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CUTTING APPARATUS FOR CHIPPERS

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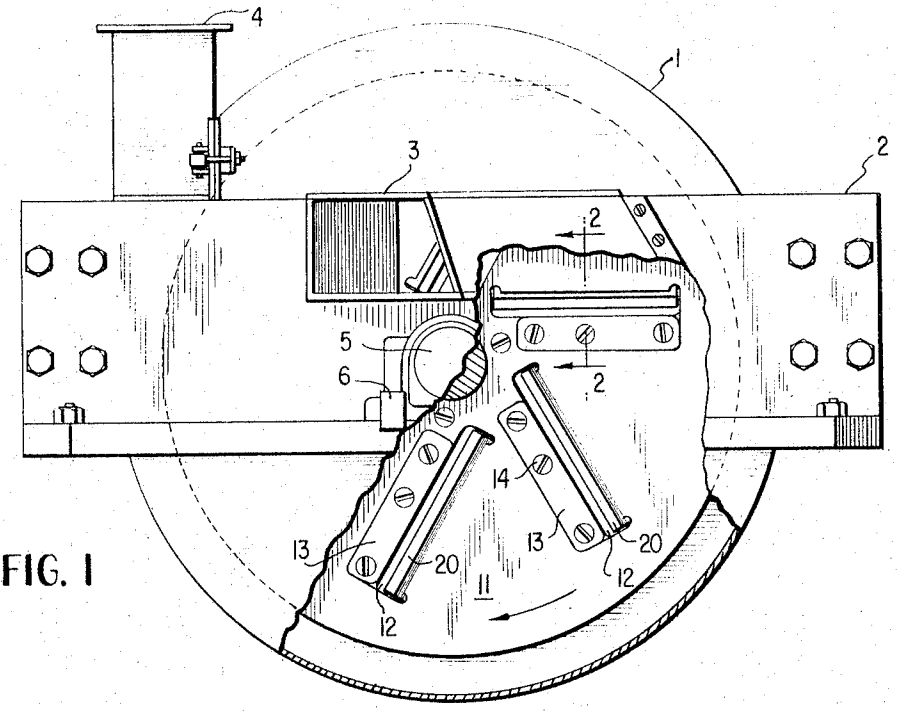
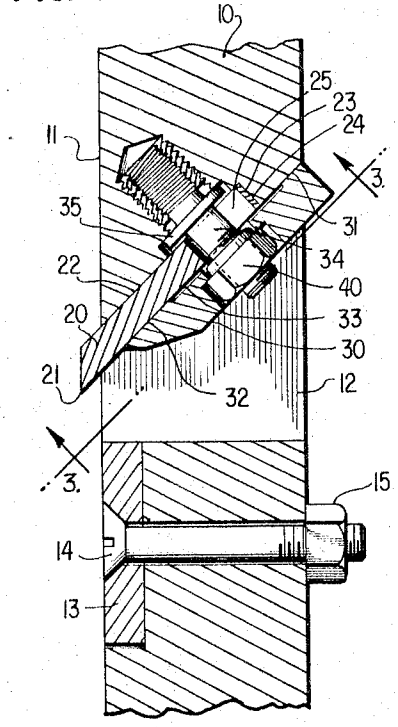


FIG. 1

FIG. 2



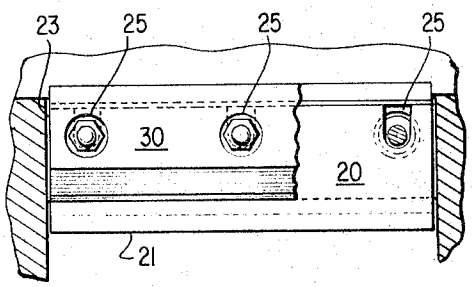


FIG. 3

INVENTOR.
ANDREW ZAICHKOWSKY
BY Irons, Birch, Swindler and McKie
ATTORNEYS.

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CUTTING APPARATUS FOR CHIPPERS

Andrew Zaichkowsky, Montreal, Quebec, Canada, assignor to Carthage Machine Company, Inc., Carthage, N.Y., a corporation of New York

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This invention relates generally to cutting apparatus for a chipper to produce usable chips from wood, logs, boards, slabs, and the like. More particularly, this invention relates to cutting apparatus for a chipper with improved clamping means for securing the chipping knives to the rotatable chipper disc.

Wood chippers are well known, and generally comprise a heavy steel or cast iron disc mounted for rotation about a fixed shaft. This heavy disc has chipping knives mounted on it with the cutting edges of the knives extending beyond the face of the disc. The chipping takes place when the waste wood, such as slabs or rounds, is fed axially toward the rotating disc into the path of the cutting edges of the chipping knives.

It has been a substantial problem in the chipping industry to provide cutting apparatus for a chipper with a clamping device which securely holds the knives on the rotating disc. The knife clamps must be sufficiently strong to withstand the heavy forces created by the impact between the chipping knives and the wood being chipped. Looseness or play of the knives on the disc resulting from such impact increases the wear on the chipper assembly, and can materially affect the size and quality of the chips produced.

A further problem has been to provide a clamping device which eliminates the need for adjusting the knives on the disc to accommodate for knife wear. This adjustment has been necessary because the width of the knives is diminished by the repeated sharpening of the cutting edges, as required for maintaining efficient operation of the chipper.

Many knife clamping devices of prior chippers thus included adjusting screws, or similar devices, mounted on the rotating disc adjacent to the knife clamp to compensate for this change in knife width. In addition, metal shims, such as babbit, have been attached to the end of the sharpened knives to compensate for the diminished knife width. However, it has been difficult to hold a shimmed knife securely to the chipper disc using heretofore known clamping devices.

It is therefore a primary object of this invention to provide improved cutting apparatus for a chipper in which the chipping knives are securely held in position on the rotatable chipper disc.

It is a further object of this invention to provide cutting apparatus for a chipper including improved clamping means for securing the knives to the disc which distributes the clamping force to the front of the knives adjacent to the cutting edges.

It is an additional object of this invention to provide improved cutting apparatus for a chipper which eliminates the need for adjusting the chipping knives to compensate for wear after placement of the knives in position on the rotatable disc.

It is still a further object of this invention to provide improved cutting apparatus for a chipper in which the clamping means for securing the knives to the disc is particularly adapted to enable use of a metal shim at the rear end of the knife to compensate for wear.

This invention can be generally described as a cutting apparatus for a chipper comprising a rotatable disc, one side of which provides a disc face, said disc having a slot extending therethrough generally toward the periphery thereof and spaced away from the axis of rotation of said

disc, the top of said slot defining a recess, a chipping knife positioned within said recess, said knife including a cutting edge at its front end, the distance between said cutting edge and the rear end of the knife defining the width of said knife, said recess opening at said disc face and extending partially through said disc for less than the width of said knife to terminate at a shoulder which forms a seat against which the rear end of said knife abuts with said cutting edge projecting beyond said face, means for removably clamping said knife within said recess, said means comprising a clamping plate having a first bearing surface abutting said disc rearwardly of said seat and a second bearing surface abutting said knife near the front end of said knife, and fastening means connecting said clamp to said disc between said bearing surfaces to urge said first bearing surface against said disc and said second bearing surface against said knife, whereby the force of said clamp is directed to the front of said knife adjacent the cutting edge thereof, to securely clamp said knife within said recess in a cutting position on said disc.

This invention will be more fully understood by reference to the drawings showing a specific embodiment thereof. In the drawings:

FIGURE 1 is an elevation view partially broken away, of a chipper assembly including the cutting apparatus of this invention;

FIGURE 2 is a fragmentary section view taken along the line 2—2 of FIGURE 1; and

FIGURE 3 is a removed section taken along line 3—3 of FIGURE 2.

Referring to FIGURE 1, the wood chipper illustrated therein generally comprises a housing 1 which is held in position within the sawmill, or other industrial plant where the chipping is to be completed, by the frame structure 2. The chipper includes a horizontal feed spout 3 for feeding waste wood and the like into the chipper, and an outlet 4 through which the chips are discharged. A shaft 5 is also supported on the frame structure 2 and is free to rotate with the bearing assembly 6.

A rotatable disc 10 having a face 11 is mounted on shaft 5 within housing 1. A plurality of slots 12, cut axially through disc 10, are spaced away from the center of rotation of the disc and extend generally toward the disc periphery. The particular positioning of these slots on disc 10, as shown in FIGURE 1, is completely described in my co-pending application filed contemporaneously herewith and is not critical to this invention. Accordingly, slots 12 may be arranged in any suitable chipping position in the disc.

In this embodiment, the lower portion of each slot 23 forms a "chip slot" 12' through which the chips can be discharged to the back of disc 10. Removable wear plates 13 are fastened to the disc face 11 adjacent to slot 12, and ahead of the slot in the direction of rotation of the disc, as best seen in FIGURE 2. These wear plates 13 can be held in position by any suitable means, such as bolts 14 and nuts 15.

A chipping knife 20 having a cutting edge 21 is mounted on disc 10 within a recess 22, defined by the top portion of each of the slots 12. Recess 22 opens at the disc face 11 and is preferably substantially the same height as the thickness of the knife 20. Further, recess 22 extends only partially through the disc for less than the width of knife 20, that is, the distance between the end of the knife and cutting edge 21, so that a shoulder is formed defining a knife seat 23 against which the rear end of the chipping knife abuts. Preferably, recess 22 extends within disc 10 at an acute angle with the face 11 of the disc, such as 45°, to maintain the knife 20 at the desired cutting angle. In addition, apertures

25 are cut through knife 20, and are elongated to extend toward the knife end, to permit the knife to be adjusted within recess 22 to compensate for knife wear resulting from prolonged use, as further described hereinafter.

Knife 20 is removably secured within recess 22 by a knife clamping plate 30. This clamping plate 30 includes a first bearing surface 31, designed to abut with disc 10 adjacent to and behind seat 23, and a second bearing surface 32 designed to abut with the front of the knife approximately adjacent to disc face 11. Preferably clamp 30 comprises a substantially flat plate having a groove 33 extending the length of the plate so that the edges of the groove define the inner ends of bearing surfaces 31 and 32.

The knife clamp 30 is fastened in position by bolt 34 which extends through an opening in the clamp between bearing surfaces 31 and 32, and which continues through the apertures 25 in the knife. The upper end of bolt 34 threadably engages disc 10 above the knife 20. As seen in FIGURE 2, bolt 34 may include a detent flange 35 which limits the upward advance of the bolt by abutting with the disc 10, to prevent damage to the bolt threads. Nut 40 threadably engages the lower end of bolt 34, and fastens clamp 30 to disc 10, to securely hold the knife 20 within recess 22.

As nut 40 is tightened, bearing surface 31 is drawn against disc 10 behind seat 23, and bearing surface 32 is drawn against knife 20 only at the front portion of the knife near the cutting edge and substantially adjacent to the face 11 of the disc. Accordingly, the holding force of clamp 30 is concentrated near the front end of the chipping knife, where the impact of the chipping operation on the knife is maximum. The knife 20 is, therefore, held in a chipping position on disc 10 more securely by clamp 30 than by prior known knife clamps.

After prolonged use, the cutting edge 21 is sharpened, such as by grinding, and the knife 20 replaced within recess 22. Since this sharpening diminishes the width of the knife, a metal shim 24, such as babbitt, can be integrally attached to the end of knife 20, or otherwise placed between seat 23 and the knife end, to compensate for this diminished width. Normally the knife is placed in a mold and molten babbitt is applied to the end of the knife to form a shim. When the babbitt hardens, the knife is removed from the mold. The shim is thus an integral part of the knife. As seen in FIGURE 2, shim 24 abuts with seat 23 to hold the chipping knife 20 substantially in the same position within recess 22 as before the knife was sharpened.

In accordance with this invention, groove 33 in clamp 30 defines the inner ends of bearing surfaces 31 and 32 spaced away from the knife end and the shim 24 so that clamp 30 does not come into contact with shim 24 as nut 40 is tightened to secure the knife to the disc. Instead, clamp 30 bears only against the front portion of the knife 20, to clamp the front of the knife against the disc 10, and hold it in a chipping position within recess 22. The operation of clamp 30 is thus unaffected by the presence of shim 24.

To assemble the cutting apparatus of this invention, the apertures 25 in the knife 20 are mounted on the bolt 34 and the knife is moved upwardly into recess 22 until the top of the knife is in contact with the disc 10, and the end of the knife abuts with seat 23. The knife is thus mounted on the rotatable disc in chipping position, with the cutting edge 21 projecting beyond the disc face 11 the desired distance. Clamp 30 is then mounted on bolt 34, and nut 40 is threadably engaged with the bolt and tightened, to urge the clamp upwardly and bring bearing surface 31 up against the disc, and bearing surface 32 against the front of the knife. Knife 20 is thereby securely mounted on disc 10 within recess 22 with the clamping force concentrated at the front of the knife.

To remove the knife 20 for sharpening, nut 40 is loosened, clamp 30 is disengaged, and the knife removed from recess 22. After sharpening, the babbitt shim 24 is formed on the knife 20 to compensate for the diminished width of the knife caused by the sharpening operation. The knife 20 can then be replaced within recess 2 as heretofore described.

The width of this shim can be accurately dimensioned so that when the sharpened knife and the shim are placed within recess 22, as shown in FIGURE 2, the shim fills the gap between the end of the knife and seat 23. The apertures 25 in knife 20 are elongated toward the knife end, as clearly shown in FIGURE 3, so that bolts 34 will extend through the knife when the shimmed knife is replaced within recess 22. The cutting edge 21 thus projects beyond the disc face 11 the same distance as before the knife was sharpened, and the need for adjusting the knife after mounting it on disc 10 is eliminated.

Although a specific embodiment of this invention has been illustrated and described herein, modifications of this invention can be devised by those skilled in the art without departing from the spirit of the invention, the scope of which is defined solely by the appended claims.

What is claimed is:

1. A cutting apparatus for a chipper comprising a rotatable disc, one side of which provides a disc face, said disc, having a slot extending therethrough generally toward the periphery thereof and spaced away from the axis of rotation of said disc, the top of said slot defining a recess, a chipping knife positioned within said recess, said knife including a cutting edge at its front end, the distance between said cutting edge and the rear end of the knife defining the width of said knife, said recess opening at said disc face and extending partially through said disc for less than the width of said knife to terminate at a shoulder which forms a seat against which the rear end of said knife abuts with said cutting edge projecting beyond said face, means for removably clamping said knife within said recess, said means comprising a clamping plate having a first bearing surface abutting said disc rearwardly of said seat and a second bearing surface abutting said knife near the front end of said knife, and fastening means connecting said clamp to said disc between said bearing surfaces to urge said first bearing surface against said disc and said second bearing surface against said knife, whereby the force of said clamp is directed to the front of said knife adjacent the cutting edge thereof, to securely clamp said knife within said recess in a cutting position on said disc.

2. A cutting apparatus according to claim 1 wherein said clamping plate has a groove between said first and second bearing surfaces.

3. A cutting apparatus according to claim 1 wherein said fastening means comprises a threaded member extending through said knife to engage a threaded opening in said disc.

4. Cutting apparatus for a chipper comprising a rotatable disc, one side of which provides a disc face, said disc having a slot extending therethrough toward the periphery thereof and spaced away from the axis of rotation of said disc, the top of said slot defining a recess, a chipping knife positioned within said recess, said knife including a cutting edge at its front end, the distance between said cutting edge and the rear end of the knife defining the width of said knife, said knife having an aperture near said rear end, said recess opening at said disc face and extending partially through said disc for less than the width of said knife to terminate at a shoulder which forms a seat against which the rear end of said knife abuts with said cutting edge projecting beyond said disc face, means for removably clamping said knife within said recess, said means comprising a clamping plate having a groove facing said recess, said clamping plate defining rearwardly of said groove a first bearing surface abutting with said disc adjacent said seat and a second

bearing surface forwardly of said groove abutting said knife near the front end of said knife, and fastening means extending through said clamping plate in said groove between said first and second bearing surfaces and extending through said aperture in said knife to threadably engage said disc above said knife to clamp said knife against said disc, whereby the force of said clamping plate is directed near the front end of said knife adjacent the cutting edge thereof to securely clamp said knife in a cutting position on said disc.

5. A cutting apparatus according to claim 4 wherein a shim is positioned between the rear end of said knife and said seat to compensate for wear of said cutting edges.

6. A cutting apparatus according to claim 5 wherein said aperture is elongated to extend toward the rear end of said knife to permit said knife to be adjusted in said recess to accommodate said shim.

7. A cutting apparatus according to claim 4 wherein the lower portion of said slot through said disc defines a chip slot through which chips may be discharged.

8. A cutting apparatus according to claim 4 wherein said recess is positioned at an acute angle with respect to said disc face so that said knife projects angularly beyond said face.

9. A cutting apparatus according to claim 4 wherein the depth of said recess is substantially equal to the thickness of said knife.

References Cited by the Examiner

UNITED STATES PATENTS

599,687	3/1898	Connolly	269—94 X
3,030,987	4/1962	Jackson et al.	144—176 X

WILLIAM W. DYER, JR., *Primary Examiner.*

W. D. BRAY, *Assistant Examiner.*