A method of cutting round timber. A method of cutting round timber such as logs (40) into pieces, in which method the timber is cut in the process line with parallel cuts and with cuts obliquely positioned with respect to the parallel cuts. Two or more oblique pieces are cut from the log (40) with one orientation, the same direction being maintained throughout the whole cutting process, and, when required, also spars, planks, and/or boards are cut at the same time. Cuts parallel with each other and cuts that are obliquely positioned in respect with the parallel cuts are simultaneously made by means of organs (53, 54, 55, 56, 57, 57) arranged in succession and/or side by side. The object of the invention is to afford a more economical timber cutting method through savings in raw material and labour costs, through improved feasibility of the plant arrangement, and through a reduction in the plant construction costs.
A method of cutting round timber

The present invention relates to a method of cutting round timber such as logs into pieces, in which method the timber is cut in the process line with parallel cuts and with cuts obliquely positioned with respect to the parallel cuts.

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.
The object of the present invention is to afford a new, more feasible and economical method in order to avoid said drawbacks, i.e. to save raw material and labour costs and feasibly produce timber pieces with oblique sides, and, when required, also spars, boards and/or planks. It is also an objective of the invention to provide a means in which the equipment will be economical and simple and thus bring about savings in the construction costs of the plant.

For attaining the objectives mentioned above and to be expressed later, the principal characteristic feature of the invention is that at least two or more oblique pieces are cut from the log with one orientation, the same direction being maintained throughout the whole cutting process, and that, when required, also spars, planks, and/or boards are cut at the same time.

A method in accordance with the invention leads to an optimal use of raw material and savings in labour, as will be proven by the the following detailed description of the invention and the comparison with corresponding known methods representing the Prior Art.

Figures A to K in the attached drawing illustrate the State of 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 D illustrate a known method of cutting timber into pieces and producing oblique-sided timber pieces.


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

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 we 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 1, 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.

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 organs shown in figure 1, which cutting organs comprise lateral levelling organs 53 and 54, which may be combined with oblique cutting organs and top and bottom levelling organs 55, which also may be combined with oblique cutting organs. 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 organs 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 organs, the oblique cutting organs 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 of cutting round timber such as logs (40) into pieces, in which method the timber is cut in the process line with parallel cuts and with cuts obliquely positioned with respect to the parallel cuts, wherein at least two or more oblique pieces are cut from the log (40) with one orientation, the same direction being maintained throughout the whole cutting process, and wherein, when required, also spars, planks, and/or boards are cut at the same time.

2. A method in accordance with claim 1, wherein cuts parallel with each other and cuts that are obliquely positioned in respect with the parallel cuts are made by means of organs (53, 54, 55, 56, 57, 57) arranged in succession and/or side by side.

3. A method in accordance with claim 1 or 2, wherein cuts parallel with each other and cuts that are obliquely positioned in respect with the parallel cuts are performed simultaneously.

4. A method in accordance with one of claims 1 to 3, wherein oblique-sided pieces are cut at the opposite sides of the log (49) (figures 4, 5, 6).

5. A method in accordance with one of claims 1 to 4, wherein oblique-sided pieces are cut from four sides of the log (40) (figure 7).

6. A method in accordance with one of claims 1 to 5, wherein only oblique-sided pieces (44, 45) are cut from the log (40) (figure 4).

7. A method in accordance with one of claims 1 to 6, wherein both oblique-sided pieces and pieces with rectangular cross section are simultaneously cut from the log (40) (figures 5, 6, 7).