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Description

This invention concerns improvements in and relating to timber production, more particularly to wet mill production.

The invention provides a process of wet mill sawing and apparatus for use in wet mill sawing in accordance with the process.

This invention concerns more particularly the sawing of cants into timber in the wet mill, generally the sawing of cants into lumber or rough timber. In the wet mill logs are sawn into cants, scantlings, boards, planks and deals. In view of its nature as will be described below this invention may be of especial interest in the sawing of fast grown timber, for example, such as occurs in the Southern Hemisphere including countries such as Southern Africa, South America and Australasia. Similarly the invention may be of especial significance in sawing of boards, that is thin planks.

The invention provides primarily a process of sawing timber and in addition apparatus for sawing timber.

In the art of sawing timber a perennial problem arises in that the timber, which is of regular and rectangular shape, has to be sawn from logs which are in general of irregular cylindrical shape, and more especially so in the case of fast grown timber. The most important characteristics of this irregularity for present purposes are the taper of the logs and the curvature of the logs. The irregular cylindrical shape of the logs makes it impossible to convert the entire volume of the log into regular sawn timber and in South African conditions it has been calculated that on average not more than seventy percent of logs can theoretically be converted into timber.

In practice it is found that on average only approximately fiffy percent is converted into sawn timber, and a continuing endeavour of the art is to improve the percentage figure attained in practice to a figure nearer to the theoretical maximum.

In the art the general process of sawing timber is to feed the log through a gang saw so as to cut off at least two sideboards leaving a cant (or flitch); the cant is then transported to a second gang saw, being rotated through 90° on its longitudinal axis, and sawn into deals and sideboards. The sideboards are then transported to edging saws which are gang saws which saw the edges true and square. This timber or lumber produced in the wet mill is then usually transported to the drying kilns.

In the first sawing the log is fed into the gang saw generally by means of an in-feed carriage which may be remote controlled by an operator but which is more usually controlled by an operator seated on the carriage,and it is essential that the log be rotated on its axis by the operator so that the major curvature of the log lies in a vertical plane. It is here that heavy reliance is placed on human judgement and to the extent that accurate alignment is not achieved losses in the percentage utilisation of the log volume results.

In an alternative to the in-feed carriage, an automatic feeding apparatus, which employs pairs of rollers running on vertical axes have been employed and here again it is most important that the log be orientated with its major curvature lying in a vertical plane, generally with the concave surface facing upwards.

When the cant is rotated through 90° and cut in a second salting operation into boards and planks this is most commonly done in straight cuts,these, primarily as a result of the curvature of the cant, resulting in considerable losses due to poor usage of the volume in the cant and in uneconomical cuts; sometimes to reduce these problems the flitch is cut into two halves lengthwise. In Southern Africa where curvature presents an aggravated problem a technique has been used (disclosed in AT-B-357 329) to cut the cant around the curve, guiding the cant on one side edge of the cant, preferably the concave curved side edge. This produces the cuts which form the deals or planks and boards parallel to one side of the cant.

Although cutting around the curve of the cant has improved the wet mill yield as compared with straight cutting,the results still fall very far short of the theoretically attainable maximum. Furthermore,since some planks have partly heart timber and partly side timber, losses occur in the dry timber due to warpage, and the quality of the timber is reduced, especially with fast grown timber, so that any gain this technique may achieve in the wet mill is off-set by warping in the dry mill and a reduced quality product.

Sawing along curved saw lines along or parallel to the curved longitudinal centre line of a cant is also already known, for example from DE-A-504 700 or SE-B-366 679 which disclose a process according to the precharacterizing portion of independent claim 1. Further improvements of the percentage utilization of the cant volume are still desired.

Reference is also made to US-A-4 144 782 which discloses an apparatus according to the precharacterizing portion of independent claim 5 and concerns splitting a log along the curved centre line of a log. Two guidance stations are provided adjustable transversely to the saw centre line, each comprising a pair of rollers equally adjustable in opposite directions.

In accordance with the invention there is provided a process of wet mill sawing of a cant having a curved longitudinal centreline, longitudinal flat surfaces and curved sides, said curved sides and

flat surfaces intersecting one another to form curved longitudinally extending edge lines therebetween, said flat surfaces being parallel to an imaginary plane in which the main longitudinal curvature of the cant lies, which process comprises locating the cant at the in-feed side of a gang saw having a plurality of saw blades and a straight longitudinal centre line, orienting the cant around its longitudinal axis so that its maximum overall longitudinal curvature lies in a horizontal plane, engaging the curved sides of the cant to locate it horizontally at a first guidance station on the in-feed side of the saw adjacent thereto, feeding the cant longitudinally into the saw along a curved feed line approximating the curved longitudinal centre line of the cant while guiding the cant at said first guidance station, and sawing the cant along curved saw lines into deals, sideboards and/or scantling of constant thickness, the sawing step, maintaining the curved saw lines at constant distances from the curved longitudinal centre line of the cant, characterized by engaging the curved sides of the cant to locate it horizontally at a second guidance station spaced a distance from the first guidance station wich is less than half the overall length of the cant providing at least two spaced detecting means essentially located in a vertical plane parallel to the saw centre line and laterally off-set a predetermined dimension from a horizontal line parallel to the saw centre line and passing through one of said saw blades, selecting said off-set dimension so that when a said curved edge line is detected by said detecting means said curved edge line intersects said horizontal line passing through a saw blade substantially at said one saw blade, and, prior to feeding the cant through the saw, temporarily arresting it and laterally displacing the two guidance stations with the cant gripped therein relative to the detecting means until at least one of said curved edge lines is detected by said detecting means.

Hence, according to the invention, an edge of one (or both) of the two flat surfaces is aligned with a "saw line" parallel with the longitudinal centre line of the saw. The "saw line" is a line extended parallel to the centre line on the in-feed side of the saw from a saw blade, which is thus suitably set to cut on the edge of the flat surface of the cant. This achieves the advantage that a full deal is cut, that is having a full rectangular cross section.

Aligning an edge of a flat surface of a cant with a saw line is achieved by feeding the cant towards the saw in a position in which the flat surface is intersected by a saw line, detecting the surface and edging the cant across until an edge of the surface is detected to intersect the saw line. The detection is preferably carried out in positions in advance of each of the two positions at which the curved longitudinal centre line of the cant intersects with a line parallel with the longitudinal centre line of the saw.

In accordance with an extension of the "edge alignment with a saw line" principle, the process is adapted to select any one particular saw line from a plurality of options. This selection is made by detecting the size of the cant flat surface (that is, the width of the flat surface) and from this information making a decision of which saw line to align on. (This is best done by a programmed computer). This allows the gang saw blades to set up in anticipation of the range of cant sizes to be dealt with in the course of sawing, and the saw line selection is made to give an optimum sawing pattern for each size of cant encountered in the range. The range can be defined by the sorting criteria implemented in the mill ahead of the saw.

In operating the process preferably once the leading end of the cant enters the saw blades the aligning control is removed at the second position.

In further accordance with the invention there is provided an apparatus of wet mill sawing of a cant having a curved longitudinal centre line, longitudinal flat surfaces and curved sides, said curved sides and flat surfaces intersecting one another to form curved longitudinally extending edge lines therebetween, said apparatus comprising two guidance stations located at the infeed side of a gang saw, one of said guidance stations being adjacent the saw and the other being spaced from said one guidance station a distance less than half the overall length of the cant to be sawn, said guidance stations having locating mechanisms for transversely adjusting the guidance stations with respect to the feed direction of the cant and each guidance station comprising guidance elements adapted to engage and guide opposite curved sides of the cant and being movable towards and away from each other transversely to the feed direction and synchronized for movement of equal magnitude and in opposite directions, the guidance elements of both guidance stations being centered with respect to a line parallel with a common centre line, each guidance station locating mechanism comprising detection means said detection means being spaced from one another in longitudinal direction of the saw, characterized in that said saw comprises a plurality of saw blades for sawing said cant along curved saw lines contantly spaced from the curved longitudinal centre line of the cant, that the detection means are adapted to detect one of said curved edge lines and are mounted in a vertical plane parallel to the saw centre line and off-set laterally a predetermined dimension from a horizontal line parallel to the saw centreline and passing through one of said saw blades, said off-set dimension being selected so that a said curved

edge line intersects said horizontal line generally at said saw blade when detected by said detecting means.

Since the typical cant will taper, preferably the detection means has offset means, adapted to permit an offset with respect to the saw line by an amount which bears a relation to the taper of the cant and distance of the station from the saw. This then provides that the end of the cant engages the saw blade with the edge of the flat surface in line with the saw blade. Where the thin end enters first the detection means would be offset from the saw line outwardly of the cant, and where the thick end enters first the offset would be inwardly.

A preferred feature of apparatus is that the rollers, in at least one of the two stations, preferably that station nearest the saw, comprise a tandem set of rollers. In a tandem set of rollers there are four rollers in total at the station; the four rollers are arranged in two opposite pairs, each pair mounted on a bogie which is pivotally supported at a pivot point equidistant between the rollers. This arrangement reduces the effect of knobs and bumps on the cant.

A further preferred feature of apparatus is that the locating mechanisms for transversely adjusting the guidance stations are adapted to shift the guidance stations by a limited distance, typically by a distance no more than a fraction of the smallest cant width to be sawn. This preferred mechanism is preferably used in a preferred refinement of the process to shift the position of saw cuts in the cant for boards, deals or other cuts transversely by a small amount, for example, no more than the thickness of a deal or board, to optimise yield of boards or deals at the expense of sideboards. Reference is made to the description of the preferred process above referring to a "saw line" to cut a full cross-section deal, and with reference to figures 7 and 8 to explain this aspect more fully.

However, in another preferred embodiment of the invention, the locating mechanisms for transversely adjusting the guidance stations are adapted to shift the guidance stations by a distance related to one or more spacings between saw lines, sufficient to bring the cant to any one selection of alternative sawing patterns. Preferably means is adapted to control the selection according to a detection of the size of the cant. For example, such detection can be done by means of the clamping rolls which clamp onto the cant, or by time base integrating signals from a photodetector, etc. With a known ratio of distance between cant surfaces to diameter the surface width can be derived from diameter detected by the rolls. The saw blades can then be set up in a pattern of varying widths between saw blades spread over a width greater than a cant width and by thus moving the cant to one side or the other a cutting pattern selected (computer controlled) according to cant size.

This invention will now be more fully described by way of examples with reference to the accompanying six sheets of drawings, in which :-

Figures 1 to 8 are schematically drawn cross sectional end elevations of logs and cants sawn in various ways for the sake of elucidating terminology used in the specification and aspects of the process of this invention,

Figure 8a is a similar schematic view showing another aspect of the process and apparatus,

Figure 9 is a plan view again schematically indicated for purposes of illustrating the main principles underlying the present invention,

Figure 10 is a plan view of a wet mill arrangement in accordance with the preferred embodiment of the invention,

Figure 10A shows side and end elevations and plan of a cant to be passed through the mill,

Figure 11 is a side elevation, part sectioned, of the wet mill in figure 10,

Figure 12 is an end elevation, part sectioned, on section XII - XII of figure 10, of the second guidance station in the mill of figure 10,

Figure 13 is a plan of a wet mill in accordance with a preferred embodiment of the invention,

Figure 13A shows side and end elevations and a plan of a log to be sawn into a cant in the figure 13 mill,

Figure 13B shows side and end elevations and a plan of a cant to be sawn into deals and sideboards in the mill of figure 13, and

Figure 14 is a plan of a wet mill in accordance with another embodiment of the invention.

Reference will now be made to figures 1 to 8. Figures 1 and 2 illustrate a known process of sawing timber in the wet mill and applied in particular to the sawing of a log.

Figures 3 to 8 show another process of sawing timber in the wet mill and applied in particular to the sawing of a cant. For convenience terminology usage herein will now be clarified with respect to these views.

In figure 1 a log 100 is shown sawn into a number of boards (thin planks) 101, cuts made by the saw blades of the gang saw being shown by the lines 102. The longitudinal curvature of the log is kept in a horizontal plane, for example, by putting the log on a flat table conveyor on the in-feed side of the gang saw so that the saw cuts 102 are cut around this curve, parallel to the curved centre line of the log. In this specification the expression parallel to the curved centre line of the log or cant means separated at all points along each saw line by a constant distance from the centre line. This of course gives curved boards but because of their thinness their curvature can be straightened out in

the drying kilns. The term thin in the context of boards and planks thus means such a thickness which still permits satisfactory straightening after cutting, e.g. in the drying kilns. The advantage of cutting them parallel to the centre line of the log is that any single board is consistently either heart timber along its full length or edge timber along its full length.

Figure 2 shows how each board 101 is then edged in a second gang saw with its blades set at the positions indicated by lines 103 to provide the optimum board width.

In figures 3 to 8 an alternative way of cutting a log is shown. First, the log 100 is cut into a cant 104 and sideboards 105, the blades of the first gang saw being appropriately set to positions indicated by the lines 106. The cant 104 is sometimes herein referred to as a "flitch". The log in this case is, however, sawn with its principal radius of curvature in the longitudinal direction in a vertical plane which can be achieved either with a suitable in-feed table allowing the log to take up this position, possibly assisted with side positioning rollers, or the log can be rotated by a suitable in-feed device.

The cant is then rotated through 90° to fall on one of its flat surfaces and can then be fed on a flat table on the in-feed side to a second gang saw at which the cant 104 is sawn into a number of deals 107 with sideboards 108, the positions of the saw cuts which are produced by the blades of the gang saw being indicated by the lines 109. Once again, as in the cutting operation shown in figure 1, the saw cuts are kept parallel to the centre line of the cant, thereby cutting around the curve of a cant, and again the deals and sideboards can be straightened in the drying kilns.

Occasionally as an alternative to cutting deals a scantling 110 may be cut from the cant, together with sideboards 108.

The cant is fed with the guidance means which cause the saw cuts to run parallel to the curved centre line of the cant instead of feeding the cant straight into the gang saw, for example, by horizontal feed rollers so that the scantling is straight cut.

Again figure 6 shows the edging of the sideboards 108 with saw cuts 111 in a second gang saw having its blades set up for this purpose.

Figures 7 and 8 illustrate the important feature of the invention to improve the yield. In this context it must be appreciated that whereas the present feature which is about to be described is estimated to be likely to achieve only a 2% improvement in yield, at a typical large sawmill a mere 2% may represent a money value in rands of six figures per annum. Figure 7 is a view which corresponds to the view of figure 4 and it shows that four deals 107 are produced together with four sideboards 108. In such a cut, however, if the cant is shifted slightly to the left as indicated by the arrow 112, the distance of shift being equal to half the width of one deal, so that a saw cut is exactly at the edge 170 of the flat surface 171 of the cant, the same saw cuts, that is with the blades of the gang saw still in the same setting, will produce not four deals but five deals here marked 107' and only three sideboards here marked 108'. This improvement of yield is achieved by means of the operating process and apparatus which is described further below.

Figure 8a shows how the saw blades can be set up to allow for optimum cutting of two different size cants (and sizes in between). The incoming cant 104 is size detected optically and under computer control the larger cant is moved to the position 104" shown and cut to five deals 38mm wide; a smaller cant is moved to the position 104' and so cut into three deals 38mm wide and two deals 25mm wide. This gives full deals (the view shows the cant small ends) even on the small cant, whereas retaining the saw blade pattern used for the larger cant would have produced only three full 38mm deals and two sideboards (incomplete, unsaleable as 38mm deals). This example of saw blade settings would then be applied with 2cm on diameter sorting categories for the 250mm to 270mm diameter category.

Figure 9 shows a cant 113 located on the in-feed side 114 of a gang saw 115, the longitudinal centre line 116 of the gang saw 115 being shown extended on the in-feed side 114. The curved longitudinal centre line 117 of the cant 113 is also shown. Two guidance stations for the cant are shown at 118 and 119, the station 118 being adjacent to the gang saw 115 on the in-feed side and the station 119 being a distance from the station 118 which is not more than 50% of the length of the log or cant 113. In fact this length may be reduced to about 25% of the length of the cant in suitable circumstances in order to optimise the process. Each guidance station comprises guidance elements here in the form of two rollers, each roller means here being shown simply as a cylindrical roller 120, 121, 122 and 123 respectively. Each pair of rollers is inter-connected in their mountings in such a way that they always move by the same amount in opposite directions, being centred on the centre line 116. Thus the rollers 120 and 121 are movable from a position touching each other to a fully opened position, but always being the same distance on either side of the centre line 116, and the same applies to the pair of rollers 122 and 123. When the cant is thus gripped between the two pairs of rollers the centre line 117 of the cant intercepts with the centre line 116 of the gang saw extended on the in-feed side 114 at the posi-

tions of the two guidance stations. The cant rests, for example, on a flat table so that its princip radius of curvature in the longitudinal directions lies then in the horizontal position.

The broken lines 200 show the edges of the flat surface of the cant. Detection means in the form of retroreflective photocells are provided at 201 and 202, associated with locating mechanisms for rolls 120, 121 and 122, 123 respectively. The locating mechanisms (see figs 11 & 12) for rolls 120, 121 and 122, 123 are mounted on transverse slides so that they can be centred on any line parallel with the saw centre line 116 such as the line 203. The detectors 201 and 202 are mounted in a vertical plane 204 offset to one side from a saw blade 205 to allow for cant taper, for example, 8mm to 10mm per metre is typical for certain South African woods. With the detection means 201 and 202 on the right of the saw centre line as facing the saw on the in-feed side, the offset is to the right for thin end first feeding and to the left for thick end first feeding. Preferably the detectors are mounted so that offset can be adjusted as required. Alternate sets of detectors can be mounted with switches to allow switching from one set of detectors to another according to thin end or thick end infeeding, e.g. in mills where both are used. The locating mechanism locates the cant so that saw 205 cuts on the edge of the flat surface of the cant, the cant curved centre line then intersecting with same line 203 parallel to and offset from the saw centre line 116.

It will be appreciated that centre-line-of-cant-guided cutting, which then follows, provides so called double taper cutting.

The cant 113 is shown in figure 9 being fed into the gang saw with the small diameter end first, the larger diameter end trailing. Whereas this is perhaps commoner practice today, facilitating judgement of the sideways positioning of the cant, especially for manually controlled in-feeding, preferable feeding of cants and sideboards operation can be achieved by feeding the thick end of the cant first and may be made practicable with the means of this invention, particularly in automated in-feeding arrangements.

Figures 10, 11 and 12 show a sawing arrangement in the wet mill, comprising the gang saw 160, an in-feed side 161 and an out-feed side 162. The in-feed side 161 has two guidance stations 163, located adjacent to the gang saw 160 and 164. some distance therefrom, which may be made adjustable, according to the length of cants to be sawn. Each guidance station may be of the kind described with reference to figures 11 and 12. The numeral 116 is also used to show the longitudinal centre line of the frame saw extended on the in-feed side.

Guidance station 164 comprises a pair of rollers 124 and 125, herein (loosely) described as being mounted for rotation on an upright axis, and of cylindrical form. Each is pivotally mounted on a horizontal, longitudinally orientated shaft 126 and 127 respectively, by means of suitable intermediate cranks 128 and 129. The cranks 128 and 129 are fixed to gear wheels 128A and 129A respectively which mesh with each other in the region 130 so that the rollers 124 and 125 always move equal distances inwardly or outwardly, centred on the centre line 131. The crank 128 has in this case a bell crank 132 which depends downwardly and to which the piston rod 133 of a hydraulic (or pneumatic) cylinder 134 is connected, the cylinder 134 being anchored at 135. The cylinder 134 is thus supplied with a control fluid by means of which the rollers 124 and 125 may be moved inwardly and outwardly for guidance of a cant in such a manner that it maintains the centre line of the cant coincident with the centre line 131 of the guidance station which itself is located with respect to a centre line of the gang saw extended on the in-feed side. Other aspects of this guidance station will be apparent from a perusal of the drawings.

Guidance station 163 is similar to guidance station 164 but shows the use of tandem sets of rollers in the guidance means which is located adjacent the frame saw. Here the pair of roller means operates in the self centering manner but the roller means comprises two rollers 150 and 151 and 152 and 153 respectively mounted on bogies 154 and 155 respectively, each bogie being pivotally mounted on pivots 156 and 157 respectively. The pivots 156 and 157 are mounted on the cranks 128 and 129 as shown in figures 10 to 12 for the self centering action. The rollers can be brought somewhat closer together as shown be reducing the lengths of the bogies 154 and 155. This type of arrangement is perhaps more important in the guidance position close to the frame saw so that knots or other bumps on the side of the cant will be less inclined to jink the cant and cause kinks in the saw cuts as the cant is fed longitudinally.

Other parts similar to those in station 164 are given the same reference numerals and the description with respect to these is referrred to. Both guidance stations have the important mechanical feature of transverse adjustability for the purpose which has been described above with reference to figures 7 and 8 of the drawings. Each guidance station is mounted on a movable platform 136 which has lugs 137 which are mounted on transversely orientated horizontal worm screws 138 and rods 139 to give transverse adjustability of the guidance stations. The transverse position taken up by the guidance station is controlled by the worm screws 138 which screw into threaded lug 137 mounted on the platform 136, the worm screw 138

being driven by an electric motor 143 with suitable coupling 144.

Motors 143 are reversing motors and are thus able to drive adjustment of the guidance stations to left or right on the in-feed of the saw. These motors are controlled by a signal processor receiving signals from the detectors 210 and 211, mounted under the cants which will pass towards the saw. These are retroreflective photocells, located, as seen in plan view, offset from an horizontal line 300 extending from a saw blade 301 by the distance 302 of taper of a cant over the distance from the detector to the saw, to the right for thin-end-in feeding, to the left for thick-end-in feeding. The detectors are mounted on transversely mounted screws 212 which are hand adjustable with a crank, to permit refinement of the offset according to the typical taper of timber being sawn so that the saw cut is on the edge of the flat surface of the cant. The signal processor is a computer central processor unit, C.P.U., programmed to handle the control of the guidance central means during a whole cycle. Further detectors (not shown) are mounted in the in-feed side to detect arrival of the leading end of a cant and the passing of the trailing end of the cant. On open in-feed the guidance means are opened wide, set somewhat to the right of centre. As soon as the leading end of a cant is detected coming in by a detector at position 213 the guidance rollers 124 and 125 and 150, 151 and 152, 153 close on the cant, moving equidistantly. They now hold the cant with its longitudinal centre line intersecting a longitudinal line on the in-feed bed parallel to the saw centre line but offset to the right. The detectors 210 and 211 then "see" the flat undersurface of the cant.

Guidance rollers 124,125 and 150, 151, 152 and 153 then edge the cant towards the left until detectors 210, 211 detect a drop in reflection which signals the edge of the cant flat surface, where they hold the cant in this position and its leading end enters the gang saw. In-feed speeds of the cant may range between 7 metres per minute and 40 metres per minute. As soon as the leading end enters the saw blades, as signalled by a detector, the guidance means 124,125 open wide, pressure on 150, 151 152, 153 is reduced, and the cant is sawn around the curve of its centre line in double taper sawing since the rollers 150, 151, 152, 153 adjust for the changing cant diameter equally thus centering on the cant centre-line. As the trailing end of the log passes through the saw the rollers 150, 151, 152, 153 open wide and are ready for another cycle of the next cant. The detectors 211 are two detectors, slightly offset with respect to each other and the detection may be switched from one to the other in mixed thick end or thin end first in-feeding situations.

Guidance rollers 124 - 125 and 150, 151, 152 and 153 can also be computer controlled to operate the process decribed above with reference to figure 8a. Cant size detection can be achieved for this purpose by use of the photodetectors 210 and/or 211 by transversing the cant across the sight line of the detector and so recording the width of the cant flat surface. Other cant size detection methods can be adopted, one of which has been referred to above, namely use of the rollers themselves when they clamp the cant. The transverse movement required of the rollers will in this method be more than is needed in the method described immediately above, to select the required pattern of the saw bladesetting according to cant size.

Figure 13 shows an apparatus which can be used to saw logs and/or cants.

The apparatus comprises a first gang saw 16 and a second gang saw 17 and advancing conveyor 18, a transporting table 19, an advancing device 20,and in-feed surface 21 with two pairs of in-feed rollers 23a, 23b and 24a, 24b. The apparatus further comprises an out-feed table 25, a transporting table 26, a conveyor 27, an in-feed surface 28 and two pairs of in-fees rollers 30a, 30b and 31a, 31b. At the out-feed side of the gang saw 17 an out-feed conveyor 32 is provided.

The table 20 can be adapted to provide either a flat surface so as to orientate a cant with its major curvature horizontal or the table 20 can be adjusted to provide a concave surface so as to orientate a log with its major curvature vertical in accordance with conventional practice. The feed roller pairs 23a, 23b and 24a, 24b in conjunction With the conveyor surface 21 provide an in-feed and centering function for cutting by the gang saw 16 with cuts parallel to the centre line of the cant either along the curve of the cant or in substantially straight cuts if in accordance with conventional practice or if to produce a cant which can thereafter be sawn.

The incoming log at 33 is transported at 19 to the table 20 which is adjusted to have a concave surface so that the log takes up the position oriented as shown in figure 7 in which its major longitudinal curvature is located in a vertical plane. This prepares the log for sawing into a cant and sideboards. The log is advanced by the advancing and centering means comprising the table 21 and roller pairs 23a, 23b and 24a, 24b into the gang saw 16 which produces the cant and sideboards. The sideboards are transported on by the conveyor 27 for further processing. The further processing of the sideboards may comprise edging, cutting of their lengths to economical lengths or cutting in half or other steps to optimise use of the timber, the balance being discarded. The cant is then

transported on the table 26 to prepare it for feeding into the gang saw 17 by the in-feed means including the table 28 and paired rollers 30a, 30b and 31, 31b, after rotating through 90° around its longitudinal axis. The paired rollers are again adapted to execute a centering function and also to be capable of guiding the cant for cutting around the curve, the cuts being parallel to the centre line of the cant. For this purpose the roller pairs 30a, 30b are adapted for their pressure to be reduced or removed when the leading end of the cant reaches the out-feed side of the gang saw 17.

In both figures 13A and 13B the dotted lines show the cuts which are executed respectively by the gang saw 16 and the gang saw 17.

The roller pairs at the in-feed sides of both the gang saws 16 and 17 are adapted for both centering and cutting round the curve functions; this apparatus may be employed to operate in two independent simultaneously effected processes. In this alternative the logs which are supplied from 33 are alternately transported by the table 19 and thence to the gang saw 16 or by the conveyor 18, transport table 26 to the gang saw 17. At the table 20 the support surface is made flat so that the log is orientated to a position in which its maximum longitudinal overall curvature lies on a horizontal plane and similarly at the table 26 the log is orientated so that is maximum overall longitudinal curvature lies in a horizontal plane. The log thus takes up the position as shown in figure 1 and is fed into the gang saw 16 on the one hand and in a simultaneously operating process a further log is fed into the gang saw 17. At both the gang saws 16 and 17 the logs are sawn immediately into boards as shown in figure 5 in the manner in accordance with this invention sawing around the curve parallel with the log centre line.

. The sawn boards then proceed on by the conveyors 27 and 32 to edging saws which are required in any case for the conventional operation of the mill for edging the sideboards which are cut from the flitches (or cants) and from the logs in the conventional operation.

This capability for alternative operation provides the mill with considerable flexibility. Broadly speaking very large diameter logs can,for example, be handled by the gang saw 16 either in a conventional sawing technique or in the sawing process in accordance with this invention. The smaller diameter logs can be handled directly by the gang saw 17 in the process according to this invention and the gang saw 17 will saw flitches produced by the gang saw 16, also around the centre line curve.

The table 20 can far example be a chain advanced table which can either be supported only at opposite ends and thereby have a sag if preparation of a cant is desired or underneath support rollers can be raised up along the whole length of the chain table so as to support it in a flat condition if operation in accordance with the process of this invention is chosen.

Figure 14 shows a further wet mill apparatus adapted to be selected for operation either to saw a log or in accordance with the process of the invention to saw a cant. The apparatus comprises an advancing conveyor 34, an in-feed table 35, in-feed and guide roller pairs 22a, 22b, 36a, 36b, a gang saw 37, an out-feed roller pair 38a, 38b, an out-feed advancing table 39, transporting tables 40 and 41, a storage carrier 42 and a conveyor 43. An edging saw or saws are also part of this wet mill but are not shown, being located in a position supplied by the conveyor 43. Logs supplied at 44 are advanced by the conveyor 34.

If operation to saw logs into boards is chosen conveyor 34 is adapted to orientate the log with its maximum longitudinal overall curvature in a horizontal plane and in this orientation the log is fed by the means 35, 22a, 22b, 36a, 36b into the gang saw 37. The log is then sawn around the curve with saw cuts parallel to the log centre line as shown in figure 13B, producing boards which are then moved by the out-feed table 39, then transported by the table 41 and then moved by the conveyor 43 to edging saws where each board is edged to achieve the optimum use of the timber. This means that the width of each board must be selected and cut accordingly.

If, however, the mill is to be used in a process to cut deals from cants, the advancing table 34 is adapted to allow the log to take up an orientation with its maximum longitudinal overall curvature in a vertical plane and the log is fed in this orientation through the gang saw 37 which is adapted to cut sideboards and a flitch (or cant). The sideboards then pass by conveyor 39 and transport table 41 to conveyor 43 where they are further processed by the edging saw.

The flitch is transported by the transporting table 40 to the storage area 42. From the area 42 the flitches are then taken as indicated by the arrow 45 back to the advancing conveyor 44 where the flitches are orientated as shown in figure 19 and cut by the gang saw 37 (with saw blades suitably reset) to deals or planks and sideboards and/or scantlings. In the first pass of a log through the gang saw 37 in order to produce a flitch the log is orientated as shown in figure 13A.

Thus again the table 34 is adapted to provide either orientation as shown in figure 13A or as shown in figure 13B in the case of the log,while in the case of the flitch the table is set to give orientation as shown in figure 13B.

Claims

1. A process of wet mill sawing of a cant (104; 113) having a curved longitudinal centreline (117), longitudinal flat surfaces (171) and curved sides, said curved sides and flat surfaces (171) intersecting one another to form curved longitudinally extending edge lines (170; 200) therebetween, said flat surfaces (171) being parallel to an imaginary plane in which the main longitudinal curvature of the cant (104; 113) lies, which process comprises locating the cant (104; 113) at the in-feed side (114; 161) of a gang saw (115; 160; 16; 17; 37) having a plurality of saw blades (205; 301) and a straight longitudinal centre line (116), orienting the cant (104; 113) around its longitudinal axis so that its maximum overall longitudinal curvature lies in a horizontal plane, engaging the curved sides of the cant (104; 113) to locate it horizontally at a first guidance station (118; 163) on the in-feed side (114; 161) of the saw adjacent thereto, feeding the cant (104; 113) longitudinally into the saw (115; 160; 16; 17; 37) along a curved feed line approximating the curved longitudinal centre line (117) of the cant (104; 113) while guiding the cant (104; 113) at said first guidance station (118; 163), and sawing the cant (104; 113) along curved saw lines (109) into deals (107), sideboards (108) and/or scantling (110) of constant thickness, wherein with the sawing step, the curved saw lines (109) are maintained at constant distances from the curved longitudinal centre line (117) of the cant (104; 113), characterized by engaging the curved sides of the cant (104; 113) to locate it horizontally at a second guidance station (119; 164) spaced a distance from the first guidance station (118; 163) wich is less than half the overall length of the cant (104; 113) providing at least two spaced detecting means (201, 202; 210, 211) essentially located in a vertical plane (204) parallel to the saw centre line (116) and laterally off-set a predetermined dimension (302) from a horizontal line (300) parallel to the saw centre line (116) and passing through one of said saw blades (205; 301), selecting said off-set dimension (302) so that when a said curved edge line (170; 200) is detected by said detecting means (201, 202; 210, 211) said curved edge line (170; 200) intersects said horizontal line (300) passing through a saw blade (205; 301) substantially at said one saw blade (205; 301), and, prior to feeding the cant (104; 113) through the saw (115; 160; 16; 17; 37), temporarily arresting it and laterally displacing the two guidance stations (118, 119; 163, 164) with the cant (104; 113) gripped therein relative to the detecting means (201, 202; 210, 211) until at least one of said curved edge lines (170; 200) is detected by said detecting means (201, 202; 210, 211).

2. A process of wet mill sawing according to claim 1, characterized in that the detection is carried out in positions in advance of each guiding station.

3. A process of wet mill sawing according to claim 1 or 2, characterized in that the size of the cant (104; 113) is detected and the cant (104; 113) is moved transversely to select a pattern of saw blades (205) which is adapted to cut full deals (107) from that particular size of cant (104; 113).

4. A process of wet mill sawing according to any one of claims 1 to 3, characterized by removing the guiding at the second station (119; 164) once the leading end of the cant (104; 113) enters the gang saw (115; 160; 16; 17; 37).

5. Apparatus of wet mill sawing of a cant having a curved longitudinal centre line (117), longitudinal flat surfaces (171) and curved sides, said curved sides and flat surfaces (171) intersecting one another to form curved longitudinally extending edge lines (171; 200) therebetween, said apparatus comprising two guidance stations (118, 119; 163, 164) located at the infeed side (114; 161) of a gang saw (115, 160; 16; 17; 37), one of said guidance stations being adjacent the saw and the other being spaced from said one guidance station a distance less than half the overall length of the cant (104; 113) to be sawn, said guidance stations (118, 119; 163, 164) having locating mechanisms for transversely adjusting the guidance stations with respect to the feed direction of the cant (104; 113) and each guidance station comprising guidance elements (120 to 123; 124, 125; 150 to 153; 23a, 23b, 24a, 24b; 30a, 30b, 31a, 31b; 22a, 22b; 36a, 36b) adapted to engage and guide opposite curved sides of the cant (104; 113) and being movable towards and away from each other transversely to the feed direction and synchronized for movement of equal magnitude and in opposite directions, the guidance elements (120 to 123; 124, 125; 150 to 153; 23a, 23b, 24a, 24b, 30a, 30b, 31a, 31b; 22a, 22b; 36a, 36b) of both guidance stations being centered with respect to a line parallel with a common centre line (131), each guidance station locating mechanism comprising detection means (201, 202; 210, 211) said detection means (201, 202; 210, 211) being

spaced from one another in longitudinal direction of the saw, characterized in that said saw (115; 160; 16; 17; 37) comprises a plurality of saw blades (205; 301) for sawing said cant (104; 113) along curved saw lines (109) constantly spaced from the curved longitudinal centre line (117) of the cant (104; 113), that the detection means (201, 202; 210, 211) are adapted to detect one of said curved edge lines (170; 200) and are mounted in a vertical plane (204) parallel to the saw centre line (116) and off-set laterally a predetermined dimension (302) from a horizontal line (300) parallel to the saw centreline (116) and passing through one of said saw blades (205; 301), said off-set dimension (302) being selected so that a said curved edge line (171; 200) intersects said horizontal line (300) generally at said saw blade (205; 301) when detected by said detecting means (201, 202; 210, 211).

6. Apparatus according to claim 5, characterized in that the detection means (201, 202; 210, 211) are off-set with respect to said horizontal line (300) passing through a saw blade (205; 301) by an amount which bears a relation to the taper of the cant and distance of the guidance station from the saw (115; 116; 16; 17; 37).

7. Apparatus according to claim 6, characterized by means (212) for adjusting the off-set of the detection means (201, 202; 210, 211) with respect to said horizontal line (300) passing through a saw blade (205; 301).

8. Apparatus according to claim 5, characterized by alternate sets of detectors (201, 202; 210, 211) being provided and switches to allow for switching from one set of detectors to another for thin end infeeding of the cant (104; 113) to thick end infeeding thereof.

9. Apparatus according to claim 5, characterized in that the detection means (201, 202; 210, 211) are retroreflective photocells.

10. Apparatus according to any one of claims 5 to 9, characterized in that the guidance elements (120 to 123; 124, 125; 150 to 153; 23a, 23b, 24a, 24b; 30a, 30b, 31a, 31b; 22a, 22b; 36a, 36b) are rollers rotated or rotatable on upright axes.

11. Apparatus according to any one of claims 5 to 10, characterized in that the rollers (151 to 154), at least at the guidance station (163) nearest the saw (160), comprise a tandem set of rollers, being four rollers arranged in two opposite pairs, each pair mounted on a bogie (154, 155) which is pivotally supported at a pivot point (156, 157) equidistant between the rollers.

12. Apparatus according to any one of claims 5 to 11, characterized in that the locating mechanisms for transversely adjusting the guidance stations (118, 119; 163, 164) are adapted to shift the guidance stations by a limited distance, typically by a distance no more than a fraction of the smallest cant width to be sawn.

Revendications

1. Procédé de sciage humide d'une bille de bois aplanie (104 ; 113) ayant un axe géométrique longitudinal courbe (117), des surfaces longitudinales planes (171) et des côtés courbes, lesdits côtés courbes et lesdites surfaces planes (171) se coupant pour former entre eux des lignes de bord courbes orientées longitudinalement (170 ; 200), lesdites surfaces planes (171) étant parallèles à un plan imaginaire par lequel passe la courbure principale longitudinale de la bille de bois (104 ; 113), ledit procédé consistant à placer la bille de bois (104 ; 113) sur le côté d'entrée (114 ; 171) d'une scie multiple (115 ; 160 ; 16 ; 17 ; 37) comprenant plusieurs lames (205 ; 301) et un axe géométrique longitudinal rectiligne (116), à orienter la bille de bois (104 ; 113) autour de son axe longitudinal de manière que sa courbure longitudinale globale maximale se trouve dans un plan horizontal, à faire entrer les côtés courbes de la bille de bois (104 ; 113) pour la placer horizontalement à un premier poste de guidage (118 ; 163) situé du côté de l'entrée (114 ; 161) de la scie, à proximité de ce dernier, à faire entrer la bille de bois (104 ; 113) longitudinalement dans la scie (115 ; 160 ; 16 ; 17 ; 37) le long d'une ligne de pénétration courbe se rapprochant du centre géométrique longitudinal courbe (117) de la bille de bois (104 ; 113) en guidant la bille (104 ; 113) audit premier poste de guidage (118 ; 163) et à scier la bille de bois (104 ; 113) le long de lignes courbes de sciage (109) pour en former des plots (107), des planches latérales (108) et/ou des pièces de bois équarri (110) d'épaisseur constante, les lignes courbes de sciage (109) étant maintenues pendant la phase de sciage à des distances constantes de l'axe géométrique longitudinal courbe (117) de la bille de bois (104 ; 113), caractérisé par l'introduction des côtés courbes de la bille de bois (104 ; 113) de manière à la placer horizontalement à

un second poste de guidage (119 ; 164) placé à une distance du premier poste de guidage (118 ; 163) qui est inférieure à la moitié de la longueur totale de la bille de bois (104 ; 113), la disposition d'au moins deux dispositifs de détection (201, 202 ; 210, 211) placés à distance l'un de l'autre et situés sensiblement dans un plan vertical (204) qui est parallèle à l'axe géométrique de la scie (116) et décalé latéralement sur une distance prédéterminée (302) par rapport à une ligne horizontale (300) parallèle à l'axe géométrique de la scie (116) et passant par l'une desdites lames de la scie (205 ; 301): la sélection de ladite distance de décalage (302) de telle manière que lorsqu'une desdites lignes de bord courbes (170 ; 200) est décelée par lesdits dispositifs de détection (201, 202 ; 210 ; 211), ladite ligne de bord courbe (170 ; 200) coupe ladite ligne horizontale (300) passant par une lame de la scie (205 ; 301) sensiblement à l'emplacement de ladite une lame de scie (205 ; 301) et, avant de faire passer la bille de bois (104 ; 113) par la scie (115 ; 160 ; 16 ; 17 ; 37), son immobilisation temporaire et le déplacement latéral des deux postes de guidage (118 ; 119 ; 163 ; 164) avec la bille de bois (104 ; 113) serrée dans ces postes par rapport aux dispositifs de détection (201, 202 ; 210, 211) jusqu'à ce qu'au moins l'une desdites lignes courbes de bord (170 ; 200) soit décelée par lesdits dispositifs de détection (201, 202 ; 210, 211).

2. Procédé de sciage humide selon la revendication 1, caractérisé en ce que la détection est exécutée en des emplacements situés au-devant de chaque poste de guidage.

3. Procédé de sciage humide selon la revendication 1 ou 2, caractérisé en ce que la dimension de la bille de bois (104 ; 113) est détectée et la bille (104 ; 113) est déplacée transversalement afin de sélectionner une disposition des lames de sciage (205) qui est capable de découper des plots entiers (107) dans la bille (104 ; 113) ayant la dimension particulière.

4. Procédé de sciage humide selon l'une quelconque des revendications 1 à 3, caractérisé par la suppression du guidage au second poste (119 ; 164) dès que l'extrémité d'entrée de la bille (104 ; 113) pénètre dans la scie multiple (115 ; 160 ; 16 ; 17 ; 37).

5. Machine de sciage humide d'une bille de bois aplanie ayant un axe géométrique longitudinal courbe (117), des surfaces longitudinales planes (171) et des côtés courbes, lesdits côtés courbes et surfaces planes (171) se coupant les uns les autres en formant entre eux des lignes de bord courbes orientées longitudinalement (171 ; 200), ladite machine comprenant deux postes de guidage (118, 119, 163 ; 164) placés sur le côté d'entrée (114 ; 161) d'une scie multiple (115, 160 ; 16 ; 17 ; 37), l'un desdits postes de guidage étant voisin de la scie et l'autre étant placé à une distance dudit un poste de guidage qui est inférieure à la moitié de la longueur totale de la bille de bois (104 ; 113) devant être sciée, lesdits postes de guidage (118, 119 ; 163, 164) comprenant des mécanismes de positionnement destinés à régler transversalement l'emplacement des postes de guidage par rapport à la direction de l'avancement de la bille de bois (104 ; 113) et chaque poste de guidage comprenant deux éléments correspondants (120 à 123 ; 124, 125 ; 150 à 153 ; 23a, 23b, 24a, 24 ; 30a, 30b, 31a, 31b ; 22a, 22b ; 36a, 36b) destinés à s'appliquer contre et à guider les côtés opposés courbes de la bille de bois (104 ; 113) et pouvant être rapprochés et éloignés l'un de l'autre transversalement par rapport à la direction d'avancement et, de plus: étant synchronisés de manière qu'ils exécutent des déplacements identiques et en sens opposés, les éléments de guidage (120 à 123 ; 124, 125 ; 150 à 153 ; 23a, 23b, 24a, 24b ; 30a, 30b, 31a, 31b ; 22a, 22b ; 36a, 36b) des deux postes correspondants étant centrés par rapport à une ligne parallèle à un axe géométrique commun (131), chaque mécanisme de positionnement des postes de guidage comprenant des dispositifs de détection (201, 202 ; 210, 211), lesdits dispositifs de détection (201, 202 ; 210, 211) étant placés à distance les uns des autres dans la direction de la longueur de la scie, caractérisée en ce que ladite scie (115 ; 160 ; 16 ; 17 ; 37) comprend plusieurs lames (205 ; 301) pour le sciage de ladite bille de bois (104 ; 113) le long de lignes courbes (103) placées à des distances constantes de l'axe géométrique longitudinal courbe (117) de la bille de bois (104; 113), en ce que les dispositifs de détection (201, 202 ; 210, 211) sont destinés à détecter l'une desdites lignes de bord courbes (170 ; 200) et sont montés dans un plan vertical (204) parallèle à l'axe géométrique de la scie (116) et décalé latéralement sur une distance prédéterminée (302) par rapport à une ligne horizontale (300) parallèle à l'axe géométrique de la scie (116) et passant par l'une desdites lames (205, 301), ladite distance de décalage (302) étant sélectionnée de manière que l'une desdites lignes de bord courbes (171, 200) coupe ladite ligne horizontale (300)

sensiblement au niveau de ladite lame de la scie (205 ; 301) au moment auquel elle est décelée par lesdits dispositifs de détection (201, 202 ; 210,211).

6. Machine selon la revendication 5, caractérisée en ce que les dispositifs de détection (201, 202 ; 210, 211) sont décalés par rapport à ladite ligne horizontale (300) passant par une lame de scie (205 ; 301) sur une distance qui est en relation avec la conicité de la bille de bois et la distance séparant le poste de guidage et la scie (115 ; 116 ; 16 ; 27 ; 37).

7. Machine selon la revendication 6, caractérisée par des moyens (212) de réglage du décalage des dispositifs de détection (201, 202 ; 210, 211) par rapport à ladite ligne horizontale (330) passant par une lame de scie (205 ; 301).

8. Machine selon la revendication 5, caractérisée par des groupes de détecteur (201, 202 ; 210, 211) qui sont disposés en alternance et des commutateurs pour permettre de passer d'un groupe de détecteurs à un autre pour le passage de l'introduction de la bille de bois (104 ; 113) par l'extrémité étroite à l'introduction de cette bille par l'extrémité large.

9. Machine selon la revendication 5, caractérisée en ce que lesdits dispositifs de détection (201, 202 ; 210, 211) sont des cellules photo-électriques à rétro-réflection.

10. Machine selon l'une quelconque des revendications 5 à 9, caractérisée en ce que les éléments de guidage (120 à 123 ; 124, 125 ; 150 à 153 ; 23a, 23b, 24a, 24b ; 30a, 30b, 31a, 31b ; 22a, 22b ; 36a, 36b) sont des rouleaux entraînés en rotation ou rotatifs autour d'axes verticaux.

11. Machine selon l'une quelconque des revendications 5 à 10, caractérisée en ce que les rouleaux (151 à 154), au moins ceux se trouvant au poste de guidage (163) qui est le plus proche de la scie (160), comprennent un jeu de rouleaux disposés en tandem et consistant en quatre rouleaux formant deux paires opposées, chaque paire étant disposée sur un train de roulements (154, 155) qui est monté oscillant en un point de pivotement (156, 157) qui est équidistant des rouleaux et situé entre eux.

12. Machine selon l'une quelconque des revendications 5 à 11, caractérisée en ce que les mécanismes de positionnement destinés à régler transversalement l'emplacement des postes de guidage (118, 119 ; 163, 164) sont réalisés de manière à déplacer les postes de guidage sur une distance limitée, notamment sur une distance qui ne correspond pas à plus d'une fraction de la plus petite largeur de la bille de bois devant être sciée.

Patentansprüche

1. Verfahren zum Naßsägen eines abgeflachten Langholzblockes (104;113) mit einer gekrümmten Längsmittellinie (117), flachen Längsoberflächen (171) und gekrümmten Seiten, wobei die gekrümmten Seiten und die flachen Oberflächen (171) einander schneiden, um zwischen ihnen gekrümmte, in Längsrichtung verlaufende Kantenlinien (170,200) zu bilden, wobei die flachen Oberflächen (171) parallel zu einer imaginären Ebene verlaufen, in welcher die Hauptlängskrümmung des Langholzblockes (104,113) liegt, welches Verfahren die Anordnung des Langholzblockes (104,113) an der Zuführseite (114,161) einer Gattersäge (115;160;16;17;37) mit einer Mehrzahl von Sägeblättern (205;301) und einer geraden Längsmittellinie, die Ausrichtung des Langholzblokkes (104,113) um seine Längsachse in einer Weise, daß seine maximale Gesamtlängskrümmung in einer horizontalen Ebene liegt, das Erfassen der gekrümmten Seiten des Langholzblockes (104;113), um sie an der ersten Führungsstation (118,163) an der Zuführseite (114;161) der Säge angrenzend an diese horizontal in Lage zu bringen, das Einführen des Langholzblockes (104;113) in Längsrichtung in die Säge (115,160;16;17;37) entlang einer ähnlich wie die gekrümmte Längsmittellinie (117) des Langholzblockes (104;113) gekrümmten Zuführlinie, während der Langholzblock (104;113) an der ersten Führungsstation (118,163) geführt wird, und das Sägen des Langholzblockes (104;113) entlang gekrümmte Sägelinien (109) zu Bohlen (107), Seitenbrettern (108) und/oder Kantholz (110) von konstanter Dicke, wobei während des Sägeschrittes die gekrümmten Sägelinien (109) in konstanten Abständen von der gekrümmten Längsmittellinie (117) des Langholzblockes (104;113) gehalten werden, umfaßt, gekennzeichnet durch das Erfassen der gekrümmten Seiten des Langholzblockes (104,113) zwecks horizontaler Einstellung desselben an einer zweiten Führungsstation (119;164), die sich von der ersten Führungsstation (118,163) in einem Abstand befindet, der weniger als die halbe Gesamtlänge des Langholzblockes (104;113) ist, das Vorsehen von mindestens zwei im Abstand befindlichen Detektionsmitteln

(201,202;210,211) im wesentlichen in einer vertikalen Ebene (204), die parallel zur Sägemittellinie (116) angeordnet und seitlich um ein vorbestimmtes Ausmaß (302) von einer Horizontallinie (300) versetzt ist, die parallel zur Sägemittellinie (116) verläuft und durch eines der Sägeblätter (205;301) geht, das Auswählen des Versetzungsausmaßes (302) in einer Weise, daß bei Ortung einer der gekrümmten Kantenlinien (170;200) von den Detektionsmitteln (201,202;210,211), diese gekrümmte Kantenlinie (170;200) sich mit der Horizontallinie (300), die durch ein Sägeblatt (205;301) im wesentlichen an diesem einen Sägeblatt (205,301) hindurchgeht, schneidet, und vor dem Hindurchführen des Langholzblockes (104;113) durch die Säge (115;160;16;17;37), das vorübergehende Festhalten desselben und das seitliche Verschieben der beiden Führungsstationen (118,119;163,164) mit dem darin erfaßten Langholzblock (104;113) in bezug auf die Detektionsmittel (201,202;210,211), bis zumindest eine der gekrümmten Kantenlinien (170;200) von den Detektionsmitteln (201,202;210,211) geortet wird.

2. Naßsägeverfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Ortung in Positionen vor jeder Führungsstation durchgeführt wird.

3. Naßsägeverfahren nach Anspruch 1 oder 3, dadurch gekennzeichnet, daß die Größe des Langholzblockes (104;113) festgestellt wird und der Langholzblock (104;113) quer bewegt wird, um ein Muster von Sägeblättern (205) auszuwählen, mit welchem es möglich ist, volle Bohlen (107) aus der bestimmten Größe des Langholzblockes (104;113) zu schneiden.

4. Naßsägeverfahren nach einem der Ansprüche 1 bis 3, gekennzeichnet durch Entfernen der Führung an der zweiten Station (119;164), sobald das vordere Ende des Langholzblockes (104;113) in die Gattersäge (115;160;16;17;37) gelangt.

5. Vorrichtung zum Naßsägen eines abgeflachten Langholzblockes mit einer gekrümmten Längsmittellinie (117), flachen Längsoberflächen (171) und gekrümmten Seiten, wobei die gekrümmten Seiten und die flachen Oberflächen (171) einander schneiden, um zwischen ihnen gekrümmte, in Längsrichtung verlaufende Kantenlinien (171;200) zu bilden, welche Vorrichtung zwei an der Zuführseite (114;161) einer Gattersäge (115,160;16;17;37) angeordnete Führungsstationen (118,119;163,164) umfaßt, wobei sich eine der Führungsstationen angrenzend an die Säge befindet und die andere von der einen Führungsstation in einem Abstand angeordnet ist, der weniger als die halbe Gesamtlänge des zu sägenden Langholzblockes (104,113) ist, und wobei die Führungsstationen (118,119;163,164) Einstellmechanismen zur Quereinstellung der Führungsstationen in bezug auf die Zuführrichtung des Langholzblokkes (104;113) aufweisen und jede Führungsstation Führungselemente (120 bis 123; 124,125;150bis 153;23a,23b,24a,24b;30a,30b,31a,31b;22a, 22b;36a,36b) zum Erfassen und Führen gegenüberliegender gekrümmter Seiten des Langholzblockes (104;113) umfaßt, die quer zur Zuführrichtung zu- und auseinander bewegbar sind und zwecks gleichgroßer Bewegung in entgegengesetzte Richtungen synchron laufen, wobei die Führungselemente (120 bis 123; 124, 125; 150 bis 153; 23a, 23b, 24a, 24b, 30a, 30b, 31a, 31b; 22a, 22b; 36a, 36b) beider Führungsstationen zentriert sind in bezug auf eine Linie, die zu einer gemeinsamen Mittellinie (131) parallel verläuft, und wobei jeder Führungsstation-Einstellmechanismus Detektionsmittel (201,202;210,211) umfaßt, welche Detektionsmittel (201,202;210,211) in Längsrichtung der Säge im Abstand voneinander angeordnet sind, dadurch gekennzeichnet, daß die Säge (115;160;16;17;37) eine Mehrzahl von Sägeblättern (205;301) zum Sägen des Langholzblockes (104;113) entlang gekrümmter Sägelinien (109) umfaßt, welche gekrümmten Linien sich in konstantem Abstand von der gekrümmten Längsmittellinie (117) des Langholzblockes (104;113) befinden, und daß die Detektionsmittel (201;202;210;211) so ausgelegt sind, daß sie eine der gekrümmten Kantenlinien (170;200) orten und in einer vertikalen Ebene (204) parallel zur Sägemittellinie (116) und um ein vorgegebenes Ausmaß (302) seitlich versetzt von einer Horizontallinie (300), die parallel zur Sägemittellinie (116) verläuft und durch eines der Sägeblätter (205;301) hindurchgeht, montiert sind, wobei das Ausmaß (302) der Versetzung so ausgewählt ist, daß die besagte gekrümmte Kantenlinie (171;200) die Horizontallinie (300) im allgemeinen beim Sägeblatt (205,301) schneidet, wenn sie von den Detektionsmitteln (201,202;210,211) geortet wird.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Detektionsmittel (201,202; 210,211) in bezug auf die durch ein Sägeblatt (205;301) hindurchgehende Horizontallinie (300) um ein Ausmaß versetzt sind, das in einem Verhältnis zur Verjüngung des Lang-

holzblockes und dem Abstand der Führungsstation von der Säge (115;116;16;17;37) steht.

7. Vorrichtung nach Anspruch 6, gekennzeichnet durch Mittel (212) zur Einstellung der Versetzung der Detektionsmittel (201,202;210,211) in bezug auf die Horizontallinie (300), die durch ein Sägeblatt (205;301) hindurchgeht.

8. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß alternierende Detektionssätze (201,202;210,211) vorgesehen sind und Schalter, die ein Umschalten von einem Detektionssatz zu einem anderen je nach dem Einführen des Langholzblockes (104,113) mit dem dünnen Ende oder mit dem dicken Ende ermöglichen.

9. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Detektionsmittel (201,202; 210,211) rückstrahlende Photozellen sind.

10. Vorrichtung nach einem der Ansprüche 5 bis 9, dadurch gekennzeichnet, daß die Führungselemente (120 bis 123; 124, 125; 150 bis 153; 23a, 23b, 24a, 24b; 30a, 30b, 31a, 31b; 22a, 22b; 36a, 36b) Rollen sind, die sich an aufrechten Achsen drehen oder daran drehbar sind.

11. Vorrichtung nach einem der Ansprüche 5 bis 10, dadurch gekennzeichnet, daß die Rollen (151 bis 154), zumindest an der der Säge (160) am nächsten befindlichen Führungsstation (163) einen Tandem-Rollensatz umfassen, der aus vier Rollen besteht, die in zwei gegenüberliegenden Paaren angeordnet sind, wobei jedes Paar an einem Untergestell (154,155) montiert ist, das an einem äquidistanten Schwenkpunkt (156,157) zwischen den Rollen schwenkbar abgestützt ist.

12. Vorrichtung nach einem der Ansprüche 5 bis 11, dadurch gekennzeichnet, daß die Einstellmechanismen zur Quereinstellung der Führungsstationen (118,119;163,164) zur Verschiebung der Führungsstationen um einen begrenzten Abstand, typischerweise um einen Abstand, der nicht größer als ein Bruchteil der geringsten zu sägenden Breite des Langholzblockes ist, ausgelegt sind.

FIG. 1

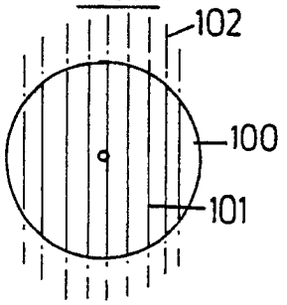


FIG. 2

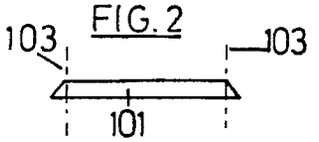


FIG. 3

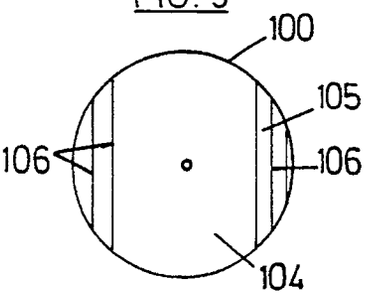


FIG. 4

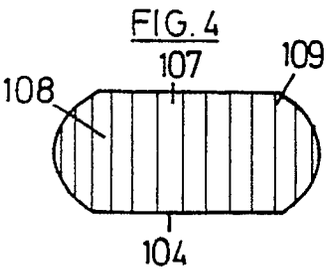


FIG. 5

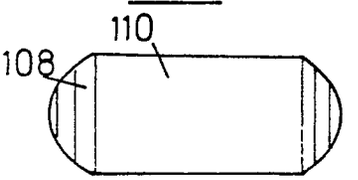


FIG. 6

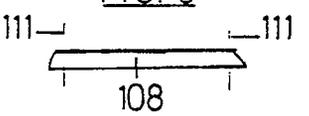


FIG. 7

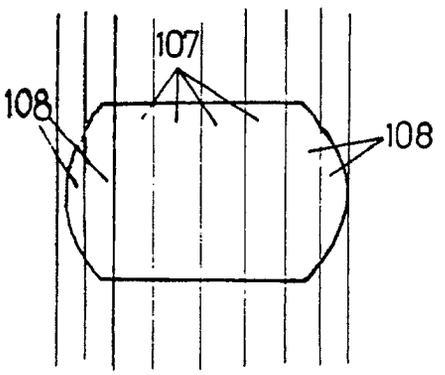


FIG. 8

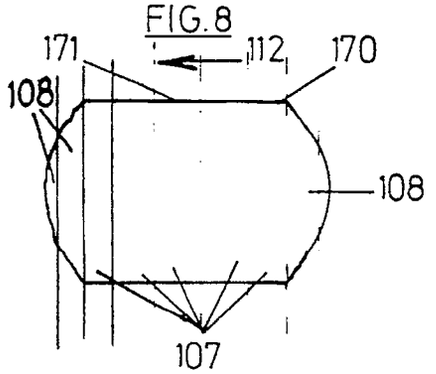
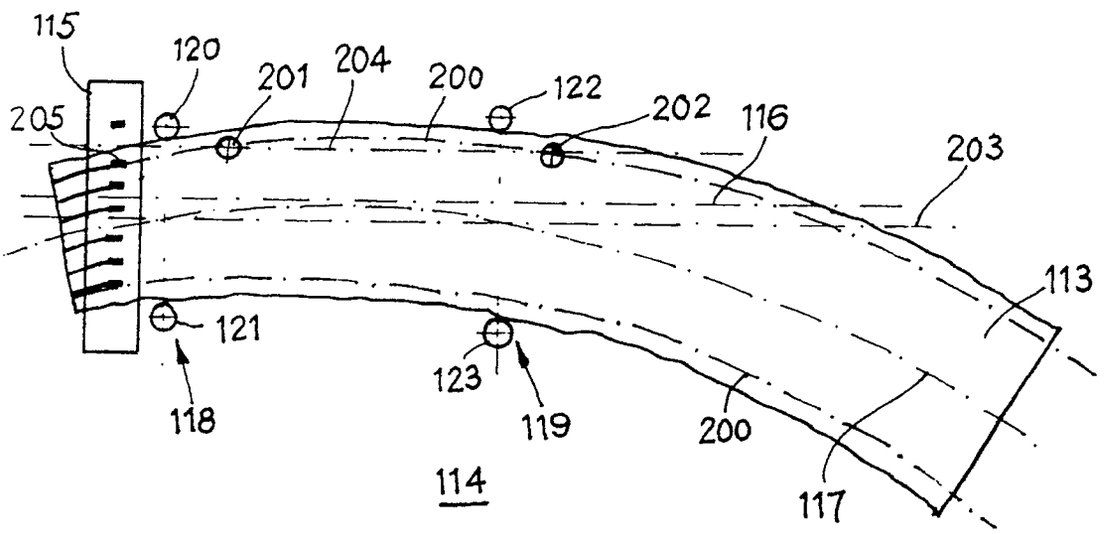


FIG. 9



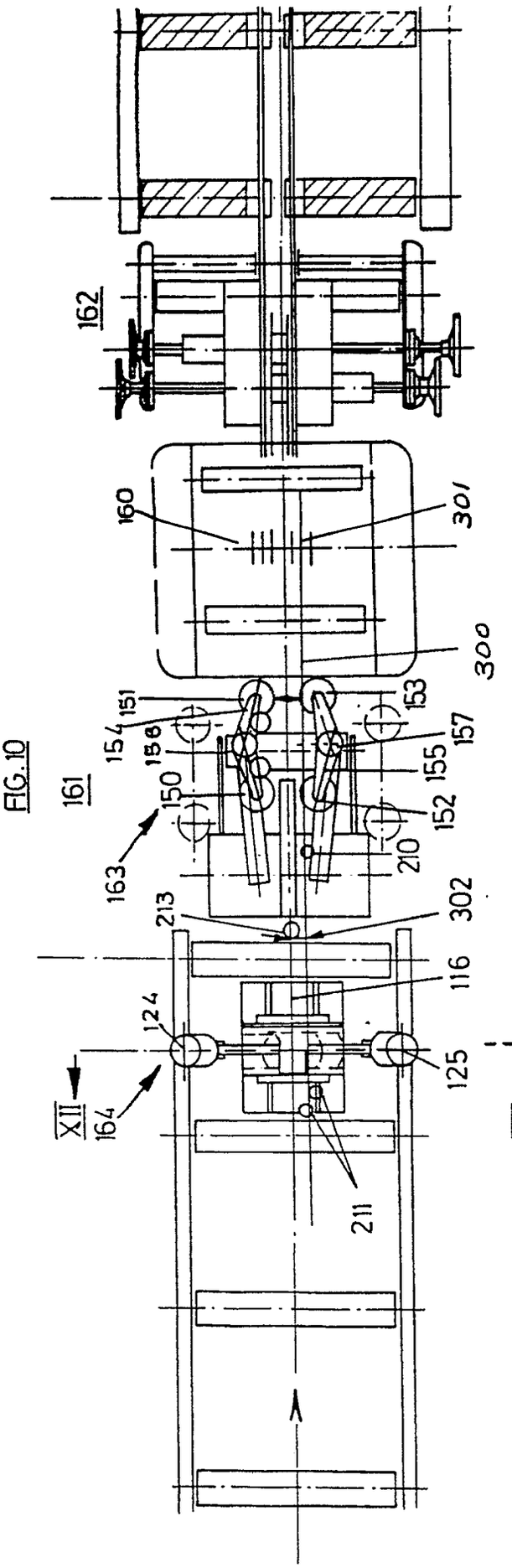


FIG. 10

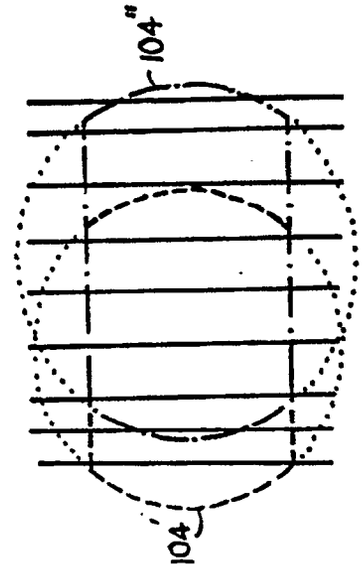


FIG. 8a

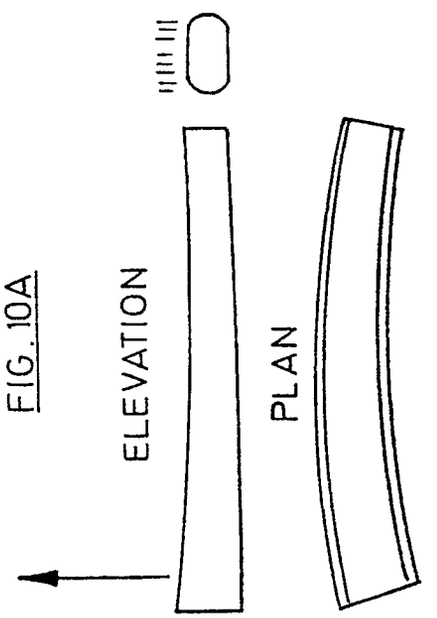
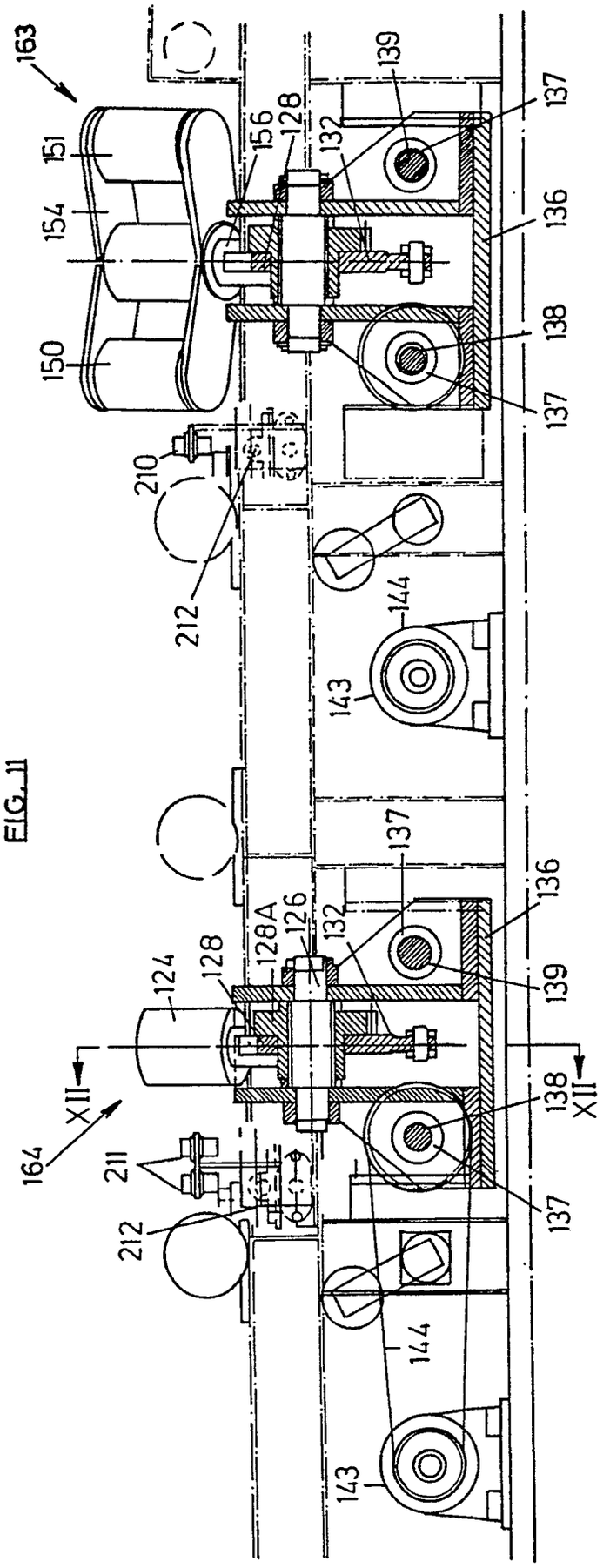


FIG. 10A


163
151
154
150
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128
132
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136
138
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210
212
144
143
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136
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126
128A
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138
XII
XII
164
211
212
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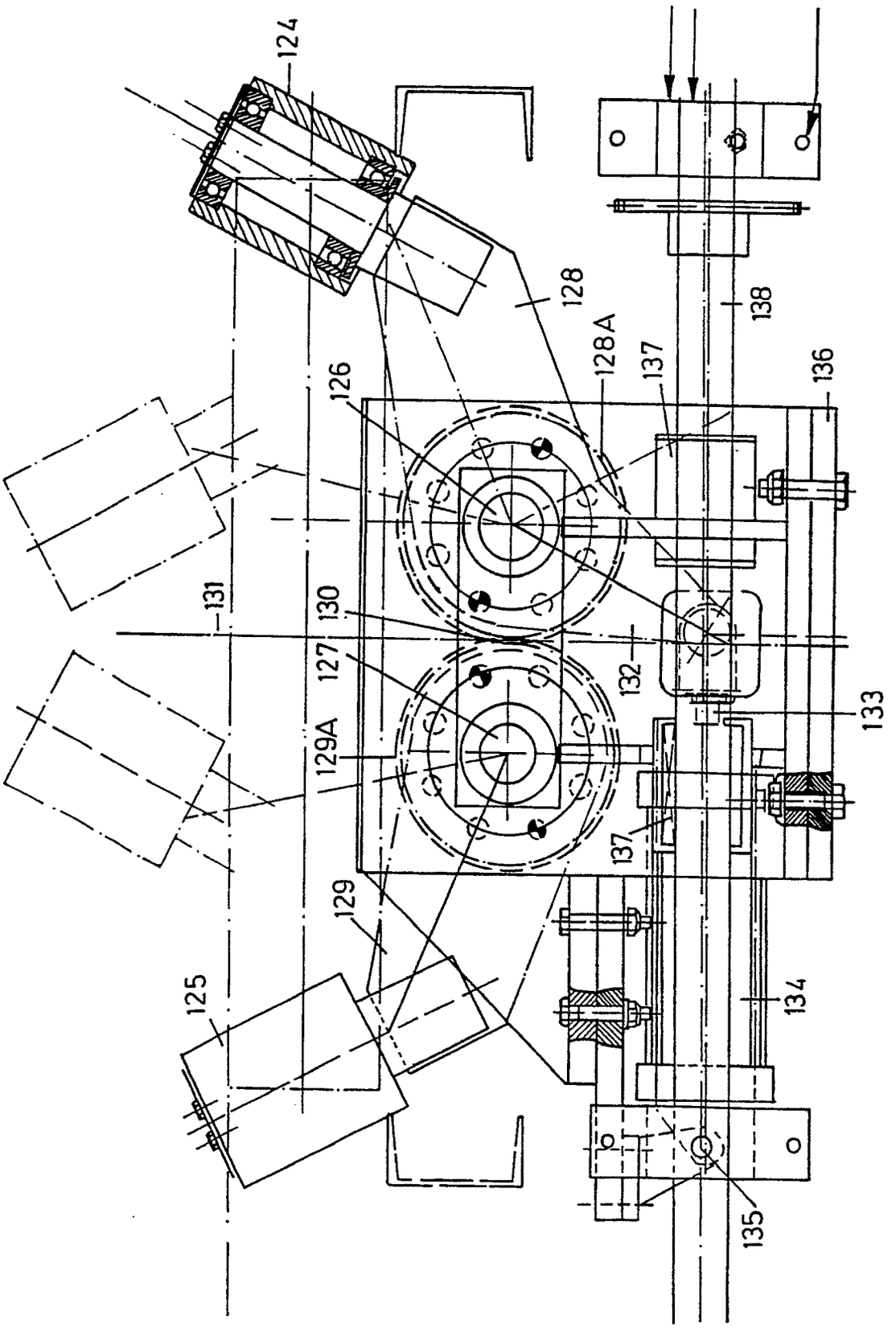
144
143

FIG. 11

FIG. 12


124
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128A
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137
136
126
131
130
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132
133
129A
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125
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135

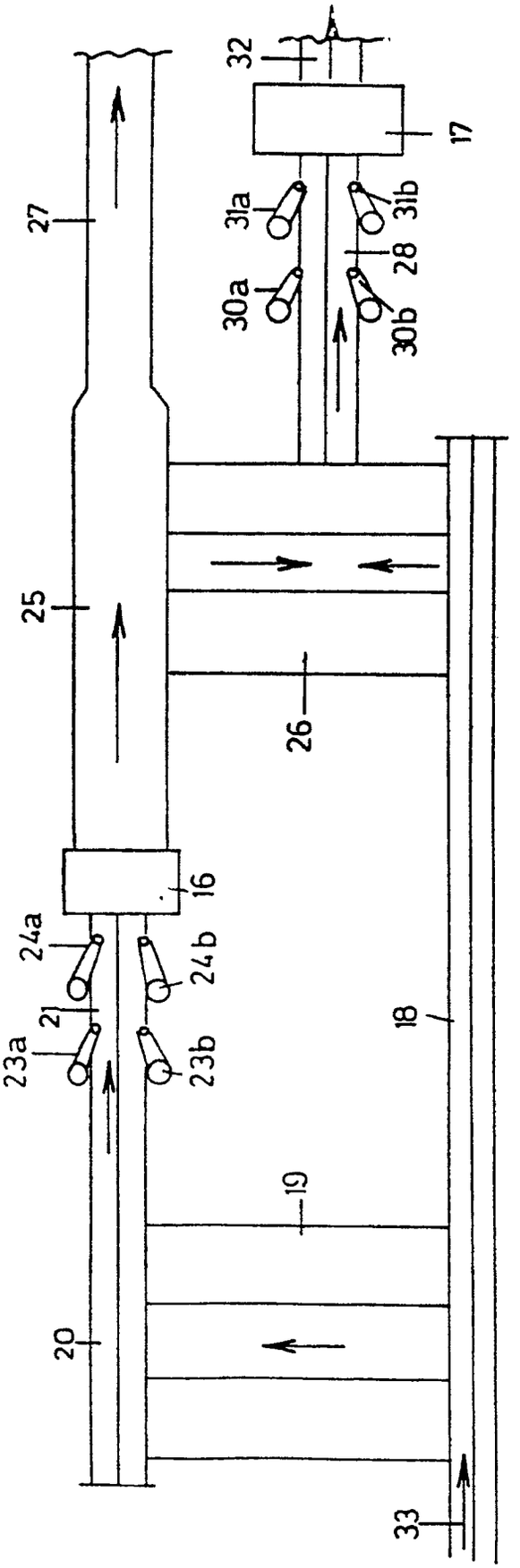

FIG. 13

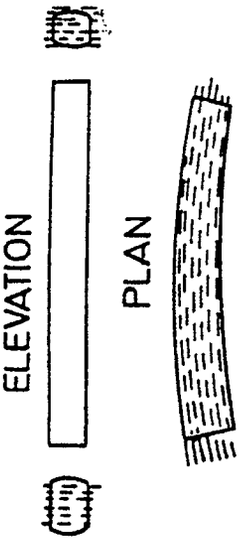

FIG. 13B

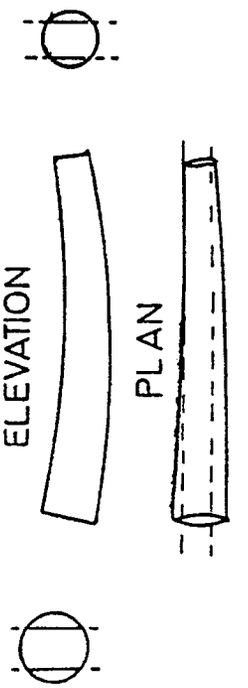

FIG. 13A

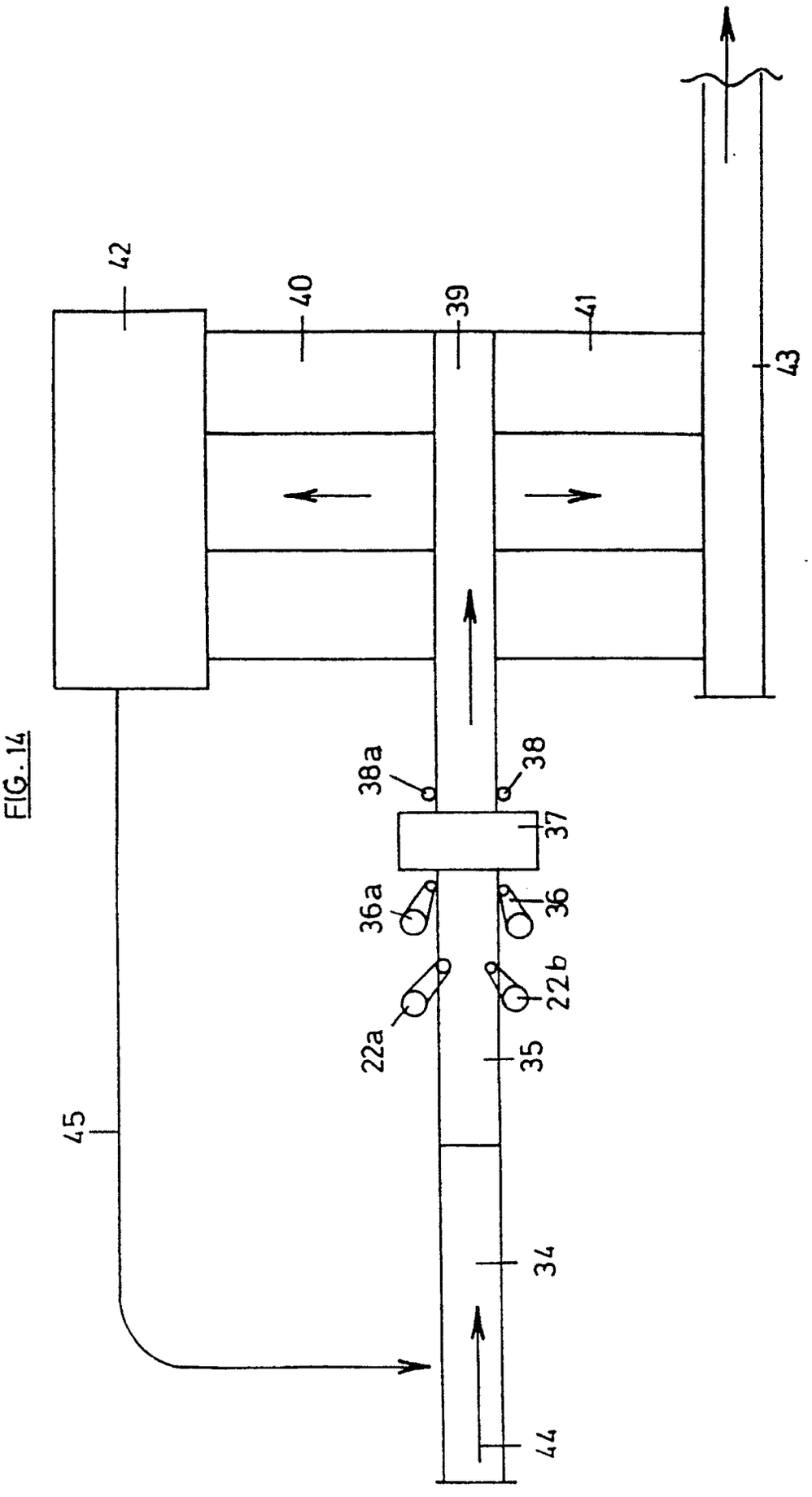

FIG.14