June 18, 1957 M. HIMMELHEBER ET AL 2,796,094

PRODUCTION OF SHAVINGS FROM PIECES OF WOOD

Filed Feb. 16, 1954 2 Sheets-Sheet 1

FIG. 1.

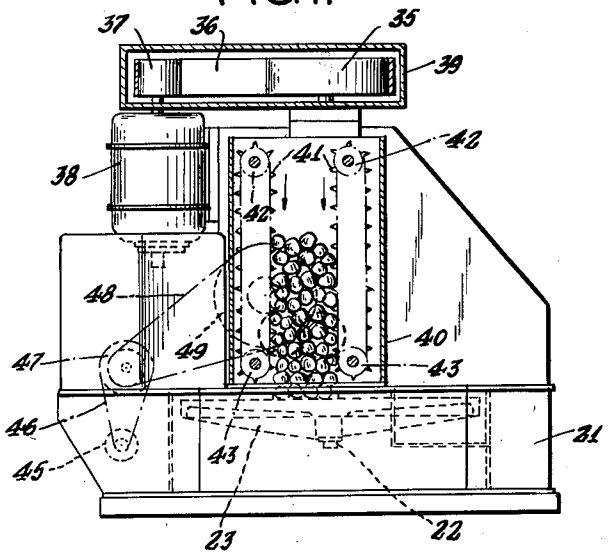


FIG. 2.

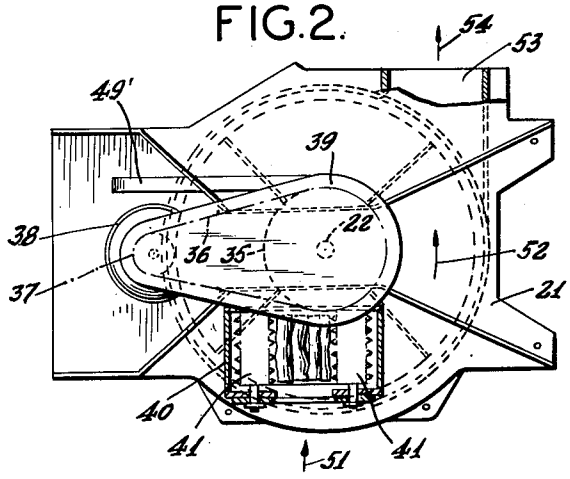
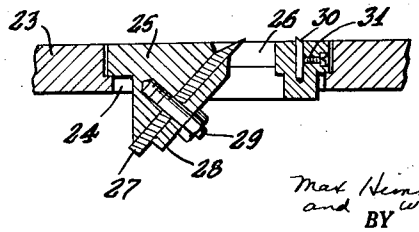


FIG. 3.



INVENTORS
Max Himmelheber, Klaus Steinle
and Walter Reiß
BY
C. W. Ang
ATTORNEY

June 18, 1957 M. HIMMELHEBER ET AL 2,796,094

PRODUCTION OF SHAVINGS FROM PIECES OF WOOD

Filed Feb. 16, 1954 2 Sheets-Sheet 2

FIG. 4.

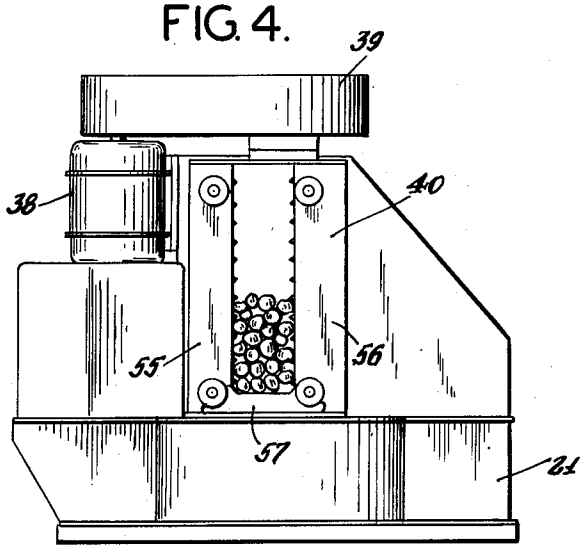
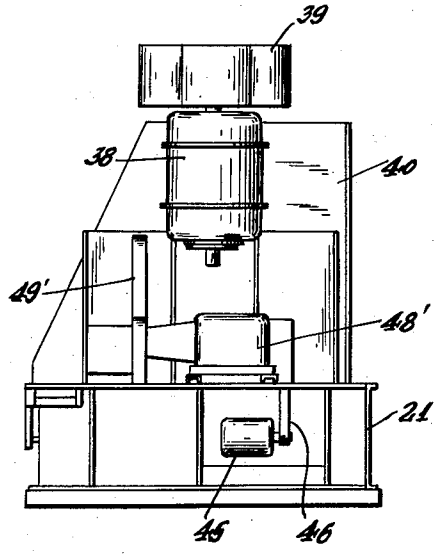


FIG. 5.



INVENTORS
Max Himmelheber, Klaus Steinle
and Walter Kull
BY
C. M. Avery
ATTORNEY

United States Patent Office 2,796,094 Patented June 18, 1957

2,796,094

PRODUCTION OF SHAVINGS FROM PIECES OF WOOD

Max Himmelheber, Baiersbronn, Black Forest, Klaus Steiner, Bad Tolz, and Walter Kuil, Freudenstadt, Germany, assignors, by mesne assignments, to Allwood Incorporated, Glarus, Switzerland, a corporation of Switzerland

Application February 16, 1954, Serial No. 410,632

1 Claim. (Cl. 144—176)

Our invention relates to the production of flat shavings from pieces of wood, particularly for the manufacture of adhesive-bonded wood-particle panels and similarly composed products.

In the manufacture of such composition products it has been found preferable to disintegrate pieces of wood waste into shavings of predetermined and properly chosen properties and dimensions, preferably with the aid of machinery especially designed for this purpose. Shavings of a flat and pliably thin shape are particularly advantageous, and such shavings have been produced on rotary-disc type shredding machines. These machines, similar to known bark peeling machines, comprise a rotating disc equipped with a number of blades whose edges extend along respective radii, or at a slight angle thereto, of the disc. The pieces of wood to be disintegrated are previously cut to a given length and are then placed into a feed box which is traversed against the rotating blades. A subdivision of the shavings may be obtained by providing the machine with scoring knives rotating together with and ahead of the cutter blades.

In known machines of this type, the blade-carrying disc extends in a vertical plane and has a horizontal shaft to permit moving and pressing the feed box with the properly prepared wood pieces on a horizontal path toward the blades. In other machines, particularly for the production of wood wool, the disc has been given a horizontal arrangement and a vertical shaft for the disintegration of pre-shaped pieces of wood. The production of shavings with the aid of the various known slicing or wood-planing methods and devices, however, leaves much to be desired if the shavings are to have the characteristics desired for use in high-quality composition panels. That is, the known methods and devices either fail to sufficiently secure a substantially uniform size and favorable fiber orientation of the shavings, or it has been necessary to provide the feed box or magazine of the machine with clamping or feed-pressure means that make the replenishment of stock excessively time consuming and also result in large residual wood pieces that cannot be further disintegrated. The necessity of frequently interrupting the disintegrating operation for replenishment of stock and the large amount of waste make such a production method economically inapplicable for industrial mass production of wood-shavings panels, aside from the fact that some of the known machines require planing or machining of the stock material prior to the shredding operation.

It is an object of our invention to obviate these deficiencies and to afford producing shavings of the desired characteristics in a continuous operation and with a complete consumption of stock material that, aside from being cut to proper length, need not be prepared by planing or the like machining.

Another object of the invention is to provide a wood disintegrating machine that combines the reliability and constructional simplicity of a horizontal blade-carrying

cutter disc with stock feeding means that secure a continuous feed pressure yet are always freely accessible for the supply and replenishment of wood stock.

These and other objects as well as the features of our invention will be apparent from, and will be mentioned in, the following description in conjunction with the embodiments of machines according to the invention exemplified by the drawings in which:

Fig. 1 is a partly sectional side elevation and Fig. 2 a top view of a shredder embodying the invention;

Fig. 3 is a sectional detail of the shredder shown in Figs. 1 and 2;

Fig. 4 shows a side elevation of the machine, and

Fig. 5 is a view from the left of Fig. 4.

The machine has a frame structure **21** in which a vertical shaft **22** is journalled. The shaft carries at its lower end a plane cutter disc **23** with a number of radial slots **24** (see Fig. 3). Mounted on the disc **23** in each slot **24** is a blade support **25**. Each support **25** is designed much in the manner of a bench plane. It has a slot **26** and forms an inclined mounting surface for a planing blade **27** which is securely fastened to the support **25** by means of a cover plate **28** and a pressure screw **29**. Each support **25** carries ahead of slot **26** a number of scoring knives **30** that are equally spaced from each other along the slot **26** in the radial direction of the disc. Each scoring knife **30** (Fig. 3) is fastened to support **25** by a set screw **31**.

The upper end of the machine shaft **22** carries a belt sheave **35** driven by an endless belt **36** from a sheave **37** on the shaft of an electric motor **38** that is firmly mounted on the frame structure **21** of the machine. The belt drive is enclosed within a protective housing **39** (Figs. 1, 2, 4).

The feed box or magazine structure **40** is firmly joined with the frame **21**. Two opposite vertical sides of the available magazine space are formed by two endless gripper belts **41**, each extending about an upper drum **42** and a lower drum **43**. The two endless belts are driven from an electric motor **45** (Figs. 1, 4) so that the inner run portions of the two belts have a downward direction of motion. The motor **45** is connected with a pair of pulleys **47** by an endless belt **46**. Another endless belt **48** connects the pulley pair **47** with a pulley **49** from which the two drums **43** are driven through intermediate spur gears shown by dotted lines in Fig. 1. The pair of pulleys **47** are enclosed by a housing **48'** (Fig. 5), while drive belt **48** and pulley **49** are enclosed by a protective housing **49'**.

The gripper belts **41** are covered toward the operator's place by vertical plates **55**, **56** (Fig. 4), and a cross plate **57** (Fig. 4) covers the bottom portion of the magazine space immediately adjacent to the cutter disc. It will be recognized from Fig. 4 that the interior space of the feed box structure is freely accessible at all times so that stock can readily be replenished without interruption of the shredding operation, while the downward movement of the belts imposes upon the stock in the magazine space a sufficient feed pressure to always secure a reliable shredding operation even though the magazine space may be filled to only part of its capacity. The stock is inserted into the magazine space in the direction of the arrow **51** in Fig. 2. In the same illustration, the direction of disc rotation is denoted by an arrow **52**. The shavings produced by the machine are removed through an opening **53** in the base portion of the frame structure in the direction of the arrow **54**, for instance, by means of a conveyor belt that passes the shavings to the next following stage of the panel-producing manufacturing equipment, such as a knife mill (not shown) for splitting the shavings along the grain into narrower shreds.

The stock to be used in machines according to the

invention consists of elongated and longitudinally fibred pieces or logs. These pieces are first cut to a length corresponding to the width of the magazine space. The width of this space, measured along a diameter of the cutter disc, is somewhat shorter than the radial length of the cutter blades. Consequently, when an individual blade passes horizontally along the bottom opening of the magazine space it slices sequentially along all pieces of stock adjacent to the cutter disc, and the cut has a slanting direction relative to each individual piece. The wood pieces, placed horizontally into the magazine, may all be oriented perpendicular to the above-mentioned radial width of the magazine space, the preferred operation, however, requires placing the wood pieces parallel to the radial width of the magazine, as shown in the illustrated embodiment. With such an orientation of the elongated wood pieces, the individual cuts of each blade progresses substantially across the grain direction of the stock. However, the shavings sliced off the stock are longitudinally fibred and have a length determined by the radial spacing between the above-mentioned scoring knives. Such a cut approximately across the grain direction results in an excellent uniformity in the thickness of the shavings so that the bulk of the shavings shredded from the stock have all a predetermined small thickness, for instance, of any desired measure between 0.1 and 0.4 mm. Such shavings are sufficiently flat and pliable for good interlacing when formed into a mat preparatory to subjecting such a mat to compression in a panel-molding press. Due to the rigid and well-defined arrangement of the planer-type blades on the disc and the simple over-all design of the cutting tools, the machines operate with utmost reliability and lend themselves especially for mass production purposes as they afford continuous shredding and complete consumption of the stock material.

It will be obvious to those skilled in the art, upon a study of this disclosure, that the invention permits of various modifications as regards design details and components of the machinery without departing from the essential features of our invention and within the scope of the claim annexed hereto.

We claim:

A machine for shredding longitudinally grained pieces of wood into pliably thin shavings, comprising a rotatable cutter disc having a horizontal planar top surface with substantially radial slots and having a vertical drive shaft, a number of substantially radially extending cutter blades firmly mounted on said disc in said slots in angularly spaced relation to each other and having respective cutting edges projecting upwardly through said slots angularly to said horizontal planar top and to above said surface, a stationary feed box structure for the reception of elongated wood pieces to be shredded, said box structure being entirely on one side of the axis of the shaft and extending upwardly from said disc and being open toward said disc so that said planar top surface forms the bottom of the feed box space, said box structure having a closed rear wall facing the axis of said shaft, two conveying devices mounted vertically along the remaining two lateral sides of said feed box structure adjacent to said rear wall and having a downward direction of motion where said devices face said feed box space, said devices being engageable with the wood pieces in said space for urging them against said planar disc surface, said feed box structure being open over substantially its entire height and the entire width of the space which is at the remaining side along the periphery of said disc and which is between the two conveying devices, to permit replenishing the wood pieces from any height of said open side, the radial span of the cutter blades being longer than the lateral dimension of the feed box space measured along the diameter of the cutter disc, the feed box being so placed that each cutter blade, when at right angles to the closed rear wall of the box, is offset from the center of the space between the two conveying devices, whereby when longitudinally fibered wood pieces are pre-cut to a length corresponding to said dimension and are inserted through the said space at the remaining side to orient the wood pieces parallel to the said lateral dimension measured along a cutter disc diameter, the individual cut of each blade progresses substantially in a slanting direction across the grain direction of the pieces, to produce longitudinally fibered shavings.

References Cited in the file of this patent

UNITED STATES PATENTS

3,359	Warner	Dec. 4, 1843
394,898	Wilson	Dec. 18, 1888
1,538,066	Street	May 19, 1925
1,786,679	Thaler	Dec. 30, 1930
1,799,814	Hommel	Apr. 7, 1931
2,146,074	Kelley	Feb. 7, 1939
2,269,352	Bacon	Jan. 6, 1942
2,388,799	Payzer	Nov. 13, 1945
2,617,454	Booth	Nov. 11, 1952
2,652,077	Alexander	Sept. 15, 1953
2,655,189	Clark	Oct. 13, 1953