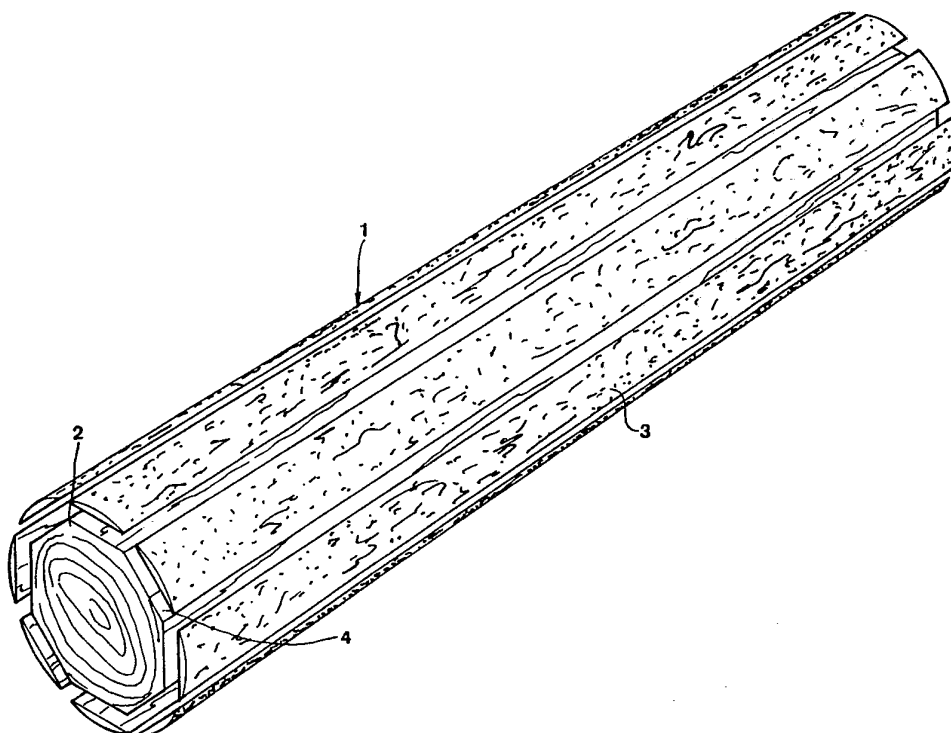




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(54) Title: METHOD FOR REDUCING A LOG



(57) Abstract

A method for reducing a log (1) for converting it into a starting wood piece (2) suitable to be divided comprises removal of material (3) located peripherally along the entire or parts of the length of the log. The material is removed along the entire length of the log according to eight planes (4) each of which making an angle of substantially 45° with the adjacent planes, so that a starting wood piece (2) having a cross-section of an octagon is formed.

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## **Method for reducing a log**

### FIELD OF THE INVENTION AND PRIOR ART

The present invention relates to a method for reducing a log for converting it into a starting wood piece suitable to be divided, in which material located peripherally is removed along the entire or parts of the length of the log.

Such methods are used in order to adapt the disintegration or dividing of a log into wood pieces to the different irregularities that a log may have, such as crookedness, quality, knots, conicity, varying density, compression wood and the like, so as to obtain a yield from the log being as high as possible with respect to the quality and the total volume of the wood obtained. The definition log comprises whole tree trunks as well as shorter logs cut off therefrom.

A series of methods of the kind mentioned in the introduction has been suggested and utilised so as to achieve this. Such a method consists in round reducing the log, which accordingly means that material is removed from the periphery of the log so that it gets a circular cross-section being constant over the length of the log. Another method consists in plan reducing the log, i.e. cut away round parts thereof according to two mutually substantially parallel planes, so that a flat starting wood piece having rounded edges before further dividing is obtained. Root swellings present on root logs are in another method removed by removal of material along the natural conicity of the log, so called root reducing, in which a starting wood piece having a circular cross-section and tapering continuously towards one end is obtained for continued dividing. Although it has been tried to adapt these different reducing techniques to the appearance of the log in question or other special wishes, they lead to starting wood pieces resulting in a considerable further material waste as well as a lower

quality yield than desirable. Furthermore, a special reducing technique makes it almost necessary to after that use one or several special techniques in the further dividing of the starting wood piece obtained, so that it will be necessary to provide the possibility to use a plurality of different reducing techniques so as to be able to have a not restricted option with respect to the further dividing.

An example of dividing techniques being suitable depending on the appearance of the log is cutting the log along the centre line thereof so as to after that study and get an impression of the quality of the interior of the log before the dividing is continued, so called inwardly/outwardly-sawing. The log is according to another technique sawn by putting a cross with the centre in the centre line of the log, so called quadrant sawing, in which substantially standing annual rings are obtained, which leads to a greater abrasion resistance of the surfaces of the wood piece. Standing annual rings may also be obtained by sawing the log by applying a series of parallel cuts therethrough from one side thereof to the other. Aiming at the obtention of a wood volume being as great as possible a log may furthermore first be plan reduced, then sideboards be cut out and after that a sawing from the outside and inwardly according to mutually parallel sawing cuts perpendicularly to the surfaces obtained by the plan reducing be carried out. Furthermore, it is possible to saw in the fibre direction, i.e. parallelly to the natural conicity of the log, so as to increase the quality of the wood pieces resulting. Sawing or the like following the curve extension of the log may also be carried out so as to raise the quality.

All these sawing techniques which may be applied on the starting wood pieces obtained by the reducing methods of the prior art give rise to a production of considerable further waste of material in the continued dividing by resulting slabs and waness, which have to be removed from certain wood pieces by length trimming saws necessary for this sake.

Furthermore, a method for reducing logs is already known, in which material is removed along the entire length of the log in such a way that a starting wood piece having a cross-section of a substantially regular hexagon is obtained. This reducing technique has been suggested so as to increase the total wood volume achievable from a log with respect to the other reducing methods mentioned above. This method leads to a starting

wood piece being extremely difficult to handle and which is difficult to divide further in a suitable way, wherein the possibilities to use different ways of dividing become very restricted, and it easily happens that wood pieces having peculiar shapes and being difficult to use are obtained at the same time as the reducing method itself gives rise to more waste of material than desirable.

## BRIEF DESCRIPTION OF THE INVENTION

The object of the present invention is to provide a method of the kind mentioned in the introduction, which while producing comparatively little waste of material leads to a starting wood piece, on which all techniques mentioned above for further division or splitting are applicable, so that starting from one single reducing method the division technique may be freely selected according to the appearance of the log in question, the quality needs and so on, and which may be divided without any further waste of material and while obtaining wood products of a high quality.

This object is according to the invention obtained for a method of the type defined in the introduction by removing material along the entire length of the log around the log according to eight planes each of which making an angle of substantially 45° with the adjacent planes, so that a starting wood piece having a cross-section of an octagon is formed.

The method according to the invention gives rise to a small amount of material waste during the production of the starting wood piece, which is good in itself, but the essential characteristic of the method according to the invention consists in the fact that all dividing techniques mentioned above may be used for the starting wood piece obtained, so that accordingly only one reducing method is necessary so as to obtain the possibility to carry out the further dividing according to the manner which turns out to be most suitable depending on the density, the shape, the constitution, the thickness and so on of the log. This starting wood piece may also be divided without the creation of any waste of material and while at the same time obtaining wood pieces having very preferable shapes, so that high quality products may be produced, also from logs having such dimensions that they until now would become chips, and in which consideration has

been taken to the different characteristics of the wood, such as the strength of certain surfaces, shrinking and swelling behaviour and so on.

Furthermore, the reducing method according to the invention leads to the fact that it starting from the starting wood piece obtained thereby is possible to obtain a series of completely new wood products with advantageous properties while maximally utilising the wood of the log. A considerable gain of wood is thereby obtained already by the fact that the wood products may be obtained directly in connection with the dividing, which is controlled in accordance with the products aimed at, and not as in the previous methods, in which first of all an independent division takes place and after transporting the wood pieces obtained thereat away these are used for the production of the wood products wanted resulting in a great further waste of material.

A series of examples of possibilities to divide or disintegrate the starting wood piece obtained by the method according to the invention and take care of the wood pieces so obtained will be described in the following description for illustrating the possibilities offered by the method according to the invention and understanding of the dramatic importance and advantages thereof.

The waste of material will be especially small if the removal of the material in accordance with the preferred embodiment of the method according to the invention is carried out along the entire length of the log around the log according to eight planes each of which making an angle of substantially  $45^\circ$  with the adjacent planes, so that a starting wood piece having a cross-section of a substantially regular octagon is formed.

Further advantages and preferred characteristics of the invention will appear from the dependent claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the appended drawings, below follows a specific description of the invention and examples of different possibilities offered thereby.

In the drawings:

Fig 1 is a perspective view illustrating the cutting away of material from a log according to a preferred embodiment of the method according to the invention,

Fig 2 illustrates how a starting wood piece obtained in accordance with the invention from a log with a small diameter may be further divided,

Fig 3 shows how the members obtained in the division according to Fig 2 may be assembled,

Fig 4 illustrates a possible division of a starting wood piece obtained in accordance with the invention from a log with a somewhat greater diameter,

Fig 5 shows how the outer wood pieces cut away in accordance with Fig 4 may be assembled,

Fig 6 shows another way to assemble the wood pieces obtained by the division according to Fig 4,

Fig 7 and 8 illustrate how the wood piece obtained in Fig 4 may be divided into two parts and after that reassembled,

Fig 9 and 10 illustrate how the inner wood piece resulting by the division according to Fig 4 may be divided and after that reassembled in an advantageous way,

Fig 11 shows how starting wood pieces obtained by applying the method according to the invention on logs of middle and big sizes may be further divided by so called from inside/outwardly-sawing,

Fig 12 illustrates how pieces resulting from the division according to Fig 11 may be assembled,

Fig 13 illustrates a division from outside and inwardly or parallelly from one side to the other in a starting wood piece obtained in accordance with the method according to the invention, which may be particularly suitable for coarse logs,

Fig 14 illustrates another conceivable division of the starting wood piece according to Fig 13,

Fig 15 is a cross section view of a log for illustrating the smaller amount of waste of material resulting already in the reduction itself in accordance with the method according to the invention, and

Fig 16 illustrates an alternative starting wood piece obtainable by the reducing method according to the invention.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

It is schematically illustrated in Fig 1 how the method according to the invention may be carried out on a log 1 for reducing it into a starting wood piece 2 having a cross-section of a substantially regular octagon. The eight material removal planes have in this embodiment been applied substantially parallelly to envelope lines or generatrices extending in the longitudinal direction of the log in accordance with the conicity thereof, so that a starting wood piece having cross-section dimensions decreasing substantially uniformly over the length thereof from one end to the other, in the form of a truncated regular pyramid with an octagon as base, is formed. This leads in other words to a removal of the material substantially parallelly to the extension of the fibres or grains of the log, which gives rise to better glue surfaces and a more resistant glued wood product, if parts of the starting wood piece are glued to other parts thereof or wood parts from other logs. Although eight small slabs 3 are shown in Fig 1 as material removal pieces, the removal of material will in the practice preferably take place by planing, so that the outer limiting surfaces of the starting wood piece defined by said eight planes 4 are prepared for gluing directly after the division of the latter into elongated wood pieces. It is noted that said planes 4 of course also may be applied substantially parallelly to the centre line of the log, so that a starting wood piece having a cross-section being substantially constant over the length thereof is obtained. Which of these two embodiments that is chosen in the reality for a certain log is in a high degree dependent on the appearance or constitution of this log and a scanner or another device detecting the constitution of the log is preferably



arranged at a conveyer in the feeding direction of the log before the material removal so as to detect and determine the constitution of the log and deliver information about the constitution of the log to the means for removal of material for directing the planes thereof with respect to the centre line of the log on the basis thereof.

The way in which the further division of the starting wood piece 2 may be carried out will be explained in the following by some examples shown in the appended figures. Sawing parallel to the fibres as well as to the centre line may then take place. The starting wood piece obtained by the reducing method according to the invention may be further divided for obtention of wood products with a high value, without forming the slightest waste of material in the form of slabs, edge rippings and the like. Furthermore, no length trimming saws as before are needed either. It is sufficient to divide the starting wood piece by sawing, whereupon the surfaces 4 preferably planned may be directly glued to other such surfaces for obtaining a finished high quality wood product, since glue enabling gluing without proceeding drying is available nowadays.

In the reduction according to the invention illustrated in Fig 1 only about 5% of the material of the log will get lost, and it is the outer material of low quality that disappears. Thus, no material waste at all results after that during a further division of the starting wood piece, except for the saw dust resulted from the sawing. This is to be compared with the methods already known, which give rise to many times greater losses of material with respect to the volume of the log and the total volume of the wood pieces obtainable by division of the starting wood piece.

How a station or plant for carrying out the reducing method according to the invention in practice will be constituted is a free choice for the man skilled in the art to decide, in which it probably is advantageous to have planners arranged to process the log in two mutually parallel planes or four planes, each of which making an angle of substantially 90° with respect to the two planes adjacent thereto. The log is preferably after that rotated and the processing takes place along new planes, either by means of the same planners or by means of planners of a second planning plant arranged downstream of the first planning plant. The distance between the processing plans of the different planners is adjusted according to the diameter of

the log, preferably automatically, since the thickness at the thickest point of a slab 3 according to Fig 1 shall be about 7,5% of the radius of the log so as to form a starting wood piece having both a maximum cross-section and a cross-section of a substantially regular octagon.

It is shown in Fig 2 how a starting wood piece 2 obtained by the method according to the invention may be further divided, should this has been obtained from a log piece having small dimensions, such as the top end of a log, which normally would only be useful as chips or thin boards or rippings fetching a low prize. It is suitable to apply the quadrant sawing already known on this starting wood piece 2, so that two cuts 5 are applied in an angle of 90° with respect to each other and intersecting each other in the centre of the log. It is noted that the starting wood piece shown in Fig 2 may have been obtained either by sawing parallelly to the fibres or sawing parallelly to the centre line of the log. The wood pieces 6 obtained by the division according to Fig 2 with substantially standing annual rings may be glued to each other to a wood piece 7 shown in Fig 3 having a square cross-section and a longitudinal inner hollow space with an also substantially square cross-section. The divided planes 8 obtained by the division according to Fig 2 have then been used as glue surfaces and the right-angled corner of each wood piece 6 obtained from the cross of the cut 5 has formed an outer right-angled corner 9 of the wood piece 7 according to Fig 3. The wood piece 7 obtained in this way has when the outer limitations are considered and the presence of the inner hollow space is neglected even a cross-section which is considerably larger than that of the original log. Furthermore, this wood piece is remarkably suitable for use in all kinds of buildings and the like, so that it commands a considerably higher prize than had been possible by the previous dividing methods. A great advantage of the wood piece 7 according to Fig 3 is namely the reaction thereof upon changes in volume in the form of swelling and shrinking of the wood because of absorption and giving off of moisture. In such a change of size of the wood there is always tangentially a change being twice the change radially with respect to the point which previously was the centre of the log, i.e. the corner 9 of the wood piece 7. This does not result in any change in the corners 9 and the greatest change most far away therefrom, where the radius is greatest. The corners 9 will as a consequence thereof lie still during said changes and a movement of the different wood pieces 6 will take place along the glue surfaces, which is illustrated by the double-arrow

A at one of the glue surfaces. Thanks to the free space provided by the inner hollow space 10 in the wood piece 7, the wood piece will be able to move slightly along the glue surfaces in accordance with the double-arrow A with respect to each other without splitting of the wood piece. Accordingly, this wood piece 7 gets a very good ability to resist stresses in the form of changes of the climate. The wood unit illustrated in Fig 3 will besides that be very strong, especially because it has almost completely standing annual rings, which makes the surfaces thereof resistant to abrasion in the form of wind, sun, friction and the like.

It is illustrated in Fig 4 how a starting wood piece 2 obtained from a log with a somewhat greater diameter could be further divided. This takes place by separating wood pieces 11 by applying a cut 5 substantially parallelly to one of said eight planes 4 for each of them while intersecting the two adjacent planes 12, so that a wood piece 11 having a cross-section of a quadrangle is formed. The remaining centre yield 13 may be sold as it is or be further sawn in accordance with known techniques if desired. It is illustrated in Fig 5-8 how the wood units 11 may be used for obtaining high quality wood pieces.

It is shown in Fig 5 how wood pieces 11 obtained by the division according to Fig 4 are glued to each other, so that the prolongation in the transversal direction of the flat surface 4 deriving from the starting wood piece of the wood piece extends in the same plane as the one parallel surface 14 deriving from said cut of the adjacent wood piece of the wood unit 15, which gets two mutually parallel large surfaces formed by the parallel surfaces of each wood piece and a constant thickness. Thus, the divided adjacent surfaces 12 are used as glue surfaces. The wood unit should be useful as for instance floor material. It would also be possible to superimpose several wood units 15 according to Fig 5 and glue them to each other, wherein every second wood unit is turned about 90° around the normal of the large surface thereof, i.e. the normal to the surfaces 4 and 14, with respect to the adjacent flat wood units. The wood block so obtained may then be cut substantially perpendicularly to the large flat surfaces of the wood units 15 included therein according to a plane which is perpendicular to the drawing plane. Several such cuts may be applied at desired intervals for obtaining plates or sheets of varying thickness. These wood units present in the form of plates or blocks have very good resistance properties, since

they get a surface making them suited to be called "cross plates", since the surface consists of alternating portions having standing annual rings and cross-cut wood. Such a wood unit could thanks to the strength thereof be used for all kind of purposes, such as for instance manufacture of furniture, floors, and so on. This wood product of high value is to be compared with the destiny that this wood material had met in the reducing and dividing methods already known, i.e. become chips or burned up. It would also be possible to cut the block according to different angles depending on the intended use of the products so obtained, since different cutting angles gives rise to different characteristics of the resulting wood products.

It is shown in Fig 6 how four wood pieces 11 obtained by the division according to Fig 4 may be assembled by turning them so that the flat surfaces 4 thereof are directed towards the centre of the wood unit 16 and the surfaces 12 form glue surfaces. This wood unit becomes a square cross-section which is very large compared with the total cross-section of the four wood pieces 11. This wood unit could by the great outer form thereof with respect to the volume thereof be used for example where comparatively thick wood units are desired for the sake of a beautiful appearance, but these have not to resist forces corresponding thereto.

It is illustrated in Fig 7 and 8 how a wood piece 11 obtained by the division according to Fig 4 may be divided into two identical wood pieces by applying a cut 17 in the middle of the wood piece perpendicularly to the flat surface 4. One of the wood pieces is after that turned by turning 180° about the longitudinal axis thereof and glued by the surfaces 12 to corresponding surfaces of the second wood piece for obtaining a wood unit 18 with a rectangular cross-section. Since it in the case shown in Fig 7 and 8 is a question about a wood piece 11 obtained by sawing parallelly to the fibres, i.e. sawing according to the conicity of the log, this wood piece 11 tapers towards one end 19 thereof, so that before gluing of the wood piece halves obtained after the cut 17 to each other in one of them end has also to be shifted for end with respect to the other. This is visible in Fig 8 by the increase of the cross-section of the left wood piece part from the left to the right, while the cross-section of the other decreases. Accordingly, by dividing according to Fig 4 and after that assembling the wood pieces 11 obtained according to Fig 8 a centre piece 13 and four boards 18 are obtained without any waste of material.

It would also be possible to in particular for small pulp wood apply two mutually parallel cuts so that an inner centre yield with a maximum rectangular cross-section and two wood pieces having the same shape as the wood piece 11 according to Fig 4 is obtained. The latter wood pieces are then the greatest possibly achievable wood pieces of this kind. Each of them is divided in accordance with a plane being perpendicular to the flat surface 4 into two parts having a mutual mirror image symmetry. A stable wood unit corresponding to the wood unit 18 may in this way be formed thanks to the standing annual rings. Thus, a centre piece and two deals are in this way obtained without any waste of material.

However, it is shown in Fig 9 and 10 how the centre piece 13 obtained in the division according to Fig 4 could be further divided in an advantageous way. Two mutually perpendicular cuts 20 intersecting each other in the centre of the wood piece 13 are then applied while turning the cut cross so that the cuts cut the surfaces of the cross-section square at a point located between the corner and the middle point of that surface. The four wood pieces 21 obtained in this way may after that be assembled as shown in Fig 10 while obtaining a wood unit 22 with a square cross-section and an inner longitudinal hollow space with an also substantially square cross-section. Some material has been cut away (at 23) at that end of the surface of each wood piece 21 which was an external surface of the wood piece 13 for receiving the shorter surface of the adjacent wood piece so as to increase the stability of the wood unit 22 obtained. The wood piece 21 may of course have been obtained by conical sawing, so that in the two pieces adjacent to each piece end has been shifted for end with respect to the latter for obtaining the constant cross-section over the length of the wood unit. This method and this wood unit are described more exactly in the Swedish patent application No. 8903365-8 of the applicant.

A starting wood piece 2 is illustrated in Fig 11 and has been produced by applying the method according to the invention on a log of middle size or middle thickness. It is appropriate to first of all separate two outer wood pieces 11 by sawing, whereupon these may be glued to each other and other such pieces in for example the ways shown in Fig 5-8. As appears the cuts 24 are applied considerably closer to the outer corners 25 of each wood piece 11 than the outer corners 26 of the starting wood piece 2 lying

closest. When the cutting away of the wood pieces 11 has taken place, a cut 27 is preferably applied through the centre of the wood piece 2 and after that from the inside and outwardly a cut 28 and then 29. Thus, a sawing from the inside and out takes place, by which it is possible to study the inner constitution of the wood piece after applying the cut 27 and make the application of the cut 28 depending thereon. Two inner deals or boards 30 are obtained in this way, which of course could be further divided by sawing, and four wood pieces 31, which may be glued to each other in the way shown in Fig 12. Thus, the entire starting wood piece 2 may be used for obtaining high quality wood units commanding a high prize and having a great possible field of use.

It is shown in Fig 13 how a starting wood piece 2 obtained from a log having coarse dimensions may be further divided. Sawing from the outside and inwardly or successively through the wood piece 2 from one side to the other by applying series of parallel cuts 32 takes place. The outer wood pieces 33 and 34 produced may be taken care in the way illustrated in Fig 5-8. It would of course also be possible to apply the saw cuts shown in Fig 13 from the inside and outwardly, should this be judged to be suitable.

It is shown in Fig 14 how the starting wood piece 2 illustrated in Fig 13 may be divided in an alternative way. The centre piece 35 is then first created by applying two parallel cuts 36, and after that two cuts 37 being perpendicular to the cut 36 are applied in each side member, so that an inner member 38 with a rectangular, preferably square cross-section and two identical outer members 39 are obtained. The members 39 may be glued to each other in the way illustrated in Fig 12, in which a wood unit having a square cross-section and an inner longitudinal hollow space with an also substantially square cross-section is obtained, or only two such members are glued to each other for forming a wood unit corresponding to the upper half of the wood unit in Fig 12 and preferable suitable for use as floor.

Furthermore, the wood gain obtained only by separating a wood piece 11 from a starting wood piece 2 according to the invention with respect to the separation of a lateral board 40 (dashed lines) in a traditionally way after removing a slab 41 located laterally with respect thereto is illustrated in Fig 15. The volume of the wood piece 11 is about 30% greater than that of the wood piece 40. Furthermore, the further division of the starting piece 2 ob-

tained in accordance with the invention will result in a larger useful volume than in traditional division. The most important thing of the invention results in addition thereto, namely the possibility to without any restriction for one and the same shape of the starting wood piece freely choose dividing process according to the needs and the individual case and by that directly obtain high quality wood products without any waste of material.

Although it is preferably from the wood gain point of view to carry out the removal of the material according to the eight planes in such a way that, as illustrated in the figures described above, a starting wood piece having a cross-section of a substantially regular octagon is formed, it will be within the scope of the invention to carry out the removal of material so that a starting wood piece having a cross-section of an octagon is formed without having to be regular. This is illustrated in Fig 16. The dividing and assembling techniques described above are applicable also on the starting wood piece having the cross-section shown in Fig 16. Accordingly, the essential thing of the invention is that the different sides of the octagon form an angle of substantially  $45^\circ$  with respect to the adjacent side, or expressed in another way: the different corners of the octagon have an angle of substantially  $135^\circ$ .

The method according to the invention gives rise to a starting wood piece which may be further divided in a series of different ways, only some of which have been illustrated above, and a man skilled in the art would be able to find further possibilities to divide and bring together. It is possible to divide parallelly to the centre line as well as to the extension direction of the fibres, and in the latter case in the different wood pieces so obtained at times end has to be shifted for end with respect to each other for assembling thereof to a wood unit. Furthermore, it is a matter of course that the different types of wood pieces obtainable by different dividing methods, for example according to Fig 2 and Fig 11 may be mutually assembled for obtaining wood units.

The definition of the method according to the invention is also intended to comprise the case in which the log is provided with planes each of which making an angle of  $45^\circ$  with the adjacent planes, but only along a part of the periphery of the log, for instance six such adjacent planes, whereupon the log is divided into two parts and after that the further planes are applied

on one or distributed on both of the log members so formed. The case in which a log is initially divided in the longitudinal direction into two parts and each part is provided with planes making an angle of  $45^\circ$  with the adjacent planes, shall be considered to lie within the scope of the invention.



## Claims

1. A method for reducing a log (1) for converting it into a starting wood piece (2) suitable to be divided, in which material (3) located peripherally is removed along the entire or parts of the length of the log, **characterized** in that the material is removed along the entire length of the log around the log according to eight planes (4) each of which making an angle of substantially 45° with the adjacent planes, so that a starting wood piece (2) having a cross-section of an octagon is formed.

2. A method according to claim 1, **characterized** in that the removal of material along said eight planes (4) is made so that each of them makes an angle of substantially 45° with the adjacent planes, so that a starting wood piece (2) having a cross-section of a substantially regular octagon is formed.

3. A method according to claim 1 or 2, **characterized** in that said planes (4) are applied substantially parallelly to the centre line of the log, so that a starting wood piece (2) having a cross-section being substantially constant over the length thereof is obtained.

4. A method according to claim 1 or 2, **characterized** in that said planes (4) are applied substantially parallelly to envelope lines extending in the longitudinal direction of the log in accordance with the conicity thereof, so that a starting wood piece (2) having cross-section dimensions decreasing substantially uniformly along the length thereof from one end to the other, in the form of a regular truncated pyramid having an octagon as base, is formed.

5. A method according to any of the claims 1-4, **characterized** in that the removal of material takes place by planning so that the outer limiting surfaces of the starting wood piece defined by said eight planes (4) are prepared for gluing directly after dividing the latter into elongated wood pieces (6, 11, 31, 33, 34, 39).

6. A method according to claim 1, 2 or 5, **characterized** in that the constitution of the log is detected and determined before the removal of material according to said planes (4), and that the

direction of said material removal planes with respect to the centre line of the log is selected on the basis of information about the constitution of the log obtained by said detection.

7. A method for producing a wood unit, **characterized** in that it is started from a starting wood piece (2) obtained by removal of material along the entire length of a log around the log according to eight planes (4) each of which making an angle of substantially  $45^\circ$  with the adjacent planes, so that a starting wood piece (2) having a cross-section of an octagon is formed, that wood pieces (11, 33, 34) are separated from the starting wood piece by, for each of them, making a cut substantially parallelly to one of said eight planes while intersecting the two adjacent planes (12), so that a wood piece (11, 33, 34) having a cross-section of a quadrangle is formed, and that such a wood piece is glued to at least another wood piece so obtained for obtaining a wood unit (15, 16) by gluing one of the two elongated surfaces being not parallel of a wood piece to such a surface of another wood piece.

8. A method according to claim 7, **characterized** in that the removal of material along said eight planes (4) is made so that each of them makes an angle of substantially  $45^\circ$  with the adjacent planes in such a way that a starting wood piece (2) having a cross-section of a substantially regular octagon is formed.

9. A method according to claim 7 or 8, **characterized** in that wood pieces (11) having substantially the same cross-section are glued to each other, so that the prolongation in the transversal direction of the flat surface (4) deriving from the starting wood piece on a wood piece extends in the same plane as the one parallel surface (14) deriving from said cut from the adjacent wood piece of the wood unit (15), which gets two mutually parallel large surfaces formed by the parallel surfaces of each wood piece and a constant thickness.

10. A method according to claim 9, **characterized** in that flat wood units so obtained are glued to each other with their large surfaces towards each other by putting every second flat wood unit turned by about  $90^\circ$  about the normal to the large surface thereof with respect to the adjacent flat wood units, and that the wood block so ob-

tained is cut substantially perpendicularly to said large flat surfaces for obtaining a wood unit having a surface of alternating portions of standing annual rings and cross-cut wood.

11. A method according to claim 7 or 8, **characterized** in that wood pieces (11) having substantially the same cross-section are glued to each other, so that the flat surface (4) of a wood piece deriving from the starting wood piece makes an angle of substantially 90° with the corresponding surface of the adjacent wood piece of the wood unit (16).

12. A method according to claim 11, **characterized** in that four wood pieces are glued to each other, so that a wood unit (16) having a substantially square cross-section shape and a longitudinal inner hollow space with the same cross-section shape is formed.

13. A method according to any of the claims 9-12, **characterized** in that it is started from a starting wood piece (2) obtained by applying said plane for removal of material substantially parallelly to envelope lines extending in the longitudinal direction of the log in accordance with the conicity thereof, so that a starting wood piece (2) having cross-section dimensions decreasing substantially uniformly over the length thereof from one end to the other, in the form of a truncated regular pyramid having an octagon as base, is formed, and that in one of the two pieces (11, 33, 34) to be glued to each other first of all end is shifted for end with respect to the other, so that the width of the two flat longitudinal surfaces (4, 14) of one of the wood pieces of the wood unit increases in the longitudinal direction of the wood unit when these surfaces of the adjacent wood piece of the wood unit decrease, and conversely, so that the wood unit gets a cross-section being substantially constant over the longitudinal direction thereof.

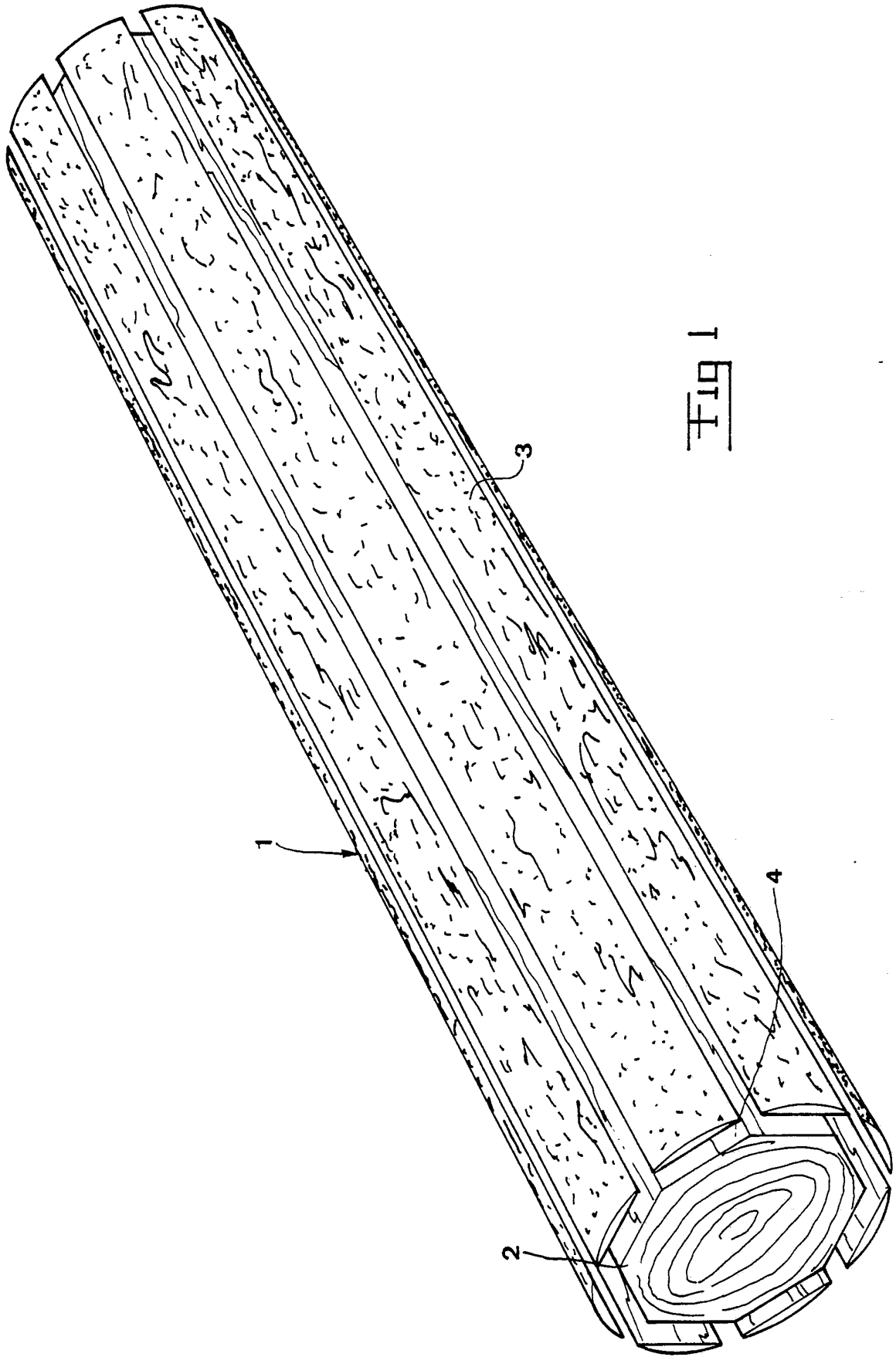


FIG 1

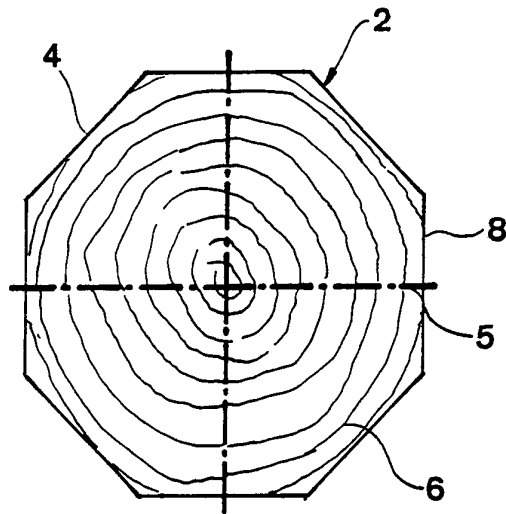


Fig 2

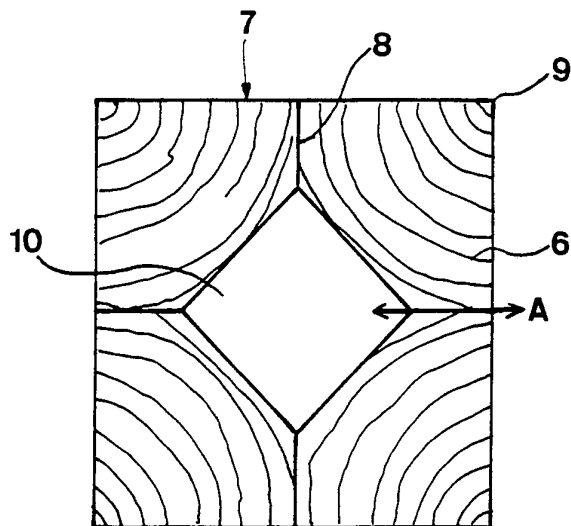


Fig 3

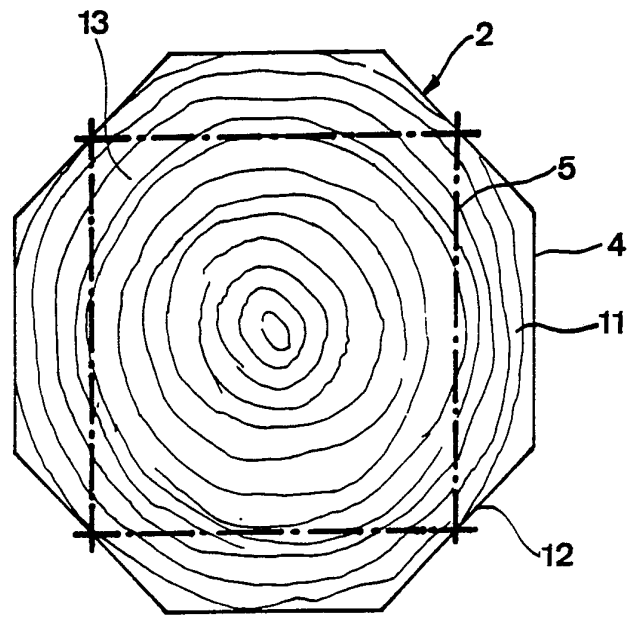


Fig 4

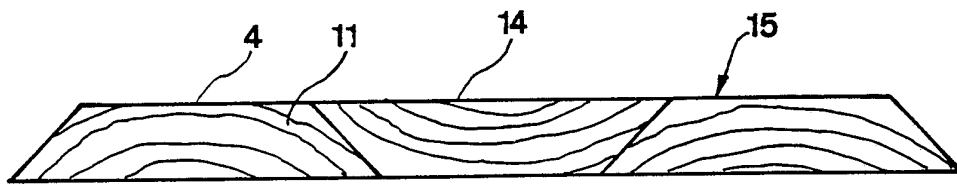


Fig 5

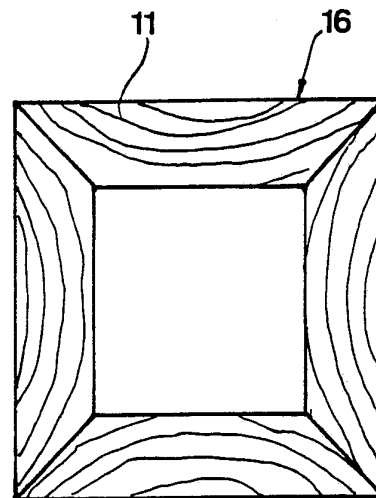
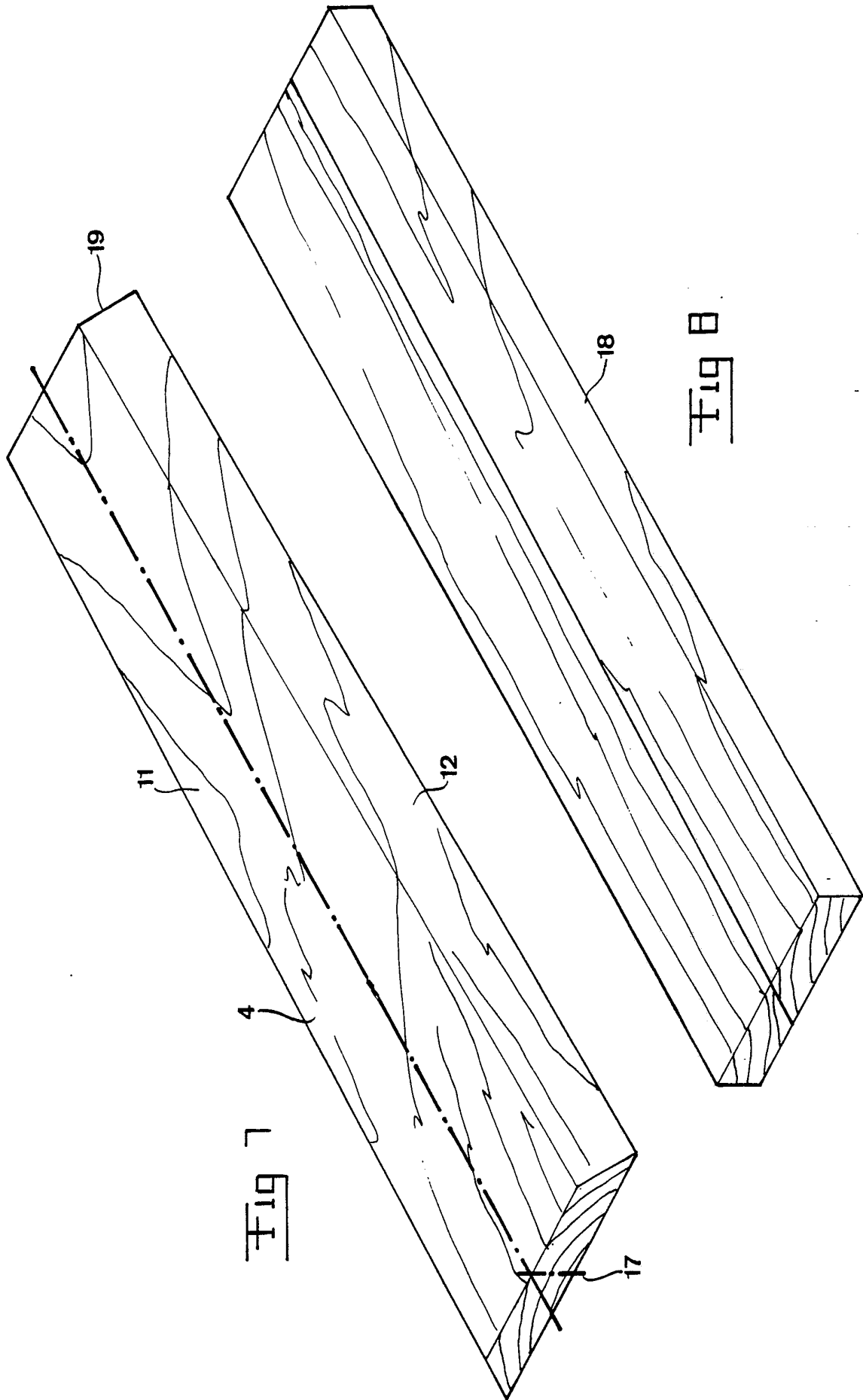


Fig 6



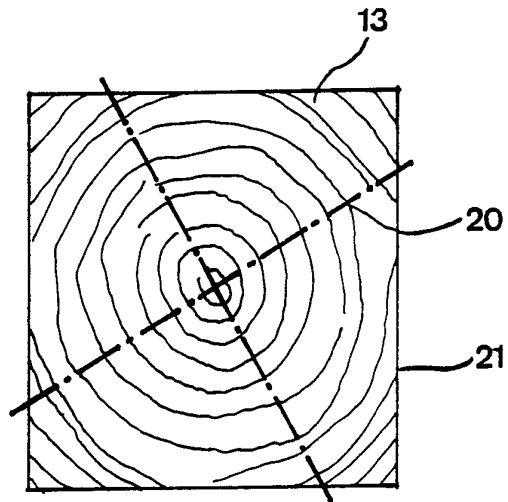


Fig 9

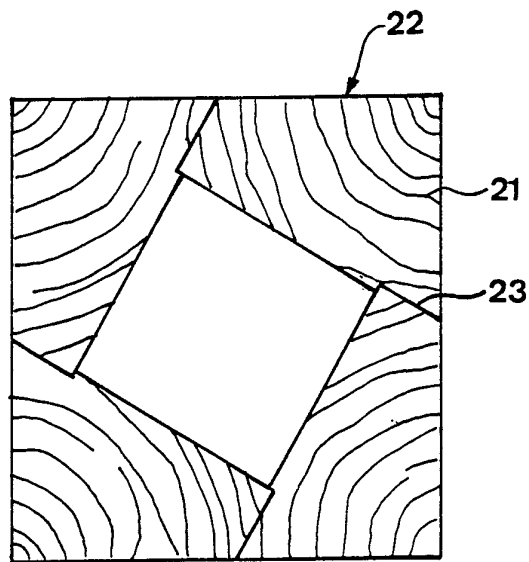
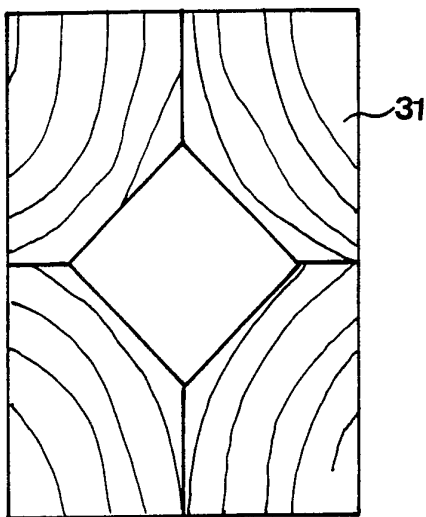
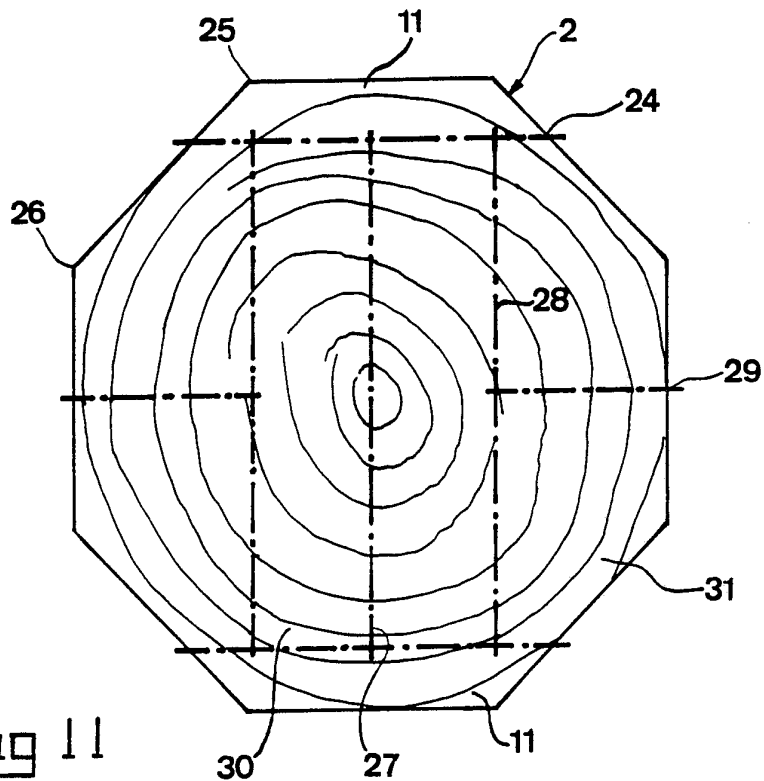


Fig 10





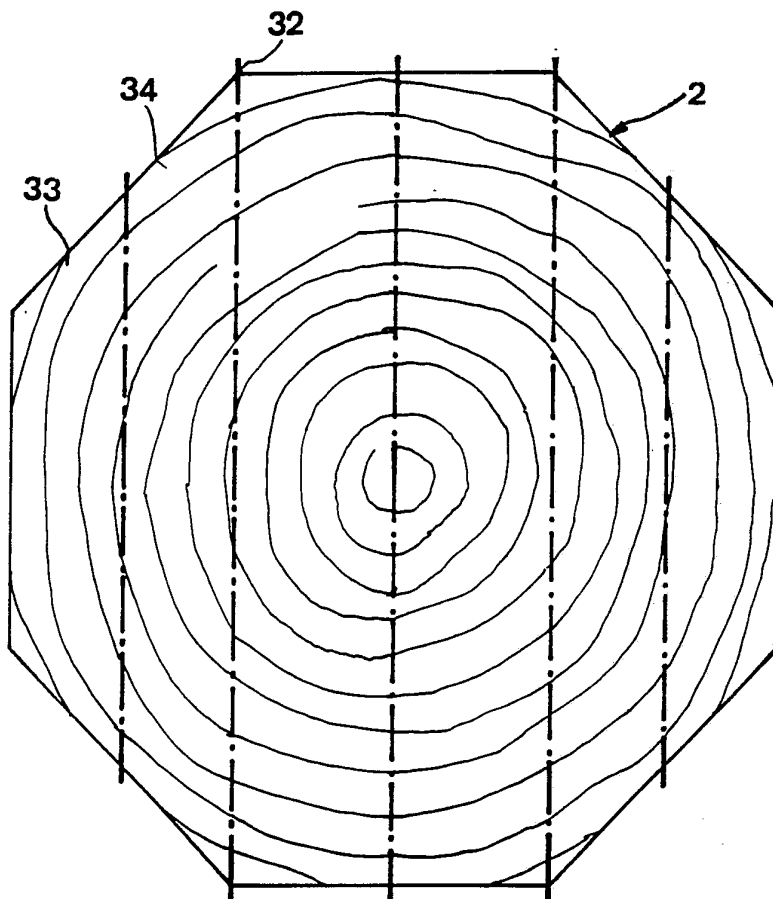


Fig 13

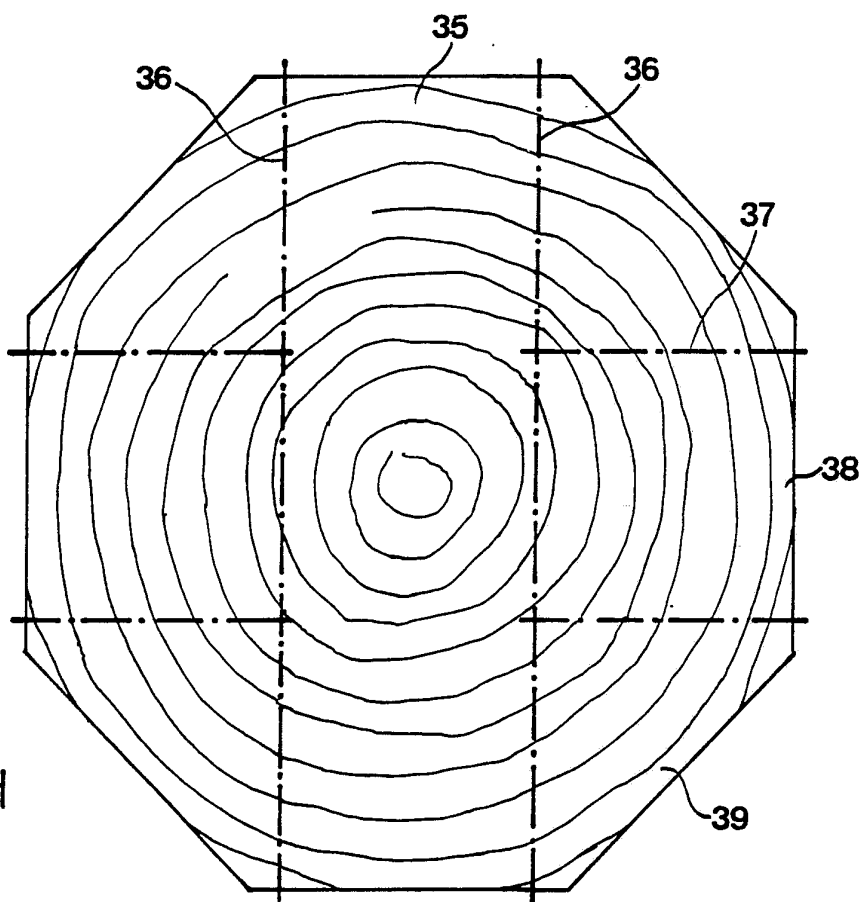


Fig 14

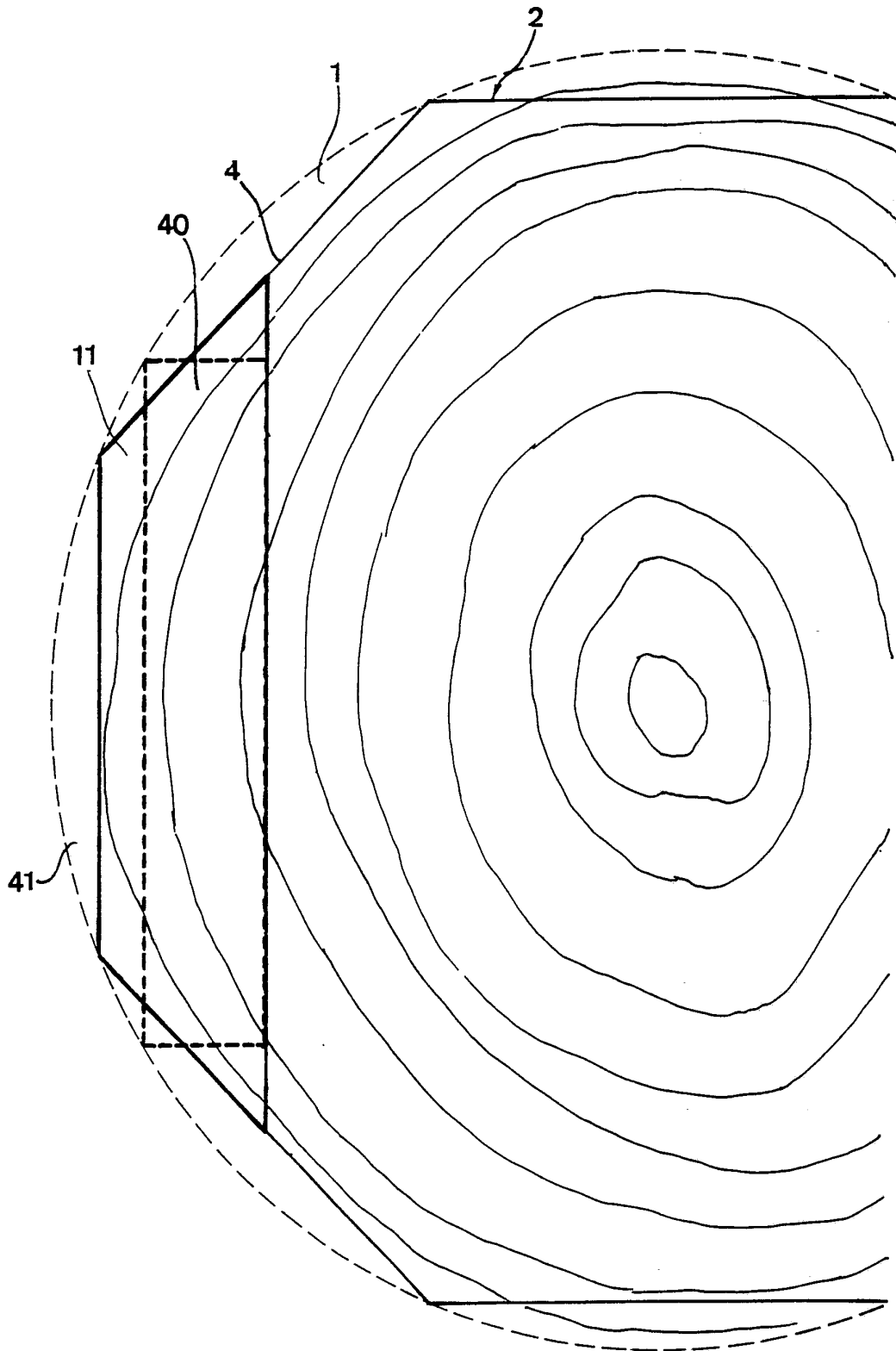


Fig 15

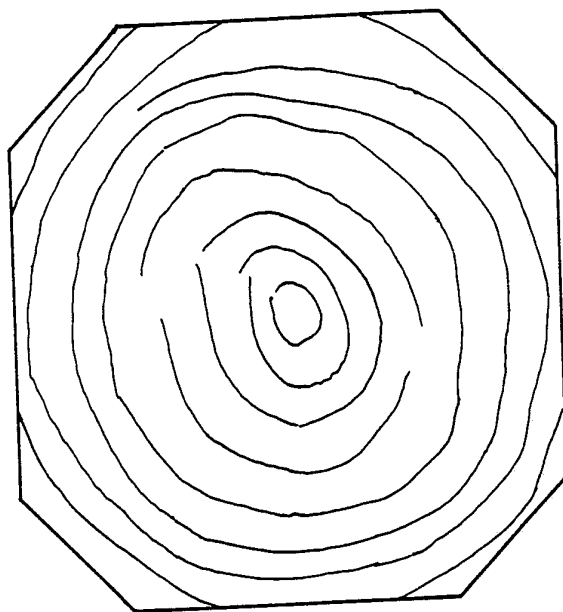


Fig 16

# INTERNATIONAL SEARCH REPORT

International Application No **PCT/SE 92/00143**

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>				
According to International Patent Classification (IPC) or to both National Classification and IPC				
<b>IPC5: B 27 B 1/00</b>				
<b>II. FIELDS SEARCHED</b>				
Minimum Documentation Searched <sup>7</sup>				
Classification System	Classification Symbols			
IPC5	B 27 B; B 27 M			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched <sup>8</sup>				
SE,DK,FI,NO classes as above				
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>				
Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>		
X	Derwent's abstract, No. 87- 63 274/09, SU 1 242 351, publ. week 8709 (S YUZHGIPRONISELSTR) See the whole document	1-2		
Y	--	3-13		
Y	SE, B, 465412 (LARS HAMMARSTRÖM) 26 December 1988, see the whole document	1-13		
Y	WO, A1, 8303791 (POLACZEK. PETER) 10 November 1983, see the whole document	1,2,3,5, 7,8,9, 13		
Y	SE 115667 (P.D. FOSSUM) 15 January 1946, see the whole document	3,4,5, 11,12, 13		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <p>* Special categories of cited documents:<sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; border: none; vertical-align: top;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents:<sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>
<p>* Special categories of cited documents:<sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>			
<b>IV. CERTIFICATION</b>				
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report			
9th October 1992	15 -10- 1992			
International Searching Authority	Signature of Authorized Officer			
<b>SWEDISH PATENT OFFICE</b>	Eddy Leopold			

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	SE 19315 (N.G. SÖRENSEN) 4 February 1904, see the whole document ---	1-3
Y	SE, B, 452720 (A AHLSTRÖM OY) 14 December 1987, see abstract ---	6
A	DE, A1, 2947611 (FEYLER, KURT) 27 May 1981, see the whole document ---	1-13
A	EP, A1, 0286701 (JOHANN WOLF GMBH KG) 19 October 1988, see the whole document -----	1-13

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 92/00143**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on **30/09/92**. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
SE-B- 465412	88-12-26	AU-B- 612210	91-07-04
		AU-D- 2674088	90-06-14
		SE-A- 8702626	88-12-26
WO-A1- 8303791	83-11-10	DE-A- 3216669	83-11-10
		EP-A-B- 0107690	84-05-09
SE- - 115667	46-01-15	NONE	
SE- - 19315	04-02-04	NONE	
SE-B- 452720	87-12-14	SE-A- 8106697	82-05-15
		SU-A- 1136744	85-01-23
		US-A- 4441537	84-04-10
DE-A1- 2947611	81-05-27	EP-A- 0029256	81-05-27
EP-A1- 0286701	88-10-19	US-A- 4846237	89-07-11