United States Patent

[11] **3,559,705**

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[54] **CHIPPER KNIFE AND KNIFE MOUNTING FOR DRUM TYPE WOOD CHIPPER**
5 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **144/162,** 144/218; 241/91
[51] **Int. Cl.** **B27l 11/02,** B27g 13/04
[50] **Field of Search** ..... 144/(Cursory); 144/162, 172, 218, 230, 241; 241/91, 298; 146/89, 91, 92

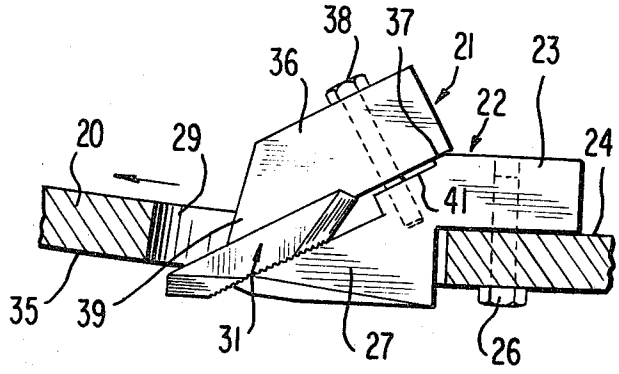
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Primary Examiner—Donald R. Schran
Attorney—Lawrence L. Colbert

ABSTRACT: A simplified and secure mounting for a reversible symmetrical knife for a drum type wood chipper. The knife produces a controlled size chip as required by the paper industry.



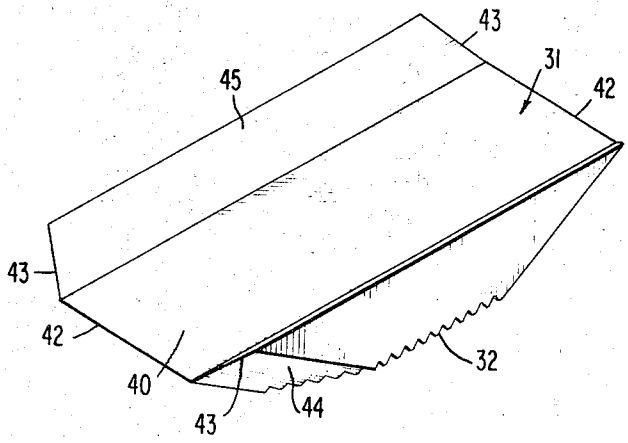


FIG. 1

FIG. 2

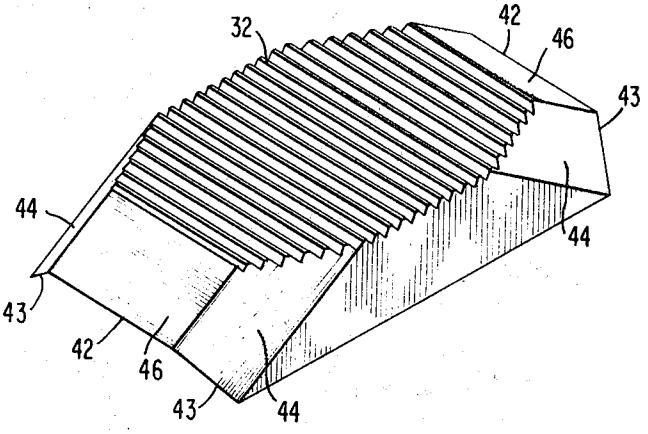


FIG. 3

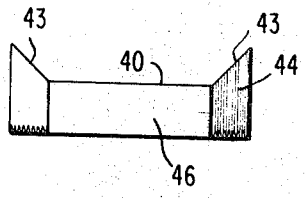


FIG. 4

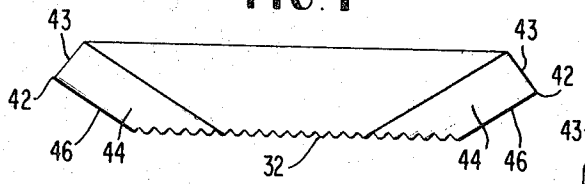
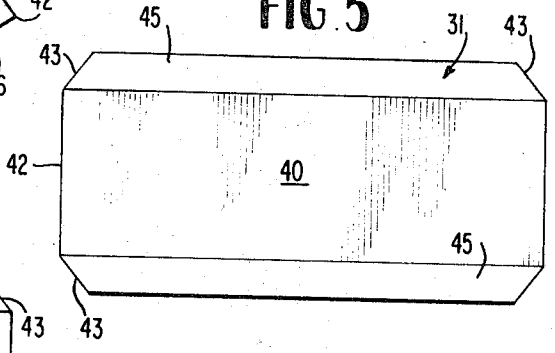


FIG. 5



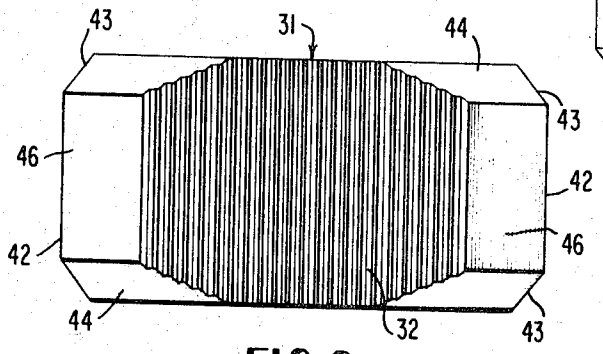


FIG. 6

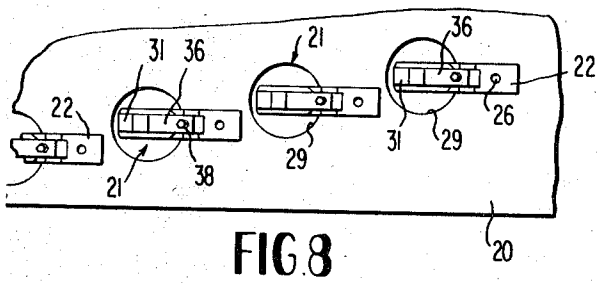


FIG. 8

FIG. 7

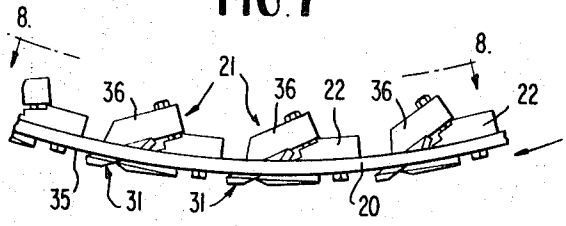
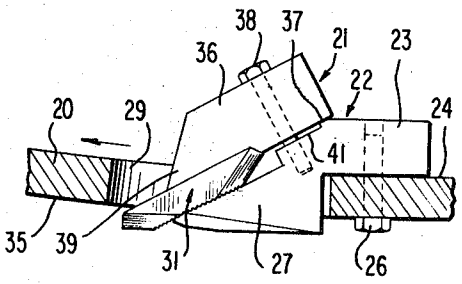


FIG. 9



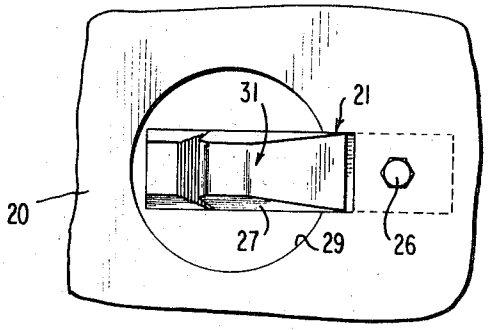


FIG. 10

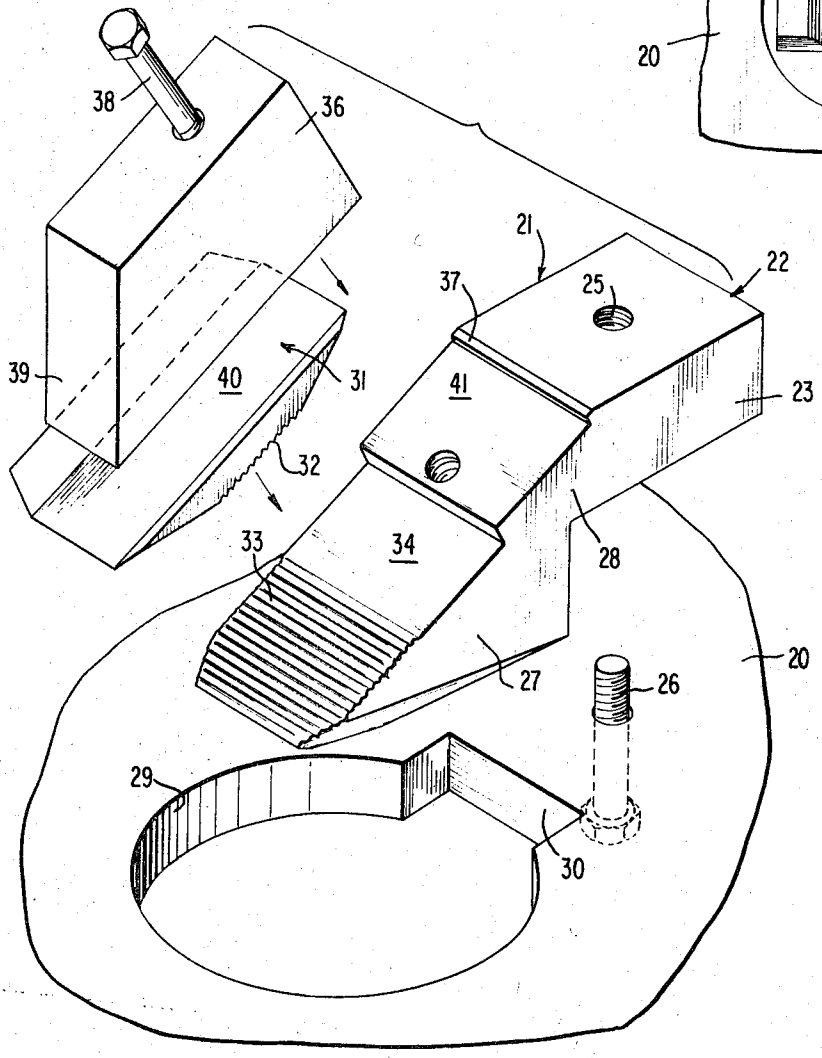


FIG. 11

CHIPPER KNIFE AND KNIFE MOUNTING FOR DRUM TYPE WOOD CHIPPER

The need for the present invention arises in cone connection with certain deficiencies of conventional drum type wood chippers.

The knives of prior art machines have generally failed to produce wood chips of uniform width and grain length as well as uniform but adjustable thickness. Also, the chips produced on existing equipment are not sufficiently compact at the cut edges and there is excessive brooming and splintering of the chip.

Furthermore, conventional drum chipper knives are difficult to replace in case of damage and the design of the usual knife makes it difficult to resharpen and sometimes requires expensive special shaped grinding equipment.

The aim of the present invention it to overcome these and other known deficiencies of existing equipment.

According to the present invention, a more secure mounting for the chipper knife on the drum is po provided and replacement or reversal of the knife is rendered very easy due to the accessibility of parts and simplicity of fastening together of parts.

The improved knife per se produces controlled size chips by the inclusion of a unique double-ended arrangement symmetrical design including a folded cutting edge arrangement at each end. Each folded cutting edge includes a primary cutting edge for removal of the body of the chip from the wood and two secondary edges for cutting the grain ends of the chip as the chip body is removed from the wood being consumed.

Each cutting edge of the knife is formed by the intersection of two planes and may readily be reproduced or sharpened by plane surface grinding equipment and does not require special grinding shapes which is very important from the standpoint of economy. The knife is completely reversible any may be sharpened easily at either end.

A serrated back surface of the knife greatly increases the holding power of a coacting holder and clamp.

Each knife on the drum can independently complete the cut of a chip without regard to the pattern of arrangement of knives, or the "hand" of the machine. Fouled knives may be adjusted, replaced, or end reversed without disturbing adjacent knife mountings. Other advantages and features will be apparent to those skilled in the art as detailed description of the invention proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a wood chipper knife embodying the invention.

FIG. 2 is a perspective view looking at the opposite side of the knife.

FIG. 3 is an end elevational view.

FIG. 4 is a side elevational view.

FIGS. 5 and 6 are plan views of the opposite sides of the knife.

FIG. 7 is a fragmentary side elevational view on a reduced scale of several chipper knives and their mounting elements on the wall of a drum.

FIG. 8 is a fragmentary plan view on line 8–8 of FIG. 7.

FIG. 9 is an enlarged fragmentary vertical section through the drum showing the mounting of one chipper knife thereon.

FIG. 10 is a fragmentary elevational view of the exterior of the drum adjacent the knife and holder means of FIG. 9.

FIG. 11 is an exploded perspective view on an enlarged scale of the chipper knife and holder.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing in detail, wherein like numerals are employed to designate like parts throughout, reference is made first to FIGS. 7 through 11 wherein the numeral 20 designates a fragment of the wall of a chipper drum which rotates in the direction of the arrows, FIGS. 7 and 9. Drum type chippers are well-known in the art and a description or illustration of the entire machine is quite unnecessary to a proper understanding of the present invention which relates primarily to the mounting of chipper knives on the drum wall and to the knives per se.

FIGS. 7 and 8 however, show the mounting of a plurality of chipper knife units 21 on the drum wall 20 in one preferred spaced arrangement, it being understood that the arrangement of the knives on the drum may be varied in some instances. The knives may be arranged in staggered rows, as shown, or spirally arranged and variations are contemplated.

Since each knife unit 21 is identical to the others, a complete description of one unit will suffice to describe them all.

Each unit 21 comprises a holder 22 having a block extension 23 which rests on the interior surface 24 of the drum wall 20, as shown in FIG. 9. The block extension 23 has a threaded opening 25 formed therethrough which receives a machine screw 26 or the like preferably from the outside of the drum 20, as shown.

The holder 22 has a tapered head portion 27 and an intermediate inclined portion 28. The head 27 engages through a relatively large circular clearance opening 29 of the drum wall having a rectangular locator notch 30 formed therein to receive the back of the head 27 and lock the holder 22 against turning on the axis of screw 26, making for a very secure mounting of the holder on the drum.

A reversible symmetrically formed chipper knife 31, to be described in detail has its lower serrated face 32 in engagement with serrations 33 on the inclined face 34 of head 27, whereby the knife 31 may be adjusted considerably lengthwise of the holder to regulate the projection of one cutting end of the knife outwardly of the peripheral face 35 of the drum. The knife is also received within the clearance opening 29.

The chipper knife 31 is secured fixedly to the holder head 27 in the required inclined position by a clamp piece or block 36 held against a narrow inclined shoulder 37 of the holder 22 by a screw 38. The tapered toe portion 39 of the clamp block 36 engages the upper flat face 40 of the chipper knife and the remainder of the claim remainder of the clamp block between the shoulder 37 and knife is slightly spaced from the inclined face 41 of the holder, as shown in FIG. 9. This arrangement enables the knife 31 to be held extremely securely in an easily adjustable manner with a minimum of components employed. The parts are strong and durable to withstand the pounding inherent in consuming a log to make wood chips of the proper length and shape for the paper making industry. Individual knives 31 may be adjusted, replaced or reversed without disturbing other knife units of the drum. The advantages and economies of the chipper knife mounting arrangement in FIGS. 7 through 11 should be apparent to those skilled in the art.

FIGS. 1 to 6 show the chipper knife 31 in full detail and the formation or construction of this knife is an important element of the invention enabling the consistent production of properly sized chips as discussed in the introductory part of the specification.

The knife 31 has a main flat rectangular face 40 already mentioned, and an opposed parallel somewhat shorter serrated face 32 whose margins are formed by the intersection of certain angular faces on the knife. The knife 31 is symmetrical about longitudinal and transverse axes and each end of the knife has a primary sharp chip cutting edge 42 which serves to remove the body of the chip from the consumed log. Two secondary cutting edges 43 are provided at each end of the knife 31 and are formed by the intersection of beveled planes 44 at the exterior corners of the knife and interior plane faces 45 which extend longitudinally for the entire length of the knife on opposite sides of the main flat face 40. The main cutting edges 42 are similarly formed by the intersection of the flat face 40 and beveled faces 46 at the ends of the knife.

The secondary cutting edges 43 are for cutting grain ends of the chip as the body of the chip is taken from the wood.

The sharpening of all cutting edges is rendered easy since plane surface grinding equipment can be employed

throughout on the several flat beveled faces which intersect to form the cylindrical cutting edges. The knife is reversible end-for-end, as stated, is easily removed and replaced, and due to its economy may even be discarded when both ends are dulled. As shown in FIGS. **1** and **4**, the cutting edges **42** and **43** are disposed in angled relationship in two planes.

The general mode of operation of the machine is conventional and corresponds to that of other drum type chippers and therefore need not be described in detail. The essence of the invention resides in the knife **31** per se for producing consistently a controlled size chip and in the improved adjustable mounting means for the knife on the drum wall, whereby the knife can quickly be reversed or replaced or adjusted lengthwise to render the cut deeper or more shallow.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. In a drum type rotary wood chipper, a drum wall having a clear clearance opening, a knife holder including a head projecting within the clearance opening and an anchoring portion resting upon the interior face of the drum, means for releasably securing securing said anchoring position to the drum, a clamping element disposed in opposed relationship to

an inclined surface of the head, a symmetrical end reversible chipper knife engaged between the inclined face of the head and an opposed face to the clamping element, and means rigidly and releasably securing the clamping element, and to the holder in clamping relationship with the chipper knife, said knife projecting diagonally through said opening and beyond the exterior surface of said drum.

2. The structure of claim **1**, and wherein the clearance opening has a locator notch and a part of said head of the holder is engaged lockingly within the lc locator notch so that the holder cannot pivot upon the drum.

3. The structure of claim **1**, and wherein said head has a diagonally inclined serrated face within the clearance opening and said knife has serrations on one face thereof adjustably engaging the serrations of the head whereby the extent of projection of the knife exteriorly of the drum wall may be adjusted.

4. The structure of claim **2**, wherein said first-named means is a single screw element attaching said anchoring portion to said drum wall.

5. The structure of claim **2** wherein said head is a tapering element having its wider heel portion engaging within said locator notch and including an inclined surface which extends diagonally of the clearance opening and is serrated, said chipper knife having a coacting serrated surface engagement with the serrated surface of the head.