Nov. 22, 1966 T. F. MEIS 3,286,745

MACHINES FOR PRODUCING WOOD SHAVINGS

Filed Aug. 14, 1964

FIG. 1

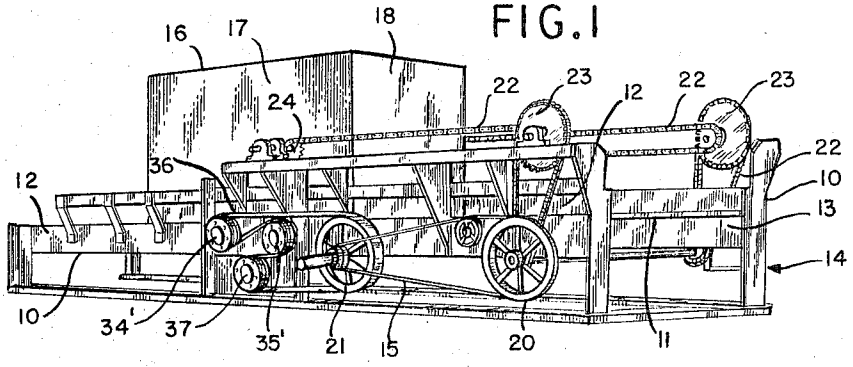


FIG. 2

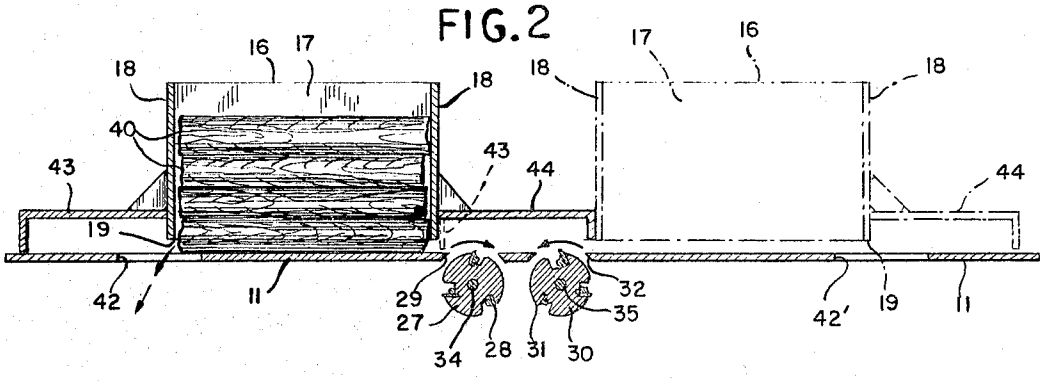


FIG. 3

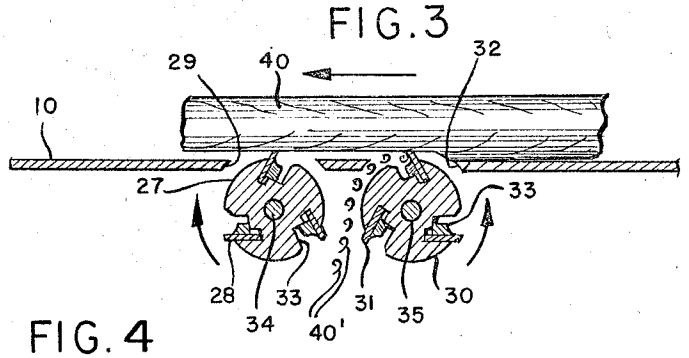
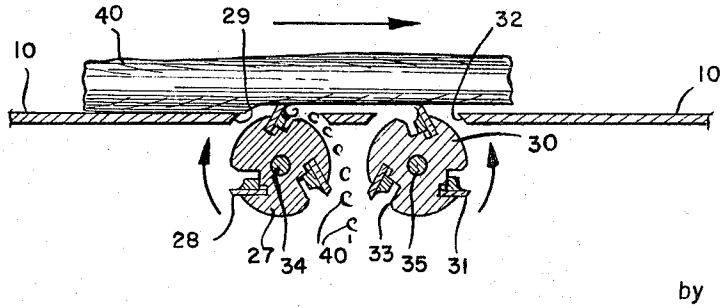


FIG. 4



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MACHINES FOR PRODUCING WOOD SHAVINGS

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This invention relates to improvements in machines for producing wood shavings, and more particularly to an improved wood shaving mill adapted to produce shavings of uniform consistency and quality, and which shavings are particularly well suited for making bedding litter for poultry and other animals.

It is common practice for farmers and others to use wood chips and shavings as bedding for their poultry and livestock, but unfortunately, the material usually obtained for this purpose is not of consistent size and quality, and is not always well-suited for its intended purpose. While some of the shavings may be light and fluffy, for example, much of said material may be thick and contain harmful slivers, and be completely unsuitable. Therefore, one of the principal objects of the present invention is to provide an improved machine which produces wood shavings which are consistently fluffy and absorbent, and wherein there are no thick shavings or chips which can injure the animals or cause them discomfort.

A more specific object of the present invention is to provide a wood shaving mill generally similar to that disclosed in the Hassler et al. Patent No. 2,442,492, but which improved machine is especially designed to eliminate the occurrence of shavings of unequal size, shape and consistency, and wherein the end product is superior for its intended use.

A still more specific object of the invention is to provide a novel wood shaving mill having a pair of oppositely-rotating, in-line cutter heads, in lieu of the single rotating cutter employed in Hassler and other prior machines, said improved dual cutter assembly being so designed that the reciprocating wood piece is always acted upon and shaved only by the cutter head rotating in the travel direction of said wood, in contrast to said prior machines wherein the single rotating cutter acts upon the wood in both travel directions and wherein the shaving of said wood against its direction of movement frequently causes uneven and poor quality shavings.

A further object is to provide an improved machine having a novel dual cutter assembly whereby the wood is always shaved only by the cutter rotating in the same direction said wood is traveling, as described, which innovation reduces the wear on the cutting blades and substantially increases their operating life.

A further object of the invention is to provide an improved machine which is especially designed to automatically eject knots and other undesirable pieces, thus preventing said pieces from interfering with the shaving operation, and further ensuring a consistently fine product.

Still further objects of the present invention are to provide a novel and improved wood shaving mill, which machine is fast and and efficient, which is relatively inexpensive in construction, which is rugged and durable, and which is otherwise particularly well suited for its intended purpose.

With the above and other objects in view, which other objects and advantages will become apparent hereinafter, the invention comprises the improved wood shaving machine hereinafter described and any and all changes or modifications therein as may come within the spirit of said invention and within the scope of the appended claims.

In the accompanying drawing, wherein there is illustrated one preferred embodiment of the invention, and wherein like reference numerals designate the same parts in all of the views:

FIG. 1 is a perspective view of the complete wood shaving machine;

FIG. 2 is a simplified side elevational and sectional view showing the reciprocating hopper at one end of its traversing cycle in full lines, and showing said hopper at the other end of its cycle in broken lines;

FIG. 3 is a simplified side elevational view illustrating the action of the dual cutter heads in one direction of wood travel; and

FIG. 4 is a view similar to FIG. 3 and showing the cutter action when the wood piece travels in the opposite direction.

In general, the wood shaving mill comprising the present invention includes a flat table **10**, an open-bottom wood hopper **16** which is designed to travel back and forth over a rotating cutter mounted in said table, and drive means for reciprocating said hopper and for driving said rotatable cutter. Basically, the structure and operation of the machine is similar to that disclosed in the aforementioned Hassler et al. Patent No. 2,442,492, the novelty in the present machine being confined primarily to its new and improved cutter assembly, and in the means provided in said machine for continuously purging knots and other undesirable pieces or wood particles, as will be hereinafter seen.

Referring now to FIG. 1 of the drawing, the table portion **10** of the machine includes an elongated horizontal bed **11**, a pair of spaced, parallel walls **12** and **13** defining a longitudinal passageway therebetween, and the entire apparatus is supported on a rigid metal framework **14**. The wood hopper **16** is designed to ride on the upper edges of said walls **12** and **13**, or on suitable rails secured on said wall members, and is preferably provided with flanged wheels (not shown) to ensure its secure riding engagement thereon. Said hopper is rectangular in form, having side walls **17** and end walls **18**, and the top and bottom of said hopper are open, the hopper bottom edge **19** (FIG. 2) being spaced upwardly from the surface of the bed **11** a distance sufficient to avoid interference with the cutters to be later described. In the use of the machine the wood from which the shavings are to be formed, such as the illustrated cord wood logs **40**, are cut to a suitable length and are positioned longitudinally within said hopper.

As shown in FIG. 2, projecting longitudinally from the opposite ends of the hopper **16** are elongated arm members **43** and **44** having downwardly-extending end portions designed to slideably ride over the surface of the machine bed **11**. The purposes of said arm members are to provide a protective covering for the rotatable cutter blades, as will be seen, and to provide sweeper means to ensure that the shavings and chips accumulating on the table are directed into the cutter openings in said table, where they are intended to fall into a bin or container, or onto a moving conveyor belt. In place of the simplified sweeper arm design shown, a vertically-adjustable plate can be mounted on the end of each of said arms to permit the same to be readily adjusted and set as desired, or a spring-loaded sweeper arm such as that disclosed in the aforementioned Hassler et al. patent can be employed.

The hopper driving assembly is generally similar to those employed on prior wood shaving mills and will not, therefore, be described in detail herein. Said assembly preferably includes a gasoline engine or other prime mover and a system of drive wheels **20** and **21**, and belts **15** on the frame **14**, and endless chains **22** trained about sprockets **23** and **24** on said frame, as well as suitable belt tightening and clutch means. In the operation of the machine, said drive mechanism is adapted to reciprocate the hopper **16** longitudinally along the passageway between the table walls **12** and **13**, thereby moving the wood in said hopper in two directions, alternately, over

the cutters mounted therebelow. In lieu of the illustrated mechanical drive assembly a hydraulic or pneumatic system could also be utilized, and the invention is by no means to be limited in this respect. A hopper travel rate of between 40–60 feet per minute has been found to be effective for most cutting operations, but this can be varied to suit particular requirements. Moreover, the most effective travel speed of the hopper, and the ratio thereof to the speed of the rotating cutters, is dependent upon whether the material being shaved is a hard or soft wood, as well as other variables.

Unlike conventional wood-shaving mills, the present machine is provided with a pair of cutting units, in lieu of the single cutter heretofore employed. As will be seen in FIGS. 2–4, the first cutter includes an elongated cylindrical member or cutter head **27** having a plurality of angled, radially-projecting blades **28** which are co-extensive with said head, said cutter being mounted transversely beneath the bed **11** and projecting upwardly through a transverse opening **29** therein. Said cutter head is preferably provided with gullets **33** to assure proper cutting action and to aid in freely disposing of the shavings, which are designated by the numeral **40'** in FIGS. 3 and 4. Mounted as close to said first cutter as their bearing dimensions will permit is a second, parallel cutter unit including a cylindrical head **30** having plural co-extensive blades **31**, and being designed to project upwardly through an opening **32** in the bed. Said first and second cutters are mounted on shafts **34** and **35**, respectively, which are vertically adjustably journaled in the frame side walls **12** and **13**, said adjustable mounting permitting said cutting units to be shifted and set relative to the hopper bottom to produce shavings of a predetermined thickness.

As shown in FIG. 1, the outer, projecting ends of the cutter shafts **34** and **35** are provided with sheaves **34'** and **35'**, respectively, and trained thereabout and about the drive wheel **21** is an endless belt **36**. Said belt is trained around said sheaves in opposite directions, there being a third, idler sheave **37** to provide proper driving connection between said cutter sheaves and the drive wheel **21**, with the result that when the engine or other power source is actuated to turn said wheel **21**, the cutter members are simultaneously rotated in opposite directions. In operation, the cutter head **27** turns in a clockwise direction, while the adjacent cutter head **30** rotates in the opposite direction, as is designated by the arrows in FIGS. 2–4, said cutters being geared to rotate at a relatively high speed as compared to the traversing speed of the hopper.

In the use of the present machine for producing wood shavings, the logs **40** or other wood pieces are positioned longitudinally within the hopper **16**, and the engine is started to actuate the hopper reciprocating means and to simultaneously drive the rotating cutter heads **27** and **30**, as described. As the hopper **16** is drawn to the right in FIG. 2, the lowermost logs **40** therein are engaged by the first cutter unit **27**, **28** which is rotating in the direction of travel of said hopper. As is illustrated in FIG. 4, said cutter initially engages and cuts the cross grain at the log end, and the cut is completed by the blades rotating with the grain of said wood, thus shaving short, fluffy pieces **40'** from the underside thereof as said logs pass thereover. Due to the fact that said first cutter **27** functions to continuously remove the under portion thereof, as said logs pass over the second, oppositely-rotating cutter head **30**, the blades **31** on the latter do not contact the wood, or contact it just slightly.

When the hopper reaches the end of its travel in one direction, as shown in broken lines in FIG. 2, the lowermost logs **40** fall to a slightly lower position, so that they again rest on the table **11**, and the hopper automatically reverses and begins its return travel, said hopper being operatively connected to the driven endless chains **22** (FIG. 1) by means of pivotal connecting arms or links, as is well known in the art. As appears in FIG. 3, when the wood piece **40** commences moving in the opposite direction it is initially acted upon by the blades **31** on the cutter **30** which is rotating in the same direction said wood is traveling, and the blades **28** on the oppositely-rotating cutter **27** do not contact and shave said wood. When said lowermost log or logs **40** have been completely formed into shavings, the logs immediately thereabove automatically descend by gravity to take their place, and the shaving operation is repeated with each succeeding layer until the entire contents of the hopper have been thus consumed.

As hereinabove described, with the present machine the cross grain at the log end is cut first, and the cut is completed by the blades rotating with the grain of the moving wood, as opposed to cutting with the grain first and then the cross grain, as in conventional machines. With the present device there is peeled off a thin shaving of more consistent quality than is obtained with said prior machines, and which produces a greater bulk and volume of shavings, thus providing a more absorbent, higher-quality bedding material. A further, important advantage is that the dual cutter assembly eliminates any tendency of the wood to gradually become wedge-shaped as a result of variation in the cutting characteristics of first cutting with, and then against the wood travel direction, as in conventional machines. Moreover, cutting only with the travel direction of the wood reduces the wear on the cutting blades and prolongs their operating life.

Another important structural feature of the present invention is the means incorporated therein for permitting the escape of knots or other undesirable pieces which may accumulate within the hopper. It is important to eject such pieces not only because they could be harmful to the fowl if they are included in the bedding material, but because such particles frequently become wedged beneath the log being shaped and cause the same to become biased, thus interfering with the evenness of the shaving action, and producing non-uniform chips. In order to eliminate this possibility, the bed **11** in the present machine is provided with transverse openings **42** and **42'** (FIG. 2) which are located adjacent the extremities of the hopper travel cycle. Thus, escape passageways are provided whereby loose particles which accumulate at the bottom of the hopper can fall through to the ground prior to each traversing cycle of the hopper (as indicated by the arrows in FIG. 2), where they will not interfere with the operation of the machine.

From the foregoing detailed description it will be seen that the present invention provides a new and improved machine for producing wood shavings for use as poultry and livestock bedding litter, which machine has several important advantages over prior devices intended for the same purpose. As described, the present machine is provided with a unique dual cutter assembly which permits the shaving of the wood only in its travel direction, thus providing finer, more consistent shavings than are obtained when the rotating cutting blades act upon the wood against its travel direction, as in conventional shaving mills. Moreover, the present machine is adjustable to permit the shaving of chips or pieces of predetermined thickness, and it is designed to produce shavings which are consistently fluffy and absorbent, and wherein there are no thick shavings or chips which can injure the animals or cause them discomfort. Further, the present machine is especially designed to permit the discharge of knots and other undesirable pieces during operation, it is fast and efficient, and it is extremely rugged and durable.

It is to be understood that various modifications and changes in the machine illustrated and hereinbefore described will undoubtedly occur to those skilled in the art, and it is intended to cover herein not only the exact structural details shown and described, but also any and all modifications or changes therein as may come within the

spirit of the invention, and within the scope of the following claims.

What I claim is:

1. A machine for producing wood shavings comprising: an elongated table having a cutter opening therein; an open bottom wood log hopper mounted for reciprocating movement over and beyond said cutter opening; a pair of rotary cutters supported for rotation below said table opening and having portions projecting therethrough and slightly above said table; means for rotating said cutters in opposite directions; and means for reciprocating said hopper to cause it to completely traverse the cutter opening and both cutters in each direction of reciprocation of the hopper, the full reciprocation of the hopper and the directions of rotation of the cutters causing the lowermost logs in the hopper to be substantially evenly shaved in each direction of reciprocation of the hopper only by the cutter rotating in the same direction as the table is being then reciprocated from the then leading ends of the logs inwardly.

2. The machine recited in claim 1 wherein said table is provided with a discharge opening through which loose particles of wood can escape from said hopper.

3. The machine recited in claim 1 wherein said table is provided with a discharge opening adjacent the extremes of said hopper reciprocating cycle through which loose particles of wood can escape from said hopper during operation.

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