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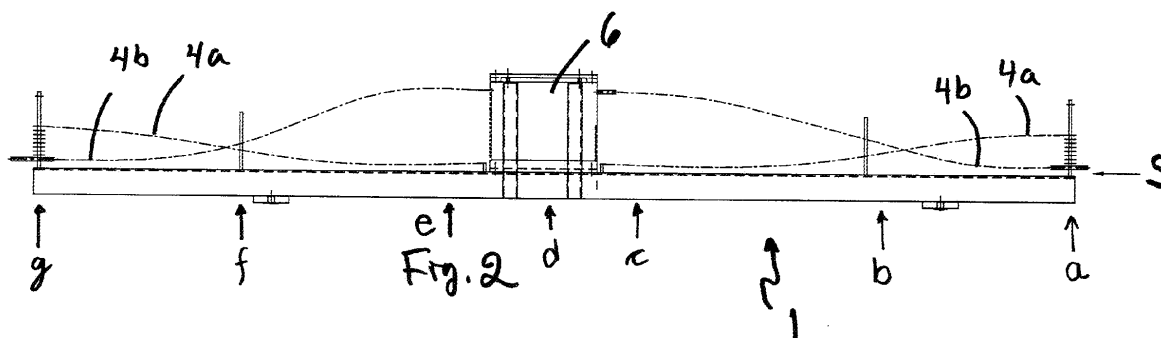
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(54) **Wood block handling**

(57) The invention comprises an arrangement and a method in wood block (2) handling. The method comprises

- sawing blocks (2) of a desired length from an elongated wood material with one or more automatic cutting saws, which blocks have a longitudinal direction (S);
- separating the blocks (2) after the automatic cutting saw into different grades according to a desired position of the sawed block (2);

- transferring the blocks in a transfer device (1) in their longitudinal direction (S) toward a next handling stage;
- turning the sawed blocks (2) around their longitudinal axis into the desired position before they are fed into the next handling stage,
- turning the sawed blocks (2) around their longitudinal axis in the turning chute (3) arranged in connection with the transfer device (1) at the same time as the blocks (2) are transferred in the longitudinal direction toward the next handling stage.



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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The object of the invention is a method and an arrangement in wood block handling and new uses according to the preambles of the independent claims presented below. The invention especially relates to a new way for handling wood blocks, where after the cutting saw the blocks are turned based on their grade into a desired position before they are fed into the next handling stage.

PRIOR ART

[0002] Turning of wood blocks based on their grade is done in the wood industry for many different reasons. It may for example be desirable to have the grains of the wood in a certain direction or possible poor edges or knag-free surfaces of the wood blocks always in a certain direction. The turning of elongated wood blocks is during the transverse or longitudinal movement of the wood blocks done by machine one by one or several at a time. The wood blocks may be stopped for the turning or they may be turned during movement. The turning may also be done manually.

[0003] Mechanical turning devices may grab hold of a block for example with underpressure, cylinders or by pressing between conveyor belts. Some devices lift the block to be turned by its end or by its long side during movement or when the block is stationary. In some applications the block is allowed to fall or slide against a suitable stopper, whereby the turning occurs with the aid of gravity and kinetic energy. The driving force of mechanical turning devices is usually electricity or pressurised air.

[0004] Known solutions intended for turning wood blocks into a desired position are often complicated, possibly slow down the rest of the process and they may have many malfunctions. The same solution is often difficult to adjust to fit blocks of different sizes.

OBJECT OF THE INVENTION

[0005] It is an object of the present invention to reduce or even eliminate the above-mentioned problems appearing in prior art.

[0006] It is especially an object of the present invention to provide a solution, with which a handling device for sawed wood blocks is provided, which in comparison to previous ones has a larger capacity, lower use and service costs, is more reliable and can be adjusted for several timber dimensions.

DESCRIPTION OF THE INVENTION AND SOME OF ITS EMBODIMENTS

[0007] In order to achieve among others the objects

mentioned above, the arrangement and method and other objects of the invention are characterised by what is presented in the characterising parts of the enclosed independent claims.

[0008] The embodiments and advantages mentioned in this text relate, where applicable, to all embodiments of the invention, even if this is not always specifically mentioned.

[0009] A typical arrangement according to the invention in wood block handling comprises

- one or more automatic cutting saw, which is arranged to saw blocks of a desired length from an elongated wood material, which blocks have a longitudinal direction;
- an automatic separating device for separating the blocks after the automatic cutting saw into different grades according to a desired position of the blocks;
- a transfer device for transferring the sawed blocks in the longitudinal direction of the blocks toward a next handling stage;
- a turning device for turning the sawed blocks around their longitudinal axis into the desired position before they are fed into the next handling stage.

[0010] In a typical arrangement according to the invention the turning device comprises a turning chute, which is arranged in connection with the transfer device for turning the blocks around their longitudinal axis at the same time as they are moved in their longitudinal direction toward the next handling stage.

[0011] An arrangement according to the invention may be used in a method according to the invention in wood block handling, which method has at least the following stages

- sawing blocks of a desired length from an elongated wood material with one or more automatic cutting saws, which blocks have a longitudinal direction;
- separating the blocks after the automatic cutting saw into different grades according to a desired position of the sawed block;
- transferring i.e. moving the blocks in a transfer device in their longitudinal direction toward a next handling stage;
- turning the sawed blocks around their longitudinal axis into the desired position before they are fed into the next handling stage, whereby the turning is done in a turning chute arranged in connection with the transfer device at the same time as the blocks are moved in the longitudinal direction toward the next handling stage.

[0012] In one embodiment of the invention the separating of the sawed blocks into different grades according to the desired position is done as controlled by an automatic grading device. The automatic grading device is arranged to observe the grade of the sawed blocks and

to make decisions regarding which grade each sawed block belongs to. The observing may be done before or after the sawing. The automatic grading device is arranged to produce control information regarding the grade of each sawed block for the automatic separating device. Based on the obtained control information the automatic separating device separates the blocks in a certain way based on their grade. For example blocks of the first grade may be guided into a first transfer device and blocks of the second grade may be guided into a second transfer device. The automatic grading device is prior art as such.

[0013] The automatic cutting saw cuts the wood blocks as controlled for example by a user or the automatic grading device. The cutting usually optimizes the grade. The automatic cutting saw is prior art as such.

[0014] The term elongated means that the wood material to be sawed is for example board, batten or laminated timber, the dimensions of which in one direction is at least twice as long as the directions, which are perpendicular thereto. This longest direction typically defines the longitudinal direction of the wood material. In one embodiment of the invention the sawed blocks are also elongated. In one embodiment of the invention the longitudinal direction of the original wood material to be sawed also remains as the longitudinal direction of the sawed blocks.

[0015] In one embodiment of the invention the sawed blocks are of the same size.

[0016] The transfer device may comprise for example various conveyors, such as belts, chutes, hoists, pushers, rollers and wheels. The transfer device may be at least partly active i.e. used, whereby it has active power means, such as a pulling roller assembly or a belt conveyor. The transfer device may also be at least partly passive i.e. not used, whereby it may for example comprise freely rotating rollers or sliding surfaces.

[0017] The next handling stage may for example be the grouping of the blocks as needed into a board, line or bundle, or finger-jointing, gluing or other attaching of the blocks.

[0018] A desired position means a position determined according to the grade optimisation, which improves the value and/or usability of the wood block in the next handling stage. The desired position may after the cutting be the position of the block without turning or the block as turned around its longitudinal axis to a certain degree. The desired position may for example be 90, 180 or 270 degrees compared to the position after the sawing. The turning may always be done in the same direction or in the direction, where the turning in each case requires the least amount of turning.

[0019] According to the desired position of the blocks those blocks, which need to be turned the same amount and in the same direction in order for them to be in the desired position, are sorted into the same grade.

[0020] A turning chute means a turning device known as such, which has a turning, e.g. screw-like shape. The

block to be turned is arranged to move along the turning chute, so that the block turns due to the shape of the chute around its axis as much as the shape of the chute determines. The turning chute may for example comprise various conveyors, such as belts, rollers and wheels. The turning device may be at least partly active i.e. used, whereby it has active power means, such as a pulling roller assembly or a belt conveyor. A belt conveyor may for example form one or several surfaces of the turning chute, against which the block to be turned is held. The turning chute may also be at least partly or completely passive i.e. not used, whereby it may for example comprise freely rotating rollers or sliding surfaces.

[0021] In one embodiment of the invention at least two transfer devices are used, such as belt conveyors or chutes. The transfer devices are arranged to transfer the blocks in their longitudinal direction. In one embodiment of the invention each grade sorted according to its desired position has its own transfer device, so that the grades are kept separate from each other until the next handling stage. In one embodiment of the invention blocks of each grade are moved in their longitudinal direction in their own longitudinal transfer device. Each different grade, which needs turning, has its own kind of turning chute, which turns the blocks of the grade in question just the required amount.

[0022] It has now thus been found that it is profitable to turn sawed blocks separated into different grades around their axis during the longitudinal movement in the turning chute. The turning chute is a simple and reliable way to turn the block into a certain desired position. The turning chute functions very well in a situation according to the invention, where only blocks intended to be turned the same amount are led into one turning chute. The turning chutes are prior art as such. They are simple and thus reliable. The turning chute may be arranged on the path from one block handling stage to another. The blocks do not necessarily need to be stopped for the turning chute, and the blocks do not need to be separately grabbed. Thus the turning in the turning chute slows the process only a little, if at all.

[0023] In one embodiment of the invention the force moving the blocks is directed onto the blocks outside the turning chute, for example before the turning chute. Thus the blocks may move forward in the turning chute by pushing with line pressure. Thus the structure of the turning chute may be very simple.

[0024] In one embodiment of the invention the turning chute is used for turning the sawed wood blocks, which are sorted automatically according to the desired position, a desired amount as the blocks are moved in the longitudinal direction toward the next handling stage.

[0025] The invention is suited for use for example in handling glue board lamellae or in manufacturing finger-jointed components.

BRIEF DESCRIPTION OF THE FIGURES

[0026] The invention is described in more detail below with reference to the enclosed schematic drawing, in which

Figures 1a-1g show cross-sections of a transfer device according to the invention cut at the points a-g of Figure 2, and

Figure 2 shows the transfer device according to the invention seen from the side.

DETAILED DESCRIPTION OF THE EXAMPLES OF THE FIGURES

[0027] Figure 2 shows a transfer device 1 according to the invention. The blocks 2 come to the transfer device 1 of Figure 2 from an automatic cutting saw (not shown). After the cutting saw the sawed blocks 2 are separated according to how much and in which direction they need to be turned, so that they would be in the optimal position with regards to the process. Only such blocks 2 are led to the transfer device 1 of Figure 2, which it is desired to turn 180 degrees around their longitudinal axis. After the transfer device 1 the blocks are guided to the next handling stage, for example gluing (not shown).

[0028] The transfer device has a turning chute 3, of which only the dotted lines depicting the position of the outer edges 4a and 4b of the sliding plane 4 of the turning chute are shown in Figure 2, for the sake of the clarity of the figure. The turning chute 3 has a screw-like shape, so that the block 2 coming into the transfer device from the right in the figure is turned 180 degrees around its longitudinal axis in the travel direction as it travels through the turning chute. The general travel direction of the block in the transfer device 1 is shown with an arrow S. The sliding plane 4 of the turning chute, i.e. the surfaces of the turning chute which are intended to touch the block 2 to be turned, are formed from steel round bars. The sliding plane 4 is thus passive, i.e. not used. During the use of the transfer device 1 there are several blocks 2, which are right next to each other, subsequently in the turning chute 3. The kinetic energy for the blocks 2 is obtained with line pressure, so that some block in the line is before the turning chute pushed forward in the travel direction S, for example between two belt conveyors. The pushed block then pushes all the blocks before it forward through the turning chute 3.

[0029] Figure 1a-1g show cross-sections of the transfer device at the points a-g marked in Figure 2, seen in the direction of the arrow S. A sawed wood block 2 with a rectangular cross-section has been drawn in Figures 1a-1g in different situations as it travels in the turning chute 3 of the transfer device. A dashed corner 5 has been marked in the wood block 2 in order to illustrate the turning of the block. In Figure 1a the block has come into the transfer device on its breast on the sliding plane 4. The corner 5 is in Figure 1a down on the right. In

Figure 1b the screw-like shape of the turning chute has turned the block about 45 degrees around its longitudinal axis in the travel direction as compared to the initial situation in Figure 1a. The corner 5 is in Figure 1b at the bottom of the block. In Figure 1c the screw-like shape of the turning chute has turned the block about 90 degrees around its longitudinal axis in the travel direction as compared to the initial situation in Figure 1a. The corner 5 is in Figure 1c down on the left. In the Figure 1c, 1d and 1e the turning chute 3 is straight, and does not turn the block 2. In Figure 1d there is an adjustment device 6, by means of which the size of the turning chute may be adjusted as desired. Figure 1d shows how the sliding plane 3 in the turning chute from there onwards shifts to the other side of the block 2. In Figure 1f the screw-like shape of the turning chute has turned the block about 135 degrees around its longitudinal axis in the travel direction as compared to the initial situation in Figure 1a. The corner 5 is in Figure 1f on the left. In Figure 1g the screw-like shape of the turning chute has turned the block about 180 degrees around its longitudinal axis in the travel direction as compared to the initial situation in Figure 1a. The corner 5 is in Figure 1g up on the left.

[0030] The figures show only a few preferred embodiments according to the invention. Facts of secondary importance with regards to the main idea of the invention, facts known as such or evident for a person skilled in the art, such as power sources or support structures possibly required by the invention, are not separately shown in the figures. It is apparent to a person skilled in the art that the invention is not limited exclusively to the examples presented above, but that the invention may vary within the scope of the claims presented below. The dependent claims present some possible embodiments of the invention, and they are not to be considered to restrict the scope of protection of the invention as such.

Claims

1. An arrangement in wood block (2) handling, which arrangement comprises
 - one or more automatic cutting saws, which are arranged to saw blocks (2) of a desired length from an elongated wood material, which blocks have a longitudinal direction (S);
 - an automatic separating device for separating the blocks (2) after the automatic cutting saw into different grades according to a desired position of the blocks (2);
 - a transfer device (1) for transferring the sawed blocks (2) in the longitudinal direction (S) of the blocks toward a next handling stage;
 - a turning device (3) for turning the sawed blocks around their longitudinal axis into the desired position before they are fed into the next handling stage;

characterised in that the turning device (3) comprises

- a turning chute (3), which is arranged in connection with the transfer device (1) for turning the blocks (2) around their longitudinal axis at the same time as they are moved in their longitudinal direction toward the next handling stage.

2. The arrangement according to claim 1, **characterised in that** it comprises

- at least two transfer devices (1), which are arranged to transfer blocks (2) in their longitudinal direction and to keep the grades separate from each other until the next handling stage.

3. The arrangement according to claim 1 or 2, **characterised in that**

- the grades are kept separate from each other and blocks (2) of each grade are moved in their longitudinal direction in their own longitudinal transfer device (1).

4. The arrangement according to any of the preceding claims, **characterised in that**

- each grade has its own transfer device (1), which has a turning chute (3), which is arranged to turn the blocks (2) of a certain grade around their longitudinal axis by just the amount defined for this grade.

5. The arrangement according to any of the preceding claims, **characterised in that**

- surface of the turning chute (3) is a belt conveyor, which is arranged to move the blocks (2).

6. A method in wood block (2) handling, which method comprises at least the following stages

- sawing blocks (2) of a desired length from an elongated wood material with one or more automatic cutting saws, which blocks have a longitudinal direction (S);
- separating the blocks (2) after the automatic cutting saw into different grades according to the desired position of the sawed block (2);
- transferring the blocks in a transfer device (1) in their longitudinal direction (S) toward a next handling stage;
- turning the sawed blocks (2) around their longitudinal axis into a desired position before they are fed into the next handling stage,

characterised in

- turning the sawed blocks (2) around their longitudinal axis in a turning chute (3) arranged in connection with the transfer device (1) at the same time as the blocks (2) are transferred in the longitudinal direction toward the next handling stage.

7. The method according to claim 6, **characterised in**

- transferring the blocks (2) in their longitudinal direction and keeping the grades separate from each other until the next handling stage with at least two different transfer devices (1).

8. The method according to claim 6 or 7, **characterised in**

- keeping the grades separate from each other and moving the blocks (2) of each grade in their longitudinal direction in their own longitudinal transfer device (1).

9. The method according to any of the preceding claims 6-8, **characterised in**

- turning the blocks (2) of each grade around their longitudinal axis in the turning chute (3) of their own transfer device (1) by just the amount defined for this grade.

10. The method according to any of the preceding claims 6-9, **characterised in**

- moving the blocks (2) by means of the belt conveyor arranged to be the surface of the turning chute (3).

11. The method according to any of the preceding claims 6-10, **characterised in**

- directing the force moving the blocks (2) onto the blocks (2) outside the turning chute (3), before the turning chute.

12. The method according to claim 11, **characterised in**

- moving the blocks (2) in the turning chute (3) by pushing with line pressure.

13. Use of the arrangement according to claims 1-5 in the manufacturing of a glue board in the handling of glue board lamellae.

14. Use of the arrangement according to claims 1-5 in the manufacturing of finger-jointed components in the handling of the wood blocks to be used.

15. Use of a turning chute (3) for turning sawed wood

blocks (2), which are sorted automatically according to the desired position, by a desired amount as the blocks (2) are moved in the turning chute (3) in their longitudinal direction (S) toward a next handling stage.

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