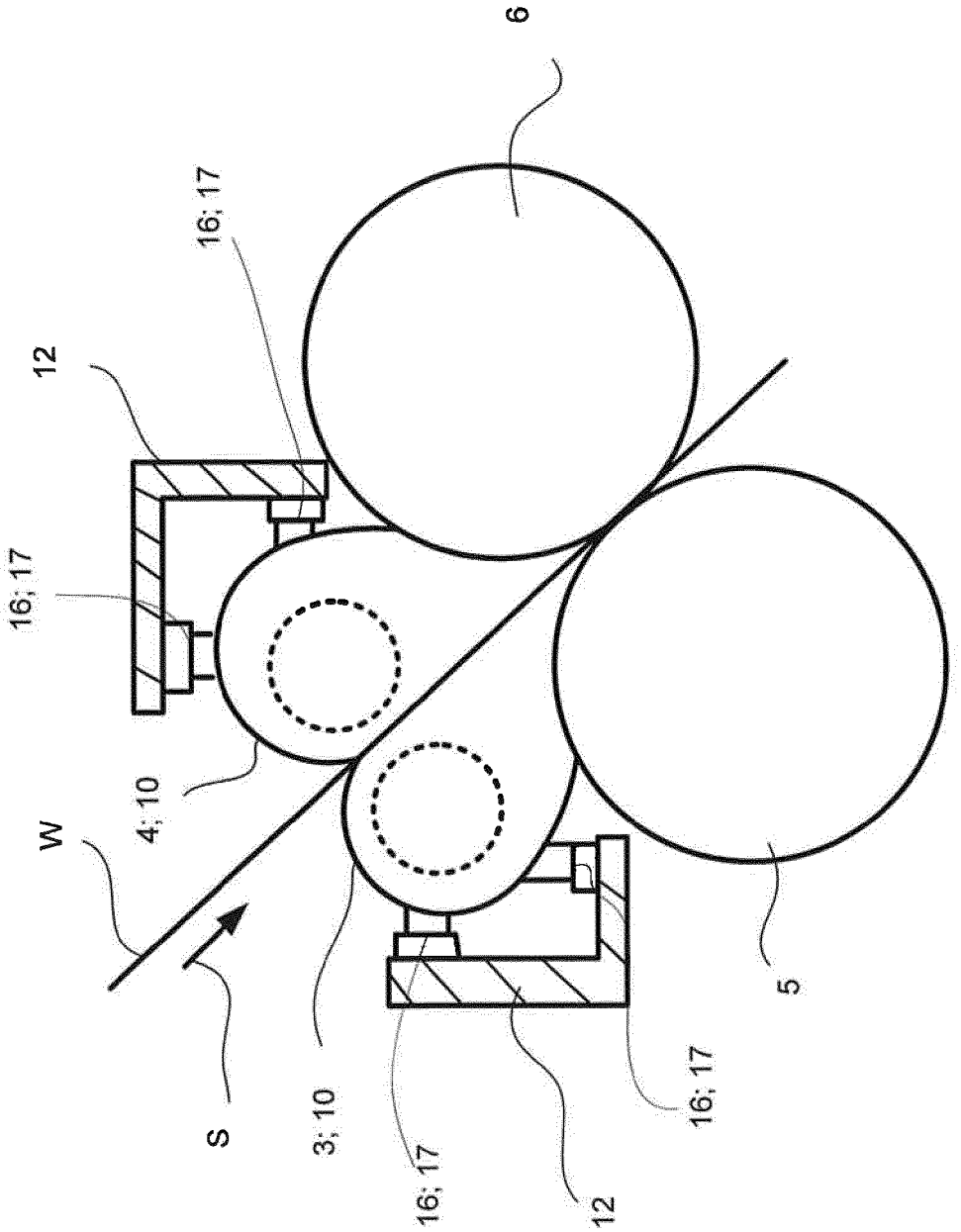


Fig. 3

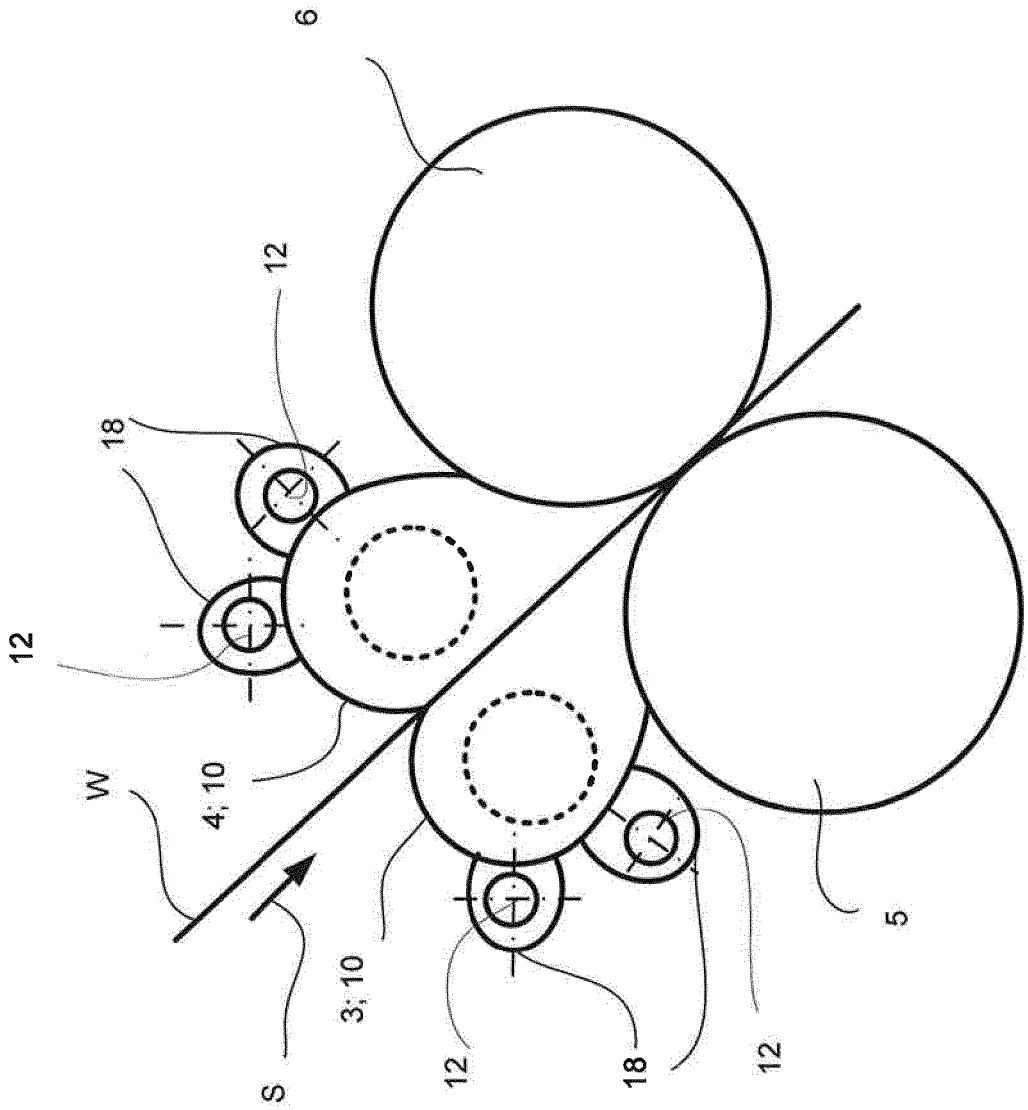


Fig. 4

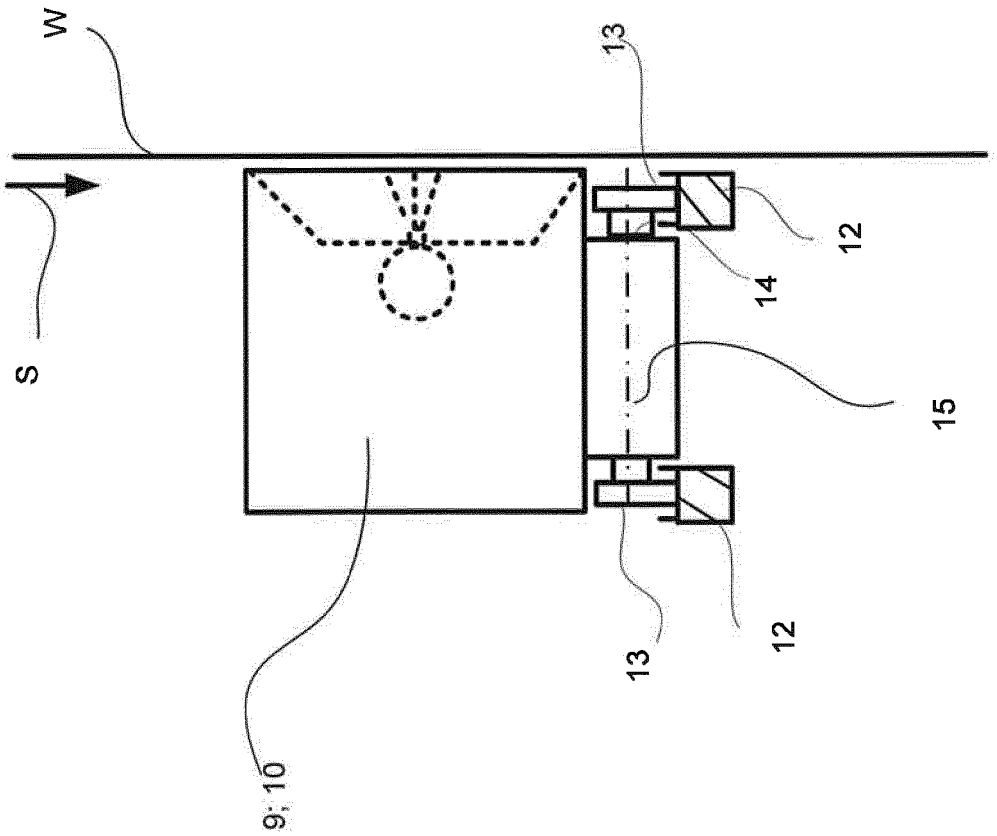


Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 13 16 1316

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 May 2013	Naeslund, Per

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