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⑰ **A method of cutting round timber.**

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DE-C- 290 153
US-A-3 552 457
US-A-3 903 943
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Description

The present invention relates to a method for cutting a round log.

The most common machine for cutting round timber such as logs or similar is saw, such as frame saw, band saw, or circular saw.

In recent years, cutting timber with various milling cutters has become usual; these milling cutters are used for cutting round timber into pieces alone or together with saw blades. A feasible feature of using cutters is that the type of wood chips produced in milling cutters is, better than sawdust, suited for use as raw material in paper and pulp industry.

The most common final or intermediate products produced by known methods of cutting round timber are timber pieces of rectangular cross section, such as spars, boards and planks of various sorts.

Other cross sections are manufactured of rectangular timber by a separate stage such as planing.

Intensive development is done in the sawmill industry in order to save raw material, as the price of stock is approx. 50% or more of the price of the sawn product. In traditional methods, the waste in the form of chips and sawdust is approx. 50%. Another large expense is labour. The aim is to reduce said expenses by automation and by reducing the number of separate stages of work, particularly manual ones.

Figures A to K in the attached drawing illustrate the State of the Art related to the invention.

Figure A represents a cross section of an oblique-sided timber piece produced with traditional methods; Figure B is a shelf board or similar made of such timber pieces.

Figures C, D, and E illustrate a known method of cutting timber into pieces and producing oblique-sided timber pieces.

Figures F, G, H, I, J, and K represent another method of producing oblique-sided timber pieces.

In the Prior Art, trapezoidal timber pieces 10 illustrated in Figure A have been made as shown in Figures C, D, and E. These timber pieces 10 have been assembled to for instance shelf boards illustrated in Figure B. For this, as shown in Figure C, log 12 have been cut in a sawing-milling line into rectangular timber pieces 13, 14, 15 and 16. For producing oblique-sided pieces 10 shown in Figure A, for instance pieces 15 and/or 16 (Figure D) have been separated from log 12 having been sawn in the way shown in Figure C. Thereafter pieces 15 and 16 have been taken to a separate processing line, where parts 20 have been removed from pieces 15, 16 by sawing and/or planing as shown in Figure E.

It is easy to note that in the described prior art the amount of wasted raw material will be high and the labour costs extensive. The labour costs will be high due to several separate work stages. A great deal of raw material will be wasted or go to inferior use in the form of surfaces 17 and 18 of log 12.

Another known method of making oblique-

sided timber pieces is illustrated in Figures F to K. According to this method, the log is at first turned on a lathe to completely round piece 19, which is thereafter sawn 21 to two halves 22 and 23. Said halves 22 and 23 are dried in a separate stage, after which each half 22, 23 are separately sawn and/or milled so that their cross sections become trapezoidal; i.e. two opposite sides 25 of the halves 22, 23 will be parallel, while two other opposite sides 26 will be oblique in respect with each other.

As shown in Figures I, J, and K, the center part 29 of the log is taken with parallel sawings 27 and 28 for producing spars, planks and boards, while side sections 30 and 31 are separated and processed in accordance with Figures J and K in a similar fashion as described in connection with Figures G and H so that an oblique-sided 33, 34 timber piece 33, 34 will be obtained.

With the well-known method described in Figures F to K it is possible to save raw material, but the labour costs will be rather high particularly due to several sorting, handling, processing and transporting stages.

According to US—A—4,239,069 a method for cutting a round log is known, where notches are milled into the log in a process line and circle-segment shaped edge-sections are milled away. According to this, first and second longitudinal cuts which run perpendicular to one another are provided in the same process line. By means of these longitudinal cuts a middle piece with a square cross-section and four planks with a rectangular cross-section are produced. Pieces with a trapezoidal cross-section are not produced by means of the known process. During milling of the notches and in the milling away of the circle-segment shaped edge areas milling sand dust is produced.

Based on the previously described known process the invention has the task of placing the longitudinal cuts in the log such that with as little waste product as possible useable pieces are produced which are as approximately equal as possible to the cross-section of the log.

The task is solved by the features given in the characterizing part of the independent Claims 1 and 3.

With respect to the solutions it is to be particularly emphasized that by means of the longitudinal cuts pieces with a trapezoidal cross-section are also produced, which allow for a better approximation of the cross-section of the log than pieces with a square cross-section. Such pieces with a trapezoidal cross-section are, however, known according to Figures H and K. They were, however—as described above—produced in separate process lines, which involves a great deal of time, costs and work. The last-mentioned disadvantages are avoided by the solutions according to Claims 1 and 3.

Useful embodiments of the process according to the invention are described in the independent sub-claims 1 and 4—7.

Figures 1 to 7 illustrate some embodiments of the present invention.

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Figure 1 is a plan view of a timber cutting line carried out in accordance with the invention.

Figure 2 shows a cross section of a log entering the process in accordance with the method of the invention, and Figure 3 shows a cross section of a log processed and cut with the method.

Figures 4, 5, 6, and 7 show some alternative feasible patterns of cutting logs.

A feasible embodiment of the method in accordance with the invention will now be described, by way of an example only, with reference to Figures 1 to 7. In accordance with the invention, raw material log 40 is brought by means of conveyor 50 to a cutting stage in accordance with the invention. Figure 2 shows the cross section of log 40, its base 41a and top 41b. Log 40 is fed from behind and/or from the side onto the feeding conveyor 50, whose idler rollers are indicated with numbers 51 and 52. On the feeding conveyor 50 the log is centered and orientated into a cutting line in which the procedure in accordance with the invention has been implemented, which cutting line may comprise for instance cutting means shown in Figure 1, which cutting means comprise lateral levelling means 53 and 54, which may be combined with oblique cutting means and top and bottom levelling means 55, which also may be combined with oblique cutting means. With one centering it is possible to mill and/or saw 58 from log 40 timber pieces 42, 43, 44, and 45. In connection with saws 58 or milling cutters there may also be oblique cutting means 56 and 57.

This cutting and/or sawing produces rectangular timber pieces 42 and 43 and trapezoidal timber pieces 44 and 45.

Figures 4, 5, 6, and 7 illustrate some alternative log cutting patterns. The cutting pattern determines the number of required cutting organs and milling cutters and the need of oblique cutting organs.

According to Figure 4, only two oblique-sided pieces 44 and 45 are taken from the log.

According to Figure 5, a plank or spar 49 is taken from the center part of the log, and two oblique-sided pieces 4 and 45 are separated from both broad sides of the spar 49.

According to Figure 6, two planks or boards 42 and 43 are taken from the center part of the log, and oblique-sided pieces 44 and 45 are separated from their broad sides.

According to Figure 7, two planks or spars 42 and 43 are taken from the center part of the log, and from their each side are taken oblique-sided pieces 44, 45, 47, 48 so that surface parts 46 consist only a very small portion of the whole cross section of the log.

In addition to these examples, many other cutting patterns may as well be used within the framework of the invention.

If the cutting line is used for cutting into pieces very many different log sizes, there will be a relatively great number of cutting means, the oblique cutting means included, yet arranged in such a way, that when cutting smaller logs a part

of these organs may be out of operation.

As, in accordance with the invention, at least two oblique-sided pieces are taken from the raw material log, the round cross-sectional area of the log can be used more efficiently compared with the situation where only pieces with rectangular cross section are produced. This fact is easy to perceive when comparing for instance cutting patterns of Figures C and 6 of the Application.

The invention is by no means restricted to aforementioned details which are described only as examples; they may vary within the framework of the inventional idea as defined in the following claims.

Claims

1. A method for cutting a round log (40) in a process line by first parallel longitudinal cuts in a process line characterized in that in said process line second longitudinal cuts are executed in pieces with a circle-segment cross-section produced by said first longitudinal cuts, wherein said first longitudinal cuts form an acute angle with said second longitudinal cuts such that pieces (44, 45) are produced with a trapezoidal cross-section and others with a circle-segment cross-section.

2. A method according to Claim 1, characterized in that only such pieces (44, 45) are produced with a trapezoidal cross-section and other such pieces with a circle-segment cross-section by said first and second cuts.

3. A method for cutting a round log (40) in a process line by first parallel longitudinal cuts and second parallel longitudinal cuts which are perpendicular to said first longitudinal cuts whereby at least one piece (49, 42, 43) is produced with a rectangular cross-section, characterized in that in the same process line third longitudinal cuts are executed in pieces with a circle-segment cross-section produced by said first or second longitudinal cuts, wherein the first and/or second longitudinal cuts form an acute angle with said third longitudinal cuts such that pieces (44, 45, 47, 48) are produced with a trapezoidal cross-section and others (46) with a circle-segment cross-section.

4. A method according to Claim 3, characterized in that pieces (44, 45) with a trapezoidal cross-section are cut only from two opposite sides of the log (40).

5. A method according to Claim 3, characterized in that pieces (44, 45, 47, 48) with a trapezoidal cross-section are cut from four sides of the log (40).

6. A method according to one of the preceding claim, characterized in that all longitudinal cuts are executed simultaneously.

7. A method according to one of the Claims 1—5, characterized in that all longitudinal cuts are executed by cutting tools (53—58) in successive and/or side by side.

Patentansprüche

1. Verfahren zum Schneiden eines Rundholzes (40) in einer Bearbeitungslinie durch erste parallele Längsschnitte dadurch gekennzeichnet, daß in dieser Bearbeitungslinie in durch die ersten Längsschnitte erzeugten Stücken mit kreissegmentförmigen Querschnitt zweite Längsschnitte ausgeführt werden, wobei die ersten Längsschnitte mit den zweiten Längsschnitten einen spitzen Winkel bilden, so daß Stücke (44, 45) mit trapezförmigem Querschnitt und andere Stücke mit kreissegmentförmigem Querschnitt erzeugt werden.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß durch die ersten und zweiten Schnitte nur solche Stücke (44, 45) erzeugt werden, die einen trapezförmigen Querschnitt haben, und solche Stücke, die einen kreissegmentförmigen Querschnitt haben.

3. Verfahren zum Schneiden eines Rundholzes (40) in einer Bearbeitungslinie durch erste parallele Längsschnitte und zweite parallele Längsschnitte, die senkrecht zu den ersten Längsschnitten verlaufen, wodurch wenigstens ein Stück (49, 42, 43) mit rechteckigem Querschnitt erzeugt wird, dadurch gekennzeichnet, daß in derselben Bearbeitungslinie in durch die ersten oder zweiten Längsschnitte erzeugten Stücken mit kreissegmentförmigem Querschnitt dritte Längsschnitte ausgeführt werden, wobei die ersten und/oder zweiten Längsschnitte mit den dritten Längsschnitten einen spitzen Winkel bilden, so daß Stücke (44, 45, 47, 48) mit trapezförmigem Querschnitt und andere Stücke mit kreissegmentförmigem Querschnitt erzeugt werden.

4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, daß Stücke (44, 45) mit trapezförmigem Querschnitt nur aus zwei entgegengesetzten Seiten des Rundholzes (40) geschnitten werden.

5. Verfahren nach Anspruch 3, dadurch gekennzeichnet, daß Stücke (44, 45, 47, 48) mit trapezförmigen Querschnitt aus vier Seiten des Rundholzes (40) geschnitten werden.

6. Verfahren nach einem der vorgehenden Ansprüche, dadurch gekennzeichnet, daß alle Längsschnitte gleichzeitig ausgeführt werden.

7. Verfahren nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß alle Längsschnitte durch Schneidwerkzeug (53 bis 58) ausgeführt werden, die hintereinander und/oder seitlich nebeneinander angeordnet sind.

Revendications

1. Procédé de coupe de bois rond ou bûches

(40) dans un ligne de traitement par des premières coupes longitudinales parallèles dans une ligne de traitement, caractérisé en ce que dans cette ligne de traitement des secondes coupes longitudinales sont effectuées pour obtenir des pièces de section transversale en segment de cercle produites par les premières coupes longitudinales, dans lequel les premières coupes longitudinales forment un angle aigu avec les secondes coupes longitudinales de telle sorte que sont produites des pièces (44, 45) de section transversale trapézoïdale et d'autres pièces de section transversale en segment de cercle.

2. Procédé selon la revendication 1, caractérisé en ce que seules sont produites ces pièces (44, 45) ayant une section transversale trapézoïdale et d'autres pièces ayant une section transversale en segment de cercle par les premières et secondes coupes.

3. Procédé de coupe d'un bois rond (40) dans une ligne de traitement par des premières coupes longitudinales parallèles et des secondes coupes longitudinales parallèles qui sont perpendiculaires aux premières coupes longitudinales est produite grâce à quoi au moins une pièce (49, 42, 43) de une section transversale rectangulaire, caractérisé en ce que dans la même ligne de traitement, les troisièmes coupes longitudinales sont exécutées pour former des pièces de section transversale en segment de cercle produites par les premières ou secondes coupes longitudinales, dans lequel les premières et/ou secondes coupes longitudinales forment un angle aigu avec les troisièmes coupes longitudinales de sorte que sont produites des pièces (44, 45, 47, 48) de section transversale trapézoïdale et d'autres pièces (46) de section transversale en segment de cercle.

4. Procédé selon la revendication 3, caractérisé en ce que les pièces (44, 45) de section transversale trapézoïdale sont découpées uniquement à partir des deux côtés opposés de la bûche (40).

5. Procédé selon la revendication 3, caractérisé en ce que des pièces (44, 45, 47, 48) de section transversale trapézoïdale sont découpées à partir des quatre côtés de la bûche (40).

6. Procédé selon l'une quelconque des revendications précédentes, caractérisé en ce que toutes les coupes longitudinales sont exécutées simultanément.

7. Procédé selon l'une quelconque des revendications 1—5, caractérisé en ce que toutes les coupes longitudinales sont exécutées par des outils de coupe (53, 58) en succession et/ou côte à côte.

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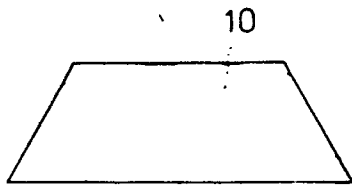


FIG. A

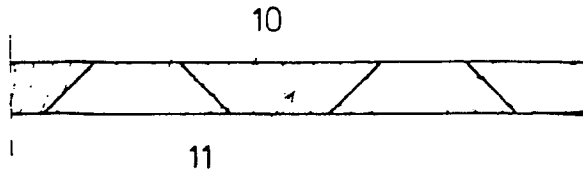


FIG. B

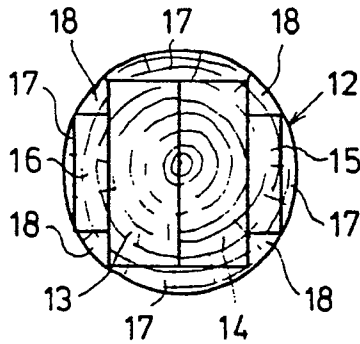


FIG. C

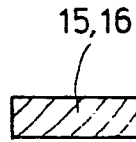


FIG. D

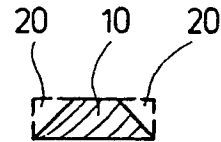


FIG. E

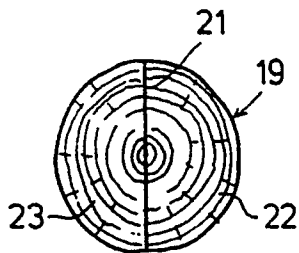


FIG. F

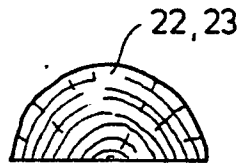


FIG. G

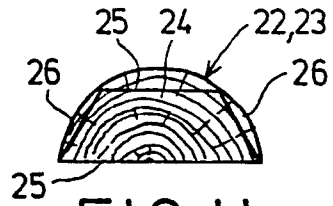


FIG. H

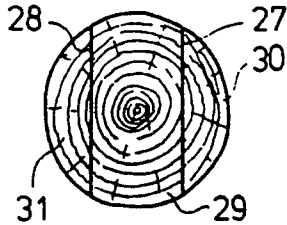


FIG. I



FIG. J

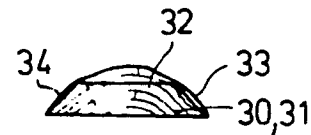


FIG. K

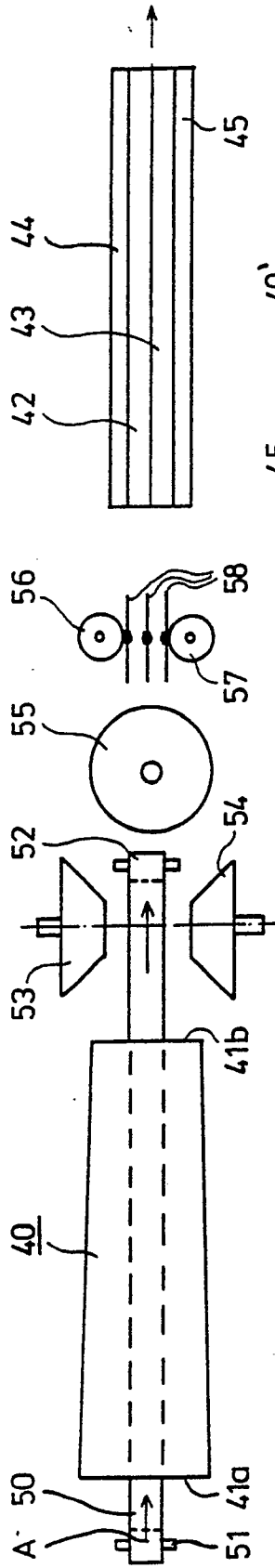


FIG. 1

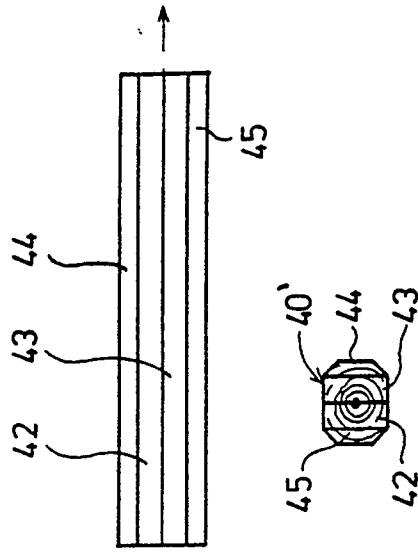


FIG. 2

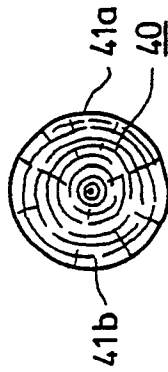


FIG. 3

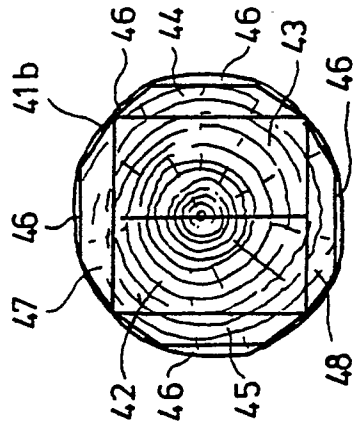


FIG. 4

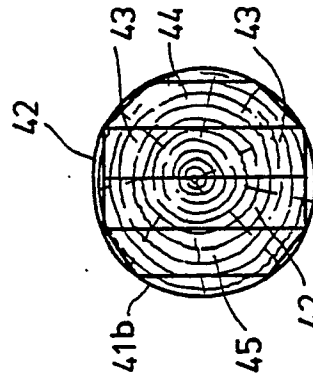


FIG. 5

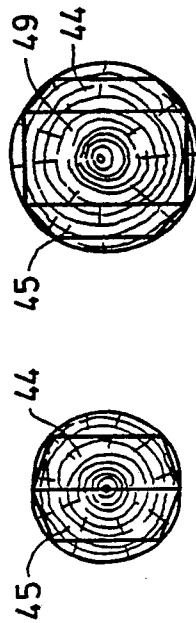


FIG. 6

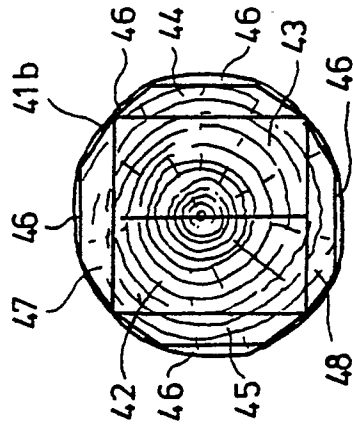


FIG. 7