(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 199665854 B2**
(10) Patent No. **702923**

(54) Title

Improved wood chipper knife disc

(51)[6] International Patent Classification(s)

B27L 011/02 B27L 011/08

(21) Application No: 199665854 (22) Application Date: 1996.09.25

(30) Priority Data

(31) Number	(32) Date	(33) Country
PN5608	1995.09.26	AU

(43) Publication Date : 1997.04.10
(43) Publication Journal Date : 1997.04.10
(44) Accepted Journal Date : 1999.03.11

(71) Applicant(s)

Rivett Arboricultural and Waste Equipment Pty Ltd

(72) Inventor(s)

Nicholas Rivett

(74) Agent/Attorney

GRIFFITH HACK,GPO Box 1285K,MELBOURNE VIC 3001

(56) Related Art

DE 3022260
US 5211688
US 5080153

AU9665854

(12) PATENT ABSTRACT (11) Document No. AU-A-65854/96
(19) AUSTRALIAN PATENT OFFICE

(54) Title
IMPROVED WOOD CHIPPER KNIFE DISC

International Patent Classification(s)
(51)[6] **B27L 011/02** **B27L 011/08**

(21) Application No. : **65854/96** (22) Application Date : **25/09/96**

(30) Priority Data

(31) Number	(32) Date	(33) Country
PN5608	**26/09/95**	**AU AUSTRALIA**

(43) Publication Date : **10/04/97**

(71) Applicant(s)
RIVETT ARBORICULTURAL & WASTE EQUIPMENT PTY LTD

(72) Inventor(s)
NICHOLAS RIVETT

(74) Attorney or Agent
GRIFFITH HACK , GPO Box 1285K, MELBOURNE VIC 3001

(57) Claim

1. An improved knife disc for wood chipping apparatus of the type which rotates the knife disc for disintegration of trunks, stems, branches, limbs, foliage and other vegetation waste material delivered to the face of the disc, the improvement comprising a plurality of elongate radial openings or pockets formed through the disc, each said opening increasing in width from its innermost end near the central axis of the disc to its outermost end near the periphery of the disc.

ABSTRACT OF THE DISCLOSURE

A wood chipper knife disc for use in wood chipping apparatus of the type which rotates the knife disc for disintegration of vegetation is disclosed wherein the disc is provided with improved pocket openings which are wider at the periphery of the disc than at their inner ends and have the outer ends thereof curved whereby fine material which normally tends to clog the openings is readily discharged therethrough.

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION

STANDARD PATENT

Applicant(s):

RIVETT ARBORICULTURAL & WASTE EQUIPMENT PTY LTD

A.C.N. 052 058 447

Invention Title:

IMPROVED WOOD CHIPPER KNIFE DISC

The following statement is a full description of this invention, including the best method of performing it known to me/us:

IMPROVED WOOD CHIPPER KNIFE DISC

This invention relates to wood chipping apparatus and refers more particularly to a knife disc therefor.

Knife discs as used in chipping apparatus are often subject when chipping fine, light or fleshy material with low compression strength, to clogging of the end of the slotted openings in the disc in the vicinity of the knives, owing to the inability of slots to be cleared of material it gathers in the vicinity of the end of the slots and at the periphery of the knife slot. This stopping the machine for clearing of the slots blocking may require large material to be fed through if available or stopping the machine to clear the blockage thereby disrupting the chipping process.

It is accordingly an object of the present invention to provide an improved knife disc which overcomes the aforementioned problem and which is more efficient in its operation.

According to the present invention there is provided a knife disc for wood chipping apparatus of the type which rotates the knife disc for disintegration of trunks, stems, branches, limbs, foliage and other vegetation waste material delivered to the face of the disc, the improvement comprising a plurality of elongate radial openings or pockets formed through the disc, each said opening increasing in width from its innermost end near the central axis of the disc to its outermost end near the periphery of the disc.

The invention will be more readily understood from the following description of one form of the invention which may be preferred wherein reference is made to the accompanying drawings in which

Fig 1 is a plan view of a disc embodying the invention

Fig 2 is a cross-sectional view taken along line A-A of Fig 1

Figs 2A and 2B are cross sectional views of modifications of the invention, and

Fig 3 & 4 are perspective views of the disc prior to formation of the slots, the number of which is dependent upon the number of knives to be employed and/or the diameter of the disc.

Referring now to Fig 1, a knife disc 10 comprises three slots or pockets 11 each of which gradually widens from its inner end 12 to its outer end 13, the width of the inner end of each pocket being between 44 and 55 mm, preferably 51 mm and the width at the outer end being between 65 and 80 mm, preferably 72 mm. The length of each pocket 11 is dependent upon the diameter of the chipper disc. For example, a 6" diameter material chipper will have a pocket length between 180 mm and 210 mm, preferably about 185 mm. A 9" diameter material chipper will have a pocket length between 230 mm and 270 mm, preferably about 260 mm. A 12" diameter material chipper will have a pocket length between 355 mm and 380 mm, preferably about 360 mm and a 14" diameter material chipper will have a pocket length between 360 mm and 495 mm, preferably about 410 mm. The corners 14 of the pockets 11 are rounded to assist passage of material therethrough.

The Disc Pocket far edge 11A is angled from the knife edge side of the pocket by 5° and the pocket has a 25 mm radius at the outer corner 14. The curvature or radius of the corners 14 may of course be varied in accordance with the size of the pocket openings and/or the diameter of the disc. This combined effect eliminates chip packing in the outer edge of the knife for two reasons; the first being that by increasing the width of the pocket towards the perimeter of the disc 10 the larger volume of material that is cut at the outer edge of the disc where the light fine material that has little structural strength to push material through the disc pocket is readily removed and secondly the curvature of the pocket overcomes the tight packing point created by the previous sharp angle and the centrifugal force generated by the disc revolutions.

The hitherto used tight right angle, or substantially so, allowed material to wedge. This wedged material and centrifugal force caused the pocket to block at the outer extremities with fine material. Once blocked, this fine material does not have the structural strength to push this tightly packed material clear. Consequently, as more material is fed in via the feed rollers, the infeed transition area between the Disc and Feed Wheels, the 2500 PSI hydraulic pressure soon packs this area full of material causing the machine to stop processing and creating a major downtime to clear the blockage.

As shown in Figs 2 and 2A the seating for the knife is tapered at an angle of 5° from the pocket opening. The knife and pocket angle cause the disc to positively feed (pull) the material in to be chipped. This has not been possible with the pocket of the standard commercially available design. So the combination of knife set, knife angle and pocket taper all combine to form a disc that feeds/processes/chips material without the feed wheel

system. However, when working with the feed wheel system, it works in close harmony.

An anti-wrap anvil 15 is welded or otherwise secured to the face of the disc in the space between the inner end of each pocket 11 and the central drive staff 16 as best illustrated in Fig 3. Each pocket 11 is also provided with an upstanding anvil 17 at the outer end thereof.

The disc is further provided with face scrapers 18 welded or otherwise affixed to the disc in the vicinity of the rear edge of the knives (not shown) which are attached to the disc on the machined surface 19 extending from the rear edge 20 of each pocket 11. Edge scrapers 21 are welded or otherwise attached to the periphery of the disc at three equidistant locations and fan blades 22 are affixed to the rear surface of the disc as shown in Fig 4. The face scrapers 18 and edge scrapers 21 continually clear material from the edge of the disc. The blades 22 deliver the chipped material which passes through the pockets 11 to a hopper or the like (not shown).

By reason of the configuration of the pockets 11 which widen towards their outer ends 13, and the curvature of the outermost corners of the pockets, material which tends to build up and clog the pockets of standard configuration is able to pass therethrough and therefore pocket-end block is avoided.

The pocket anvils 17, and face scrapers 18 and edge scrapers 21 continually clear material which tends to gather on the casing surrounding the disc and the material so cleared, passes through the pockets 11 or between the disc edge and the housing in the rear of the disc for discharge to a hopper or the like.

According to the embodiment illustrated in Fig 2A, the

sides of the pockets are tapered at an angle of up to 45° to provide for improved passage of material through the pockets.

According to the embodiment of Fig 2B, only the pocket far edge 11A is tapered, again up to 45° and preferably of that angle. The outer ends of the pockets are also tapered at an angle corresponding to the taper of the pocket far edge. The tapering of the side and end of each pocket further assists in the passage of material through the pocket openings.

Although the description of the preferred embodiment has been directed to a knife disc having three pocket openings, the number of openings is dependent upon the number of knives to be applied to the disc and/or the diameter of the disc.

It will thus be seen that by the present invention, and the unique configuration of the pockets 11, pocket end block by build up of material thrown towards the periphery of the disc by centrifugal force is avoided and a more efficient operation results.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An improved knife disc for wood chipping apparatus of the type which rotates the knife disc for disintegration of trunks, stems, branches, limbs, foliage and other vegetation waste material delivered to the face of the disc, the improvement comprising a plurality of elongate radial openings or pockets formed through the disc, each said opening increasing in width from its innermost end near the central axis of the disc to its outermost end near the periphery of the disc.

2. A knife disc as claimed in claim 1 wherein the width of said openings is progressively increased at an angle of 5°.

3. A knife disc as claimed in claim 1 or 2 wherein the far edge of each said opening is angled at 5° from the knife edge.

4. A knife disc as claimed in any preceding claim wherein the radially outermost corners of each pocket are rounded.

5. A knife disc as claimed in claim 5 wherein the rounded corners have a radius of not less than 25mm.

6. A knife disc as claimed in any preceding claim wherein the sides of each pocket opening are tapered outwardly from the face to the rear of the disc.

7. A knife disc as claimed in claim 6 wherein the sides are tapered at an angle of up to 45°.

8. A knife disc as claimed in any one of claims 1 to 5 wherein the pocket far edge is tapered outwardly from the face to the rear of the disc.

9. A knife discs as claimed in claim 8 wherein the angle of the taper is up to 45°.

10. A knife disc as claimed in claim 8 wherein the rounded outermost end of each pocket is tapered outwardly from the face to the rear of the disc.

11. A knife disc as claimed in claim 10 wherein the angle of taper is up to 45°.

12. A knife disc substantially as hereinbefore described with reference to the accompanying drawings.

DATED THIS 25th DAY OF September 1996
RIVETT ARBORICULTURAL & WASTE EQUIPMENT PTY LTD
By its Patent Attorneys:
GRIFFITH HACK
Fellows Institute of Patent
Attorneys of Australia

GRIFFITH HACK
MELBOURNE OFFICE

GREG MUNT

65854/96

1/2

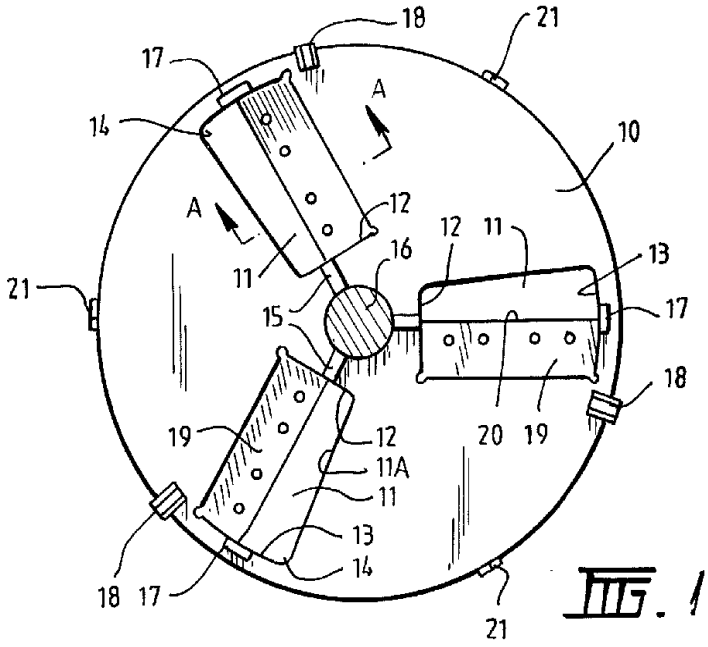

FIG. 1.

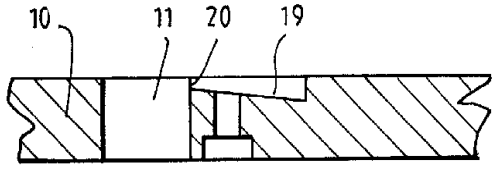

FIG. 2.

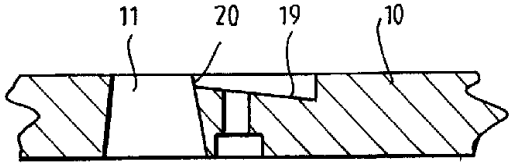

FIG. 2A.

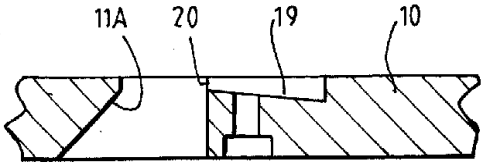

FIG. 2B.

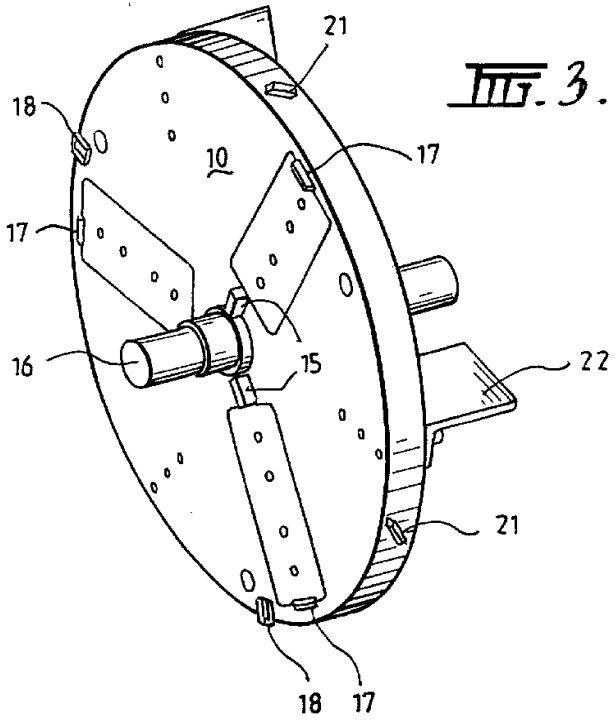

FIG. 3.

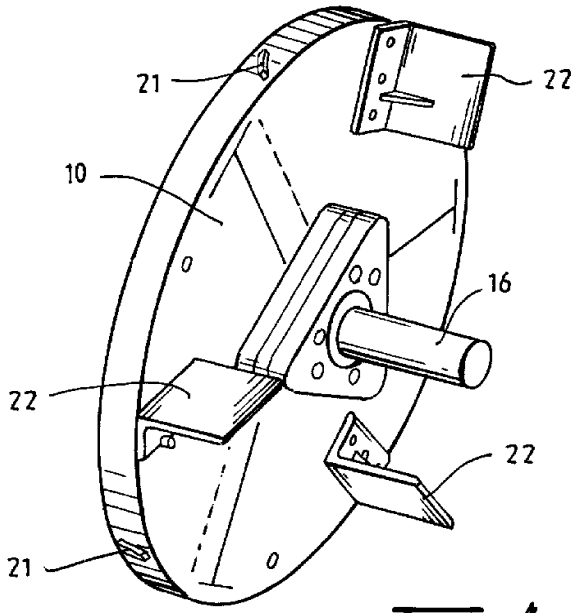

FIG. 4.