

[54] **SHAVINGS MAKING MACHINES**

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[22] Filed: **March 12, 1970**

[21] Appl. No.: **18,828**

[52] U.S. Cl. **241/280**
 [51] Int. Cl. **B02c 18/06**
 [58] Field of Search 241/280; 144/162, 172

[56] **References Cited**

UNITED STATES PATENTS

2,811,183 10/1957 Mottet 241/280 X

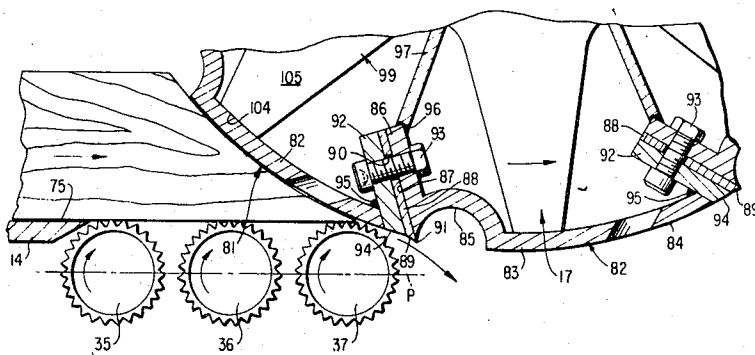
2,825,373 3/1958 Forman 144/172
 2,710,635 6/1955 Alexander 241/280 X
 2,023,455 12/1935 Warren 241/280

Primary Examiner—Granville Y. Custer, Jr.
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[57] **ABSTRACT**

A shavings making machine comprises a rotating cutter drum having a plurality of longitudinally extending cutter blades on its periphery, and a moving feed bed for advancing pieces of wood to be converted into shavings under controlled feed conditions into the path of said blades, the feed bed comprising a plurality of longitudinally serrated rotatable rollers.

6 Claims, 7 Drawing Figures



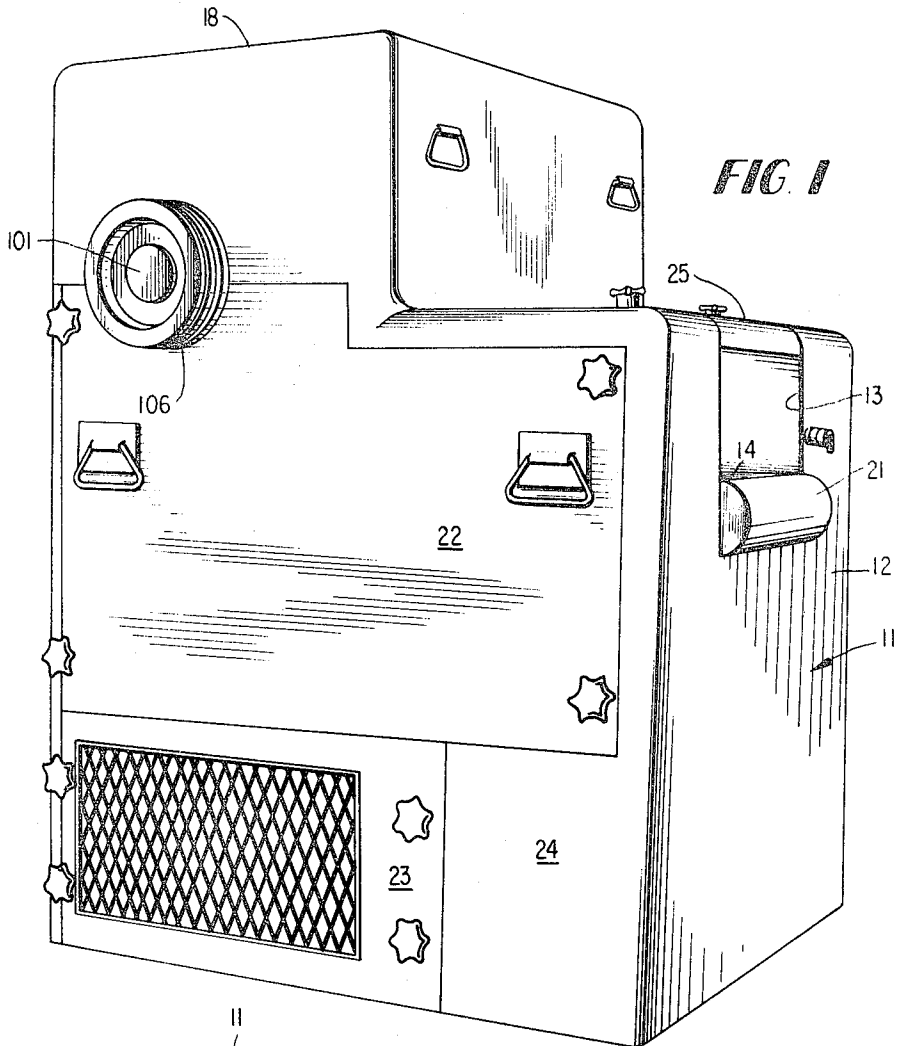


FIG. 1

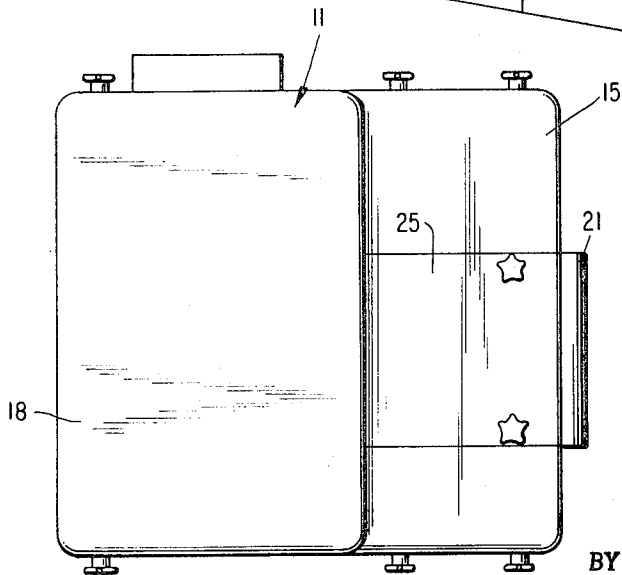


FIG. 2

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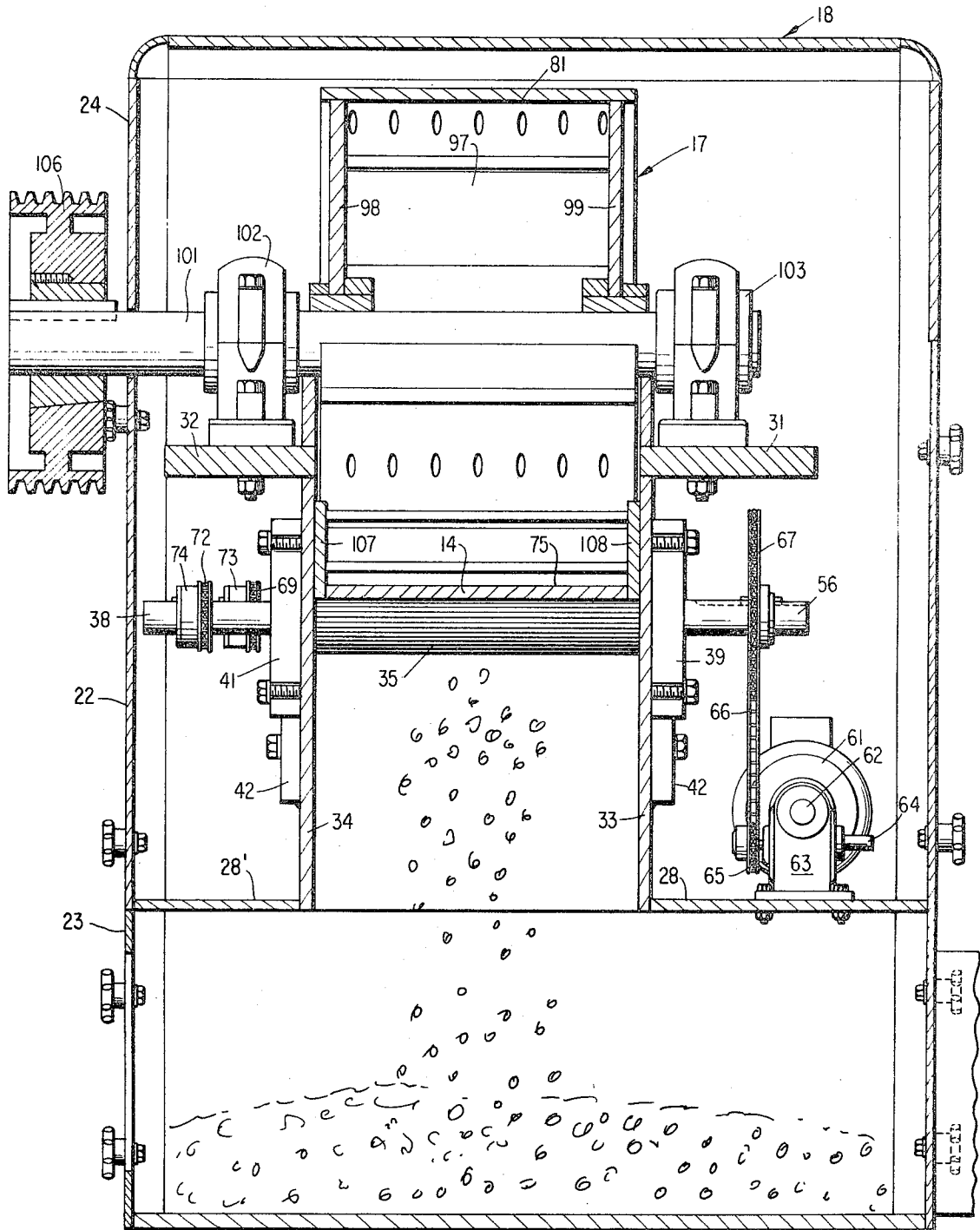


FIG. 3

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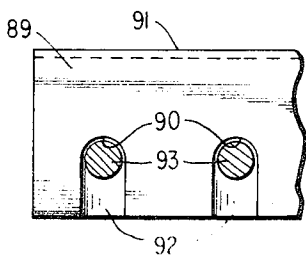
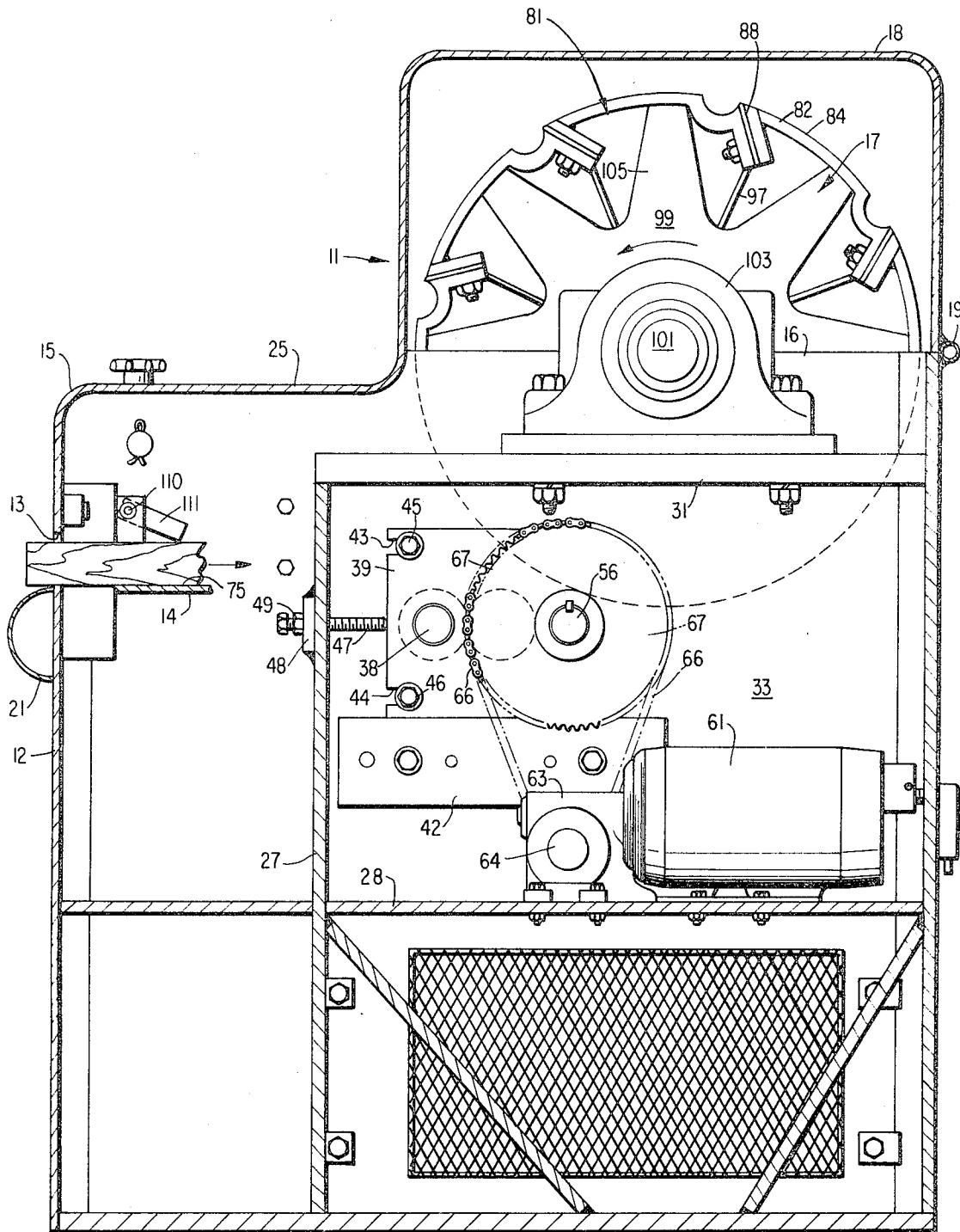


FIG. 7

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FIG. 4

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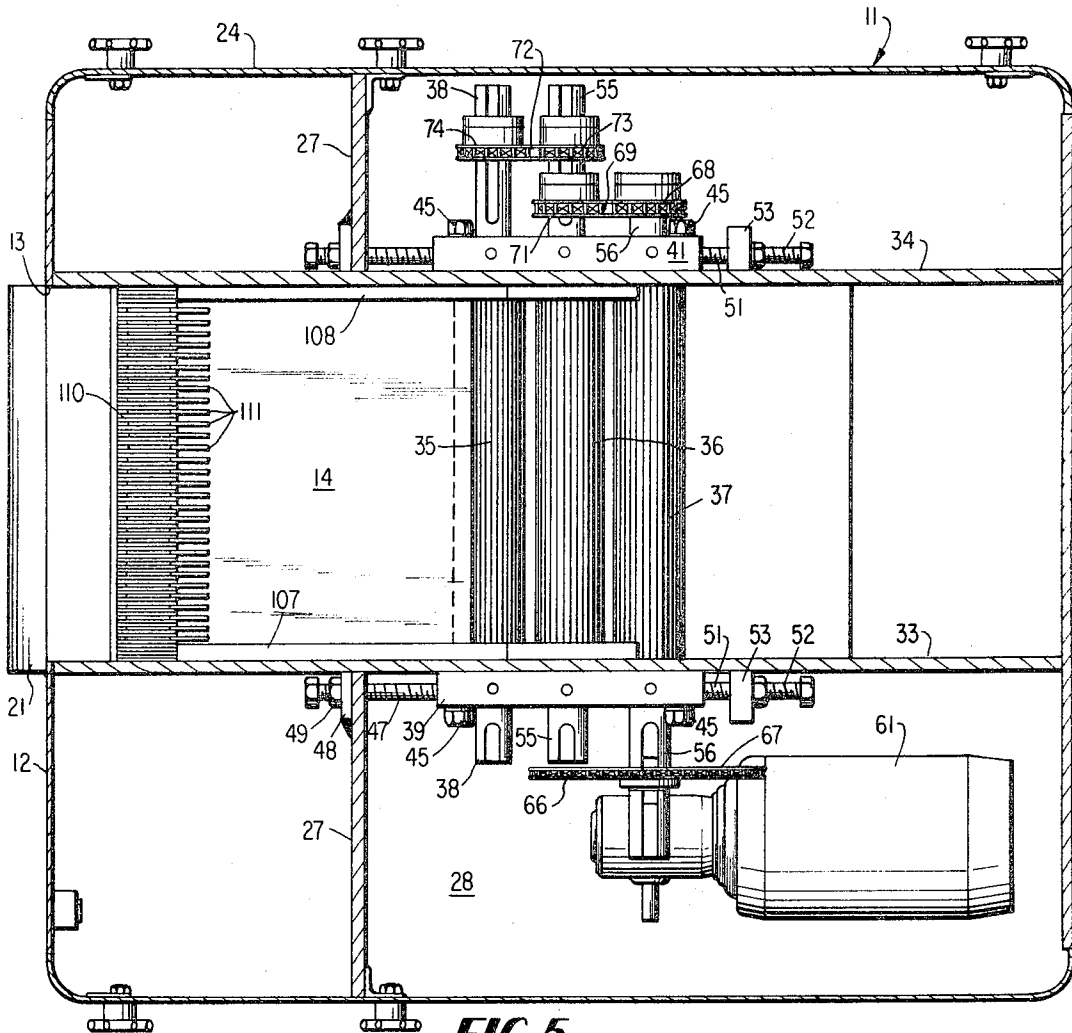


FIG. 5

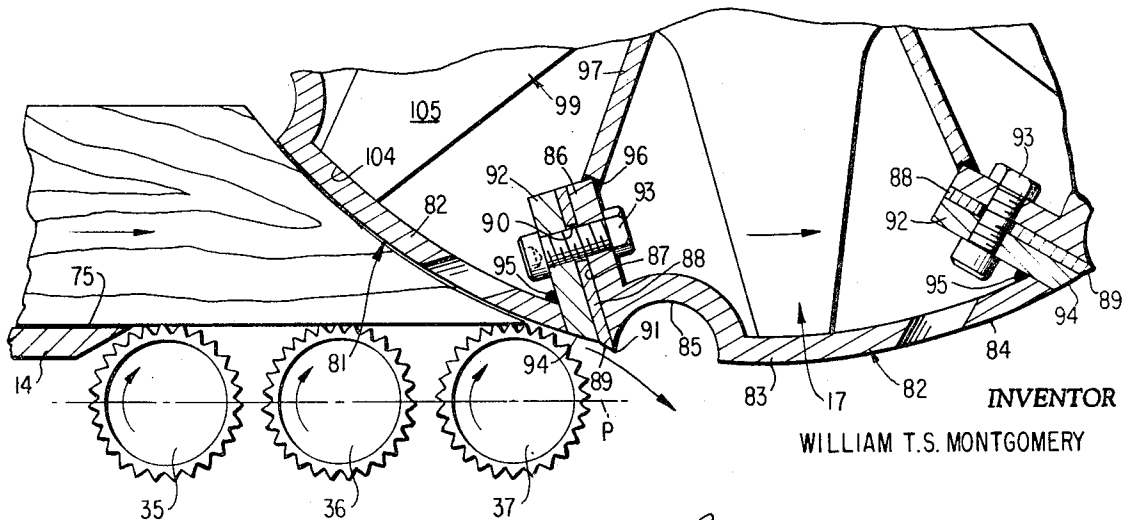


FIG. 6

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SHAVINGS MAKING MACHINES

This invention relates to a machine for converting random size and shape pieces of wood or like materials into relatively uniform thickness shavings.

The invention may be advantageously used for example in a woodworking shop where scrap wood pieces of random size and shape accumulate and present a disposal problem. This problem can be solved to profitable advantage by converting the scrap to fluffy shavings which can be sold for use in cattle bedding for dairy farms, chicken litter for chicken farms, mulch for mixture with fertilizer and the like.

Machines for cutting wood pieces to provide shaving, chips and the like have been proposed but none are known that can cut random size pieces of wood as required. Many of these chip forming machines employ rotary cutter drums and are for special purposes, such as disclosed in Alexander U.S. Pat. No. 2,710,635 and Thompson U.S. Pat. No. 2,813,557. In all of these known cutter drum machines the cylindrical surface of the cutting drum is relied upon as a stop to infeed of the wood piece, the problems are encountered due to the fact that the knives during cutting act to pull the wood more tightly against the drum surface. This acts to brake the drum to reduce the speed and wood is charred due to the rubbing friction and char coats the drum surface. Cutting is non-uniform. Damage from pressure of the wood is also sustained by the cutting knives.

The present invention solves the problem of continuously rapidly producing shavings by providing a positively feeding moving bed controllably advancing the wood piece into cutting position at the drum periphery in such manner that rubbing abutment of the leading end of the wood piece against the drum surface is avoided while each knife on the drum acts in sequence to cut a shaving, and this is a major object of this invention.

In a preferred form of the invention the moving bed adjacent the drum is formed by side by side parallel serrated surface rolls rotated at the same speed and in the same direction in synchronism with the speed of a continuously rotated cutting drum, and this is another object of the invention.

Another object of the invention is to provide a novel shavings making machine wherein a serrated roller bed for feeding a piece of wood toward a continuously rotating drum having a series of longitudinal knife edges along its periphery is disposed in a predetermined location adjacent the bottom of the rotating drum.

Further objects of the invention will appear as set forth in the claims, including novel knife blade mounting on the cutting drum, specific relative association of the moving feed bed and the rotating drum in normal operation, and general organization in the machine.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a generally perspective view showing a shavings making machine according to a preferred embodiment of the invention;

FIG. 2 is a top plan view of the machine;

FIG. 3 is a vertical section through the machine showing the cutter and feed drives and other detail;

FIG. 4 is a vertical section through the machine at right angles to the section of FIG. 3 showing further detail;

FIG. 5 is a horizontal view in section at the infeed opening of the machine showing the serrated roller drive;

FIG. 6 is an enlarged fragmentary side elevation mainly in section showing the shavings making action; and

FIG. 7 is a fragmentary plan view showing a knife.

PREFERRED EMBODIMENTS OF INVENTION

The shavings making mechanism of the invention is enclosed in a sheet metal housing 11 having a front wall 12 that is formed at its upper end with an infeed opening 13 from the lower edge of which a flat smooth generally horizontal metal feed table plate 14 extends into the interior.

The upper wall 15 of the housing has a rearwardly disposed opening indicated in FIG. 4 through which projects the upper half of a rotatably cutter device 17. A cover 18 hinged to the rear of the casing at 19 encloses the upper half of the cutter.

At the lower edge of opening 13 an external generally cylindrical guide threshold 21 is secured to the housing front wall for guiding material into the opening.

Access into the interior of the machine may be had through removable side panels such as panels 22 and 23 on side wall 24, and cover 18 which has a forward extension panel 25.

The housing is suitably braced by internal frame members such as the vertical member 27 and horizontal members 28 and 28' as shown in FIGS. 3 and 4. Just below the opening, the housing contains internal horizontal supports 31 and 32 (FIG. 3) rigid with vertical frame members 33 and 34.

Frame members 33 and 34 are fixed at their forward ends to frame member 27, and at their lower ends to frame members 28 and 28'. The foregoing frame members all contribute to provide a sturdy rigid frame assembly within the housing.

Inwardly of the inner edge of table 14 and below the cutter device 17, as shown in FIGS. 5 and 6, a series of three equally spaced rollers 35, 36 and 37 of the same diameter are mounted with their axes preferably lying in a horizontal plane P parallel to the axis of rotation of cutter device 17. All of the rollers have longitudinally serrated peripheral surfaces, and their peripheral surfaces lie in cylindrical envelopes to which the upper plane surface of table 14 is tangent. While it is preferred that the rollers provide a substantially horizontal feed bed or one slightly inclined inwardly and downwardly, any suitable roller bed arrangement for feeding toward the cutter knives may be used.

Roller 35 is fixed on a shaft 38 the ends of which extend freely through frame members 33 and 34 and are journaled in similar parallel bearing plates 39 and 41 lying flush on the frame members. As shown in FIG. 4, plate 39 is horizontally slidably supported from below on a block 42 bolted or otherwise fixed to frame member 33, and its opposite four corners (two shown) are formed with open horizontal slots such as shown at 43 and 44 receiving headed guide and clamp bolts 45 and 46 threaded into frame member 33. Plate 41 is similarly adjustably mounted on frame member 34.

Plates 39 and 41 are thus parallel and horizontally adjusted in parallel relation along their respective support blocks 42. Adjustment control screws 47 threaded in bosses 48 rigid with frame members 27 engage the forward side edges of plates 39 and 41. Lock nuts 49 secure the adjustment. At the rear side edges of plates 39 and 41, upper and lower adjustment control screws 51 and 52 threaded into lugs such as 53 rigid with the frame bear against the plates.

Roller 36 is mounted on a shaft 55 opposite ends of which are journaled in plates 39 and 41, and roller 37 is mounted on a shaft 56 opposite ends of which are journaled in plates 39 and 41.

In the assembly, the positions of bearing plates 39 and 41 are accurately determined and maintained by the foregoing adjustment screws. This enables the three parallel axis rollers 35, 36 and 37 to be shifted together as a unit forwardly or rearwardly in a horizontal plane (see FIG. 6) in the space between the inner edge of table 14 and the periphery of cutter 17, without changing their relative locations, for a purpose to appear.

An electric motor 61 is mounted on frame member 28, and its output shaft 62 is connected through reduction gearing 63 to a cross shaft 64 carrying a sprocket 65. A chain 66 connects sprocket 65 to a sprocket 67 on shaft 56 and, as shown in FIG. 5, shaft 56 at the other end carries a sprocket 68 connected by chain 69 to a sprocket 71 on shaft 55. A chain 72 connects a second sprocket 73 on shaft 55 to a sprocket 74 on shaft 38.

When motor 61 is driven, all of the serrated rollers 35, 36 and 37 are rotated at the same peripheral speed in the same direction and a horizontal plane comprising extension of the smooth top surface 75 of table 14 will be substantially tangent to the upper surfaces of all of the rollers.

Cutter device 17 comprises a relatively large diameter hollow drum 81 the periphery of which is composed of a series of identical arcuate segments 82 of special shape fixedly secured together. Each segment 82, there are eight in a preferred embodiment, consists essentially of an integral outer section 83 having a cylindrically curved external surface 84 and at one end an outwardly open longitudinal recess 85 and an inwardly projecting terminal attachment flange 86.

Recess 85, which is preferably cylindrically curved, and flange 86 extends the entire distance longitudinally of the drum and flange 86 has a flat knife blade seating face 87. A flat sided knife blade 88 extending longitudinally of the drum is seated on face 87 and its outer cutting edge is beveled at 89 to terminate in a linear cutting edge 91 which projects a predetermined distance from the outer surface of drum 81 in the assembly. Edge 91 extends longitudinally of the drum parallel to the axis of rotation of the drum.

A flat blade holder bar 92 lies flush upon the other side of knife blade 88, and a bolt or like fastener assembly 93 passing through suitable aligned holes in the flange, blade and bar detachably secures the blade to the drum segment. The holes in blade 88 are preferably open ended slots 90 (FIG. 7) to enable the blades to be inserted and/or adjusted when worn by merely loosening fastener 93, and it is not necessary to dismantle the drum. Any number of these fastener assemblies may be spaced along the length of blade 88. The outer edge 94 of bar 92 is beveled to extend in alignment with the beveled end of the knife blade.

In the assembly the eight segments 82 with the blades fastened thereon are mounted to form the drum periphery as shown in FIG. 4. Preferably, as shown in FIG. 6, each bar 92 may be integrally secured to the end of the adjacent segment 82 by a linear weld 95. The inner ends of flanges 86 in the assembly are secured, as by welds indicated at 96, to the outer ends of generally radial reinforcing ribs 97 extending between drum and spiders 98 and 99 having their hubs secured upon a horizontal shaft 101 supported for rotation in bearing blocks 102 and 103 mounted on the frame. The outer end 104 of each spider arm 105 is shaped (FIG. 6) to fit with a segment 82, whereby the segments are supported at opposite ends on the spiders and across the drum on the ribs. These junctures may be welded.

The assembled drum 81 thus has an outer cylindrical surface consisting of aligned outer segment surfaces 84 which is essentially continuous except for the eight longitudinal recesses 85 and the adjacent eight knife edges 91 each projecting the same small distance beyond the cylindrical drum surface. In operation the drum rotates counterclockwise as indicated in FIGS. 4 and 6, so that each recess 85 is disposed immediately forwardly of a knife edge 91.

Drum 81 may be rotated continuously by suitable motor driven belt means (not shown) connected to the pulley 106 secured on shaft 101 outside housing 11. Any suitable drive may be connected to rotate shaft 101.

Referring to FIGS. 3 and 5, flat side guides 107 and 108 are preferably secured along the opposite side edges of table 14 to guide inserted wood pieces along the table toward the drum. Above table surface 75 is mounted a horizontal transverse guard assembly comprising a fixed rod 110 extending parallel to the table surface 75 and a series of spaced hold down fingers 111 freely pivoted on the rod and adapted, as shown in FIG. 4, to lie upon the upper surfaces of wood pieces being fed along the table surface. These fingers are effectively by gravity not only to hold the wood pieces down on the serrated rolls during feeding but they also provide protection to the operator against kickback from the cutter device.

OPERATION

Random size pieces of wood may be fed through opening 13 onto table surface 75. This is usually done only after drum 81 has been started rotating at normal speed, and motor 61 has started to rotate the serrated rollers 35-37. The hold down arms 111 swing inward.

As the leading end of the wood piece approaches drum 81, see FIG. 6, its undersurface passes onto the moving feed bed consisting of rotating serrated rollers which controllably feed it toward the drum surface 84. The parts are so arranged that the front end of the wood piece never abuts drum surface 84 in rubbing engagement. Each rotating knife blade acts in sequence to cut a shaving of predetermined thickness, and the speed of feed imparted by rollers 35-37 is such that each shaving is cut off and passes down below the cutter device 17 and the leading edge of the advancing wood piece remains short of abutment with the drum surface 84 before the next blade 88 starts cutting.

In operation, the serrated rolls provide a moving feed bed that positively advances the woodpiece at a controlled rate. By synchronizing the speeds of rotation of the drum 81 and the rolls 35-37, and by carefully predetermining the disposition of the plane of feed relative to the drum, efficient production of shavings is obtained.

It has been found in a machine wherein an approximately twelve inch radius drum 81 is rotated is about 1,750 revolutions per minute, with the knife edges 91 projecting about 0.012 inch beyond surface 84, that the surface speed of rolls 35-37 should be such that the wood piece is advanced toward the drum at about 16 feet per minute. The periphery of final roller 37 of the moving bed is preferably spaced about one thirty-second to three-fourths inch from the periphery of drum 81 depending upon the wood being cut out and other operational conditions, and the plane of surface 75 is slightly above the lowermost surface of drum 81. This relation can be set by adjustment of plates 39 and 41.

In the invention, the knives 88 are accessible through the end spiders for adjustment and removal and replacement of the knives and this enables such to be accomplished merely by removing top housing cover 18 and gradually rotating the drum 81 for moving each knife to an accessible location.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patents is:

1. A shavings making machine comprising a rotating cutter device having a plurality of longitudinally extending cutter blades on its periphery, means providing a moving feed bed for advancing pieces of wood or the like to be converted into shavings under controlled feed conditions into the circular path of said blades, said moving feed bed comprising a plurality of successive rollers each having a longitudinally serrated surface, said rollers being disposed to rotate on axes substantially parallel to the axis of rotation of said rotating cutter device and one of said rollers being positioned next to said cutter device closely adjacent the bottom of the circular path of said cutter blades, and means for adjustably shifting said rollers together toward or away from said cutter device.

2. A shavings making machine as defined in claim 1, wherein said rollers are of the same diameter and rotated at the same peripheral speed, with their upper surfaces lying in a plane parallel to the axis of rotation of said cutter device.

3. A shavings making machine as defined in claim 1, wherein said cutter device is a drum having a cylindrical surface from which project said cutter blades, said drum is rotated at a constant speed, and said moving feed bed is adapted to advance said wood toward the drum surface at such a rate relative to the movement of the drum surface that said blades cut successive shavings from the wood and abutment of the leading end of the advancing wood with the drum surface is avoided.

4. A shavings making machine as defined in claim 1, comprising a substantially flat feed table located forwardly of said roller feed bed, the top surface of the table being substantially

in a plane containing the upper surfaces of said rollers and extending parallel to the axis of rotation of the cutter device.

5. A shavings making machine as defined in claim 4, comprising means above said table for holding work pieces down during advance along said table toward the moving feed bed. 5

6. A shavings making device as defined in claim 1, wherein the cutter device is a cylindrical drum with the cutter blades comprising longitudinal projections therefrom.

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