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

(11) **EP 2 578 523 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.04.2013 Bulletin 2013/15

(51) Int Cl.:
B65H 19/12 *(2006.01)*

(21) Application number: **11183680.5**

(22) Date of filing: **03.10.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Metso Paper Inc.**
00130 Helsinki (FI)

(72) Inventors:
- **Enwald, Petri**
  FI-04310 Tuusula (FI)
- **Kojo, Teppo**
  FI-04600 Mäntsälä (FI)

(74) Representative: **Jyrämä, Hanna-Leena Maria**
Berggren Oy AB
P.O. Box 16
Antinkatu 3 C
00101 Helsinki (FI)

(54) **Arrangement for transferring loads, in particular elongate loads, in connection with production of fiber webs**

(57) The invention relates to an arrangement for transferring loads, in particular elongate loads, such as parent rolls and/or reeling shafts and/or rolls and/or beams of cranes and/or machine parts, between at least two target stations (20; 21; 22) in connection with production of fiber webs. The arrangement comprises at least one transfer device (10), at least one pallet (11) that is provided for transferring of parent rolls (12) and/or reeling shafts (15) i.e. parent roll pallet (11), and at least one pallet (13) that is provided for transferring rolls (14) i.e. roll pallet (13).

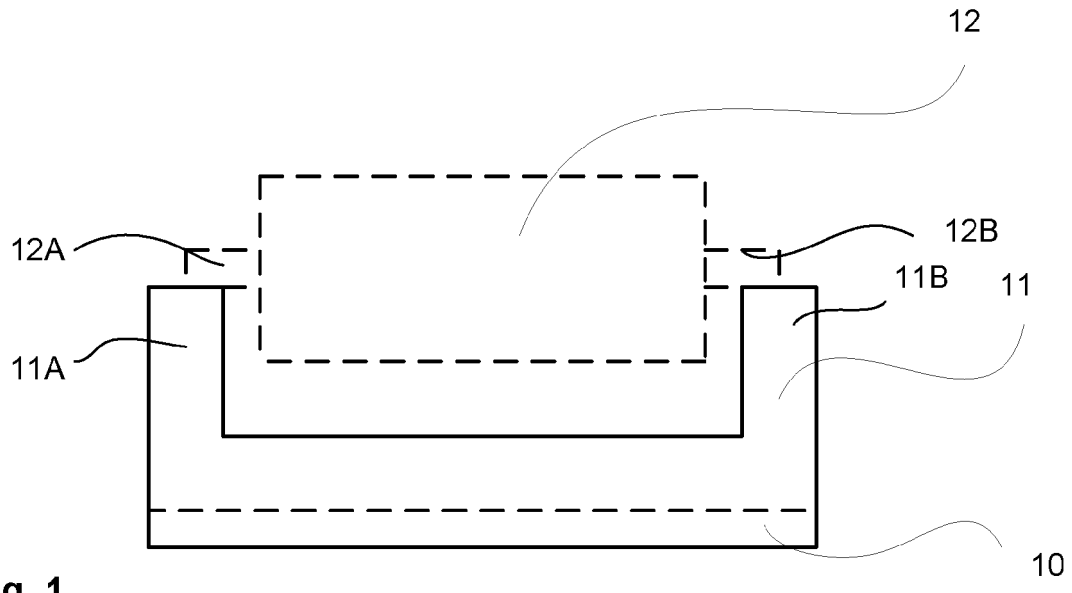

Fig. 1

EP 2 578 523 A1

Description

[0001] In general present invention relates to producing fiber web in a fiber web machine. Specifically, but not exclusively, the invention relates to the transferring of loads, in particular elongate loads, such as reeling shafts, parent rolls, beams of cranes, rolls and machine parts. More especially, but not exclusively the present invention relates to an arrangement according to preamble part of claim 1.

[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, for example, 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.

[0003] 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.

[0004] 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 parent roll (machine 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.

[0005] The web of the parent roll generated during manufacture is full-width and even more than 100 km long, so it must be cut into partial webs of a suitable width and length for customers and wound around cores into "customer rolls" before dispatch from the mill. As known, this slitting and winding of the web takes place in a separate machine fitted to the purpose, i.e., a slitter-winder.

[0006] In the slitter-winder the parent roll is unwound in the unwinding station and the broad web is slit with the slitting section into a number of narrower partial webs, which are wound with the winding section around winding spools such as cores into customer rolls. When the customer rolls are ready, the slitter-winder is stopped and the customer rolls, or "set", are removed from the machine. After this, the process continues with the winding of a new set. These stages are repeated periodically until the paper on the parent roll runs out, at which point the parent roll is replaced and the operation restarts with the winding of a new parent roll.

[0007] In a manufacturing process of a fiber web, in connection with the reel-up, the transfer of a parent roll forwards in the process takes typically place rolling along rails either on the basis of gravity (inclined rails) or moved by a separate transfer device. The move forward from the reel-up may also be carried out using a lifting device, such as a hoist. The parent roll is normally conveyed with a hoist to such a slitter-winder that is not connected to the paper machine with transfer rails and lowered to transfer rails. In applications where the reel-up of the fiber web machine and the slitter-winder are connected to each other with transfer rails inline, the parent roll is transferred along the transfer rails from the reel-up to the slitter-winder. In the simplest implementation, particularly in the case of small parent rolls, the parent roll may also be conveyed with a crane directly to an unwinding station. Thus in the unwinding stations of known fiber web production lines, the parent roll is typically conveyed to such unwinding stations that is 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 station. The transfer rails for full parent rolls consist of horizontal or inclined rails with stand-by stations. Along transfer rails, the parent roll is transferred from one stand-by station to another until the unwinding station is reached. With horizontal transfer rails, the parent roll is transferred from one stand-by station 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. The parent roll in some cases is also transferred from the reel-up to the unwinding station by a transfer cart and for example in publication EP 1266091 B1 is disclosed a transfer cart supported on a floor, used for transferring parent rolls at the height of transfer rails for parent rolls.

[0008] An unwinding station of typically comprises an unwind stand which holds the parent roll up during unwinding. The unwind stand comprises a first unwind stand on the driving side and another unwind stand on the tending side. The ends of the parent roll are on these unwind stands during unwinding. Locking arms are fastened to the unwind stand with joints; the arms are used for locking the parent roll in place during unwinding. A parent roll located in an unwinding station is connected to a brake generator, which functions as a drive of the unwinder.

[0009] Generally, a reeling shaft emptied as a result of unwinding is removed from the unwinding station either through manual lifting with a crane or automatically with a reeling shaft handling apparatus. A reeling shaft handling apparatus comprises either vertical lifting devices or rotatable lifting arms and return rails for empty reeling shafts, located above the transfer rails for parent rolls,

often also above the unwinding station or above the slitter-winder. An empty or nearly empty reeling shaft is lifted with a lifting device or with lifting arms to return rails, which normally have a number of return positions. Typically reeling shaft storage is located above the unwinding station. Along the return rails, the reeling shaft is transferred from one station to another either by means of a transfer device or by means of rolling based on gravity using stop and release mechanisms. In some cases the empty winding shaft is removed from the return rails by lowering devices and moved to the reel-up of the machine with a crane or by a transfer cart. The return rails may also be connected directly to the reel-up's reeling shaft storage rails, whereby the reeling shaft may be transferred directly from the unwinding station to the reel-up.

[0010] To ensure a smooth continuity of the process, storage spaces are needed in for full parent rolls, partly filled parent rolls and empty reeling shafts. As known, such storage spaces at the finishing end of the fiber web manufacturing line are located in the main machine line between the main devices of the manufacturing process. Also typically a rejecting location for the bottom-ends of parent rolls or partially filled parent rolls in the pulper is needed in connection with the arrangements for handling parent rolls and reeling shafts.

[0011] If a parent roll needs to be moved in the lateral direction from a rail line defined by a reel-up to, e.g., another device or to e.g. a storage location, which may be located in an aisle of the building, a transfer cart supported on a floor is typically used for the lateral transfer, in which case the parent roll is loaded from the end of the transfer rails or lifted with a crane.

[0012] The transfer cart for example as described in the mentioned EP patent 1266091 integrates the functions of a steel structure sufficient for supporting the heavy parent roll, in some cases, an apparatus section necessary for moving the parent roll, an energy transfer/storage arrangement necessary for producing kinetic energy, actuators necessary for receiving and handing over the parent roll and their power supply, and safety devices to secure the automated functions. Thus it is possible with a transfer cart to move and hand over parent rolls on the rails of the receiving station or to be lifted with a crane. Typically such transfer carts are provided with fixed rails and so the carts may only operate in a certain area defined by the rails. Furthermore, the driving order of the parent rolls cannot be changed with reel carts; rather, when changing the driving order, parent rolls must be lifted with a crane.

[0013] The reeling shaft handling solutions implemented in the prior art are complex, inflexible and expensive. For example, it is difficult to make paths of reeling shaft and parent roll transfer carriages, transfer rails, and transfer and conveyance routes of cranes adjust to changing needs. It is difficult to turn winding shafts and parent rolls with transfer carts that are supported on rails and/or wheels. The moving and turning of winding shafts and parent rolls imposes special requirements and takes room with transfer carts that are supported on rails and/or wheels. The handling solutions for reeling shafts require expensive concrete and steel beam structures implemented according to the full parent roll 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 transfer needs at a short notice. In some cases the machine hall height is not enough for arranging return rails for reeling shafts above the parent roll transferring rails or for the use of a crane.

[0014] In connection with fiber web machines there also exists needs for transferring rolls, such as drying rolls, suction rolls, calender rolls, rolls used in connection with coating devices, rolls used for guiding the fiber web, rolls used for guiding fabrics of the fiber web machine. The dimensions of these rolls are various and typically also different from the dimensions of reeling shafts. In connection with fiber web machines there also exist other needs for transferring other elongate loads such as beams of cranes.

[0015] During maintenance of the fiber web machine and its devices and sections there are also various needs for transferring different kinds of loads.

[0016] The timing of the various transfers in connection with the production with the fiber web is complicated and demanding as there exists needs for transferring rolls simultaneously with the need for transferring reeling shafts. There might be need for maintenance or change of the crane beam simultaneously with the time when handling of reeling shafts or rolls is required.

[0017] EP 2116464 A2 discloses a reel vehicle that has a chassis with wheels or an air cushion support provided on a driving surface. On top of the chassis a slidable, rotatable and/or extendable upper holder has been located for holding a reeling shaft, a roll and a customer roll and the holder has variable functional elements for fixing the load. The holder also has multiple drive units and a blocking element that blocks variable paths in a spatial direction and that is coupled with the holder in order to block space formed in an edge area of the chassis.

[0018] EP 2116495 A2 discloses an adapter for wheel vehicle that has a chassis comprising wheels or an air cushion support provided on a driving surface. The chassis has an upper side-arranged holder for a tambour. A supporting frame is arranged to be supported on the holders for receiving differently dimensioned loads. The supporting frame is detachable connected with the holders.

[0019] WO 2010125232 discloses a movable support apparatus, supported on a floor and movable between at least two target stations, for receiving, moving and handing over rolls, winding shafts and/or parent rolls intended for the handling of fiber web, the movable support apparatus comprising support members for holding up a load being handled at both its support ends. This prior art movable support apparatus is adapted to be supported on the floor with at least one air cushion element and the movable support apparatus is movable between at

least two devices of a fiber web manufacturing process. WO 2010125232 also discloses a handling system for receiving, moving and handing over rolls, winding shafts and/or parent rolls intended for the handling of a fiber web by means of a movable support apparatus supported on a floor and movable between at least two target stations, the movable support apparatus comprising support members for holding up the load being handled at both its support ends and the handling system comprises at least two movable support apparatuses that are movable between at least two devices of a fiber web manufacturing process and that are of the type disclosed in this publication.

[0020] An object of the present invention is to create a new arrangement for transferring loads in connection with the production of fiber web. Specially an object of the present inventions is create a new arrangement for transferring elongate loads, such as parent rolls and reeling shafts and rolls and beams of cranes and machine parts, in connection with the production of fiber web. In particular an object of the present invention is to achieve simple, flexible and cost effective arrangement for transferring loads in connection with production of fiber webs and especially in connection with transferring of elongate loads in connection with a production line for fiber webs.

[0021] One object of the present invention is to eliminate or at least minimize disadvantages and problems relating to arrangements according to prior art.

[0022] One, non-obligatory object is to further improve the in WO 2010125232 disclosed movable support apparatus.

[0023] To achieve the objects mentioned above and later the arrangement according to the invention is mainly characterized by the features of the characterizing part of claim 1.

[0024] According to the invention the arrangement for transferring loads, in particular elongate loads, such as parent rolls and/or reeling shafts and/or beams of cranes and/or rolls, in connection with production of fiber web comprises at least one transfer device, at least one pallet that is provided for transferring of machine rolls and/or reeling shafts i.e. parent roll pallet, and at least one pallet that is provided for transferring rolls i.e. roll pallet, specially for transfer between a fiber web machine and a roll maintenance location.

[0025] The pallet for rolls i.e. the roll pallet is rigid such that weight of the load is substantially evenly divided in relation to the transfer device even in situations where dimensions of the elongate load alternate.

[0026] The roll pallet and the parent roll pallet are supported on the floor and are lifted with the aid of the transfer device off the floor for transferring. Advantageously the lifting is accomplished by an air cushion provided in the transfer device.

[0027] At least the parent rolls are transferred with the aid of the parent roll pallet that comprises support structures for supporting the parent roll at its both ends at a height such that the fiber roll surface is at a distance from the pallet surface facing the roll. This pallet can also be used for transporting reeling shafts, reject rolls and partially wound/unwound parent rolls.

[0028] By the arrangement according to the invention efficient parent roll and reeling shaft and roll transfer is achieved since all steps of transfer of parent roll and reeling shaft are accomplished by an arrangement with at least one transfer device and at least one parent roll pallet and at least one roll pallet and in which the parent roll pallet and the roll pallet are easily exchangeable on/from the transfer device such that smooth change according to transferring needs of the production are accomplished.

[0029] In this description and claims by empty reeling shafts are also meant such reeling shafts that may have layers of fiber web around, for example reject rolls and partially unwound parent rolls

[0030] In the following the invention is discussed in more detail by reference to figures of accompanying drawings.

Figure 1 shows schematically a side view of one example of the arrangement according to one advantageous embodiment of the invention in case of transferring parent rolls.

Figure 2A shows schematically a side view of the arrangement according to the embodiment of the invention when transferring a roll supported on its mantle.

Figure 2B shows schematically a side view of the arrangement according to the embodiment of the invention when transferring a roll supported from its ends.

Figure 2C shows schematically a side view of the arrangement according to the embodiment of the invention when transferring a short roll supported from its ends.

Figure 2D shows schematically a side view of a bock to be used when transferring a roll supported from its ends in connection with examples shown in figures 2B - 2C.

Figure 3 shows schematically an end view of the example arrangement presented in figure 1.

Figure 4 shows schematically an end vie of the example arrangement present in figure 2A.

Figure 5 shows schematically a layout presentation of an example of utilizing one example of the invention.

[0031] In the following description 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. In some figures some reference signs indicating parts or components respective to the same parts or components in other figures have been omitted for the clarity of the figures.

[0032] In the example of figures 1 and 3 is shown one example of the arrangement for transferring loads, in particular elongate loads and as shown the arrangement comprises a movable transfer device 10 that is supported on the floor or corresponding horizontal level of the machine hall of the fiber web production line. Advantageously the transfer device 10 comprises at least one air cushion for moving the transfer device on the floor in desired directions and for lifting the pallet 11 to a distance from the floor level such that the pallet 11 is not in contact with the floor during the transferring movements. In figures 1 and 3 the pallet 11 is a parent roll pallet provided for transferring parent rolls 12 and has support structures 11 A, 11 B for supporting the parent roll 12 from its ends 12A, 12B. In this example the pallet 11 for parent rolls 12 is of U-shape in side view such that the arms of the U create the support structures 11 A, 11 B for the ends 12A, 12B of the parent roll 12. The transfer device 10 is advantageously of the type described in WO 2010125232 but it can also be constructed as devices know from prior art and are as such known to one skilled in the art. For example it can be constructed to be movable on wheels and having a separate mechanism for lifting the pallet for transportation.

[0033] The parent roll pallet 11 is releasably attached to the transfer device 10 for transportation so that when loading the parent roll pallet 11 with a parent roll 12 on the transfer device 10 the transfer device 10 is moved under the parent roll pallet 11 and then the at least one air cushion lifting effect is activated and thus the transfer device 10 loaded the parent roll pallet 11 with a parent roll 12 is ready for transfer movement to the desired target destination.

[0034] At least the parent rolls 12 are transferred with the aid of the parent roll pallet 11 that comprises support structures for supporting the parent roll at its both ends at a height such that the fiber web parent roll 12 surface is at a distance from the parent roll pallet 11 surface facing the parent roll 12. This parent roll pallet 11 can also be used for transporting reeling shafts or reject parent rolls partially wound/unwound parent rolls 12 with more or less fiber web still around the reeling shaft.

[0035] In the example of figures 2A and 4 is shown one example of the arrangement for transferring loads, in particular elongate loads and as shown the arrangement further comprises a roll pallet 13 that is provided for transferring rolls 14, especially between a fiber web machine and a roll maintenance or storage location. The roll pallet 13 is releasably attached on the transfer device. The roll 14 is for example of a device of a fiber web machine, for example a calender roll, a suction roll, a press roll, a coater roll, a guide roll etc. This roll pallet 13 for rolls 14 is of a simple construction for example a flat bed on which the roll 14 to be transferred is loaded so that it is laying on the top surface of the roll pallet 13 supported on its mantle. The transfer device 10 is the same than in figures 1 and 3 or in embodiments where the arrangement in connection with the fiber web machine comprises more transfer devices 10 of substantially the same type of transfer device 10 advantageously similar.

[0036] In the examples of figures 2A - 2C and 4 are shown examples of the arrangement for transferring loads, in particular elongate loads and as shown the arrangement further comprises a roll pallet 13 that is provided for transferring rolls 14 and other elongate loads, especially between a fiber web machine and a roll maintenance or storage location to be releasably attached on the transfer device. The roll 14 is of a device of a fiber web machine, for example a calender roll, a suction roll, a press roll, a coater roll, a guide roll etc. The roll pallet 13 is used for transferring elongate loads excluding parent rolls. The roll pallet 13 is also usable for transferring crane beams, machine parts etc. The transfer device 10 is the same than in figures 1 and 3 or in embodiments where the arrangement in connection with the fiber web machine comprises more transfer devices 10 of substantially the same type of transfer device 10 advantageously similar.

[0037] The roll pallet 13 is releasably attached to the transfer device 10 for transportation so that when loading the pallet 13 with a roll 14 on the transfer device 10 the transfer device 10 is moved under the roll pallet 13 and then the at least one air cushion lifting effect is activated and thus the transfer device 10 loaded the roll pallet 13 with a roll 14 is ready for transfer movement to the desired target destination.

[0038] The roll pallet 13 provided for transferring of rolls 14 is rigid such that weight of the load is substantially evenly divided in relation to the transfer device 10 even in situations where dimensions of the elongate loads alternate.

[0039] The roll pallet 13 is of a simple construction for example a flat bed on which the roll 14 to be transferred is loaded.

[0040] In the example of figure 2A is shown a roll pallet 13 transferring a roll 14 so that the roll 14 is laying on the top surface of the roll pallet 13 supported on its mantle. This kind of transportation is suitable for example for rolls with hard surface and no special requirements of surface quality. This kind or transportation is also suitable for beams of cranes and for many types of machine parts.

[0041] In the example of figure 2B is shown a roll pallet 13 transferring a roll 14 so that the roll 14 is supported at its ends on bocks 16. The bocks 16 are as such known to one skilled in the art and are usually of wood and often used also in storage locations for rolls. The bocks 16 may be releasably attached on the pallet 13 or they might be unattached.

[0042] In the example of figure 2C is shown a roll pallet 13 transferring a short roll 14 so that the roll 14 is sup-

ported at its ends on bocks 16.

[0043] Figure 2D shows schematically a side view of a bock 16 used when transferring a roll supported from its ends in connection with examples shown in figures 2B - 2C. The bocks 16 are as such known to one skilled in the art and are usually of wood and often used also in storage locations for rolls. The bocks 16 may be releasably attached on the pallet 13 or they might be unattached.

[0044] In the examples of figures 2A - 2C are shown examples in which only one load is supported on the roll pallet 13. Depending on dimensions of loads more than one load can be transferred simultaneously on one roll pallet 13. For example at least two short rolls can be located successively and/or at least two rolls with small diameter juxtaposed on the same roll pallet 13. In cases of other types of elongate loads there might be even more possibilities of supporting more loads on the roll pallet. The load can be dimensioned such that a part of it might exceed an edge of the pallet. There might be cases in which loads are supported on the pallet one on the other.

[0045] The pallets 11, 13 are supported on the floor by support parts 11 C, 11 D; 13C, 13D and lifted with the aid of the transfer device 10, advantageously by at least one air cushion off the floor for transferring. The pallets 11, 13 have an opening or a space for the transfer device 10 on the side facing the floor such that the transfer device 10 is movable under the pallet 11, 13 while the pallet 11, 13 is supported on the floor by the support parts 11 C, 11 D; 13C, 13D.

[0046] In figure 5 is shown schematically a layout presentation of an example of utilizing one example of the invention. In this example the transferring arrangement is utilized in connection with finishing end of a fiber web machine. In this example the arrangement is provided for transfers in connection with a reel-up 21, an unwinder 22 of a slitter-winder and a roll storage area 20 and in connection with further devices not shown but are apparent to one skilled in the art. In connection with the reel-up 21 a finished parent roll 12 is loaded on a transferring device 10 on a parent roll pallet 12 and is ready or transfer to the desired location for example to the unwinder 22 of the slitter-winder or to the parent roll storage area 24. In connection with the roll storage area 20 a transfer device 10 with a roll pallet 13 is ready for taking over a roll or other load transfer in a waiting position. One pallet 11; 13 is also shown in a storage location. As shown by arrows X, Z the transfer device 10 is movable on the floor level in desired directions, in X- and Z directions and in all directions in between and it is also usable for turning movements.

[0047] The arrangement for transferring elongate loads in connection with production of fiber webs comprises a transfer device 10 that is according to the need of production provided for transfer either with a parent roll pallet or a roll pallet. The arrangement comprises at least one transfer device 10 and at least one parent roll pallet 11 and at least one roll pallet 13 but according to the needs of production more transfer devices and more pallets can be provided.

[0048] The transfer device 10 may be manually driven and/or automatic. The transfer device 10 may be switched to a manual drive mode or an automatic drive mode. An apparatus section necessary for the transfer device 10 may be arranged in the transfer device, such as a drive and wheels, en energy transfer arrangement necessary for producing kinetic energy and/or an energy storage arrangement, such as compressed-air hoses, cables, etc. or batteries.

[0049] In this description, 'floor' refers to such an even support plane on which the movable support apparatus may be moved by means of air cushion technology, such as a machine hall floor, the floors and support planes in the aisles of the building, and the surface of the ground outside the building. The transfer device 10 may be moved over minor unevenness on the support plane.

[0050] The target station of the transferring arrangement may be a device of the fiber web manufacturing process e.g. a reel-up or an unwinder, a storage area, a storage rail, a transfer rail, a reject location, a location related to roll maintenance, such as a roll grindery. The target stations may be within the area of one or more machine halls and/or within the area of one or more fiber web manufacturing processes and/or within the area of one or more fiber web manufacturing lines.

[0051] Above some preferred embodiments and examples of the invention have been described but many modifications are possible to those presented and a person skilled in the art will appreciate that any embodiment of an example of the invention may be applied in the same aspect and other aspects alone or in combination with other embodiments.

Claims

1. Arrangement for transferring loads, in particular elongate loads, such as parent rolls and/or reeling shafts and/or rolls and/or beams of cranes and/or machine parts, between at least two target stations (20; 21; 22) in connection with production of fiber webs, **characterized in, that** the arrangement comprises at least one transfer device (10), at least one pallet (11) that is provided for transferring of parent rolls (12) and/or reeling shafts (15) i.e. parent roll pallet (11), and at least one pallet (13) that is provided for transferring rolls (14) i.e. roll pallet (13).

2. Arrangement according to claim 1, **characterized in, that** in the arrangement the transfer device (10) comprises at least one air cushion.

3. Arrangement according to claim 1, **characterized in, that** in the arrangement the transfer device (10) comprises wheels.

4. Arrangement according to claim 1, **characterized in, that** transfer device (10) is supported on the floor or corresponding horizontal level of the machine hall of the fiber web production line.

5. Arrangement according to claim 1, **characterized in, that** in the arrangement the parent roll pallet (11) and the roll pallet (13) are exchangeable on/from the transfer device (10) and that the pallets (11, 13) are releasably attached to the transfer device (10).

6. Arrangement according to claim 1, **characterized in, that** the roll pallet (13) is rigid such that weight of the load is substantially evenly divided in relation to the transfer device (10) even in situations where dimensions of the elongate load alternate.

7. Arrangement according to claim 1, **characterized in, that** the roll pallet (13) and the parent roll pallet (11) are supported on the floor and are lifted with the aid of the transfer device (10) to a height off the floor for transferring.

8. Arrangement according to claim 1, **characterized in, that** the pallet (11) for parent rolls (12) is substantially of U-shape in side view such that the arms of the U create the support structures (11A, 11 B) for the ends (12A, 12B) of the parent roll (12).

9. Arrangement according to claim 7, **characterized in, that** the pallets (11, 13) are supported on the floor by support parts (11 C, 11 D; 13C, 13D) and that the pallets (11, 13) have an opening or a space for the transfer device (10) on the side facing the floor such that the transfer device (10) is movable under the pallet (11, 13) while the pallet (11, 13) is supported on the floor by the support parts (11 C, 11 D; 13C, 13D).

10. Arrangement according to claim 1, **characterized in, that** the arrangement comprises at least two different kinds of pallets (11, 13) that are moved by the same at least one transfer device (10).

11. Arrangement according to claim 1, **characterized in, that** in the arrangement the at least one transfer device (10) is provided for moving both kinds of pallets (11, 13).

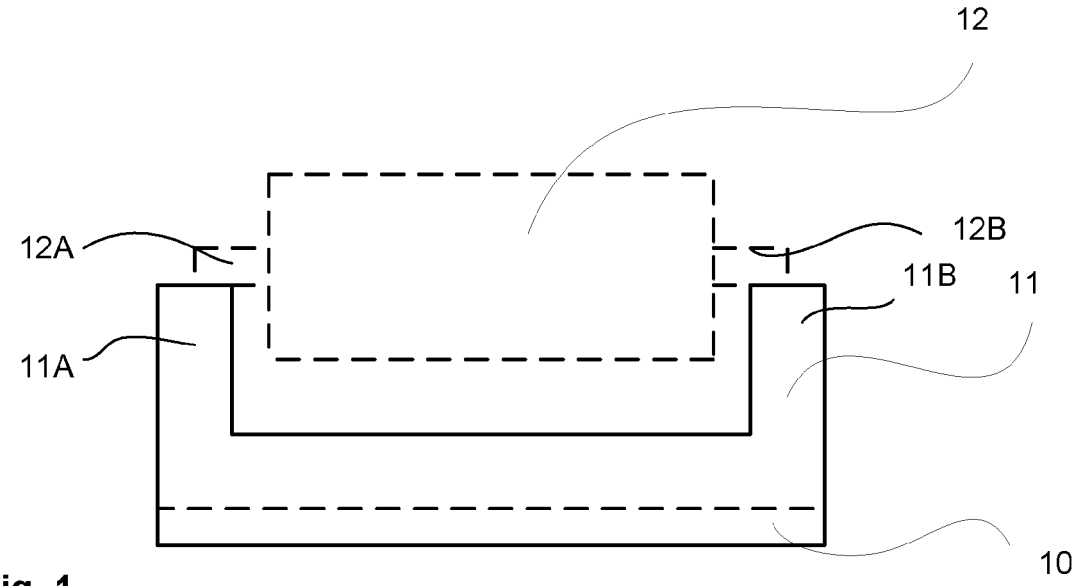

Fig. 1

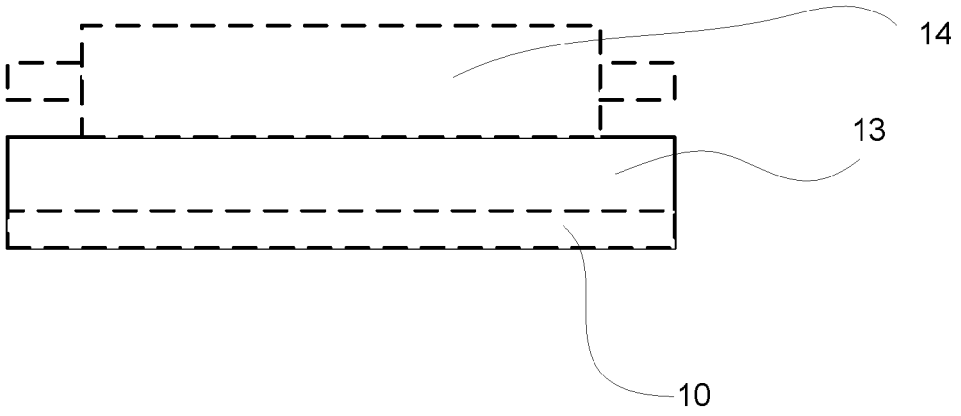

Fig. 2A

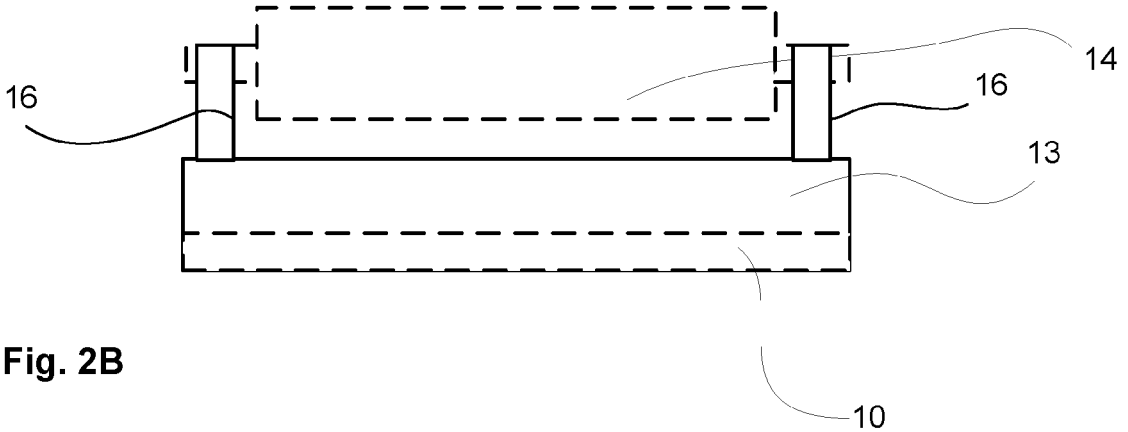

Fig. 2B

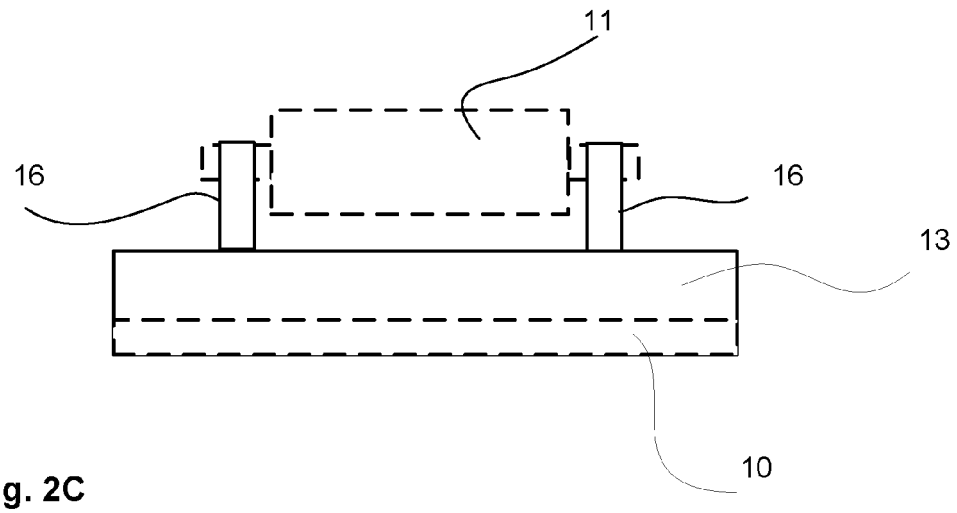

Fig. 2C

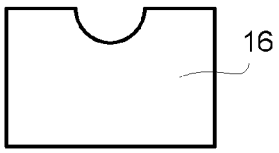

Fig. 2D

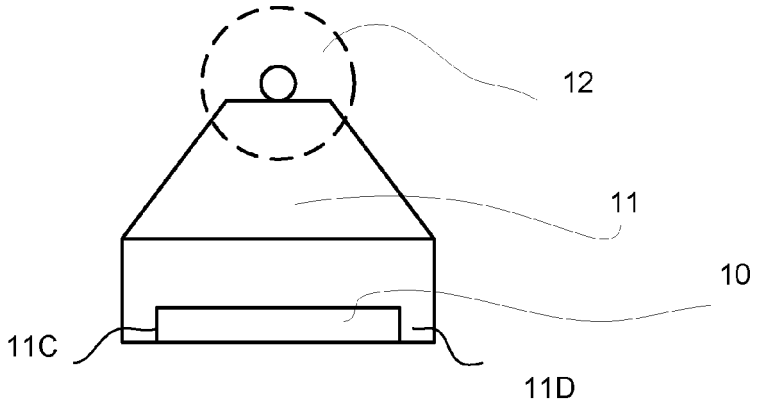

Fig. 3

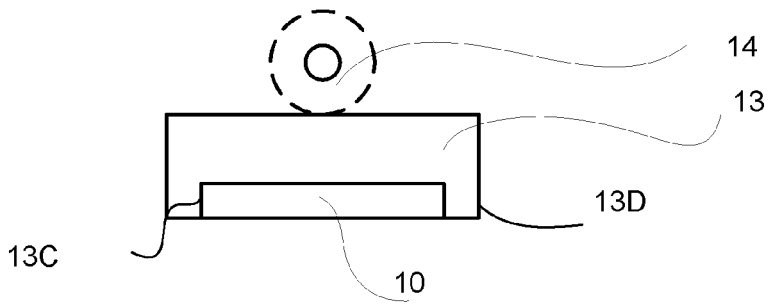

Fig.4

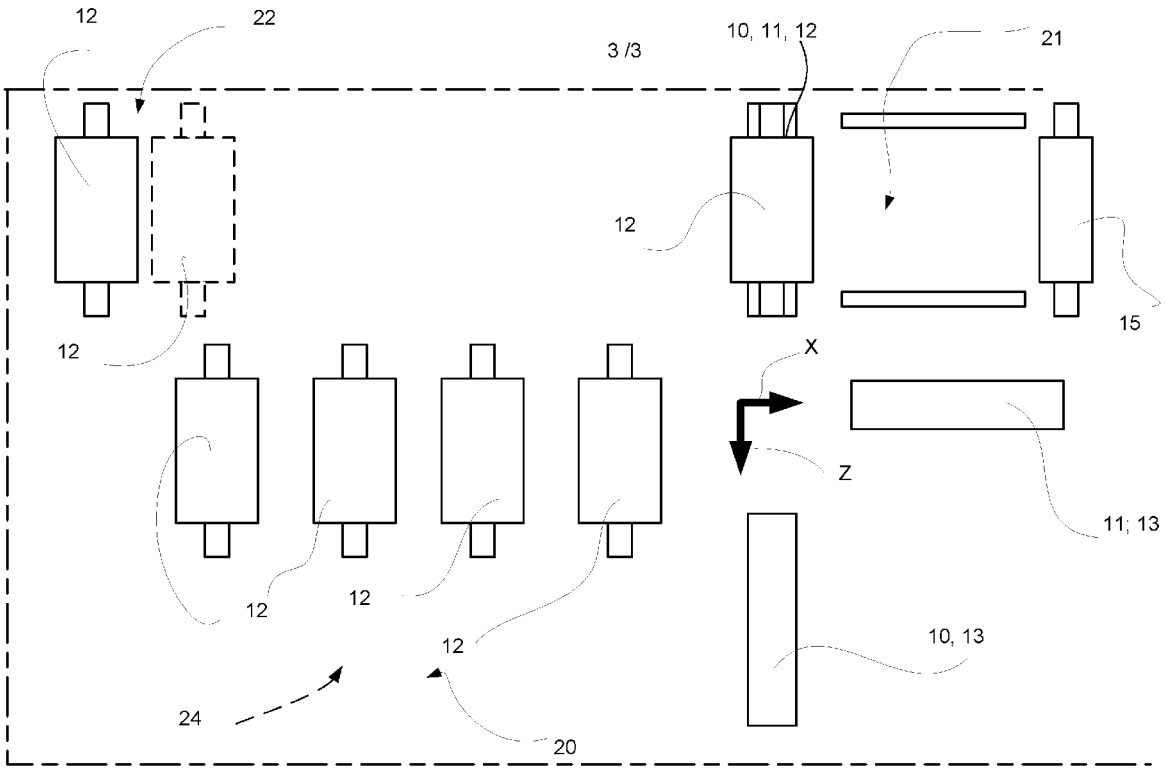

Fig. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 18 3680

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	DE 20 2010 003281 U1 (METSO PAPER INC [FI]) 27 May 2010 (2010-05-27) * the whole document * -----	1,4,6,8 2,3 5,7,9-11	INV. B65H19/12
X,D A	WO 2010/125232 A2 (METSO PAPER INC; ENWALD PETRI [FI]; KOJO TEPPO [FI]; LANNES PETTERI [F) 4 November 2010 (2010-11-04) * page 6, line 30 - page 7, line 11 * * page 7, line 28 - page 8, line 1 * * page 9, line 8 * -----	1-4,6 5,7-11	
X	JP 59 092853 A (KITO KK) 29 May 1984 (1984-05-29) * abstract; figures * -----	1,3,5-9	
X Y A	DE 10 2005 000081 A1 (VOITH PATENT GMBH [DE]) 4 January 2007 (2007-01-04) -----	1,3,4,6, 10,11 2 5,7-9	
Y	EP 2 116 494 A2 (VOITH PATENT GMBH [DE]) 11 November 2009 (2009-11-11) * the whole document * -----	2,3	TECHNICAL FIELDS SEARCHED (IPC) B65H B65G B60V
A	DE 10 2008 029964 A1 (MANROLAND AG [DE]) 21 January 2010 (2010-01-21) * claim 1; figure 1 * -----	5	
A	DE 100 48 135 A1 (HOLZAPFEL & CO KG GEB [DE] HOLZAPFEL GMBH & CO KG GEB [DE]) 18 April 2002 (2002-04-18) -----	1	
A	WO 97/09261 A1 (MINNESOTA MINING & MFG [US]) 13 March 1997 (1997-03-13) * page 5, line 4 - line 29; figures 3,4 * -----	1	

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 March 2012	Haaken, Willy

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 18 3680

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-03-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202010003281 U1	27-05-2010	NONE	
WO 2010125232 A2	04-11-2010	EP 2424801 A2	07-03-2012
		US 2012048986 A1	01-03-2012
		WO 2010125232 A2	04-11-2010
JP 59092853 A	29-05-1984	JP 1481803 C	27-02-1989
		JP 59092853 A	29-05-1984
		JP 63030258 B	17-06-1988
DE 102005000081 A1	04-01-2007	NONE	
EP 2116494 A2	11-11-2009	CN 201605053 U	13-10-2010
		DE 102008001701 A1	12-11-2009
		EP 2116494 A2	11-11-2009
DE 102008029964 A1	21-01-2010	NONE	
DE 10048135 A1	18-04-2002	NONE	
WO 9709261 A1	13-03-1997	AU 3504295 A	27-03-1997
		DE 69516731 D1	08-06-2000
		DE 69516731 T2	31-08-2000
		EP 0850185 A1	01-07-1998
		JP H11512065 A	19-10-1999
		WO 9709261 A1	13-03-1997

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1266091 B1 **[0007]**
- EP 1266091 A **[0012]**
- EP 2116464 A2 **[0017]**
- EP 2116495 A2 **[0018]**
- WO 2010125232 A **[0019] [0022] [0032]**