Dec. 22, 1953 W. K. VAUGHAN 2,663,506

WOOD CHIPPER

Filed Dec. 12, 1951 2 Sheets-Sheet 1

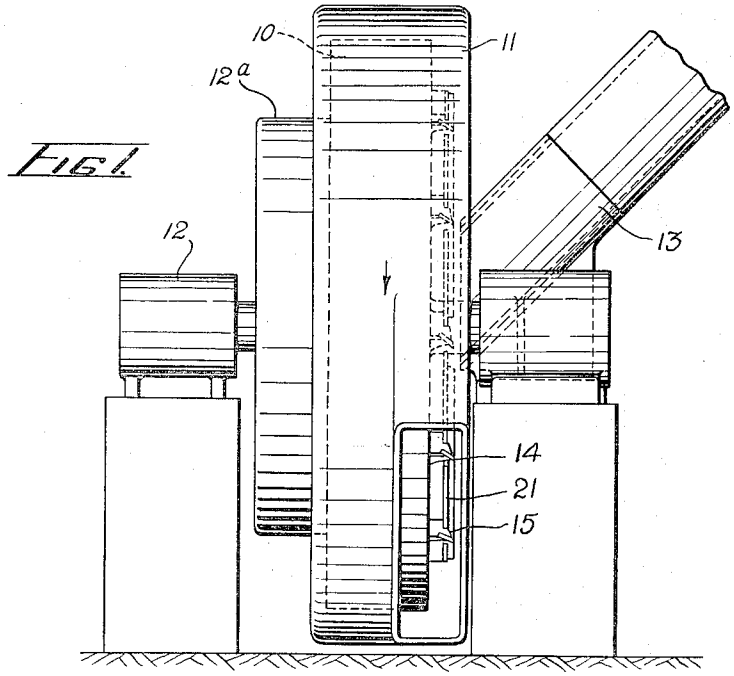


FIG. 1.

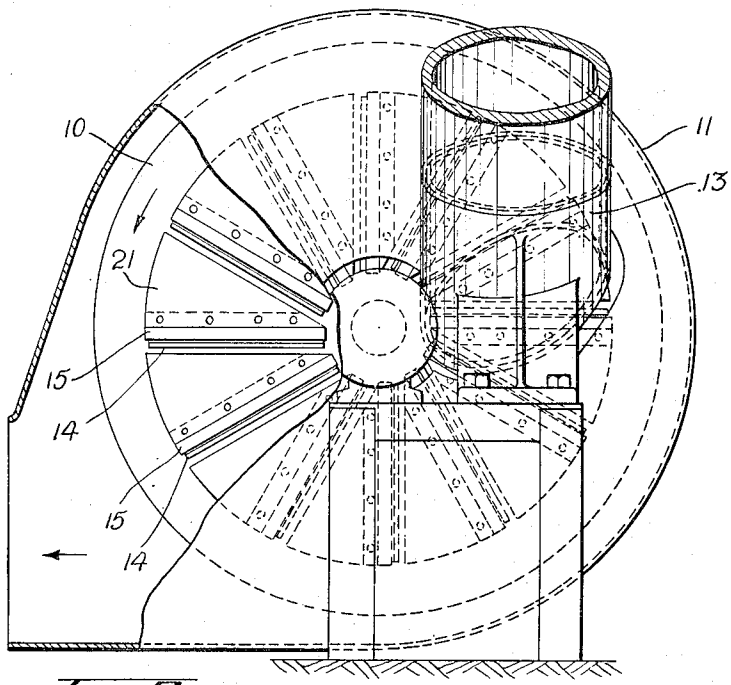


FIG. 2.

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WOOD CHIPPER

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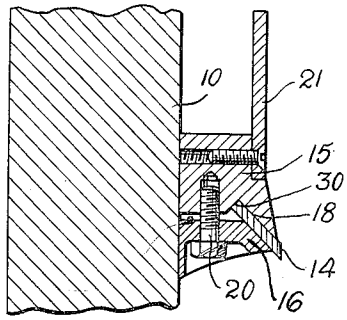


FIG 4.

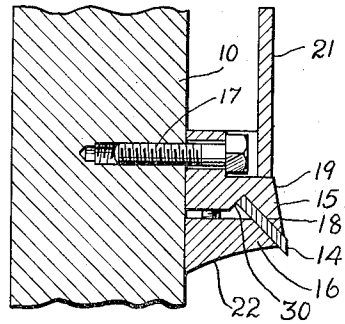


FIG 5.

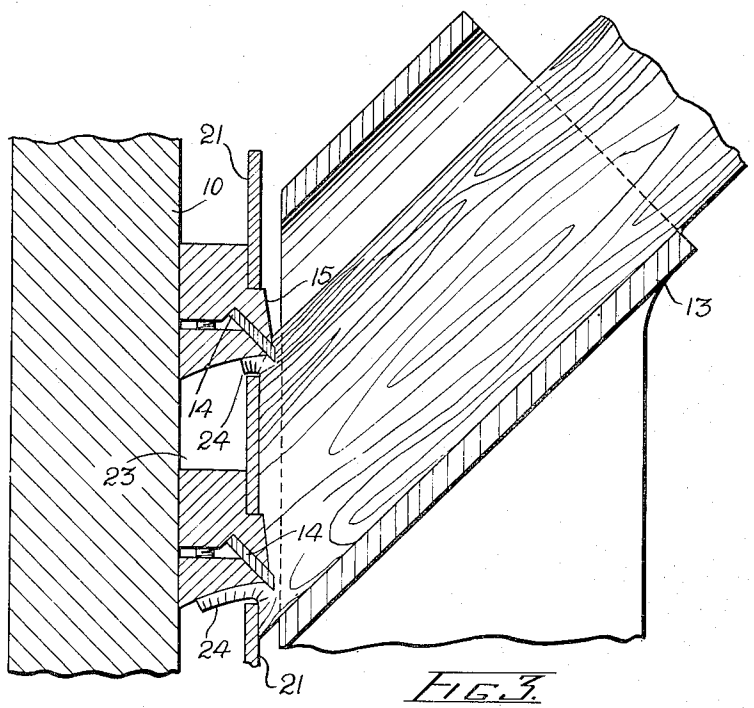


FIG 3.

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UNITED STATES PATENT OFFICE

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WOOD CHIPPER

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Application December 12, 1951, Serial No. 261,216

5 Claims. (Cl. 241—278)

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This invention relates to wood chippers of the type which are used industrially for the purpose of cutting wood into small pieces or chips of suitable size preparatory to the manufacture of wood pulp for use in the production of paper, paper board and the like. The invention relates particularly to the mounting of the knives on the chipper disc.

Wood chippers usually comprise a rotatable disc having a series of knives or blades which extend at a suitable cutting angle a short distance above the surface of the disc and which are usually spaced symmetrically around the working face of the disc radially or tangentially of the disc hub. Usually, a plurality of knives or blades are mounted on the disc and heretofore it was thought important advantages were gained by spacing the knives such that two or more knives were in engagement with the log at one time. The log to be chipped usually is fed to the disc through an inclined feed spout or chute which brings the end of the log against the surface of the disc where it is engaged by the knives or blades.

Heretofore, the knives or blades have been mounted with the cutting edges adjacent to slots which extend through the disc and through which the chips are discharged as they are cut from the log. This conventional arrangement of knife or blade mounting and slots has several important disadvantages.

The trend over recent years has been to design the disc and the arrangement of the knives such that the end of the log is engaged by two or more knives or blades at one time. This is accomplished by mounting a plurality of knives on the disc and by spacing the knives as closely as possible. As the disc structure is progressively weakened as the spacing between the knife slots is decreased, particularly adjacent to the hub, and, accordingly, the number of knives which can be mounted on the disc is restricted. Also, the knives must be spaced a substantial distance from the hub of the disc to avoid weakening the disc, and this has the disadvantage that only relatively large diameter logs can be engaged simultaneously by two or more knives and small logs are engaged only by a single knife with attendant variations in chip sizes and increased production of sawdust and bruised chips. A further disadvantage is that it is necessary to provide, at the discharge side of each slot a device known as a card breaker to break the oversize chips or cards as they pass through the slots into chips of a desired uniform size suitable for the subsequent cooking operation to form wood pulp. Also, the chips as they pass through the slots, lose their momentum and it may be necessary to provide a blower attachment, such as a vane, on the outside of the chipper disc, to blow the chips clear of the slots. Chips tend to get caught by this vane attachment with attendant increase in the production of bruised chips and fines.

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An important object of this invention is to provide a knife mounting for a chipper disc which is mounted on the surface of the disc and with which the conventional knife slots are eliminated.

A further important object of this invention is to provide a knife mounting for wood chippers in which the knives or blades can be extended to a point adjacent to the hub of the chipper disc without weakening the chipper disc.

A further important object of the invention is to provide a knife mounting for wood chippers in which the chips are broken into a substantially uniform size as they are cut from the log and are delivered to and discharged from the periphery of the knife mounting assembly.

A further object of the invention is to provide a knife mounting for wood chippers which permits the arrangement of the chipper disc and the flywheel and/or the driving pulley as an integral unit to provide a compact and sturdy design.

A still further object of the invention is to provide a chipper disc in which the rate at which each knife blade engages the end of the log is such that the log does not have an opportunity to rebound from the face of the disc at the end of the engagement of one knife before it is engaged by the next following knife.

An understanding of the manner in which the above and other objects of this invention are attained may be had from the following description, reference being made to the accompanying drawing, in which:

Figure 1 is a side elevation of a wood chipper incorporating the improvements of the present invention;

Figure 2 is a front elevation;

Figure 3 is an enlarged detail view; and

Figures 4 and 5 are detail views.

Like reference characters refer to like parts throughout the specification and drawings.

Referring to the drawings, the numeral 10 indicates a chipper disc enclosed, during operation, by a removable cover 11. The disc, usually, is in the form of a heavy casting. The disc is mounted on a shaft 12 and is driven from a motor, not shown, through a driving pulley 12a.

A flywheel may be provided or the belt pulley may be designed to function also as a flywheel. An inclined chute or feed spout 13 is provided through which the logs are fed to the chipper disc. The discharge end of the spout is positioned adjacent to but is spaced a short distance from the face of the chipper disc according to conventional practice.

The disc has mounted thereon a plurality of cutting blades or knives 14 which are spaced symmetrically around the working face of the disc and extend radially or tangentially of the disc hub from a point adjacent to the disc hub to a point adjacent to but spaced from the periphery of the disc. The number of knives or blades is determined by the diameter of the disc and it is found that the maximum chipping benefits are derived by having the blades relatively closely spaced at their inner ends to ensure the engagement of a plurality of knives at any one instant in the end of the log, even in chipping logs of small diameter.

The knife mountings are in the form of pairs of clamping members 15—16 which are the same length as the knife blades 14 which they support. The clamping members 15—16 are secured firmly to the disc such as by bolts 17 which extend through the member 15 into the disc and draw bolts 20 which extend through the member 16 into the member 15. The forward face of the member 15, which, in the direction of rotation of the chipper disc, is opposite to the member 16, is cut away to provide an angularly disposed seat 30 for the rearward edge of the knife 14 and thence is inclined upwardly at an angle to provide an angularly disposed bevelled surface 18 which extends to the outer or exposed surface 19. The upper surface of the member 16 is bevelled at the same angle as the bevelled surface 18 and the knife blade 14 is positioned between the two bevelled surfaces with its rearward edge positioned in the seat 30 and the cutting edge extended at a predetermined angle beyond the mounting. With the knife blade in position, the members 15 and 16 are drawn together by the draw bolts 20 until the knife is clamped firmly in place.

The opposing bevelled surfaces are designed to support the knife in a position such that the maximum cutting effect is obtained. As the width of the blade is decreased through sharpening, the predetermined projection of the cutting edge beyond the mounting can be maintained by inserting shims between the seat 30 and the rearward edge of the blade. The knife is thus adjustable to provide the maximum cutting effect and the mounting is detachable from the disc for replacement or repair.

A projection 21 is formed on or carried by the upper surface of the member 15 and extends rearwardly of the member away from the knife blade to a point adjacent to but spaced a short distance from the cutting edge of the next following knife blade, the free end of the projection 21 being spaced from the next following knife blade a distance sufficient to accommodate the thickness of the wood chip as it is cut from the log. This projection 21 may be formed as part of the member 15 or it may be in the form of a removable plate. This projection 21 serves to support the end of the log as it is being cut preparatory to being engaged by the next following knife edge, and the chip is directed into the space 23 between the cutting edge and the free end of the projection 21 as it is cut from the log. The space 23 provides a passageway which extends the length of the knife mounting and discharges from the outer periphery thereof.

The surface of the forward edge 22 of the member 16 immediately below the cutting edge of the knife blade 14 is preferably in the form of a concave curve.

In operation, logs are fed to the working face of the chipper disc through the spout 13, the end of the log being engaged by at least one and often by a plurality of knife blades 14 which rapidly cut the log into chips 24. The number of blades in engagement with the end of the log at any one time is, of course, dependent upon the diameter of the log. As a chip is cut from the log, it enters the space 23 between the opposing faces of the free end of the projection 21 and the cutting edge of the knife blade. As the chip advances along the inclined surface 22 of the member 16, it comes in contact with the face of the disc and breaks into the desired size. The chip is then carried by the centrifugal force of the rapidly rotating disc through the passageway 23 to the periphery of the knife mounting where it is discharged from the disc and collected for subsequent treatment.

The knife mounting assembly of the present invention possesses a number of important advantages over the knife mountings heretofore employed with wood chippers. The disc structure is substantially stronger due to the absence of the conventional chip discharge slots. The knives or cutting blades can be brought close to the disc hub to obtain the maximum efficiency from the chipping operation. The large chips or cards are broken into chips of a desired uniform size as they are cut from the log and it is no longer necessary to provide an especial attachment to break the cards. Also, as the chips are discharged from the periphery of the knife mountings and not through slots in the disc as heretofore it is possible to combine a flywheel and/or driving pulley with the disc as an integral structure. Thus, it is possible to realize, in addition to the advantages in operation and maintenance, important savings in the capital cost of the entire structure.

A further important advantage of the present invention is that the disc can be rotated at a high rate of speed to the extent that even in chipping small logs the time interval between the engagement by individual knives is insufficient to permit the log to rebound away from the chipper disc, thus ensuring the production of chips of uniform size with a minimum of fines even from logs of small diameter. In this, I have found that the time interval that the end of the log is free from engagement by a knife should be less than the period of rest, following the disengagement of one knife and the engagement of the next following knife, and prior to the time at which the end of the log otherwise would rebound away from the face of the chipper disc.

What I desire to protect by Letters Patent of the United States is:

1. In combination with a wood chipper comprising a rotatable disc, a plurality of knife blade supports mounted on and secured to a face of said disc and symmetrically arranged thereon in a generally straight line extending from a point adjacent to the hub of the disc towards the periphery thereof and extending beyond the surface of said disc, means for securing a knife blade to each of said supports with a cutting

edge thereof extending at an angle to the outer surface of said support, means extending rearwardly of each knife blade support towards but stopping short of the cutting edge of the next following knife blade, and a passageway for wood chips defined by said last mentioned means, the opposing surface of the disc and opposing faces of adjacent knife blade supports, said passageway extending from end to end of said knife blade supports.

2. In combination with a wood chipper comprising a rotatable disc, a plurality of pairs of clamping members mounted on and secured to a surface of said disc and symmetrically arranged thereon in a generally straight line extending from a point adjacent to the hub of the disc towards the periphery thereof and extending beyond the surface of the disc, a knife blade secured between each pair of clamping members with a cutting edge extending at an angle to the outer surface of the clamping member, means extending rearwardly of each knife blade support towards but stopping short of the cutting edge of the next following knife blade, and a passageway for wood chips defined by said last mentioned means, the opposing surface of the disc and opposing faces of adjacent knife blade supports, said passageway extending from end to end of said knife blade supports.

3. In combination with a wood chipper comprising a rotatable disc, a plurality of knife supports mounted on and secured to a surface of said disc and symmetrically arranged thereon in a generally straight line extending from a point adjacent to the hub of the disc towards the periphery thereof and extending beyond the surface of the disc, each of said supporting means comprising a pair of members adapted to be clamped together to form a seat for the rearward

edge of a knife blade and having opposing faces adapted to engage the rearward portion of the knife blade and support it with a cutting edge thereof extending at an angle to the outer surface of the support, log supporting means extending rearwardly of each knife blade support towards but stopping short of the cutting edge of the next following knife blade, and a passageway for wood chips defined by the log supporting means, the opposing surface of the disc and opposing faces of adjacent knife blade supports, said passageway extending from end to end of said knife blade supports.

4. A wood chipper according to claim 3 in which the face of the knife blade supporting member below the leading edge of the knife blade is arcuately curved from the knife blade to the surface of the disc.

5. A wood chipper according to claim 3 in which the log supporting means is in the form of a removable plate carried by the knife blade supporting member and extending rearwardly thereof towards but stopping short of the cutting edge of the next following knife blade.

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