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(54) **Method in reeling of fiber webs and a reel-up**

Verfahren zum Aufrollen von Bahnen aus Fasermaterial und Aufroller

Procédé pour enrouler des rouleaux de matériau fibreux et enrouleuse

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Description

[0001] In general present invention relates to reeling of fiber webs in a fiber web machine. More especially the present invention relates to a method in reeling according to preamble part of claim 1. The invention relates also to a reel-up according to preamble part of claim 6. As known, fiber webs, such as paper or board webs, are manufactured in machines together forming a fiber web manufacturing line, which may be hundreds of meters long. Modern paper machines may produce more than 450,000 tons of paper per year. The speed of a paper machine may exceed 2000 m/min and the width of a paper web may be more than 11 meters.

[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 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.

[0003] In fiber web manufacturing lines, manufacturing operates as a continuous process. The finished fiber web being output from the machine is wound with a reel-up around a reeling shaft, i.e. a reel spool, into a machine roll (parent roll), the diameter of which may be more than 5 meters and which may weigh more than 160 tons. The purpose of the winding is to transfer the fiber web from its planar manufacturing form into a form in which it can be handled more easily. At the reel-up, which is located in the main machine line, the continuous process of the machine is interrupted for the first time, after which the process continues in stages. Every attempt is made to interlink these stages as smoothly as possible so that the work already performed would not be wasted.

[0004] In the reel-up the machine reel (parent roll) is formed around the reeling shaft operating as the reeling core i.e. the fibrous web being on one machine reel has a start and an end. The trend in the field is a continuous increase in the size of machine reels, which causes an on-going development requirement for reel-ups. The dimensioning of the reeling shaft specifies the maximum size of the machine reel in practice. However, as we are concerned with a dynamic environment and the fibre web is reelable material sensitive to various faults, the task performed by the reel-up as the maintainer of the efficiency of the paper or board machine is very considerable. A reason behind the continuous increase in the size of machine reels is the desire to obtain fewer starts and ends in the production of the fibrous web, which impedes or disturb the production and decrease the efficiency.

[0005] From the reel-up the parent rolls with desired diameter are transferred to next processing unit in inline processes to unwinding section of a slitter-winder or to a offline processing unit for example to a calender or to a coating part in which the parent roll is unwound. In some cases the parent roll needs to be turned around its longitudinal axis in horizontal level such that the parent roll has right rotational direction for unwinding. For this a crane, a transfer cart or corresponding device with the possibility of turning the parent roll around its axis in horizontal level is needed.

[0006] These devices implemented in the prior art are often complex, inflexible and expensive. For example, it is difficult to make paths and room for rotating the machine reel when using machine reel transfer carriages. Sometimes the transfer rails need modifications and transfer and conveyance routes of cranes need to be adjusted to changing needs. The devices require expensive concrete and steel beam structures implemented according to the full machine reel in order to hold up lifting devices, such as cranes. The crane capacity may be reserved, in which case the crane may not be able to respond to rotating needs at a short notice.

[0007] In EP 1659080 is disclosed a method in reeling of fiber webs, in which the web is reeled by a reeling cylinder of a reel-up into a parent roll around a reeling shaft by means of a reeling nip formed between the reeling cylinder and the parent roll to be wound around the reeling shaft and in the method the reeling draw is chosen between at least two alternatives of threading routes around the reeling cylinder according to the need of rotational direction of further processing of the parent roll to be reeled. In EP 0994058 and in DE 4213712 corresponding known methods are disclosed.

[0008] In EP 1433730 is disclosed reel-up for reeling of fiber webs, which reel-up comprises a reeling cylinder, a reeling nip formed between the reeling cylinder and parent roll to be wound around a reeling shaft, a roll preceding the reeling cylinder and the reeling cylinder and the roll preceding the reeling cylinder comprise means for changing their direction of rotation and that the reel-up further comprises at least two draws, one upper draw and one lower draw, for directing the fiber web in the reel-up.

[0009] One object of the present invention is to solve at least part of the disadvantages and problems relating to methods and devices according to prior art.

[0010] One object of the present invention is to provide a new possibility of changing the rotational direction of a parent roll.

[0011] To achieve the objects mentioned above and later the method according to the invention is mainly characterized by the features of the characterizing part of claim 1.

[0012] The reel-up according to the invention is mainly characterized by the features of the characterizing part of claim 6. According to the invention two alternatives of reeling draws i.e. two alternatives of threading routes around the reeling cylinder and reeling around the reeling shaft onto the reeling shaft are arranged in connection with the reel-up such that the direction of rotation of the

parent roll can be changed already in the reel-up when needed for further needs of the manufacturing process steps. Two threading routes are arranged such that the side of the reeling can be changed by first cutting the web and then guiding the web along the other route to be reeled around the reeling shaft. The two alternative draws comprise at least a draw above the reeling cylinder and a draw below the reeling cylinder.

[0013] Advantageously in the reel-up according to the invention the reeling cylinder and the guide or spreading roll preceding the reeling cylinder have means for changing their direction of rotation.

[0014] According to an advantageous feature of the invention the reel-up comprises at least one, advantageously two doctoring devices either mechanical doctors or air doctors in connection with the reeling cylinder when threading is done in running speed. In cases when the threading is done in crawling speed for example in connection with reel-ups for off-line coaters or for off-line calenders doctoring device is not necessary. According to an advantageous feature the reel-up further comprises at least one blow device for guiding the web end.

[0015] According to an advantageous feature two turn-up devices are also arranged in connection with the reel-up. These turn-up devices may be based on same or on different turn-up principle such as water jet, blade or goose neck turn-up devices. According to another advantageous feature in connection with the reel-up one, advantageously movable, turn-up device is arranged. This turn-up device is for example a water jet, a blade or a goose neck turn-up device.

[0016] According to a further advantageous feature the reel-up comprises a movable pulper cover and / or a movable guide plate for directing the web to pulper from each direction depending on the reeling draw and the threading route.

[0017] According to a further feature when a reeling cylinder with grooves are used the grooves are designed to provide for rotating in both directions. In cases where a reeling cylinder that has low-gradient spiral grooves originating from the middle of the drum is used the reeling cylinder can be turned in cross direction.

[0018] The invention provides for a reel-up in which the parent roll does not need to be turned around its longitudinal axis during the following process stages if different sidedness parent roll is needed due to the possibility of reeling parent rolls with different sidedness as the side of the reeling is accomplished by cutting the web in reeling and then the draw of the reel-up that provides for desired sidedness.

[0019] The reel-up according to the invention applicable both to new builds of reel-ups and rebuilds of reel-ups. The reel-up according to the invention is applicable in all position of reel-ups in a fiber manufacturing line.

[0020] In the following the invention is discussed in more detail by reference to figures of accompanying drawing.

Figures 1A - 1B show schematically example arrangements for threading alternatives in accordance of an advantageous embodiment of the invention.

Figures 2A - 2B show schematically example arrangements for turn-up alternatives in accordance of an advantageous embodiment of the invention.

Figures 3A - 3B show schematically another example arrangement for turn-up alternatives in accordance of another advantageous embodiment of the invention.

Figures 4A - 4B show schematically a further example arrangement for turn-up alternatives in accordance of a further advantageous embodiment of the invention.

[0021] 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.

[0022] In figures a reel-up 10 is schematically shown. In the reel-up full width fiber web coming from the previous processing step for example from a drying section of a fiber web machine is reeled around a reeling shaft 11 to a parent roll12 by means of a reeling nip between the roll to be formed around the reeling shaft and a reeling cylinder 15. The fiber web W is directed to the reel-up 10 from a spreading roll 16. In the figures rotating directions of reeling cylinder 15, reeling shaft 11 and spreading roll 16 are indicated by arrows in the respective figure element.

[0023] In figure 1A is schematically show the reel-up with typical upper draw in threading stage in which beginning end of fiber web W is directed to the reel-up 10 from the spreading roll 16. From previous guiding roll (not shown) the end of the fiber web W is directed underneath the spreading roll 11 which is rotating clockwise as indicated by the arrow. The path of the end of the web is then directed upwards onto the reeling cylinder 15 such that the end of the web travels on the top surface of the reeling cylinder 15 which is rotating counterclockwise as indicated by the arrow. On the reeling cylinder 15 the end of the web W follows the surface of the reeling cylinder and is then travelling downwards. In order to make the web end turn around the reeling shaft 11 the travel of the end of the web W is turned by means of a turn-up device and by means of a doctoring device 18 that can be either a mechanical doctor or an air doctor the beginning end of the web is guided into the pulper. The pulper shield or pulper guide plate 17 is moved such that it is inclined towards the coming direction of the web and directing the web end to the pulper (not shown) when needed i.e. typically until the point of the web with desired grade is reached to be reeled to a parent roll 12. The end of the

web W is then reeled around the reeling shaft 11 which rotates clockwise and the reeling is begun and reeling continues as long as the desired diameter of the parent roll 12 is reached. When the parent roll 12 has reached the desired diameter a turn-up (explained in more detail in connection with figure 2A) is carried out and reeling of a new parent roll is begun. The parent roll 12 with desired diameter has been moved to a waiting position for transfer to the next process step.

[0024] In figure 1B is schematically show the reel-up with a lower draw in threading stage in which beginning end of fiber web W is directed to the reel-up 10 from the spreading roll 16. From previous guiding roll (not shown) the end of the fiber web W is directed over the spreading roll 11 which is rotating counterclockwise as indicated by the arrow. The path of the end of the web is then directed downwards to the reeling cylinder 15 such that the end of the web travels on the bottom surface of the reeling cylinder 15 which is rotating clockwise as indicated by the arrow. On the reeling cylinder 15 the end of the web W follows the surface of the reeling cylinder and is then travelling upwards. The end of the web W is guided onto the reeling shaft by the turn-up device and in some cases a blow device 19 helps to make the web end turn around the reeling shaft 11 as the travel of the end of the web W is turned by means of the blow device 19. The pulper shield or pulper guide plate 17 is moved such that it is inclined towards the going direction of the web and directing the web end WT to the pulper (not shown) when needed i.e. typically until the point of the web with desired grade is reached to be reeled to a parent roll 12. The end of the web W is then reeled around the reeling shaft 11 which rotates counterclockwise and the reeling is begun and reeling continues as long as the desired diameter of the parent roll 12 is reached. When the parent roll 12 has reached the desired diameter a turn-up (explained in more detail in connection with figure 2A) is carried out and reeling of a new parent roll is begun. The parent roll 12 with desired diameter has been moved to a waiting position for transfer to the next process step.

[0025] As shown in figures 1A - 1B the reel-up 10 is provided with two possibilities for threading and reeling, one called upper draw in which the end of the web W is directed around the top surface of the reeling cylinder 15 and one called lower draw in which the web end WT is directed around the lower surface of the reeling cylinder 15. In the reel-up the reeling cylinder 15 and the spreading roll 16 are provided with means for changing the rotation direction for each alternative. In the method the web W is directed to the upper draw by first guiding the web below the roll 16 preceding the reeling cylinder 15 and then around the upper surface of the reeling cylinder 15 to the reeling nip and around the reeling shaft 11. In the method the web W is directed to the lower draw by first guiding the web above the roll 16 preceding the reeling cylinder 15 and then around the lower surface of the reeling cylinder 15 to the reeling nip and around the reeling shaft 11.

[0026] In an advantageous embodiment the reel-up 10 has a doctoring device 18 for directing the end of the web W into the pulper in connection with the upper draw (fig. 1A) and a blow device 19 for directing the web end WT into the pulper by air blows indicated by arrows in connection with the lower draw. By a mechanical doctoring device 18 also the surface of the reeling cylinder 15 can be cleaned during the actual reeling when utilizing the upper draw. In cases a touching mechanical doctoring device 18 is used it is provided by means for moving it to a non-touching posit-ing if the lower draw is utilized. Both the doctoring device 18 and the blow device have control means for controlling their operation. The pulper guide plate or pulper shield 17 is movable for changing the inclination angle for each alternative as shown in figures.

[0027] In figure 2A the reel-up 10 is shown when the upper draw is utilized in the turn-up stage in which the reeling of a parent roll 14 has reached the stage in which the diameter of the parent roll 14 is desired and the reeling will be stopped around this parent roll and changed to be around the next reeling shaft 11. The turn-up device 21 is located above the travel of the web and it has means for cutting the web for example mechanical cutting means or water jet cutting means. The web W is cut and the end of the cut web W is directed around the finished parent roll 14 with desired diameter and the beginning end of the cut web W is directed around the new reeling shaft 11 that has been moved from the reeling shaft storage or waiting position to be in contact with the reeling cylinder 15 to the beginning position of the reeling as shown in the figure 2A. The reeling is begun with the reeling shaft in this change position and as the reeling progresses the reeling shaft is lowered to the reeling position.

[0028] In figure 2B the reel-up 10 is shown when the lower draw is utilized in the turn-up stage in which the reeling of a parent roll 14 has reached the stage in which the diameter of the parent roll 14 is desired and the reeling will be stopped around this parent roll and changed to be around the next reeling shaft 11. The turn-up device 22 is located below the travel of the web W and it has means for cutting the web for example mechanical cutting means or water jet cutting means. The web W is cut and the end of the cut web W is directed around the finished parent roll 14 with desired diameter and the beginning end of the cut web W is directed around the new reeling shaft 11 that has been moved from the reeling shaft storage or waiting position to be in contact with the reeling cylinder 15 to the beginning position of the reeling as shown in the figure 2A. The reeling is begun with the reeling shaft in this change position and as the reeling progresses the reeling shaft is lowered to the reeling position.

[0029] In an advantageous example the turn-up devices 21,22 are water jet turn-up devices that cut the web such that the beginning end of the web has the form of a wedge and the pick-up is carried out with help of adhesive agent for example by means of glue or tape. Turn-up devices 21, 22 can be located such that the cutting is

carried out on the reeling cylinder 15 or such that the cutting is carried out at web travel before the reeling cylinder 15. For guiding the new end of the web around the reeling cylinder 15 the reeling cylinder can be provided by moisturizing means and / or by a suction zone. The reel-up 10 can also be provided with means for attaching the end of the web to the surface of the parent roll 14.

[0030] In figures 3A - 3B schematically shown example corresponds to the example of figures 2A - 2B with the exemption that the reel-up type is different and corresponding parts are marked with corresponding reference signs. In this example new reeling shaft 11 is brought to the reel-up and onto connection with the reeling cylinder 15 from below the reeling cylinder. In this example the web W is reeled by a reeling cylinder 15 of a reel-up 10 into a parent roll 12, 14 around a reeling shaft 11 by means of a reeling nip formed between the reeling cylinder 15 and the parent roll 14 to be wound around the reeling shaft 11 . Reeling draw is chosen between two alternatives of threading routes around the reeling cylinder 15 according to the need of rotational direction of further processing of the parent roll 12, 14 to be reeled such that the web W is directed to one of at least two threading routes. The web W is directed to the upper draw, figure 3A, by first guiding the web around the upper surface of the reeling cylinder 15 to the reeling nip and around the reeling shaft 11. As shown in figure 3B the web W is directed to the lower draw by first guiding the web around the lower surface of the reeling cylinder 15 to the reeling nip and around the reeling shaft 11.

[0031] In figures 4A - 4B schematically shown example corresponds to the examples of figures 2A - 2B and 3A - 3B with the exemption that the reel-up type is different and corresponding parts are marked with corresponding reference signs. In this reel-up type during reeling as the reeling progress the reeling cylinder 15 is located below the horizontal level of the rolls to be formed 11, 12, and 14. The roll to be formed moves over the reeling cylinder in horizontal lever during the reeling and the reeling cylinder 15 is provided with means for moving it in essentially vertical or inclined direction. In this example the web W is reeled by a reeling cylinder 15 of a reel-up 10 into a parent roll 12, 14 around a reeling shaft 11 by means of a reeling nip formed between the reeling cylinder 15 and the parent roll 14 to be wound around the reeling shaft 11 . Reeling draw is chosen between two alternatives of threading routes around the reeling cylinder 15 according to the need of rotational direction of further processing of the parent roll 12, 14 to be reeled such that the web W is directed to one of at least two threading routes. The web W is directed to the upper draw, figure 3A, by first guiding the web around the upper surface of the reeling cylinder 15 to the reeling nip and around the reeling shaft 11. As shown in figure 3B the web W is directed to the lower draw by first guiding the web around the lower surface of the reeling cylinder 15 to the reeling nip and around the reeling shaft 11.

[0032] Above some preferred embodiments and examples of the invention have been described but many modifications are possible to those presented.

Claims

1. Method in reeling of fiber webs, in which method the web is reeled by a reeling cylinder (15) of a reel-up (10) into a parent roll (12, 14) around a reeling shaft (11) by means of a reeling nip formed between the reeling cylinder (15) and the parent roll (14) to be wound around the reeling shaft (11) and in which method the reeling draw is chosen between at least two alternatives of threading routes around the reeling cylinder (15) according to the need of rotational direction of further processing of the parent roll (12, 14) to be reeled such that the web (W) is cut and directed to one of at least two threading routes, to upper draw above the reeling cylinder (15) or to lower draw below the reeling cylinder (15)
characterized in that in the method the turn-up for changing the reeling of a parent roll to the next parent roll is carried out by turn-up devices provided one for each draw.

2. Method according to claim 1 **characterized in, that** in the method the web (W) is directed to the upper draw by first guiding the web around the upper surface of the reeling cylinder (15) to the reeling nip and around the reeling shaft (11).

3. Method according to claim 1 **characterized in that** in the method the web (W) is directed to the lower draw by first guiding the web around the lower surface of the reeling cylinder (15) to the reeling nip and around the reeling shaft (11).

4. Method according to any of the preceding claims, **characterized in that** in the method the beginning end of the web is guided into the pulper by means of a doctoring device and / or by means of a blow device.

5. Method according to any of the preceding claims, **characterized in that** in the method the turn-up is carried out by at least one water jet turn-up device.

6. Reel-up for reeling of fiber webs, which reel-up (10) comprises a reeling cylinder (15), a reeling nip formed between the reeling cylinder (15) and parent roll (14) to be wound around a reeling shaft (11), a roll (16) preceding the reeling cylinder (15) and in the reel-up (10) the reeling cylinder (15) and the roll (16) preceding the reeling cylinder (16) comprise means for changing their direction of rotation and that the reel-up further comprises at least two draws, one upper draw and one lower draw, for directing the fiber web (W) in the reel-up, **characterized in**

that, the reel-up (10) further comprises two turn-up devices (21, 22), which are arranged in connection with the draws of the reel-up.

7. Reel-up according to claim 6, **characterized in that**, in the reel-up (10) at least one of the turn-up devices (21, 22) is a water jet turn-up device.

8. Reel-up according to claim 6, **characterized in that**, the reel-up (10) further comprises a movable pulper cover and / or a movable guide plate (17) for directing the web to pulper from each direction depending on the reeling draw.

9. Reel-up according to claim 6, **characterized in that**, the reel-up (10) further comprises at least one doctoring device (18) and/or at least one blow up device (19).

10. Reel-up according to claim 6, **characterized in that**, the reel-up (10) is used as a new build reel-up.

11. Reel-up according to claim 6, **characterized in that**, the reel-up (10) is used as a rebuild reel-up.

Patentansprüche

1. Verfahren zum Aufwickeln von Faserbahnen, wobei in dem Verfahren die Bahn mittels eines Wickelzylinders (15) eines Aufwicklers (10) in einen Tambour (12,14) um eine Wickelwelle (11) mittels eines Wickelspalts gewickelt wird, der zwischen dem Wickelzylinder (15) und dem um die Wickelwelle (11) zu wickelnde Tambour (14) gebildet wird, und wobei in dem Verfahren der Wickelzug gemäß der Notwendigkeit der Rotationsrichtung der weiteren Verarbeitung des aufzuwickelnden Tambours (12,14) zwischen wenigstens zwei Alternativen von Aufführrouten um den Wickelzylinder (15) derart gewählt wird, dass die Bahn (W) geschnitten und in wenigstens eine der zwei Aufführrouten gelenkt wird, und zwar zu einem oberen Zug oberhalb des Wickelzylinders (15) oder zu einem unteren Zug unterhalb des Wickelzylinders (15),
dadurch gekennzeichnet, dass
in dem Verfahren das Umschlagen zum Wechselns des Aufwickelns von einem Tambour zu dem nächsten Tambour mittels Umschlageinrichtungen durchgeführt wird, von denen für jeden Zug eine vorgesehen ist.

2. Verfahren nach Anspruch 1,
dadurch gekennzeichnet, dass
in dem Verfahren die Bahn (W) dadurch zu dem oberen Zug gerichtet wird, dass zuerst die Bahn um die obere Oberfläche des Wickelzylinders (15) zu dem Wickelspalt und um die Wickelwelle (11) geleitet wird.

3. Verfahren nach Anspruch 1,
dadurch gekennzeichnet, dass
in dem Verfahren die Bahn (W) dadurch zu dem unteren Zug gerichtet wird, dass zuerst die Bahn um die untere Oberfläche des Wickelzylinders (15) zu dem Wickelspalt und um die Wickelwelle (11) geleitet wird.

4. Verfahren nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass
in dem Verfahren das Anfangsende der Bahn mittels einer Schabereinrichtung und/oder mittels einer Blaseinrichtung in den Pulper geleitet wird.

5. Verfahren nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass
in dem Verfahren das Umschlagen mittels wenigstens einer Wasserstrahlumschlageinrichtung durchgeführt wird.

6. Aufwickler zum Aufwickeln von Faserbahnen, wobei der Aufwickler (10) einen Wickelzylinder (15), einen zwischen dem Wickelzylinder (15) und einer um eine Wickelwelle (11) zu wickelnden Tambour (14) gebildeten Wickelspalt, eine vor dem Wickelzylinder (15) angeordnete Rolle (16) aufweist, wobei in dem Aufwickler (10) der Wickelzylinder (15) und die Rolle (16), die vor dem Wickelzylinder (15) angeordnet ist, eine Einrichtung zum Ändern der Rotationsrichtung aufweist, und wobei der Aufwickler des Weiteren wenigstens zwei Züge, und zwar einen oberen Zug und einen unteren Zug, zum Leiten der Faserbahn (W) in dem Aufwickler aufweist,
dadurch gekennzeichnet, dass
der Aufwickler (10) des Weiteren zwei Umschlageeinrichtungen (21,22) aufweist, die in Verbindung mit den Zügen des Aufwicklers angeordnet sind.

7. Aufwickler nach Anspruch 6,
dadurch gekennzeichnet, dass
in dem Aufwickler wenigstens eine der Umschlageeinrichtungen (21,22) eine Wasserstrahlumschlageeinrichtung ist.

8. Aufwickler nach Anspruch 6,
dadurch gekennzeichnet, dass
der Aufwickler (10) des Weiteren eine bewegliche Pulperabdeckung und/oder eine bewegliche Führungsplatte (17) zum Lenken der Bahn zu dem Pulper von jeder Richtung abhängig von dem Wickelzug aufweist.

9. Aufwickler nach Anspruch 6,
dadurch gekennzeichnet, dass

der Aufwickler (10) des Weiteren wenigstens eine Schabereinrichtung (18) und/oder wenigstens eine Blaseinrichtung (19) aufweist.

10. Aufwickler nach Anspruch 6,
dadurch gekennzeichnet, dass
der Aufwickler (10) als ein neu gebauter Aufwickler verwendet wird.

11. Aufwickler nach Anspruch 6,
dadurch gekennzeichnet, dass
der Aufwickler (10) als ein wiederhergestellter Aufwickler verwendet wird.

Revendications

1. Procédé d'enroulement de rouleaux de matériaux fibreux, dans lequel procédé le rouleau de matériau est enroulé à l'aide d'un cylindre d'enroulement (15) d'une enrouleuse (10) à l'intérieur d'un rouleau parent (12, 14) autour d'un arbre d'enroulement (11) au moyen d'une pince d'enroulement formée entre le cylindre d'enroulement (15) et le rouleau part (14) pour être embobiné autour de l'arbre d'enroulement (11) et dans lequel procédé le tirage d'enroulement est choisi entre au moins deux alternatives de voies d'enfilage autour du cylindre d'enroulement (15) selon le besoin d'une direction de rotation de traitement supplémentaire du rouleau parent (12, 14) à enrouler de sorte que le rouleau de matériau (W) soit coupé et dirigé vers au moins une des deux voies d'enfilage, vers le tirage supérieur au-dessus du cylindre d'enroulement (15) ouvert le tirage inférieur en dessous du cylindre d'enroulement (15)
caractérisé en ce que dans le procédé le retournement permettant de changer l'enroulement d'un rouleau parent vers le prochain rouleau parent est effectué au moyen de dispositifs de retournement fournis pour chaque tirage.

2. Procédé selon la revendication 1, **caractérisé en ce que** dans le procédé le rouleau de matériau (W) est dirigé vers le tirage supérieur premièrement en guidant le rouleau de matériau autour de la surface supérieure du cylindre d'enroulement (15) vers la pince d'enroulement et autour de l'arbre d'enroulement (11).

3. Procédé selon la revendication 1, **caractérisé en ce que** dans le procédé le rouleau de matériau (W) est dirigé vers le tirage inférieur premièrement en guidant le rouleau de matériau autour de la surface inférieure du cylindre d'enroulement (15) vers la pince d'enroulement et autour de l'arbre d'enroulement (11).

4. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** dans le procédé le début-fin du rouleau de matériau est guidé à l'intérieur du désintégrateur au moyen d'un dispositif de raclage et/ou au moyen d'un dispositif de gonflement.

5. Procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** dans le procédé le retournement est effectué par au moins un dispositif de retournement à jet d'eau.

6. Enrouleuse destinée à enrouler des rouleaux de matériau fibreux, laquelle enrouleuse (10) comprend un cylindre d'enroulement (15), une pince d'enroulement formée entre le cylindre d'enroulement (15) et le rouleau parent (14) pour être embobiné autour d'un arbre d'enroulement (11), un rouleau (16) précédant le cylindre d'enroulement (15) et dans l'enrouleuse (10) le cylindre d'enroulement (15) et le rouleau (16) précédant le cylindre d'enroulement (16) comprennent un moyen pour changer leur direction de rotation et que l'enrouleuse comprend en outre au moins deux tirages, un tirage supérieur et un tirage inférieur, pour diriger le rouleau de matériau fibreux (W) dans l'enrouleuse, **caractérisée en ce que**, l'enrouleuse (10) comprend en outre deux dispositifs de retournement (21, 22) qui sont agencés en connexion avec les tirages de l'enrouleuse.

7. Enrouleuse selon la revendication 6, **caractérisée en ce que**, dans l'enrouleuse (10) au moins un des dispositifs de retournement (21, 22) soit un dispositif de retournement à jet d'eau.

8. Enrouleuse selon la revendication 6, **caractérisée en ce que**, l'enrouleuse (10) comprend en outre un couvercle de désintégrateur mobile et/ou une plaque de guidage mobile (17) pour diriger le rouleau de matériau vers le désintégrateur à partir de chaque direction en fonction du tirage d'enroulement.

9. Enrouleuse selon la revendication 6, **caractérisée en ce que**, l'enrouleuse (10) comprend en outre au moins un dispositif de raclage (18) et/ou au moins un dispositif de gonflement (19).

10. Enrouleuse selon la revendication 6, **caractérisée en ce que**, l'enrouleuse (10) est utilisée en tant qu'enrouleuse neuve.

11. Enrouleuse selon la revendication 6, **caractérisée en ce que**, l'enrouleuse (10) est utilisée en tant qu'enrouleuse remise à neuf.

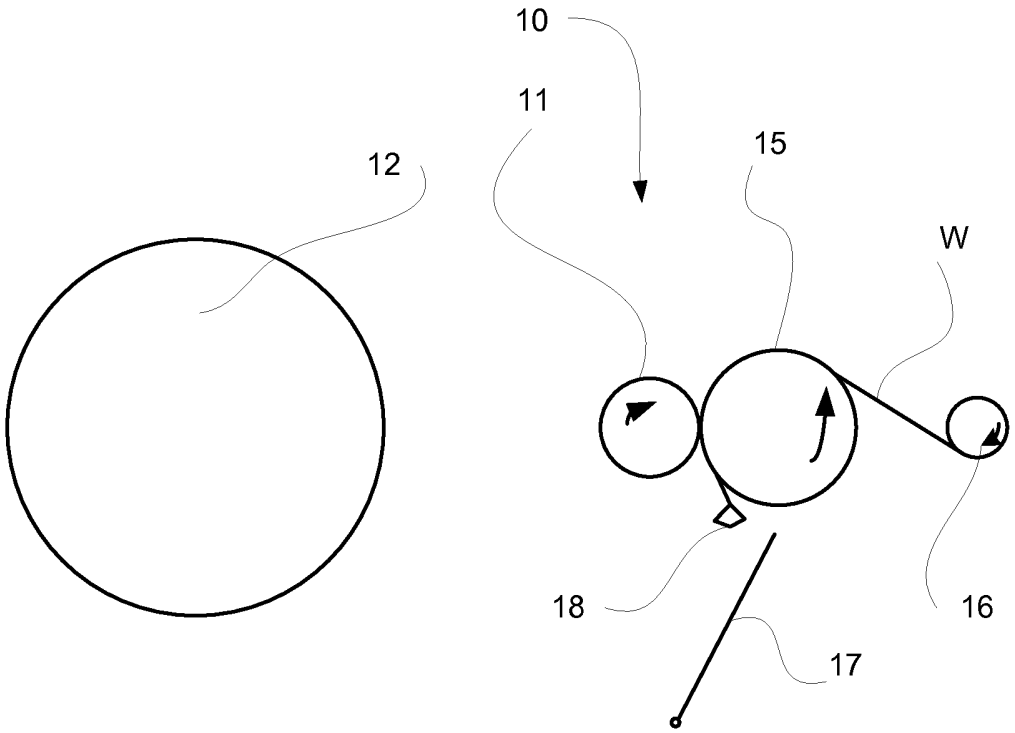


Fig. 1A

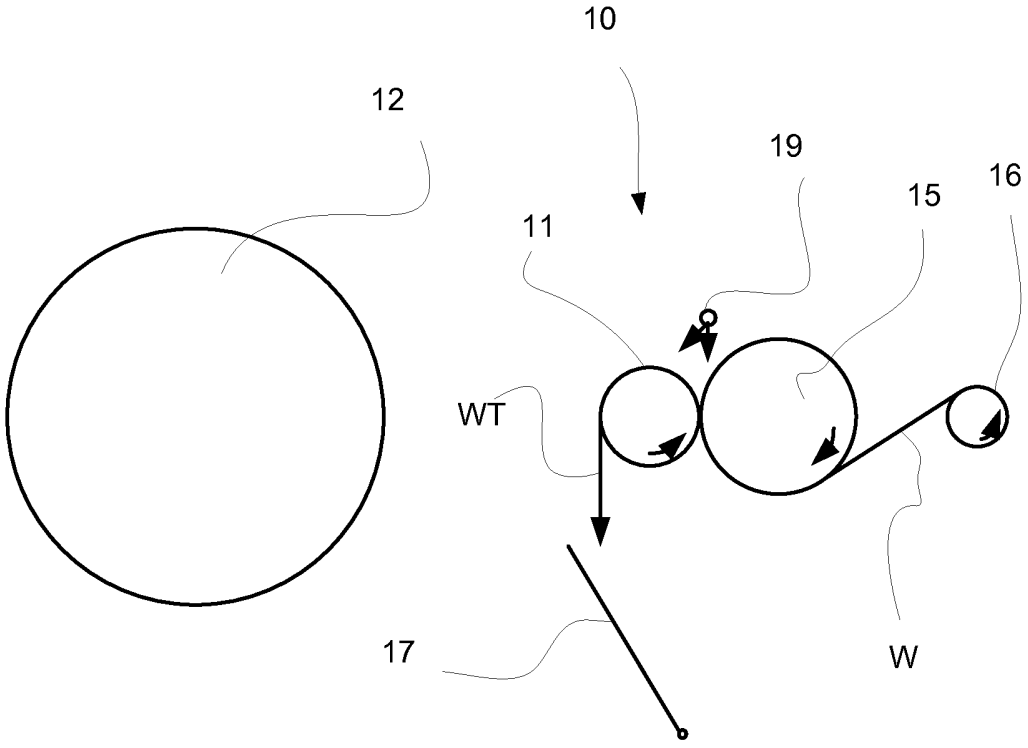


Fig. 1B

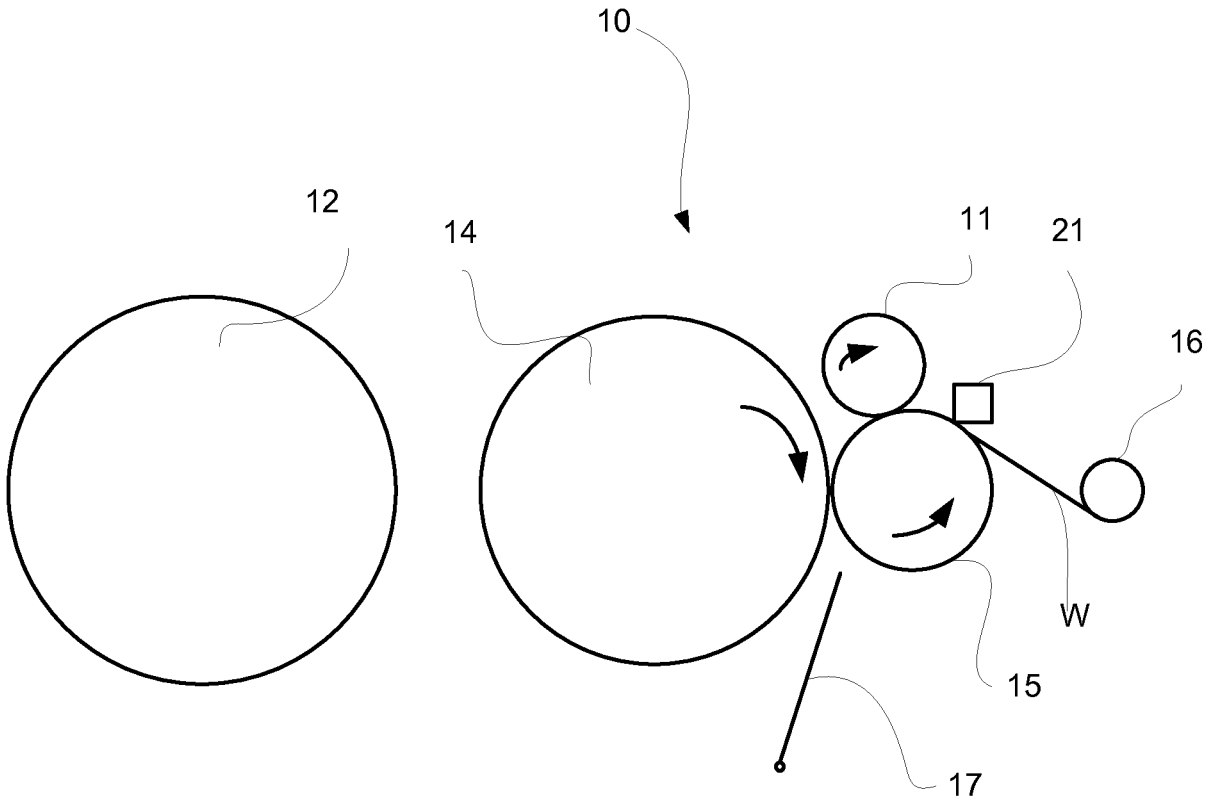


Fig. 2A

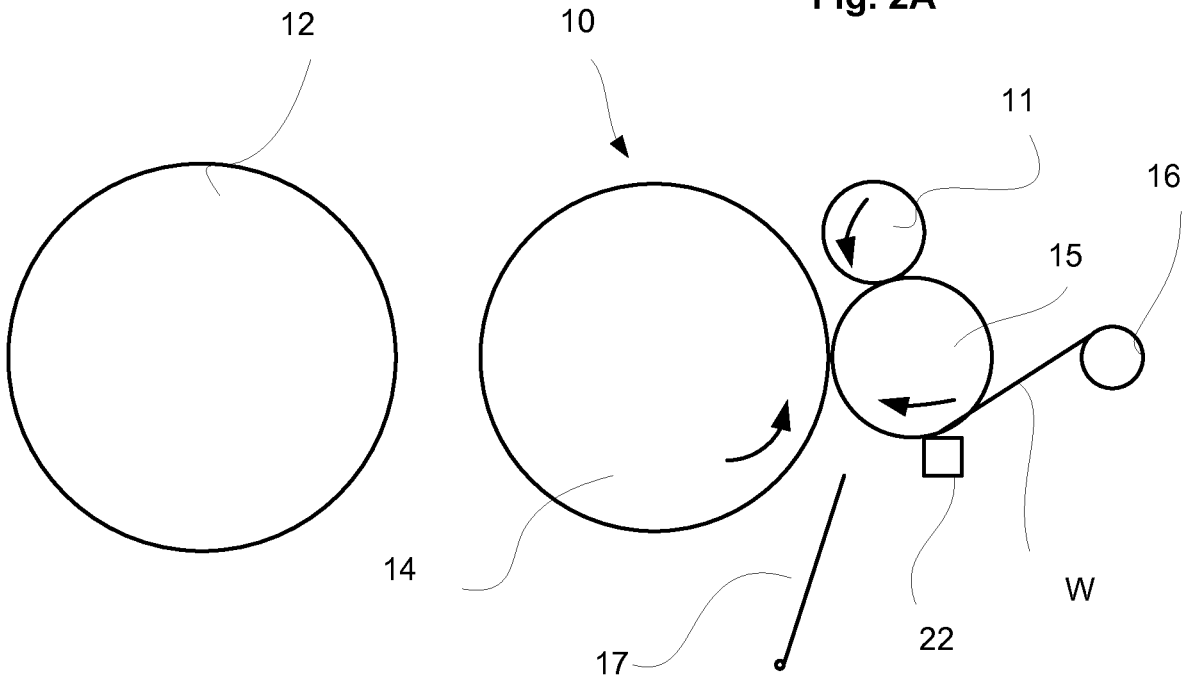


Fig. 2B

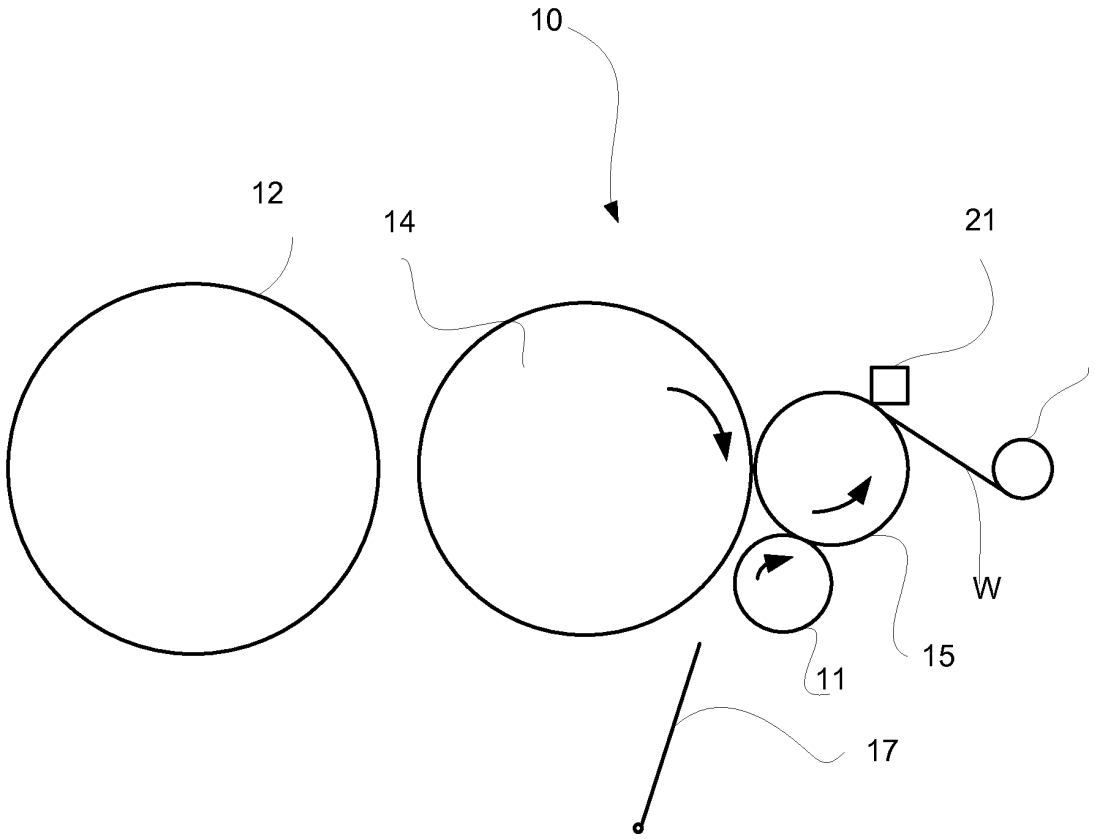


Fig. 3A

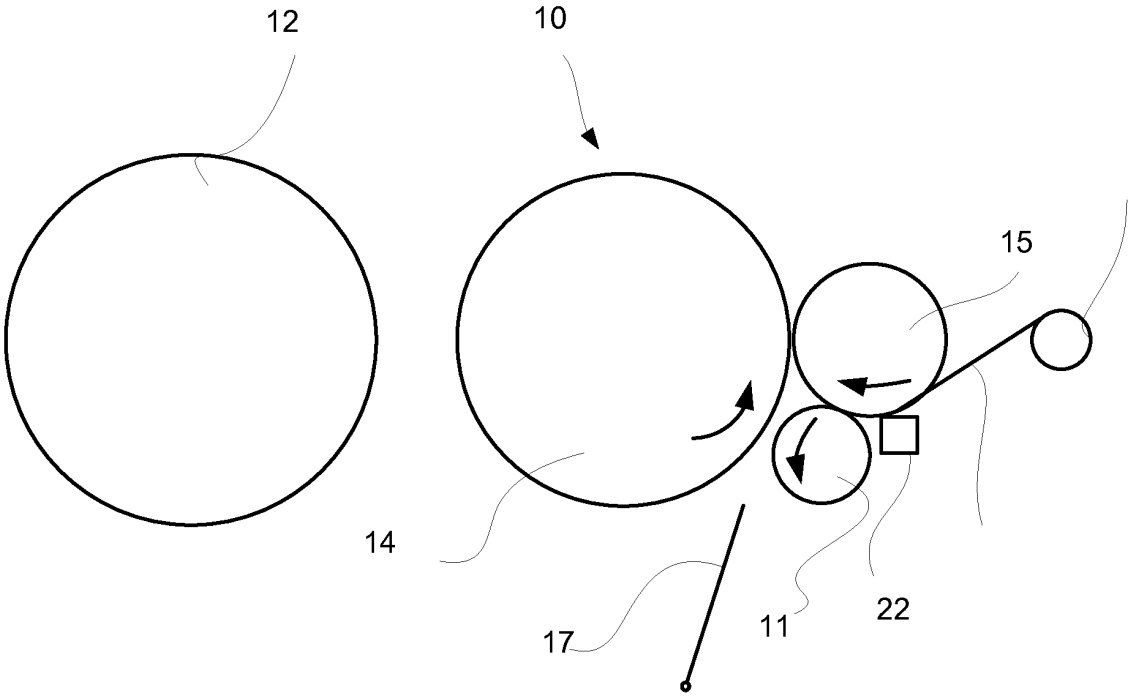


Fig. 3B

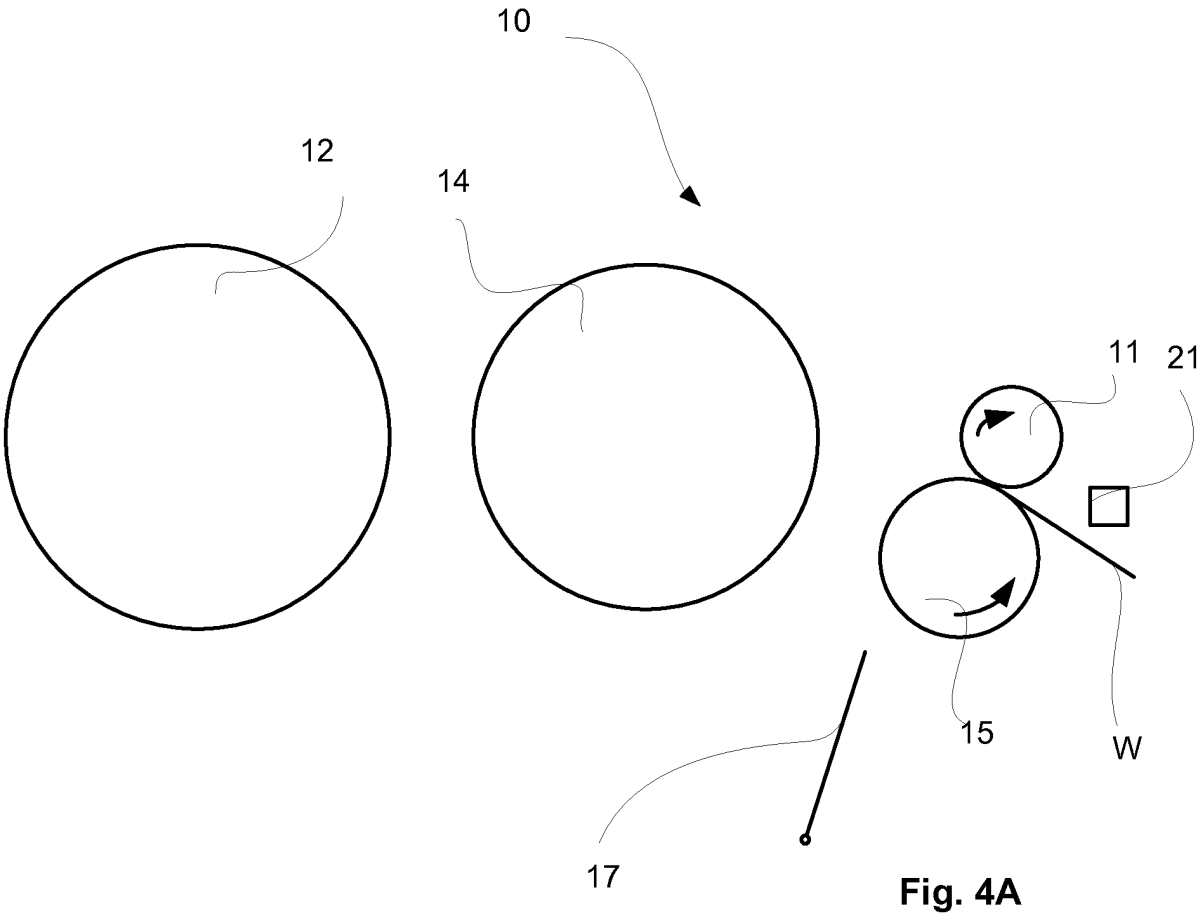


Fig. 4A

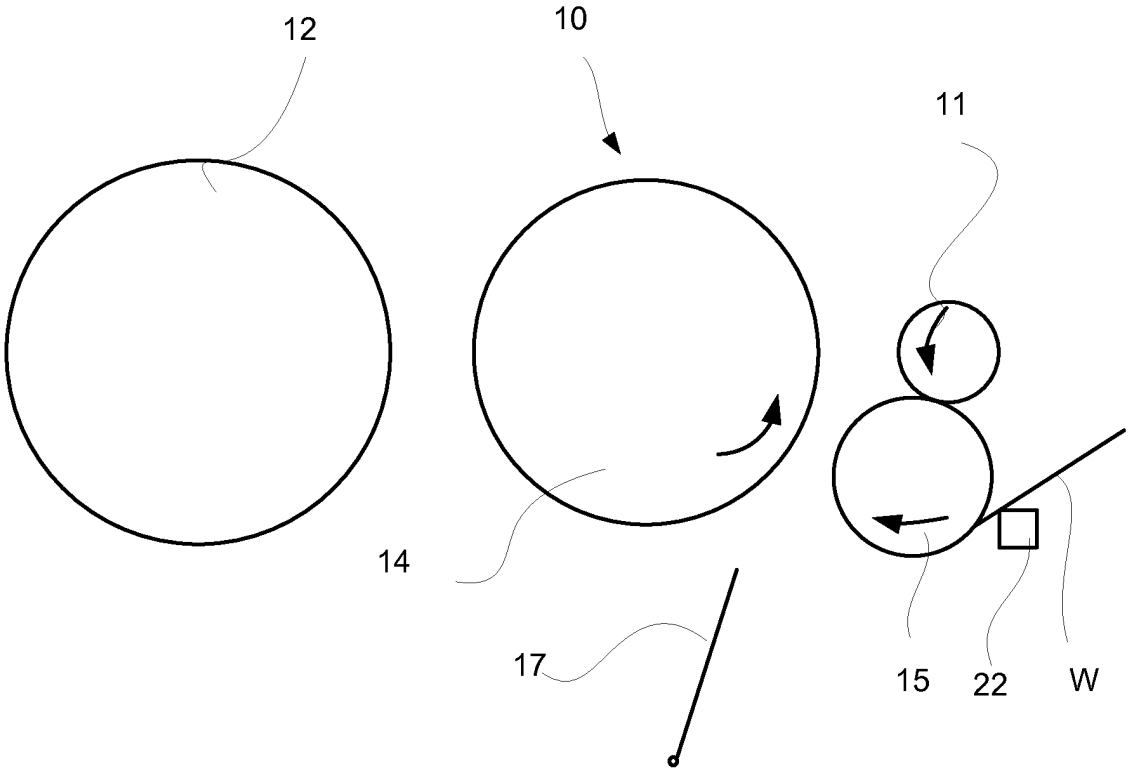


Fig. 4B

REFERENCES CITED IN THE DESCRIPTION

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