Title: DEBARKING SHAFT FOR A DEBARKING MECHANISM

Abstract: The invention relates to a debarking shaft (3) for a debarking mechanism (1), said debarking mechanism being intended for the decortication or pretreatment of trees (2) for separately performed final debarking and for the expulsion of at least some of the removed barks from a wood flow passing through the debarking mechanism, said debarking mechanism comprising a number of rotatable debarking shafts (3) extending parallel to the advancing direction of the trees (2) to be fed therethrough and provided with a number of teeth (4) extending beyond the circumferential surface of the shaft (3) and adapted to strip bark off the presently processed trees (2) transversely to the lengthwise direction of the trees and at the same to convey the trees transversely relative to said shafts (3), and said shafts (3), together with the teeth (4) thereof, being adapted to constitute at least a part of a support surface, upon which the presently processed trees (2) travel through the debarking mechanism (1). The debarking shaft (3) has its teeth (4) designed as a number of annular tooth rims (20), each of said tooth rims comprising two or more releasably connected elements (21, 22), having the outer periphery provided with the teeth (4) and said elements being adapted to be fitted around a body member (25) of the debarking shaft (3) by way of press clamping.
Debarking shaft for a debarking mechanism

The invention relates to a debarking shaft for a debarking mechanism, said debarking mechanism being intended for the decortication or pretreatment of trees for separately performed final barking and for the expulsion of at least some of the removed barks from a wood flow passing through the debarking mechanism, said debarking mechanism comprising a number of rotatable debarking shafts extending parallel to the advancing direction of trees to be fed therethrough and provided with a number of teeth extending beyond the circumferential surface of the shaft and adapted to strip bark off the presently processed trees transversely to the lengthwise direction of the trees and at the same to convey the trees transversely relative to said shafts, and said shafts, together with the teeth thereof, being adapted to constitute at least a part of a support surface, upon which the presently processed trees travel through the debarking mechanism.

The above type of debarking mechanism is prior known for example from US patents 4,685,498 and 5,394,912.

In the above type of debarking mechanism, the teeth are generally mounted fixedly in certain positions. In one application, the individual teeth can be replaceable, but even in that case the position of a tooth on the shaft remains always the same.

It is an object of the invention to provide a debarking shaft for a debarking mechanism, wherein the teeth of a toothed debarking shaft are readily removable and replaceable, as well as reversible regarding the rotating direction thereof.

Another object of the invention is to enable an axial and peripheral displacement and locking or clamping of teeth to a desired position.
According to the invention, these objects are accomplished by means of a debarking shaft of the invention, which is characterized in that the debarking shaft has its teeth designed as a number of annular tooth rims, each of said tooth rims comprising two or more releasably connected elements, having the outer periphery provided with the teeth and said elements being adapted to be fitted around a body member of the debarking shaft by way of press clamping.

The tooth rim elements are preferably provided with clamping means for forcing the elements toward each other against the body member of a debarking shaft. The clamping means may comprise for example a headless screw, having one end provided with a left-handed thread and the other end with a right-handed thread, as well as a gripping section between the threads for turning the headless screw.

The debarking shaft is preferably constituted by a circular pipe. Thus, adjacent tooth rims present on a common shaft can be readily locked or clamped on the shaft at an angular position arbitrarily different from each other in the shaft rotating direction, the teeth of adjacent tooth rims being capable of providing the shaft e.g. with helixes. The same way, the relative distance in axial direction between tooth rims present on a shaft can be adjusted as desired.

The debarking shaft has its body member provided, preferably for each tooth rim, with a guide element, preferably a key and slot, for guiding the tooth rims to position.

The debarking shaft has its body member preferably designed in its cross-section as a polygon, whereby the tooth rims can be readily guided and clamped to various angular positions.
The teeth are preferably designed to be effective in both rotating directions of debarking shafts. The teeth effective in opposite rotating directions can be different from or similar to each other. When using different types of teeth in opposite rotating directions, the various rotating directions shall result in different barking capacities, e.g. for wintertime barking and summertime barking. It is also possible to use sharp teeth for the decortication of initially hard-to-bark or frozen trees, while worn teeth can be used for the treatment of easy-to-bark trees. The replacement is effected simply by dismounting a tooth rim and by remounting the same after turning it around.

Barking capacity can also be influenced by making one or more sections of a tooth rim toothless. Hence, some of the tooth rims on a debarking shaft can be completely or partially toothless.

The invention will now be described in more detail with reference to the accompanying drawings, in which:

Fig. 1 shows a debarking shaft for a debarking mechanism of the invention, in a schematic side view.

Fig. 2 shows a section along a line II-II in fig. 1.

Fig. 3 shows a section along a line III-III in fig. 2.

Fig. 4 shows a section along a line IV-IV in fig. 3.

Fig. 5 shows a section along a line V-V in fig. 3.

A debarking mechanism 1 shown in the drawings is intended for the decortication or pretreatment of trees 2 for separately performed final
barking and for the expulsion of at least some of the removed barks from a wood flow passing through the debarking mechanism.

The debarking mechanism 1 is provided with a number of rotatable debarking shafts 3 extending parallel to the advancing direction of the trees 2 to be fed therethrough. In the illustrated example, the debarking shafts 3 have each end thereof provided with sprockets 6, whereby, at least at one end of the debarking mechanism 1, the sprockets 6 are by way of a sprocket chain (not shown) to each other and to the gear of an electric motor, not shown.

The debarking shafts 3 are provided with a number of teeth 4 extending beyond the circumferential surface of the shaft 3 and adapted to strip bark off the presently processed trees 2 transversely to the longitudinal direction of the trees and at same time to convey the trees transversely relative to the debarking shafts 3.

The debarking shafts 3, together with the teeth 4 thereof, constitute a part of a support surface for carrying the trees 2 through the debarking mechanism 1. The illustrated example includes four debarking shafts 3 which are assembled relative to each other to define an inclined plane. Other than that, the support surfaces comprise solid surfaces which are designed for providing, together with the support surface constituted by the debarking shafts, an open-ended chute covering the debarking mechanism 1 from end to end.

The debarking shaft 3 has its teeth 4 designed as a number of annular tooth rims 20, as best shown in figs. 3 and 4. In the example of fig. 4, each tooth rim 20 comprises two releasably connectable elements 21, 22, having the outer periphery thereof provided with the teeth 4. The elements 21, 22 are
adapted to be fitted around a body member 25 of the debarking shaft 3 by way of press clamping.

The tooth rim 20 has its elements 21, 22 preferably provided with clamping means, generally designated with reference numeral 23, for forcing the elements 21, 22 toward each other against the body member 25 of the debarking shaft 3.

In the example of fig. 4, the clamping means 23 comprises a headless screw, having one end provided with a left-handed thread and the other end with a right-handed thread, as well as a gripping section 24 between the threads for turning the headless screw. The elements 21 and 22 are provided with mating threads, whereby the gripping section 24 can be turned for drawing the elements 21, 22 towards or away from each other.

The body member 25 of the debarking shaft 3 is circular in its cross-section, being preferably constituted by a circular pipe. The body member 25 may be provided, for each tooth rim 20, with a guide element (not shown), preferably a key and slot, for guiding the tooth rims 20 to positions predetermined therefor.

The debarking shaft 3 may also have its body member 25 designed in its cross-section as a polygon, whereby the tooth rims can be readily guided and clamped to various angular positions relative to the body member 25.

According to the example of fig. 4, the teeth 4 can be designed to work in both rotating directions of the debarking shafts 3. The effective teeth 4 can be different from each other in different rotating directions, as shown in the example of fig. 4, or identical to each other. The choice of various tooth shapes can be used to have an impact on attainable barking capacity.

Barking can be similarly influenced by setting the teeth 4 of the adjacent
tooth rims 20 at angular positions different from each other. One or more of the tooth rims 20 can also be toothless (not shown).

The debarking shafts 3 have each end thereof provided with smaller-
diameter shaft stubs 8, on which are mounted bearings, along with bearing
cups 9 therefor, as well as the sprockets 6. The bearing cups 9 are adapted
to be secured with screws 11 to end panels 10 present at the ends of the
debarking mechanism 1 in line with the debarking shafts 3. The end panels
10 have a top edge thereof provided with open-topped grooves 12 for the
shaft stubs 8 of the debarking shafts 3, whereby, if necessary, the debarking
shafts 3 can be readily lifted out by overhead route.
Claims

1. A debarking shaft (3) for a debarking mechanism (1), said debarking mechanism being intended for the decortication or pretreatment of trees (2) for separately performed final barking and for the expulsion of at least some of the removed barks from a wood flow passing through the debarking mechanism, said debarking mechanism comprising a number of rotatable debarking shafts (3) extending parallel to the advancing direction of the trees (2) to be fed therethrough and provided with a number of teeth (4) extending beyond the circumferential surface of the shaft (3) and adapted to strip bark off the presently processed trees (2) transversely to the lengthwise direction of the trees and at the same to convey the trees transversely relative to said shafts (3), and said shafts (3), together with the teeth (4) thereof, being adapted to constitute at least a part of a support surface, upon which the presently processed trees (2) travel through the debarking mechanism (1), characterized in that the debarking shaft (3) has its teeth (4) designed as a number of annular tooth rims (20), each of said tooth rims comprising two or more releasably connected elements (21, 22), having the outer periphery provided with the teeth (4) and said elements being adapted to be fitted around a body member (25) of the debarking shaft (3) by way of press clamping.

2. A shaft as set forth in claim 1, characterized in that the elements (21, 22) of the tooth rim (20) are provided with clamping means (23) for forcing the elements (21, 22) toward each other against the body member (25) of the debarking shaft (3).

3. A shaft as set forth in claim 2, characterized in that the clamping means (23) comprises a headless screw, having one end provided with a left-handed thread and the other end with a right-handed thread, as well as a gripping section (24) between the threads for turning the headless screw.
4. A shaft as set forth in claim 1, characterized in that the debarking shaft (3) has its body member (25) constituted by a circular pipe.

5. A shaft as set forth in claim 1, characterized in that the debarking shaft (3) has its body member (25) provided, for each tooth rim (20), with a guide element, preferably a key and slot, for guiding the tooth rims to position.

6. A shaft as set forth in claim 1, characterized in that the debarking shaft (3) has its body member (25) designed in its cross-section as a polygon.

7. A shaft as set forth in claim 1, characterized in that the teeth (4) are designed to be effective in both rotating directions of the debarking shafts (3).

8. A shaft as set forth in claim 1, characterized in that the teeth (4) effective in opposite rotating directions of the debarking shaft (3) are different from each other.

9. A shaft as set forth in claim 1, characterized in that the teeth (4) effective in opposite rotating directions of the debarking shaft (3) are identical to each other.

10. A shaft as set forth in claim 1, characterized in that the tooth rim (20) has one or more sections which are toothless.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B27L 1/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B27L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:
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