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(54) **UNWINDING SECTION AND A METHOD FOR REMOVING SLAB FIBER WEB FROM A REELING SHAFT**

(57) The invention relates to an unwinding section for unwinding a fiber web (W) from a parent roll (12) wound around a reeling shaft (10), which unwinding section (15) comprises two unwinding positions (I, II) consisting of a first unwinding position (I) and a second unwinding position (II), in which unwinding section (15) the unwinding of the parent roll (12) is configured to be begun at the first unwinding position (I) and in which unwinding section (15) towards end of the unwinding the parent roll (12) is configured to be transferred to the second unwinding position (II), which unwinding section (15) comprises a broke opening (26). The unwinding section (15) comprises a slabbing device (35) configured to operate in area of the first and second unwinding positions (I, II). The slabbing device (35) is configured to pick up a slab fiber web (RW) from a reject roll (13) formed of a fiber web remaining on the reeling shaft (10) after the unwinding of the parent roll (12) is finished in the second unwinding position (II) and the slabbing device (35) is configured to empty the slab fiber web (RW) through the broke opening (26). The invention also relates to a method for removing slab fiber web from a reeling shaft for removing slab fiber web from a reeling shaft (10) in an unwinding section (15) comprising two unwinding positions (I, II) consisting of a first unwinding position (I) and a second unwinding position (II) and comprising a broke opening (26), in which method in the unwinding section (15) the unwinding of the parent roll (12) is begun at the first unwinding position (I) and towards end of the unwinding the parent roll (12) is transferred to the second unwinding position (II). In the method the slab fiber web (RW) is removed by a slabbing device (35) operating in area of the first and second unwinding positions (I, II),

the slab fiber web (RW) from a reject roll (13) formed of a fiber web remaining on the reeling shaft (10) after the unwinding of the parent roll (12) is finished in the second unwinding position (II) is picked up by the slabbing device (35) and the slab fiber web (RW) is emptied from the slabbing device (35) through the broke opening (26).

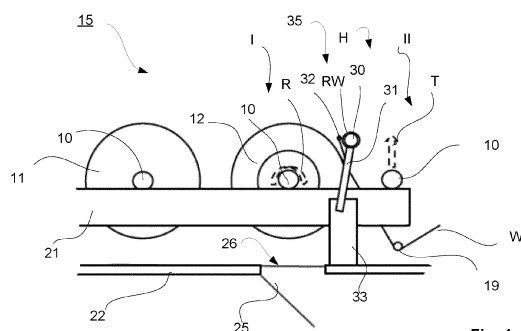


Fig. 1

Description

Technical field

[0001] The invention relates to an unwinding section for unwinding fiber webs. Especially the invention relates to an unwinding section according to the preamble part of the independent claim 1 and to a method for removing slab fiber web from a reeling shaft.

Background

[0002] It is known that a fiber web, e.g. paper and board, is manufactured in machines which together constitute a paper-manufacturing line which can be hundreds of meters long. Modern paper machines can produce over 450,000 tons of paper per year. The speed of the paper machine can exceed 2,000 m/min and the width of the paper web can be more than 11 meters.

[0003] As known from the prior art in fiber web producing lines typically comprise an assembly formed by a number of apparatuses arranged consecutively in the process line. A typical production and treatment line for fiber web 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 sections and devices for treatment and/or finishing the fiber web, for example a sizer, a coating device, a calender. The production and treatment line also typically comprises at least one slitter-winder for forming customer rolls as well as a roll packaging apparatus.

[0004] In fiber web production lines, the manufacture of the fiber web takes place as a continuous process. A fiber web completing in the fiber web machine is reeled by a reel-up around a reeling shaft i.e. a reel spool into a parent roll the diameter of which can be more than 5 meters and the weight more than 160 tons. The purpose of reeling is to modify the fiber web manufactured as planar to a more easily processable form. On the reel-up located in the main machine line, the continuous process of the fiber web machine breaks for the first time and shifts into periodic operation. Reel-ups are used in fiber web production for reeling the fiber web coming from the fiber web production line, and also from a coating machine, a calender or a corresponding finishing device.

[0005] The fiber web wound onto the parent roll is full-width so it must be slit in longitudinal direction into partial fiber webs with suitable width and the partial fiber webs are wound to partial fiber web rolls (customer rolls) of suitable length or of suitable diameter for the customers. The slitting and winding take place as known from prior art in an appropriate separate machine i.e. in a slitter-winder. As known from the prior art, in the slitter-winder the parent roll is unwound in an unwinding section, the full-width fiber web is slit on the slitting section into several narrower partial fiber webs which are wound up on the winding section around winding cores or around winding

shafts or around winding cores located on the shafts, 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.

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

[0007] In the unwinding sections of known fiber web production lines, the parent roll is typically conveyed to such unwinding stations, that are not connected to the paper machine with transfer rails, with a crane and lowered to transfer rails. In applications where the unwinding station is connected to the production line with transfer rails inline, the parent roll is transferred along the transfer rails from reel-up to the unwinding section. The transfer rails for full parent rolls typically comprise horizontal or inclined rails with stand-by stand positions. Along transfer rails, the parent roll is transferred from one stand-by position to another until the unwinding position in the unwinding section is reached. With horizontal transfer rails, the parent roll is transferred from one stand-by position to another by means of a transfer device, and with inclined transfer rails, by means of rolling based on gravity and stop and release mechanisms.

[0008] In patent publication FI 121007 B is disclosed an unwinding section comprising two unwinding positions, in which the unwinding of a full parent roll is first begun in a first unwinding position of the unwinding section and then transferring the partially unwound parent roll to a second unwinding position during unwinding in the unwinding section and the unwinding is finished in the second unwinding position. Often at least some unwound fiber web remains on the reeling shaft and a reject roll is formed. When the unwinding is finished in the second unwinding position the empty reeling shaft or the reject roll is transferred to a waiting position of the unwinding section. From the waiting position the empty reeling shafts are returned to the reel-up and the reject rolls to a slabbing station. Typically, an operator uses crane to move the reject roll to a separate slabbing station for emptying the reel spool bottom paper. The reject roll can also be emptied of the slab fiber web through a broke opening of the unwinding section. The reject roll is moved above the broke opening for emptying by the crane or by

transfer devices. The slab fiber web removed from the reject roll and emptied through the broke opening is typically directly or indirectly via a conveyor led to a pulper or to broke handling means. The reject roll is heavy due mainly to the weight of the reeling shaft and thus heavy transfer devices are needed. This type of reject roll emptying often also interferes with other operations of the unwinding section or the crane. Typically, in the separate slabbing station rotation devices and/or other slabbing devices and a pulper are needed for reel spool bottom emptying i.e. for emptying the reject roll to provide an empty reeling shaft to be reused in the reel-up. This slabbing station is usually located at one of the storage positions. Using it for spool emptying interferes the process between reel and winder.

[0009] Generally, a reeling shaft emptied as a result of unwinding is removed from the unwinding section either through manual lifting with a crane or automatically with a reeling shaft handling apparatus. The unwinding position can be followed by transfer rails, on which one or more empty or almost empty reeling shafts are at least temporarily stored before transferred to the next stage, for example to storage or to a reel-up. A reeling shaft handling apparatus may comprise either vertical lifting devices or rotatable lifting arms and return transfer rails for empty reeling shafts, located above the transfer rails for parent rolls, often also above the unwinding section or above the slitter-winder. An empty reeling shaft or nearly empty reeling shaft i.e. reject roll may be lifted with a lifting device or with lifting arms to return transfer rails, which normally have a number of return positions. In some cases, the empty reeling shaft or the reject roll is removed from the return transfer rails by lowering devices and moved with a crane or by a transfer cart.

[0010] To ensure a smooth continuity of the fiber web production and treatment, storage spaces are typically used for full parent rolls, partly filled parent rolls and/or empty reeling shafts and/or reject rolls. As known, such storage spaces at the finishing end of the fiber web manufacturing line are typically located in the main machine line between the main devices of the manufacturing process on transfer rails. Also, at least one rejecting location for the partially filled parent rolls or for the reject rolls for removing the bottom slab i.e. the slab fiber web into the pulper is needed in connection with the arrangements for handling parent rolls and reeling shafts can be arranged on transfer rails. One way to slab i.e. to empty the bottom-ends of parent rolls or partially filled machine rolls or reject rolls in the pulper, so called unwinding type slabbing, is to unwind the fiber web left on these rolls by an unwinder in a slabbing station.

[0011] An object of the invention is to create an unwinding section for fiber webs and a method for removing slab fiber web from a reeling shaft, in which disadvantages and problems of known methods and devices are eliminated or at least minimized.

[0012] A further object of the invention is to create an unwinding section for fiber webs and a method for re-

moving slab fiber web from a reeling shaft, in which the need of a separate slabbing station is eliminated or at least minimized.

[0013] A further object of the invention is to create an unwinding section for fiber webs and a method for removing slab fiber web from a reeling shaft, in which savings are achieved in operator work.

[0014] An object of the invention is to create an unwinding section for fiber webs and a method for removing slab fiber web from a reeling shaft in which the disadvantages of known systems and methods relating to safety risks relating to manual operations in slabbing are eliminated or at least minimized.

15 Summary

[0015] To achieve the above-mentioned objects and those which come out later, the unwinding section according to the invention is mainly characterized by what is presented in the characterizing part of claim 1. Advantageous features of the invention are defined in dependent claims.

[0016] According to the invention the unwinding section for unwinding a fiber web from a parent roll wound around a reeling shaft comprises two unwinding positions consisting of a first unwinding position and a second unwinding position, in which unwinding section the unwinding of the parent roll is configured to be begun at the first unwinding position and in which unwinding section towards end of the unwinding the parent roll is configured to be transferred to the second unwinding position, which unwinding section comprises a broke opening, wherein the unwinding section comprises a slabbing device configured to operate in area of the first and second unwinding positions, the slabbing device is configured to pick up a slab fiber web from a reject roll formed of a fiber web remaining on the reeling shaft after the unwinding of the parent roll is finished in the second unwinding position and the slabbing device is configured to empty the slab fiber web through the broke opening. Advantageously, the broke opening is located below the first unwinding position. Advantageously, the slabbing device is configured to empty the slab fiber web through the broke opening into a pulper or onto a conveyor.

[0017] According to an advantageous feature of the invention the slabbing device comprises a slabbing roll and transfer arms and the slabbing roll is rotatably attached from each end to the corresponding transfer arm. Advantageously, the slabbing roll is a suction roll. Advantageously, the transfer arms are turnable pivot arms.

[0018] According to an advantageous feature of the invention the slabbing device comprises a holder configured to hold the slab fiber web around the slabbing roll. Advantageously, the holder extends in cross-direction of the fiber web i.e. in the longitudinal direction of the slabbing roll.

[0019] According to an advantageous feature of the invention length or height level of the transfer arm is con-

figured to be such, that the parent roll during transfer from the first unwinding position to the second unwinding position has enough space to pass under the slabbing roll.

[0020] According to an advantageous feature of the invention the slabbing device has at least two positions: a pick-up position for picking up the slab fiber web from the reject roll and an emptying position located above the broke opening for emptying the slab fiber web through the broke opening.

[0021] According to an advantageous feature of the invention the slabbing device has three positions: the pick-up position located at the second unwinding position for picking up the slab fiber web from the reject roll, the emptying position located at the first unwinding position above the broke opening for emptying the slab fiber web through the broke opening and a home position for waiting to be moved to the pick-up position or to the emptying position.

[0022] According to an advantageous feature of the invention the unwinding section is an unwinding section of a slitter-winder.

[0023] According to the invention in the method for removing slab fiber web from a reeling shaft in an unwinding section comprising two unwinding positions consisting of a first unwinding position and a second unwinding position and comprising a broke opening, in which method in the unwinding section the unwinding of the parent roll is begun at the first unwinding position and towards end of the unwinding the parent roll is transferred to the second unwinding position, wherein the slab fiber web is removed by a slabbing device operating in area of the first and second unwinding positions, in the method the slab fiber web from a reject roll formed of a fiber web remaining on the reeling shaft after the unwinding of the parent roll is finished in the second unwinding position is picked up by the slabbing device and the slab fiber web is emptied from the slabbing device through the broke opening. Advantageously, the broke opening is located below the first unwinding position.

[0024] According to an advantageous feature of the invention the reject roll is emptied of the slab fiber web by the slabbing device after the unwinding of a parent roll is finished and while the reject roll is still in the unwinding section and located in the second unwinding position and the next parent roll is under unwinding in the first unwinding position.

[0025] According to an advantageous feature of the invention in the method a slabbing roll of the slabbing device is moved to a pick-up position by or on transfer arms of the slabbing device and the slabbing roll picks the slab fiber web from the reject roll around the reeling shaft and winds the slab fiber web up around itself by its rotating movement. Advantageously, the slabbing roll is a suction roll and picks up the slab fiber web from the reject roll by means of suction. Advantageously the transfer arms are pivot arms and the slabbing device is moved by turning the pivot arms.

[0026] According to an advantageous feature of the

invention the slabbing roll with the slab fiber web is moved by or on the transfer arms to a home position for waiting to be emptied.

[0027] According to an advantageous feature of the invention while the unwinding of the parent roll continues at the second unwinding position, the slabbing roll of the slabbing device is moved by or on the transfer arms to an emptying position located at an operating distance from the broke opening, advantageously above the broke opening and when the slabbing roll of the slabbing device is located in the emptying position the slab fiber web is unwound from the slabbing roll and dropped or guided through the broke opening.

[0028] According to an advantageous feature of the invention the slabbing roll is emptied of the slab fiber web the slabbing roll is returned to the home position by or on the transfer arms for waiting to perform the next slabbing operation.

[0029] According to an advantageous feature of the invention the slab fiber web is emptied from the slabbing device through the broke opening into a pulper or onto a conveyor.

[0030] According to an advantageous aspect of the invention the reject roll is emptied of the slab fiber web, while the reject roll is still in the unwinding section. When the invention is utilized in connection with a slitter-winder a full parent roll is under unwinding in the first unwinding position and in a winding section of the slitter-winder a first set of customer rolls is under winding. Simultaneously in the second unwinding position a reject roll i.e. a reeling shaft with remaining fiber web layers (bottom) is located. A slabbing roll of a slabbing device picks the fiber web from the reeling shaft and winds the remaining fiber web up around itself. The slabbing roll is moved to a home position for waiting to be emptied. The empty reeling shaft is thus ready to be returned from the unwinding section to the reel-up. Towards the end of the unwinding of the parent roll, typically when on the parent roll remains fiber web for winding one to two customer roll sets in the winding section of the slitter-winder, the parent roll under unwinding is moved to the second unwinding position. The unwinding of the parent roll then continues in the second unwinding position. At this stage the slabbing roll of the slabbing device is moved to an emptying position at operating distance from a pulper, typically above a pulper, typically the pulper of the unwinding section located under the first unwinding position of the unwinding section, as also during threading the beginning reject is guided to this pulper. When the slabbing roll is located in the emptying position the reject fiber web is unwound from the slabbing roll and dropped or guided into the pulper. When the slabbing is done, the slabbing roll of the slabbing device is returned to the home position for waiting to perform the next slabbing operation. The empty reeling shaft has been returned and the waiting position is ready to receive the next reject roll or an empty reeling shaft.

[0031] The invention is utilizable in unwinding sections,

in particular in unwinding sections of slitter-winders. The invention is very advantageous in unwinding sections comprising two unwinding positions. The invention is also very advantageous, when utilized in connection with automated reeling shaft handling systems.

[0032] By the invention and its advantageous features several advantages are achieved: The need for a separate slabbing station with a pulper and rotation and/or other slabbing devices is removed. Additionally, savings are achieved in operator work. The safety and ergonomics of the operator are also provided due to decreased need of manual work operations. Additionally, smooth transfer operations are provided as there is no interference with parent roll or other transportation need.

Brief description of the drawings

[0033] Aspects of the invention, however, together with additional objects and advantages thereof, will be best understood from the following description of some example embodiments when read in connection with the accompanying drawings and in the following the invention is described in more detail referring to the accompanying drawing, in which

[0034] In figures 1-9 is schematically shown an advantageous example of an unwinding section according to the invention as a side view in different steps of an advantageous example of the method for removing slab fiber web from a reeling shaft.

[0035] In figures 10-18 is schematically shown an advantageous example of an unwinding section according to the invention as a side view in different steps of an advantageous example of the method for removing slab fiber web from a reeling shaft.

Detailed description

[0036] During the course of the description of the figures 1-9 like numbers and signs will be used to identify like elements according to the different views which illustrate the invention. Repetition of some reference signs may have been omitted in the figures for clarity reasons.

[0037] In the figures 1 - 9 is shown an example of an unwinding section 15 of a slitter-winder. In the figures by reference numeral 22 a floor of a machine hall for the slitter-winder is denoted. A fiber web W is unwound from a parent roll 12 in the unwinding section 15 and guided via a guide roll to a slitting section (not shown) of the slitter-winder and thereafter to a winding section (not shown) of the slitter-winder. The unwinding section 15 has two, first and second unwinding positions I, II. The unwinding of the parent roll 12 under unwinding is begun at the first unwinding position I. Towards end of the unwinding of the parent roll 12, typically when on the parent roll 12 remains fiber web for winding one to two customer roll sets in the winding section of the slitter-winder, the parent roll 12 under unwinding is moved to the second unwinding position II. The parent roll 11, 12 is wound

around a reeling shaft 10, which is transferrable supported at each end on transfer rails 21. The rotation direction of the reeling shaft is denoted by reference sign R in the figures. In the example of the figures is also shown a parent roll 11, which will be transferred to the first unwinding position I, when the on-going unwinding of the parent roll 12 is finished, to be the next parent roll under unwinding. When the unwinding in the second unwinding position is finished, some slab fiber web RW may still remain around the reeling shaft 10 and a reject roll 13 is formed. In the unwinding section 15 a broke opening 26 of a pulper 25 is located below the first unwinding position I. The pulper 25 has the broke opening 26 on level of the floor 22 and the pulper 25 is located below the floor 22. The unwinding section 15 also comprises a slabbing device 35 configured to operate in the area of the first and second unwinding positions I, II. The slabbing device 35 comprises transfer arms 31, which are turnably S31 attached from one, lower end to support structures 33 supported on the floor 22. The slabbing device also comprises a rotatably S30 to other, upper end of the transfer arms 31 attached slabbing roll 30, advantageously suction roll 30, which is rotatably attached from each end to the corresponding transfer arm 31. The slabbing device 33 also comprises a holder 32 extending in cross-direction of the fiber web i.e. in the longitudinal direction of the slabbing roll 30. The holder 32 is configured to hold end of reject web on the slabbing roll 30. The slabbing device 35 comprises actuators or like for providing the turning movement S31 of the transfer arms 31, the rotating movement S30 of the slabbing roll 30 and the movements of the holder 32 from the open position to the closed position and vice versa. Length of the transfer arm 31 is configured to be such, that the parent roll 12 during transfer from the first unwinding position I to the second unwinding position II has enough space to pass under the slabbing roll 30. Advantageously, the length of the transfer arm 31 is such, that space in vertical direction is at least 1,4 m, advantageously about 2,5 m, measured from center axis of the reeling shaft.

[0038] In the unwinding section 15 the reject roll 13 is emptied of the slab fiber web RW by the slabbing device 35 after the unwinding of a parent roll 12 is finished and while the reject roll 13 is still in the unwinding section 15 and located in the second unwinding position II. When the slabbing device 35 is utilized the next parent roll 12 is under unwinding in the first unwinding position I and in connection with the slitter-winder in the winding section of the slitter-winder a first set of customer rolls is under winding. Simultaneously in the second unwinding position II the reject roll 13 i.e. the reeling shaft 10 with remaining slab fiber web RW i.e. bottom of the parent roll around the reeling shaft 10 is located. The slabbing roll 30 of the slabbing device 35 is moved to a pick-up position P by turning S31 the transfer arms 31 and the slabbing roll 30 by means of suction picks the slab fiber web RW from the reject roll 13 around the reeling shaft 10 and winds the slab fiber web RW up around itself 30 by its

rotating movement. The slabbing roll 30 with the slab fiber web RW is moved by turning S31 the transfer arms 31 to a home position H for waiting to be emptied. The empty reeling shaft 10 in the second unwinding position II is thus ready to be returned by transfer T of transfer means from the unwinding section 15 to the reel-up (not shown). Towards the end of the unwinding of the parent roll 12 in the first unwinding position I, typically when on the parent roll 12 remains fiber web for winding one to two customer roll sets in the winding section of the slitter-winder, the parent roll 12 under unwinding is moved by transfer movement T to the second unwinding position II passing below the slabbing roll 30 of the slabbing device 35. The unwinding of the parent roll 12 continues at the second unwinding position II. At this stage the slabbing roll 30 of the slabbing device 35 is moved by turning movement S31 of the transfer arms 31 to an emptying position E located at an operating distance from the broke opening 26 of the pulper 25, typically above the broke opening 26 of the pulper 25. The broke opening 26 of the pulper 25 of the unwinding section 15 in the example of the figures is located in a typical position under the first unwinding position I of the unwinding section 15, as also during threading a beginning reject is guided to this pulper 25. When the slabbing roll 30 of the slabbing device 35 is located in the emptying position E the slab fiber web RW is unwound from the slabbing roll 30 and dropped or guided through the broke opening 26 into the pulper 25. When the emptying is done the slabbing roll 30 of the slabbing device 35 is returned to the home position H by means of turning S31 the transfer arms 31 for waiting to perform the next slabbing operation. The empty reeling shaft has been returned and the waiting position is ready to receive the next reject roll or an empty reeling shaft. The holder 32 presses the slab fiber web, which is wound around the slabbing roll 30, against the slabbing roll 30 during movements S31 of the transfer arms 31 and during the stay of the slabbing roll 30 in the home position H for preventing the slab fiber web RW to unwind from the slabbing roll 30 before the emptying of the slab fiber web RW from the slabbing roll 30 in the emptying position.

[0039] In stage of the figure 1 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The empty reeling shaft from the previous parent roll unwinding is ready at the second unwinding position II to be returned to the reel-up. The slabbing device 35 is in the home position H and the slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for emptying. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0040] In stage of the figure 2 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15 and is almost ready to be moved to the second unwinding position II. The empty reeling shaft from the previous parent roll unwinding has been returned to the

reel-up and the second unwinding position II is not in operation. The slabbing device 35 is in the home position H and the slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for emptying. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0041] In stage of the figure 3 the parent roll 12 under unwinding is transferred T to the second unwinding position II of the unwinding section 15 below the slabbing roll 30 of the slabbing device 35 in the home position H. The slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for emptying. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0042] In stage of the figure 4 the parent roll 12 is unwound in the second unwinding position II of the unwinding section 15. The slabbing device 35 in the home position H. The slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for emptying. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0043] In stage of the figure 5 the parent roll 12 is unwound in the second unwinding position II of the unwinding section 15. The slabbing device 35 is turned S31 from the home position H to the emptying position E for removal of the slab fiber web RW from the previous parent roll unwinding around the slabbing roll 30. The holder 32 preventing the slab fiber web RW from unwinding from the slabbing roll 30 is opened and the slabbing roll 30 is rotated for removal of the slab fiber web RW through the broke opening 26 into the pulper 25. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0044] In stage of the figure 6 the parent roll 12 is unwound in the second unwinding position II of the unwinding section 15. The slab fiber web RW from the slabbing roll 30 of the slabbing device 35 has been removed and the slabbing device 35 is turned S31 from the emptying position E to the home position H for the next pick-up of the slab fiber web from the second unwinding position II, when the unwinding of the parent roll 12 in the second unwinding position II has been finished. The holder 32 preventing the slab fiber web RW from unwinding from the slabbing roll 30 is open. From upstream from the first unwinding position I the next parent roll 11 for unwinding is transferred T to the unwinding in the first unwinding position I.

[0045] In stage of the figure 7 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The slabbing device 35 is in the pick-up position P and the end of the slab fiber web RW from the previous parent roll unwinding is picked up to be wound

around the slabbing roll 30 for emptying. The end can be attached to the surface of the slabbing roll 30 by suction or with adhesive means. The holder 32 is open and thus, not preventing the end of the slab fiber web RW to be picked-up by the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0046] In stage of the figure 8 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The slabbing device 35 is in the pick-up position P and the slab fiber web RW from the previous parent roll unwinding is wound around the slabbing roll 30 for emptying. The holder 32 is open and thus, not preventing the slab fiber web RW to be wound around the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0047] In stage of the figure 9 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The slabbing device 35 has been turned from the pick-up position P to the home position H and the slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 for emptying. The holder 32 is closed against the slab fiber web RW around the slabbing roll 30 and preventing the slab fiber web RW to be unwound from around the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0048] In the figures 10 — 18 is shown another example of an unwinding section 15 of a slitter-winder. In the figures by reference numeral 22 a floor of a machine hall for the slitter-winder is denoted. A fiber web W is unwound from a parent roll 12 in the unwinding section 15 and guided via a guide roll to a slitting section (not shown) of the slitter-winder and thereafter to a winding section (not shown) of the slitter-winder. The unwinding section 15 has two, first and second unwinding positions I, II. The unwinding of the parent roll 12 under unwinding is begun at the first unwinding position I. Towards end of the unwinding of the parent roll 12, typically when on the parent roll 12 remains fiber web for winding one to two customer roll sets in the winding section of the slitter-winder, the parent roll 12 under unwinding is moved to the second unwinding position II. The parent roll 11, 12 is wound around a reeling shaft 10, which is transferrable supported at each end on transfer rails 21. The rotation direction of the reeling shaft is denoted by reference sign R in the figures. In the example of the figures is also shown a parent roll 11, which will be transferred to the first unwinding position I, when the on-going unwinding of the parent roll 12 is finished, to be the next parent roll under unwinding. When the unwinding in the second unwinding position is finished, some slab fiber web RW may still remain around the reeling shaft 10 and a reject roll 13 is formed. In the unwinding section 15 a broke opening 26 of a pulper 25 is located below the first unwinding position I. The pulper 25 has the broke opening 26 on level of the

floor 22 and the pulper 25 is located below the floor 22. The unwinding section 15 also comprises a slabbing device 35 configured to operate in the area of the first and second unwinding positions I, II. The slabbing device 35 comprises transfer arms 31, which are attached to support structures 33 supported on the floor 22. The slabbing device also comprises a rotatably S30 to the transfer arms 31 attached slabbing roll 30, advantageously a suction roll, which is rotatably attached from each end to the corresponding transfer arm 31. The slabbing device 30 also comprises a holder 32 extending in cross-direction of the fiber web i.e. in the longitudinal direction of the slabbing roll 30. The holder 32 is configured to hold end of reject web on the slabbing roll 30. The slabbing device 35 comprises actuators or like for providing the linear movement L of the slabbing roll 30 on the transfer arms 31, the rotating movement S30 of the slabbing roll 30 and the movements of the holder 32 from the open position to the closed position and vice versa Height level of the transfer arm 31 is configured to be such, that the parent roll 12 during transfer from the first unwinding position I to the second unwinding position II has enough space to pass under the slabbing roll 30. Advantageously, the height level of the transfer arm 31 is such, that space in vertical direction is at least 1,4 m, advantageously about 2,5 m, measured from center axis of the reeling shaft.

[0049] In the unwinding section 15 the reject roll 13 is emptied of the slab fiber web RW by the slabbing device 35 after the unwinding of a parent roll 12 is finished and while the reject roll 13 is still in the unwinding section 15 and located in the second unwinding position II. When the slabbing device 35 is utilized the next parent roll 12 is under unwinding in the first unwinding position I and in connection with the slitter-winder in the winding section of the slitter-winder a first set of customer rolls is under winding. Simultaneously in the second unwinding position II the reject roll 13 i.e. the reeling shaft 10 with remaining slab fiber web RW i.e. bottom of the parent roll around the reeling shaft 10 is located. The slabbing roll 30 of the slabbing device 35 is moved to a pick-up position P on the transfer arms 31 and the slabbing roll 30 by means of suction picks the slab fiber web RW from the reject roll 13 around the reeling shaft 10 and winds the slab fiber web RW up around itself 30 by its rotating movement. The slabbing roll 30 with the slab fiber web RW is moved on the transfer arms 31 to a home position H for waiting to be emptied. The empty reeling shaft 10 in the second unwinding position II is thus ready to be returned by transfer T of transfer means from the unwinding section 15 to the reel-up (not shown). Towards the end of the unwinding of the parent roll 12 in the first unwinding position I, typically when on the parent roll 12 remains fiber web for winding one to two customer roll sets in the winding section of the slitter-winder, the parent roll 12 under unwinding is moved by transfer movement T to the second unwinding position II passing below the slabbing roll 30 of the slabbing device 35. The unwinding of the parent roll 12 continues at the second unwinding position

II. At this stage the slabbing roll 30 of the slabbing device 35 is moved by linear movement L on the transfer arms 31 to an emptying position E located at an operating distance from the broke opening 26 of the pulper 25, typically above the broke opening 26 of the pulper 25. The broke opening 26 of the pulper 25 of the unwinding section 15 in the example of the figures is located in a typical position under the first unwinding position I of the unwinding section 15, as also during threading a beginning reject is guided to this pulper 25. When the slabbing roll 30 of the slabbing device 35 is located in the emptying position E the slab fiber web RW is unwound from the slabbing roll 30 and dropped or guided through the broke opening 26 into the pulper 25. When the emptying is done the slabbing roll 30 of the slabbing device 35 is returned to the home position H by linear movement L on the transfer arms 31 for waiting to perform the next slabbing operation. The empty reeling shaft has been returned and the waiting position is ready to receive the next reject roll or an empty reeling shaft. The holder 32 presses the slab fiber web, which is wound around the slabbing roll 30, against the slabbing roll 30 during movements L on the transfer arms 31 and during the stay of the slabbing roll 30 in the home position H for preventing the slab fiber web RW to unwind from the slabbing roll 30 before the emptying of the slab fiber web RW from the slabbing roll 30 in the emptying position.

[0050] In stage of the figure 10 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The empty reeling shaft from the previous parent roll unwinding is ready at the second unwinding position II to be returned to the reel-up. The slabbing device 35 is in the home position H and the slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for emptying. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0051] In stage of the figure 11 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15 and is almost ready to be moved to the second unwinding position II. The empty reeling shaft from the previous parent roll unwinding has been returned to the reel-up and the second unwinding position II is not in operation. The slabbing device 35 is in the home position H and the slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for emptying. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0052] In stage of the figure 12 the parent roll 12 under unwinding is transferred T to the second unwinding position II of the unwinding section 15 below the slabbing roll 30 of the slabbing device 35 in the home position H. The slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 waiting for empty-

ing. The holder 32 prevents the slab fiber web RW from unwinding from the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0053] In stage of the figure 13 the parent roll 12 is unwound in the second unwinding position II of the unwinding section 15. The slabbing device 35 is moved L from the home position H to the emptying position E for removal of the slab fiber web RW from the previous parent roll unwinding around the slabbing roll 30. The holder 32 preventing the slab fiber web RW from unwinding from the slabbing roll 30 is opened and the slabbing roll 30 is rotated for removal of the slab fiber web RW through the broke opening 26 into the pulper 25. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0054] In stage of the figure 14 the parent roll 12 is unwound in the second unwinding position II of the unwinding section 15. The slab fiber web RW from the slabbing roll 30 of the slabbing device 35 is removed in the emptying position E. The holder 32 preventing the slab fiber web RW from unwinding from the slabbing roll 30 is open. From upstream from the first unwinding position I the next parent roll 11 for unwinding is transferred T to the unwinding in the first unwinding position I.

[0055] In stage of the figure 15 the parent roll 12 is unwound in the second unwinding position II of the unwinding section 15. The slab fiber web RW from the slabbing roll 30 of the slabbing device 35 has been removed and the slabbing device 35 is moved L from the emptying position E to the home position H for the next pick-up of the slab fiber web from the second unwinding position II, when the unwinding of the parent roll 12 in the second unwinding position II has been finished. The holder 32 preventing the slab fiber web RW from unwinding from the slabbing roll 30 is open. From upstream from the first unwinding position I the next parent roll 11 for unwinding is transferred T to the unwinding in the first unwinding position I.

[0056] In stage of the figure 16 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The slabbing device 35 is in the pick-up position P and the end of the slab fiber web RW from the previous parent roll unwinding is picked up to be wound around the slabbing roll 30 for emptying. The end can be attached to the surface of the slabbing roll 30 by suction or with adhesive means. The holder 32 is open and thus, not preventing the end of the slab fiber web RW to be picked-up by the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0057] In stage of the figure 17 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The slabbing device 35 is in the pick-up position P and the slab fiber web RW from the previous parent roll unwinding is wound around the slabbing roll 30 for emptying. The holder 32 is open and thus, not preventing the slab fiber web RW to be wound around

the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0058] In stage of the figure 18 the parent roll 12 is unwound in the first unwinding position I of the unwinding section 15. The slabbing device 35 has been moved from the pick-up position P to the home position H and the slab fiber web RW from the previous parent roll unwinding is around the slabbing roll 30 for emptying. The holder 32 is closed against the slab fiber web RW around the slabbing roll 30 and preventing the slab fiber web RW to be unwound from around the slabbing roll 30. Upstream from the first unwinding position I the next parent roll 11 for unwinding is waiting to be transferred to the unwinding.

[0059] In the description in the foregoing, although some functions have been described with reference to certain features, those functions may be performable by other features whether described or not. Although features have been described with reference to certain embodiments or examples, those features may also be present in other embodiments or examples whether described or not. Above the invention has been described by referring to some advantageous examples only to which the invention is not to be narrowly limited. Many modifications and alterations are possible within the invention as defined in the following claims.

Reference signs used in the drawing

[0060]

10	reeling shaft
11	parent roll
12	parent roll under unwinding
13	reject roll
15	unwinding section
19	guide roll
21	transfer rail
22	floor
25	pulper
30	slabbing roll
31	transfer arm
32	holder
35	slabbing device
E	emptying position
H	home position
I	first unwinding position
II	second unwinding position
L	linear movement
P	pick-up position
R	rotation direction
RW	slab fiber web
S30	rotation direction
S31	turning direction
T	transfer direction
W	fiber web

Claims

1. Unwinding section for unwinding a fiber web (W) from a parent roll (12) wound around a reeling shaft (10), which unwinding section (15) comprises two unwinding positions (I, II) consisting of a first unwinding position (I) and a second unwinding position (II), in which unwinding section (15) the unwinding of the parent roll (12) is configured to be begun at the first unwinding position (I) and in which unwinding section (15) towards end of the unwinding the parent roll (12) is configured to be transferred to the second unwinding position (II), which unwinding section (15) comprises a broke opening (26), **characterized in, that** the unwinding section (15) comprises a slabbing device (35) configured to operate in area of the first and second unwinding positions (I, II), that the slabbing device (35) is configured to pick up a slab fiber web (RW) from a reject roll (13) formed of a fiber web remaining on the reeling shaft (10) after the unwinding of the parent roll (12) is finished in the second unwinding position (II) and that the slabbing device (35) is configured to empty the slab fiber web (RW) through the broke opening (26).
2. Unwinding section according to claim 1, **characterized in, that** the slabbing device (35) comprises a slabbing roll (30) and transfer arms (31), and that the slabbing roll (30) is rotatably attached from each end to the corresponding transfer arm (31).
3. Unwinding section according to claim 1 or 2, **characterized in, that** the slabbing device (35) comprises a holder (32) configured to hold the slab fiber web around the slabbing roll (30).
4. Unwinding section according to claim 3, **characterized in, that** the holder (32) extends in cross-direction of the fiber web i.e. in the longitudinal direction of the slabbing roll (30).
5. Unwinding section according to any of claims 2 - 4, **characterized in, that** length or height level of the transfer arm (31) is configured to be such, that the parent roll (12) during transfer from the first unwinding position (I) to the second unwinding position (II) has enough space to pass under the slabbing roll (30).
6. Unwinding section according to any of the previous claims, **characterized in, that** the slabbing device (35) has at least two positions: a pick-up position (P) for picking up the slab fiber web (RW) from the reject roll (13), an emptying position (E) above the broke opening (26) for emptying the slab fiber web (RW) through the broke opening (26).
7. Unwinding section according to claim 6, **character-**

- ized in, that** the slabbing device (35) has at least three positions: the pick-up position (P) located at the second unwinding position (II) for picking up the slab fiber web (RW) from the reject roll (13), the emptying position (E) located at the first unwinding position (I) above the broke opening (26) for emptying the slab fiber web (RW) through the broke opening (26) and a home position (H) for waiting to be moved to the pick-up position (P) or to the emptying position (E).
8. Unwinding section according to any of the previous claims, **characterized in, that** the unwinding section (15) is an unwinding section of a slitter-winder.
9. Method for removing slab fiber web from a reeling shaft (10) in an unwinding section (15) comprising two unwinding positions (I, II) consisting of a first unwinding position (I) and a second unwinding position (II) and comprising a broke opening (26), in which method in the unwinding section (15) the unwinding of the parent roll (12) is begun at the first unwinding position (I) and towards end of the unwinding the parent roll (12) is transferred to the second unwinding position (II), **characterized in, that** in the method the slab fiber web (RW) is removed by a slabbing device (35) operating in area of the first and second unwinding positions (I, II), that in the method the slab fiber web (RW) from a reject roll (13) formed of a fiber web remaining on the reeling shaft (10) after the unwinding of the parent roll (12) is finished in the second unwinding position (II) is picked up by the slabbing device (35) and the slab fiber web (RW) is emptied from the slabbing device (35) through the broke opening (26).
10. Method according to claim 9, **characterized in, that** the reject roll (13) is emptied of the slab fiber web (RW) by the slabbing device (35) after the unwinding of a parent roll (12) is finished and while the reject roll (13) is still in the unwinding section (15) and located in the second unwinding position (II) and the next parent roll (12) is under unwinding in the first unwinding position (I).
11. Method according to claim 9 or 10, **characterized in, that** in the method a slabbing roll (30) of the slabbing device (35) is moved to a pick-up position (P) by or on transfer arms (31) of the slabbing device (35) and the slabbing roll (30) picks the slab fiber web (RW) from the reject roll (13) around the reeling shaft (10) and winds the slab fiber web (RW) up around itself (30) by its rotating movement.
12. Method according to any of claims 9 - 11, **characterized in, that** the slabbing roll (30) with the slab fiber web (RW) is moved by or on the transfer arms (31) to a home position (H) for waiting to be emptied.
13. Method according to any of claims 9 - 12, **characterized in, that** while the unwinding of the parent roll (12) continues at the second unwinding position (II), the slabbing roll (30) of the slabbing device (35) is moved by or on the transfer arms (31) to an emptying position (E) located at an operating distance from the broke opening (26), advantageously above the broke opening (26) and when the slabbing roll (30) of the slabbing device (35) is located in the emptying position (E) the slab fiber web (RW) is unwound from the slabbing roll (30) and dropped or guided through the broke opening (26).
14. Method according to any of claims 9 - 13, **characterized in, that** the slabbing roll (30) is emptied of the slab fiber web (RW) and the slabbing roll (30) is returned to the home position (H) by or on the transfer arms (31) for waiting to perform the next slabbing operation.
15. Method according to any of claims 9 - 14, **characterized in, that** the slab fiber web (RW) is emptied from the slabbing device (35) through the broke opening (26) into a pulper (25) or onto a conveyor.

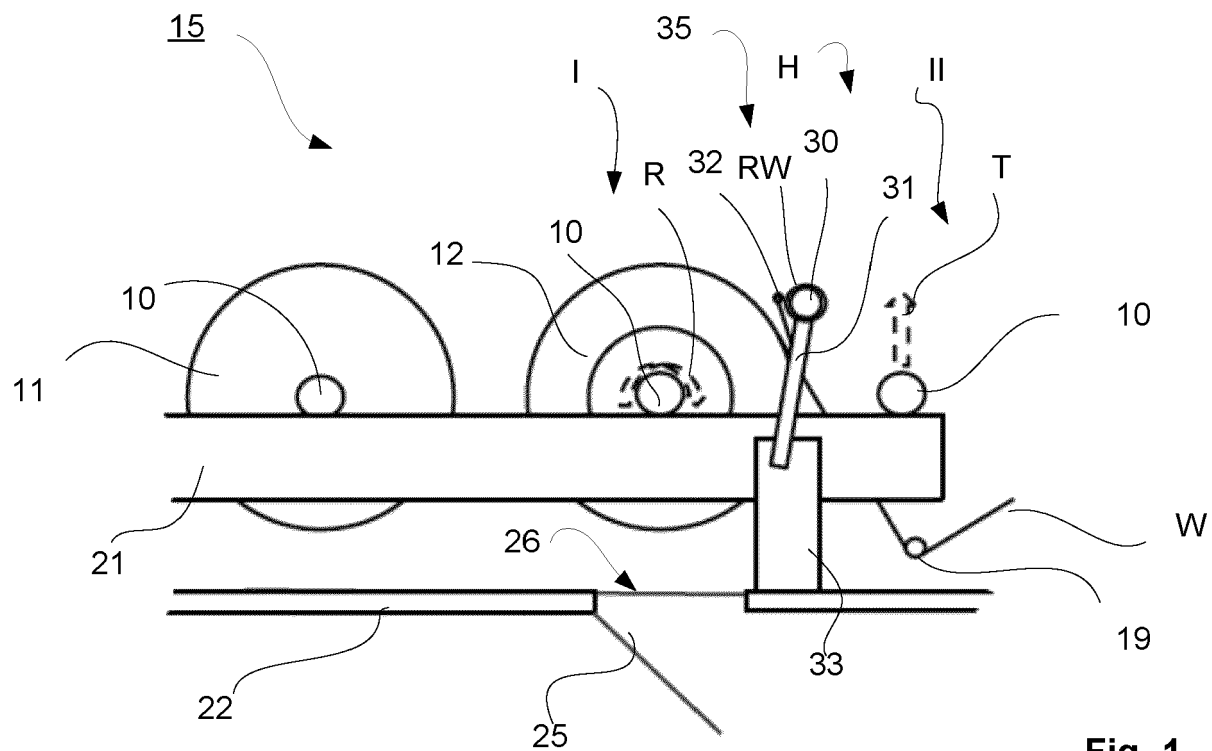


Fig. 1

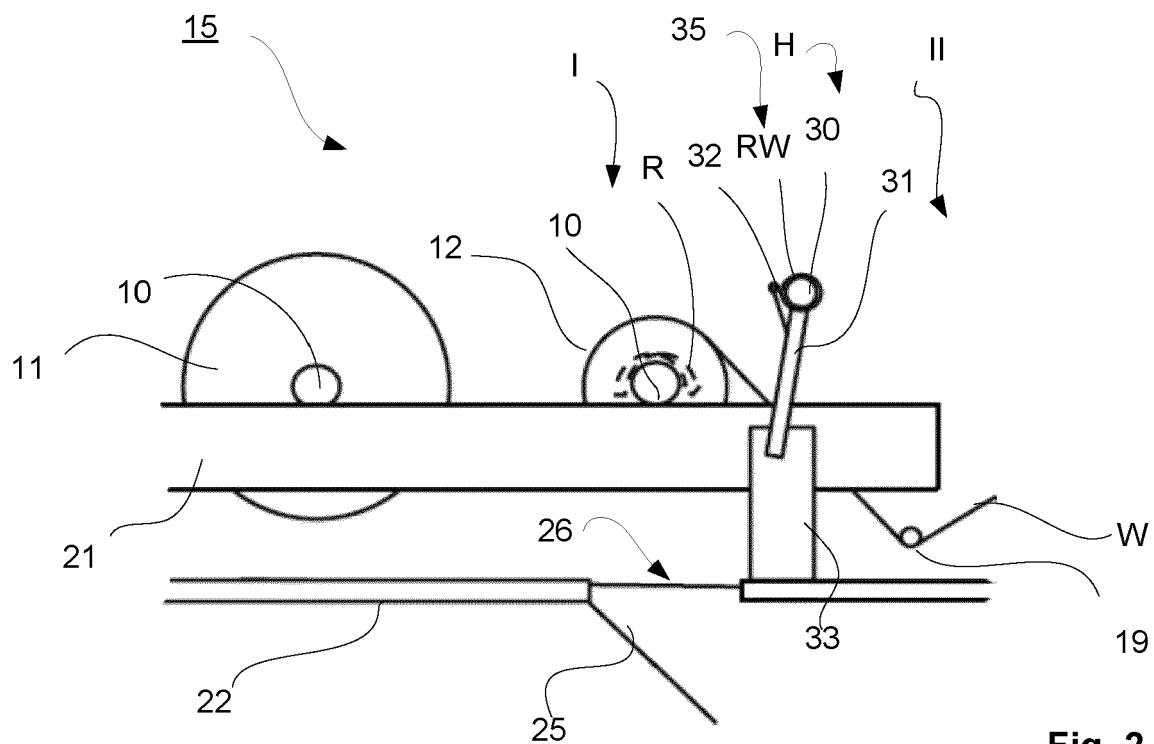


Fig. 2

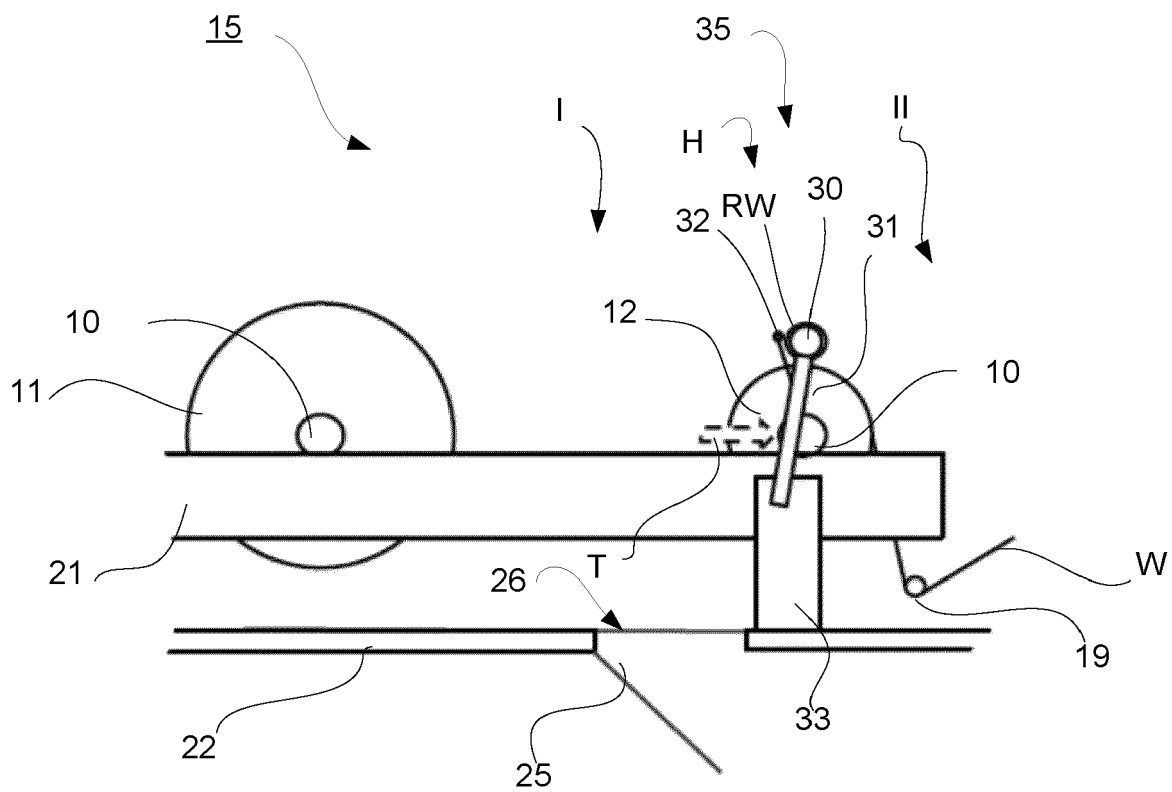


Fig. 3

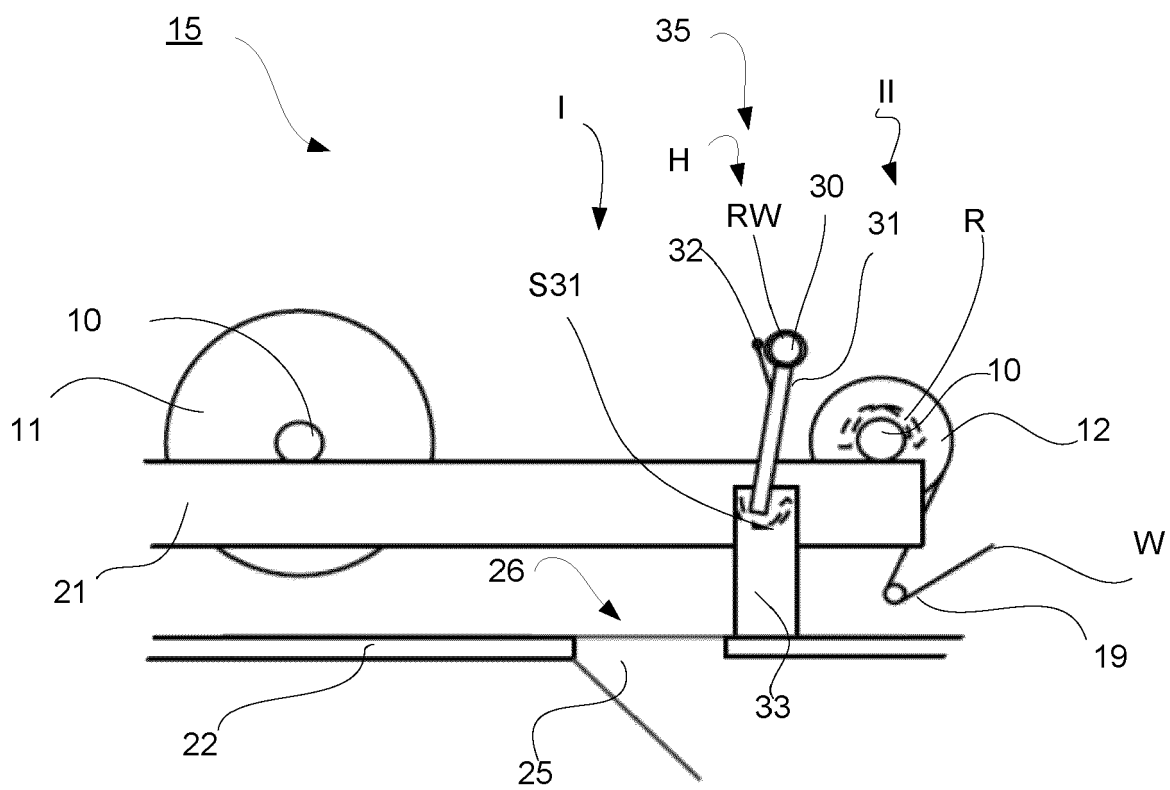


Fig. 4

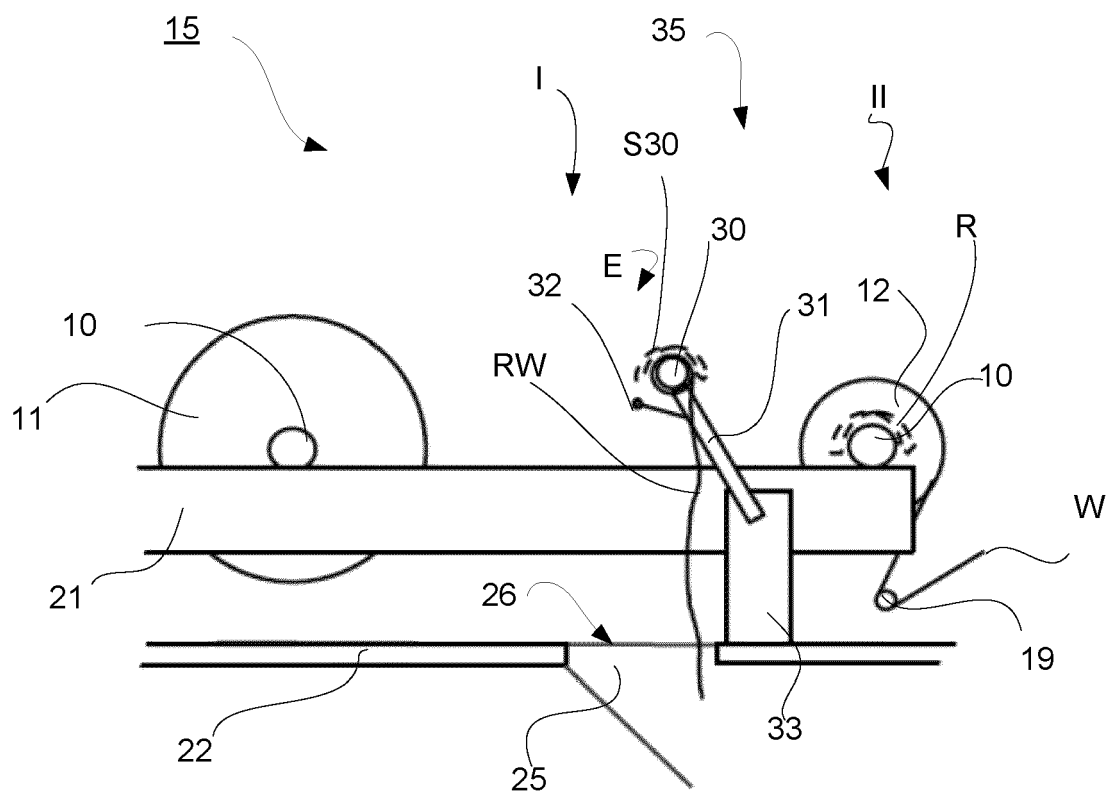


Fig. 5

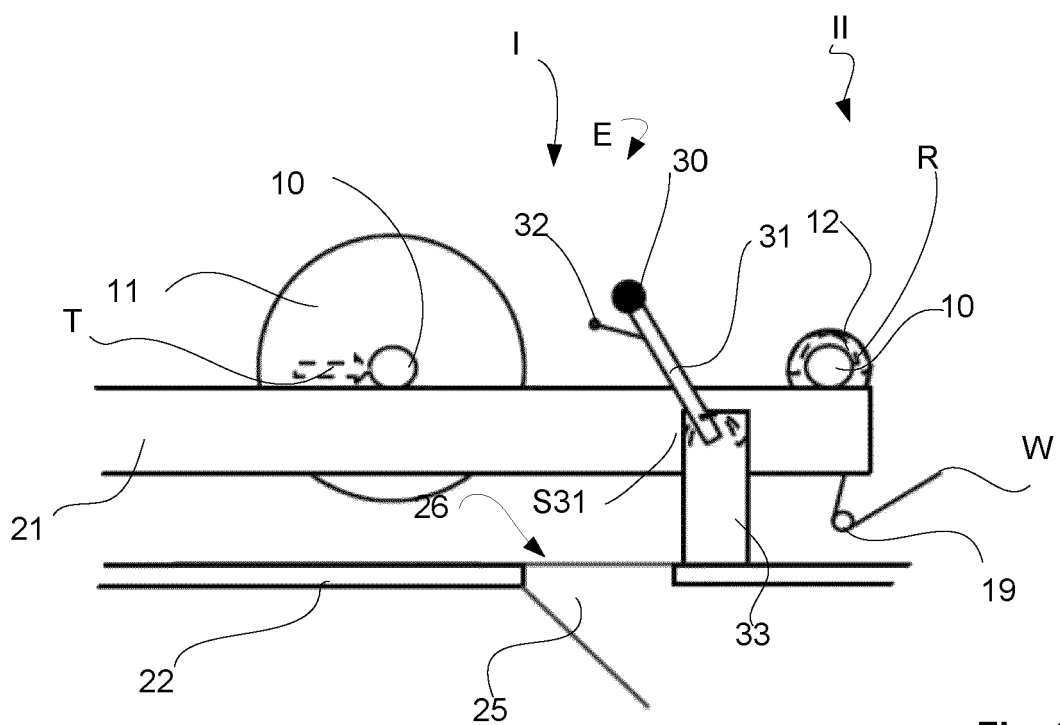


Fig. 6

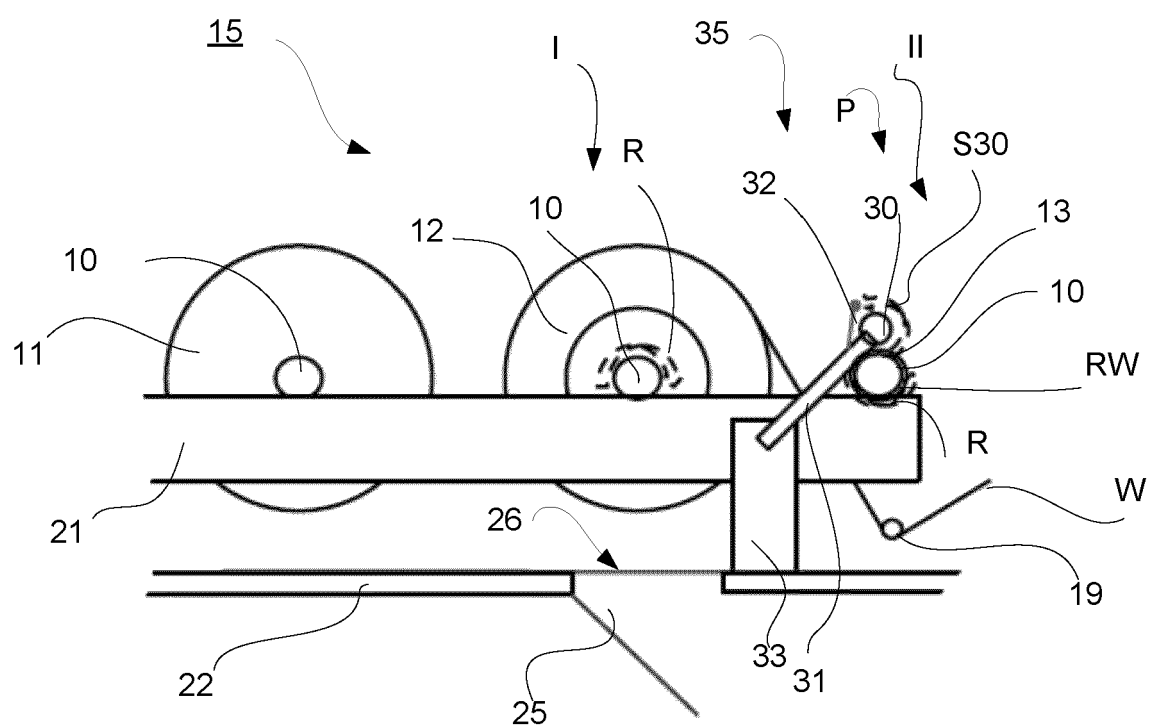


Fig. 7

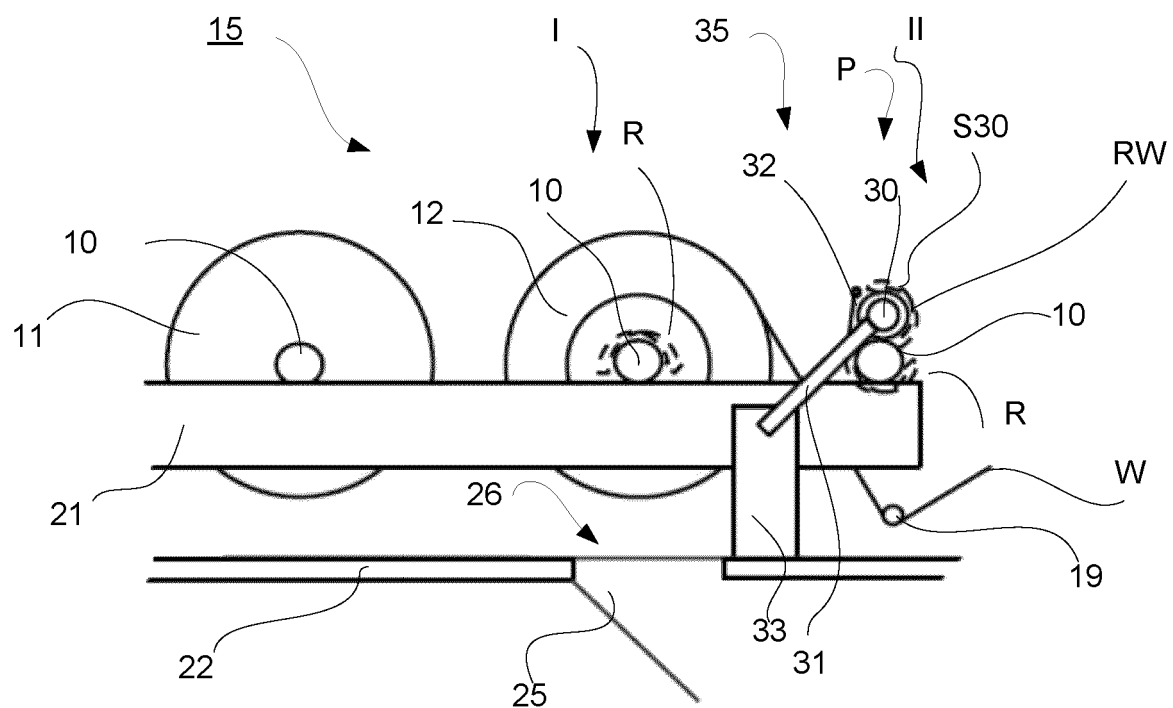


Fig. 8

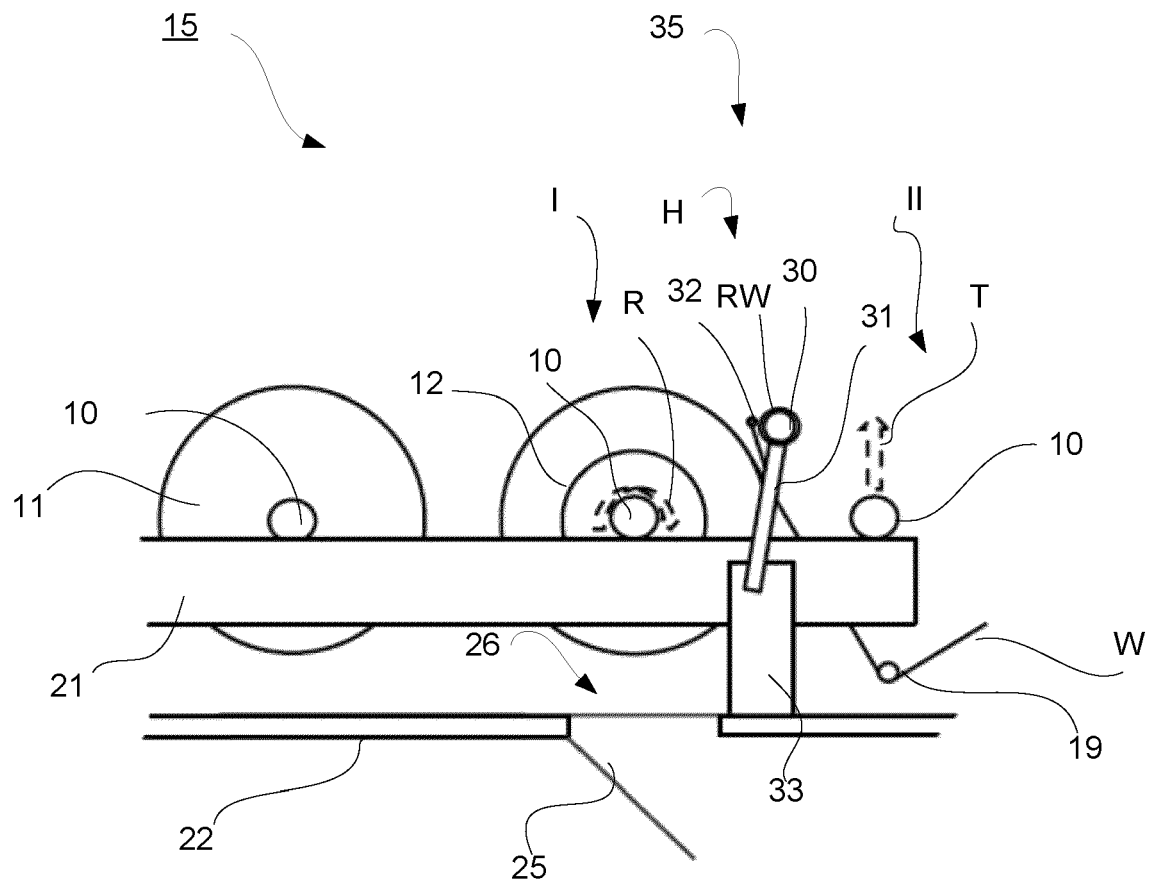


Fig. 9

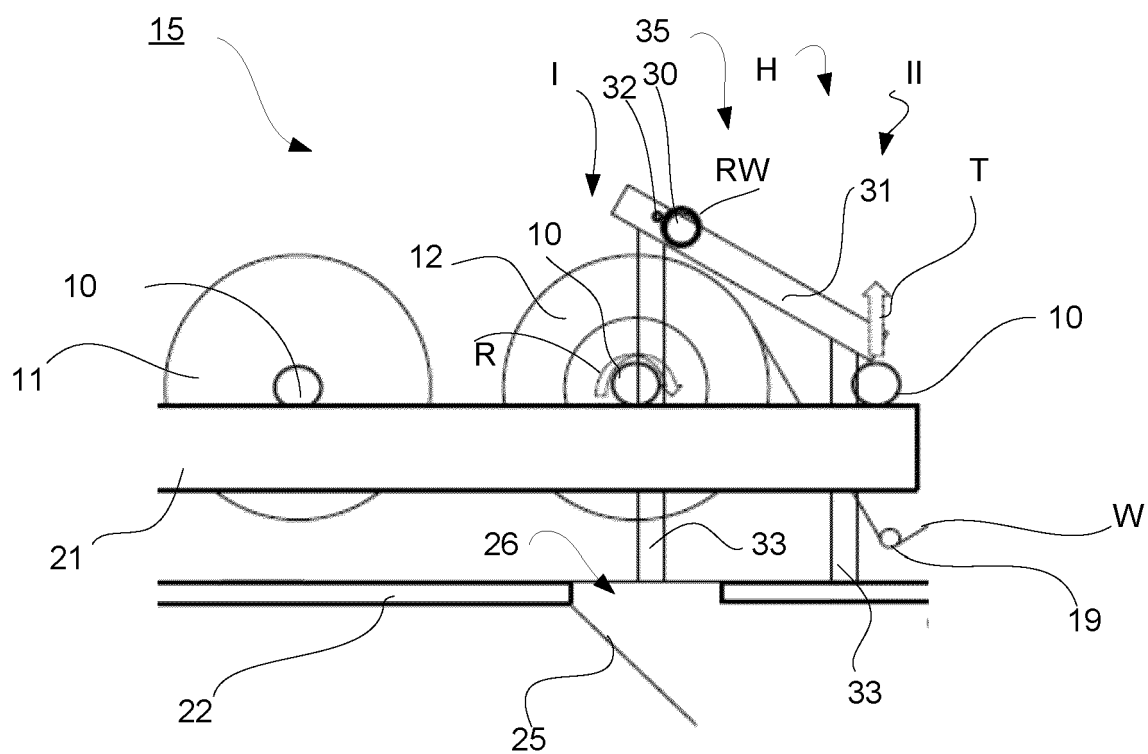


Fig. 10

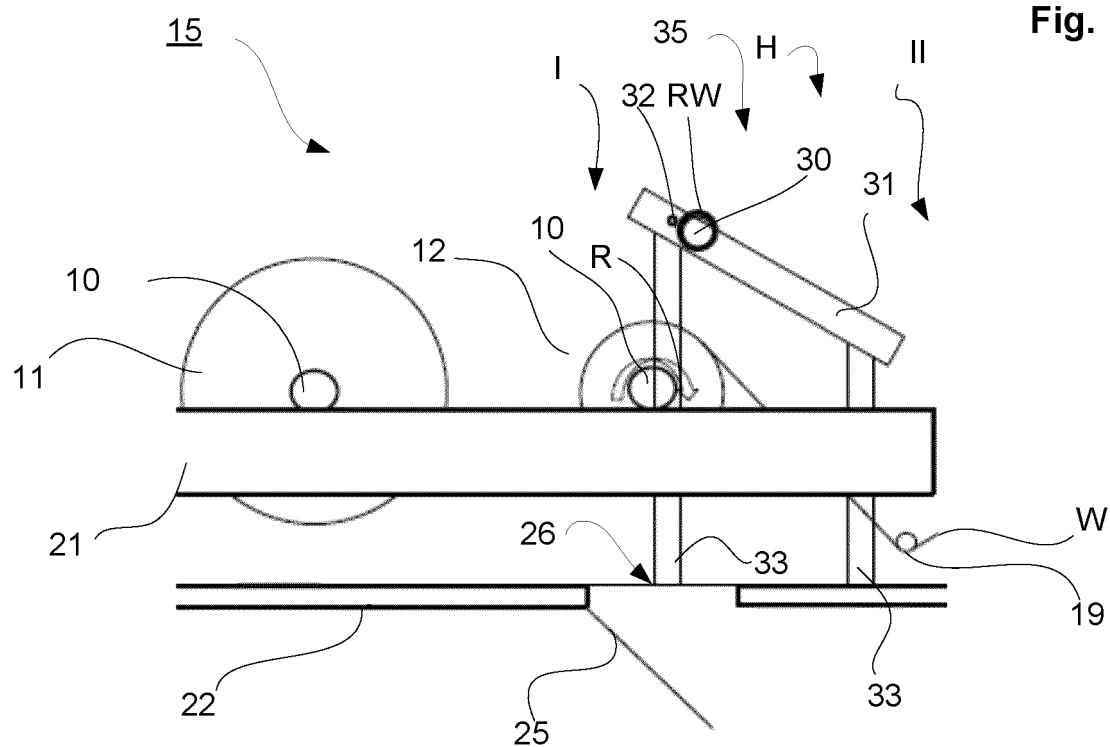


Fig. 11

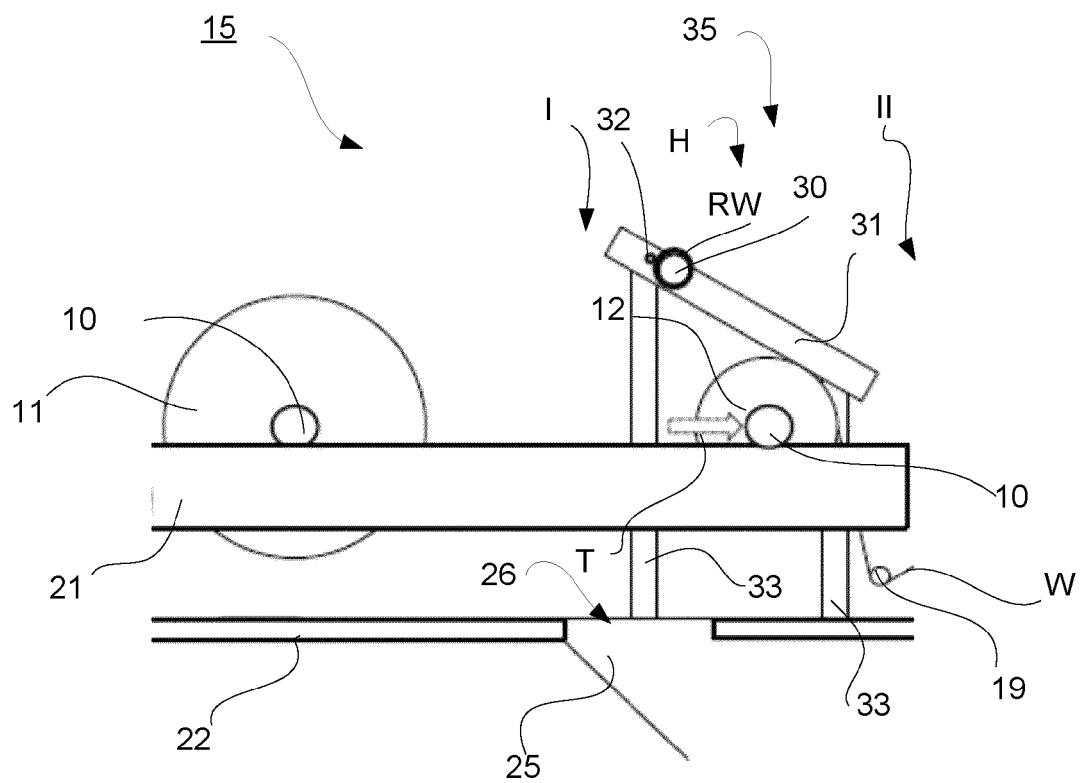


Fig. 12

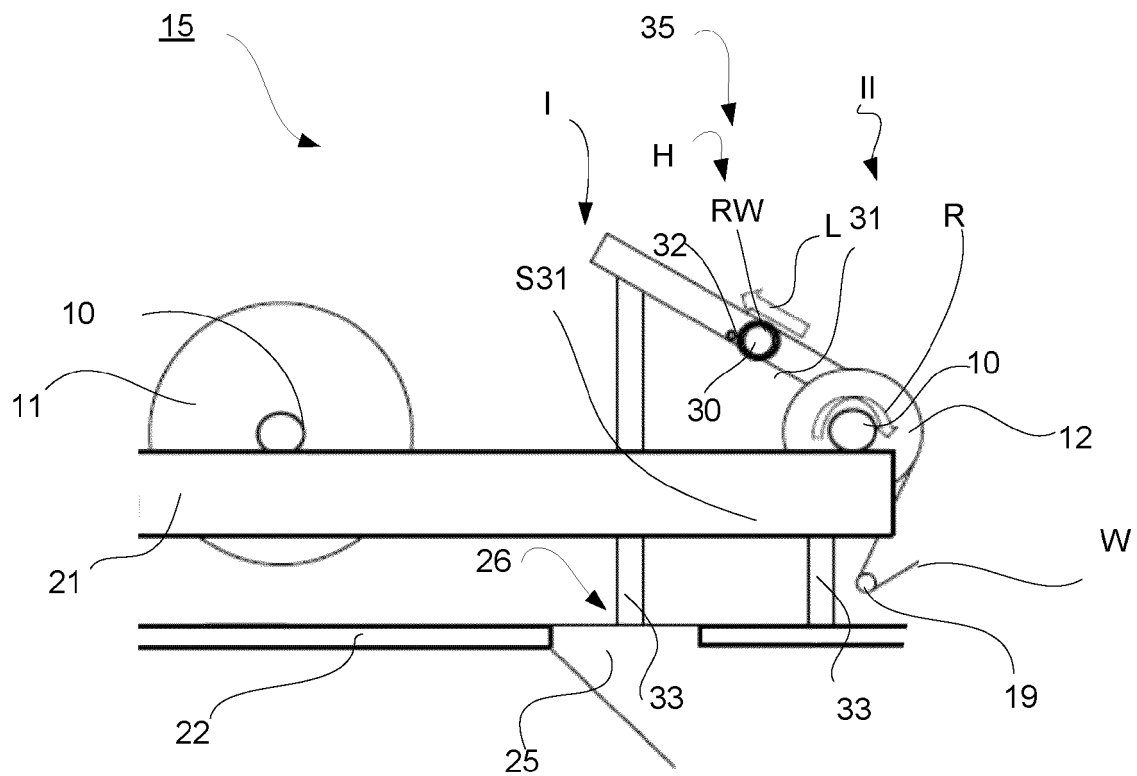


Fig. 13

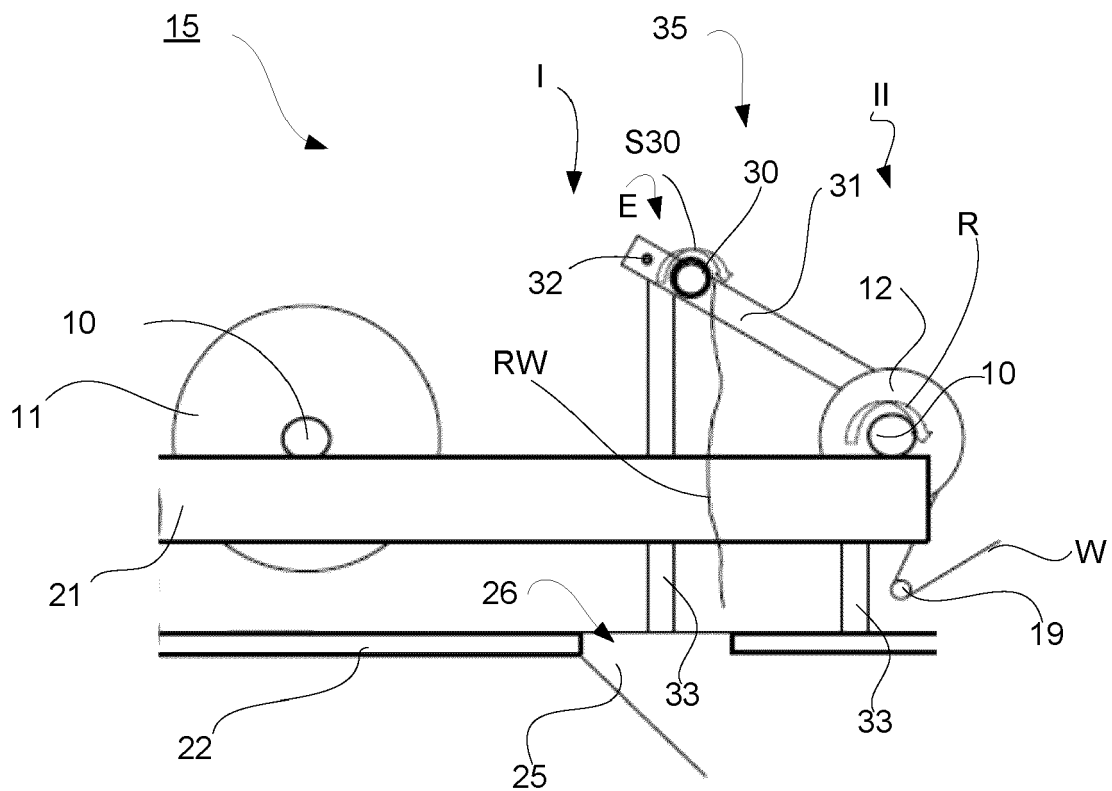


Fig. 14

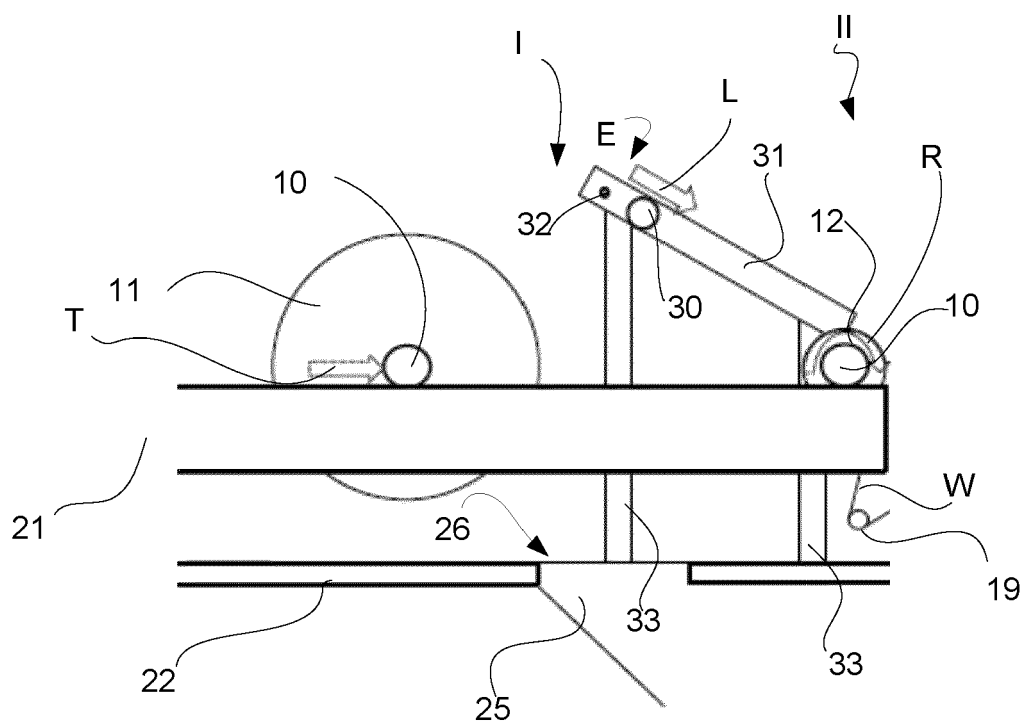


Fig. 15

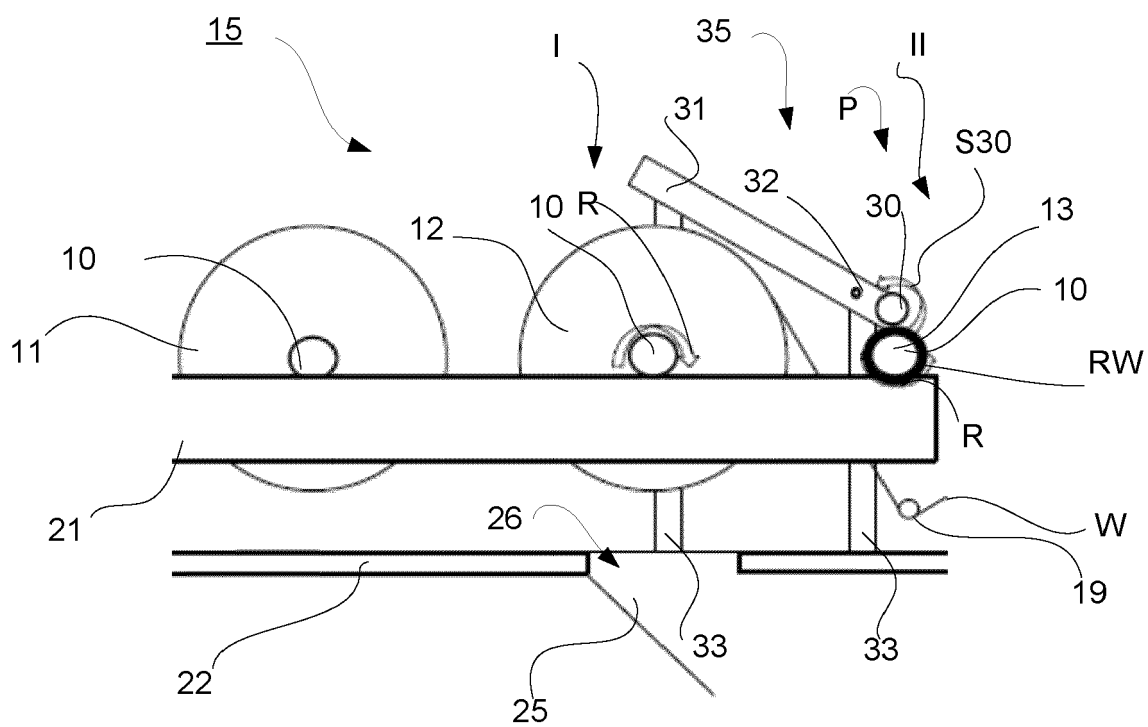


Fig. 16

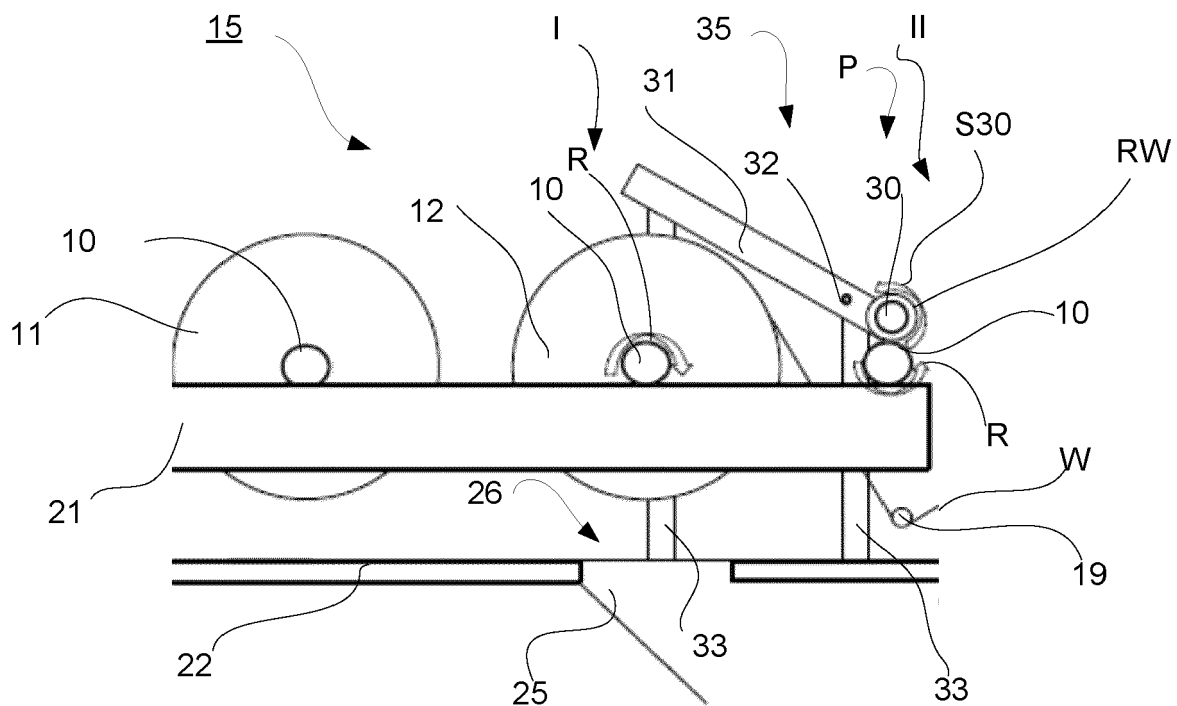


Fig. 17

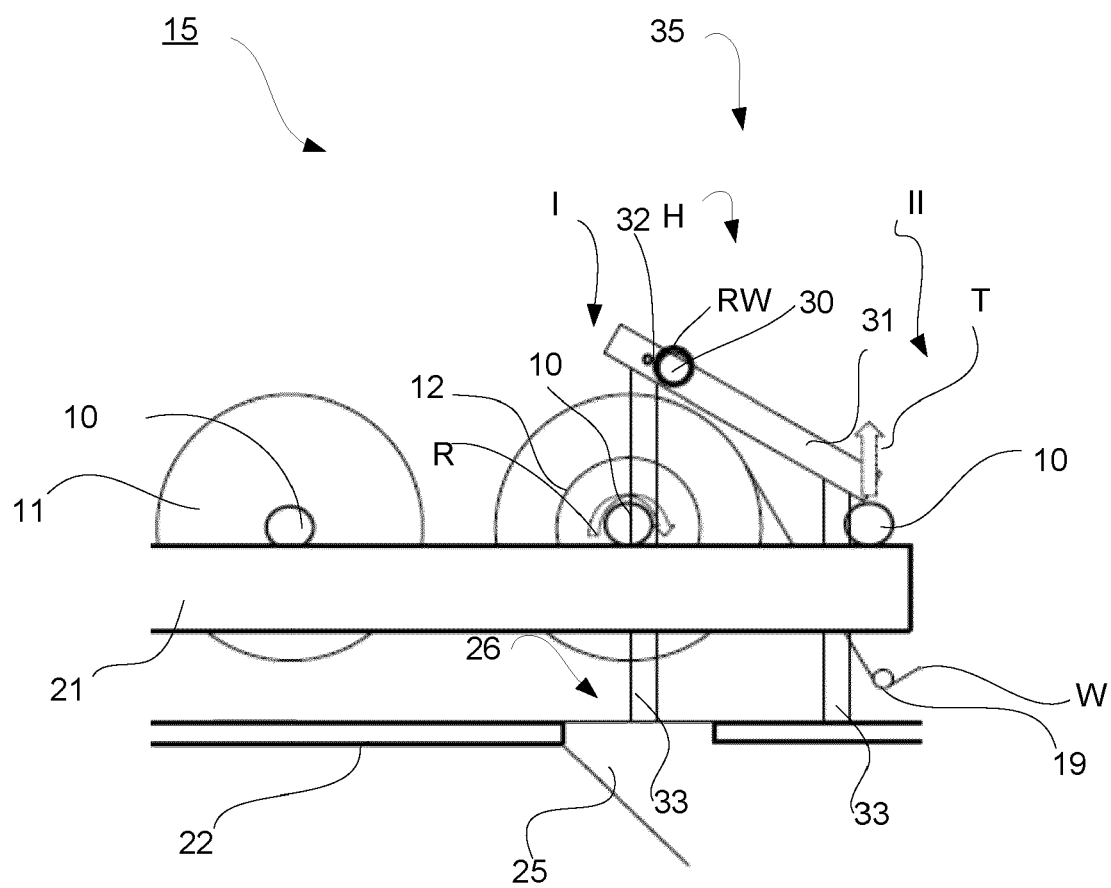


Fig. 18



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Application Number

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Place of search		Date of completion of the search	Examiner
The Hague		19 April 2022	Cescutti, Gabriel
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