(54) Title: CHIPPER BED KNIFE

(57) Abstract: The invention relates to a chipper (1) bed knife (2) attached detachably to the chipper frame (3), the chipper (1) having a chipper disc (5) supported on its shaft (4), which shaft is fitted rotatably to the chipper frame (3), the chipper disc (5) comprising a number of knives (6) arranged to pass the knife edge (7) of the bed knife (2) at a distance corresponding to the required knife clearance (v), when the chipper disc (5) is rotating. The bed knife (2) also has a second knife edge (7), the said knife edges (7, 7) being arranged at a distance from each other in the direction of movement (A) of the chipper disc (5) knives (6). A groove (8) is formed in the bed knife (2) between the said knife edges (7, 7).
Chipper bed knife

The invention relates to a chipper bed knife attached detachably to the chipper frame, the chipper having a chipper disc supported on its shaft, which shaft is fitted rotatably to the chipper frame, the chipper disc comprising a number of knives arranged to pass the knife edge of the bed knife at a distance corresponding to the required knife clearance, when the chipper disc is rotating.

When logs are chipped, also very thin and long strips are sometimes cut from them. This is due to the properties of wood. The outermost layer of a debarked log is often difficult to cut, as a result of which the said long strips are produced. Such wood strips pass through between the chipper disc and bed knife without being cut, thus causing problems at chip screens, conveyors and other equipment.

The object of the invention is to provide a bed knife by means of which the said wood strips can be cut to such a length that they will not cause problems in the further processing of the chips.

This object is achieved by means of the bed knife according to the invention, which is characterised in that the bed knife also has a second knife edge, the said knife edges being arranged at a distance from each other in the direction of movement of the chipper disc knives, and that a groove is formed in the bed knife between the said knife edges.

In the solution according to the invention, the wood strips passing the first knife edge of the bed knife are caught in the groove between the knife edges of the bed knife and cut into short pieces by the second knife edge.
The bed knife consists of one solid piece or, alternatively, of two or more pieces joined together. The bed knife according to the invention can thus easily replace a conventional bed knife.

The second knife edge is preferably formed by providing a groove in the bed knife. The groove can be made either by ordinary machining or by composing the bed knife of pieces.

The knife edges of a bed knife are preferably parallel to each other. The bed knife can be dimensioned in such a way that the knife clearance is equal at both knife edges.

The minimum size of the groove in the bed knife is $5 \times 5$ mm. The larger the groove size, the better the long wood strips are caught in the groove and cut into shorter pieces. In practice, the maximum size of the groove is limited by the size of the bed knife.

The bed knife may be fitted in a chipper, which chips logs. Alternatively, the bed knife may also be used in a chipper cutting chips already chipped once.

The invention is described in greater detail in the following, with reference to the accompanying drawings, in which:

Figure 1 shows a disc chipper as a schematic end view.

Figure 2 shows a section along line II – II in Figure 1.

A disc chipper 1 is generally used when producing wood chips for the needs of the pulp and paper industry, a schematic example of which is shown in Figure 1. The wood is chipped by knives 6 fitted to the chipper disc 5 usually slightly deviating from the radial direction, of which knives Figure 1 shows.
only one. The knives 6 of the chipper disc 5 hit the log to be chipped, which leans against the bed knife 2 on its opposite side. The bed knife 2 is fitted to the end of the log infeed chute 9.

The bed knife 2 of the chipper 1 is attached to the chipper 1 frame 3 detachably, for example, by means of bolts 10. The chipper disc 5 is supported on its shaft 4, which shaft is fitted rotatably to the frame 3. The chipper disc 5 comprises a number of knives 6, which are arranged to pass the knife edge 7 of the bed knife 2 at a distance corresponding to the required knife clearance v, when the chipper disc 5 is rotating in the direction of the arrow A.

The chips cut by the knife 6 pass via the chip slot 11 through the chipper disc 5 and further to the discharge opening 12 of the chipper 1.

When logs are chipped, very thin and long wood strips are sometimes cut from them due to the properties of wood. Such strips cause problems in the further processing of chips. In order to eliminate such problems, a second knife edge 7' is provided on the bed knife 2. The knife edges 7, 7' are arranged at a distance from each other in the direction of movement A of the knives 6 of the chipper disc 5. The knife edges 7, 7' are most preferably arranged in such a way that the knife clearance v is equal at both knife edges. In the bed knife 2 is, in addition, provided a groove 8 between the said knife edges 7, 7'. The minimum size a x b of the groove 8 is 5 x 5 mm.

The function of the groove 8 is to receive long wood strips, whereby when caught in the groove 8, they are cut into short pieces when the knife 6 passes the knife edge 7'. The groove 8 functions best when it is as large as possible. The size of the bed knife 2 obviously determines the maximum size of the groove 8.
In the example of Figure 2, the bed knife 2 consists of one solid piece. The
bed knife 2 may, however, also be made of two or more pieces which are
joined together to facilitate the handling of the bed knife 2.

In the example of Figure 2, the knife edge 7' has been formed by cutting a
groove 8 in the bed knife 2. The knife edge 7' and its groove 8 on the side of
the knife edge 7 may obviously also be accomplished in another way, for
example by composing the bed knife 2 of suitable pieces.

The invention has been described above only with reference to a chipper,
where logs are chipped. The bed knife 2 according to the invention can,
however, also be used in chippers re-chipping already made chips, among
which there are long wood strips that need to be cut prior to further
processing of the chips.
Claims

1. A chipper (1) bed knife (2) attached detachably to the chipper frame (3), the chipper (1) having a chipper disc (5) supported on its shaft (4), which shaft is fitted rotatably to the chipper frame (3), the chipper disc (5) comprising a number of knives (6) arranged to pass the knife edge (7) of the bed knife (2) at a distance corresponding to the required knife clearance (v), when the chipper disc (5) is rotating, characterised in that the bed knife (2) also has a second knife edge (7'), the said knife edges (7, 7') being arranged at a distance from each other in the direction of movement (A) of the chipper disc (5) knives (6), and that a groove (8) is formed in the bed knife (2) between the said knife edges (7, 7').

2. A bed knife as claimed in claim 1, characterised in that the bed knife (2) consists of one solid piece.

3. A bed knife as claimed in claim 1, characterised in that the bed knife (2) is composed of two or more pieces joined together.

4. A bed knife as claimed in claim 1, characterised in that a second knife edge (7') is formed by providing a groove (8) in the bed knife (2).

5. A bed knife as claimed in claim 1, characterised in that the knife edges (7, 7') are essentially parallel to each other.

6. A bed knife as claimed in claim 1, characterised in that the knife clearance (v) is essentially equal at both knife edges (7, 7').

7. A bed knife as claimed in claim 1, characterised in that the minimum size a x b of the groove (8) is 5 x 5 mm.
8. A bed knife as claimed in claim 1, characterised in that the bed knife (2) is arranged to be fitted in a chipper for chipping logs, or alternatively in a re-chipper for cutting chips that have already been chipped once.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 2004/050024

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B02C 18/18, B02C 18/22, B27C 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: B02C, 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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 4969605 A (MORIN, N H), 13 November 1990 (13.11.1990), column 2, line 29 - column 4, line 37</td>
<td>1-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>US 6027055 A (DOSKOCIL, D L), 22 February 2000 (22.02.2000), figure 2</td>
<td>1-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>FI 99099 B (HAKALA, R V K), 30 June 1997 (30.06.1997), abstract</td>
<td>1-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>FI 86973 B (KONE OY), 31 July 1992 (31.07.1992), abstract</td>
<td>1-8</td>
</tr>
</tbody>
</table>

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

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "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)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed
  "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
  "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  "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
  "&" document member of the same patent family

Date of the actual completion of the international search: (9 June 2004) Date of mailing of the international search report: 05-07-2004

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Authorized officer
Facsimile No. +46 8 666 02 86
Anders Edlund /LR
Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (January 2004)
<table>
<thead>
<tr>
<th>Country</th>
<th>Application Number</th>
<th>Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>4969605 A</td>
<td>13/11/1990</td>
<td>NONE</td>
</tr>
<tr>
<td>US</td>
<td>6027055 A</td>
<td>22/02/2000</td>
<td>NONE</td>
</tr>
<tr>
<td>FI</td>
<td>99099 B</td>
<td>30/06/1997</td>
<td>FI 962786 D 00/00/0000</td>
</tr>
</tbody>
</table>
DE 69212213 D,T 05/12/1996  
SE 0512299 T3          
FI 912307 A 31/07/1992  
US 5236024 A 17/08/1993  |